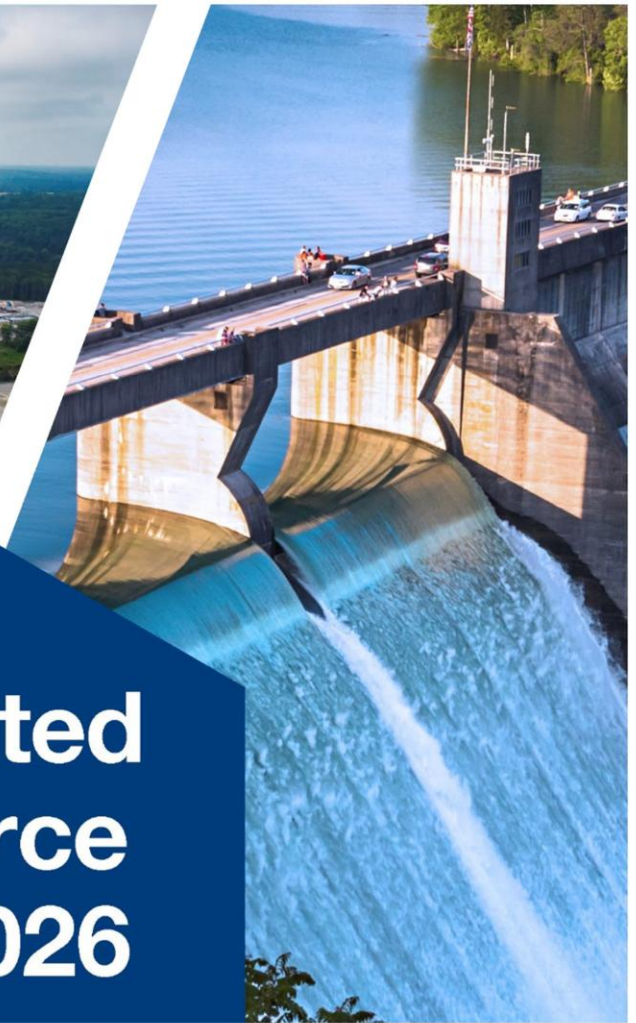




Integrated Resource Plan 2026

VOLUME 2 / ENVIRONMENTAL IMPACT STATEMENT

PRELIMINARY FINAL
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Integrated Resource Plan Final Environmental Impact Statement

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Abstract: TVA's 2026 Integrated Resource Plan (IRP) evaluates the long-term demand for power in the TVA region, the resource options available for meeting that demand, and the potential economic, operating, and environmental impacts of these options. Consideration of stakeholder input is integral to TVA's IRP process. The IRP will provide strategic direction for meeting the region's energy needs between now and 2050, establishing a strong planning foundation and informing TVA's next long-range financial plan.

TVA identified three scenarios, or possible futures that TVA may find itself operating in: (1) Reference, (2) High Growth, and (3) Carbon Legislation. Three planning strategies, or alternative approaches TVA could employ to meet electricity demand, were evaluated against the backdrop of these scenarios: (A) Baseline Utility Planning, (B) Innovation, and (C) Distributed. The modeling process applied each strategy in each scenario, resulting in nine core resource portfolios. The IRP considered a wide range of supply-side, distributed, and demand-side resources to meet electricity needs in each of these portfolios. With consideration of stakeholder and public input, TVA further analyzed sensitivity cases which evaluate the change in a single key assumption to isolate the impact of that change on portfolio results.

The Environmental Impact Statement (EIS) assesses the natural, cultural, and socioeconomic impacts associated with the implementation of the 2026 IRP. The Baseline Utility Planning strategy is the No Action Alternative, and the remaining two strategies and the Power Supply Mix Ranges and Strategic Portfolio Direction through 2040 are the Action Alternatives. The EIS analyzes and identifies the relationship of the natural and human environment to each of the three strategies considered in the IRP.

Table of Contents

1	Introduction	1-1
1.1	Purpose and Need for Integrated Resource Planning	1-1
1.2	Environmental Review Process	1-4
1.3	Relationship with Other NEPA Reviews	1-7
1.3.1	Programs, Plans and Policies	1-7
1.3.2	Power Generation – Coal and Gas	1-8
1.3.3	Power Generation – Nuclear	1-11
1.3.4	Power Generation – Solar, Storage and Other Renewables	1-11
2	TVA Power System	2-1
2.1	Introduction	2-1
2.2	TVA Customers, Sales, and Power Exchanges	2-1
2.3	TVA-Owned Generating Facilities	2-2
2.3.1	Coal-Fired Generation	2-3
2.3.2	Nuclear Generation	2-5
2.3.3	Natural Gas-Fired and Oil-Fired Generation	2-6
2.3.4	Diesel-Fired Generation	2-8
2.3.5	Hydroelectric Generation	2-8
2.3.6	Non-Hydro Renewable Generation	2-9
2.4	Purchased Power	2-9
2.5	Demand-Side Management Programs	2-13
2.6	Transmission System	2-13
3	Alternatives	3-1
3.1	Development of Scenarios	3-1
3.2	Alternative Strategies and Associated Capacity Expansion Plans	3-2
3.2.1	Development of Alternative Strategies	3-2
3.2.2	Capacity Expansion Plans	3-3
3.2.3	Sensitivity Analysis	3-7
3.2.4	Potential Retirement or End-of-Life of TVA Generating Facilities	3-7
3.3	Strategy Performance	3-9
3.3.1	Strategy A: Baseline Utility Planning (No Action Alternative)	3-10
3.3.2	Strategy B: Innovation	3-10
3.3.3	Strategy C: Distributed	3-11
3.4	Preferred Alternative – Power Supply Mix Ranges and Strategic Portfolio Direction	3-11

3.4.1 Power Supply Mix Ranges through 2040	3-12
3.4.2 Strategic Portfolio Direction.....	3-12
3.5 Summary Comparison of Environmental Impacts of the Alternatives.....	3-15
4 Affected Environment	4-1
4.1 Introduction	4-1
4.2 Air Quality.....	4-1
4.2.1 Regulatory Framework for Air Quality	4-1
4.2.2 Criteria Air Pollutants	4-1
4.2.3 TVA Emissions.....	4-4
4.2.4 Hazardous Air Pollutants.....	4-5
4.2.5 Mercury	4-6
4.2.6 Visibility	4-7
4.2.7 Acid Deposition	4-10
4.3 Climate and Greenhouse Gases	4-12
4.3.1 Climate Normals and Trends	4-13
4.3.2 Greenhouse Gas Emissions	4-16
4.3.3 Forecast Climate Trends.....	4-19
4.4 Water Resources.....	4-20
4.4.1 Groundwater	4-20
4.4.2 Surface Water	4-23
4.4.3 Water Supply	4-31
4.4.4 Aquatic Life	4-36
4.5 Land Resources	4-36
4.5.1 Geology.....	4-36
4.5.2 Vegetation and Wildlife	4-40
4.5.3 Endangered and Threatened Species	4-45
4.5.4 Wetlands	4-47
4.5.5 Floodplains.....	4-48
4.5.6 Parks, Managed Areas, and Ecologically Significant Sites	4-49
4.5.7 Land Use.....	4-51
4.5.8 Cultural Resources	4-53
4.6 Availability of Renewable Energy Resources	4-57
4.6.1 Hydroelectric Energy Potential.....	4-58
4.6.2 Solar Energy Potential	4-58
4.7 Solid and Hazardous Wastes	4-60

4.7.1 Coal Combustion Solid Wastes.....	4-61
4.7.2 Nuclear Waste	4-63
4.8 Socioeconomics	4-65
4.8.1 Population and Demographics	4-65
4.8.2 Sociocultural Characteristics.....	4-70
4.8.3 Economics	4-76
5 Anticipated Environmental Impacts.....	5-1
5.1 Facility Siting and Review Processes	5-1
5.2 Environmental Impacts of Supply-Side Resource Options	5-2
5.2.1 Fossil-Fueled Generation.....	5-6
5.2.2 Nuclear Generation	5-11
5.2.3 Renewable Generation	5-13
5.2.4 Energy Storage	5-21
5.3 Environmental Impacts of Energy Efficiency and Demand Response Resource Options.....	5-23
5.4 Environmental Impacts of Transmission Facility Construction and Operation.....	5-24
5.5 Environmental Impacts of Alternative Strategies and Associated Capacity Expansion Plans	5-27
5.5.1 Air Quality	5-29
5.5.2 Climate and Greenhouse Gases.....	5-35
5.5.3 Water Resources	5-52
5.5.4 Land Resources.....	5-58
5.5.5 Fuel Consumption.....	5-62
5.5.6 Solid and Hazardous Waste.....	5-66
5.5.7 Socioeconomics.....	5-69
5.6 Potential Mitigation Measures	5-71
5.7 Unavoidable Adverse Environmental Impacts.....	5-72
5.8 Relationship Between Short-Term Uses and Long-Term Productivity of the Human Environment	5-73
5.9 Irreversible and Irretrievable Commitments of Resources.....	5-73
5.10 NEPA Compliance Certification.....	5-73

List of Tables

Table 1-1: Laws and EOs Relevant to the Environmental Effects of Power System Planning, Construction and Operation.....	1-6
Table 1-2: Other Solar, Storage, and Renewable Projects with NEPA Documents.....	1-12
Table 2-1: FY 2020-2025 Generation by Type from Both TVA Facilities and Purchased Power	2-1
Table 2-2: Characteristics of TVA Coal-Fired Generating Facilities	2-3
Table 2-3: Characteristics of TVA Nuclear Generating Units.....	2-5
Table 2-4: Characteristics of TVA Natural Gas-Fueled Plants.....	2-6
Table 2-5: Major Power Purchase Agreement Contracts/Facilities	2-10
Table 3-1. Strategic Portfolio Direction – Planned Resource Actions through 2040 (Preferred Alternative)	3-13
Table 4-1: Percent Change in Ambient Concentrations of Air Pollutants in the U.S., 1980-2024	4-2
Table 4-2: Five-Year (2020-2024) Average Emissions of Existing Coal Units.....	4-5
Table 4-3: Monthly, Seasonal and Annual Temperature Averages for Six NWS Stations in the TVA Region, 1991–2020	4-13
Table 4-4: Monthly, Seasonal, and Annual Precipitation Averages in the Tennessee River Watershed for 1890-2025.....	4-15
Table 4-5: Aquifer, Well, and Water Quality Characteristics in the TVA Region.....	4-22
Table 4-6: Ecological Health Ratings, Major Water Quality Concerns, and Fish Consumption	4-26
Table 4-7: Annual Quantities (in tons) of Hazardous Wastes Generated by Routine Operations at TVA Facilities, 2020-2024.....	4-60
Table 4-8: TVA Coal Combustion Residual Production and Utilization, 2020-2024	4-62
Table 4-9: Low-Level Radioactive Waste Generated at TVA Nuclear Plants (cubic feet) .	4-64
Table 4-10: Mixed Waste Generated at TVA Nuclear Plants and Other Facilities (kilograms [kg])	4-64
Table 4-11: Population Data for the TVA PSA, TVA MSAs, Division 6, and U.S.....	4-66
Table 4-12: Demographics of the TVA PSA, Division 6, and U.S.....	4-68
Table 4-13. Counties in the TVA PSA with Minority Populations Exceeding 50 Percent...	4-69
Table 4-14: Demographics of Federally Recognized Tribal Nations in the TVA PSA.....	4-72
Table 4-15: Population Data for the Most/Least Populous Counties in the TVA PSA	4-75
Table 4-16: Population Characteristics for Selected TVA Power Plants.....	4-76
Table 4-17: TVA Capital Investment Between 2019 and 2025.....	4-77
Table 4-18: Tax Equivalent Payments by TVA to States Where TVA Produces Power or Acquired Lands	4-78
Table 4-19: Employment in Occupations in the TVA PSA, Division 6, and U.S.....	4-79
Table 4-20: TVA-Assisted Jobs Between 2019 and 2025	4-79
Table 5-1: Environmental Characteristics of New Supply-Side Resources Included in Alternative Strategies	5-6

Table 5-2: Coal Emissions Factors by Phase	5-7
Table 5-3: Natural Gas Emissions Factors by Phase	5-8
Table 5-4: Generic Construction Effects of Natural Gas Generation Plants (TVA Projects 2010-2025)	5-10
Table 5-5: Nuclear Emissions Factors by Phase	5-11
Table 5-6: Hydroelectric Emissions Factors by Phase	5-13
Table 5-7: Wind Emissions Factors by Phase	5-17
Table 5-8: Solar Emissions Factors by Phase	5-18
Table 5-9: Generic Construction Effects of Solar Generation Facilities (TVA Projects 2014-2023)	5-20
Table 5-10: Biomass Emissions Factors by Phase	5-21
Table 5-11: Pumped Storage Emissions Factors by Phase	5-22
Table 5-12: Battery Emissions Factors by Phase	5-23
Table 5-13: Generic Effects of Transmission System Construction and Maintenance Activities (TVA Projects 2005-2023)	5-26
Table 5-14: Average Total, Annual, and Percent Reduction of Emissions of SO ₂ , NO _x , and Mercury by Alternative Strategy	5-29
Table 5-15: Average 2026-2050 CO ₂ Emissions and Emissions Rates, and Percent Changes by Alternative Strategy	5-36
Table 5-16: CO _{2e} Emission Factors for all Life Cycle Phases, by Resource Type	5-42
Table 5-17: CO ₂ Emission Factors for all Life Cycle Phases, by Resource Type	5-45
Table 5-18: CH ₄ Emission Factors for all Life Cycle Phases, by Resource Type	5-45
Table 5-19: N ₂ O Emissions Factors for all Life Cycle Phases, by Resource Type	5-46
Table 5-20: Average Cumulative Life Cycle GHG Emissions (2026-2050, millions of short tons)	5-47
Table 5-21: System Average Cost (2026-2050) for each Portfolio (\$/MWh)	5-70

List of Figures

Figure 1-1: TVA PSA and Watershed	1-3
Figure 2-1: FY 2025 TVA-Owned/Operated Summer Net Generating Capability, in MW by Type of Generation	2-3
Figure 2-2: FY 2024 and 2025 Coal Purchases by Mining Region	2-4
Figure 3-1: Key Characteristics of the Three Scenarios	3-1
Figure 3-2: Key Characteristics of the Three Alternative Strategies	3-2
Figure 3-3: Promotion Levels for Selected Energy Resources Associated with Each Strategy	3-3
Figure 3-4. Incremental Capacity through 2040 (Summer NDC)	3-4
Figure 3-5. Total Energy in 2040	3-5
Figure 3-6: Incremental Capacity through 2050 (Summer NDC)	3-6
Figure 3-7: Total Energy in 2050	3-6

Figure 3-8: 2026 IRP Strategy Performance Summary	3-9
Figure 3-9: Power Supply Mix Ranges through 2040	3-12
Figure 4-1: Trends in Emissions of Air Pollutants in Tennessee, 1990-2024	4-3
Figure 4-2: TVA Emission Trends for SO ₂ , 1974-2024 (top), NO _x , 1974-2024 (middle), and Mercury, 2000-2024 (bottom)	4-5
Figure 4-3: Total Wet Mercury Deposition in the U.S. in 2022	4-7
Figure 4-4: The TVA Power Service Area and Class I Areas	4-9
Figure 4-5: Change in Visibility in the Great Smoky Mountains National Park on the Worst 20 Percent of Days and the Best 20 Percent of Days, 1990-2024	4-10
Figure 4-6: Year 2000 Total SO ₄ Deposition	4-11
Figure 4-7: Year 2021 Total SO ₄ Deposition	4-12
Figure 4-8: Annual Average Temperature (°F) in Tennessee, 1895–2025	4-14
Figure 4-9: Annual Average Summer Temperature (°F) in Tennessee, 1895–2025	4-14
Figure 4-10: Annual Average Winter Temperature (°F) in Tennessee, 1896–2025	4-15
Figure 4-11: Annual Average Precipitation in Tennessee, 1895-2025	4-16
Figure 4-12: U.S. 2021 GHG Emissions by Economic Sector - Percent	4-18
Figure 4-13: CO ₂ Emissions (million tons) From Generation of Power Marketed by TVA, 1995-2024	4-19
Figure 4-14: Major Watersheds Within TVA Region	4-25
Figure 4-15: 2020 Water Withdrawals by Category in the Tennessee River Basin	4-32
Figure 4-16: Groundwater and Surface Water Withdrawals in the Tennessee River Basin, 1995 to 2020	4-32
Figure 4-17: Groundwater Use by Category in the Tennessee River Basin, 2000 to 2020	4-33
Figure 4-18: Surface Water Use by Category in the Tennessee River Basin, 2000 to 2020	4-34
Figure 4-19: Physiographic Areas of TVA Region	4-37
Figure 4-20: Solar Photovoltaic Generation Potential in the TVA Region	4-59
Figure 5-1: Summary of Resource Options	5-1
Figure 5-2: Trends in Emissions of SO ₂ by Alternative Strategy Based on Averages of the Three Scenarios	5-30
Figure 5-3: Trends in Emissions of NO _x by Alternative Strategy Based on Averages of the Three Scenarios	5-31
Figure 5-4: Trends in Emissions of Mercury by Alternative Strategy Based on Averages of the Three Scenarios	5-31
Figure 5-5: Total 2026-2050 Emissions of SO ₂ by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-32
Figure 5-6: Total 2026-2050 Emissions of NO _x by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-33

Figure 5-7: Total 2026-2050 Emissions of Mercury by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-34
Figure 5-8: 2026-2050 Trends in Emissions of CO ₂ by Alternative Strategy Based on Averages of the Three Scenarios.....	5-36
Figure 5-9: 2026-2050 Trends in CO ₂ Emissions Rate by Alternative Strategy Based on Averages of the Three Scenarios	5-37
Figure 5-10: 2026-2050 Total Emissions of CO ₂ by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-38
Figure 5-11: Average 2026-2050 CO ₂ Emissions Rates by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom).....	5-39
Figure 5-12: Overview of Life Cycle Phases for which Emissions are Incorporated into GHG LCA (source: NLR)	5-42
Figure 5-13: Life Cycle Phase Annual Impact Examples.....	5-43
Figure 5-14: Overview of TVA's GHG LCA Approach	5-44
Figure 5-15: Cumulative CO ₂ Emissions, Case 1A, 2026-2050	5-48
Figure 5-16: Cumulative CH ₄ Emissions, Case 1A, 2026-2050.....	5-49
Figure 5-17: Cumulative N ₂ O Emissions, Case 1A, 2026-2050	5-49
Figure 5-18: Trends in Water Withdrawal by Alternative Strategy Based on Averages of the Three Scenarios	5-53
Figure 5-19: Average Annual 2026-2050 Water Withdrawal by the Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom).....	5-54
Figure 5-20: Trends in Average Annual Water Consumption by Alternative Strategy Based on Averages of the Three Scenarios	5-56
Figure 5-21: Average Annual 2026-2050 Water Consumption by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom).....	5-57
Figure 5-22: Average Annual Water Consumption by Alternative Strategy and Major River Basin (in billion gallons).....	5-58
Figure 5-23: Average Total Land Area for all New Generating Facilities by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-60
Figure 5-24: Land Requirements for New Generating Facilities by Type of Generation, Alternative Strategy, and Scenario	5-61

Figure 5-25: Average Total 2026-2050 Coal Consumption by TVA Plants by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-63
Figure 5-26: Trends in Average Annual Natural Gas Consumption by Alternative Strategy based on Averages of the Three Scenarios	5-64
Figure 5-27: Average Total 2026-2050 Natural Gas Consumption by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-65
Figure 5-28: Trends in Average Annual Coal Combustion Residual (Combined Ash and Gypsum) Alternative Strategy based on Averages of the Three Scenarios	5-66
Figure 5-29: Total Average 2026-2050 Coal Combustion Residual Production by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)	5-67

Appendices

Appendix A	Federally Listed Species near TVA Generation Facilities
Appendix B	Socioeconomics
Appendix C	Environmental Parameters of the Nine Capacity Expansion Plans
Appendix D	Life Cycle Greenhouse Gas Emissions
Appendix E	NEPA Documents Reviewed for Chapter 5 Generic Effects Tables
Appendix F	Literature Cited
Appendix G	List of Preparers
Appendix H	Response to Comments on the Draft IRP and EIS
Appendix I	Index

List of Acronyms

Acronym	Description
°C	Degrees Celsius
°F	Degrees Fahrenheit
AC	alternating current
ACS	American Community Survey
ACT	Allen Aeroderivative Combustion Turbine
Aero	aeroderivative
ALF	Allen Fossil Plant
ARC	Appalachian Regional Commission
B.P.	before present
BART	Best Available Retrofit Technology
BESS	Battery Energy Storage System
BFN	Browns Ferry Nuclear Plant
BRF	Bull Run Fossil Plant
Btu	British Thermal Units
CAA	Clean Air Act
CC	Combined Cycle
CCR	Coal Combustion Residuals
CCS	carbon capture and storage/sequestration
CFR	Code of Federal Regulations
CH ₄	Methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	CO ₂ equivalent emissions
CRN	Clinch River Nuclear
CT	Combustion Turbine
CUF	Cumberland Fossil Plant
CWA	Clean Water Act
DC	Direct Current
DER	Distributed Energy Resources
DO	dissolved oxygen
DOE	Department of Energy
DR	demand response
DSI	dry sorbent injection
DSM	Demand-side management
DSS	Distributed Solar Solutions
dV	deciview
EA	Environmental Assessment
EBCI	Eastern Band of Cherokee Indians
EE	energy efficiency

Acronym	Description
EIS	Environmental Impact Statement
ELG	Effluent Limitation Guidelines
EO	Executive Order
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
FGD	flue gas desulphurization
FONSI	finding of no significant impact
FRP	Flexibility Research Project
FY	Fiscal Year
GAF	Gallatin Fossil Plant
GDP	gross domestic product
GHG	greenhouse gas
GP	Generation Partners
GPP	Green Power Providers
GW	gigawatt
GWh	gigawatt hours
HAP	Hazardous Air Pollutants
HRSG	heat recovery steam generator
HVAC	heating, ventilation, and air conditioning
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
JOF	Johnsonville Fossil Plant
kg	kilogram
KIF	Kingston Fossil Plant
kV	kilovolt
kWh	kilowatt-hours
LCA	life cycle analysis
LNB	low-NOx burner
LPC	Local Power Companies
LSC	low sulfur coal
m ²	square meters
MATS	Mercury and Air Toxics Standards
MBCI	Mississippi Band of Choctaw Indians
MBTA	Migratory Bird Treaty Act
mmBtu	Million British Thermal Units
MGD	million gallons per day
MISO	Midcontinent Independent System Operator
Mm	Mega-meters
MSA	metropolitan statistical areas
MW	Megawatt
MWh	Megawatt-hour

Acronym	Description
NAAQS	National Ambient Air Quality Standards
NCA	National Climate Assessment
NEPA	National Environmental Policy Act
NETL	National Energy Technology Laboratory
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLR	National Laboratory of the Rockies (formerly NREL)
N ₂ O	Nitrous oxide
NO ₂	nitrogen dioxide
NO ₃	nitrate
NOI	Notice of Intent
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NREL	National Renewable Energy Laboratory (now NLR)
NRHP	National Register of Historic Places
NWS	National Weather Service
OBBA	One Big Beautiful Bill Act
PA	Programmatic Agreement
PAF	Paradise Fossil Plant
Pb	lead
PC	pulverized coal
PCB	polychlorinated biphenyl
PM	particulate matter
PM ₁₀	Particulate matter less than 10 microns in size
PM _{2.5}	Particulate matter less than 2.5 microns in size
PPA	Power Purchase Agreement
ppm	parts per million
PSA	Power Service Area
PURPA	Public Utility Regulatory Policies Act
PV	photovoltaic
RCP	representative concentration pathway
RCRA	Resource Conservation and Recovery Act
RIA	Renewable Investment Agreement
ROD	Record of Decision
RSO	Renewable Standard Offer
SCF	Standard cubic feet
SCPC	supercritical pulverized coal
SCR	selective catalytic reduction
SDTSA	state-designated tribal statistical areas
SF ₆	Sulfur hexafluoride

Acronym	Description
SHF	Shawnee Fossil Plant
SHPO	State Historic Preservation Officer
SMR	small modular reactors
SNCR	selective non-catalytic reduction
SO ₂	sulfur dioxide
SO ₄	sulfate
SSI	Solar Solutions Initiative
TCP	Traditional Cultural Properties
TIGER	Topologically Integrated Geographic Encoding and Referencing
TSCA	Toxic Substances Control Act
TVA	Tennessee Valley Authority
TVA Act	Tennessee Valley Authority Act of 1933
TWh	terawatt hours
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
VOC	volatile organic compounds
WBN	Watts Bar Nuclear
WMA	Wildlife management area
WUTA	Water Use Tabulation Area

1 Introduction

The Tennessee Valley Authority (TVA) has developed the Integrated Resource Plan (IRP) and associated programmatic Environmental Impact Statement (EIS) to address the demand for power in the TVA power service area (PSA), the resource options available for meeting that demand, and the potential environmental, economic, and operating impacts of these options. The IRP will provide strategic direction for meeting the energy needs of the TVA region between now and 2050 across a variety of possible future scenarios.

TVA is the largest producer of public power in the United States (U.S.). TVA provides wholesale power to 153 local power companies (LPCs) and directly sells power to 62 industrial and federal customers. TVA's power system serves approximately 10 million people in a seven-state, 80,000-square-mile region. TVA's PSA includes virtually all counties in Tennessee and portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. The TVA region shown in Figure 1-1 encompasses the PSA and the Tennessee River watershed.

As of FY 2025, TVA's generating assets include: three nuclear sites, 18 natural gas and/or oil-fired sites, four coal-fired sites, 29 conventional hydroelectric sites, one pumped-storage hydroelectric site, one diesel generator site, and nine operating solar installations. These assets have a summer net generation capability of 32,268 megawatts (MW). In addition, TVA maintains long-term agreements with third-party power producers totaling 8,482 MW and offers demand response (DR) programs that provide 1,390 MW of capacity. In total, TVA currently maintains 42,140 MW of capacity to meet the region's power supply needs.

The final IRP is detailed in Volume 1, which includes descriptions of the methodology and development of IRP recommendations. This document (Volume 2) contains the final EIS that analyzes the potential environmental effects of the IRP recommendations that may have a significant impact on the quality of the human environment. Volume 1 is incorporated into the EIS by reference.

1.1 Purpose and Need for Integrated Resource Planning

Like other utilities, TVA prepares IRPs. This planning process includes evaluating the long-term demand for power in the TVA region, the resource options available for meeting that demand, the potential economic, operating, and environmental impacts of these options, and public involvement. In the mid-1990s, TVA developed a comprehensive IRP, Energy Vision 2020 IRP and EIS (TVA 1995) and has since prepared IRPs and associated EISs in 2011 (TVA 2011a), 2015 (TVA 2015), and 2019 (TVA 2019a).

TVA developed the 2026 IRP and associated EIS to address regional and national changes within the utility marketplace. After a decade of flat electricity demand, the TVA region is now experiencing increasing demand for electricity driven by population, employment, and

industrial growth (particularly from data centers), weather trends, and increasing electrification. TVA is experiencing rising consumer demand for specific characteristics in generation resources, and in some cases, customers are willing to pay more to utilize those options. Additionally, U.S. energy policy and regulations have evolved since the last IRP. Finally, advancements are being made in emerging energy technologies, such as advanced nuclear and advanced storage. Upon approval by the TVA Board of Directors (TVA Board), the 2026 IRP will replace the 2019 IRP (TVA 2019a). The purpose of the IRP is to provide TVA with direction on how to best meet future electricity demand. The IRP process evaluates TVA's current energy resource portfolio and alternative future portfolios of energy resource options on a least-cost, system-wide basis to meet the future electrical energy needs of the TVA region while considering TVA's mission of energy, environmental stewardship, and economic development. Consideration of stakeholder input is integral to TVA's IRP process.

An updated IRP is needed to provide strategic direction for meeting the region's energy needs between now and 2050, establish a strong planning foundation, and inform TVA's next long-range financial plan.

PRELIMINARY

TVA Power System

In addition to assets operated by TVA, TVA also maintains long-term power purchase agreements for additional solar, wind, gas, and coal capacity.

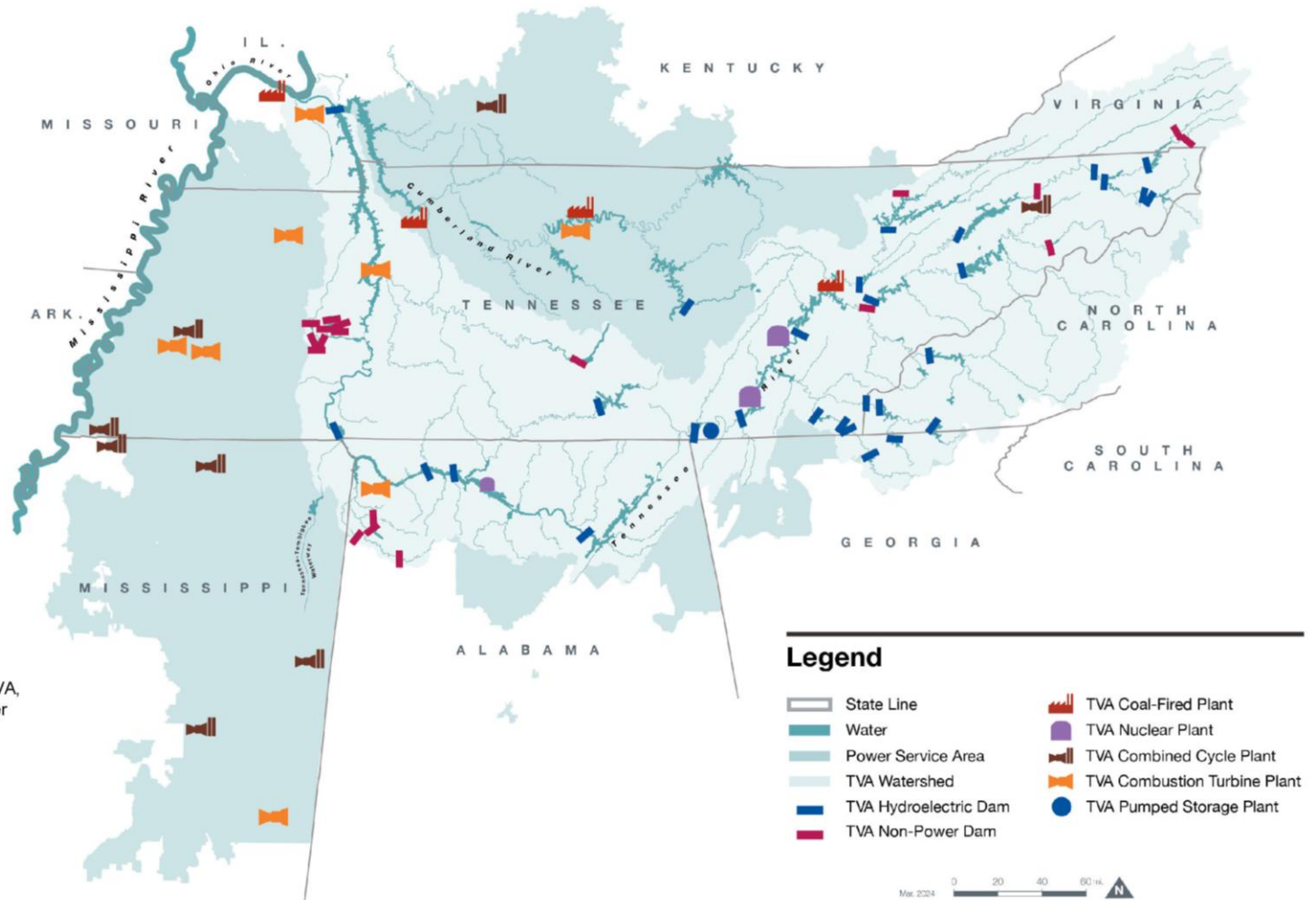


Figure 1-1: TVA PSA and Watershed

1.2 Environmental Review Process

This EIS has been prepared by TVA in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S. Code [U.S.C.] §§ 4321 *et seq.*), and TVA NEPA procedures (18 Code of Federal Regulations [CFR] part 1318). NEPA requires federal agencies to consider the impact of their proposed actions on the environment before making decisions. For major federal actions that are likely to have significant environmental impacts, NEPA requires that an EIS be prepared.

Due to the comprehensive nature of the IRP, TVA is completing a programmatic EIS. A programmatic EIS is appropriate when a decision involves a policy or program, or a series of related actions by an agency over a broad geographic area. In a programmatic EIS, the environmental impacts of the alternative actions are addressed at a regional level, with some extending to a national or global level. TVA will address the site-specific effects associated with projects that are proposed to implement the IRP in subsequent tiered environmental reviews.

The IRP and EIS are developed with stakeholder involvement and public input. TVA used the input from the scoping period in development of the IRP and EIS. Scoping is a procedure that solicits public input to the NEPA process to ensure that: (1) issues are identified early and properly studied; (2) issues of little significance do not consume substantial time and effort; (3) the NEPA document is thorough and balanced; and (4) delays caused by an inadequate review are avoided. Engagement in TVA's 2026 IRP officially began with a Notice of Intent (NOI) in the Federal Register that initiated a 45-day public scoping period from May 19 to July 3, 2023. In addition to publishing an NOI, TVA notified the public of the initiation of the IRP study by providing information on the TVA webpage, notifying the media, and sending notices to numerous individuals, organizations, and intergovernmental partners. The objective was to gather input from the public and key stakeholders to help frame the IRP study and identify future conditions, strategies, and resource options to be evaluated. The NOI also initiated the environmental review process for the IRP, consistent with the requirements of NEPA.

During the scoping period, TVA received 43 official comments through the online portal, email, and mail-in options. Comments were primarily received from states in the TVA region, with the balance from four other states and Washington, D.C. Of the 43 submissions, 22 comments were received from individuals, nine from businesses, 10 from civic or non-governmental organizations, and two from government agencies. In addition to comments formally submitted by the public, TVA reviewed several hundred statements posted by the public on several social media pages.

Public comments covered a broad spectrum of issues. Common themes were:

- Support and opposition for various types of power generation sources

- Increasing decarbonization efforts
- Promoting distributed energy resources (DER)
- Interest in energy efficiency (EE) and energy storage alternatives
- Feedback on the IRP process and need for transparency
- Importance of reliability and resilience in the face of increasing demand
- More attention to environmental justice communities
- Concern about climate change and environmental impacts

Commenters also provided advice on scenarios and strategies to explore and suggestions to improve public outreach and stakeholder involvement. Additional information on the scoping effort and comments received can be found in the [Integrated Resource Plan Scoping Report](#) on TVA's IRP website (www.tva.gov/irp).

Early in the planning process, TVA also established the IRP Working Group, a group of stakeholders with broad-ranging perspectives who meet regularly to provide input and feedback on every aspect of the IRP. The contributions of the Working Group are summarized in the IRP Volume 1, Section 2.2.

In September 2024, TVA published the draft IRP and EIS and distributed them to a broad range of individuals and groups; and federal, state, and local agencies for their review and comment. During the 75-day public comment period for the draft IRP and EIS (September 23 to December 11, 2024), TVA conducted 10 public meetings throughout the TVA region and two virtual webinars. Following the public comment period, TVA responded to the comments received and incorporated any necessary changes into the IRP and/or EIS. Public involvement for the draft IRP and EIS during the 75-day public comment and review period is included in Appendix H - Response to Comments on the Draft IRP and EIS.

The TVA Board will consider the information and analyses in the EIS when it makes a decision on the recommended power supply mix ranges through 2040 and 2050, strategic portfolio direction, and key signposts to monitor.

In addition to NEPA, several other laws and executive orders (EOs) are considered by TVA when developing new power generation resources (Table 1-1). These laws and EOs may affect the review and consideration of environmental consequences of an alternative plan or measures needed during its implementation. Most of these laws also have associated implementing regulations. In addition to these laws, TVA must comply with a variety of state and local requirements not included in Table 1-1.

Chapter 4 (Affected Environment) describes the regulatory setting for each resource in more detail. Chapter 5 (Anticipated Environmental Impacts) discusses applicable laws and their relevance to this analysis.

Table 1-1: Laws and EOs Relevant to the Environmental Effects of Power System Planning, Construction and Operation

Environmental Resource Area	Law / EO
Water Quality	Clean Water Act (CWA)
Groundwater	- Safe Drinking Water Act - Resource Conservation and Recovery Act (RCRA) - Comprehensive Environmental Response, Compensation, and Liability Act - Federal Insecticide, Fungicide, and Rodenticide Act
Air Quality	Clean Air Act (CAA)
Wetlands and Waters	- CWA - EO 11990 – Protection of Wetlands - Wild and Scenic Rivers Act
Floodplains	EO 11988 – Floodplain Management
Endangered and Threatened Species	- Endangered Species Act (ESA) - Migratory Bird Treaty Act (MBTA) - Fish and Wildlife Coordination Act - Bald and Golden Eagle Protection Act
Cultural Resources	- National Historic Preservation Act (NHPA) - Archaeological Resources Protection Act - Native American Graves Protection and Repatriation Act - American Indian Religious Freedom Act - EO 13007 – Indian Sacred Sites - EO 13175 – Consultation and Coordination with Indian Tribal Governments - EO 13287 – Preserve America
Land Use	Farmland Protection Policy Act
Coal Mining	Surface Mining Control and Reclamation Act
Waste Management	- RCRA - Comprehensive Environmental Response, Compensation, and Liability Act - Toxic Substances Control Act (TSCA)
Infrastructure Planning and Sustainability	- Federal Power Act - Inflation Reduction Act - EO 14154 – Unleashing American Energy - EO 14156 – Declaring a National Energy Emergency - Fiscal Responsibility Act of 2023 - One Big, Beautiful, Bill Act (OBBA) of 2026

Throughout 2025 and continuing in 2026, the utility industry experienced significant policy and regulatory shifts. EO 14156, issued January 20, 2025, formally declared a national energy emergency. In parallel, the U.S. Environmental Protection Agency (USEPA) announced intentions to provide regulatory relief affecting existing coal and future natural-gas generation. The USEPA proposed a rule to repeal all greenhouse gas (GHG) emissions standards for the power sector under Section 111 of the CAA (the “2024 GHG Rule”), as well as a final rule authorizing state permit writers to extend compliance deadlines under the Effluent Limitation Guidelines (ELG) for steam electric generating units.

In addition to these policy and regulatory changes, the One, Big, Beautiful Bill Act (OBBB) was signed into law on July 4, 2025. OBBB included updates to investment tax credit opportunities available for renewable, storage, and nuclear resources. All IRP scenarios reflect the impacts of OBBB on resource costs and national and regional energy prices.

More information on current and potential U.S. energy policy is explored in Volume 1, Section 2.4.4.

1.3 Relationship with Other NEPA Reviews

Numerous environmental documents and reviews are relevant to TVA's IRP and the current environmental review. These are briefly discussed below and are grouped by the type of action, program, or location. More information may be found at <https://www.tva.com/nepa>.

1.3.1 Programs, Plans and Policies

2019 Integrated Resource Plan (June 2019)

The 2019 IRP has provided direction for how TVA will meet the long-term energy needs of the Tennessee Valley region and updates TVA's 2015 plan. The 2019 IRP and the associated EIS evaluated scenarios and strategies for providing electricity through 2038. As noted above, the 2019 plan will be replaced by the 2026 IRP.

Changes to Green Power Providers Program Environmental Assessment (December 2019)

In this document, TVA evaluated changes to how TVA assists residential customers interested in solar installations and the December 31, 2019, closure of its Green Power Providers Program to new applications.

Diesel-fueled Generation in TVA Demand Response Program (February 2017)

In 2017, TVA issued a final Environmental Assessment (EA) and finding of no significant impact (FONSI) for authorizing the use of customer-owned diesel-fueled generators to provide backup generation during certain DR events.

Natural Resource Plan (July 2020)

This plan guides TVA's natural resource stewardship activities, which primarily occur on TVA-managed public lands. This document and the associated EIS evaluated the resource management programs and activities, alternative approaches to TVA's resource management efforts, and the environmental impacts of the alternatives.

Reservoir Operations Study (May 2004)

In 2004, TVA established its current operating policy for the Tennessee River and reservoir system. The purpose of the Reservoir Operations Study was to determine whether changes in its reservoir operations policy will produce overall public value. This document addresses the operation of TVA's hydroelectric generation resources.

Resilience 360 Program (August 2025)

In 2025, TVA issued a final Programmatic EA and FONSI addressing a partnership program that would allow customers to improve and enhance resiliency during events that challenge the transmission of power on the grid. The program addresses backup generation in the form of on-site modular natural gas units or battery energy storage systems (BESSs) were reviewed.

TVA Power Supply Flexibility Proposal (June 2020)

In this document, TVA evaluated the offering of flexible power generation options to its LPC customers (Valley Partners) that have entered into long-term partnership agreements with TVA.

TVA Solar Photovoltaic Projects (September 2014)

TVA is increasing the amount of renewable energy in its energy portfolio by constructing and operating solar photovoltaic (PV) systems and/or purchasing electricity from solar facilities being constructed within TVA's PSA. In September 2014, TVA documented the potential environmental effects of implementing small solar projects in this programmatic EA and FONSI.

1.3.2 Power Generation – Coal and Gas**Allen Fossil Plant (ALF)**

TVA evaluated options for closure of the plant, including ash impoundments, in the ALF Ash Impoundment Closures EIS and record of decision (ROD) (2020), ALF Decontamination and Deconstruction EA and FONSI (2019), and ALF Emission Control Project EA and FONSI (2014).

Allen Aeroderivative Combustion Turbine (ACT)

TVA addressed the addition of six natural gas-fired Aeroderivative (Aero) combustion turbines (CTs) at the ACT site in Memphis, Tennessee, in an EIS completed in July 2025. TVA issued a ROD in late 2025. The new units would generate approximately 200 MW and are expected to be in commercial operation in 2027.

Bull Run Fossil Plant (BRF)

BRF is retired, though its NEPA documents for various projects remain relevant, including the BRF Ash Impoundment Closure Project Supplemental EA and FONSI (2019), BRF Decontamination and Decontamination EA and FONSI (2023), BRF Landfill-Management of Coal Combustion Residuals EIS (2016), and BRF Potential Retirement EA and FONSI 2019.

Closure of Coal Combustion Residual Impoundments EIS (2016)

The Ash Impoundment Closure Programmatic EIS was used to support the implementation of TVA's goal to eliminate all wet coal combustion residuals (CCR) storage at its coal plants by closing CCR impoundments across the TVA system, and to assist TVA in complying with

USEPA's CCR Rule. The EIS programmatically considers the impacts of the two primary closure methods. The ROD was issued in July 2016.

Colbert Fossil Plant

Documents available regarding retirement of this plant include a Decontamination and Deconstruction EA and FONSI (2016) and Colbert Ash Pond 4 Seismic Project EA and FONSI (2021).

Cumberland Fossil Plant (CUF)

Documents available for the retirement of the CUF include the Cumberland Retirement EIS and ROD (2023), CUF Wastewater Treatment Facility EA and FONSI (2019), CUF Management of Coal Combustion Residuals EIS and ROD (2019), and Access Road and Borrow Areas for CUF EA and FONSI (2017). In 2026, TVA supplemented the Cumberland Retirement EIS and issued a modified decision addressing continued operations.

Gallatin Fossil Plant (GAF)

Documents available regarding activities for GAF include the GAF Borrow Site EA and FONSI (2018), GAF Bottom Ash Process Dewatering Facility EA and FONSI (2017), GAF Installation of Air Pollution Control Equipment and Associated Facilities EA and FONSI (2013), and Gallatin Surface Impoundment Closure and Restoration Project EIS and ROD (2020).

John Sevier Fossil Plant Deconstruction (2015)

The EA and FONSI for the deconstruction of the John Sevier Fossil Plant near Rogersville, Tennessee, were issued in 2015. The EA evaluates the potential environmental effects of the future disposition of the physical structures associated with the retired coal-fired plant units, including the powerhouse, coal handling facilities, and surrounding support buildings.

Continued Operation of Johnsonville Combustion Turbine Units 1 Through 10 (2025)

In this document, TVA assessed the effects of continuing to operate CT units 1 through 10 to allow TVA to leverage existing infrastructure, minimize environmental disturbance, and avoid the higher costs and longer lead times associated with constructing new generation facilities. These units would also preserve approximately 650 MW of dispatchable generation capacity and aid in maintaining system reliability during periods of peak demand. An EA and FONSI were issued in November 2025 for this project.

Johnsonville Aeroderivative Combustion Turbine Project (2022)

In this document, TVA addressed the addition of 10 natural gas-fired Aero CTs at the Johnsonville Reservation in Humphreys County, Tennessee. The Aero CTs, which began commercial operation in 2025, generate approximately 550 MW. An EA and FONSI were issued in 2022 for this project.

Johnsonville Cogeneration Plant (2015)

TVA evaluated the addition of a heat recovery steam generator (HRSG) to an existing CT at the Johnsonville Fossil Plant (JOF). The steam generator would provide steam to an adjacent industrial customer that was previously provided by now-retired coal-fired units. TVA issued the EA and FONSI in 2015.

Johnsonville Fossil Plant (JOF)

Documents available involving closure activities of JOF include the JOF Decontamination and Deconstruction EA and FONSI (2018) and JOF Proposed Actions (2018).

Kingston Fossil Plant (KIF)

Documents available regarding retirement activities for KIF include the KIF Borrow Site #3 EA and FONSI (2020), KIF Bottom Ash Dewatering Facility EA and FONSI (2016), KIF Landfill Expansion EA and FONSI (2019), and KIF Retirement DEIS (2023). The Kingston Retirement final EIS was published in February 2024; the ROD was published in April 2024. In 2026, TVA supplemented the Kingston Retirement EIS and issued a modified decision addressing continued operations.

New Caledonia Combustion Turbine Project (2025)

In January 2025, TVA finalized an EIS to construct and operate six dual-fuel, simple cycle frame CTs on approximately 63 acres at TVA's existing New Caledonia site in Lowndes County, Mississippi. TVA published a ROD in March 2025. The CTs would generate approximately 500 MW and are expected to be in commercial operation by the end of 2027.

Paradise Fossil Plant (PAF)

Documents available regarding retirement activities for PAF include the Potential Retirement of PAF EA and FONSI (2019), PAF Units 1 and 2 – Mercury Air Toxics Standards Compliant Project EA and FONSI (2013), PAF Decontamination and Deconstruction EA and FONSI (2021), and the Management of Coal Combustion Residuals from the PAF EA and FONSI (2017). Additionally, following a CT modernization study in 2019, an EA and FONSI were issued in 2021 on Paradise and Colbert Combustion Turbine Plants.

Shawnee Fossil Plant (SHF)

Documents available regarding retirement activities for SHF include the Management of Coal Combustion Residuals from SHF EIS and ROD (2018), SHF Bottom Ash Process Dewatering Facility EA and FONSI (2016), and SHF Units 1 and 4 EA and FONSI (2014).

Widows Creek Fossil Plant

Documents available regarding closure activities of this plant include the Widows Creek Fossil Plant Deconstruction EA and FONSI (2016) and the Widows Creek Fossil Plant Soil Excavation and Gypsum Stack Closure EA and FONSI (2014).

1.3.3 Power Generation – Nuclear

Browns Ferry Nuclear Plant (BFN)

The BFN Subsequent License Renewal Final SEIS (2023) addresses the potential environmental effects associated with obtaining Nuclear Regulatory Commission (NRC) subsequent license renewals for an additional 20 years for Units 1, 2, and 3 located in Limestone County, Alabama. TVA issued a ROD in February 2024. Also available is the BFN Thermal Performance Program Cooling Tower Capacity Improvements EA and FONSI (2020).

Clinch River Nuclear Site (CRN) Advanced Nuclear Reactor Technology Park (2022)

In 2022, TVA issued a programmatic EIS and ROD for site preparation, construction, operation, and decommissioning of various facilities at an advanced nuclear reactor technology park in Oak Ridge, Roane County, Tennessee. The facilities containing one or more advanced nuclear reactors would have a cumulative output not to exceed 800 MW. In 2025, TVA supplemented the EIS to assess a GE Hitachi Nuclear Energy BWRX-300 small modular reactor unit at the site.

Fukushima Response Strategy (2013)

A final EA and FONSI were issued for implementing TVA's response strategy for NRC requirements following the March 2011 earthquake and tsunami that struck the Fukushima Daiichi electrical power station in Japan. The strategy addresses improving TVA's ability to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a severe accident.

Sequoyah Nuclear Plant Units 1 and 2 License Renewal Supplemental Environmental Impact Statement (2011)

In this Supplemental EIS, TVA reviewed the continued operation of the two units at the Sequoyah Nuclear Plant for an additional 20 years (between 2020 and 2041).

Watts Bar Nuclear Plant (WBN)

Documents available regarding the Watts Bar facility include the WBN Unit 2 Replacement of Steam Generators EA and FONSI (2017), and the WBN Independent Spent Fuel Storage Installation Facility EA and FONSI (2014).

1.3.4 Power Generation – Solar, Storage and Other Renewables

Shawnee Project Phoenix Solar Facility EA and FONSI (2024)

In March 2024, TVA completed an EA for its pilot proposal to construct a solar facility at SHF, utilizing a portion of an area where CCRs are being closed and managed in place. The project is known as Project Phoenix.

Vonore BESS and Associated Subsystem (2022)

TVA issued a final EA and FONSI associated with the construction and operation of a BESS and associated transmission and fiber improvements near an industrial complex in Vonore, Tennessee. The BESS and associated substation project, which will become operational in 2026, is designed for 20 MW capacity – for two hours of continuous power and 40 MWh stored energy. The project is consistent with TVA’s 2019 IRP, which called for the evaluation of demonstration battery storage projects to gain operational experience as a near-term action.

Further information on other TVA solar, storage, and other renewable projects, listed in Table 1-2, can be found at <https://www.tva.com/nepa>.

Table 1-2: Other Solar, Storage, and Renewable Projects with NEPA Documents

Project Name	Year	Location
Five Western North Carolina Solar Farms – Hampton Solar Farm, Sweetwater Cove Solar Farm, Unnamed 1 MW Solar Farm, Carter Cove Solar Farm, Lance Cove Solar Farm	2014	Cherokee County, NC Clay County, NC Avery County, NC
Marshall Properties Solar Farm	2014	Blairsville, GA
General Mills Combined Heat and Power Project	2014	Murfreesboro, TN
Starkville Solar Facilities	2014	Oktibbeha County, MS
Pulaski Energy Park Expansion	2014	Giles County, TN
Purchase of Power Generated at Bristol, VA Sanitary Landfill	2014	City of Bristol’s Sanitary Landfill, VA
River Bend Solar Project	2015	Colbert County, AL
Providence Solar Center	2016	Madison County, TN
Selmer North I & II Solar Projects	2016	McNairy County, TN
Wildberry Solar Center	2016	Fayette County, TN
Houston, Mississippi Solar Farms	2016	Chickasaw County, MS
Latitude Solar Center	2016	Hardeman County, TN
Jonesborough Solar Site	2017	Washington County, TN
Millington Solar Farm	2017	Shelby County, TN
Muscle Shoals Solar Project	2017	Colbert County, AL
Naval Air Station Meridian Solar Farm	2017	Lauderdale County, MS
Haywood Solar Farm	2017	Haywood County, TN
Memphis Solar Project	2018	Memphis, Shelby County, TN
Cumberland Solar Farm	2018	Limestone County, AL
Yum Yum Solar Project	2019	Fayette County, TN
Jackson Solar Project	2019	Jackson, Madison County, TN
Bellefonte Solar Energy Center Project	2020	Jackson County, AL
Elora Solar Energy Center Project	2020	Lincoln County, TN
Knoxville Utilities Board Solar Project	2020	Knox County, TN
Horus Kentucky Solar Project	2021	Simpson County, KY
Skyhawk Solar Project	2021	Obion County, TN
Ridgely Energy Farm	2021	Lake County, TN
SR Bell Buckle Solar Project	2021	Bedford County, TN
SR McKellar Solar Project	2021	Madison County, TN
SR Millington II Solar Facility	2022	Shelby County, TN
SR Canadaville Solar Facility	2022	Fayette County, TN

Project Name	Year	Location
Golden Triangle I & II Solar and Battery Energy Storage Project	2022	Lowndes County, MS
Graceland Solar Project	2022	Shelby County, TN
Logan County Solar Project	2023	Logan County, KY
Gaynor Solar LLC – Volunteer Electric Cooperative Solar Project	2023	Pleasant Hill, Cumberland County, TN
Moore County Solar Project	2023	Moore County, TN
Optimist Solar and BESS Project	2023	Clay County, MS
Adamsville Solar Project	2024	McNairy and Hardin Counties, TN
SR Puryear Solar Project	2024	Henry County, TN
Ripley II Utility Scale Solar Project	2024	Lauderdale County, TN
SR Magnolia Utility Scale Solar Project	2024	Monroe County, MS
SR Middleton Utility Scale Solar Project	2024	Hardeman County, TN
Hillsboro Solar Project	2025	Lawrence County, AL
Okolona Solar Project	2025	Chickasaw County, MS
Spring Valley Solar Project	2026	Colbert County, AL

2 TVA Power System

2.1 Introduction

To meet the region's power supply needs, TVA currently maintains 42,140 MW of summer net dependable capability. TVA operates a generating asset portfolio of 32,268 MW, maintains long-term agreements with third-party power producers totaling 8,482 MW, and offers DR programs that provide 1,390 MW of capacity. Annual power generation by these facilities for the 2020-2025 fiscal years (FY) is summarized in Table 2-1. TVA operates a network of over 16,000 miles of transmission lines and 590 substations, switching stations, and switchyards. This system transmits power from TVA and non-TVA generating facilities to 1,351 customer connection points. Unless stated otherwise, the capacity of energy resources described in this EIS is the summer net dependable capacity, with the exception of renewables, including hydro, and storage which are typically provided in nameplate capacity.

Table 2-1: FY 2020-2025 Generation by Type from Both TVA Facilities and Purchased Power

Type of Generation	Generation in million kilowatt-hours (kWh) per FY					
	FY 2025 ¹	FY 2024 ¹	FY 2023 ¹	FY 2022 ¹	FY 2021 ¹	FY 2020 ¹
Nuclear	56,157	65,235	67,102	64,475	66,265	64,531
Coal	30,733	23,959	23,618	23,752	25,764	22,141
Natural Gas and/or oil-fired	59,418	55,534	48,170	54,611	44,126	42,822
Hydroelectric	17,213	15,035	15,115	16,477	18,510	19,543
Wind	4,562	3,718	3,754	4,383	3,919	3,839
Solar	1,719	1,618	1,381	1,023	468	250
Biomass	51	30	23	22	26	30
Other Program Renewables ²	577	564	628	713	700	665
TOTAL	170,470	165,693	159,791	165,456	159,778	153,821

Source: TVA 2025a; TVA 2024a, TVA 2023a, TVA 2022a, TVA 2021a, TVA 2020a

¹ Includes purchased power gas, coal fired and hydroelectric.

² From contract renewable resources through historical renewable energy programs that consist of power purchase agreements (PPAs) and energy purchased from qualifying facilities through TVA's Dispersed Power Production Program.

2.2 TVA Customers, Sales, and Power Exchanges

TVA sells power at wholesale to its 153 LPCs. In FY 2025, it sold 167,612 million kilowatt-hours (kWh) of electricity; total revenue from these sales was \$13.5 billion. In FY 2024, it sold 162,933 kWh of electricity, with total revenues of \$12.1 billion. LPCs in turn distribute electricity to residential, commercial, and industrial customers within their service areas.

These non-profit, publicly owned LPCs are diverse and include municipal systems and rural electric cooperatives. The largest, Memphis Light, Gas and Water, serves approximately 421,000 electric customers and accounted for 9 percent of TVA's 2025 operating revenues. Some of the smallest LPCs serve less than 1,500 customers. Many provide only electrical service while others also provide water, wastewater, telecommunications, and/or natural gas service. Revenues from LPCs accounted for approximately 90 percent of TVA's total operating revenues for 2025.

In addition to the LPCs, TVA sells power directly to 62 industries and federal installations. The direct served industries include chemical, metal, paper, textile, data centers, and automotive manufacturers. The federal installations include the Department of Energy (DOE) Oak Ridge Operations in Tennessee and military bases in the region. Revenues from direct served industries and federal installations accounted for approximately 8 percent of TVA's total operating revenues in 2025. Since 2015, power sales to federal installations have decreased while sales to direct served industries have increased.

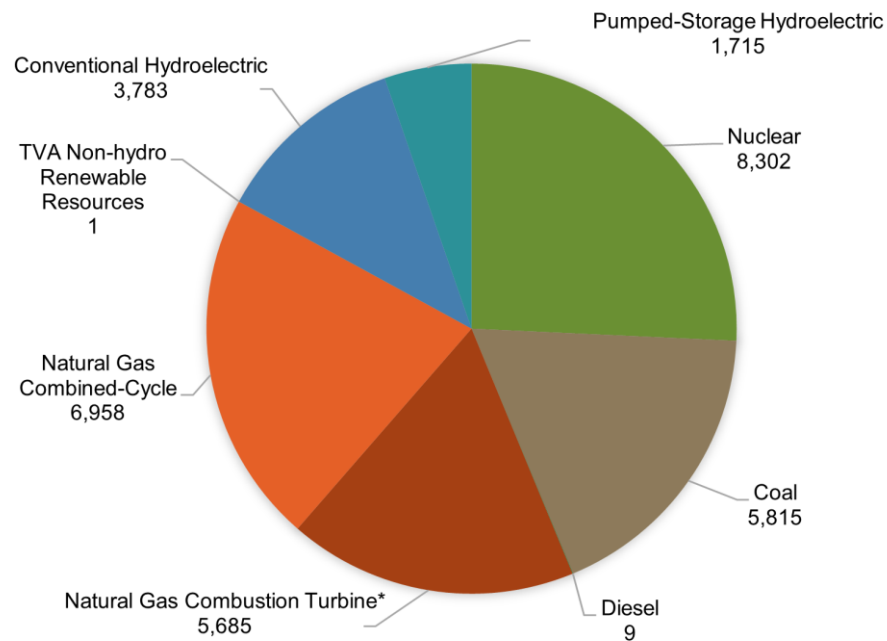
The TVA PSA (Figure 1-1) was established by the Tennessee Valley Authority Act of 1933 (TVA Act). The TVA Act restricts TVA from entering into contracts that would make TVA or its LPCs a source of power outside the area for which TVA or its LPCs were the primary source of power on July 1, 1957.

The TVA Act authorizes TVA to exchange, buy, or sell power with 13 neighboring electric utilities. This arrangement gives TVA the ability to purchase power when its generating capacity cannot meet demand or when purchasing power from a neighboring utility is more economical for TVA than generating it. The arrangement also allows TVA to sell power to neighboring utilities when its generation exceeds demand. TVA conducts these exchanges through 69 transmission system interconnections. To the extent allowed by federal law, TVA offers transmission services to others to transmit power throughout the TVA PSA.

In 2020, TVA began providing a flexibility option to LPCs that enter into a long-term partnership agreement. The flexibility option, named Generation Flexibility, allows these LPCs to locally generate or purchase up to approximately 5 percent of their average total hourly energy sales to meet their individual customers' needs. Revised Flexibility Agreements, made available to LPCs in August 2023, permit projects to be located anywhere in TVA's PSA, either connected to the LPC distribution system or TVA's transmission system, and make it easier for LPCs to partner in projects. As of August 2024, 147 LPCs have signed the long-term partnership agreement with TVA, and 102 of these LPCs have signed a Power Supply Flexibility Agreement.

2.3 TVA-Owned Generating Facilities

TVA owns and/or operates under long-term lease 32,268 MW of summer net generating capability (Figure 2-1).



Source: TVA 2025a

*Natural Gas CT sums all generation from Johnsonville, which includes co-generation and Aero units

Figure 2-1: FY 2025 TVA-Owned/Operated Summer Net Generating Capability, in MW by Type of Generation

2.3.1 Coal-Fired Generation

As of September 2025, TVA has 24 active coal-fired generating units at four plant sites with a total summer net dependable capability of approximately 5,815 MW (Figure 1-1, Table 2-2). The coal-fired units range in size from 134 MW (SHF Units 1-9) to 1,235 MW (CUF Unit 1). The oldest unit was placed in service in 1953 at SHF, and the newest is CUF Unit 2, which began operation in 1973. For additional information, see the 2026 IRP (Volume 1, Section 2.6).

Table 2-2: Characteristics of TVA Coal-Fired Generating Facilities

Facility	Number of Units	2025 Summer Net Capability (MW)	Commercial Operation Date (First and Last Unit)	Boiler Type ¹	Emission Controls ²
CUF	2	2,470	1973	SCPC	FGD, LNB, SCR
GAF	4	976	1956, 1959	PC	FGD, SCR
KIF	9	1,298	1954, 1955	PC	LNB (4 units), SCR, FGD
SHF	9	1,071	1953, 1955	PC	DSI, FGD (2 units), LSC, LNB, SCR (4 units), SNCR
Total Coal	24	5,815			

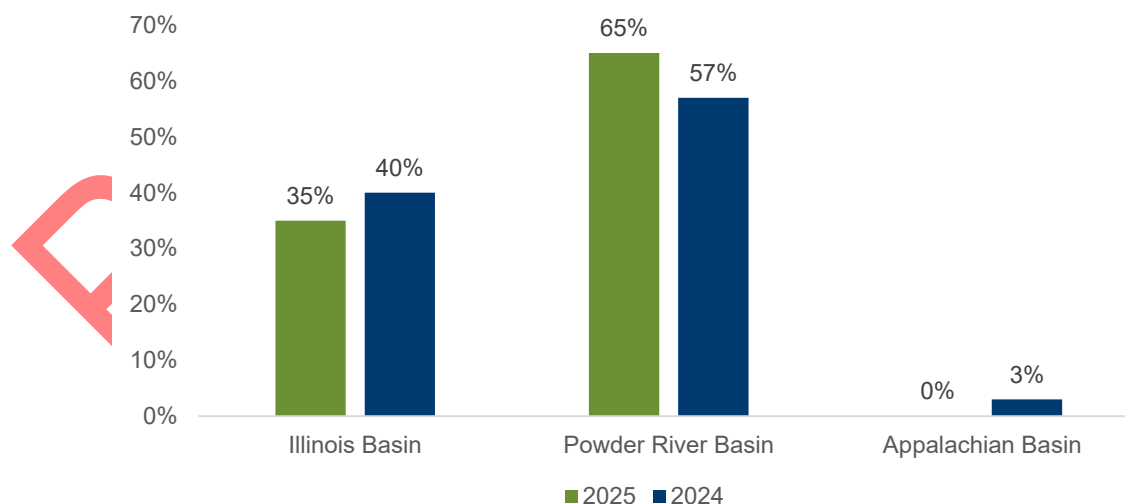
¹ PC – pulverized coal; SCPC – supercritical pulverized coal

² DSI – dry sorbent injection; FGD – flue gas desulfurization (“scrubber”); LNB – low-NOx burner; LSC – low sulfur coal, may be blended with high sulfur coal; SCR – selective catalytic reduction; SNCR – selective non-catalytic reduction.

In February 2026 the TVA Board authorized TVA to take steps to allow for the continued operation of CUF and KIF, subject to permitting and regulatory requirements, to meet rapidly increasing demand for electricity and address associated reliability concerns in the TVA region. TVA also re-evaluated and updated planning assumptions related to end-of-life expectations for all coal units.

Fuel Procurement. TVA coal consumption has greatly decreased since 2010 because of coal unit retirements, increased generation from other resources, and increased EE. Coal inventory decreased in 2024 as compared to 2023. Coal supply availability and transportation performance continued to improve in 2023 and 2024. Throughout 2024, TVA was able to meet burn and increase inventory stockpiles due to current market conditions reflecting an approximate balance between demand and available supply, weaker export markets, and stable natural gas prices. Coal inventory levels in 2025 remained consistent with those of 2024. TVA also invested in additional multi-year coal supply contracts to help provide stability in coal supply availability. These investments are expected to support fuel resiliency with TVA’s overall coal supply. Coal consumption at TVA’s coal-fired generating facilities during both 2023 and 2024 was approximately 12 million tons, and increased to 14 million tons in 2025.

In recent years, TVA has obtained coal from the Appalachian Basin (Kentucky, Pennsylvania, Tennessee, West Virginia, and Virginia) and Illinois Basin (Illinois, Indiana, and Kentucky) regions in the eastern U.S. and from the Powder River Basin (Wyoming) region in the western U.S. TVA-purchased coal by basin for 2024 and 2025 is shown in Figure 2-2.



Source: TVA 2025a

Figure 2-2: FY 2024 and 2025 Coal Purchases by Mining Region

TVA purchases coal under both long-term (more than one year) and short-term (one year or less) contracts; 94 percent of 2024 purchases and 100 percent of 2025 purchases were with long-term contracts. During 2025, 46 percent of TVA's coal supply was delivered by rail, 13 percent was delivered by barge, and 41 percent was delivered by a combination of barge and rail. These percentages vary from year to year depending on the coal sourcing areas and other factors.

TVA uses large quantities of limestone to operate the FGD systems at its four coal plants. This limestone is acquired from quarries in the vicinity of the plants and transported to the plants primarily by truck.

2.3.2 Nuclear Generation

TVA operates seven nuclear units at three sites with a total net summer dependable capacity of 8,302 MW (Figure 1-1, Table 2-3). The newest nuclear unit, WBN Unit 2, began commercial operation in 2016 after initial construction efforts were halted in the mid-1980s. In 2017, TVA received approval from the NRC for an extended power uprate at BFN, which was completed by the end of 2019.

Table 2-3: Characteristics of TVA Nuclear Generating Units

Facility	Units	2025 Summer Net Capability (MW)	Type	Commercial Operation Date (First and Last Unit)	Operating License Expiration
BFN	3	3,662	Boiling Water	1974, 1977	2053, 2054, 2056
Sequoyah	2	2,292	Pressurized Water	1981, 1982	2040, 2041
WBN	2	2,348	Pressurized Water	1996, 2016	2035, 2055
Total	7	8,302			

The second or subsequent license renewal application for all three BFN units was submitted in January 2024. The NRC approved the renewals on December 11, 2025, which extended the licenses for an additional 20 years on all three BFN units – to 2053, 2054, and 2056, respectively. Now, work on the first license renewal application for WBN Unit 1 is underway, targeting submission in late 2026 and approval in 2028, which will be followed by work on the second license renewal for Sequoyah Units 1 and 2. TVA has an Early Site Permit to potentially construct and operate small modular reactors at TVA's CRN in Oak Ridge, Tennessee, and in 2022, the TVA Board approved a programmatic approach to exploring advanced nuclear technology.

Fuel Procurement. TVA's seven nuclear units use a total of about 4 million pounds of natural uranium equivalent (U_{235}) per year. Converting uranium to nuclear fuel generally involves four stages: mining and milling of uranium ore to produce uranium concentrates;

conversion of uranium concentrates to uranium hexafluoride gas; enrichment of uranium hexafluoride; and fabrication of the enriched uranium hexafluoride into fuel assemblies. TVA currently has sufficient enriched uranium and fabrication in inventory or under contract to provide all its requirements.

2.3.3 Natural Gas-Fired and Oil-Fired Generation

As shown in Table 2-4, TVA's natural gas-fueled fleet consists of 93 CT blocks at 10 sites (68 simple-cycle units, one cogeneration unit, 10 Aero units, 14 combined-cycle power units). The oldest CTs were completed in 1971 and the newest in 2025. Eight CTs are co-located at the coal-fired GAF site and 32 are at the sites of four now-retired coal plants (ALF, Colbert, JOF, and PAF). The remaining 45 CTs are located at five stand-alone plant sites. Some CT sites are also co-located with natural gas CC plants (Allen, Lagoon Creek, and Paradise). The individual CT units range in generating capacity from 46 MW (ACT) to 216 MW (Colbert CT Units 9-11 and Paradise CT Units 5-7). Sixty-one of the CT units are also capable of using fuel oil, and 49 are capable of quick start-up, reaching full generation capability in about 10 minutes. Commercial plant operations began for Colbert CT Units 9-11 and Paradise CT Units 5-7 in 2023, and for Johnsonville Aero CT Units 21-30 in 2025. TVA has other ongoing projects at its Cumberland and Kingston sites, an Aero CT project at its ACT site, and a simple cycle CT project on TVA land in Caledonia, Mississippi.

TVA also has 14 natural gas-fueled CC units at eight sites. At CC plants, electricity is first generated by CT units; the hot exhaust from the CTs is then run through a HRSG which creates steam to drive a steam turbine generator, greatly increasing overall plant output and efficiency. Three of the CC sites are adjacent to now-retired coal plants (ALF, John Sevier, and PAF), and three are co-located with CT units (ACT, Lagoon Creek, and Paradise). The three-unit Caledonia plant is leased by TVA through a long-term agreement, and the other CC plants are owned by TVA. The arrangement of CTs and steam generators varies, with each steam generator paired with a CT at some plants while at others, two or three CTs drive a single steam generator. Some of the turbines at the newest CC plants can be operated in traditional CC mode, or as stand-alone quick-start CT units in the event of an outage to the steam turbine or HRSG. The total summer net capabilities are 5,089 MW for the CT units, 6,958 MW for the CC units, 66 MW for the cogeneration unit, and 530 MW for the Aero CT units.

Table 2-4: Characteristics of TVA Natural Gas-Fueled Plants

Facility	Units	2025 Summer Net Capability (MW)	Commercial Operation Date (First and Last Unit)	Oil Fueling Capability
Simple Cycle (CT)				
ACT	2	92	1971, 1972	Yes
Brownsville	4	425	1999	No
Colbert	11	998	1972, 2023	Yes/No
Gallatin	8	534	1975, 2000	Yes

Facility	Units	2025 Summer Net Capability (MW)	Commercial Operation Date (First and Last Unit)	Oil Fueling Capability
Gleason	3	463	2000	No
Johnsonville ¹	13	208	1975, 2000	Yes
Kemper	4	273	2002	Yes
Lagoon Creek	12	844	2001, 2002	Yes
Marshall	8	571	2002	Yes
Paradise	3	681	2023	No
CT Subtotal	68	5,089		
Combined Cycle (CC)				
Ackerman ²	2	713	2007	No
Allen ³	1	1,106	2018	No
Caledonia ⁴	3	819	2003	No
John Sevier ⁵	1	871	2012	Yes
Lagoon Creek ⁶	1	596	2010	No
Magnolia	3	951	2003	No
Paradise ⁷	1	1,100	2017	No
Southaven	3	802	2003	No
CC Subtotal	14	6,958		
Cogeneration				
Johnsonville	1	66	1975, 2000	---
Aeroderivative CT				
Johnsonville	10	530	2025	---
Total Natural Gas and/or Oil-Fueled	93	12,643		

Source: TVA 2025a

¹ As of September 30, 2025, TVA had 10 idled units at Johnsonville CT Facility (Units 1-10). These units are included in their respective locations in the table; however, the capacity from these units is excluded.

² Ackerman CC Facility is a single steam cycle unit driven by two gas turbines (2x1 configuration).

³ Allen CC Facility is a single steam cycle unit driven by two gas turbines (2x1 configuration).

⁴ Caledonia CC Plant ("Caledonia CC") is currently a leased facility operated by TVA.

⁵ John Sevier CC Facility ("John Sevier CCF") is a single steam cycle unit driven by three gas turbines (3x1 configuration).

⁶ Lagoon Creek CC Facility is a single steam cycle unit driven by two gas turbines (2x1 configuration).

⁷ Paradise CC Facility is a single steam cycle unit driven by three gas turbines (3x1 configuration).

Fuel Procurement. TVA's consumption of natural gas has greatly increased in recent years as natural gas-fueled generation, particularly from CC plants, has increased and coal-fired generation has decreased. In 2014, TVA used about 56 billion cubic feet of natural gas to fuel its CT and CC plants and to fuel generating facilities at some non-TVA plants that sell power to TVA under terms of a power purchase agreement (PPA). Since 2014, natural gas consumption has increased and has averaged 300 billion cubic feet over the past five years. Natural gas consumption was 290 billion cubic feet in 2019, 297 in 2020, 285 in 2021, 337 in 2022, 299 in 2023, and 370 for 2024.

Annual natural gas consumption can vary due to several factors, including deviations in weather demand, generation availability across primary generation sources, and price

competition. TVA Power Operations added two CT peaking plants (Colbert and Paradise) in 2023, and the Johnsonville Aero gas turbines became operational in 2025.

TVA purchases natural gas from multiple suppliers on a daily, monthly, seasonal, and term basis. TVA transports the gas across multiple interstate pipelines to gas-generating facilities. TVA contracts for natural gas storage to provide peaking supply and balancing services to accommodate changes in generation. Due to the variety of suppliers and characteristics of the pipeline transportation network, it is not possible to break down the natural gas supply by sourcing area or extraction technique.

Fuel oil is purchased on the spot market for immediate delivery to the plants. TVA maintains an inventory of fuel oil at all its plants with oil fueling capability to provide a short-term backup supply in the event the gas supply is disrupted.

2.3.4 Diesel-Fired Generation

TVA owns one diesel-fired generating facility with 9 MW of summer net capability. This plant, located in Meridian, Mississippi, consists of five units completed in 1998. These units are not currently dispatched for generation to the transmission grid. Diesel fuel is purchased on the spot market and transported via TVA tanker trucks from third party terminals and/or other TVA on-site fuel tanks.

2.3.5 Hydroelectric Generation

The TVA hydroelectric generating system consists of 29 hydroelectric dams with 109 conventional hydroelectric generating units. Twenty-eight of these dams are on the Tennessee River and its tributaries, and one dam (Great Falls) is on a Cumberland River tributary (Figure 1-1). TVA also operates the four-unit Raccoon Mountain Pumped-Storage Plant near Chattanooga, Tennessee, with a summer net capability of 1,715 MW. The 86-MW Unit 2 at the Hiwassee hydroelectric plant in southwestern North Carolina is a reversible turbine/generator with the ability to operate as a pumped storage hydroelectric plant.

The summer net capability of the TVA hydroelectric system is 5,498 MW; this includes 3,783 MW of conventional hydroelectric generation and 1,715 MW from Raccoon Mountain. Conventional hydroelectric plants range in size from the 4-unit, 7-MW Wilbur plant to the 21-unit, 631-MW Wilson plant. The oldest of the conventional plants, Ocoee No. 1, was completed in 1911, and the newest, Tims Ford, was completed in 1970. Beginning in the early 1990s, TVA began its Hydro Modernization Program to replace outdated turbines and other equipment in the hydroelectric plants. Renamed the Hydro Life Extension Program, these modernization efforts have been completed on 68 out of 109 conventional hydroelectric units and the four pumped storage units. These project efforts allowed TVA to extend the operating life of its fleet and, in some cases, increase its MW output or increase overall unit efficiency.

TVA made additional improvements and updates to the Raccoon Mountain facility, which added 84 MW of pumped storage capacity. TVA continues to modernize its remaining hydroelectric units at the rate of two or three units per year. These ongoing efforts are designed to maintain the units' generating capacity and improve their efficiency; they will not necessarily result in increased capacity. Details about the hydroelectric plants and the operation of the hydroelectric system are available in the Reservoir Operations Study (TVA 2004).

2.3.6 Non-Hydro Renewable Generation

TVA owns approximately 1 MW of solar capability across nine operating small PV solar installations (Figure 1-1). Renewable resources are typically referred to in nameplate capacity, or maximum hourly generating capability. TVA has also been adding solar through PPAs based on economics and to meet customer demand. TVA has long-term PPAs for 1,438 MW of operating solar nameplate capacity and has contracted for an additional 2,528 MW of solar nameplate capacity expected to come online over the next few years, including contracts signed in the latest procurement cycle.

2.4 Purchased Power

For FY 2021 through FY 2025, purchased power comprised 13 to 20 percent of TVA's total power supply. In FY 2025, TVA purchased 33,379 million kWh of power, which comprised 20 percent of its total power supply. Approximately 3 percent of this purchased power was purchased on the spot market, 2 percent through short-term PPAs, and 95 percent through long-term PPAs.

TVA has major PPAs for nearly 8,500 MW of generating capacity, with an additional 2,848 MW under contract but not yet online (TVA 2025a). The major PPA contracts/facilities, other than those that are part of specific programs, are listed in Table 2-5. Additionally, TVA purchases hydroelectric generation from nine U.S. Army Corps of Engineers (USACE) dams on the Cumberland River and its tributaries through a long-term contract with the Southeastern Power Administration, a federal power marketing agency.

Under the Public Utility Regulatory Policies Act (PURPA), TVA is required to purchase energy from qualifying facilities at a price equal to what it would cost TVA to generate this energy itself or purchase this energy from another source. Qualifying facilities are cogeneration or small power production facilities that meet certain ownership, operating, and efficiency criteria. Cogeneration (also known as combined heat and power) facilities produce electricity and another form of useful thermal energy (heat or steam) for industrial or other uses. A qualifying small power production facility has a capacity of 80 MW or less and generates power through renewable (hydroelectric, wind or solar), biomass, waste, or geothermal resources. TVA fulfills this requirement through the Dispersed Power Production program. As of September 30, 2025, there were 1,344 generation sources, with a combined qualifying capacity of 281 MW, whose power TVA purchases through the Dispersed Power

Production program. Most of this power is generated by a 45-MW cogeneration plant operated by International Paper in Lowndes County, Mississippi, and by a 30-MW cogeneration plant operated by DTE Energy in Marshall County, Kentucky. Most of the smaller Dispersed Power Production generation sources are solar PV facilities with a capacity of less than 600 kW and installed on or in association with municipal, institutional, and commercial buildings.

Since 2003, TVA has executed several Dispersed Power Production programs that issue contracts with PURPA qualifying facilities to promote and increase renewable energy. These programs have been developed and improved throughout the years leading to more efficient implementation practices.

Table 2-5: Major Power Purchase Agreement Contracts/Facilities

Facility	Owner/Marketer	Location	Capacity (MW) ¹	Contract End Date
Natural Gas				
Decatur Energy Center	Capital Power	AL	833	2032
Morgan Energy Center	Calpine Energy Services	AL	735	2028
Wansley CC (1 unit)	Southern Company	GA	250	2024
Wansley CC (1 unit)	Southern Company	GA	250	2025
Harris CC	Southern Company	AL	500	2024
Bethlehem Energy Center	Calpine Energy Services	PA	500	2028
Sandersville Plant	Morgan Stanley	GA	146	2026
Zion Energy Center	Calpine Energy Services	IL	479	2025
Nodaway Power Plant	Associated Electric Coop	MO	50	2024
Lignite Coal				
Red Hills Power Plant	PurEnergy	MS	440	2032
Coal				
Daniel Coal Plant	Southern Company	MS	500	2025
Bowen Coal Plant	Southern Company	GA	250	2025
Diesel				
McMinnville	City of McMinnville	TN	23	2029
Powell Valley	Powell Valley	TN	20	2031
University of Tennessee Martin	University of Tennessee	TN	8	2028
City of Ripley	City of Ripley	TN	8	2028
University of Mississippi	University of Mississippi	MS	20	2028
Mississippi State University	Mississippi State University	MS	26	2028
City of Scottsboro	City of Scottsboro	AL	10	2035
Wind				
Buffalo Mountain (Windrock)	Invenergy	TN	25	2025
Lost Lakes	EDPR	IA	101	2030
Caney River	ENEL Green Power North America	KS	201	2031

Facility	Owner/Marketer	Location	Capacity (MW) ¹	Contract End Date
Pioneer Prairie	EDPR	IA	198	2031
White Oak	NextEra Energy Resources	IL	150	2031
Bishop Hill	Brookfield Renewable	IL	200	2032
Cimarron	NextEra Energy Resources	KS	165	2032
California Ridge	Brookfield Renewable	IL	200	2032
Solar				
West Tennessee Solar Farm	University of Tennessee	TN	4	2032
River Bend	NextEra Energy Resources	AL	75	2036
Millington	Silicon Ranch	TN	53	2038
Skyhawk	Origis Energy	TN	100	2043
Elora	NextEra	TN	150	2042
Muscle Shoals Solar	Orsted	AL	227	2041
McKeller	Silicon Ranch	TN	70	2038
Bell Buckle	Silicon Ranch	TN	35	2043
Canadaville	Silicon Ranch	TN	16	2042
Golden Triangle II	Mississippi Solar 6	MS	150	2040
Storage				
Golden Triangle II	Mississippi Solar 6	MS	50	2040
Biomass				
Chestnut Ridge Landfill Gas	Waste Management	TN	5	2031
Hydroelectric				
Cumberland Hydro	DOE	TN, KY	402	2026
BSMH	Brookfield Smoky Mountain Hydropower LP	TN, NC	377	2024

¹ Capacities for the solar PV facilities are direct current (DC); all other capacities are alternating current (AC).

Green Power Providers (GPP) Program. The GPP program is an end user generation program that began in 2003 as the Generation Partners (GP) pilot program. Under the GP pilot program, TVA purchased renewable energy generated by facilities installed by residential, commercial, and industrial customers. TVA purchased qualifying renewable generation at retail cost plus a premium rate via a generation credit on the participant's monthly bill via a 10-year PPA. In 2007, the TVA Board adopted a dual metering standard under PURPA that required TVA to make available to its distributors the option to participate in a dual metering program modeled after the GP pilot program. In 2012, the GP pilot program was replaced with the GPP program, which operated similarly to its predecessor and consistent with the dual metering standard TVA adopted in 2007. Qualifying generating systems had a maximum capacity of 50 kW_{DC} (direct current, DC) and included solar PV panels, wind turbines, low-impact hydropower, and systems using several types of biomass fuels. A \$1,000 incentive for new participants was phased out in 2015 for new non-residential participants and in 2016 for new residential participants. Additionally, the generation credit paid decreased in concert with the significant decrease in the installed cost of solar. For calendar year 2018, the GPP program capacity for new applicants was capped at 10 MW_{DC}.

Generation credit rates for the 20-year contract period were \$0.09/kWh for systems with a capacity of up to 10 kW_{DC} and \$0.075/kWh for larger systems.

The maximum capacity of individual systems installed under the two programs has varied from a high of 1 MW_{DC} to the current 50 kW_{DC}. As of January 2024, the combined GP and GPP program had over 3,500 generating systems with a total nameplate capacity of about 108 MW_{DC}. Solar PV facilities comprised about 90 percent of this capacity. Biomass (landfill gas, wastewater methane and wood waste and chips) comprised about 10 percent of capacity. Wind generation provided about 96 kW_{DC} and small hydroelectric systems provided 9 kW_{DC}. In February 2019, the TVA Board approved a revised net metering standard, the closure of the GPP program to new applicants effective January 1, 2020, and the phasing out of the GPP program completely as existing contracts with participants expire.

Renewable Standard Offer (RSO). In October 2010, TVA issued the RSO to promote the development of renewable energy in the TVA PSA. TVA's RSO program was designed for developers of new renewable energy projects greater than 50 kW and less than or equal to 20 MW in size located within the TVA region; and offered set prices and terms and conditions (or a "standard offer") to developers of small to mid-size renewable projects under long-term contracts up to 20 years to promote renewable generation from qualified sources. Qualifying fuel sources included solar PV, wind, and biomass from wood waste, agricultural crops or waste, animal and other organic waste, energy crops, and landfill gas and wastewater methane. The RSO program was closed to new proposals in 2015. As of January 2025, 15 RSO facilities with over 138 MW of generating capacity were operating. TVA may still seek and enter into additional long-term, negotiated PPAs for new landfill gas and digester gas-to-energy projects if they meet similar criteria used under RSO, plus additional, negotiated business case justifications.

Solar Solutions Initiative (SSI). In February 2012, TVA initiated the SSI, a targeted incentive program aimed to support the existing TVA-region's solar industry and to recruit new industry to the region. In addition to terms similar to those of the RSO, SSI provided incentive payments for solar projects in the RSO program greater than 50 kW and less than or equal to 1 MW that used local certified solar installers. As of January 2025, the program had 56 operating facilities with a total capacity of about 37 MW.

Distributed Solar Solutions (DSS). At the end of 2015, TVA closed the SSI program to new proposals and initiated the DSS program. The DSS program was designed to encourage the TVA-region LPCs to develop and operate solar projects with capacities between 50 kW and 2 MW. The program was offered in 2016 and 2017, and as of January 2025, the program has 11 facilities with a total capacity of about 20.6 MW operating.

Renewable Investment Programs. In 2018, TVA launched two programs to support accelerated renewable investment: Renewable Investment Agreement (RIA) and the Flexibility Research Project (FRP) pilot. RIA supports utility scale renewable generating

facilities for large commercial and industrial customers, and FRP supports community solar, in partnership with LPCs. Community scale solar provides opportunities for LPC customers to invest in LPC sponsored community solar facilities as a lower cost alternative to constructing and operating their own rooftop or other solar facilities. In 2020, the RIA program was rebranded to Green Invest. FRP closed in January 2021. One project is operational of around 1 MW with the Knoxville Utility Board, and one additional proposal that is still being considered.

2.5 Demand-Side Management Programs

TVA has had a portfolio of demand-side management (DSM) programs focusing on EE and DR for many years. EE programs are designed to reduce the use of energy while still providing reliable electric service. Smart electric technology programs improve consumer energy performance, safety, and comfort. DR programs are designed to temporarily reduce a customer's use of electricity, typically during peak periods and for system reliability or economic reasons. Because the energy use is typically shifted to off-peak times, DR typically has little effect on total energy use. It does, however, provide system reliability and reduce the need for peaking generation capacity. DR program participants receive credits on their electric bills. The TVA DSM portfolio is a combination of fully deployed mature programs, recently initiated programs, and programs under development. Refer to Volume 1, Appendix G for more information.

2.6 Transmission System

TVA operates one of the largest transmission systems in the U.S. It serves an area of 80,000 square miles through a network of 16,400 miles of transmission line; 583 substations, switchyards, and switching stations; and 1,351 individual customer connection points. The system connects to switchyards at generating facilities and transmits power from them at either 161 kilovolts (kV) or 500 kV to LPCs and direct served customers. Substations at delivery points reduce the voltage for delivery through LPC distribution lines serving end users.

The TVA transmission system operates at a range of voltages:

- 500-kV lines – 2,486 miles
- 345- and 230-kV lines – 150 miles
- 161-kV lines – 11,992 miles
- 138- and 115-kV lines – 221 miles
- 69-kV lines – 946 miles
- 46-kV lines – 533 miles
- 26- and 13-kV lines – 16 miles

The TVA transmission system has 69 interconnections with 13 neighboring electric systems and delivered nearly 168 billion kWh of electricity to TVA customers in 2025. These interconnections allow TVA and its neighboring utilities to buy and sell power from each other and to transmit power through their systems to other utilities. Pursuant to its Transmission Service Guidelines, TVA offers transmission services to eligible customers to transmit wholesale power in a manner that is comparable to TVA's own use of the transmission system.

In recent years, TVA has built an average of about 65 miles of new transmission lines and several new substations and switching stations per year to serve new customer connection points and/or to increase the capacity and reliability of the transmission system.

PRELIMINARY

3 Alternatives

TVA uses a scenario planning approach in integrated resource planning, a common approach in the utility industry. Scenario planning is useful for determining how various business decisions will perform in an uncertain future. The IRP develops a least-cost plan that is consistent with TVA's requirements under Section 113 of the Energy Policy Act of 1992. The IRP objectives, including the least-cost planning principles, are described in Section 2.1 of Volume 1. Multiple strategies, which represent business decisions within TVA's control, are modeled against multiple scenarios, which represent uncertain futures outside of TVA's control. The intersection of a single strategy and a single scenario results in a resource portfolio. A portfolio is a long-term capacity plan through 2050 that is unique to each combination of strategy and scenario. Additional information can be found in Chapter 2 of Volume 1, incorporated herein by reference.

3.1 Development of Scenarios

The 2026 IRP includes three unique scenarios for evaluation (Figure 3-1):

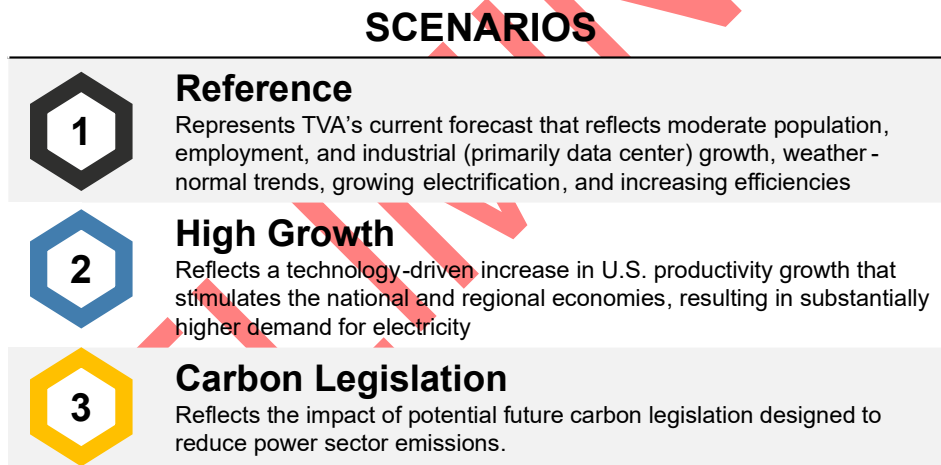


Figure 3-1: Key Characteristics of the Three Scenarios

Generally defined, scenarios are the future worlds in which TVA may find itself operating. They are driven by factors outside of TVA's control but to which TVA must be prepared to respond. The IRP scenarios were designed assuming that key uncertainties would deviate from historical trends in the future. Key uncertainties identified relate to electricity demand, environmental policy and regulations, macro-economic trends, and other factors. These and other aspects of the scenarios are described in detail in Volume 1, Section 2.4.

3.2 Alternative Strategies and Associated Capacity Expansion Plans

3.2.1 Development of Alternative Strategies

TVA decided on three distinct strategies to explore in the IRP analysis. Strategy A, Baseline Utility Planning, is the No Action Alternative. The two other strategies represent action alternatives, along with the Preferred Alternative.

- Strategy A: Baseline Utility Planning (No Action Alternative)
- Strategy B: Innovation
- Strategy C: Distributed

Figure 3-2 provides key characteristics of the three alternative strategies. Narratives for alternative strategies were developed to generally explain the goal of each strategy and then resource types to be emphasized were identified to achieve each strategy's goal. Baseline Utility Planning represents fundamental least-cost planning, and all strategies apply a planning reserve margin to provide sufficient resources to account for variations in load and generating unit availability. The other strategies emphasize specific themes – from promotion of emerging, firm, dispatchable resources through innovation, R&D and partnerships to promotion of distributed and demand-side resources or smaller, more dispersed resources that enhance local resiliency, as shown in Figure 3-3. The mechanism applied to promote resources required minimum additions in order to drive diverse portfolio outcomes. The Strategy Design Matrix provides the roadmap for how resource promotions were applied in capacity planning. Further details on strategy design can be found in Volume 1, Section 2.5.

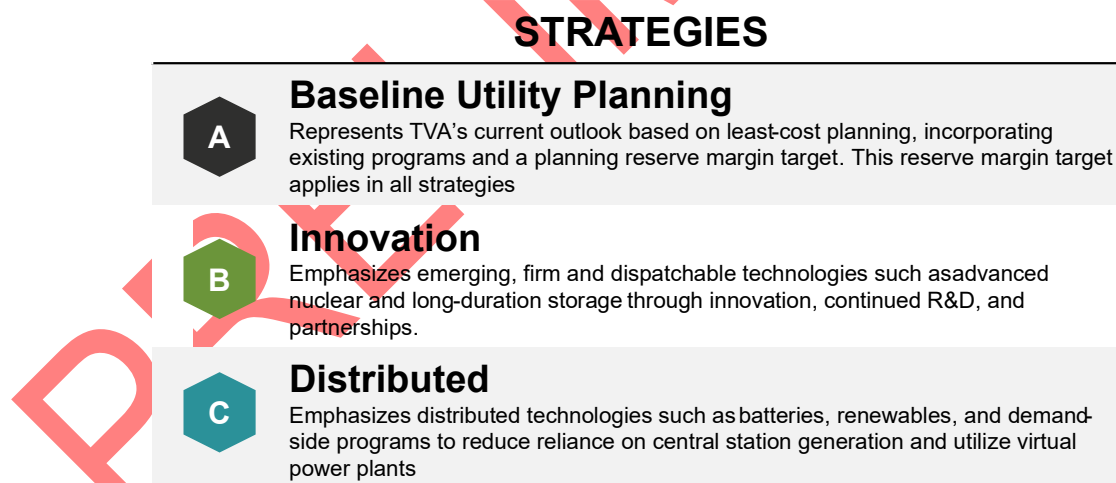


Figure 3-2: Key Characteristics of the Three Alternative Strategies

STRATEGY	UTILITY-SCALE RESOURCES							DISTRIBUTED AND DEMAND-SIDE RESOURCES			
	Nuclear	Coal	Gas CC and Frame CT	Aero CTs and RICE	Renewables	Battery Storage	Long-duration Storage	Distributed Solar	Distributed Storage	EE	DR
A Baseline	Base	Base	Base	Base	Base	Base	Base	Base	Base	Base	Base
B Innovation	Emphasize	Base	Base	Base	Base	Base	Emphasize	Base	Base	Base	Emphasize
C Distributed	Base	Base	Base	Emphasize	Emphasize	Emphasize	Base	Emphasize	Emphasize	Emphasize	Emphasize

Figure 3-3: Promotion Levels for Selected Energy Resources Associated with Each Strategy

3.2.2 Capacity Expansion Plans

The three scenarios forecasted varying levels of electricity demand, which drove varying levels of capacity requirements and need for incremental resources in each scenario. The planning model then applied the resource emphasis identified for each strategy and solved for an optimal, least-cost portfolio for each unique scenario and strategy combination.

Capacity expansion plans are comprised of baseline firm supply plus incremental capacity change, or the total MW available. The following provides a summary of the capacity expansion plans, also known as resource portfolios, developed for each of the alternative strategies. Capacity additions are quantified in MW and annual energy production is quantified in terawatt hours (TWh). The forecasted capacity available from existing resources changes over the study window as purchased power contracts expire and some generating units are projected to reach the end of their useful life (see Volume 1, Table 2-2).

Key themes regarding capacity and expansion plans across all portfolios through 2040 and additional sensitivity analysis include:

- New capacity is needed in all scenarios to support load growth or replace expiring and end-of-life capacity.
- Firm, dispatchable technologies are needed to ensure system reliability throughout the year.
- Gas expansion serves broad system needs, with the ability to provide firm, dispatchable capacity, economic energy, and system flexibility.
- Storage expansion continues, driven by both battery storage and the potential for additional pumped storage.
- New nuclear technologies, with continued advancements, can support load growth and reduce fuel volatility and regulatory risks.
- Solar expansion plays a complementary role, meeting customer needs and providing economic energy.
- EE deployment reduces energy needs, particularly between now and 2040, and DR programs grow with the system and the use of smart technologies.

A mix of resource types – both supply and demand-side – will be required to meet system needs. In all scenarios, TVA will continue to provide affordable, reliable, and resilient energy for years to come.

The figures below show the portfolio results through 2040. Results are presented in two ways – incremental capacity from now through 2040 (Figure 3-4) and total energy in 2040 (Figure 3-5). Incremental capacity represents the new resources selected to fill capacity needs. Capacity needs are driven by forecasted growth in energy demand and the expiration or expected end-of-life of approximately 11,000 MW of existing capacity. Total energy represents the energy expected from the economic dispatch of resources in the capacity plans for each portfolio. The results for each portfolio are grouped together. Within a scenario, strategy results are grouped by resource type, which varies based on strategic focus and the impact on portfolio optimization. Further information on capacity plans can be found in Volume 1, Chapter 3 and Appendix H.

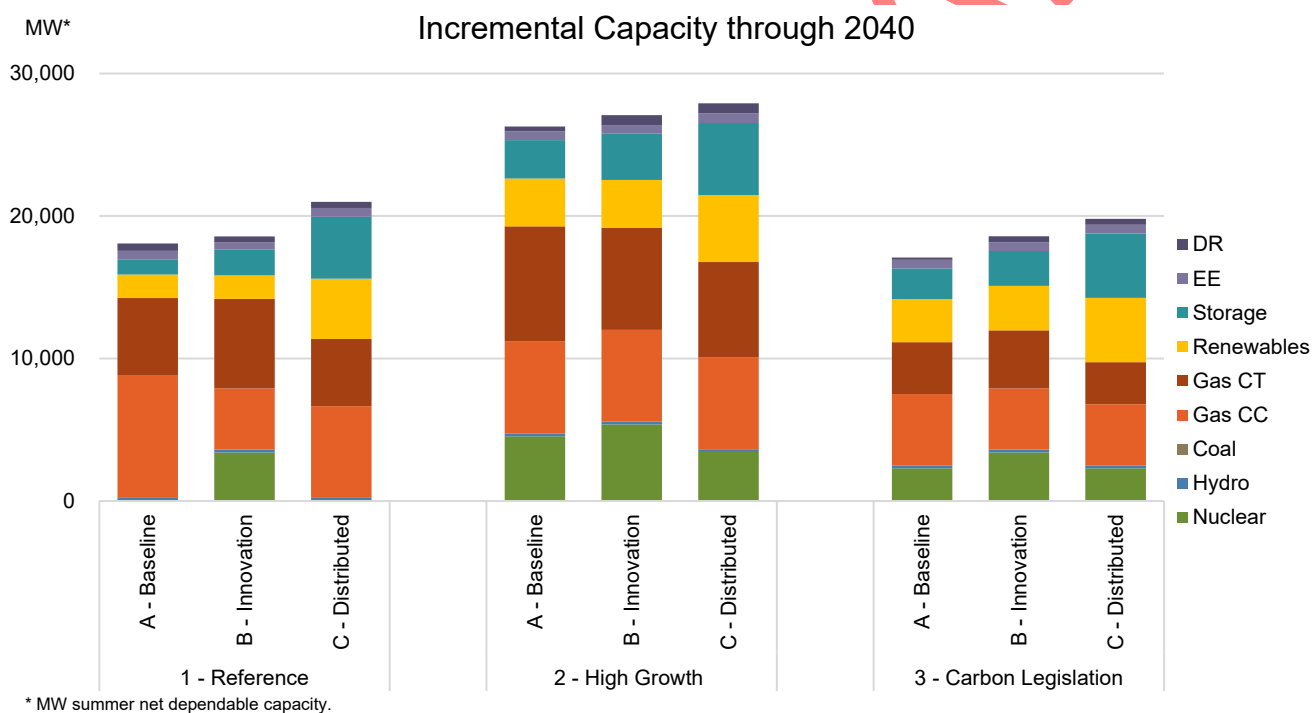


Figure 3-4. Incremental Capacity through 2040 (Summer NDC)

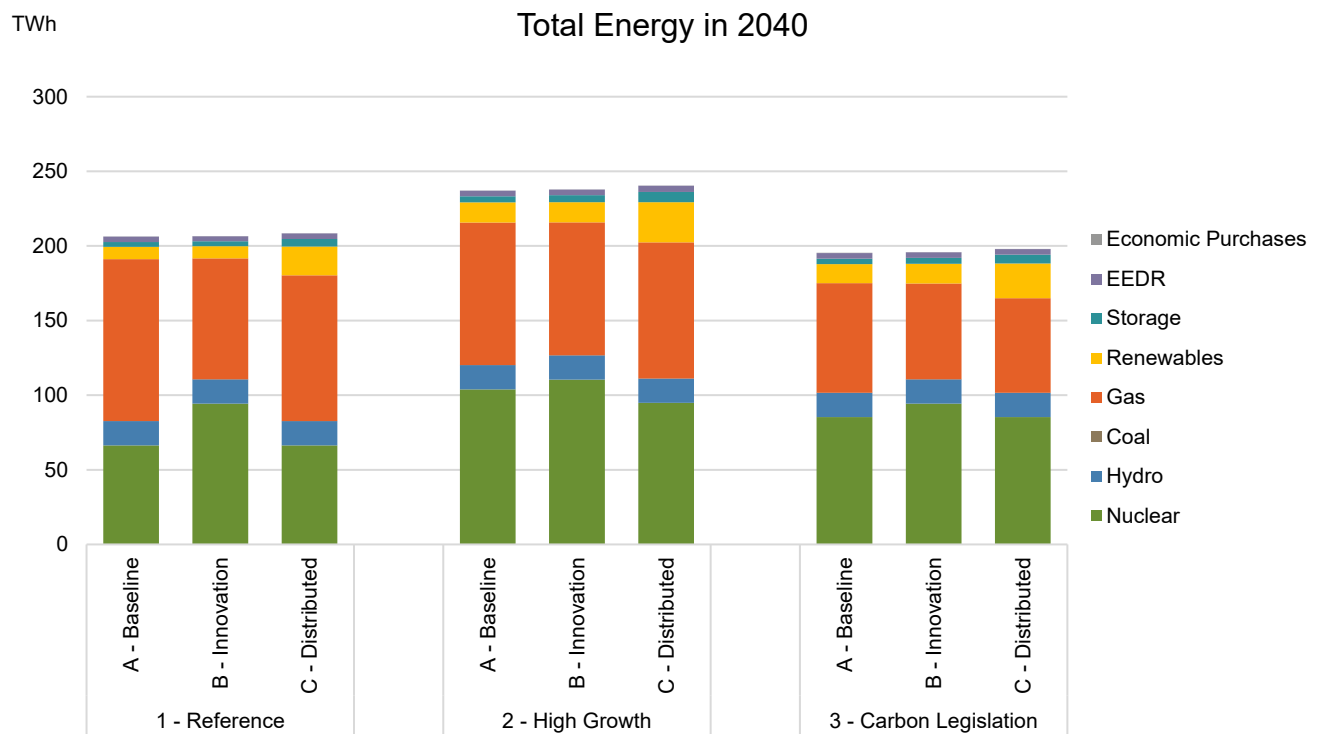


Figure 3-5. Total Energy in 2040

Similar to the above portfolio results, the figures below extend the portfolio results through 2050, again displayed in two ways – incremental capacity changes from now through 2050 (Figure 3-6) and total energy in 2050 (Figure 3-7). Within a scenario, strategy results are grouped by resource type, which varies based on strategic focus and the impact on portfolio optimization. Further information on capacity and energy plans can be found in Volume 1, Sections 3.2 through 3.4, and Appendix H.

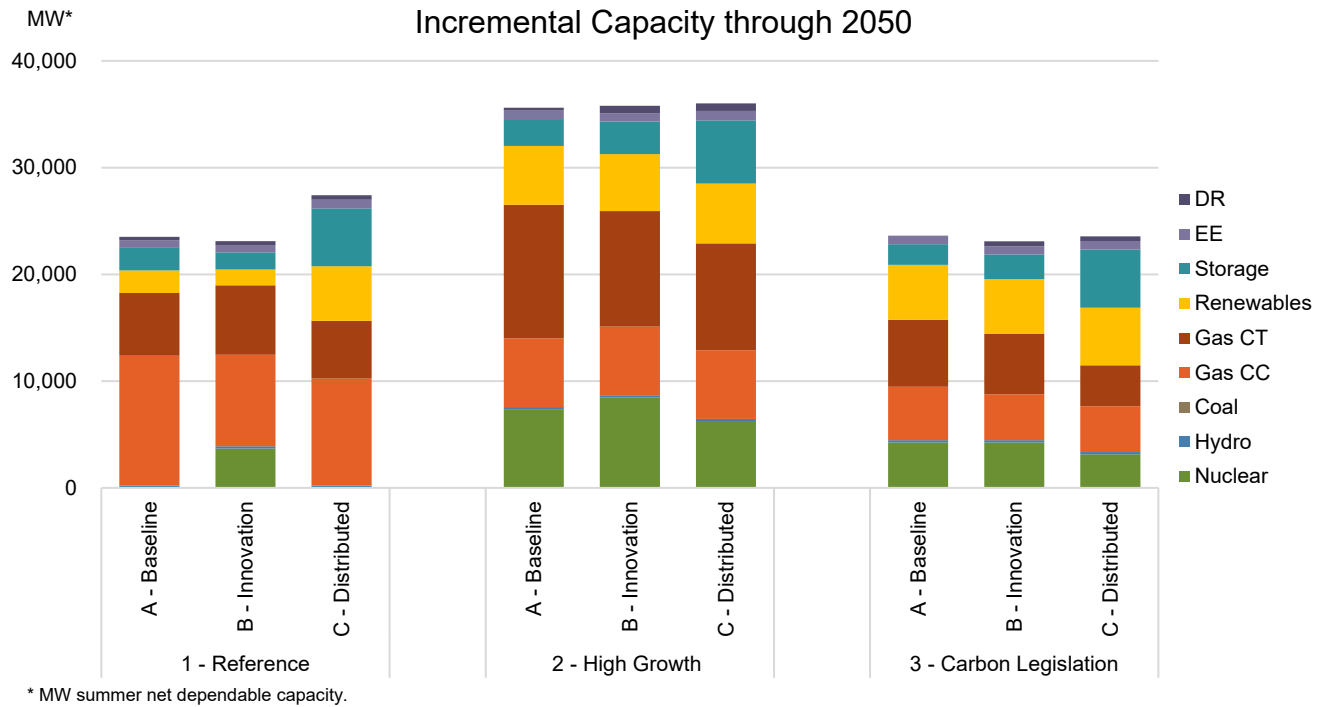


Figure 3-6: Incremental Capacity through 2050 (Summer NDC)

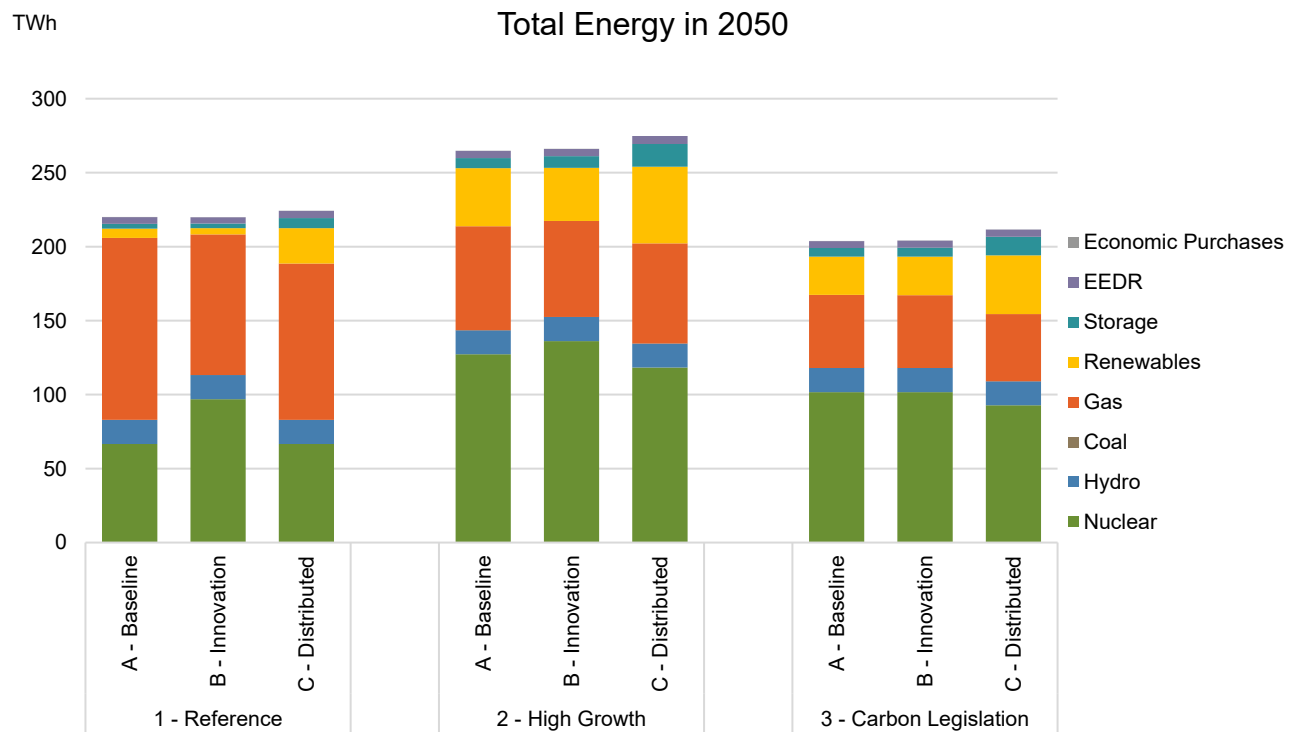


Figure 3-7: Total Energy in 2050

3.2.3 Sensitivity Analysis

When analyzing core portfolio results and considering stakeholder and public input, TVA identified questions warranting further evaluation related to key assumptions that could influence results. TVA used sensitivity analysis to assess potential impacts, varying a key assumption to isolate the impact of that change on portfolio results. For additional insights, TVA performed sensitivity analysis focused in the following areas:

- Electricity demand changes
- Resource costs and availability
- Natural gas commodity prices

In general, sensitivity results fell within the capacity expansion bounds for resource selection of the nine core portfolios with the exception of Higher EE Availability and Deployment and Supercharged Growth. Additionally, earlier and later coal end-of-life cases were evaluated and show very little variation in incremental capacity by 2040; rather, it is the timing of resource additions that differs. A discussion of each sensitivity is included in Volume 1, Section 3.10. The results of sensitivity analyses, along with the results of the nine core portfolios, metrics, and the EIS, were considered in developing the IRP recommendations, including the Preferred Alternative. Sensitivities are also included in the extended range of environmental impacts found throughout Volume 2, Section 5.5 for multiple resources.

3.2.4 Potential Retirement or End-of-Life of TVA Generating Facilities

Several TVA facilities have units that could reach end-of-life during the planning period. For planning purposes, existing TVA coal plants are expected to reach end-of-life by 2039, subject to TVA Board approval and further environmental review. In addition, based on unit age, TVA expects some of its oldest gas CC plants to reach end-of-life in the late 2030s and 2040s.

The following sections describe in general the activities that would occur upon potential retirement or end-of-life of these facilities.

3.2.4.1 Natural Gas Plants

Decommissioning is the performance of activities required to ready a facility for deactivation. Key decommissioning activities at natural gas-fired CT and CC facilities include:

- Tag out all unit or plant equipment except service water, lighting, etc.
- Remove and properly dispose of hazardous and other wastes, including polychlorinated biphenyl (PCB)-containing equipment.
- Empty all storage tanks and reuse or dispose of contents (fuel oil, glycol, demineralized water, raw water, condensable fluids from gas supply).
- Open all equipment electrical breakers not in use.
- Drain oil, fuel, and fluids.

- Salvage, store, and relocate, as practical, all useable equipment, components, materials, spare parts, office products, etc.
- Salvage and store all key plant records.

Deactivation is the shutting down of power and energized systems as appropriate as well as severing and/or isolating power, water, fuel supply and piping to the plant to provide a cold, dark and dry structure. Activities may also include rerouting of power and services as required for any facilities that will remain operational.

Limited decontamination involves removing select regulated materials in a safe and practical manner with the intention of leaving the plant in a status that does not present a hazard or risk to the environment or personnel. Work may include abatement and disposal of regulated materials. Regulated materials include but are not limited to PCB equipment, asbestos, hazardous waste, solid waste, products, etc. Key decontamination activities at CTs include:

- Removal and proper disposal of regulated materials, as practical.
- Periodic materials condition monitoring.
- Periodic waste removal as materials deteriorate over time.

Decommissioning may also include the demolition of structures or infrastructure and the preparation and reclamation of the site for future use.

3.2.4.2 Coal Plants

Decommissioning is the performance of activities required to ready a facility for deactivation. Work performed includes removal of equipment, components, and parts that can be used at other sites; draining of oil/fluids from equipment; removal of coal and ash from boilers and other equipment; removal of hazardous materials and potential waste-like materials; removal of PCB equipment; removal of furniture/furnishings; removal of information technology assets; and removal of plant records. Key decommissioning activities at coal plants include:

- Tagging out all unit or plant equipment except service water, lighting, etc.
- Emptying and cleaning hoppers, bins, bunkers, etc.
- Opening all equipment electrical breakers not in use.
- Draining oil and fluids
- Salvaging, storing, and relocating as practical all useable equipment, components, materials, spare parts, office products, etc.
- Salvaging and storing all key plant records.

Deactivation work is similar to natural gas facilities but may also include removing power and services, installing bulkheads, and sealing tunnels. Activities may also include rerouting of power and services as required for any facilities that would remain operational. Key deactivation activities at coal plants include:

- Performing electrical and mechanical isolation of systems, components, and areas.
- Installing bulkheads and/or fill tunnels.
- Providing alternate power and services (sump pumps, Federal Aviation Administration stack lighting, etc.).

Limited decontamination involves removing select regulated materials in a safe and practical manner with the intention of leaving the plant in a status that does not present a hazard or risk to the environment or personnel. Limited contamination work may include abatement and disposal of regulated materials, which include but are not limited to PCB equipment, asbestos, hazardous waste, solid waste, products, etc. Key decontamination activities at coal plants include:

- Removal and proper disposal of regulated materials, as practical.
- Periodic materials condition monitoring.
- Periodic waste removal as materials deteriorate over time.

Decommissioning may also include the demolition of structures or infrastructure and the preparation and reclamation of the site for future use.

3.3 Strategy Performance

Reflecting least-cost planning principles and feedback from the IRP Working Group, TVA developed a set of metrics to assess the performance of the portfolios. Metrics were grouped into four categories – low cost, risk informed, environmentally responsible, and diverse, reliable, and flexible system operations. Metrics were calculated for the nine portfolios and were used to evaluate strategy performance for each category (Figure 3-8).

Strategy	Low Cost	Risk Informed	Environmentally Responsible			Diverse, Reliable, and Flexible
			Land	Water	Air	
A Baseline Utility Planning						
B Innovation						
C Distributed						
Good Strong Outstanding						

Figure 3-8: 2026 IRP Strategy Performance Summary

Looking across the metric categories, there were key tradeoffs to consider. Key takeaways include:

- Strategy A that applies baseline utility planning is the lowest cost strategy overall, though its reliance on natural gas generation results in higher risk than alternative strategies.
- Strategy B is the most expensive overall, as it would require significant investments in nuclear expansion, but performs well in risk informed and operational metrics with low variation in operating cost due to lower fuel price volatility.
- Strategy C is generally the median in cost and performs well in risk informed metrics due to low variation in operating cost due to lower fuel price volatility; Strategy C is most challenged in operational metrics as higher reliance on intermittent renewable generation increases the risk of unserved energy or energy curtailment.
- All strategies include timeline, technological, transmission, and/or market depth uncertainty and execution risks, which are amplified by load growth and regulatory impacts.
- Strategies feature environmental tradeoffs, such as Strategy C having the highest land use, Strategy B having the highest water consumption, and Strategy A having the highest carbon dioxide (CO₂) intensity.
- All strategies perform well in operational metrics on an absolute basis and would continue to result in a reliable and resilient system.

3.3.1 Strategy A: Baseline Utility Planning (No Action Alternative)

Baseline Utility Planning represents fundamental least-cost planning. No specific resource types are emphasized beyond existing programs. Resources are modeled and chosen economically to meet the reserve margin constraint for reliability. Planning reserve margins are included for summer and winter peak seasons, and they apply in all strategies. These targets are developed separately from the IRP and employ an industry best-practice 1-in-10-year loss-of-load expectation level of reliability.

As Strategy A applies no resource promotions, it is the lowest cost strategy overall, though its higher reliance on natural gas generation results in higher risk than alternative strategies. Strategy A portfolios have the highest natural gas generation and the lowest land use on average across the strategies.

See Volume 1, Section 3.7 for more information about Strategy A performance.

3.3.2 Strategy B: Innovation

Under the Innovation strategy, TVA focuses on developing emerging technologies that are firm and dispatchable, meaning that they can be reliably and predictably turned on and off to meet demand. These technologies include advanced nuclear and long duration storage. Under this strategy, TVA would increase efforts in research and development to advance and deploy these new technologies. This could be executed through partnerships with the

federal government or other organizations, such as universities, research labs, and startups, to share resources and expertise.

Strategy B is the most expensive overall, as it would require significant investments in nuclear expansion. Land use is comparable to Strategy A, but water consumption is highest in this strategy. Technological risks are greatest in portfolios with more reliance on emerging energy technologies, and Strategy B portfolios have the highest amount of new nuclear. This strategy performs well in operational metrics with low variation in operating cost due to lower fuel price volatility, and it features median performance in unserved energy and curtailment metrics.

See Volume 1, Section 3.7 for more information about Strategy B performance.

3.3.3 Strategy C: Distributed

The Distributed strategy emphasizes resources that are more geographically dispersed in nature, both at utility and distribution scale. At the utility scale, this strategy would emphasize battery storage and smaller natural gas generators, such as Aero CTs and reciprocating internal combustion engines, which are more modular and can be sized and adapted to meet both local and system needs. This strategy also emphasizes utility scale solar where individual solar farms are often smaller in capacity compared to traditional thermal generation and are therefore more distributed across the service territory. Finally, this strategy includes increased incentives to encourage customers to install distributed generation and participate in DSM programs. Distributed generation includes distributed solar and storage while DSM options include EE and DR programs. This strategy would require the use of existing and potentially expanded customer partnerships and programmatic solutions to increase uptake of these distributed resources. Program design would need to ensure that the incentive structure is balanced and fair, so that it does not disrupt the grid or lead to higher costs for other non-participating customers.

Strategy C is generally the median in cost. Strategy C portfolios have the highest renewable and storage additions on average. With the largest solar buildouts under this strategy, transmission risks and land use are greatest. Water consumption intensity is lowest as higher renewable generation displaces thermal generation. Operationally, higher reliance on intermittent renewable generation increases the risk of unserved energy or energy curtailment.

See Volume 1, Section 3.7 for more information about Strategy C performance.

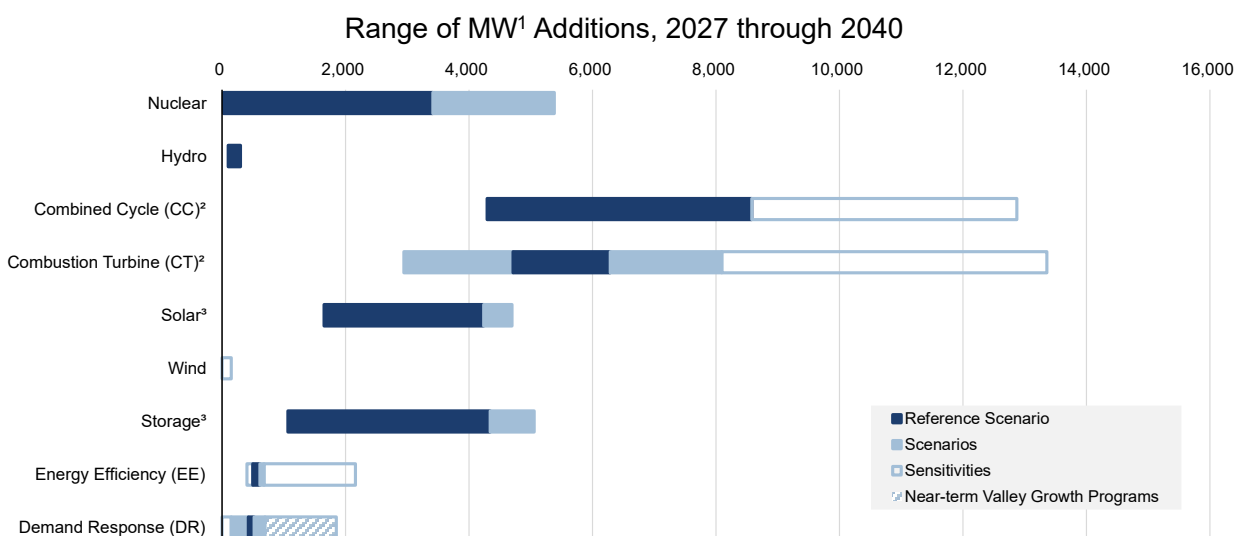
3.4 Preferred Alternative – Power Supply Mix Ranges and Strategic Portfolio Direction

The IRP results – including the nine core portfolios, metrics, sensitivities, and EIS – provide robust analysis that offers insights into the potential power supply mix and impacts to the customer priorities of power cost, reliability, resiliency, and environmental responsibility. The

implementation process is described in detail in Volume 1, Chapter 4 and was guided by the objectives of resource planning outlined in Volume 1, Chapter 2, which evaluates cost, operational, environmental, and risk factors in order to provide reliable service at the lowest system cost. The resulting 2026 IRP Power Supply Mix Ranges and Strategic Portfolio Direction is TVA's preferred alternative.

3.4.1 Power Supply Mix Ranges through 2040

Exploring potential scenarios and strategies in the IRP is fundamental to ensuring TVA is well prepared to meet the region's energy needs however the future unfolds. The chart below shows the power supply mix ranges – or incremental additions – from now through 2040. The ranges encompass the full set of results, with reference scenario results shown in the dark blue bars, and alternative scenario and sensitivity results outside of the reference ranges shown in the light blue bars and outline-only bars, respectively. In general, the upper end of most ranges are set by the High Growth scenario or the Supercharged Growth sensitivity.



¹ MW capacity expressed in summer net dependable capacity.

² CC and CT additions could include control technologies, such as carbon capture and storage/sequestration (CCS), alternative fuel co-firing (e.g., hydrogen), or gas re-firing of existing coal burners.

³ Solar and storage include utility-scale and distributed resource additions.

Figure 3-9. Power Supply Mix Ranges through 2040

3.4.2 Strategic Portfolio Direction

TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced

nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The 2026 IRP's strategic portfolio direction includes the following recommended actions:

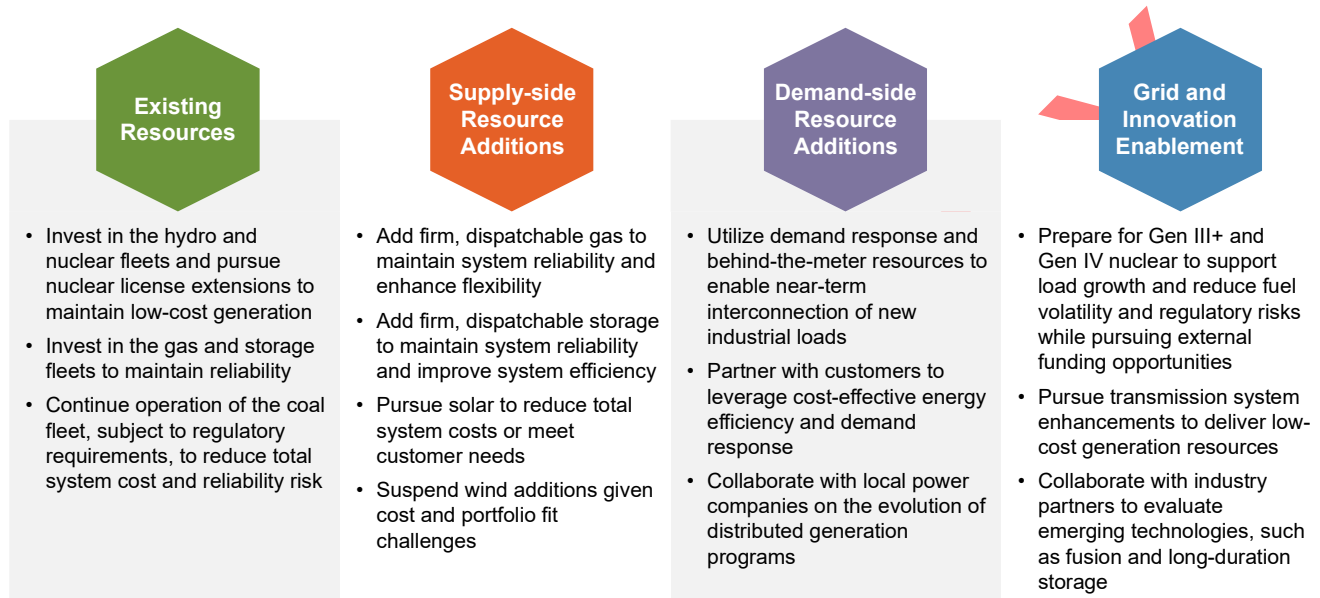


Table 3-1 outlines the IRP ranges, current actions in progress, and planned actions through 2040 for existing resources and mature resource additions, including supply-side and demand-side resources. A combination of resource additions is needed to ensure the region continues to have affordable, reliable, and resilient power. Additions will vary within the ranges based on movements in key signposts.

Table 3-1. Strategic Portfolio Direction – Planned Resource Actions through 2040 (Preferred Alternative)

Resource Type	Gigawatts (GW) by 2040	Actions in Progress	Planned Actions through 2040
Nuclear	Up to 5 GW	Pursuing license extensions for and investing in the existing nuclear fleet; evaluating advanced nuclear options	Continue investing in the existing nuclear fleet and cost-effective opportunities to increase output; potential for advanced nuclear deployment
Hydro	Up to 1 GW	Ongoing investments in the Hydro Life Extension (HLE) program, leveraging cost-effective ways to increase output	Continue investing in the existing hydro fleet, maximize cost-effective uprate potential, and evaluate market opportunities

Resource Type	Gigawatts (GW) by 2040	Actions in Progress	Planned Actions through 2040
Coal	Expected to reach end of life by 2040	Continuing operation of coal fleet, subject to regulatory requirements, as an immediate, cost-effective option to reduce total system cost and system reliability risk	Evaluate existing fleet, as needed, considering material condition, system reliability, system cost, regulatory requirements, and replacement generation
Gas CC	4 to 13 GW	2 GW of CC capacity being added by 2028 to address capacity requirements and provide grid support	Continue investing in the existing fleet and evaluate future CC additions and market opportunities for system reliability needs
Gas CT	3 to 13 GW	2 GW of Frame and Aero capacity being added by 2028 to address capacity requirements, provide grid support, and enhance system flexibility	Continue investing in the existing fleet and evaluate future CT additions and market opportunities for system reliability, flexibility, and resiliency needs
Solar	2 to 5 GW (3 to 12 GW nameplate)	3 GW of Green Invest, self-directed, and Generation Flexibility solar projects contracted to come online by 2030	Evaluate solar additions to either lower system costs or meet customer needs utilizing regular procurement cycles
Wind	<1 GW (Up to 1 GW nameplate)	Screening wind offers through request for proposal processes for cost-effectiveness and system fit	Monitor wind proposals to determine if cost and system fit challenges are improving
Storage	1 to 5 GW (1 to 8 GW nameplate)	0.7 GW of Green Invest, self-directed, and Generation Flexibility battery projects contracted to come online by 2030; evaluating pumped storage option	Continue investing in the existing pumped storage fleet and evaluate storage options to support reliability, resiliency, and system flexibility; potential for additional pumped storage deployment
EE	1 to 2 GW	Investing in residential, commercial, and industrial EE programs using insights from the Energy Programs Potential Study	Partner with customers to realize cost-effective EE program potential, reducing power generation resource needs
DR	Up to 2 GW	Investing in residential, commercial, and industrial DR programs to enable interconnection of new industrial loads and to serve system needs	Collaborate with customers to realize cost-effective DR program potential, reducing power generation resource needs

A portion of resource additions will be driven by LPCs through flexible generation options or the evolution of contractual arrangements. Also, TVA will continue to evaluate future market offers received on a one-off basis in the context of least-cost planning and the IRP's strategic direction.

Additions of new energy resources of all types typically require additional investments in the transmission system. Generally, these investments include optimizing existing infrastructure through projects such as reconductoring transmission lines and upgrading substations, along with building new transmission infrastructure such as transmission lines, substations, and other devices that support system reliability and stability. Where possible, TVA prefers to utilize brownfield sites with existing infrastructure and easements. TVA is also expanding its use of grid-enhancing technology, such as advanced conductors and dynamic line ratings, to greater leverage the existing transmission system when adding new generation and storage to the system.

Additions of new gas-fired resources typically require new or expanded gas pipeline infrastructure. The TVA region has a robust gas pipeline network, and future siting efforts will seek to leverage existing pipelines and minimize the need for infrastructure expansion to the extent possible. To support reliability of gas-fired plants, TVA typically contracts for a high level of fuel delivery priority and/or invests in a backup fuel source on site, depending on the expected operations profile of a particular plant.

The strategic portfolio direction also includes recommended actions to advance emerging technologies, such as advanced nuclear. Actions for emerging resources focus on enabling and demonstrating emerging energy technologies and leveraging partnerships that reduce cost and risk.

For additional information on the 2026 IRP Recommendations, including the Power Supply Mix Ranges through 2040 and 2050, Strategic Portfolio Direction, and Key Signposts and Implications, see Volume 1, Chapter 4.

3.5 Summary Comparison of Environmental Impacts of the Alternatives

This section provides a summary of the environmental impacts of the alternatives. Detailed analysis of the anticipated environmental impacts is provided in Chapter 5.

While the total amount of energy generated during the 2026-2050 planning period is, by design, similar across the alternative strategies, which encompass the Power Supply Mix Ranges, for each scenario, the way this energy is generated varies across strategies (Figure 3-4 through Figure 3-7). This is a result of the differences between the alternative strategies and their focus on different energy resources as described in Volume 2, Section 3.2 and Volume 1, Section 2.5.

Environmental impacts differ less between strategies than between scenarios, as the scenario that materializes for load and U.S. energy policy is the primary driver of environmental profiles. For most environmental resources, impacts would be greatest in Scenario 2 (High Growth) and lowest in Scenario 3 (Carbon Legislation). IRP strategies feature environmental tradeoffs, such as Distributed (C) having the highest land use,

Innovation (B) having the highest water consumption, and Baseline (A) having the highest air quality and climate impacts.

While the IRP is not site-specific, the IRP and EIS provide insights into potential impacts to communities across the region. For example, the average system cost metric is directionally indicative of overall trends in customer bills (Strategy A is the lowest cost strategy overall), and metrics related to carbon emissions are directionally indicative of air quality trends in the region (Strategies B and C have the lowest air emissions). Site-specific aspects of actions that are later proposed to implement the IRP strategic direction will be addressed and considered in tiered environmental reviews.

PRELIMINARY

4 Affected Environment

4.1 Introduction

This chapter describes the natural and socioeconomic resources that could be affected by the alternative strategies and portfolios developed in the integrated resource planning process. These resources are generally described at a regional scale rather than a site-specific scale. The primary study area is the TVA PSA and the Tennessee River watershed (Figure 1-1), including all counties in Tennessee and portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. TVA's power system serves approximately 10 million people in the seven-state, 80,000-square-mile region. All but one of TVA's hydroelectric plants, as well as all its nuclear plants, are located in the Tennessee River watershed. Its coal-fired plants are in the Tennessee River watershed as well as along the Cumberland and Ohio rivers (Figure 1-1). Natural gas and fuel oil-fired generators are located at 17 sites. Nine operating small PV solar installations are located within the TVA PSA. The seven windfarms that TVA purchases power from (see Section 2.4) are outside the TVA region. TVA also purchases power from several USACE hydroelectric plants in the Cumberland River drainage basin. Some of these plants are in the TVA region, and the others are in southern Kentucky north of the TVA region.

For some resource issues, such as air quality, climate change, and renewable energy resources, impacts may extend beyond the TVA region. For most resources, the primary study area consists of 181 counties and two independent cities where TVA is a major provider of electric power.

4.2 Air Quality

4.2.1 Regulatory Framework for Air Quality

The CAA, as amended, is the comprehensive law that addresses air quality by regulating emissions of air pollutants from stationary sources (such as power plants and factories) and mobile sources (such as automobiles). It requires the USEPA to establish National Ambient Air Quality Standards (NAAQS) for specific air pollutants and directs the states to develop State Implementation Plans to achieve these standards. This is primarily accomplished through permitting programs that establish limits for emissions of air pollutants from various sources. The CAA also requires USEPA to set standards for emissions of hazardous air pollutants (HAPs).

4.2.2 Criteria Air Pollutants

USEPA has established NAAQS for the six criteria air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone, particulate matter (PM), and sulfur dioxide (SO₂). TVA's entire PSA, except for a small SO₂ nonattainment area in part of Sullivan County, Tennessee, is currently designated as attainment, attainment/unclassifiable, or unclassifiable

with respect to all NAAQS. There are currently no other NAAQS nonattainment areas within the TVA PSA.

An unclassifiable status or attainment/unclassifiable status means that an area has insufficient air quality monitoring data to make a firm determination of attainment. However, the unclassifiable or attainment/unclassifiable status areas are treated as in attainment with NAAQS, for the purposes of CAA planning and permitting requirements.

In general, for all six criteria pollutants regulated under the NAAQS, air quality nationwide has been improving for several decades (Table 4-1). This has been due in large part to compliance with CAA-related regulations developed by the USEPA and state/local agencies that have dramatically reduced pollutant emissions from stationary and mobile sources. The reductions in emissions of air pollutants have come about because of the development and use of emission control technologies that prevent pollutants from forming during combustion or other processes, technologies that remove the pollutants from the exhaust streams after the pollutants have formed, and the switch to cleaner fuels. A summary of improvements in air quality nationally is provided in Table 4-1, which shows the percent improvement for each NAAQS-regulated pollutant from the start of each decade since 1980 through 2024. For some of the listed pollutants, there are multiple standards based on different sampling time intervals. The standards for PM also address two different sizes of particles, one for particles less than 10 microns in size (PM₁₀), and one for particles less than 2.5 microns in size (PM_{2.5}). The major criteria pollutants emitted by power plants are nitrogen oxides (NO_x; including NO₂) and SO₂. Ozone is not directly emitted by any source; it is formed by a chemical reaction between NO_x and volatile organic compounds (VOCs) in the presence of sunlight. VOCs are produced by both man-made and natural sources; in the Southeast, most VOCs are from natural sources and power plants are not significant emitters of VOCs.

Table 4-1: Percent Change in Ambient Concentrations of Air Pollutants in the U.S., 1980-2024

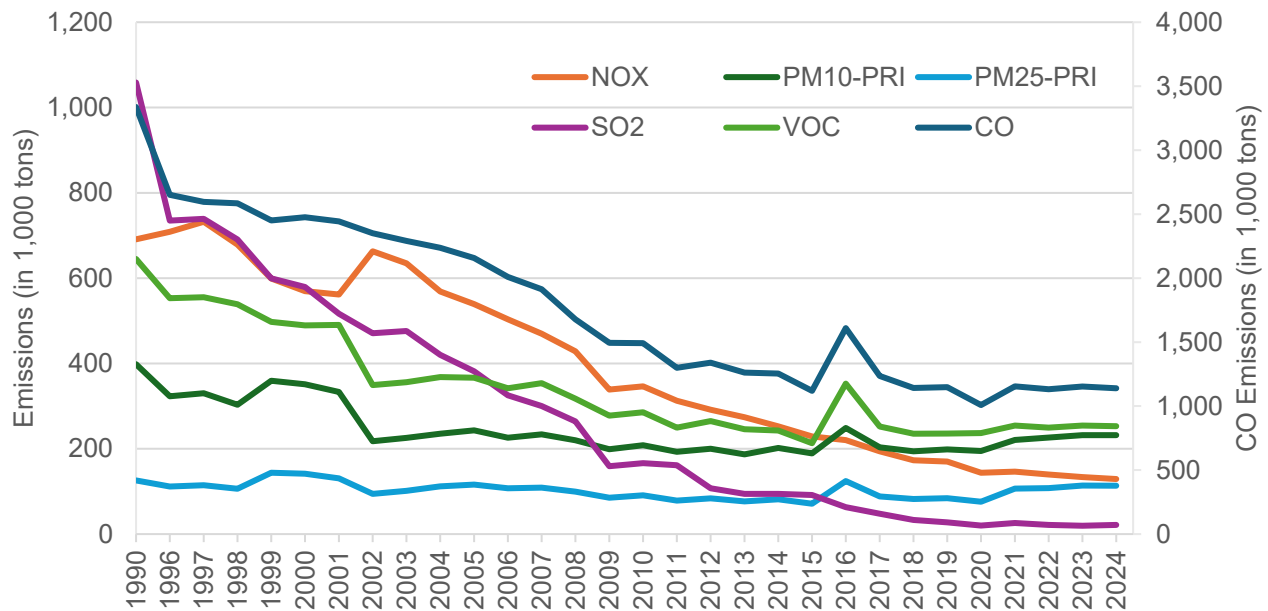
Air Pollutant	1980 vs 2024	1990 vs 2024	2000 vs 2024	2010 vs 2024
CO	-87	-80	-67	-25
Pb	--	--	--	-86
NO ₂ (annual)	-69	-63	-54	-31
NO ₂ (1-hour)	-66	-55	-40	-23
Ozone (8-hour)	-29	-24	-18	-7
PM ₁₀ (24-hour)	---	-36	-39	-7
PM _{2.5} (annual)	---	---	-46	-27
PM _{2.5} (24-hour)	---	---	-45	-21
Sulfur Dioxide (1-hour)	-95	-93	-87	-79

Source: USEPA 2026a

Improvement in air quality has been realized in TVA's PSA as well, as many counties in this region were previously designated as nonattainment for one or more NAAQS, and in recent decades have come into attainment. The improvement in air quality and attainment of

NAAQS in the region is even more remarkable, considering that several of the NAAQS have been made substantially more stringent in the past two decades. The improvements in air quality in TVA's PSA is representative of what has happened nationally.

Regional emissions trends for the TVA PSA are approximated for this assessment by using statewide Tennessee emissions. TVA serves nearly all of Tennessee, and portions of several adjacent states, so the emissions trends for Tennessee are used here as a surrogate for regional emissions trends in the TVA PSA. Figure 4-1 shows the trend lines of Tennessee pollutant emissions from 1990 through 2024, based on data obtained from USEPA's National Emissions Inventory website at <https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data> (USEPA 2025).



Source: USEPA 2025

Figure 4-1: Trends in Emissions of Air Pollutants in Tennessee, 1990-2024

The data in Figure 4-1 represent, for each pollutant, the sum of emissions from all stationary and mobile source sectors, including wildfires and prescribed fires for those years where fires were inventoried. As shown in this chart, there is a significant downward trend for all pollutants in the region, especially for pollutants of concern emitted from stationary combustion sources such as SO₂ and NO_x.

TVA's emissions reductions are responsible for much of the statewide Tennessee stationary source SO₂ and NO_x emissions reductions since 1990. The utility sector SO₂ emissions in Tennessee, the vast majority of which were from TVA in 1990, decreased from 817,612 tons in 1990 to 24,532 tons in 2022, a decrease of 97 percent.

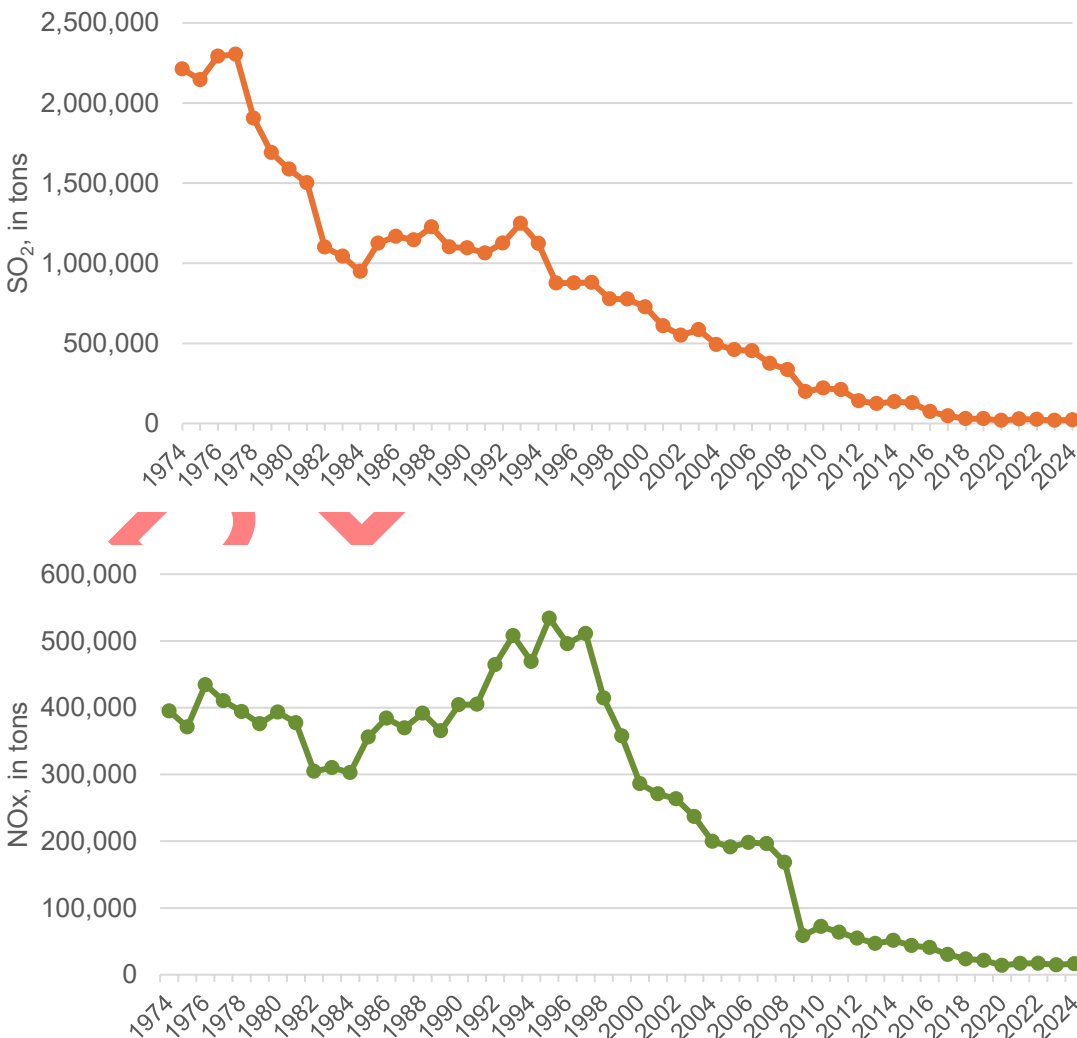
Utility sector NOx emission in Tennessee, primarily attributed to TVA, increased from 240,359 tons in 1990 to 283,464 tons in 1997, before decreasing for the next two decades to 17,048 tons in 2022, a decrease of 94 percent from the 1997 peak.

Nationally, electric utility emissions have fallen to the point where they no longer represent the largest emitting sector for the pollutants of primary focus. According to data from the National Emissions Inventory, in 2024 on-road vehicles produce 42 percent of all NOx emissions in Tennessee (52,420 tons per year) and non-road vehicles produce 10 percent of all NOx emissions in Tennessee (12,977 tons per year) (USEPA 2025). NOx is a concern due to its role as a precursor in the formation of fine PM and ozone.

4.2.3 TVA Emissions

4.2.3.1 TVA System-Wide Emissions

The trends in TVA's reported SO₂, NOx, and mercury emissions are shown in Figure 4-2. These data represent emissions from TVA's facilities across its entire PSA.



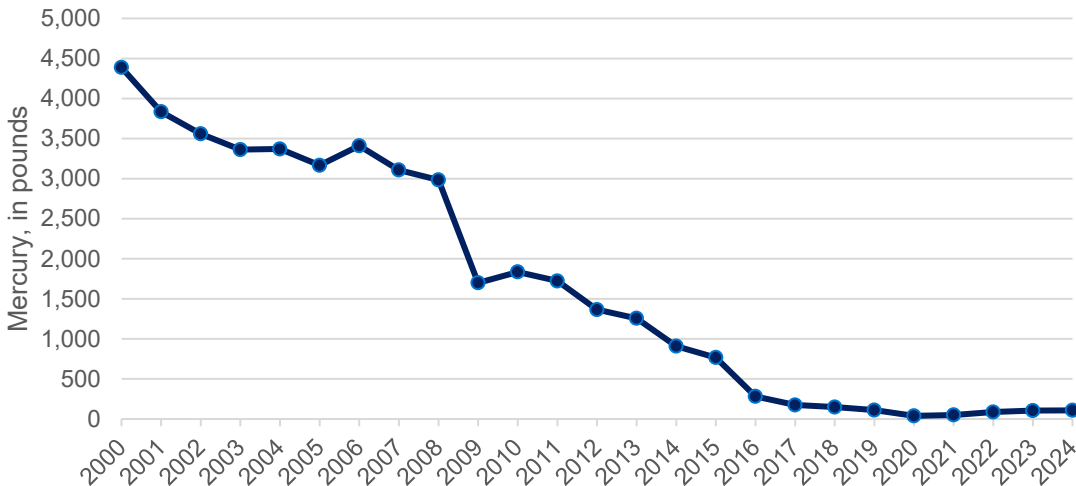


Figure 4-2: TVA Emission Trends for SO₂, 1974-2024 (top), NO_x, 1974-2024 (middle), and Mercury, 2000-2024 (bottom)

4.2.3.2 Emissions from Existing Coal Facilities

Several TVA facilities have units that are in operation, though may reach end-of-life in the future. Table 4-2 lists those units and the emissions by plant over a five-year period (2020-2024). Table 4-2 also shows the annual emissions by plant in tons, and emission rates in units of pounds per megawatt-hour (lbs/MWh).

Table 4-2: Five-Year (2020-2024) Average Emissions of Existing Coal Units

Facility and Units	Generation (MWh)	SO ₂ (5-yr average)		NO _x (5-yr average)		Mercury (5-yr average)	
	5-year avg.	tons/yr	lbs/MWh	tons/yr	lbs/MWh	lbs/yr	lbs/GWh
SHF 1-9	5,804,527	12,452	4.3	6,299	2.2	16.40	2.83E-03
KIF 1-9	3,061,790	2,072	1.4	1,336	0.9	18.57	6.06E-03
GAF 1-4	4,138,791	1,496	0.7	1,173	0.6	19.50	4.71E-03
CUF 1-2	9,842,081	6,112	1.2	3,837	0.8	18.33	1.86E-03
Total	22,847,189	22,131	7.6	12,646	4.4	72.8	0.015

*GWh = gigawatt hours

4.2.4 Hazardous Air Pollutants

HAPs are toxic air pollutants that are known or suspected to cause cancer or other serious health effects or adverse environmental effects. The CAA identifies 187 pollutants as HAPs. Most HAPs are emitted by human activity, including motor vehicles, factories, refineries and power plants. There are also indoor sources of HAPs, such as building materials and cleaning solvents. Some HAPs are emitted by natural sources, such as volcanic eruptions and forest fires. Exposure to HAPs can result from breathing air toxics, drinking water in which HAPs have deposited, or eating food exposed to HAPs deposition on soil or water.

Exposure to high levels of HAPs can cause various chronic and acute harmful health effects, including cancer. The level of exposure that may result in adverse health impacts varies for each pollutant.

Emissions of HAPs, including organic compounds, acid gases, and heavy metals, have also been generally decreasing in recent decades, along with the SO₂ and NO_x emissions, as coal use has decreased and as coal and gas-fired electric generating units are fitted with better emissions controls.

4.2.5 Mercury

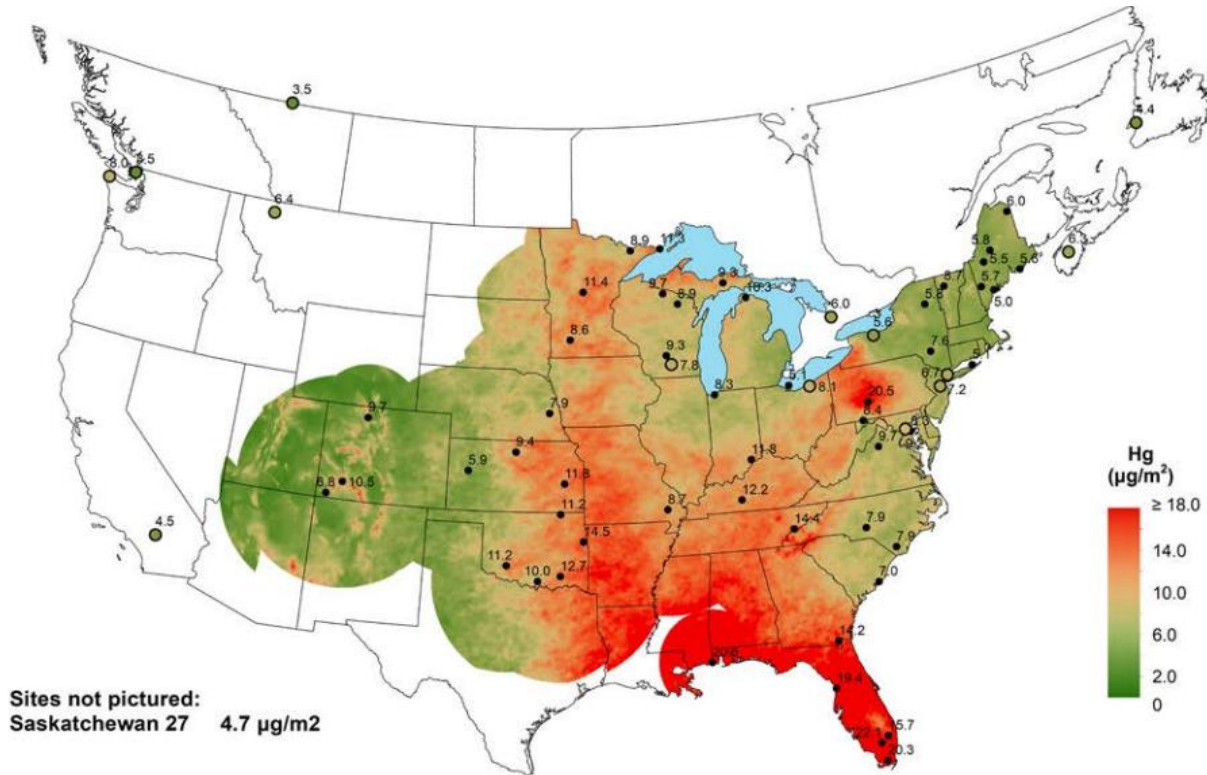
One HAP that has been singled out for a focused effort at emission reduction with respect to fossil-fueled facilities is mercury. Mercury is emitted to the air by human activities, such as burning coal or manufacturing, and from natural sources, such as volcanoes. Once it is in the environment, mercury cycles between air, water, and soils, being re-emitted and re-deposited. Worldwide, artisanal and small-scale mining produce the highest level of man-made methyl-mercury (38 percent), followed by coal combustion (21 percent), non-ferrous metal production (15 percent), and cement production (11 percent) (USEPA 2023a).

Once mercury is deposited in streams and lakes, it can be converted to methyl-mercury, the most toxic form of mercury, through microbial activity. Methyl-mercury accumulates in fish at levels that may cause harm to the fish and the animals that eat them. Some wildlife species with high exposures to methyl-mercury have shown increased mortality, reduced fertility, slower growth and development, and abnormal behavior that affects survival (USEPA 1997). Studies have also shown impaired neurological development in fetuses, infants and children with high exposures to methyl-mercury. In January 2017, USEPA and the Food and Drug Administration issued a final fish consumption advisory recommending that pregnant and breastfeeding women, those who may become pregnant, and young children avoid some marine fish and limit consumption of others. TVA region states have also issued advisories on fish consumption due to mercury for several rivers and reservoirs across the TVA region (see Section 4.4.2).

In 2011, USEPA finalized the Mercury and Air Toxics Standards (MATS) rule to reduce mercury and other toxic air pollution from coal and oil-fired power plants. USEPA estimated this rule would prevent about 90 percent of the mercury in coal burned in power plants from being emitted to the air. USEPA also estimated the rule would result in a 5 percent reduction in U.S. nationwide mercury deposition from 2005 levels. This small overall reduction is largely because mercury emissions tend to be deposited globally, rather than locally, with most of the deposition occurring in precipitation. In 2017, mercury emissions were reported at approximately 4 tons, an 86 percent reduction compared to 2010 levels, with a 96 percent and an 81 percent reduction in acid gas HAPs and non-mercury metals respectively (USEPA 2023b).

Deposition occurs in two forms: wet (dissolved in rain, snow, or fog) and dry (solid and gaseous particles deposited on surfaces during periods without precipitation). Wet mercury

deposition is measured at Mercury Deposition Network monitors operated by the National Atmospheric Deposition Program. The highest wet deposition of mercury in the U.S. occurs in Florida and along the Gulf Coast, as shown in Figure 4-3. Mercury deposition in the TVA region ranges from nine to 15 micrograms per square meter, in the medium-high range for North America.



Source: NADP 2023

Figure 4-3: Total Wet Mercury Deposition in the U.S. in 2022

TVA mercury emissions have decreased 98 percent from 4,388 pounds in 2000 to 94 pounds in 2022 (Figure 4-2). Much of this reduction has resulted from the retirement of coal-fired units and the installation and operation of flue gas desulphurization (FGD) and selective catalytic reduction (SCR) systems on most of the remaining coal units. TVA has also taken specific measures to reduce mercury emissions in response to MATS, including the installation of activated carbon injection systems on some units and the retirement and replacement of PAF Units 1 and 2 with natural gas-fueled generation.

4.2.6 Visibility

Air pollution can impact visibility, which is a particularly important issue in national parks and wilderness areas where millions of visitors expect to be able to enjoy scenic views. Historically, “visibility” has been defined as the greatest distance at which an observer can see a black object viewed against the horizon sky. However, visibility is more than just a

measurement of how far an object can be seen; it is a measurement of the conditions that allow appreciation of the inherent beauty of landscape features.

Visibility in the eastern U.S. is estimated to have declined from 90 miles to approximately 15-25 miles due to air pollution from various sources (USEPA 2023c). Visibility impairment is caused when sunlight is scattered or absorbed by fine particles of air pollution obscuring the view. Some haze-causing particles are emitted directly to the air, while others are formed when gases are transformed into particles. In the TVA region, the largest contributor to visibility impairment is ammonium sulfate particles formed from SO₂ emissions (primarily from coal-fired power plants). Other particles impacting visibility include nitrates (from motor vehicles, utilities, and industry), organic carbon (predominantly from motor vehicles), elemental carbon (from diesel exhaust and wood burning) and dust (from roads, construction, and agricultural activities). Visibility extinction is a measure of the ability of particles to scatter and absorb light and is expressed in units of inverse mega-meters (Mm⁻¹). Another metric used to measure visibility impairment is the deciview (dV), which is calculated from the atmospheric light extinction coefficient (b_{ext}) expressed in inverse megameters (Mm⁻¹):

$$dV \text{ index} = 10 \ln (b_{ext}/10 \text{ Mm}^{-1}).$$

The dV unit is used to establish thresholds under visibility rules in 40 CFR 51, Appendix Y, as a basis for determining whether modeled visibility impacts from a source are great enough to warrant Best Available Retrofit Technology (BART) retrofits. Substantial progress toward attaining natural visibility conditions nationwide has been made since the issuance of the BART requirements in 2005. Some of the improvements have been due to BART implementation, and much improvement has also resulted from other regulatory programs to reduce stationary source and mobile source emissions.

The CAA designated national parks greater than 6,000 acres and wilderness areas greater than 5,000 acres as Class I areas to protect their air quality under more stringent regulations. There are eight Class I areas in the vicinity of the TVA region: Great Smoky Mountains National Park, Mammoth Cave National Park, Joyce Kilmer-Slick Rock Wilderness, Shining Rock, Linville Gorge, Cohutta, Sipsey, and Upper Buffalo Wilderness Areas (Figure 4-4). The Great Smoky Mountains National Park is the largest Class I area in the TVA region.

In 1999, USEPA promulgated the Regional Haze Rule to improve visibility in Class I areas. This regulation requires states to develop long-term strategies to improve visibility with the goal of restoring natural background visibility conditions by 2064. Visibility trends are evaluated using the average of the 20 percent worst days and the 20 percent best days with the goal of improving conditions on the 20 percent worst days, while preserving visibility on the 20 percent best days.

The trend in visibility improvement measured at Great Smoky Mountains National Park is shown in Figure 4-5, which shows the visibility improvement in dV on average for the worst

20 percent of days and the best 20 percent of days. From 1990 to 2024, there was about a 48 percent improvement in both the visibility on the worst days and the best days (FED 2026). For a comparison with natural conditions (no human emissions impacts), the Federal Land Manager Environmental Database lists the natural conditions at the Great Smoky Mountains as 11.2 dV on the haziest days and 4.6 dV on the clearest days.

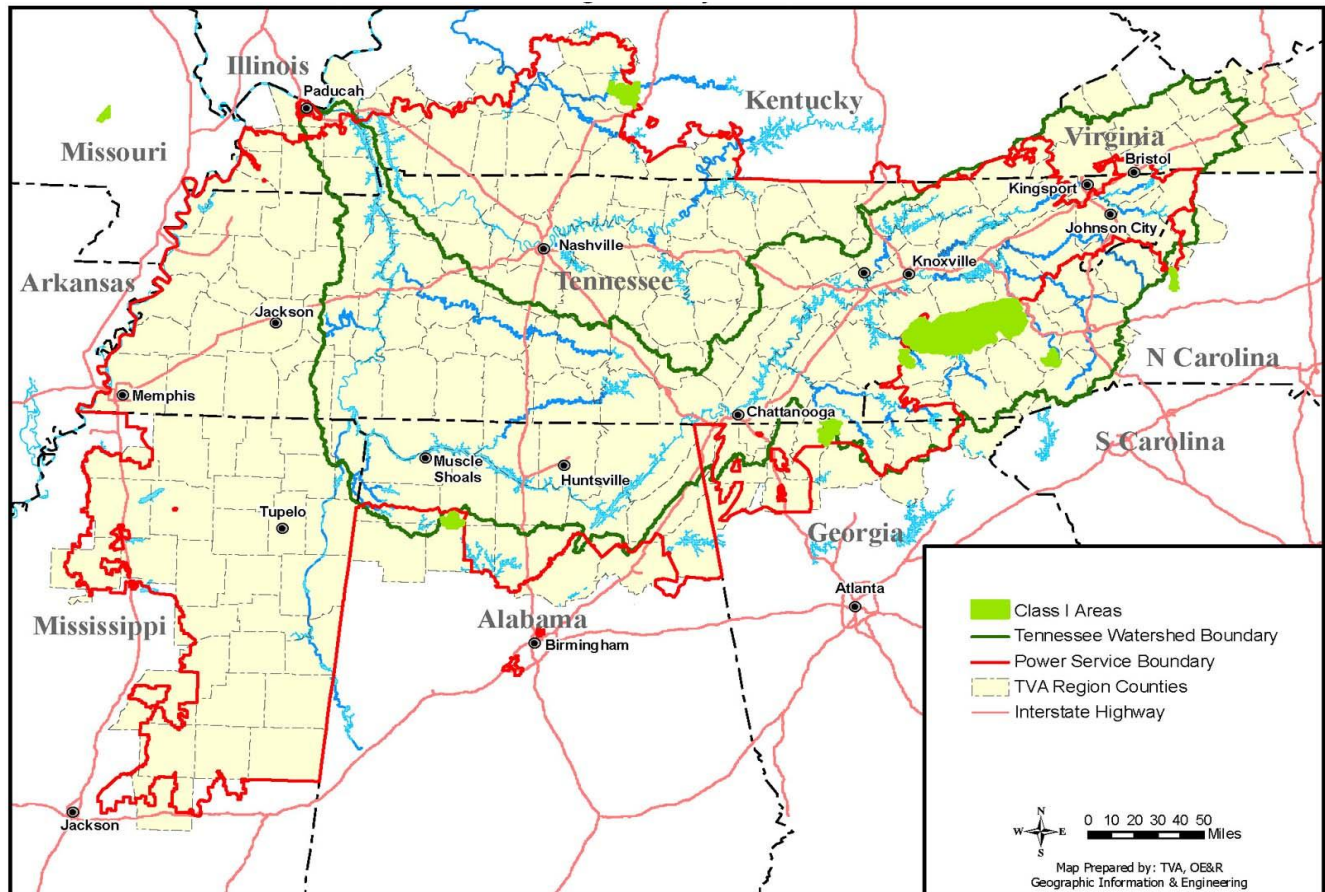
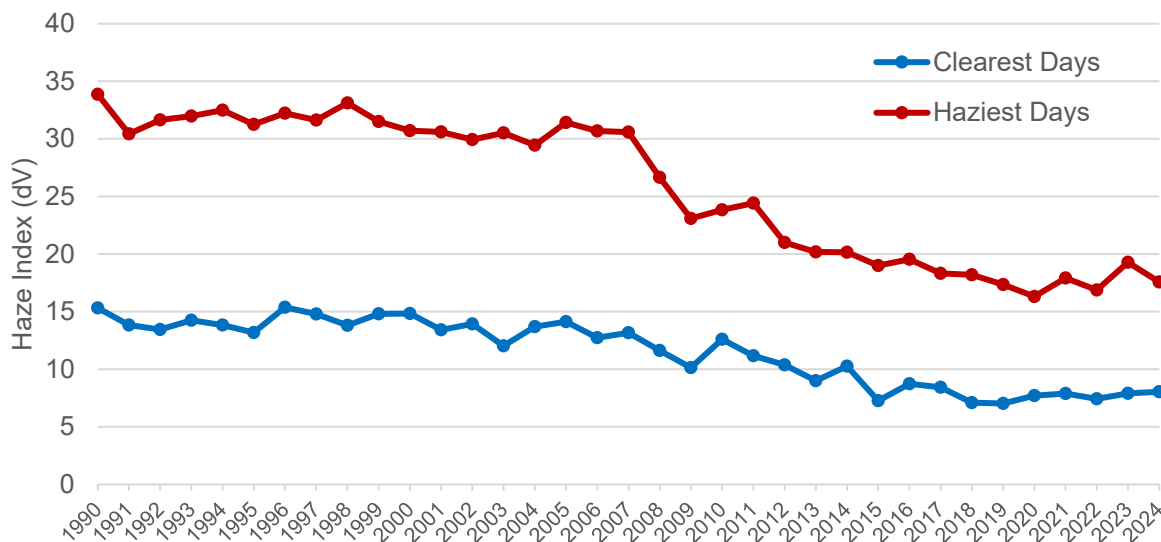


Figure 4-4: The TVA Power Service Area and Class I Areas



Source: FED 2026

Note: Smaller dV values indicate better visibility.

Figure 4-5: Change in Visibility in the Great Smoky Mountains National Park on the Worst 20 Percent of Days and the Best 20 Percent of Days, 1990-2024

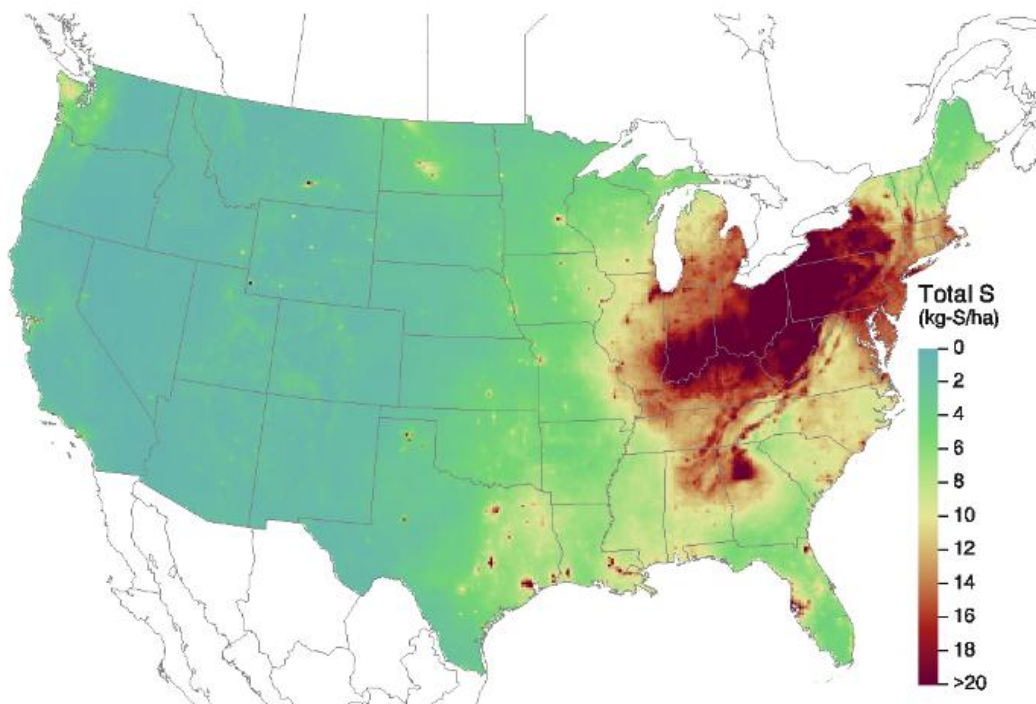
4.2.7 Acid Deposition

Acid deposition, also called acid rain, is primarily caused by SO_2 and NO_x emissions which are transformed into sulfate (SO_4) and nitrate (NO_3) aerosols, then deposited in precipitation (rain, snow, or fog). Acid deposition causes acidification of lakes and streams in sensitive ecosystems, which can adversely impact aquatic life. Acid deposition can also reduce agricultural and forest productivity. Some ecosystems, such as high elevation spruce-fir forests in the southern Appalachians, are quite sensitive to acidification, while other ecosystems with more buffering capacity are less sensitive to the effects of acid deposition. The acidity of precipitation is typically expressed on a logarithm scale called pH, which ranges from zero to 14 with seven being neutral. pH values less than seven are considered acidic and values greater than seven are considered basic or alkaline. It is thought that the average pH of pre-industrial rainfall in the eastern U.S. was approximately 5.0 (Charlson and Rodhe 1982).

Based on the data reflected in Figure 4-1, on emissions for the state of Tennessee, together with TVA emissions data in Figure 4-2, as of 2017, the TVA SO_2 emissions were greater than those of the state of Tennessee and TVA NO_x emissions totaled less than 14 percent of statewide total emissions. As stated above in 2022, TVA's SO_2 emissions in Tennessee have decreased by 97 percent since 1990 and its NO_x emissions in the state have decreased by 94 percent from their peak level in 1997. Emissions from utilities across the eastern U.S. have also decreased significantly, and emissions from mobile sources have started a substantial downward trend as well in the past decade or more.

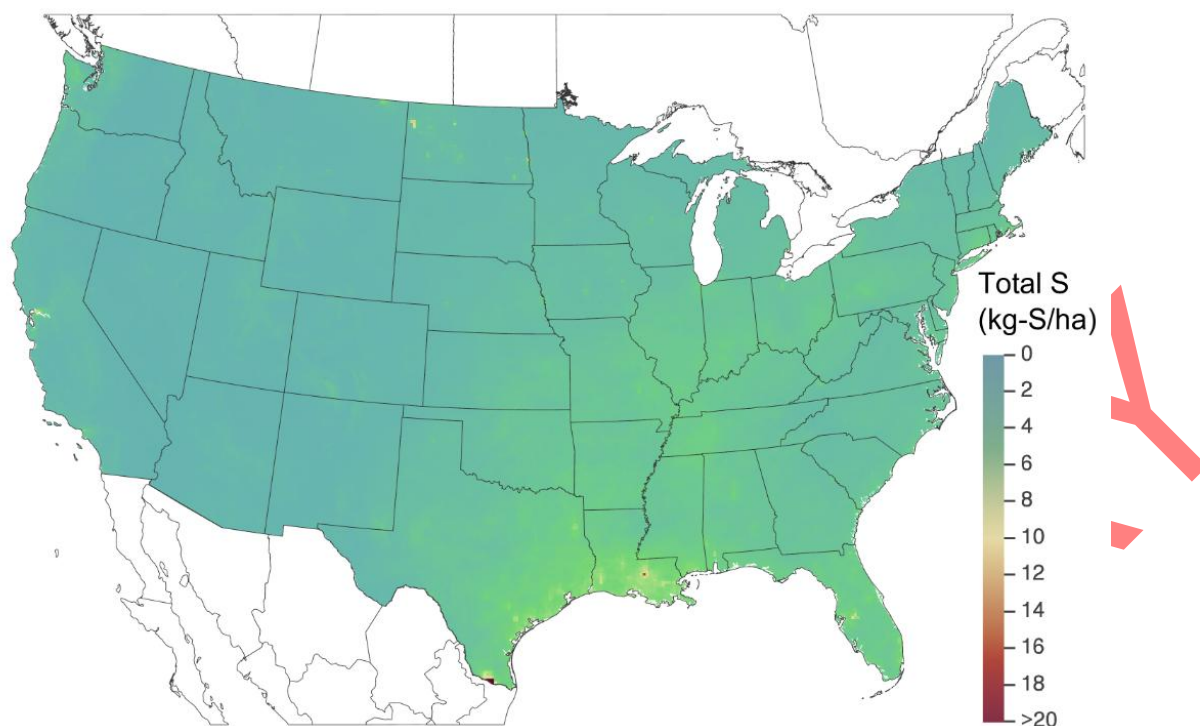
The 1990 CAA Amendments established the Acid Rain Program to reduce SO_2 and NO_x emissions and the resulting acid deposition. Since this program was implemented in 1995, reductions in SO_2 and NO_x emissions have contributed to significant reductions in acid deposition, concentrations of $\text{PM}_{2.5}$ and ground-level ozone, and regional haze. Other regulatory programs aimed at industrial emitters and vehicle engines (on road and nonroad) are also driving down emissions.

Figure 4-6 and Figure 4-7 illustrate the dramatic decreases in total SO_4 deposition between 2000 and 2021 (most recent data available) across the U.S. (USEPA 2023d). Similar reductions in NO_3 deposition have also occurred over the 2006 to 2023 period. Even by the year 2000, deposition of SO_4 and NO_3 was decreasing across the U.S., as pollution control retrofits were already in place for many large utility sources. However, the decreases since that time have been even more dramatic. The values in Figure 4-6 and Figure 4-7 are based on a hybrid approach of combining monitoring and modeling to develop the plots.



Source: USEPA 2023d

Figure 4-6: Year 2000 Total SO_4 Deposition



Source: USEPA 2023d

Figure 4-7: Year 2021 Total SO₄ Deposition

4.3 Climate and Greenhouse Gases

The TVA region spans the transition between a humid continental climate to the north and a humid subtropical climate to the south. This provides the region with generally mild temperatures (i.e., a limited number of days with temperature extremes), ample rainfall for agricultural and water resources, vegetation-killing freezes from mid-autumn through early spring, frequent severe thunderstorms, infrequent tornado events, infrequent snow, and infrequent impacts from tropical storms, primarily in the form of heavy rainfall. The seasonal climate variation induces a dual-peak in annual power demand, one for winter heating and a second for summer cooling. Rainfall does not fall evenly throughout the year but tends to peak in late winter/early spring and again in mid-summer. Winds over the region are generally strongest during winter and early spring and lightest in late summer and early autumn. Solar radiation (insolation) varies seasonally with the maximum sun elevation above the horizon and longest length in summer. However, insolation is moderated by frequent periods of cloud cover typical of a humid climate.

This section describes the current climate and recent climate trends of the TVA region in more detail. It describes emissions of GHGs, widely considered to be a major source of climate change (NAS and RS 2020) and projected changes in climate during this century, based on the Fourth National Climate Assessments (NCA) and Fifth NCA (USGCRP 2017, USGCRP 2023), produced by the U.S. Global Change Research Program (USGCRP), and related sources. Identifying recent trends in regional climate parameters such as temperature and precipitation is a challenge because year-to-year variation may be larger

than the multi-decadal change in a climate variable. Climate is frequently described in terms of the climate “normal,” the 30-year average for a climate parameter (NCEI 2021). The climate normals described below are for the most recent period of record, 1991–2020. Earlier and more recent data are also presented where available. The primary sources of these data are National Weather Service (NWS) records and records from the rain gauge network maintained by TVA in support of its reservoir operations. NWS records, unless stated otherwise, are from Memphis, Nashville, Chattanooga, Knoxville, and the Tri-Cities area in Tennessee, and Huntsville, Alabama.

4.3.1 Climate Normals and Trends

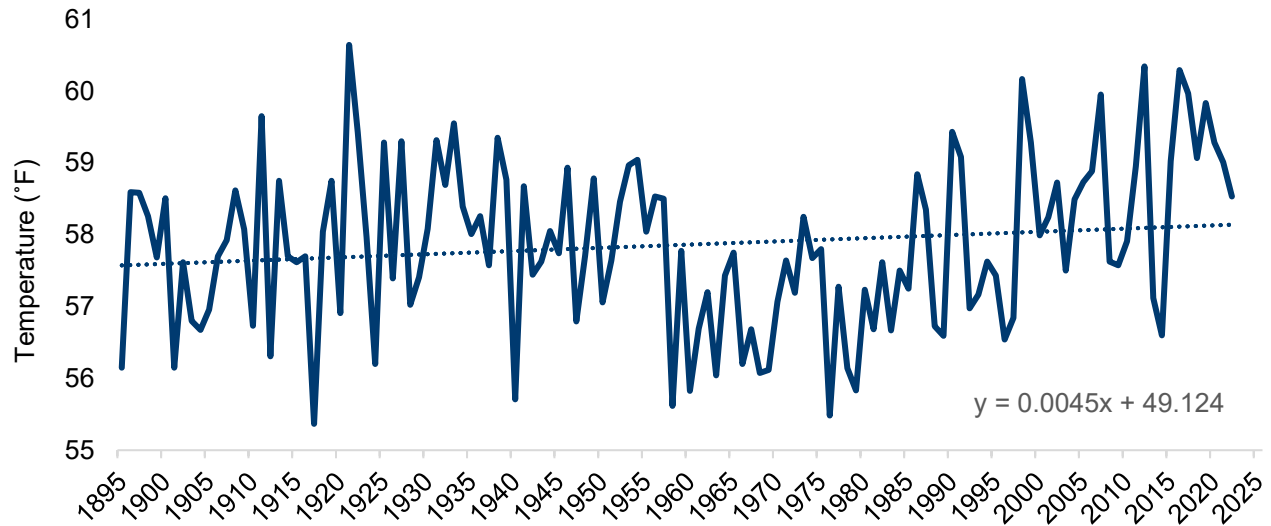
Temperature. Observed average monthly temperatures for the TVA region during 1991–2020 ranged from 40.0 degrees Fahrenheit (°F) in January to 79.7°F in July (Table 4-3). These data show considerable year-to-year variability with an overall warming trend of 0.5–0.6°F (0.3–0.4 degrees Celsius [°C]) per decade for 1991–2020. This is greater than the global average trend reported by the U.S. Climate Change Science Program (Lanzante et al. 2006), which shows an increase in global surface temperature of about 0.16°C per decade between 1979 and 2004. Longer term temperature data for Tennessee (assumed to be representative of the TVA region) are illustrated in Figure 4-8, Figure 4-9, and Figure 4-10. Both annual average temperature and annual average winter temperature showed increases (0.45°F/100 years and 1.05°F/100 years, respectively) since the 1890s. The annual average summer temperature showed a small, long-term increase of 0.06°F/100 years.

For additional information regarding the historical weather data and trends used in the development of IRP scenario load forecasts, see Volume 1, Appendix B.

Table 4-3: Monthly, Seasonal and Annual Temperature Averages for Six NWS Stations in the TVA Region, 1991–2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
°F	40.0	43.9	51.6	60.5	69.0	76.5	79.7	78.9	72.9	61.5	50.1	42.9
°C	4.5	6.6	10.9	15.8	20.5	24.7	26.5	26.0	22.7	16.4	10.1	6.0
	Winter			Spring		Summer		Fall	Annual			
°F	42.2			60.4		78.4		61.5	60.6			
°C	5.7			15.8		25.8		16.4	15.9			

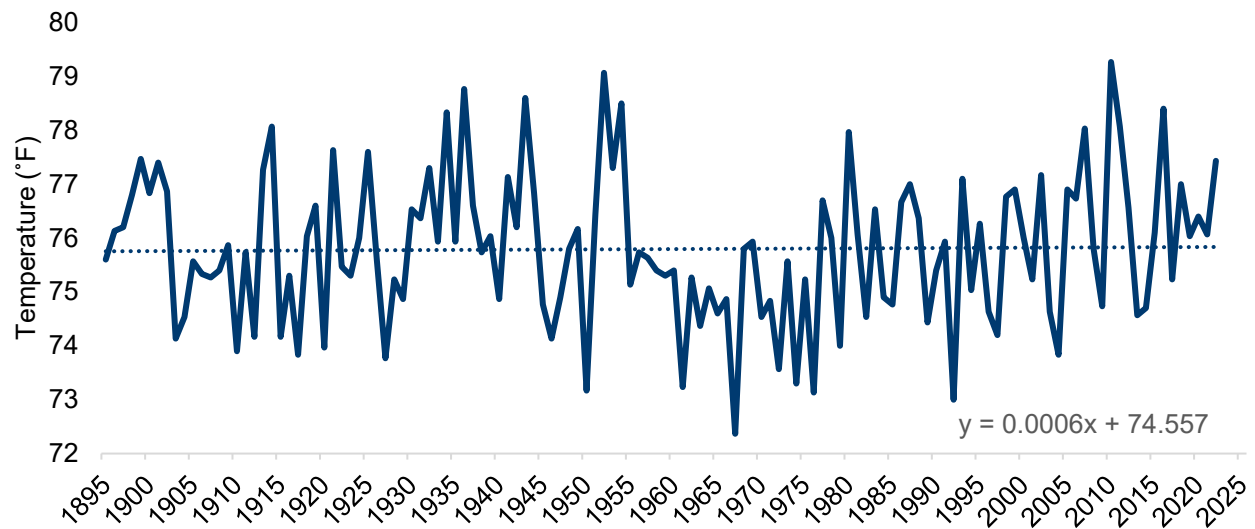
Source: NWS 2023



Source: WRCC 2023

Note; The dashed line is the trend based on least squares regression analysis.

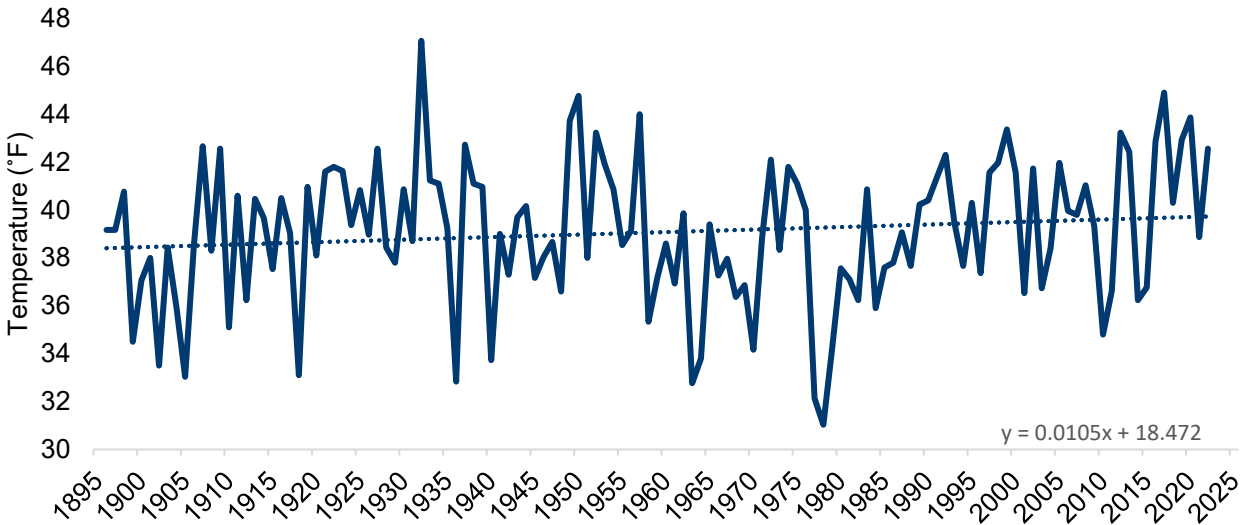
Figure 4-8: Annual Average Temperature (°F) in Tennessee, 1895–2025



Source: WRCC 2023

Note: The dashed line is the trend based on least squares regression analysis.

Figure 4-9: Annual Average Summer Temperature (°F) in Tennessee, 1895–2025



Source: WRCC 2023

Note: The dashed line is the trend based on least squares regression analysis.

Figure 4-10: Annual Average Winter Temperature (°F) in Tennessee, 1896–2025

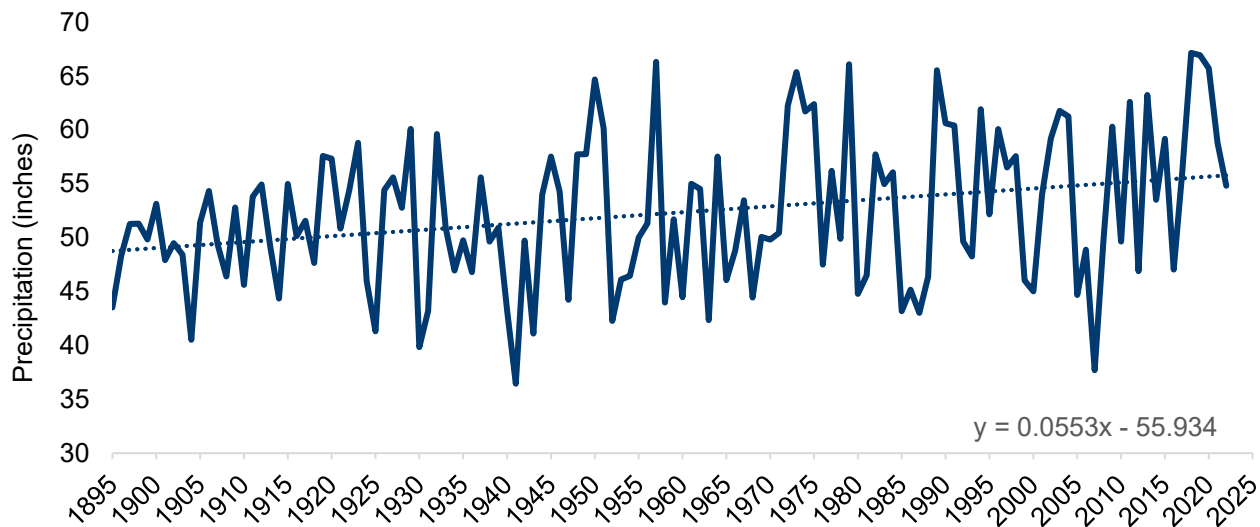
Precipitation. The observed average annual precipitation in the Tennessee River watershed during 1890–2025 was 54.8 inches; monthly averages range from 2.07 inches in December to 8.10 inches in May (Table 4-4). The wettest locations in the TVA region occur in southwestern North Carolina, and the driest locations are in northeast Tennessee (NACSE 2024). There has been a decrease in the frequency and intensity of certain cold season events such as snowfalls, and estimates show that the Southeast is at an increased risk for extreme precipitation and flooding events (USGCRP 2023).

Table 4-4: Monthly, Seasonal, and Annual Precipitation Averages in the Tennessee River Watershed for 1890-2025

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inches	3.18	5.39	5.35	5.93	8.10	5.91	4.75	3.79	4.61	3.32	2.43	2.07
Centimeters	8.08	13.69	13.59	15.06	20.57	15.01	12.07	9.63	11.71	8.43	6.17	5.26
	Winter			Spring	Summer	Fall	Annual					
Inches	10.64			19.38	14.45	10.36	54.83					
Centimeters	27.03			49.22	36.71	26.31	139.27					

Source: TVA

Figure 4-11 shows Tennessee annual total precipitation for the period 1895 through 2025. These data show that over this period of record, the average annual precipitation has increased at an average rate of around 11 percent per 100 years, as is apparent from the linear regression equation provided on this chart. The increase in average annual precipitation occurred prior to 1970, and there has been no significant trend for the last 50 years.



Source: WRCC 2023

Note: The dashed line is the trend based on least squares regression analysis.

Figure 4-11: Annual Average Precipitation in Tennessee, 1895-2025

4.3.2 Greenhouse Gas Emissions

The sun is the primary source of energy for the Earth's climate. About 30 percent of the sun's energy that reaches Earth is reflected back to space by clouds, gases and small particles in the atmosphere. The remainder is absorbed by the atmosphere and the surface (Walsh et al. 2014a). Changes in global scale climate are primarily in response to processes that alter the balance between incoming solar energy and outgoing energy from the Earth. In the surface-albedo feedback, which quantifies the fraction of sunlight reflected by the surface of the Earth, increasing temperatures melts the ice over land and bodies of water. This exposes the darker surface underneath, which absorbs more energy, thereby contributing to further warming, rather than reflecting it, which would contribute to temperature decrease (USGCRP 2023). In nature, CO₂ is exchanged continually between the atmosphere, plants, and animals through processes of photosynthesis, respiration, and decomposition, and between the atmosphere and oceans through gas exchange. Billions of tons of carbon in the form of CO₂ are annually absorbed by oceans and living biomass (i.e., sinks) and are annually emitted to the atmosphere through natural and man-made processes (i.e., sources) (Galloway et al. 2014). Climate change impacts are already seen in the deterioration of such ecosystems, which increases risks to human populations. These risks are projected to grow with additional warming and atmospheric CO₂ (USGCRP 2023).

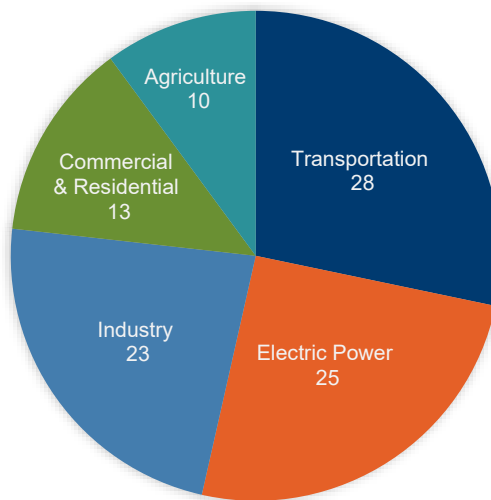
Similar to the glass in a greenhouse, certain gases, primarily CO₂, nitrous oxide (N₂O), methane (CH₄), hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride (SF₆), absorb heat that is radiated from the surface of the Earth. Increases in the atmospheric concentrations of these gases cause the Earth to warm by trapping more heat (Walsh et al. 2014a) in a phenomenon known as the "greenhouse effect." Though some halogenated gases have decreased due to ozone-depletion policies, the atmospheric abundance of many of these well-mixed GHGs have continued to increase (USGCRP 2023). The 2022 global

average of atmospheric CO₂ set a record high at 417.06 parts per million (ppm). This was a 2.13-ppm increase from 2021, marking the 11th year in a row where CO₂ in the atmosphere increased by over 2 ppm (NOAA 2023). While water vapor is the most abundant GHG in the atmosphere, it is not included in the above list of GHGs because changes in the atmospheric concentration of water vapor are generally considered to be the result of climate feedbacks related to the warming of the atmosphere, rather than a direct result of human activity. That said, the impact of water vapor is critically important to projecting future climate change (Walsh et al. 2014a), as it factors into the intensity of precipitation extremes (USGCRP 2023). Quantifying the effect of feedback loops on global and regional climate is the subject of ongoing data collection and active research (Walsh et al. 2014a).

The magnitude of the warming induced by the greenhouse effect depends largely on the amount of GHG accumulating in the atmosphere (Walsh et al. 2014b). GHGs are assigned global warming potentials, a measure of the relative amount of infrared radiation they absorb, their absorbing wavelengths and their persistence in the atmosphere. All these gases remain in the atmosphere long enough to become well mixed, meaning the amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions.

The primary GHG emitted by electric utilities is CO₂ produced by the combustion of fossil fuels. CO₂ is also produced by the combustion of biomass fuels, although these fuels when derived from plant (i.e., vegetation) sources are often considered to be carbon-neutral since the subsequent plant regrowth sequesters carbon. Small amounts of SF₆, which has a very high global warming potential relative to other GHGs (Global Warming Potential for SF₆ = 22,800 times CO₂ on a pound-for-pound basis, per 40 CFR 98), are emitted due to its use in high-voltage circuit breakers, switchgears, and other electrical equipment. Methane, which has a global warming potential of 25 times that of CO₂ (per 40 CFR 98), is emitted during coal mining and from natural gas wells and delivery systems.

The nationwide anthropogenic emissions of GHGs below is the latest available data from the USEPA for each of several sectors of the economy. The 2022 estimates by sector are shown in the chart in Figure 4-12 and represent the most recent data available. Transportation and electricity generation each represented approximately 28 and 25 percent, respectively, of nationwide GHG emissions in 2021, with industrial sources, commercial and residential buildings, and agriculture each representing successively smaller portions of the total.



Source: USEPA 2023e

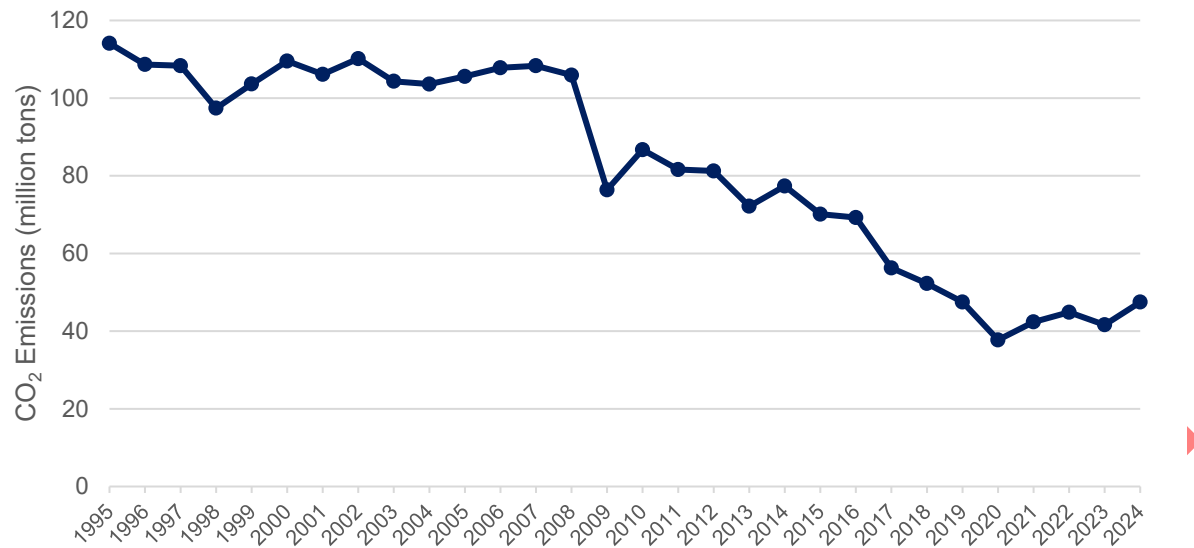
Figure 4-12: U.S. 2021 GHG Emissions by Economic Sector - Percent

According to 2021 data from the U.S. Energy Information Administration, transportation comprises 49.3 percent of Tennessee's CO₂ emissions from fossil fuel consumption and is the largest CO₂ emitter of all end-use sectors in the state (USEIA 2023a).

TVA and the Baker School of Public Policy and Public Affairs at the University of Tennessee – Knoxville (UTK) collaborated on a Valley Pathways Study (UTK 2024), informed by stakeholder input. This study established a GHG baseline for the region and looked across economic sectors such as transportation, industry, agriculture, and building emissions to evaluate potential paths for achieving a competitive and clean economy by 2050. The Valley Pathways Study indicates that in 2019, the Valley region generated an estimated 200 million metric tons of carbon dioxide equivalent (CO₂-eq) across all sectors of the economy, or about 3 percent of U.S. GHG emissions, which aligns to population percentage. According to the study, transportation contributed the largest share at 36 percent, and the electricity sector represented 27 percent of the total emissions.

4.3.2.1 TVA System-Wide Emissions

As of 2024, CO₂ emissions from the TVA power system have decreased by 58.40 percent since 1995 (Figure 4-13). This decrease is mainly due to the retirement of coal plants, which emit large quantities of CO₂ relative to other types of electrical generation, and the replacement of coal generation with nuclear and natural gas-fueled generation. Nuclear generation does not result in emissions of CO₂, and CO₂ emissions from natural gas-fueled generation are about half that of coal. In terms of lbs/MWh, TVA's CO₂ emissions rate averaged 679.84 (lbs/MWh) for 2024, including that of owned and purchased power. This is significantly lower than the 2023 USEPA eGRID national rate of 771.52 lbs/MWh, as well as the regional rate of 895.69 lbs/MWh (TVA 2025b).



Source: TVA 2025b

Figure 4-13: CO₂ Emissions (million tons) From Generation of Power Marketed by TVA, 1995-2024

4.3.3 Forecast Climate Trends

The modeled projections of temperature and precipitation cited here are from the Fourth and Fifth NCA (USGCRP 2017, USGCRP 2023). The publications cite climate change projections for various emission scenarios, which result in representative concentration pathways (RCPs) that each relate to a given amount of radiative forcing in the year 2100. For example, an RCP2.6 scenario means that emissions would increase at a rate sufficient to create 2.6 watts per square meter (m^2) of radiative forcing in 2100.

Climate change continues to exhibit the same trends in the Southeast with virtually no exception from what was reported in the Fourth NCA (USGCRP 2023). For the Southeast, the Fourth NCA projects that temperatures will rise under all emission scenarios presented, including a “very low” scenario where emissions peak soon and begin to decrease globally (RCP2.6). Under a low emissions increase scenario (RCP4.5) that includes a modest rise in global GHG emissions that peaks in about 20 years and then declines steeply, the Fourth NCA projects that average annual temperatures in the Southeast will be 3.4°F higher than recent climate normals by mid-century with temperatures 4.4°F higher by late century (USGCRP 2017). Additionally, the Fifth NCA predicts that future climate change impacts (under RCP4.5) may cause billions of dollars’ worth of damages to U.S. transportation infrastructure by 2050, with especially high cost in the Southeast, which also faces some of the highest economic risk related to energy infrastructure damage (USGCRP 2023). The Fourth NCA report, however, notes that Southeast temperatures have not increased in the last century, contrary to climate model projections of what should have happened with the increase in atmospheric GHG concentrations that has already occurred (USGCRP 2017).

For extreme high temperatures, under a high emissions scenario (RCP8.5, with GHG emissions continuing to increase at near their present rate of increase) the Fourth NCA states that climate model predictions show large changes from the near present climate normal (USGCRP 2017). Direct annual climate damages are projected to be especially large in the Southeast, with overall agricultural yield expected to decrease as well (USGCRP 2023). For the coldest and warmest day of the year, the climate modeling predicts that the coldest day of the year will be on average nearly 5°F warmer and the warmest day of the year will be nearly 6°F warmer by mid-century in the Southeast. The Fourth NCA concludes that extreme temperatures will increase by even more than average temperatures. This prediction also deviates from observed trends for hot days, which have decreased in the Southeast over the past century (USGCRP 2017). While observed hot days have decreased, this does not mean that the region is not affected by extreme high temperature, as heatwaves have become hotter and lengthier in duration in recent decades (USGCRP 2023).

Climate models are generally unreliable at predicting precipitation variability and amounts across different geographic areas, or variability over time. One reason for this is their inability to simulate convective precipitation processes, given that these processes occur at scales smaller than the grid scales used to run global circulation climate models (USGCRP 2017). However, the Fifth NCA (see Figure 2-4 of that report) provides projections for changes in seasonal precipitation across North America by comparing present day (2002-2021) precipitation totals to that of the first half of the last century (1901-1960). In the last two decades, the Southeast has received more precipitation in the fall but seen drier conditions in the spring and summer (USGCRP 2023).

4.4 Water Resources

This section describes water resources in the TVA region that could be affected by the alternative strategies. Potentially affected water resources include groundwater, surface water, water supply, and aquatic life.

4.4.1 Groundwater

4.4.1.1 Regulatory Framework for Groundwater

The Safe Drinking Water Act of 1974 established the sole source aquifer protection program, which regulates certain activities in areas where the aquifer (water-bearing geologic formations) provides at least half of the drinking water consumed in the overlying area. This act also established both the Wellhead Protection Program, a pollution prevention and management program used to protect underground sources of drinking water, and the Underground Injection Control Program to protect underground sources of drinking water from contamination by fluids injected into wells. Several other environmental laws contain provisions aimed at protecting groundwater, including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act, and the Federal Insecticide, Fungicide, and Rodenticide Act. On April 17, 2015, the USEPA published the Disposal of Coal Combustion Residuals from Electric Utilities final

rule (CCR Rule) in the *Federal Register* to provide a comprehensive set of national criteria for the management of CCR produced by electric utilities. The CCR Rule requires groundwater monitoring and addresses the potential risks of coal ash contaminants migrating into groundwater when groundwater protection standards are statistically exceeded. On May 18, 2023, the USEPA proposed changes to the CCR regulations for inactive electric utilities, referred to as “legacy CCR surface impoundments.” On May 8, 2024, USEPA finalized changes to the CCR regulations for inactive surface impoundments at inactive electric utilities, referred to as “legacy CCR surface impoundments.” In February 2026, deadlines related to CCR Management Unit requirements were extended, but the overall goal of the legacy CCR rule remains. Within tailored compliance deadlines, owners and operators of legacy CCR surface impoundments must comply with all existing requirements applicable to inactive CCR surface impoundments at active facilities, except for the location restrictions and liner design criteria.

4.4.1.2 TVA Region Aquifers

Three basic types of aquifers occur in the TVA region: alluvial, sand (composed primarily of sand with lesser amounts of gravel, clay, and silt), and fractured bedrock (primarily carbonate but non-carbonate also present). Groundwater movement in alluvial and sand aquifers occurs through the pore spaces between sediment particles. Carbonate rocks are another important class of aquifers. Carbonate rocks, such as limestone and dolomite, contain a high percentage of carbonate minerals (e.g., calcite) in the rock matrix. Carbonate rocks in some parts of the region readily transmit groundwater through enlarged fractures and cavities created by dissolution of carbonate minerals by acidic groundwater. Fractured non-carbonate rock aquifers include sedimentary and metamorphic rocks (e.g., sandstone, conglomerate, and granite gneiss) which transmit groundwater through fractures, joints, and beddings planes. Eight major aquifers occur in the TVA region (Table 4-5). These aquifers generally align with the major physiographic divisions of the region.

The aquifers include (in order of increasing geologic age): Quaternary age alluvium occupying the floodplains of major rivers, notably the Mississippi River; Tertiary and Cretaceous age sand aquifers of the Coastal Plain Province; Pennsylvanian sandstone units found mainly in the Cumberland Plateau section; carbonate rocks of Mississippian, Silurian and Devonian age of the Highland Rim section; Ordovician age carbonate rocks of the Nashville Basin section; Cambrian-Ordovician age carbonate rocks within the Valley and Ridge Province; and Cambrian-Precambrian metamorphic and igneous crystalline rocks of the Blue Ridge Province.

The largest withdrawals of groundwater for public water supply are from the Tertiary and Cretaceous sand aquifers in the Mississippi Alluvial Plain and Coastal Plain physiographic areas. These withdrawals account for about two-thirds of all groundwater withdrawals for public water supply in the TVA region. The Pennsylvanian sandstone and Ordovician carbonate aquifers have the lowest groundwater use (less than 1 percent of withdrawals)

and lowest potential for groundwater use. Groundwater use is described in more detail in Section 4.4.3.

The quality of groundwater in the TVA region largely depends on the chemical composition of the aquifer in which the water occurs (Table 4-5). Precipitation entering the aquifer is generally low in dissolved solids and slightly acidic. As it seeps through the aquifer it reacts with the aquifer matrix and the concentration of dissolved solids may increase.

Table 4-5: Aquifer, Well, and Water Quality Characteristics in the TVA Region

Aquifer Description	Well Characteristics (common range, maximum)		Water Quality Characteristics
	Depth (feet)	Yield (gpm)	
Quaternary alluvium: Sand, gravel, and clay. Unconfined.	10–75, 100	20–50, 1,500	High iron concentrations in some areas.
Tertiary sand: Multi-aquifer unit of sand, clay, silt and some gravel and lignite. Confined; unconfined in the outcrop area.	100–1,300, 1,500	200–1,000, 2,000	Problems with high iron concentrations in some places.
Cretaceous sand: Multi-aquifer unit of interbedded sand, marl and gravel. Confined; unconfined in the outcrop area.	100–1,500, 2,500	50–500, 1,000	High iron concentrations in some areas.
Pennsylvanian sandstone: Multi-aquifer unit, primarily sandstone and conglomerate, interbedded shale and some coal. Unconfined near land surface; confined at depth.	100–200, 250	5–50, 200	High iron concentrations are a problem; high dissolved solids, sulfide or sulfate are problems in some areas.
Mississippian carbonate rock: Multi-aquifer unit of limestone, dolomite, and some shale. Water occurs in solution and bedding-plane openings. Unconfined or partly confined near land surface; may be confined at depth.	50–200, 250	5–50, 400	Generally hard; high iron, sulfide, or sulfate concentrations are a problem in some areas.
Ordovician carbonate rock: Multi-aquifer unit of limestone, dolomite, and shale. Partly confined to unconfined near land surface; confined at depth.	50–150, 200	5–20, 300	Generally hard; some high sulfide or sulfate concentrations in places.
Cambrian-Ordovician carbonate rock: Highly faulted multi-aquifer unit of limestone, dolomite, sandstone, and shale; structurally complex. Unconfined; confined at depth.	100–300, 400	5–200, 2,000	Generally hard, brine below 3,000 feet.
Cambrian-Precambrian crystalline rock: Multi-aquifer unit of dolomite, granite gneiss, phyllite, and metasedimentary rocks overlain by thick regolith. High yields occur in dolomite or deep colluvium and alluvium. Generally unconfined.	50–150, 200	5–50, 1,000	Low pH and high iron concentrations may be problems in some areas.

Note: gpm = gallons per minute

Source: Webbers 2003

4.4.1.3 Causes of Degraded Groundwater Quality

Causes of degraded groundwater quality may include:

- Spills – Electrical generating plants and other industrial facilities often utilize chemicals, including fuels, in their processes or to operate machinery. If accidental spills of these chemicals occur during usage, storage, or transport, vertical migration of the chemicals into the underlying groundwater aquifer may occur.
- Waste Storage – Over time, many electrical generating stations stored waste byproducts (e.g., CCR) either in landfills or in surface impoundments. Rainfall infiltration into and through dry stacked waste can migrate vertically downward over time, carrying contaminants into groundwater, particularly in unlined landfills or surface impoundments. Capping and covering the waste controls and prevents rainfall infiltration. Depending on hydrogeologic and geologic conditions, storage of waste in unlined landfills and surface impoundments may result in direct contact between the waste material and groundwater, whereby contaminants can leach from the waste material into groundwater over time. Modern landfills constructed with both a clay liner and geosynthetic liner system prevent vertical migration of contaminants into groundwater; however, after long periods of time the storage of waste in lined landfills could result in degraded groundwater quality if the liner fails and contaminants leach from the landfill into groundwater over time.
- Air pollution – Airborne pollutants (e.g., mercury, sulfates) can affect groundwater through rainfall and infiltration.

4.4.2 Surface Water

The quality of the TVA region's surface waters – its streams, rivers, lakes, and reservoirs – is critical to the protection of human health and aquatic life. Water resources provide habitat for aquatic life, recreation opportunities, domestic and industrial water supplies, and other benefits. Major watersheds in the TVA region include the entire Tennessee River Basin, most of the Cumberland River Basin, and portions of the lower Ohio, lower Mississippi, Green, Pearl, Tombigbee, and Coosa River basins. Fresh water abounds in much of this area and generally supports most beneficial uses, including fish and aquatic life, public and industrial water supply, waste assimilation, agriculture, and water-contact recreation, such as swimming. Water quality in the TVA region is generally good.

4.4.2.1 Regulatory Framework for Surface Water Quality

The Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA), is the primary law that affects water quality. It establishes standards for the quality of surface waters and prohibits the discharge of pollutants from point sources unless a National Pollutant Discharge Elimination System (NPDES) permit is obtained. NPDES permits also address CWA Section 316(b) requirements for the design, location, construction, and capacity of cooling water intakes to reflect the best technology available for minimizing

environmental impact as well as Section 316(a) requirements for effluent limitations on thermal discharges to assure maintenance of a balanced indigenous population of fish and wildlife. Section 404 of the CWA further prohibits the discharge of dredge and fill material to waters of the U.S., which include many wetlands, unless authorized by a permit issued by the USACE. In addition, Section 401 of the CWA requires applicants for federally issued permits to obtain a state Water Quality Certification ensuring that proposed activities will comply with applicable water quality standards and will not result in more than de minimis degradation of state waters.

The seven states in the TVA PSA have enacted laws regulating water quality and implementing the CWA. As part of this implementation, the states classify water bodies according to their uses and establish water quality criteria specific to these uses. Each state has also issued an antidegradation statement containing specific conditions for regulated actions and designed to maintain and protect current uses and water quality conditions.

4.4.2.2 Surface Water Quality of TVA Region River Systems

Tennessee River Basin

The Tennessee River Basin contains all except one of TVA's dams and covers about half of the TVA PSA (Figure 4-14). A series of nine locks and dams built mostly in the 1930s and 1940s regulates the entire length of the Tennessee River and allows navigation from the Ohio River upstream to Knoxville (TVA 2004). Almost all the major tributaries have at least one dam, creating 14 multi-purpose storage reservoirs and seven single-purpose power reservoirs. The construction of the TVA dam and reservoir system fundamentally altered both the water quality and physical environment of the Tennessee River and its tributaries. While dams promote navigation, flood damage reduction, power generation, water supply, water quality, and river-based recreation by moderating the flow effects of floods and droughts throughout the year, they also disrupt the daily, seasonal, and annual flow patterns characteristic of a river. Damming of most of the rivers was done at a time when there was little regard for aquatic resources (Voigtlander and Poppe 1989). Beyond changes in water quality, flood control activities and hydropower generation have altered the flow regime (the main variable in aquatic systems) to suit human demands (Cushman 1985). This system of dams and their operation is the most significant factor affecting water quality and aquatic habitats in the Tennessee River and its major tributaries. Portions of several rivers downstream of dams are included on state CWA Section 303(d) lists of impaired waters (e.g., Tennessee Department of Environment and Conservation [TDEC] 2022) due to low dissolved oxygen (DO) levels, flow modifications and thermal modifications resulting from impoundment. TVA has undertaken several major efforts (e.g., TVA's Lake Improvement Plan, Reservoir Release Improvement Plans, and Reservoir Operations Study) to mitigate some of these impacts on aquatic habitats and organisms. While these actions have resulted in improvements to water quality and habitat conditions in the Tennessee River Basin, the Tennessee River and its tributaries remain substantially altered by human activity.

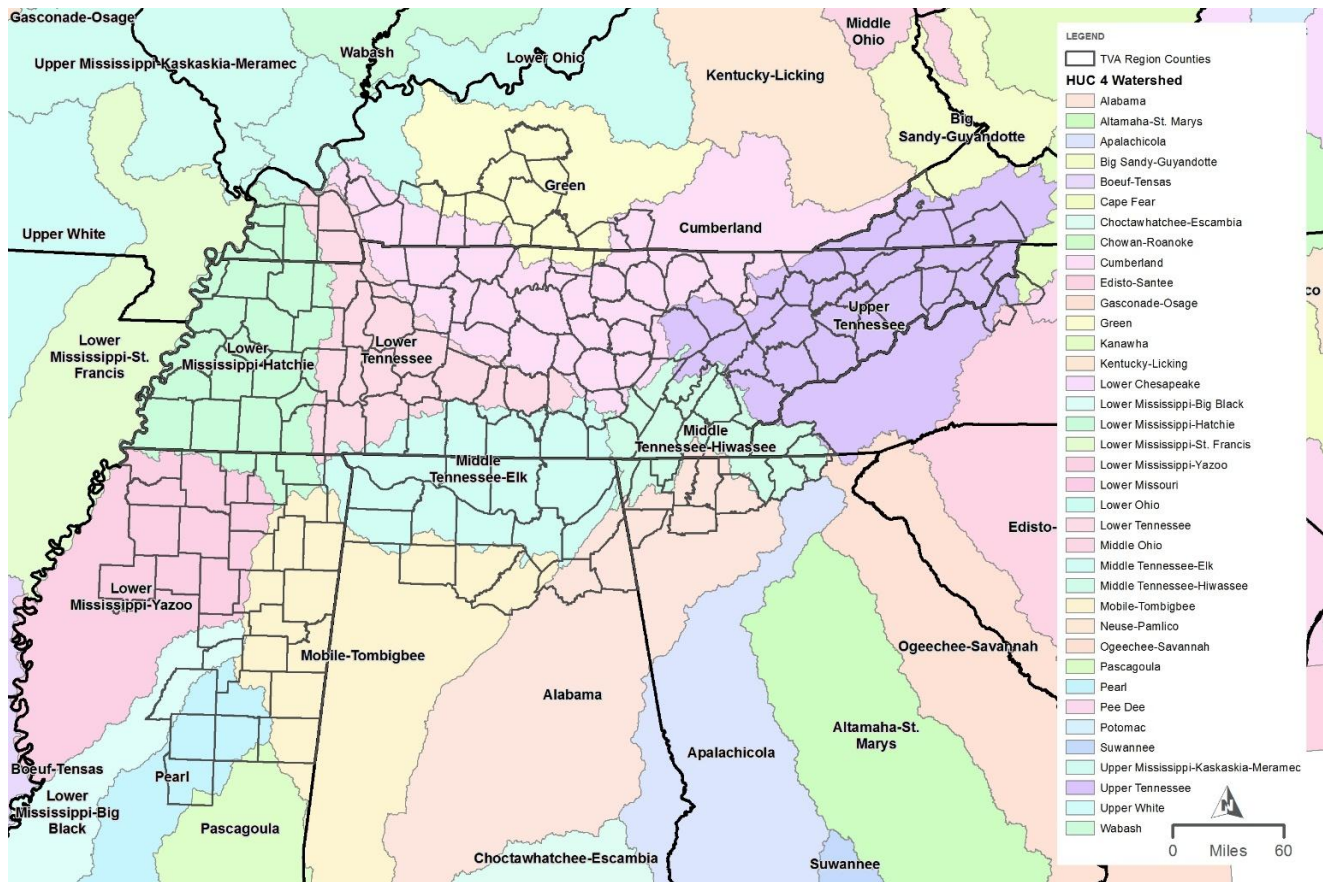


Figure 4-14: Major Watersheds Within TVA Region

Major water quality concerns within the Tennessee River Basin include point and nonpoint sources of pollution that degrade water quality at several locations on mainstream reservoirs and tributary rivers and reservoirs.

Mainstem Reservoirs. The nine mainstem reservoirs on the Tennessee River differ from TVA's tributary reservoirs primarily in that they are shallower, have greater flows and retain the water in the reservoir for a shorter period. Although DO in the lower lake levels is often reduced, it is seldom depleted. Winter drawdowns on mainstem reservoirs are much less severe than tributaries, so bottom habitats generally remain wetted all year. This benefits benthic (bottom-dwelling) organisms but promotes the growth of aquatic plants in the extensive shallow overbank areas of some reservoirs. Tennessee River mainstem reservoirs generally support healthy fish communities, ranging from about 50 to 90 species per reservoir. Good to excellent sport fisheries exist, primarily for black bass, crappie, sauger, white and striped bass, sunfish, and catfish. The primary commercial species are channel and blue catfish, and buffalo.

Tributary Reservoirs and Tailwaters. Tributary reservoirs are typically deep and retain water for long periods of time. This results in thermal stratification, the formation of an upper layer that is warmer and well oxygenated (high DO), an intermediate layer of variable

thickness and a lower layer that is colder and poorly oxygenated (low DO). These aquatic habitats are simplified compared to undammed streams and fewer species are found. Aquatic habitats in the tailwater can also be impaired due to intermittent flows and low DO levels, which restrict the movement, migration, reproduction, and available food supply of fish and other organisms. Dams on tributary rivers affect the habitat of benthic invertebrates, which are a vital part of the food chain of aquatic ecosystems. Benthic invertebrates include worms, snails, and crayfish (which spend all their lives in or on the stream beds), and mussels, clams, and aquatic insects (which live on the stream beds during all or part of their life cycles). Many benthic organisms have narrow habitat requirements that are not always met in reservoirs or tailwaters below dams. Farther downstream from dams, the number of benthic species increases as natural re-aeration occurs and DO levels and water temperatures rise.

TVA regularly evaluates several water quality indicators as well as the overall ecological health of reservoirs through its Ecological Health Monitoring Program. This program evaluates five metrics: chlorophyll concentration, fish community health, bottom life, sediment contamination and DO (TVA 2004). Scores for each metric from monitoring sites in the deep area near the dam (forebay), mid-reservoir, and at the upstream end of the reservoir (inflow) are combined for a summary score and rating. Ecological ratings, major areas of concern, and fish consumption advisories are listed in Table 4-6.

One of TVA's four operating coal-fired power plants, one CC natural gas plant and all of TVA's nuclear plants are in the Tennessee River watershed. All these facilities depend on the river system for cooling water. Two of TVA's CT plants are along or close to the Tennessee River; however, they do not depend on the Tennessee River for cooling water.

Table 4-6: Ecological Health Ratings, Major Water Quality Concerns, and Fish Consumption

Reservoir	Ecological Health Rating – Score	Latest Survey Date	Concerns	Fish Consumption Advisories
Apalachia	Fair – 69	2024	--	Mercury – North Carolina statewide advisory
Bear Creek	Poor – 42	2023	DO, chlorophyll, bottom life	Mercury – Dam forebay area
Beech	Poor – 55	2024	DO	Mercury – Entirety of reservoir
Blue Ridge	Good – 80	2023	--	Mercury, PCBs – Entirety of reservoir
Boone	Fair – 62	2024	DO, bottom life	PCBs, chlordane – Entirety of reservoir
Cedar Creek	Fair – 60	2023	DO, bottom life	Mercury – Dam forebay to 1-mile upstream of dam
Chatuge	Poor – 54	2024	DO, sediments	Mercury – Entirety of reservoir PCBs – Georgia portion
Cherokee	Fair – 61	2024	DO, bottom life	Mercury – Entirety of reservoir

Reservoir	Ecological Health Rating – Score	Latest Survey Date	Concerns	Fish Consumption Advisories
Chickamauga	Good – 81	2023	--	Mercury – Hiwassee River from Highway 58 (RM 7.4) upstream to Highway 11 (RM 18.9)
Douglas	Fair – 60	2022	DO, bottom life	None; however, TDEC has issued fish consumption advisories for the French Broad River (FBRM 71.4 to 77.5) and Nolichucky River (NoRM 0.0 to 92.1) due to mercury.
Fontana	Fair – 71	2022	Bottom life	Mercury – Entirety of reservoir
Fort Loudoun	Fair – 59	2023	DO (forebay), chlorophyll (mid-reservoir), bottom life	Mercury – Portion of reservoir upstream of U.S. 129 PCBs – Entirety of reservoir Mercury, PCBs – Little River embayment
Fort Patrick Henry	Fair – 67	2022	Chlorophyll	PCBs – Entirety of reservoir
Guntersville	Fair – 75	2024	--	Mercury – Crow Creek, Widows Creek, Sequatchie River, Short Creek, Long Island Creek, and Town Creek embayments
Hiwassee	Poor – 57	2024	DO, bottom life (forebay)	Mercury – North Carolina statewide advisory
Kentucky	Good – 74	2023	Chlorophyll (Big Sandy embayment), chlorophyll (forebay and Big Sandy embayment)	Mercury – Kentucky statewide advisory; Tennessee: Big Sandy River and Beech Creek embayments; and West Sandy Creek dewatering area PFAS – Kentucky statewide advisory
Little Bear Creek	Fair – 64	2023	DO	Mercury – Dam forebay area
Melton Hill	Fair – 69	2024	DO, bottom life (forebay only)	PCBs – entirety of reservoir
Nickajack	Good – 81	2024	--	PCBs – Entirety of reservoir PCBs, chlordane – Chattanooga Creek
Normandy	Poor – 55	2022	DO, chlorophyll	Mercury – Entirety of reservoir
Norris	Fair – 63	2023	DO, bottom life (Powell mid-reservoir)	Mercury – Clinch River portion
Nottely	Poor – 53	2023	DO, chlorophyll (mid-reservoir), bottom life (forebay)	Mercury – Entirety of reservoir
Parksville/Ocoee #1	Fair – 62	2023	Sediments	PCBs – Entirety of reservoir

Reservoir	Ecological Health Rating – Score	Latest Survey Date	Concerns	Fish Consumption Advisories
Pickwick	Fair – 63	2024	DO (Bear Creek embayment), chlorophyll	Mercury – Vicinity of TRM 230; Bear Creek, Cane Creek, Spring Creek, and Little Bear Creek embayments PCBs – Tennessee portion (TRM 207 to TRM 215)
South Holston	Fair – 69	2024	DO	Mercury – Tennessee portion
Tellico	Poor – 56	2023	DO, bottom life (forebay only)	PCBs – Entirety of reservoir
Tims Ford	Poor – 55	2022	DO, bottom life	None
Watauga	Fair – 67	2024	DO	Mercury – Entirety of reservoir
Watts Bar	Good – 73	2024	DO (forebay), bottom life	PCBs – Entirety of reservoir Mercury and PCBs – Poplar Creek embayment Mercury – Emory River (RM 12.4 to 28.4)
Wheeler	Fair – 64	2023	DO (Elk River embayment), chlorophyll, bottom life (forebay and Elk River embayment)	Mercury – Vicinity of TRM 277 and TRM 320; Flint Creek, Fox Creek, Limestone Creek, and Round Island Creek embayments PFOS – TRM 296-303; Bakers Creek and Fox Creek embayments
Wilson	Fair – 62	2024	DO, chlorophyll, bottom life (forebay only)	Mercury – Big Nance Creek embayment

Source: TVA 2026a

Notes: DO = Dissolved Oxygen; PCB = Polychlorinated biphenyls; PFOS = Perfluorooctane sulfonate; RM = River Mile; FBRM = French Broad River Mile; NoRM = Nolichucky River Mile; TRM = Tennessee River Mile

Other Major River Systems

The other major rivers within the TVA region (the Cumberland, Mobile, and Mississippi River) share a diversity of aquatic life equal to or greater than the Tennessee River Basin. As with the Tennessee River, these river systems have seen extensive human alteration, including construction of reservoirs, navigation channels, and locks. Despite these changes, diverse aquatic communities are present in each of these river systems.

4.4.2.3 Causes of Degraded Surface Water Quality

Causes of degraded surface water quality may include:

- Wastewater discharges – Municipal sewage treatment systems, industrial facilities, concentrated animal feeding operations, and other sources discharge waste into streams and reservoirs. These discharges are controlled through state-issued NPDES permits issued under the authority of the CWA. NPDES permits regulate the amounts of various pollutants in the discharges (including heat) and establish monitoring and reporting requirements.

- **Runoff discharges** – Runoff from agriculture, forest management (silvicultural) activities, urban uses, and mined land can transport sediment and other pollutants into streams and reservoirs. Runoff from some commercial and industrial facilities and some construction sites is regulated through state NPDES stormwater permitting programs. Runoff from agriculture, silvicultural and other sources not regulated under the NPDES program is referred to as “nonpoint source” runoff.
- **Cooling Systems** – Electrical generating plants and other industrial facilities withdraw water from streams or reservoirs, use it to cool facility operations, and discharge heated water into streams or reservoirs. The aquatic community may be impacted due to temperature changes in the receiving waters and from fish and other organisms being impinged upon the intake screens or entrained in the facility cooling system. These water intakes and discharges are controlled through state-issued NPDES permits.
- **Air pollution** – Airborne pollutants (e.g., mercury, sulfates) can affect surface waters through rainout (the removal of foreign substances from the atmosphere by precipitation) and deposition.

Following is an overview of how power generation can affect water quality.

Coal and Natural Gas Plant Wastewater. Coal-fired power plants have several liquid waste streams that may be permitted for discharge to surface waters and these streams may include condenser cooling water, cooling tower blowdown, ash transport water, metal-cleaning wastewaters, combustion residual leachate, and various low volume wastes, including sumps and drains. CC natural gas plant wastewaters include cooling tower blowdown and various low volume wastewaters. Coal and gas plant sites use best management practices to control stormwater runoff, such as retention ponds to capture sediment and oil/water separators to remove oil and grease as required by regulations. Discharges at coal and natural gas plants are regulated by permits issued by the state under the NPDES program, which may require treating the waters prior to discharge. Periodic analytical monitoring and toxicity testing, as required, ensure there are no adverse effects to the receiving water or to aquatic life. See Section 4.7.1 for further discussion of CCR management at TVA coal plants.

Nuclear Plant Wastewater. Liquid waste streams at nuclear plant sites include condenser cooling water, cooling tower blowdown, water treatment wastewaters, steam generator blowdown, liquid rad-waste including tritiated wastewater, and various low volume wastes including sumps and drains.

Periodic analytical monitoring and toxicity testing is performed on these discharges as required by the NPDES permit to ensure that plant wastes do not contain chemicals at deleterious levels that could affect aquatic life. Best management practices are used to

control stormwater runoff and may include retention ponds to capture sediment and oil/water separators. The radiological component of discharges from nuclear plants is regulated by the NRC and by states under the CWA.

Thermal Plant Cooling Systems. All of TVA's coal-fired and nuclear plants and two CC gas plants withdraw water from reservoirs or rivers for cooling and discharge the heated water back into the water body (see Section 4.4.3). In some cases, the cooling water is chemically treated to prevent corrosion or biofouling of the cooling system. TVA conducts extensive monitoring programs to help ensure permit compliance and to provide information about potential adverse effects from the heated and/or chemically treated discharges. Plant-specific monitoring includes concentrations of various chemicals, toxicity, discharge flow rates, discharge and receiving stream temperatures, DO, fish communities, and benthic organisms.

Recent programs have also focused on spawning and development of cool-water fish species such as sauger, the attraction of fish to the heated discharges and changes in undesirable aquatic micro-organisms such as blue-green algae. In general, these monitoring programs have not detected significant negative effects resulting from release of heated water from TVA facilities in the Tennessee River drainage basin.

Runoff and Air Pollution. Many nonpoint sources of water pollution are not subject to government regulations or control. Principal causes of non-point source pollution are agriculture, including runoff from fertilizer, pesticide applications, erosion, and animal wastes; silvicultural activities; mining, including erosion and acid drainage; and urban runoff. Pollutants reach the ground from the atmosphere as dust falls or is carried to the ground by precipitation.

Low DO Levels and Low Flow Downstream of Dams. A major water quality concern is low DO levels in reservoirs and in the tailwaters downstream of dams. Long stretches of river can be affected, especially in areas where pollution further depletes DO. In addition, flow in these tailwaters is heavily influenced by the amount of water released from the upstream dams; in the past, some of the tailwaters were subject to periods of little or no flow. Since the early 1990s, TVA has addressed these issues in the Tennessee River system by installing equipment and making operational changes to increase DO concentrations below 16 dams and to maintain minimum flows in tailwaters (TVA 2004).

NPDES Permit Requirements. All of TVA's coal, CC natural gas, and nuclear generating facilities have state-issued NPDES permits for discharging to surface waters or pretreatment permits issued under state-approved programs for discharging into public sewer systems. At a minimum, these permits restrict the discharge of pollutants to levels established by USEPA ELG. Additional, and sometimes more restrictive, limits may also be included based on state water quality standards.

Finalized 316(b) regulations for existing facilities (USEPA 2014) require TVA and other utilities to perform additional evaluations of the impacts of their facilities and cooling water intakes and may require modifications to plant cooling systems and/or plant operations to reduce impacts to fish and other aquatic organisms.

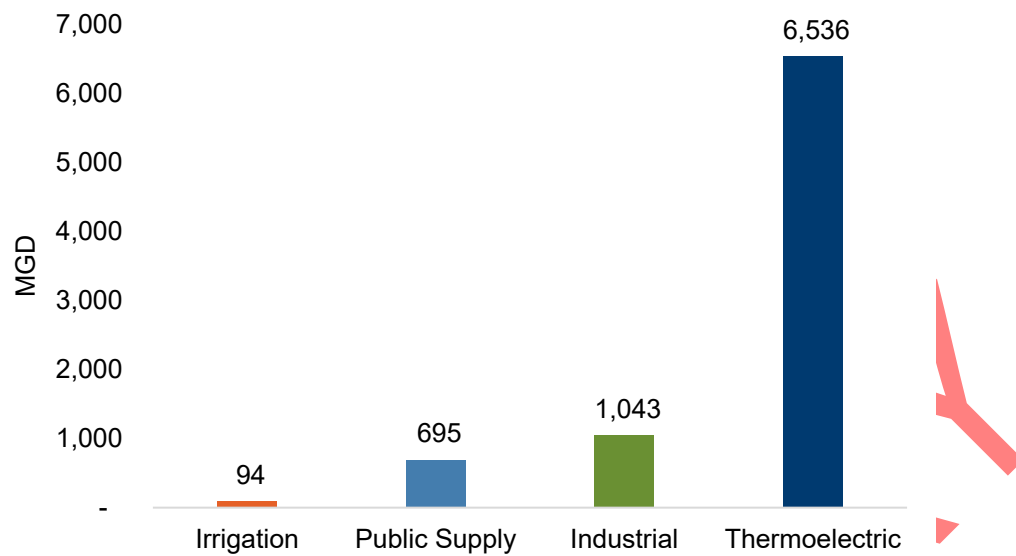
Fuel Cycle Impacts. The extraction, processing, and transportation of fuel can affect water quality. Runoff and other discharges from coal and uranium mines, natural gas well sites, and from fuel processing facilities can discharge sediment and other pollutants into surface waters. These discharges are typically subject to NPDES permit requirements, as well as permit requirements specific to coal and uranium mining. Mining operations can also result in the alteration and elimination of streams. Mining and natural gas extraction can also affect groundwater quality and quantity. Impacts to water quality from the extraction of natural gas by hydraulic fracturing are described in more detail in Section 5.2.1.3.

4.4.3 Water Supply

The TVA PSA contains most of the Tennessee River Basin, which is considered one of the most water rich basins in the U.S. The Tennessee River Basin, which is about half of the TVA PSA, is one of the most intensively used basins in the contiguous U.S. as measured by intensity of freshwater withdrawals in gallons per day per square mile. While the withdrawal rate is high, the basin has a low consumptive use by returning over 95 percent of the withdrawals back for downstream use (Sharkey and Springston 2022).

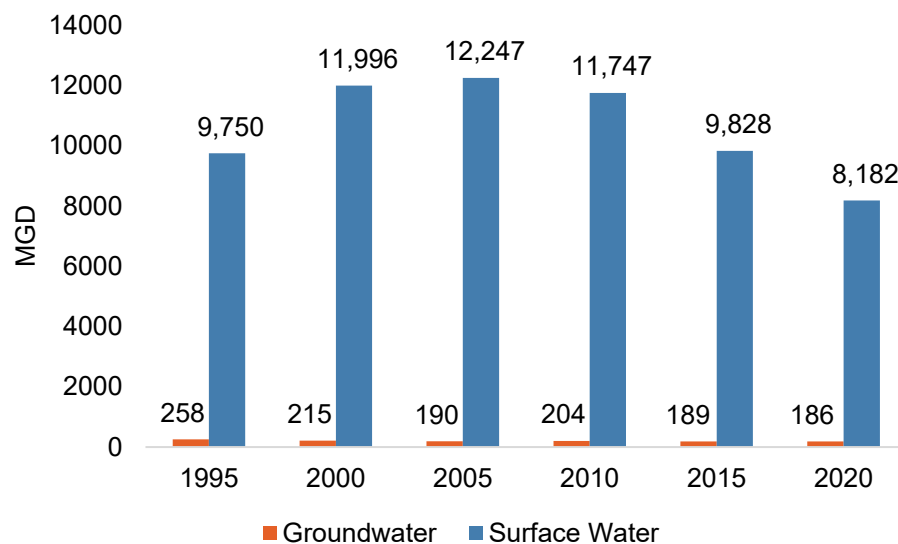
Off-stream water use in the Tennessee River watershed is categorized as thermoelectric power, industrial, public supply, and irrigation. Water use is summarized by source of water (surface water or groundwater) and location of withdrawal (reservoir catchment area). Water returns to the watershed are used to estimate consumptive use.

Total water withdrawals in 2020 were estimated to average 8,368 million gallons per day (MGD) and the 2020 total withdrawal rate was 16.5 percent lower than it was in 2015. This was largely due to a reduction in thermoelectric withdrawal of 20.5 percent (Sharkey and Springston 2022). Of the total withdrawal, 97.8 percent, or 8,182 MGD came from surface water. Groundwater supplied the remaining 2.2 percent, or 186 MGD. Return flow totaled 7,965 MGD, or 95.2 percent of total withdrawal. Total net water demand was 403 MGD, or 4.8 percent of total withdrawal. Water withdrawals for 2020 by category are shown in Figure 4-15. Groundwater and surface water withdrawals in the Tennessee River Basin from 1995 to 2020 are shown in Figure 4-16.



Source: Sharkey and Springston 2022

Figure 4-15: 2020 Water Withdrawals by Category in the Tennessee River Basin



Source: Sharkey and Springston 2022

Figure 4-16: Groundwater and Surface Water Withdrawals in the Tennessee River Basin, 1995 to 2020

Since 1995, the Tennessee River Basin's public water supply has been sourced primarily from surface water. In 2020, public supply water was comprised of 82.4 percent surface water and 17.6 percent ground water. Total surface water withdrawals in the Tennessee River Basin have been decreasing since 2005.

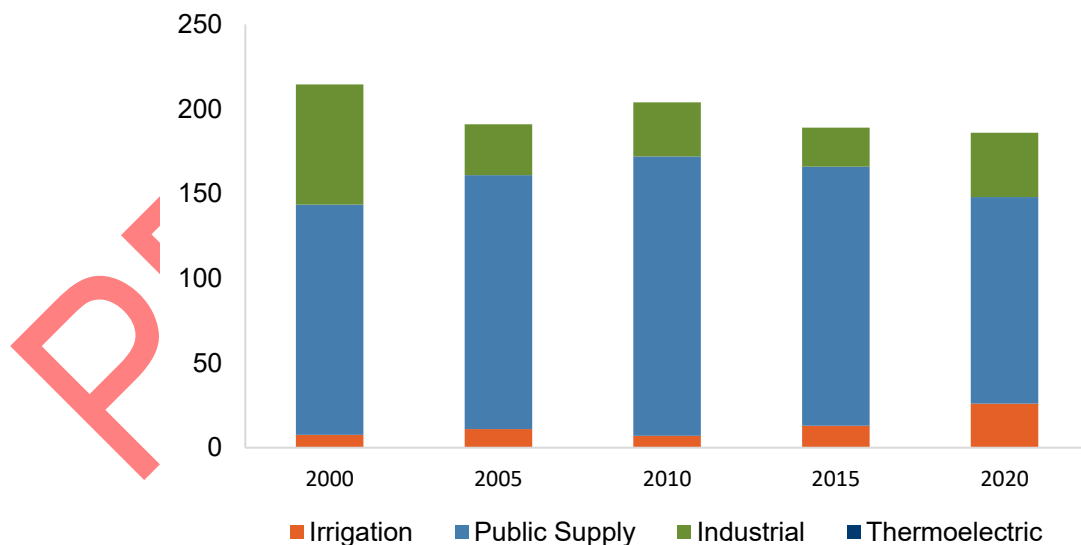
4.4.3.1 Groundwater Use

The use of groundwater to meet public water supply needs vary across the TVA PSA and is the greatest in West Tennessee and Northern Mississippi. This variation is the result of several factors, including groundwater availability, surface water availability, where both

surface and groundwater are present in adequate quantity and quality, which water source can be developed most economically, and public water demand, which is largely a function of population. There are numerous sparsely populated, rural counties in the region with no public water systems. Residents in these areas are self-served by individual wells or springs.

Approximately 60 percent of all groundwater withdrawals were supplied by Tertiary sand aquifers in West Tennessee and North Mississippi. Aquifers in Shelby County, Tennessee (Memphis), accounted for about 38 percent of the total in 2015. The dominance of groundwater uses over surface water use in the western portion of the TVA PSA is due to the availability of prolific aquifers and the absence of adequate surface water resources in some areas. Additionally, several TVA facilities, primarily CC plants, which use groundwater for industrial purposes (e.g., fire protection and cooling) are in this area.

The largest use of groundwater is for public water supply, shown in Figure 4-17, which includes data for the Tennessee River Basin. Approximately 17.6 percent of the water used for domestic supply and 27.2 percent of water used for irrigation in the Tennessee River Basin is groundwater. Groundwater is also used for industrial, mining, livestock, and aquaculture purposes. Total groundwater use for public water supply in 2020 was 122 MGD in the Tennessee River Basin. Groundwater withdrawal for industrial use in the Tennessee River Basin was 38 MGD, or 3.6 percent of total industrial withdrawal. Groundwater use for irrigation was 26 MGD, or 27.2 percent of total irrigation use. Wheeler-Wilson was the Water Use Tabulation Area (WUTA) with the highest groundwater withdrawal, at 43 MGD (Sharkey and Springston 2022). Groundwater use has shown a decreasing trend from 1995 to 2020, except for 2010. In 2020, groundwater withdrawals reached their lowest level since 1995.

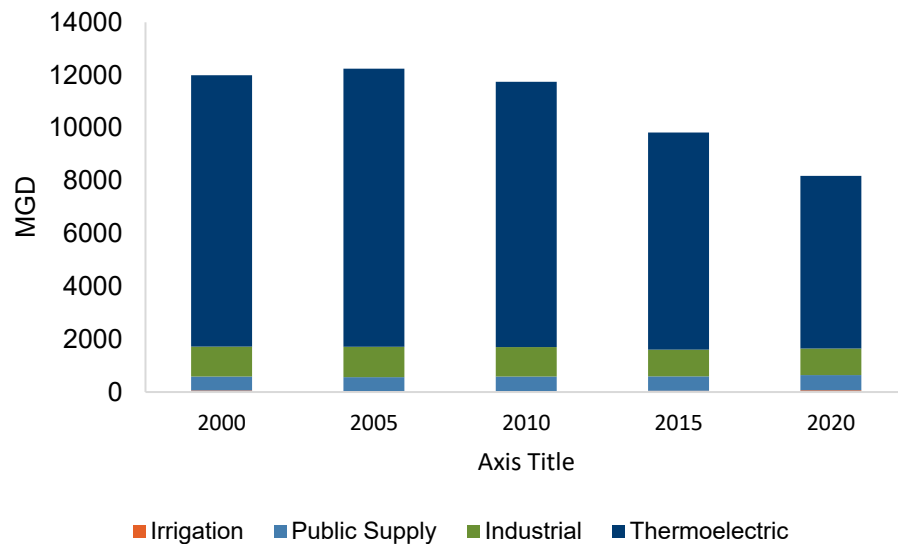


Source: Sharkey and Springston 2022

Figure 4-17: Groundwater Use by Category in the Tennessee River Basin, 2000 to 2020

4.4.3.2 Surface Water Use

Most of the water used for thermoelectric, public supply, aquaculture, and industrial uses is surface water. In 2020, the total surface water use in the Tennessee River Basin was 8,182 MGD. Surface water supplied the entire thermoelectric withdrawal of 6,536 MGD. Surface water was the source for 1,005 MGD, or 96.4 percent of the industrial withdrawal; 573 MGD, or 82.4 percent of the public water supply withdrawal; and 68 MGD, or 72.8 percent of the irrigation withdrawal. Wheeler-Wilson was the WUTA with the highest surface withdrawal, at 3,520 MGD (Sharkey and Springston 2022). Surface water continued to supply most of the water used in the watershed in 2020. Except for the 2020 public supply, surface water withdrawals by source have remained relatively constant over the 2000 to 2020 period. As metropolitan areas within the TVA region increase in population, water use for public supply in these areas has increased. Figure 4-18 includes data for surface water uses in the Tennessee River Basin.



Source: Sharkey and Springston 2022

Figure 4-18: Surface Water Use by Category in the Tennessee River Basin, 2000 to 2020

4.4.3.3 Water Use for Thermoelectric Power Generation

Thermoelectric power generation uses steam produced from the combustion of fossil fuels or from a nuclear reaction. A substantial volume of cooling water is required to condense steam into water. All TVA coal-fired plants and nuclear plants are cooled by water withdrawn from adjacent rivers or reservoirs. Surface water withdrawals may be supplemented by groundwater withdrawn via production wells at some plants, though the quantity of groundwater withdrawn is significantly less than the quantity of surface water withdrawn. The amount of water required is highly dependent on the type of cooling system employed. While the volume of water used to cool the plants is large, most of this water is returned to the adjacent rivers or reservoirs.

Total 2020 thermoelectric withdrawal in the Tennessee River Basin was 6,536 MGD, of which 6,463 MGD, or 98.9 percent, was returned. The largest WUTA withdrawal was 3,294 MGD from the Wheeler-Wilson WUTA. This accounted for 50.4 percent of total thermoelectric withdrawal. The Wheeler-Wilson withdrawal was used to generate 33,105 million kWh of electricity, or 40.2 percent of the total power generated in the Tennessee River watershed (Sharkey and Springston 2022). The largest withdrawal within the Wheeler-Wilson WUTA was at BFN in Limestone County, Alabama. The second largest WUTA withdrawal was from the Watts Bar-Chickamauga WUTA, which comprised 2,601 MGD, or 39.8 percent of total thermoelectric withdrawal. The Watts Bar-Chickamauga WUTA withdrawal was used to generate 39,602 million kWh of electricity, or 48.1 percent of the total power generated in the Tennessee River watershed (Sharkey and Springston 2022).

4.4.3.4 Trends in Thermoelectric Water Withdrawal

Nationally, water use factors have been declining since the 1960s. The national power plant water use factors have declined from a high of about 60,000 gallons (gal)/MWh to a low of about 23,000 gal/MWh (EPRI 2002). The reduction was primarily due to increasing use of closed-cycle cooling, particularly in the western U.S. where water is relatively scarce. TVA's water use factor is higher than the national average because the TVA system was designed and located to specifically take advantage of open-cycle cooling and therefore has a lower percentage of closed-cycle cooling systems than the national average. While closed-cycle cooling systems withdraw less water, they consume more water in their cooling tower systems due to evaporation. TVA's systems are designed for less overall water consumption, even though they do require more water withdrawal upfront.

The average percent of total withdrawal for thermoelectric use between 2000 and 2015 was 83.8 percent. Thermoelectric withdrawal in 2020 was 20.5 percent lower than it was in 2015, and the percentage of total withdrawal in 2020 dropped to 78.1 percent (Sharkey and Springston 2022).

In 2000 and 2005, the thermoelectric unit water requirement for power generation was 39 gallons per kilowatt-hour (gal/KWh). It rose in 2010 to 42 gal/KWh and remained nearly the same in 2015. In 2020, the thermoelectric unit water requirement for power generation dropped to 29 gal/KWh. From 2015 to 2020, there was an increase in thermoelectric power generation of 16.9 percent. However, during the same period, there was a 20.5 percent reduction in water withdrawal. Changes in cooling technology, closure of three fossil plants, conversions to CC plants, and increased hydrogeneration due to increased rainfall led to the decrease in the thermoelectric unit water requirement in 2020 (Sharkey and Springston 2022).

4.4.4 Aquatic Life

4.4.4.1 Regulatory Framework for Aquatic Life

Aside from the Endangered Species Act (ESA) and related state laws described in Section 4.5.3, and harvest regulations established by states, the CWA is the major law affecting aquatic life. Water quality standards and NPDES discharge limits are established, in part, to protect aquatic life. CWA Section 316 regulates (a) the design and operation of cooling water intake structures to minimize adverse effects to aquatic life from entrainment and impingement, and (b) wastewater discharges in order to minimize adverse effects of heat on aquatic life.

The Federal Power Act requires hydropower projects with licenses to provide conditions for the protection, mitigation and enhancement of fish and wildlife that are consistent with agency recommendations, such as those of the U.S. Fish and Wildlife Service (USFWS).

4.4.4.2 Aquatic Life within the TVA Region

The TVA region encompasses portions of several major river systems, including all of the Tennessee River drainage and portions of the Cumberland River drainage, Mobile River drainage (primarily the Coosa and Tombigbee Rivers), and larger eastern tributaries to the Mississippi River in Tennessee and Mississippi (Figure 4-14). These river systems support a large variety of freshwater fishes and invertebrates (including freshwater mussels, snails, crayfish, and insects). Due to the presence of several major river systems, the region's high geologic diversity (see Section 4.5.1), and the lack of glaciation, the region is recognized as a globally important area for freshwater biodiversity (Stein et al. 2000).

Invasive aquatic animals in the TVA region that harm or potentially harm aquatic communities include the common, grass, bighead, and silver carp; alewife; blueback herring; rusty crayfish; Asiatic clam; and zebra mussel. Because of their potential to affect water intake systems, TVA uses chemical and warm-water treatments to control Asiatic clams and zebra mussels at some of its generating facilities.

4.5 Land Resources

This section describes the land resources in the TVA region that could be affected by the alternative strategies. The potentially affected land resources include geology, vegetation and wildlife, endangered and threatened species, wetlands, parks, managed areas and ecologically significant sites, land use, and cultural resources.

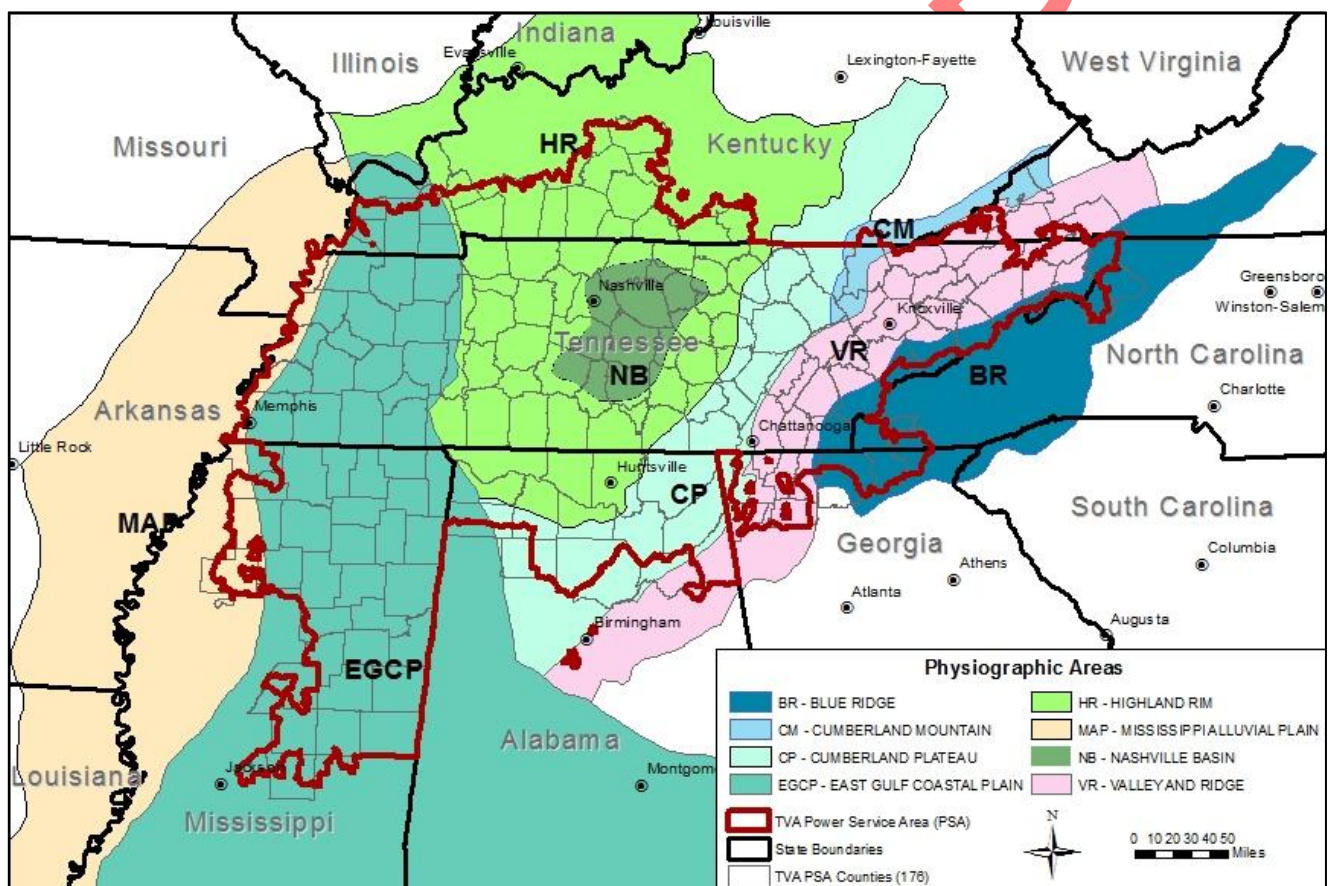
4.5.1 Geology

The TVA region encompasses portions of the following major physiographic provinces and physiographic sections (Figure 4-19) (Fenneman 1938, Miller 1974):

- Blue Ridge
- Valley and Ridge

- Interior Low Plateaus Province
 - Highland Rim
 - Nashville Basin
- Appalachian Plateaus Province
 - Cumberland Plateau
 - Cumberland Mountains
- Coastal Plain Province
 - East Gulf Coastal Plain

Physiographic provinces and sections are areas of characteristic geomorphology and geology resulting from similar geologic events.



Source: Adapted from Fenneman (1938).

Figure 4-19: Physiographic Areas of TVA Region

The easternmost part of the region is the Blue Ridge physiographic province, an area composed of the remnants of an ancient mountain chain. This province has the greatest variation in terrain within the TVA region. Terrain ranges from nearly level along floodplains at elevations of about 1,000 feet to rugged mountains that reach elevations greater than 6,000 feet above sea level. The rocks of the Blue Ridge have been subjected to significant

folding and faulting and are primarily sedimentary (shales, sandstones, conglomerates, quartzite) and metamorphic (slate, phyllite, gneiss) rocks of Precambrian and Cambrian age.

Located west of the Blue Ridge and east of the Appalachian Plateau, the Valley and Ridge Province is characterized by alternating valleys and ridges that trend northeast to southwest. Ridges have elevations up to 3,000 feet and are generally capped by dolomites and resistant sandstones, while valleys have been formed in less resistant dolomites and limestones. Dominant soils in this province are residual clays and silts derived from in-place weathering of rock. Karst features such as sinkholes and springs are common in the Valley and Ridge province.

The Appalachian Plateaus Province is an elevated area between the Valley and Ridge and Interior Low Plateaus provinces. It is comprised of two sections in the TVA region: the extensive Cumberland Plateau and the smaller Cumberland Mountains (Figure 4-19). The Cumberland Plateau rises about 1,000 to 1,500 feet above the adjacent provinces and is formed by layers of near horizontal Pennsylvanian sandstones, shales, conglomerates, and coals, and underlain by Mississippian and older shale and limestones. The sandstones are resistant to erosion and have produced a relatively flat landscape cut by deep stream valleys. Toward the northeast, the Cumberland Mountains section is more rugged due to extensive faulting and several peaks exceeding 3,000 feet elevation. The province has a long history of coal mining and encompasses the Appalachian coal field (USGS 1996). Coal mining has historically occurred in much of the province. The most recent Appalachian coal mining within the TVA region has been from the southern end of the province in Alabama, the northern portion of the Cumberland Plateau section in Tennessee and the Cumberland Mountains section.

Two sections of the Interior Low Plateaus Province occur in the TVA region. The Highland Rim section is a plateau that occupies much of central Tennessee and parts of Kentucky and northern Alabama. The bedrock of the Highland Rim is Mississippian limestones, chert, shale, and sandstone. The terrain varies from hilly to rolling to extensive relatively flat areas in the Northwest and Southeast. The southern end of the Illinois Basin coal region (USGS 1996) overlaps the Highland Rim in northwest Kentucky and includes part of the TVA region. The Nashville Basin (also known as the Central Basin) section is an oval area in middle Tennessee with an elevation about 200 feet below the surrounding Highland Rim. The bedrock is composed of generally flat-lying limestones. Soil cover is usually thin, and streams cut into the limestone bedrock. Karst is well-developed in parts of both the Highland Rim and the Nashville Basin.

The Coastal Plain Province encompasses much of the western and southwestern TVA region (Figure 4-19). Most of the Coastal Plain portion of the TVA region is in the extensive East Gulf Coastal Plain section. The underlying geology is a mix of poorly consolidated gravels, sands, silts, and clays. Soils are primarily of windblown and alluvial (deposited by water) origin, low to moderate fertility and easily eroded. The terrain varies from hilly to flat in

broad river bottoms. The Mississippi Alluvial Plain section occupies the western edge of the TVA region and much of the historic floodplain of the Mississippi River. Soils are deep and often poorly drained. The New Madrid Seismic Zone, an area of large prehistoric and historic earthquakes, is in the northern portion of the section.

4.5.1.1 Geologic Carbon Dioxide Sequestration Potential

Carbon capture, use, transport, and storage provide carbon management by reducing net GHG emissions. Globally, more than a quarter billion tons of CO₂ have been captured and stored as-of 2023. The sequestration (i.e., capture and permanent storage) of CO₂ from large stationary industrial sources such as natural gas processing and coal-fired power plants is an important potential component of efforts to significantly reduce anthropogenic CO₂ emissions. Successful large-scale, economical CO₂ sequestration (also referred to as carbon capture and storage/sequestration [CCS]) would minimize net emissions.

Few power plant CCS projects are currently operating and the technology for commercial scale CCS continues to develop. In January 2023, there were 417 carbon capture, storage, and combined capture and storage projects globally at various stages of development. Of these, 177 projects were located in the U.S., including 12 operational projects, 100 in developmental status, and 29 terminated projects. In January 2023, 24 CCS projects of various development statuses were in the vicinity of the TVA region, with projects in Alabama, Kentucky, Mississippi, North Carolina, and Virginia. Further, only 54 of U.S. CCS projects were tied to power plants and only 11 of those were in the vicinity of the TVA region (NETL 2023).

Geologic CO₂ storage involves capturing and separating the CO₂ from the power plant exhaust; purifying and compressing the CO₂; and transporting the supercritical CO₂ by pipeline to the storage site where it is pumped through wells into deep geological formations. At temperatures exceeding 87.98°F (31.1°C) and pressures exceeding 72.9 atmospheres, CO₂ becomes supercritical, requiring much less volume for storage of this liquid-like material. Supercritical CO₂ remains in the supercritical condition at depths below 2,600 feet, where natural temperatures and fluid pressures exceed the critical point for CO₂ at most places on earth. When the CO₂ capacity of the formation has been reached or when the pressure of the formation or injection well has reached a pre-determined level, CO₂ injection stops and the wells are permanently sealed and monitored (NETL 2010a, NETL 2015).

Since January 2021, DOE has invested in over a hundred projects advancing carbon capture, use, transport, and storage. In 2022, the U.S. captured and geologically stored 20 million metric tons of CO₂. By 2030, DOE anticipates this domestic capacity to expand to 128 million metric tons. DOE-funded carbon capture, utilization, and storage activities include bench scale tests in North Carolina, multiple research endeavors at the University of Kentucky, and various efforts at Tennessee's Oak Ridge National Laboratory (Intensified, Flexible, and Modular Carbon Capture Demonstration 2020-2022, Porous Catalyst Polymers for CO₂ Capture and Conversion 2021-2024, Integrated Process for Direct Air Capture and

Conversion of CO₂ 2020-2023, and Direct Air Capture with Building Handling Equipment 2020-2022) (DOE 2023a, DOE 2023b).

The Kemper County integrated gasification CC plant was constructed near the southern edge of the TVA PSA in Mississippi; as originally designed, CO₂ from the plant would have been captured and used for enhanced oil recovery in oil fields south of the TVA PSA (DOE 2010, NETL 2015). Due to problems unrelated to the area's CO₂ sequestration potential, the plant is being operated as a CC plant fueled by natural gas (Wagman 2017).

4.5.2 Vegetation and Wildlife

The TVA region encompasses nine ecoregions (Omernik 1987), which generally correspond with physiographic provinces and sections (see Section 4.5.1 and Figure 4-19):

1. Blue Ridge
2. Ridge and Valley
3. Central Appalachian
4. Southwestern Appalachian
5. Interior Plateau
6. River Valley and Hills
7. Southeastern Plains
8. Mississippi Valley Loess Plain
9. Mississippi Alluvial Plain

The terrain, plant communities, and associated wildlife habitats in these ecoregions vary from bottomland hardwood and cypress swamps in the floodplains of the Mississippi Alluvial Plain to high elevation balds and spruce-fir and northern hardwood forests in the Blue Ridge. This provides space for a biodiverse TVA Region, with about 5,000 species of plants, 16 species of reptiles, 29 species of amphibians, 180 species of breeding birds and 40 species of mammals occurring and being monitored in Tennessee alone (NRCS 2024a, TWRA 2015, TBRC 2023). Although many plants and animals are widespread across the region, others are restricted to one or a few ecoregions. For example, high elevation communities in the Blue Ridge support several plants and animals found nowhere else in the world (Ricketts et al. 1999), as well as isolated populations of species typically found in more northern latitudes.

4.5.2.1 Regulatory Framework for Vegetation and Wildlife

Aside from the ESA and related state laws described in Section 4.5.3, there are few laws specifically focused on protecting plant species and plant communities. The Plant Protection Act of 2000 consolidated previous legislation and authorized the U.S. Department of Agriculture (USDA) to issue regulations to prevent the introduction and movement of identified plant pests and noxious weeds. EO 13112 – Invasive Species directs federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore invaded ecosystems, and take other related actions. EO 13751 – Safeguarding the Nation from the Impacts of Invasive Species amends EO 13112 and

directs actions to continue coordinated federal prevention and control efforts related to invasive species. Agencies are also directed to incorporate consideration of human and environmental health, climate change, technological innovation, and other emerging priorities into their efforts to address invasive species (USDA 2018a). Funding to address these biological threats has been provided in regulatory actions throughout the years, most recently in the 2021 Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law, and the Inflation Reduction Act of 2022.

A number of species of wildlife are protected under the ESA and related state laws. In addition to these laws, the regulatory framework for protecting birds includes the Migratory Bird Treaty Act (MBTA) of 1918, the Bald and Golden Eagle Protection Act of 1940, and EO 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds. The MBTA and EO 13186 address most native birds occurring in the U.S. The MBTA makes the incidental taking, killing, or possession of migratory birds, their eggs, or nests unlawful, except as authorized under a valid permit. EO 13186 focuses on federal agencies taking actions with the potential to have negative impacts on populations of migratory birds. It provides broad guidelines on avian conservation responsibilities and requires agencies whose actions affect or could affect migratory bird populations to develop a memorandum of understanding on migratory bird conservation with the USFWS. TVA is currently in consultation with USFWS for the development of a memorandum of understanding under EO 13186.

Aside from federal and state laws regulating the hunting, trapping or other capture, and possession of some species, most wildlife other than birds and aquatic species (Section 4.4.4) generally receive no legal protection in inland areas.

4.5.2.2 Regional Vegetation

The southern Blue Ridge Ecoregion, which corresponds to the Blue Ridge physiographic province, is one of the richest centers of biodiversity in the eastern U.S. and one of the most floristically diverse (Griffith et al. 1998). The most prevalent land cover (80 percent) is forest, dominated by the diverse, hardwood-rich mesophytic forest and its Appalachian oak subtype (Dyer 2006; USGS 2016). About 14 percent of the land cover is agricultural and most of the remaining area is developed. Relative to the other eight ecoregions, the Blue Ridge Ecoregion had the least change in land cover from 1973 through 2000 (USGS 2016).

Over half (56 percent) of the Ridge and Valley Ecoregion, which corresponds to the Valley and Ridge physiographic province, is forested. Dominant forest types are the mesophytic forest and Appalachian oak sub-type. In the southern portion of the region, the southern mixed forest and oak-pine sub-type (Dyer 2006, USGS 2016) dominate. About 30 percent of the area is agricultural and 9 percent is developed (USGS 2016).

The Cumberland Mountains physiographic section comprises the southern portion of the Central Appalachian Ecoregion. This ecoregion is heavily forested (83 percent), primarily with mesophytic forests including large areas of Appalachian oak (Dyer 2006, USGS 2016).

The remaining land cover is mostly agriculture (7 percent), developed areas (3 percent) and mined areas (3 percent). The dominant source of land cover change from 1973 through 2000 was mining (USGS 2016), and this ecoregion, together with the Southwestern Appalachian Ecoregion, comprises much of the Appalachian coalfield.

The Southwestern Appalachian Ecoregion corresponds to the Cumberland Plateau physiographic section. About 75 percent of the land cover is forest, predominantly mesophytic forest; about 16 percent is agricultural and 3 percent is developed (USGS 2016). The rate of land cover change from 1973 through 2000 was relatively high, mostly due to forest management activities.

The Interior Plateau Ecoregion consists of the Highland Rim and Nashville Basin physiographic sections. The limestone cedar glades and barrens communities associated with thin soils and limestone outcrops in the Nashville Basin support rare, diverse plant communities with a high proportion of endemic (i.e., restricted to a particular area) species (Baskin and Baskin 2003). About 38 percent of the ecoregion is forested, 50 percent in agriculture and 9 percent developed (USGS 2016). Forests are predominantly mesophytic, with a higher proportion of American beech, American basswood, and sugar maple than in the Appalachian oak subtype (Dyer 2006). Eastern red cedar is also common. For the ecoregion as a whole, the rate of land cover change from forest and agriculture to developed land has increased steadily since data has been recorded (NRCS 2024a). The rate of these changes from the 1970s to the present has been very high in the greater Nashville and Huntsville areas.

A small area in the northwest of the TVA region is in the Interior River Valley and Hills Ecoregion, which overlaps part of the Highland Rim physiographic section. This ecoregion is relatively flat lowland dominated by agriculture (almost two-thirds), with about 20 percent forested hills, 7 percent developed, and 5 percent wetlands (USGS 2016). It contains much of the Illinois Basin coalfield. Drainage conditions and terrain strongly affect land use. Bottomland deciduous forests and swamp forests are common on wet lowland sites, with mixed oak and oak-hickory forests on uplands. A large portion of the lowlands has been cleared for agriculture. The rate of land cover change from 1973 through 2000 was moderate and primarily from forest to agriculture and from agriculture and forest to developed.

The Southeastern Plains and Mississippi Valley Loess Plain Ecoregions correspond, respectively, to eastern and western portions of the East Gulf Coastal Plain physiographic section. These ecoregions are characterized by a mosaic of forests (52 percent of the land area), agriculture (22 percent), wetlands (10 percent) and developed areas (10 percent). Forest cover decreases and agricultural land increases from east to west. Natural forests of pine, hickory, and oak once covered most of the ecoregions, but much of the natural forest cover has been replaced by heavily managed timberlands, particularly in the Southeastern Plains (USGS 2016). The Southeastern Plains in Alabama and Mississippi include the Black Belt, an area of rich dark soils and prairies. Much of this area has been cleared for

agricultural purposes and only remnant prairies remain. The rate of land cover change in the Southeastern Plains Ecoregion is the highest of the nine ecoregions in the TVA region, with intensive forest management practices the leading cause of the change. The rate of land cover change in the Mississippi Valley Loess Plain Ecoregion is moderate to high relative to the other ecoregions.

The Mississippi Alluvial Plain is a flat floodplain area originally covered by bottomland deciduous forests. A large portion has been cleared for agriculture and subjected to drainage activities including stream channelization and extensive levee construction. Most of the land cover is agricultural and the remaining forests are southern floodplain forests dominated by oak, tupelo, and bald cypress. The rate of land cover change since the 1970s has been moderate (USGS 2016), with the major land cover change from agriculture to developed.

The major forest regions in the TVA region include mesophytic forest, southern-mixed forest, and Mississippi alluvial plain (Dyer 2006). The mesophytic forest is the most diverse. While canopy dominance is shared by several species, red maple and white oak have the highest average importance values. A distinct section of the mesophytic forest, the Appalachian oak section, is dominated by several species of oak including black, chestnut, northern red, scarlet, and white oaks. The Nashville Basin mesophytic forest has close affinities with the beech-maple-basswood forest that dominates much of the Midwest. The oak-pine section of the southern mixed forest region occurs in portions of Alabama, Georgia, and Mississippi, where the dominant species are loblolly pine, sweetgum, red maple and southern red oak (Dyer 2006). The Mississippi alluvial plain forest region is restricted to its namesake physiographic region. The bottomland forests in this region are dominated by American elm, bald cypress, green ash, sugarberry, and sweetgum.

Numerous plant communities (recognizable assemblages of plant species) occur in the TVA region. Several of these communities are rare, restricted to very small geographic areas and/or threatened by human activities. A disproportionate number of these imperiled communities occur in the Southern Appalachian region; smaller numbers are found in the other ecoregions (NatureServe 2024). Many of the imperiled communities occur in the Southern Appalachian spruce-fir forest; cedar glades; grasslands, prairies and barrens; Appalachian bogs, fens and seeps; and bottomland hardwood forest ecosystems. Major threats to the Southern Appalachian spruce-fir forest ecosystem include invasive species such as the balsam wooly adelgid, acid deposition, ozone exposure, and climate change (TWRA 2009). The greatest concentration of cedar glades is in the Nashville Basin; a few also occur in the Highland Rim and the Valley and Ridge. Cedar glades contain many endemic plant species, including a few listed as endangered (Baskin and Baskin 2003); threats include urban development, highway construction, agricultural activities, invasive plants, reservoir impoundment, and incompatible recreational use. The category of grasslands, prairies, and barrens includes remnant native prairies; they are scattered across the TVA region but most common on the Highland Rim. This category also includes the high

elevation grassy balds in the Blue Ridge and the Black Belt prairie in the East Gulf Coastal Plain. Threats to these areas include agricultural and other development, invasive plants and altered fire regimes. Appalachian bogs, fens and seeps are often small, isolated, and support several rare plants and animals. Threats include drainage for development and altered fire regimes. Bottomland hardwood forests are most common in the Mississippi Alluvial Plain and East Gulf Coastal Plain; they also occur in other physiographic regions. About 60 percent of their original area is estimated to have been lost, largely by conversion to croplands (USEPA 2023f).

4.5.2.3 Wildlife Population Trends

Many animals are wide-ranging throughout the TVA region; most species tolerant of humans have stable or increasing populations. The populations of many animals have been greatly altered by changes in habitats from agriculture, mining, forestry, urban and suburban development, and the construction of reservoirs. While some species flourish under these changes, others have shown marked declines. For example, populations of birds dependent on grassland and forest have shown decreases in their numbers by 30 to 60 percent (NABCI 2022). Across North America, 54 percent of grassland-breeding birds qualify as birds of conservation concern because of declining populations (USFWS 2021). A large number of the declining birds are Neotropical migrants, species that nest in the U.S. and Canada and winter south of the U.S. Over 28 inland species of birds breeding in the TVA region are considered to be of conservation concern, with eight coastal species also possibly occurring within the region (USFWS 2021). A few additional bird species are considered to be of management concern because of overly abundant populations, leading to damage to natural ecosystems and human interests (USFWS 2011); the resident population of the Canada Goose in the TVA region is an example of such a species.

Global amphibian declines have been well documented but declines in amphibian populations specific to the TVA region have also been reported (Caruso and Lips 2012). The primary causes for these declines are the loss and fragmentation of habitats from urban and suburban development and agricultural and forest management practices.

Introduced pathogens have also contributed to wildlife population declines. For amphibians, diseases such as chytridiomycosis and snake fungal disease, caused by *Ophidiomyces ophiodiicola*, have led to population declines and decreasing biodiversity (Allender et al. 2015; Scheele et al. 2019). Populations of bats have been observed dying off in the TVA region after the introduction of a novel pathogen causing white nose-syndrome (see Section 4.5.3.2).

The construction of the TVA and USACE reservoir systems created large areas of habitat for waterfowl, herons and egrets, ospreys, gulls, and shorebirds, especially in the central and eastern portions of the TVA region where this habitat was limited. Ash and gypsum settling and storage ponds at TVA fossil plants have provided regionally important habitat for these birds and other wetland species although many of these areas are being closed (see Section

4.7). These overall increases in aquatic habitats, as well as the ban on the use of the pesticide dichlorodiphenyltrichloroethane, have resulted in large increases in resident and migratory populations of several birds in the TVA region. Both short-term and long-term changes in the operation of the reservoir system affect the quality of habitat for these species (TVA 2004), as do pond management practices at fossil plants.

4.5.2.4 Invasive Species

Invasive species are species that are not native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (NISC 2016). Invasive species include terrestrial and aquatic plants and animals, as well as other organisms such as microbes. Human actions, both intentional and unintentional, are the primary means of their introductions.

Several plants designated by the USDA as noxious weeds under the Plant Protection Act occur in the TVA region: hydrilla, giant hogweed, cogongrass, itchgrass, and tropical soda apple (USDA 2010). Hydrilla is a submersed aquatic plant present in several TVA reservoirs. Giant hogweed generally occurs near stream bank areas as water is an important link to giant hogweed establishment and proliferation. Cogongrass is an upland plant present in several TVA region counties in Alabama and Mississippi. It occurs on and near several TVA transmission line rights-of-way and can be spread by line construction and maintenance activities. Itchgrass grows in generally disturbed and agricultural areas, as well as roadsides. Tropical soda apple has been reported from a few counties in the TVA region and primarily occurs in agricultural areas.

There are 58 additional invasive plants considered to be an established or emerging threat that occur on or near TVA generating facilities and transmission line rights-of-way (TN-IPC 2023). These include tree-of-heaven, Asian bittersweet, autumn olive, Chinese privet, kudzu, phragmites, Eurasian water milfoil, multiflora rose, and tall fescue. Phragmites occurs in ash ponds at several TVA coal-fired plants and is otherwise uncommon in the TVA region. In recent years, the non-native eelgrass Rockstar Hybrid has displaced native aquatic plants in several TVA reservoirs.

Invasive terrestrial animals at TVA generating facilities that require occasional management include the rock pigeon, European starling, house sparrow, and fire ant. These species have little effect on the operation of TVA's power system.

4.5.3 Endangered and Threatened Species

The TVA region provides habitat for numerous species of plants and animals that have declining populations or are otherwise rare and considered to be endangered, threatened, or of special concern at the national and state levels.

4.5.3.1 Regulatory Framework for Endangered and Threatened Species

The ESA (16 U.S.C. §§ 1531-1543) was passed to conserve the ecosystems upon which endangered and threatened species depend and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Areas known as critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for federal agencies. Under Section 7 of the ESA, federal agencies are required to consider the potential effects of their proposed action on endangered and threatened species and critical habitats. If the proposed action has the potential to affect these resources, the federal agency is required to consult with the USFWS and implement avoidance and minimization measures to address adverse effects.

TVA has made a broad no effect determination at the programmatic EIS level because of both the inability to quantify effects across the entire TVA region and the conceptual (i.e., not site specific) nature of proposed actions. As the IRP is implemented with site-specific actions, TVA would conduct site-specific analysis and consult with the USFWS per Section 7 of the ESA procedures as warranted.

All seven states in the TVA region have enacted laws protecting endangered and threatened species and additional species classified as “in need of management,” “state protected,” etc.

4.5.3.2 Endangered and Threatened Species in the TVA Region

Thirty-four species of plants and 114 species of animals in the TVA region are listed under the ESA as endangered or threatened, with 16 formally proposed for such listing by the USFWS (USFWS 2026). Across the TVA region, there are also 45 areas designated as critical habitat essential to the conservation of listed species. In addition to the species listed under the ESA, about 1,432 plant and animal species are formally listed as protected species by one or more of the states or otherwise identified as species of conservation concern (TVA 2026b).

The highest concentrations of terrestrial and aquatic species listed under the ESA occur in the Blue Ridge, Appalachian Plateaus, and Interior Low Plateau regions. Relatively few listed species occur in the Coastal Plain and Mississippi Alluvial Plain regions. The taxonomic groups with the highest proportion of species listed under the ESA are fish and mollusks. Factors contributing to the high proportions of vulnerable species in these groups include the high number of endemic species in the TVA region and the alteration of their habitats by reservoir construction and water pollution. River systems with the highest numbers of listed aquatic species include the Tennessee, Cumberland, and Coosa rivers.

Populations of a few listed species have increased, primarily because of conservation efforts, to the point where they are no longer listed under the ESA (e.g., bald eagle,

peregrine falcon, Tennessee coneflower, and snail darter) or their listing status has been downgraded from endangered to threatened (e.g., large-flowered skullcap and small whorled pogonia). However, some of the listed species with populations continue to decline due to a multitude of factors. The formerly common northern long-eared bat was listed in 2015 under the ESA as threatened and upgraded to an endangered listing in 2022 due to recent dramatic population declines caused by white-nose syndrome. The same pathogen has also impacted the Indiana bat, little brown bat, and the formerly common tricolored bat, which was proposed for listing as endangered under the ESA in 2022. In the TVA region, this pathogen was first reported in 2009.

4.5.3.3 Endangered and Threatened Species in the Vicinity of TVA Generating Facilities

In addition to ESA-listed species within the TVA region, several species not listed on the Information for Planning and Consultation (IPaC) for the TVA region are known to occur on or very near TVA generating facilities and transmission lines. Appendix A lists the endangered and threatened species reported in the vicinity of TVA generating facilities. Species considered to be locally extirpated are not listed in Appendix A.

4.5.4 Wetlands

Wetlands are areas that are inundated or saturated by water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (40 CFR § 230.3(t)). Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands are highly productive and biologically diverse ecosystems that provide multiple public benefits such as flood control, reservoir shoreline stabilization, improved water quality, and habitat for fish and wildlife resources.

4.5.4.1 Regulatory Framework for Wetlands

Section 404 of the CWA prohibits the discharge of dredge and fill material to waters of the U.S., which include wetlands, unless authorized by a permit issued by the USACE. The scope of this regulation includes most construction activities in wetlands. EO 11990 – Protection of Wetlands requires federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance their natural and beneficial values. Wetlands are also protected by state regulations (e.g. Tennessee's Aquatic Resources Alteration Permit program).

4.5.4.2 Wetlands in the TVA Region

Wetlands occur across the TVA region and are most extensive in the South and West, where they comprise 5 percent or more of the landscape (USGS 2016). Wetlands in the TVA region consist of two main systems: palustrine wetlands such as marshes, swamps, and bottomland forests dominated by trees, shrubs, and persistent emergent vegetation, and lacustrine wetlands associated with lakes such as aquatic bed wetlands (Cowardin et al. 1979). Riverine wetlands associated with moving water within a stream channel are also present

but relatively uncommon. Almost 200,000 acres of wetlands are associated with the TVA reservoir system, where they are more prevalent on mainstem reservoirs and tailwaters than tributary reservoirs and tailwaters (TVA 2004). Almost half of this area is forested wetlands; other types include aquatic beds and flats, ponds, scrub/shrub wetlands, and emergent wetlands.

Manmade emergent wetlands occur on many TVA generating facility sites, often in association with CCR disposal ponds and water treatment ponds. However, CCR and water treatment ponds are excluded from regulation under CWA Section 404. Some of these wetlands provide important wildlife habitat; due to their location and composition, they do not provide the surrounding watershed with any significant flood abatement, or nutrient or sediment retention wetland functions. Many of these wetlands are being eliminated as TVA converts wet CCR storage ponds to dry storage facilities. Approximately 7,769 acres of wetlands are mapped on the National Wetlands Inventory (NWI) dataset within TVA transmission line rights-of-way (USFWS 2023). Due to routine periodic vegetation maintenance, the rights-of-way are dominated by scrub-shrub and emergent wetlands; forest wetlands make up less than 1 percent of the wetlands.

National and regional trends studies have shown a large, long-term decline in wetland area both Nationally and in the Southeast (Dahl 2000, Dahl 2006, Dahl 2011, Hefner et al. 1994). Wetland losses have been greatest for forested and emergent wetlands and have resulted from drainage for agriculture, forest management activities, urban and suburban development, and other factors. The rate of loss has significantly slowed over the past 20 years due to regulatory mechanisms for wetland protection. While the rate of wetland loss has slowed, urbanization continues to impact the ecological function of wetlands across the Southeast. Threats to wetlands associated with urbanization include habitat fragmentation, invasive species, hydrologic alteration, and changes in species composition due to global climate change (Wright et al. 2006).

4.5.5 Floodplains

Floodplains are the relatively level land areas along a stream or river that are subject to periodic flooding. The area subject to a 1-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent-chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of EO 11988 – Floodplain Management.

4.5.5.1 Regulatory Framework for Floodplains

TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is “...to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.” The EO is not intended to prohibit floodplain development in all cases, but rather to create a

consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

For “Critical Actions,” the minimum floodplain of concern is the 500-year floodplain. The U.S. Water Resources Council defines “critical actions” as “any activity for which even a slight chance of flooding would be too great” (U.S. Water Resources Council 1978). Critical actions can include facilities producing hazardous materials (such as liquefied natural gas terminals), facilities whose occupants may be unable to evacuate quickly (such as schools and nursing homes), and facilities containing or providing essential and irreplaceable records, utilities, and/or emergency services (such as large power-generating facilities, data centers, museums, hospitals, or emergency operations centers). TVA currently incorporates floodplain analyses with respect to the 500-year floodplain in addition to analyses in alignment with EO 11988.

4.5.5.2 Floodplains in the TVA Region

In the TVA region, floodplains are associated with reservoirs, streams, ponds, and sinkholes. Power generation facilities of any type, as well as electric transmission lines, could be proposed by TVA or outside entities anywhere in the TVA region.

Floodplains are mapped under the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP). Through their floodplain ordinances, counties and municipalities ensure that development within the floodplain complies with the NFIP.

In addition, development across, along, or in the Tennessee River and its tributaries is also subject to the requirements of Section 26a of the TVA Act. Activities proposed within Section 26a jurisdiction and/or in places where TVA owns property or property rights would be subject to review under EO 11988 in conjunction with TVA’s Section 26a or land use approvals, or both.

4.5.6 Parks, Managed Areas, and Ecologically Significant Sites

Numerous areas across the TVA region are recognized and, in many cases, managed for their recreational, biological, historic, and scenic resources. These areas are owned by (1) federal and state agencies, (2) local governments, (3) non-governmental organizations such as the Nature Conservancy, (4) regional land trusts and private corporations, and (5) private individuals.

Parks, managed areas, and ecologically significant sites are typically managed for one or more of the following objectives:

- Recreation areas – Managed for outdoor recreation or open space. Examples include national, state and local parks and recreation areas, reservoirs (TVA and other), picnic and camping areas, trails and greenways, and TVA small wild areas.

- Species/Habitat Protection – Places with endangered or threatened plants or animals, unique natural habitats, or habitats for valued fish or wildlife populations. Examples include national and state wildlife refuges, mussel sanctuaries, TVA habitat protection areas and nature preserves.
- Resource Production/Harvest – Lands managed for production of forest products, hunting, and fishing. Examples include national and state forests, state game lands and wildlife management areas (WMAs) and national and state fish hatcheries.
- Scientific/Educational Resources – Lands protected for scientific research and education. Examples include biosphere reserves, research natural areas, environmental education areas, TVA ecological study areas, and federal research parks.
- Historic Resources – Lands with significant historic resources. Examples include national battlefields and military parks, state historic sites, and state archaeological areas.
- Scenic Resources – Areas with exceptional scenic qualities or views. Examples include national and state scenic trails, scenic areas, wild and scenic rivers, and wilderness areas.
- Agricultural Resources – Lands with significant local agricultural production and open space value, often in areas where suburban development is increasing. Examples include working family farms protected by conservation easements.

Numerous parks, managed areas, and ecologically significant sites occur throughout the TVA PSA in all physiographic regions but are mostly concentrated in the Blue Ridge and Mississippi Alluvial Plain physiographic regions. Individual ecologically significant areas vary in size from a few acres to thousands of acres. Many areas cross state boundaries or are managed cooperatively by multiple agencies.

Parks, managed areas, and ecologically significant sites occur on or very near many TVA generating plant reservations, including the Allen, Colbert, Gallatin, Kingston, and Shawnee plants. This is especially the case at hydroelectric plants, where portions of the original dam reservations and reservoir lands have been developed into state and local parks. WMAs that are managed by state wildlife divisions are also located on some TVA property; for instance, in Tennessee, the Tennessee Wildlife Resources Agency (TWRA) manages portions or full parts of Owl Hollow Mill WMA, Chickamauga WMA, Watts Bar WMA, Paint Rock WMA, Rankin Bottom WMA, Nolichucky WMA, Beech River WMA, and more, with other WMA's abutting TVA property (TWRA 2023, TVA 2023b). TVA transmission line rights-of-way cross seven National Park Service units, nine National Forests, six National Wildlife Refuges, and numerous state WMAs, state parks, and local parks (TVA 2018a).

4.5.7 Land Use

Major land uses in the TVA region include forestry, agriculture, and urban/suburban/industrial (USDA 2018b). About 4.4 percent of the TVA region is water, primarily lakes and rivers (USDA 2020). This proportion has increased slightly since 1982 (when monitoring was started), primarily due to the construction of small lakes and ponds. About 5.7 percent of the land area is in federal ownership; this proportion has also increased slightly since 1982. The major components of federal land are national parks, national forests, national wildlife refuges, and TVA reservoir lands. Of the remaining non-federal land area, about 9 percent is classified as developed and 80 percent as rural (USDA 2020). Rural undeveloped lands include farmlands (19 percent of the rural area) and forestland (about 42 percent of the rural area). The greatest change since 1982 has been in developed land, which almost doubled in area due to high rates of urban and suburban growth in much of the TVA region. The rate of land development was high during the 1990s and early 2000s and slowed in the late 2000s. More recent data for Tennessee shows that total developed land has grown almost three percent between 2012 and 2017 (USDA 2020).

Approximately 53 percent of the TVA region is forested (USGS 2021). Forestland is predicted to decrease between 1997 and 2060 in the majority of counties in the TVA region, with several counties in the vicinity of Memphis, Nashville, Huntsville, Chattanooga, Knoxville and the Tri-Cities area of Tennessee predicted to lose more than 25 percent of forest area (Wear and Greis 2013). Loss of forest area within the TVA region is primarily a result of increasing urbanization and development.

Agriculture. Agriculture is a major land use and industry in the TVA region. In 2012, 41 percent of the land area in the TVA region was farmland that comprised 151,000 individual farms (USDA 2014). Average farm size was 160 acres, a 6.3 percent increase since 1982. The proportion of land in farms has decreased by 4.2 percent since 1982; since 2007, the decrease was 0.3 percent. Over the 1982–2012 period, the number of farms decreased by 14.7 percent while the average size of farms increased by 6.3 percent. Statewide data for states within the TVA region shows a decline in the number of farms between 1997 and 2017. Between 2012 and 2017, statewide data for Tennessee and Georgia show a small increase in the number of farms (USDA 2019). The number of small farms (between 1 and 9 acres) in Tennessee has increased between 2012 and 2017, following a national trend (USDA 2019). Average farm sizes range between 155 and 326 acres for states within the TVA region and have generally increased in size between 1997 and 2017.

For the state of Tennessee, cropland and pastureland comprise 17.8 and 15.2 percent, respectively, of rural, non-federal land in 2017 (USDA 2020). Both cropland and pastureland have decreased in area since 1982; however, the rate of cropland and pastureland loss in Tennessee has declined (USDA 2018b). While the proportion of land in farms is greatest in Mississippi, southern Kentucky and central and western Tennessee, the highest farm income occurs in northern Alabama and Georgia (EPRI and TVA 2009). Region-wide, the major crop

items by land area are forage crops (hay and crops grown for silage), soy, wheat, corn, and cotton. The major farm commodities by sales are cattle and calves, poultry and eggs, grains and beans, cotton, and nursery products (USDA 2019).

Although the area of irrigated farmland is small (6.4 percent of farmland), it increased by 25 percent from 1987 to 2017 (USDA 2019). The area of irrigated farmland is likely to increase in the future as temperature and precipitation patterns become less predictable or if drought conditions become more prevalent (EPRI and TVA 2009). Between 2012 and 2017, statewide data from Kentucky, Tennessee, North Carolina, and Virginia show minor decreases in the percentage of farms using irrigation; however, in most cases, the acres of irrigated farmland have increased (USDA 2019).

Crops grown specifically to produce biomass for use as fuels (dedicated energy crops) are a potentially important commodity in the TVA region. In 2002, the Census of Agriculture began recording information on short rotation woody crops, which grow from seed to harvestable tree in 10 years or less. These crops have traditionally been used by the forest products industry for producing pulp or engineered wood products and are also a potential source of biomass for power generation. In 2012, there were 117 farms in the TVA region growing at least 2,704 acres of short rotation woody crops, a large decrease from the 286 farms in 2007. Between 2012 and 2017, statewide data for states within the TVA region shows small increases in the number of farms and acres producing short rotation woody crops in Alabama, Georgia, Kentucky, and Mississippi and decreases in North Carolina, Tennessee, and Virginia (USDA 2019).

In 2012, the Census of Agriculture began recording information on the cultivation of switchgrass, a bioenergy crop that can be directly used as fuel and for producing ethanol. In 2012, it was grown by 18 farms in the TVA region that harvested at least 1,800 acres (USDA 2014). Most of these farms were in eastern Tennessee and grew switchgrass as part of research studies at the University of Tennessee. Between 2012 and 2017, the number of farms growing switchgrass in Tennessee has decreased from 18 to 3 (USDA 2019).

Three facilities in the TVA region produce ethanol from corn, primarily for use as biofuels with a total production capacity of 263 million gallons per year (Renewable Fuels Association 2024). A large proportion of their corn feedstock is likely grown within the TVA region. Corn grown in the TVA region is also likely used by ethanol producers elsewhere.

Prime Farmland. The Farmland Protection Policy Act of 1981 (7 U.S.C. 4201 et seq.) recognizes the importance of prime farmland, which is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses (USDA 2018b). The purpose of the Act is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. Prime farmland has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming

methods. Prime farmland is designated independently of current land use, but it cannot be areas of water, urban, or built-up land.

Approximately 23 percent of the TVA region is classified as prime farmland (NRCS 2024b). An additional roughly 4 percent of the TVA region would be classified as prime farmland if drained or protected from flooding.

Forest Management. About 50 percent of the forestland in the TVA region is classified as timberland (USDA Forest Service 2024), forestland that is producing or capable of producing more than 20 cubic feet of merchantable wood per acre per year and is not withdrawn from timber harvesting by law. About 13.5 percent of timberland is in public ownership, which includes national forests, state and local lands, and other federal lands. About 87 percent is under private ownership, which includes both corporations and non-corporate owners. While the majority of corporate timberlands have historically been owned by forest industries, this proportion has decreased in recent years as many forest product companies have sold timberlands due to changing market conditions.

4.5.8 Cultural Resources

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects. Cultural resources are considered historic properties if included in, or considered eligible for inclusion in, the National Register of Historic Places (NRHP), a designation maintained by the National Park Service. The eligibility of a resource for inclusion in the NRHP is based on the Secretary of the Interior's criteria for evaluation (36 CFR § 60.4), which state that significant cultural resources possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

- A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B. Property is associated with the lives of persons significant in our past.
- C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D. Property has yielded, or is likely to yield, information important in prehistory or history.

4.5.8.1 Regulatory Framework for Cultural Resources

Because of their importance to the nation's heritage, historic properties are protected by several laws. Federal agencies, including TVA, have a statutory obligation to facilitate the preservation of historic properties, stemming primarily from the National Historic Preservation Act (NHPA; 16 U.S.C. §§ 470 *et seq.*). Other relevant laws include the Archaeological and Historic Preservation Act (16 U.S.C. §§ 469-469c), Archaeological

Resources Protection Act (16 U.S.C. §§ 470aa-470mm) and the Native American Graves Protection, Repatriation Act (25 U.S.C. §§ 3001-3013), and the American Indian Religious Freedom Act (42 U.S.C. § 1996).

Section 106 of the NHPA requires federal agencies to consider the potential effects of their actions on historic properties and to allow the Advisory Council on Historic Preservation an opportunity to comment on the action. Section 106 involves four steps: (1) initiate the process; (2) identify historic properties; (3) assess adverse effects; and (4) resolve adverse effects. This process is carried out in consultation with the State Historic Preservation Officer (SHPO) of the state in which the action would occur. Tribal Historic Preservation Officers (THPO) and federally recognized Indian tribes attach religious and cultural significance to historic properties regardless of locations. Section 110 of the NHPA sets out the broad historic preservation responsibilities of federal agencies and is intended to ensure that historic preservation is fully integrated into their ongoing programs. Federal agencies are responsible for identifying and protecting historic properties and avoiding unnecessary damage to them. Section 110 also charges each Federal agency with the affirmative responsibility for considering projects and programs that further the purposes of the NHPA, and it declares that the costs of preservation activities are eligible project costs in all undertakings conducted or assisted by a federal agency.

In November 2019, TVA executed a Program Alternative Programmatic Agreement (PA) following consultation with the Advisory Council on Historic Preservation; THPOs and federally recognized Indian tribes that have expressed an interest in TVA's PSA, including the Absentee Shawnee Tribe of Indians of Oklahoma, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Cherokee Nation, The Chickasaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Delaware Nation, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Jena Band of Choctaw Indians, Kialegee Tribal Town, Mississippi Band of Choctaw Indians (MBCI), The Muscogee (creek) Nation, Osage Nation, Poarch Band of Creek Indians, The Quapaw Tribe of Indians, The Seminole Nation of Oklahoma, Shawnee Tribe, Thlopthlocco Tribal Town, and The United Keetoowah Band of Cherokee Indians; and, SHPOs in Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia. The PA lays out a standardized internal review process for routine undertakings unlikely to have an adverse effect on architectural and archaeological cultural resources.

4.5.8.2 Archaeological Resources

The Tennessee Valley is one of the most archaeological rich regions in the U.S. Archaeological evidence is well-documented in the area with evidence of activity at least as early as 14,000 years ago, which was likely part of a rapid population expansion following a wave of migration from eastern Asia. The Valley has been populated by humans ever since. In the Tennessee Valley, cultural chronology before the European invasion is broken into four broad time periods: following the Paleo-Indian Period are the Archaic (11,000 – 3,000 before present [B.P.]), Woodland (3,000 – 1,100 B.P.), and Mississippian (1,100 – 500 B.P.,

or AD 900-1,500) periods. Archaic peoples are known for collecting tree nuts and freshwater mussels, seasonal movements over the landscape to collect different kinds of resources as they became available, and a relatively dispersed population. By the Woodland period, the harvest of certain wild plant foods intensified, leading to cultivation and, eventually, domestication. Woodland people mostly lived in permanent or semi-permanent villages, carried out long-distance trade networks, developed elaborate rituals, made fired-clay pots and vessels, and buried their dead in large, conical-shaped earthen mounds. During the Mississippian period more complex social systems developed, based on maize-based agriculture, with large polities headed by powerful chiefs. Tragically, exploration of the Southeast by Spaniards inadvertently infected native peoples with diseases that had never been known in North America, leading to pandemics that decimated native populations coast to coast. Little is known about the particulars of this period, but by the late 17th century Mississippian chiefdoms had been replaced by, or reorganized into, the tribes that we know today as the Cherokee, Creek, Chickasaw, Choctaw, Seminole, and Shawnee. With the expansion of the English colonies, these and all the other native groups living in the eastern U.S. were gradually pushed into remnants of their former territories while forming, breaking, and re-forming alliances with the British, the French, the Spanish, and later the Americans. First British, and later Americans brought enslaved Africans to do the hard work of running farms and plantations. Although history has recorded events in our country since the earliest contact with Europeans, history is incomplete and much of what we know about the past 500 years comes from, or is enhanced by, archaeological evidence.

For over 80 years, TVA has been actively engaged in identifying archaeological resources on TVA lands and easements. In the 1930s and 1940s, under authority of the Antiquities Act of 1906, TVA completed large regional surveys in all the lands to be affected by the planned reservoir projects and excavated dozens of major archaeological sites. The work continued in the 1960s and 70s with the construction of reservoir projects such as Normandy and Tims Ford under the Reservoir Salvage Act, and during planning for the several nuclear projects that TVA pursued. The NHPA was passed in 1966; Section 106 of this Act requires federal agencies to consider the potential effects of their undertakings on historic properties, including significant archaeological sites. TVA began complying with this Act once it was passed, but compliance became more systematic in the late 1980s after the Advisory Council on Historic Preservation published regulations implementing Section 106 (36 CFR Part 800.1-16). These regulations created a process for agencies to identify historic properties, evaluate project effects on those properties, and avoid, minimize, or mitigate adverse effects, all in consultation with SHPOs, THPOs, and federally recognized Indian tribes, and others with an interest in the project. Today, TVA completes some level of identification and evaluation of archaeological sites as Section 106 compliance prior to taking or approving ground disturbing activities.

TVA maintains digital records of all archaeological sites identified on TVA property, as well as sites identified during phase I surveys off TVA land, such as surveys in connection with

transmission line projects, in CRMS. Identifying and managing archaeological resources requires careful documentation of the location, nature, and condition of each archaeological resource. Whenever a TVA action has the potential to adversely affect a sensitive resource TVA's preference, and that of TVA's consulting parties, is to avoid the site, and if avoidance is not feasible, to minimize the effects through design changes and/or best management practices. In rare instances avoidance is not possible, and in those cases the adverse effects are mitigated by the scientific collection of valuable data from the site before the site is damaged or destroyed. Mitigation consists of the scientific excavation of the site, archiving the data, and conserving the artifacts, all in consultation with SHPOs, THPOs, and federally recognized Indian tribes and other appropriate consulting parties.

4.5.8.3 Historic Architectural Resources

Historic architectural resources—sites, structures, buildings, objects, and districts that are either 50 years of age or older or are exceptionally significant—are found throughout TVA's PSA and the Tennessee River watershed. Those historic architectural resources are either eligible for listing or listed in the NRHP, and can include houses, barns, and public buildings. Many of the generating plants, corporate offices, and recreation facilities owned, leased, or otherwise occupied by TVA are also historic properties.

Fifty-nine percent of TVA's inventoried facilities (excluding transmission assets) are at least 50 years of age or older. Of those that are historic, 83 percent are historic properties—listed in or eligible for listing in the NRHP. TVA's 70 generating facilities are comprised of hydroelectric, fossil, nuclear, gas, and solar facilities. Eighty-four percent of TVA's historic generating facilities are also historic properties. All of TVA's hydroelectric projects are historic properties (listed in or eligible for listing in the NRHP); one of these, Wilson Dam, is listed as a National Historic Landmark. In addition to hydroelectric plants, two TVA fossil plants (SHF and BRF, now retired) are historic properties; the remaining fossil plants are either no longer extant or have been determined ineligible due to a lack of integrity because of modifications and alterations. Only one nuclear plant (BFN) is a historic property. None of TVA's gas or solar facilities are historic properties. The large number of TVA's historic generating facilities that remain historic properties poses a unique challenge as TVA aims to balance preservation and retention of historic fabric and character-defining features with safe and efficient energy production to meet the growing demand for electricity.

In addition to generation, TVA's facilities also include historic corporate offices (Knoxville and Muscle Shoals) and non-power dams, including two systems of smaller dams for recreation and flood control and NRHP-listed Normandy and Tellico Hydroelectric Projects. Transmission assets were excluded from this discussion, given TVA's on-going programmatic efforts to evaluate these resources.

In FY 2019, TVA initiated a multi-year project to develop a comprehensive inventory for historic architectural resources on TVA land and adjacent to TVA transmission lines. Surveys and assessments continue to grow the inventory. In addition to conducting surveys, the

inventory project includes adding historic architectural resource records in TVA's CRMS. The addition of this data not only improves efficiency of Section 106 project reviews, but also serves as a planning tool for the management of TVA's historic properties. Additionally, in FY 2023, TVA began fieldwork for systematic updates of NRHP documentation as a part of the inventory project for the first of several groups of NRHP-listed hydroelectric projects. Additional updates are anticipated to continue through 2031.

In 2019, TVA began development of a complete history of TVA's transmission system that will support a consistent assessment of TVA's historic transmission assets. In 2023, TVA entered into a new PA with the Tennessee SHPO about the cultural resource management of historic transmission assets in Tennessee. In this PA, TVA agreed to update the NRHP documentation for nine hydroelectric dams, create a TVA Transmission Digital Museum, and document the history of transmission office buildings. Part of the agreement stipulates that TVA will track all projects on historic transmission assets in Tennessee, document any adverse effects, and explain how they were resolved through the mitigation outlined in the agreement.

4.5.8.4 Traditional Cultural Properties

The TVA region is a diverse cultural landscape that held special meaning to its past inhabitants and to their descendants. Some of these places can be considered Traditional Cultural Properties (TCP). A TCP is defined as a property that is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (Parker and King 1998). Similarly, a cultural landscape is defined as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Birnbaum 1994). TVA does not make public sensitive information regarding the location or other information regarding sacred sites or TCPs identified by consulting tribes. Some examples of TCPs within the study area include mound sites, segments of the Trail of Tears, and stacked stone features. The Trail of Tears consisted of many routes and sub-routes that were traveled by Native Americans during their removal from their ancestral homelands. Segments of the Trail of Tears cross TVA transmission lines at approximately 278 locations (TVA 2018a). Stacked stone features often appear as single or a group of cylindrically stacked limestone. The origin and purpose of these stone features is uncertain, but a resolution passed by the United South and Eastern Tribes, Inc., in 2007, recommended that all federal agencies involved in the Section 106 process consider stacked stone features that cannot be conclusively linked to a historic origin to be a TCP under NRHP Criterion A (USET 2007).

4.6 Availability of Renewable Energy Resources

The alternative strategies being evaluated include the potential for additional renewable generating resources. TVA includes all renewable resources in its definition of renewable

energy, including hydroelectric generation. This assessment of the availability of renewable resources does not include TVA's existing hydroelectric facilities and considers renewable resources in the context of many state renewable portfolio standards to include solar, wind, small hydroelectric (see Volume 1, Section 2.6), and upgrades to existing large hydroelectric plants, biomass (including biogas), and geothermal energy. Geothermal generation using currently available and near-term emerging technologies is not considered further because of the lack of a developable resource in the TVA region (Augustine 2011).

Following is an assessment of the availability of potential renewable resources for generating electricity in and near the TVA region.

4.6.1 Hydroelectric Energy Potential

Hydroelectric generation (excluding the Raccoon Mountain pumped storage facility) presently accounts for about 10 percent of TVA's annual energy supply (see Section 2.3.5). TVA has gradually increased this capacity by upgrading the hydroelectric turbines and associated equipment. To date, this program has increased TVA's hydroelectric generating capacity by about 15 percent. This capacity increase qualifies as renewable energy under most renewable portfolio standards.

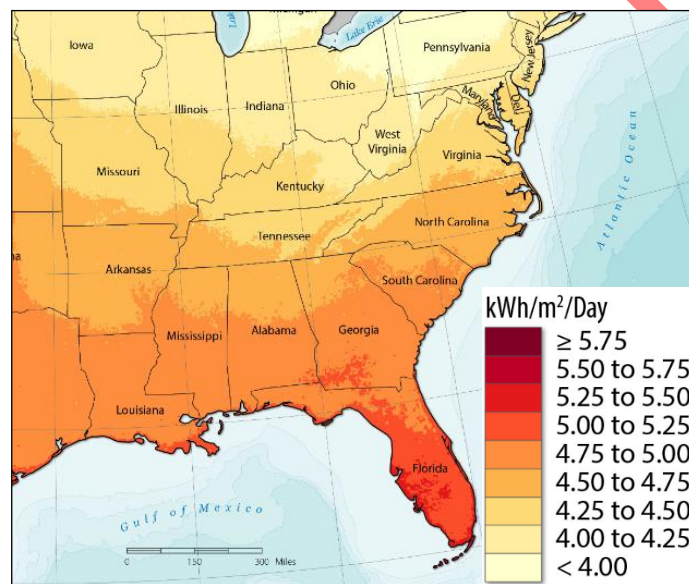
With 43 plants in service in the U.S., pumped storage hydropower accounts for 70 percent of the current grid storage in 2022, a drop from 93 percent in 2019 due to battery installations. There was an estimated 22 gigawatts (GW) of storage capacity with 553 gigawatt hours (GWh) of storage potential in 2022, and pumped storage hydropower is considered one of the lowest cost technologies for 4-16 hours duration storage. In the U.S., development of pumped storage hydropower projects has slowed, with changes mostly from upgrades or retirements (EERE 2023).

In November 2025, TVA completed an EIS to evaluate increasing pumped storage hydropower capacity within its PSA. The EIS evaluates new pumped storage hydropower facilities at two locations in Jackson County, Alabama, and expansion of the existing Raccoon Mountain Pumped Storage Plant in Marion County, Tennessee.

4.6.2 Solar Energy Potential

Solar energy resource potential is a function of average daily solar insolation (see Section 4.3) and is expressed as kWh/m²/day (available energy [kWh] per unit area [m²] per day). Solar resource measurements are reported as either direct normal radiation (no diffuse light) or total radiation (a combination of direct and diffuse light). Diffuse or scattered light, which is common in eastern North America, is caused by cloud cover, humidity, or particulates in the air. Solar PV panels are capable of generating with both direct and diffuse light sources. These measurements do not incorporate losses from converting PV-generated energy (DC) to alternating current (AC) or the reduced efficiency of some PV panels at high temperatures. Figure 4-22 shows the average annual total solar resource for the region based on 1998 to 2016 data. All current and foreseeable solar generation in the TVA region is flat plate PV, as concentrated solar technologies are not economically feasible due to high amounts of diffuse

light. The PV potential assumes flat-plate panels are oriented to the south and installed at an angle from horizontal equal to the latitude of the location. More detailed, state-specific maps are available from the National Laboratory of the Rockies (NLR), formerly known as the National Renewable Energy Laboratory (NREL) (NLR 2018). The TVA region has between 4.1 and 4.8 kWh/m²/day of available solar insolation for flat-plate PV panels, with the potential greatest in the southwestern portion of the region and decreasing toward the northeast. Most of the larger (i.e., >1 MW capacity) utility-scale solar facilities operating, under construction, or proposed in the TVA region are in areas with between 4.5 and 4.8 kWh/m²/day of insolation. TVA continues to evaluate a variety of PV installations across the PSA, although land availability, construction cost, community restrictions, interconnection, and transmission factors often limit the land available for these projects.



Source: Adapted from NLR 2018.

Figure 4-20: Solar Photovoltaic Generation Potential in the TVA Region

Because PV is the most abundant renewable resource, it is difficult to accurately assess a feasible potential total value for the TVA region. Factors that impact solar deployment at all scales include cost, land availability, community support, and transmission/interconnection constraints. Although solar resources in the TVA region are plentiful, particularly in West Tennessee, North Mississippi, and North Alabama (Figure 4-22), both storage options (short-term and medium-term) and the solar deployments that would power them (small and large scale) would need to be economically feasible for the companies undertaking those projects.

Gagnon et al. (2016) examined the technical potential of PV systems installed on rooftops. Technical potential includes the number and area of rooftops (dependent in large part on population density), geographic location, system, topographic, and land-use constraints, and system performance, but not projected costs. Across most of the TVA region, between 80 and 90 percent of small buildings (e.g., single family homes) were technically suitable for PV

systems, although that number will be much smaller in reality due to several factors such as shading, cost, and infrastructure. For the TVA region states, the proportion of 2013 electricity sales that could be provided by small building, rooftop PV ranged from a low of 16.0 percent for Kentucky to 23.5 percent for North Carolina. With the inclusion of rooftop PV on medium and large buildings, the proportion of 2013 electricity sales that could be provided by rooftop solar ranged from 25.2 percent for Kentucky to 33.8 percent in Georgia.

4.7 Solid and Hazardous Wastes

This section focuses on the solid and hazardous wastes produced by construction and operation of generating plants and transmission facilities. Wastes typically produced by construction activities include vegetation, demolition debris, oily debris, packing materials, scrap lumber, and domestic wastes (garbage). Non-hazardous wastes typically produced by common facility operations include sludge and demineralizers from water treatment plant operations, personal protective equipment, oils and lubricants, spent resins, desiccants, batteries, and domestic wastes. In 2018, TVA facilities produced approximately 20,884 tons of non-hazardous solid waste. This quantity decreased to approximately 17,351 tons in 2022, 12,160 tons in 2023, and 11,214 tons in 2024. The amount of waste produced at any one facility, however, can vary significantly from year to year due to maintenance, decommissioning, and asset improvement activities. To reduce waste generation, especially hazardous waste, TVA has incorporated into its procedures waste minimization efforts including reuse and recycling, substitution of less hazardous products and chemical traffic control.

Hazardous, non-radiological wastes typically produced by common facility operations include paint and paint solids, paint thinners, discarded out-of-date chemicals, parts washer liquids, sand blast grit, chemical waste from cleaning operations, and broken fluorescent bulbs. The amount of these wastes generated varies with the size and type of facility (Table 4-7). The decrease in tonnage from coal plants was due to closure of fossil plants. Hazardous wastes, wastes requiring special handling under the Toxic Substances Control Act (TSCA), and universal waste (see explanations below) generated from routine facility operations are generally shipped to Trans Cycle in Pell City, Alabama, and Waste Management's Emelle, Alabama, facility for disposal.

Table 4-7: Annual Quantities (in tons) of Hazardous Wastes Generated by Routine Operations at TVA Facilities, 2020-2024

Year	Type of Facility					Total
	Coal Plant	Nuclear Plant	Hydroelectric Plant	Natural Gas Plant	Other	
2020	34.3	5.0	15.9	0.0	31.5	86.7
2021	24.0	9.1	6.9	0.04	15.2	55.2
2022	5.5	1.9	4.4	0.08	23.3	35.2
2023	4.3	7.6	4.0	7.3	116.8	140.0
2024	2.5	2.9	7.4	75.6	7.9	96.3

Annual Average	Type of Facility					
	14.1	5.3	7.7	16.6	38.9	82.7

Hazardous wastes are defined by RCRA to include those that meet the regulatory criteria of ignitability, corrosivity, reactivity, or toxicity. They can include such materials as paints, solvents, corrosive liquids, and discarded chemicals. Wastes regulated under the TSCA that are typically encountered at TVA sites include PCBs, which have been historically used in insulating fluids in electrical equipment. PCB items are typically shipped to Trans Cycle Industries in Pell City, Alabama, and Waste Management in Emelle, Alabama.

Used oil is considered a waste if not recycled. Used oils include gear oils, greases, mineral oils, and an assortment of other petroleum- and synthetic-based oils. The majority of TVA's used oil is recycled annually. Used oil containing 50 or greater ppm PCB is regulated by TSCA and must be disposed of as PCB-contaminated oil.

Universal wastes are a subset of hazardous wastes that are widely available, easily recyclable, and generally pose a relatively low threat. However, these wastes can contain materials that cannot be released into the environment. This classification includes batteries, pesticides, fluorescent bulbs, and equipment containing mercury. In 2024, approximately 32.8 tons of universal waste were generated and recycled by TVA.

Wastes generated from renewable sources generally fall into these categories of wastes and do not require special management. The generation of wastes from operations of renewable facilities is small. Wastes result from the decommissioning of wind or solar facilities. As solar generation increases, the commercial recycling of PV panels has increased, allowing the recovery of high-value materials that are used in PV modules (e.g., silicon, indium, silver, tellurium, copper). However, it is estimated that in the U.S. less than 10 percent of PV modules are sent to recyclers; most modules are disposed of in landfills (Curtis et al. 2021). During decommissioning, wind turbines are typically landfilled and associated infrastructure are typically recycled.

Coal-fueled generating plants produce large quantities of ash and other coal combustion solid wastes and nuclear plants produce radioactive wastes. These wastes are described in more detail below.

4.7.1 Coal Combustion Solid Wastes

The primary solid wastes produced by coal combustion are fly ash, bottom ash, boiler slag, char, spent bed material, and FGD residue. The properties of these wastes (also known as CCR) vary with the type of coal plant, the chemical composition of the coal, and other factors. Ash and slag are formed from the noncombustible matter in coal and small amounts of unburned carbon. Fly ash is composed of small, silt- and clay-sized, mostly spherical particles carried out of the boiler by the exhaust gas. Bottom ash is heavier and coarser with

a grain size similar to fine sand to fine gravel and falls to the bottom of the boiler where it is typically collected by a water-filled hopper. Boiler slag, a coarse, black, granular material, is produced in cyclone furnaces when molten ash is cooled in water. Ash and slag are primarily composed of silica (SiO_2), aluminum oxide (Al_2O_3), and iron oxide (Fe_2O_3).

FGD residue is formed in FGD systems (scrubbers) by the interaction of sulfur in the flue gas with finely ground limestone or slaked lime. TVA's FGD systems at CUF and KIF use limestone as the reagent to bond with the sulfur, producing hydrated calcium sulfate ($\text{CaSO}_4\cdot 2\text{H}_2\text{O}$), also known as synthetic gypsum. The gypsum and fly ash from these systems are stored separately, allowing ready marketing of these materials for beneficial use in production of wallboard and ready-mix concrete, respectively. The FGD systems at the GAF and on SHF Units 1 and 4 use slaked lime as the reagent and produce calcium sulfite (CaSO_3). Unlike the other plants with FGD systems that segregate the ash and FGD residue waste streams, the CCR at GAF and SHF are combined in a single dry waste stream.

During 2024, TVA produced approximately 1.8 million tons of CCR, with approximately 43 percent being gypsum, 23 percent being fly ash, 7 percent being bottom ash, and 26 percent being dry scrubber product (Table 4-8). Of the 1.8 million tons, about 1.3 million tons, or 72 percent, were utilized or marketed. From 2019 to 2021, on average, TVA utilized or marketed approximately 1.1 million tons of CCR per year, 61 percent of the total CCR produced during this time. Additionally, from 2013 to 2016, TVA utilized or marketed approximately 1.2 million tons of CCR on average per year, which was 30 percent of the total CCR produced during this time. Thus, while the total quantity of CCR utilized or marketed has remained relatively consistent, the proportion utilized or marketed has fluctuated, though it has mostly increased. The reduced total production of CCR results from coal plant retirements. TVA fly ash is utilized as a replacement for Portland cement in ready mix concrete. TVA gypsum is used to produce wallboard and cement. The uses for TVA boiler slag include abrasives and blasting agents. Opportunities for reuse of the combined fly ash and FGD residue CCR produced at GAF and SHF are currently very limited.

CCR is regulated by 40 CFR Part 257, Subpart D, and Part 261, also known as the CCR Rule. This rule regulates the disposal of CCR as solid waste under the subtitle D of RCRA.

Table 4-8: TVA Coal Combustion Residual Production and Utilization, 2020-2024

Material	CCR in Tons									
	2020		2021		2022		2023		2024	
	Prod.	Util.	Prod.	Util.	Prod.	Util.	Prod.	Util.	Prod.	Util.
Fly Ash	388,338	307,775	452,847	263,408	384,782	253,902	400,577	354,598	420,977	215,146
Bottom Ash	125,717	3858	157,740	16,684	122,312	19,951	120,830	14,547	129,821	16,797
Boiler Slag	13,368	20,578	0	0	0	0	0	0	0	0
Gypsum*	779,660	967,071	872,486	812,258	610,298	952,834	701,810	1,066,869	782,754	1,067,105

	CCR in Tons									
Dry Scrubber Product	245,265	0	374,487	0	413,679	0	430,111	0	479,524	0

Note: Prod. = production; Util. = utilization

*Gypsum utilization totals more than 100 percent of production because material is harvested from the landfill, thereby reducing the volume of material stored.

The CCR that is not sold for reuse is currently stored in landfills at the coal plant sites. TVA operates four coal-fired plants (CUF, GAF, KIF, and SHF). All four of the facilities have been converted to dry storage and disposal. TVA is in the process of closing inactive CCR surface impoundments and landfills fleetwide.

4.7.2 Nuclear Waste

The nuclear fuel used for power generation produces liquid, gaseous, and solid radioactive wastes (“radwaste”) that require storage and disposal. These wastes are categorized as high-level waste and low-level waste based on the type of radioactive material, the intensity of its radiation, and the time required for decay of the radiation intensity to natural levels.

High-Level Waste. About 99 percent of high-level waste generated by nuclear plants is spent fuel, including the fuel rod assemblies. Nuclear fuel is made up of small uranium pellets placed inside long tubular metal fuel rods that are grouped into fuel assemblies and placed in the reactor core. In the fission process, uranium atoms split in a chain reaction yielding heat. Radioactive fission products, which are the nuclei left over after the atom has split, are trapped and gradually reduce the efficiency of the chain reaction. Consequently, the oldest fuel assemblies are removed and replaced with fresh fuel at about 18-month intervals. Because nuclear plants normally operate continuously at full load, spent fuel production varies little from year to year. On average, TVA’s seven operating nuclear units produce 250 tons of high-level waste per year.

After it is removed from the reactor, spent fuel is stored at the nuclear plants in pools (steel lined, concrete vaults filled with water) inside the plant. The spent fuel pools were originally intended to store spent fuel onsite until a monitored retrievable storage facility and a permanent repository were built by the DOE as directed by the Nuclear Waste Policy Act of 1982. Because these facilities have not yet been built, the storage capacity of the spent fuel pools at WBN, Sequoyah, and BFN nuclear plants has been exceeded. TVA, like other utilities, now stores spent fuel at all three nuclear plants in above-ground dry storage casks constructed of concrete and metal and placed on concrete pads inside of the plant security perimeter.

Low-Level Waste. Low-level waste consists of items that have contacted radioactive materials. Nuclear plants have systems for collecting these radioactive wastes, reducing their volume, and packaging them for interim onsite storage and eventual shipment to

approved processing and storage facilities. At nuclear plants, these wastes consist of solids such as:

- filters, including spent resins (primarily from water filtration systems), sludge from tanks and sumps, cloth and paper wipes, plastic shoe covers, tools and materials;
- liquids such as tritiated waste (i.e., containing tritium), chemical waste, and detergent waste; and
- gases such as radioactive isotopes created as fission products and released to the reactor coolant.

Dry active wastes, which typically have low radioactivity, are presently shipped to a processor in Oak Ridge, Tennessee, for compaction and then to a disposal facility in Clive, Utah. Wet active wastes with low radioactivity are shipped to the Energy Solutions Clive disposal facility in Utah or Waste Control Specialists in Texas. Table 4-9 lists the amounts of low-level waste produced at TVA nuclear plants between 2017 and 2025.

Table 4-9: Low-Level Radioactive Waste Generated at TVA Nuclear Plants (cubic feet)

	2017	2018	2019	2020	2021	2022	2023	2024	2025
BFN	68,589	103,439	89,448	64,677	95,138	106,788	91,767	79,274	61,954
Sequoyah	16,094	22,234	33,554	17,700	27,949	17,101	22,567	23,023	17,390
WBN	4,065	36,207	19,416	21,400	26,183	57,746	28,395	22,090	17,300
Total	88,748	161,880	142,418	103,777	149,270	181,635	142,729	124,387	96,644

Definition: Low-level radioactive waste includes class A, B and C radioactive waste as reported to the NRC.

Mixed Waste. Mixed Waste is a classification of waste that is dually regulated as radioactive and contains some other components regulated by additional environmental regulations (i.e., RCRA or TSCA). Examples of mixed waste, usually generated during maintenance activities, include lead paint chips, cleanup debris, resin and unpunctured aerosol cans that cannot be radiologically cleared. Because of the dual regulation, it is extremely difficult to find a properly permitted outlet for disposal of this material. Table 4-10 shows the mixed waste sent for disposal from TVA sites during 2017–2025.

Table 4-10: Mixed Waste Generated at TVA Nuclear Plants and Other Facilities (kilograms [kg])

	2017	2018	2019	2020	2021	2022	2023	2024	2025
BFN	4,645	0	0	0	0	0	0	0	0
Sequoyah	2.3	0	0	0	0	0	0	0	0
WBN	0	0	0	0	0	0	0	0	0
Power Service Shops	0	0	0	0	0	0	0	0	0
Total	4,647	0	0	0	0	0	0	0	0

4.8 Socioeconomics

This section describes social and economic conditions in the TVA region. It presents and compares qualitative and quantitative data from varying geographies to characterize the regional human population and associated demographics, sociocultural factors, and economics. Depending on availability and comparability, the census data derive from the U.S. Census Bureau (USCB) 2010 decennial census, the 2020 decennial census, and the most current population estimates from the 2022 American Community Survey (ACS) (2018 - 2022 5 Year estimates). These data were obtained utilizing USCB American FactFinder and USCB Topologically Integrated Geographic Encoding and Referencing (TIGER) Products. Spatial data for figures were obtained through USCB TIGER Products and ESRI. Other quantitative and qualitative data were gathered from TVA staff, regional commissions, counties and communities, and other relevant sources, as cited within each subsection.

Generally, when census data are presented, information on the TVA PSA is given as a baseline for comparison to smaller parts of the PSA. The TVA PSA considered for socioeconomics consists of 181 counties and two independent cities in seven states, including all counties in Tennessee and portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia (see Appendix B-1 for a complete list of counties considered). Smaller areas are defined as relevant to the topic and may consist of metropolitan statistical areas (MSAs), urban or rural areas, counties, or census tracts.

Where relevant, information from USCB Division 6, East South Central, is employed for comparative purposes. Division 6 includes the majority of the TVA PSA, consisting of Alabama, Kentucky, Mississippi, and Tennessee (USCB 2000). USCB Division 6 data may be more comparable to the TVA PSA than that of USCB Region 3, the South, because of similarities in population densities, demographics, sociocultural characteristics, and economics. For many topics, U.S.-wide data are also employed due to their usefulness in understanding how the TVA PSA compares with the rest of the nation.

4.8.1 Population and Demographics

Population and various demographic data are presented in this subsection. First, population change for the TVA PSA between 2010 and 2022 are compared with that for Division 6 and the U.S. Then, population variation across the TVA PSA and among its most populous MSAs is discussed. Finally, demographic variables for the TVA PSA are compared with those of Division 6 and the nation.

4.8.1.1 Population

As shown in Table 4-11, the estimated population of the TVA PSA was 9.8 million in 2010 and 10.5 million in 2022, a 7.4 percent increase. During the same time period, population in Division 6 and in the U.S. increased 5.2 percent and 7.0 percent respectively. The rate of population growth was greater in the TVA PSA as compared to the Division and the nation (USCB 2010, USCB 2022a). The annual rate of population growth in the TVA PSA between

2010 and 2020 was 0.7 percent (USCB 2010, USCB 2020, USCB 2022a). Between 2022 and 2040, the annual rate of population growth in the TVA PSA is projected to be 0.7 percent, greater than the projected growth rate of the nation of 0.4 percent (CBER 2022, GOPB 2023, KSDC 2022, SDC MS 2024, NC OSBM 2023, TN SDC 2022, Cooper Center 2022, USCB 2023a).

Table 4-11: Population Data for the TVA PSA, TVA MSAs, Division 6, and U.S.

Area	2010 Population	2020 Population	2022 Population	% Increase 2010 – 2020	% Increase 2010 – 2022	% of TVA PSA Pop., 2022
U.S.	309,338,421	331,449,281	331,097,593	7.1	7.0	--
Division 6 (East South Central)	18,459,846	19,402,234	19,413,645	5.1	5.2	--
TVA PSA	9,810,629	10,520,062	10,540,347	7.2	7.4	--
MSAs in TVA PSA						
Bowling Green, KY	159,309	179,639	180,624	12.8	13.4	1.7
Chattanooga, TN-GA	529,196	562,647	564,466	6.3	6.7	5.4
Clarksville, TN-KY	261,619	320,535	322,949	22.5	23.4	3.1
Cleveland, TN	115,913	126,164	126,479	8.8	9.1	1.2
Dalton, GA	142,315	142,837	143,096	0.4	0.5	1.4
Decatur, AL	153,949	156,494	156,218	1.7	1.5	1.5
Florence-Muscle Shoals, AL	147,260	150,791	151,599	2.4	2.9	1.4
Huntsville, AL	419,279	491,723	493,980	17.3	17.8	4.7
Jackson, TN	130,031	180,504	180,446	38.8	38.8	1.7
Johnson City, TN	199,010	207,285	207,442	4.2	4.2	2.0
Kingsport-Bristol-Bristol, TN-VA	309,494	307,614	308,386	-0.6	-0.4	2.9
Knoxville, TN	838,748	879,773	884,359	4.9	5.4	8.4
Memphis, TN-AR	1,326,280	1,337,779	1,335,804	0.9	0.7	12.7
Morristown, TN	114,219	142,709	143,196	24.9	25.4	1.4
Nashville- Davidson- Murfreesboro-Franklin, TN	1,675,757	1,989,519	1,990,873	18.7	18.8	18.9
TVA MSA TOTALS	6,522,379	7,176,013	7,189,917	10.0	10.2	68.2

Source: USCB 2010, USCB 2020, USCB 2022a

Population varies greatly among the counties in the TVA PSA. The larger population concentrations tend to be located along major river corridors: the Tennessee River and its tributaries from northeast Tennessee through Knoxville and Chattanooga into north Alabama; the Nashville area along the Cumberland River; and the Memphis area on the Mississippi River. Low population counties are scattered around the region, but most are in Mississippi, the Cumberland Plateau in Tennessee, and the Highland Rim in Tennessee and Kentucky.

As shown in Table 4-11, an increasing proportion of the total population of the TVA PSA, 66.5 percent in 2010 and an estimated 68.2 percent in 2020 and 2022, lives in USCB-

defined metropolitan statistical areas¹. Two of these areas were estimated to have populations greater than one million in 2022: Nashville, 1.9 million, and Memphis, 1.3 million. The Knoxville and Chattanooga MSAs were estimated to have populations of approximately 884,000 and 564,000, respectively. These four MSAs accounted for 45 percent of the TVA PSA's population in 2022 (USCB 2010, USCB 2020, USCB 2022a).

While the proportion of the TVA region's population living in metropolitan areas was estimated to be lower than the national average of about 80 percent, the proportion has been increasing, and this trend appears likely to continue in the future. This is reflective of a decades-long nationwide trend of urbanization, characterized by a decline of population in rural areas and an increase in metropolitan areas. Population increase in metropolitan areas may be attributed to a combination of internal growth, outward expansion to include new growth or integration of communities previously existing outside the urban area, and in-migration of young adults seeking lifestyle and employment opportunities (USCB 2023c, Frey 2019). As a result, residential populations in the urban core areas of several cities in the TVA PSA have increased, including the largest cities. A notable exception to this trend is Memphis, Tennessee, which experienced a 4 percent decline in population between 2010 and 2022 (Bellow 2023).

The COVID-19 pandemic caused a major opposing shift in the migration flows of most states as people moved from metropolitan areas to rural counties to avoid exposure to the virus. A shift to remote work as many businesses remained closed potentially influenced geographic mobility. As a result, populations grew in rural counties during the pandemic, especially in Southern states. Most people moved to rural areas within their state of origin (Melotte 2023, USDA 2022).

Southern states within the TVA PSA - including Alabama, Georgia, North Carolina, and Tennessee - also benefit from another decades-long migration pattern of northeast residents moving to southern states. Many are seniors of the large Baby Boomer generation seeking a warmer climate, lower cost of living, housing opportunities, and a favorable tax environment. Others are opportunity-seeking young adults of the equally large Millennial generation, who form the backbone of labor forces and consumer bases. According to the Tennessee State Data Center, the population of both metropolitan and rural counties in Tennessee increased during and after the pandemic, resulting in widespread gains across the state (TN SDC 2022, Frey 2019).

4.8.1.2 Demographics

As shown in Table 4-12, the median age in the TVA PSA was 41.4 years in 2022, an increase from the median age of 37.9 years in 2010. In 2022, the TVA PSA had a higher population of people over 65 years of age (17 percent) as compared to Division 6 or the

¹ The Memphis MSA has two counties outside the TVA PSA, Crittenden County, Arkansas and Tunica County, Mississippi.

nation as a whole, which had 16.8 percent and 16.5 percent, respectively. The percentage of people identifying themselves as white was 73.3 percent in the TVA PSA, greater than Division 6 and the U.S., which were 70.4 percent and 58.9 percent, respectively (USCB 2022a, USCB 2022b, USCB 2022c).

Table 4-12: Demographics of the TVA PSA, Division 6, and U.S.

Geography	Median Age	% White Alone	% Age 65 or More	% High School or Higher
U.S.	38.5	58.9	16.5	89.1
Division 6	38.9	70.4	16.8	88.2
TVA PSA	41.4	73.3	17.0	88.1

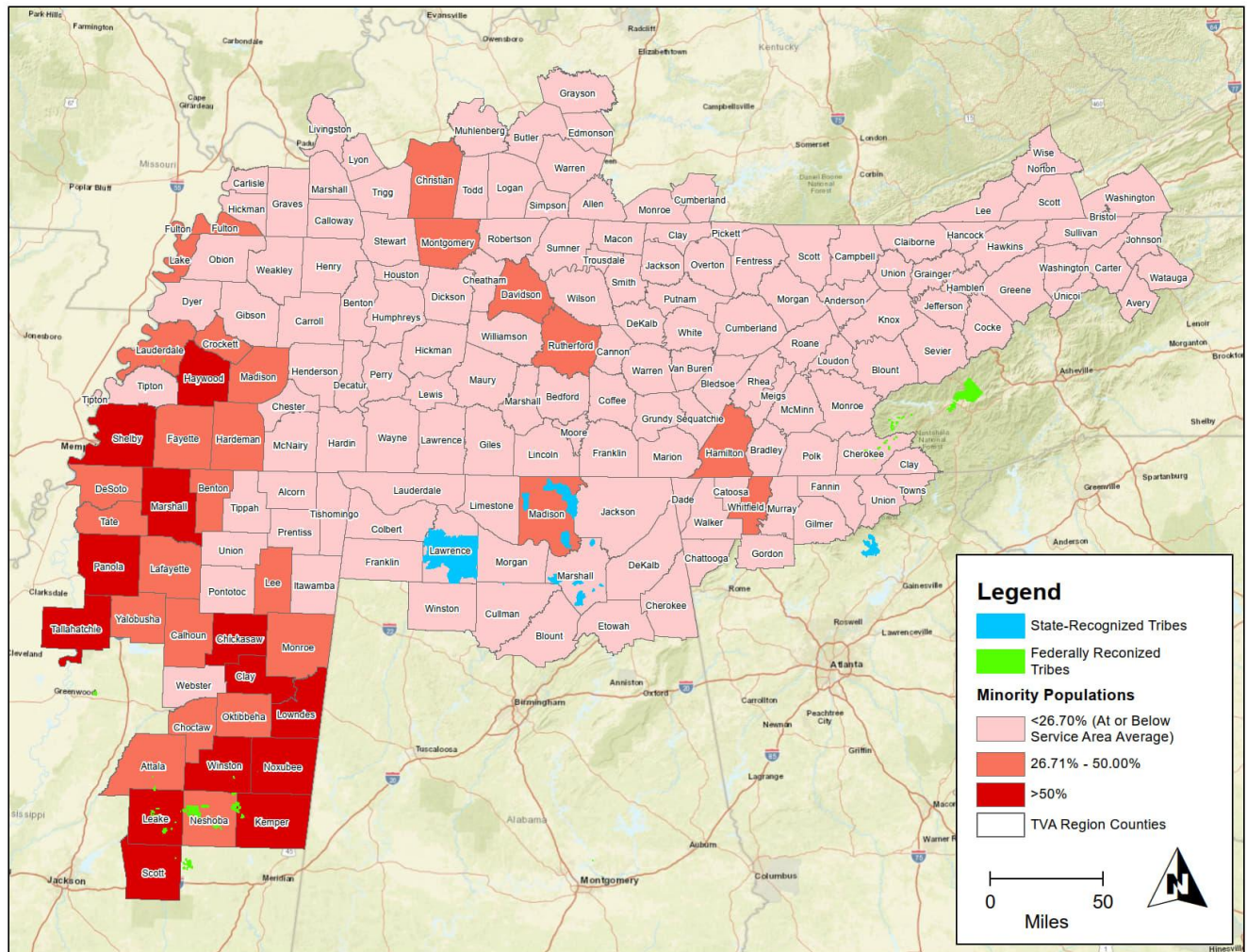
Source: USCB 2022a, USCB 2022b, USCB 2022c

As shown in Table 4-12, of the TVA PSA population 25 years old or older, approximately 88 percent held a high school diploma, equivalency diploma, or higher degree in 2022. This percentage is similar to Division 6 (88 percent) and the U.S. as a whole (89 percent) (USCB 2022c).

The TVA PSA considered for minority communities consists of 181 counties and two independent cities in seven states, including all counties in Tennessee and portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia (see Appendix B-1 for a complete list of counties considered). Where relevant, TVA PSA-wide data is compared with information from USCB Division 6, East South Central. Division 6 includes the majority of the TVA PSA, consisting of Alabama, Kentucky, Mississippi, and Tennessee (USCB 2000).

In 2022, the minority population in the TVA PSA was 26.7 percent. As shown in Figure 4-24, 13 counties in the PSA had minority populations that exceeded 50 percent, well above the TVA PSA average. These included Haywood and Shelby counties in Tennessee and Lowndes, Winston, Chickasaw, Scott, Leake, Marshall, Panola, Clay, Tallahatchie, Kemper, and Noxubee counties in Mississippi. The minority percentages of each county are shown in Table 4-13. In these areas, the African American population composed the highest percentage of the population, averaging 52 percent (USCB 2022b).

An additional 38 counties had a minority population greater than the TVA PSA average. All of the counties with minority percentages higher than the TVA PSA as a whole are listed in Appendix B-4 (USCB 2022b).



Source: USCB 2022b, USCB 2023b

Figure 4-24: Minority Populations at the County Level in the TVA PSA

Three state-designated tribal statistical areas (SDTSA) are extant in the TVA PSA in northern Alabama and considered part of the minority population (USCB 2022b). These consist of the Cherokee Tribe of Northeast Alabama SDTSA in Marshall County, Echota Cherokee SDTSA in Cullman, Lawrence, and Madison counties, and United Cherokee Ani-Yun-Wiya Nation SDTSA in Marshall County. Their locations are shown in Figure 4-24.

Table 4-13. Counties in the TVA PSA with Minority Populations Exceeding 50 Percent

Geography	2022 Population	2022 Minority (%)	Black or African American (%)	American Indian, Alaskan Native (%)	Asian (%)	Native Hawaiian, Pacific Islander (%)	Some other race (%)	Two or more races (%)	Hispanic or Latino (%)
Division 6	19,413,645	29.6	20.0	0.2	1.5	0.0	0.3	2.7	4.8
TVA PSA	10,540,347	26.7	15.7	0.2	1.6	0.1	0.3	2.9	6.0

Geography	2022 Population	2022 Minority (%)	Black or African American (%)	American Indian, Alaskan Native (%)	Asian (%)	Native Hawaiian, Pacific Islander (%)	Some other race (%)	Two or more races (%)	Hispanic or Latino (%)
TVA PSA Counties									
Chickasaw County, MS	17,024	50.9	43.7	0.0	0.2	0.0	0.0	1.9	5.1
Clay County, MS	18,598	62.0	60.0	0.0	0.0	0.0	0.0	1.8	0.2
Kemper County, MS	8,980	66.6	61.8	3.8	0.0	0.0	0.0	0.2	0.8
Leake County, MS	21,335	52.3	39.8	5.7	0.4	0.0	0.0	1.4	5.1
Lowndes County, MS	58,547	50.0	44.5	0.1	1.1	0.0	0.4	1.5	2.4
Marshall County, MS	33,980	52.9	45.5	0.0	0.1	0.0	0.5	2.4	4.3
Noxubee County, MS	10,261	74.4	73.6	0.4	0.0	0.0	0.0	0.2	0.3
Panola County, MS	33,157	53.1	49.6	0.1	0.3	0.4	0.1	1.9	0.6
Scott County, MS	27,943	51.3	35.6	0.1	0.1	0.0	0.2	3.5	11.8
Tallahatchie County, MS	12,621	65.1	61.4	0.0	0.1	0.0	0.2	1.5	1.9
Winston County, MS	17,741	50.4	46.7	0.5	0.1	0.0	0.0	1.6	1.5
Haywood County, TN	17,806	56.3	50.0	0.0	0.1	0.0	0.4	1.4	4.3
Shelby County, TN	926,440	65.5	53.6	0.1	2.9	0.0	0.3	1.9	6.8

Source: USCB 2022b

4.8.2 Sociocultural Characteristics

This subsection describes historical and cultural characteristics of USCB Division 6, which encompasses the majority of TVA's PSA. The USCB regions and divisions were developed based on "practice and tradition" rather than under any statute or legislation (USCB 1994). Division 6 overlaps the central portion of the culture region known as the South or Southeast. Culture region is a social science concept based on the idea that human culture is formed through the relationships created by people in close proximity and such associations are often related to the geography, climate, resources, population density, and history of an area (Beck et al. 2009).

Distinctions between urban and rural areas across the TVA PSA are described in this subsection. Following the 2020 Census, the USCB changed the way urban areas are defined, and released a new list of urban areas. USCB-defined urban areas comprise a densely settled core of census blocks that have at least 2,000 housing units or a population of at least 5,000. This includes adjacent territory containing non-residential and commercial uses. Rural areas are defined as all population, housing and territory not included within an urban area. In general, population density of urban areas has increased from 2,343 persons per square mile in 2010 to 2,553 in 2020 (USCB 2023c).

4.8.2.1 Historical and Cultural Characteristics

Rural lifestyles dominated the Southeast until the mid- to late 20th century. Earlier in the century, the predominant rural lifestyle, along with high unemployment and poverty rates, extensive flooding, and lagging electrification influenced the passage of the TVA Act, which created TVA. The TVA Act was part of President Roosevelt's program to assist the nation during the Great Depression (TVA 2023c). The act directed TVA to "provide for the

agricultural and industrial development of [the Tennessee Valley],” among other purposes. Flood control and the development of fertilizers were TVA programs designed to assist farmers of the region. Electrification by TVA was intended to help modernize rural communities and encourage economic development. While the Tennessee Valley region has substantially modernized since passage of the TVA Act, rural traditions continue to influence Southeastern culture, including its values, attitudes, music, language, class and race distinctions, and political and religious views (Beck et al. 2009).

Much of the TVA PSA is included in the Appalachian region, which generally straddles the ridgeline of the Appalachian Mountains and encompasses parts of Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia, and all of West Virginia. The Appalachian Regional Commission (ARC) was created in 1965 “to address the persistent poverty and growing economic despair of the Appalachian Region” (ARC 2023a). The ARC service territory extends beyond the Appalachian Mountains to include northern Alabama and a large portion of the TVA PSA in Mississippi. When ARC was formed, Appalachia, to which the region is often referred, was heavily dependent on farming, natural resource extraction, and heavy industries, and the region had a 31 percent poverty rate (ARC 2015). More recently, the region has incorporated manufacturing and professional service industries into its economy, and in 2021, the poverty rate of individuals declined to 14.5 percent, approximately 2 percent higher than the national rate of 12.6 percent (ARC 2021). Of the 423 counties in the Appalachian Region, 107 (25.3 percent) were classified as rural (defined as counties that are neither part of nor adjacent to a metropolitan area). Note that the USCB uses a different definition of rural as discussed in Section 4.8.2). Of the 26.3 million people that live in Appalachia, almost 2.5 million, or nearly 10 percent of residents, live in rural counties. Mississippi, Kentucky, and Virginia have the highest concentration of rural counties (ARC 2023b). However, pockets of the Appalachian population live near or in major metropolitan areas.

Portions of the TVA PSA in Mississippi are included in the Mid-South Delta subregion of the South, which generally surrounds the Mississippi River in Arkansas, Louisiana, and Mississippi (Beaulieu and Littles 2009). The subregion is characterized by dependence on natural resources that are integrally linked to cultural heritage and local economies. Similar to many other areas of the South, the Mid-South Delta subregion is distinguished by its sociocultural divisions based on class and race.

Similar to the Mid-South Delta subregion is the Mid-South subregion of the South, which encompasses portions of western and central Tennessee and Kentucky. Inhabitants of western portions of this subregion have strong cultural connections to the Mississippi River. Rural areas of the Mid-South are generally characterized by the predominance of farming traditions. According to the USDA Census of Agriculture, approximately 69,983 farms on nearly 11 million acres were active across Tennessee in 2017. Between 2012 and 2017, the

number of new farmers as well as the age of active farmers have increased. Market value of agricultural products sold increased 5 percent. Market value of agricultural products sold directly to consumers increased nearly 82 percent (American Farmland Trust 2023).

Resource extraction, especially in relation to coal, remains an important aspect of the economies in portions of the Appalachian region and the Mid-South subregion (USEIA 2023b). Many people in these areas have been employed in coal extraction for decades and often have generational connections to coal mining whether or not they are currently involved in the industry (Carley et al. 2018). These facts have influenced personal identities as well as the broader culture in these areas. Coal mining areas in the TVA PSA are in northern Alabama, eastern Tennessee, and extreme eastern Kentucky, and the southern portion of the Illinois Basin coalfield in western Kentucky (USEIA 2022). In recent years, TVA has obtained coal from the Appalachian Basin (Kentucky, Pennsylvania, Tennessee, West Virginia, and Virginia) and Illinois Basin (Illinois, Indiana, and Kentucky) regions in the eastern U.S. and from the Powder River Basin (Wyoming) region in the western U.S. (see Section 2.3.1). The Red Hills plant in east-central Mississippi, from which TVA purchases power, is supplied by a nearby lignite mine.

In addition to the communities described above, the TVA PSA encompasses land that historically was occupied by native Americans. TVA regularly consults with over 20 federally recognized Tribes that either reside within the PSA or have cultural or religious ties to the PSA. Many of the Tribes with whom TVA consults were subject to forcible relocation to Indian territory (now Oklahoma), mandated by the Federal government in the Indian Removal Act of 1830. Currently, the majority of these Nations are headquartered in the state of Oklahoma, and they retain strong ties to their ancestral homelands. Two federally recognized Tribes – the Eastern Band of Cherokee Indians (EBCI) in southwestern North Carolina and the MBCI in east central Mississippi – still reside in the Tennessee Valley. These sovereign nations are part of the minority population in the TVA PSA. The EBCI has approximately 13,000 tribal members. About 60 percent live on the 56,000-acre Qualla Boundary, land held in trust for the Tribe by the federal government located in western North Carolina. Tribal lands span Swain and Jackson counties, with smaller parcels in Cherokee, Graham and Haywood counties (DOJ 2024, Cherokee Chamber of Commerce 2024). The MBCI has approximately 10,000 tribal members, located on 35,000 acres in east central Mississippi, spanning 10 counties. Neshoba County is the largest of the reservation areas, and the location of the Tribe’s headquarters. The MBCI is a major contributor to the state's economy and provides permanent full-time jobs for over 5,000 employees (Choctaw.org 2024a, Choctaw.org 2024b, RRT 2024). Demographic characteristics of Tribal Nations EBCI and MCB I located within the TVA PSA is shown in Table 4-14.

Table 4-14: Demographics of Federally Recognized Tribal Nations in the TVA PSA

	EBCI	MBCI
Population	7,930	7,384

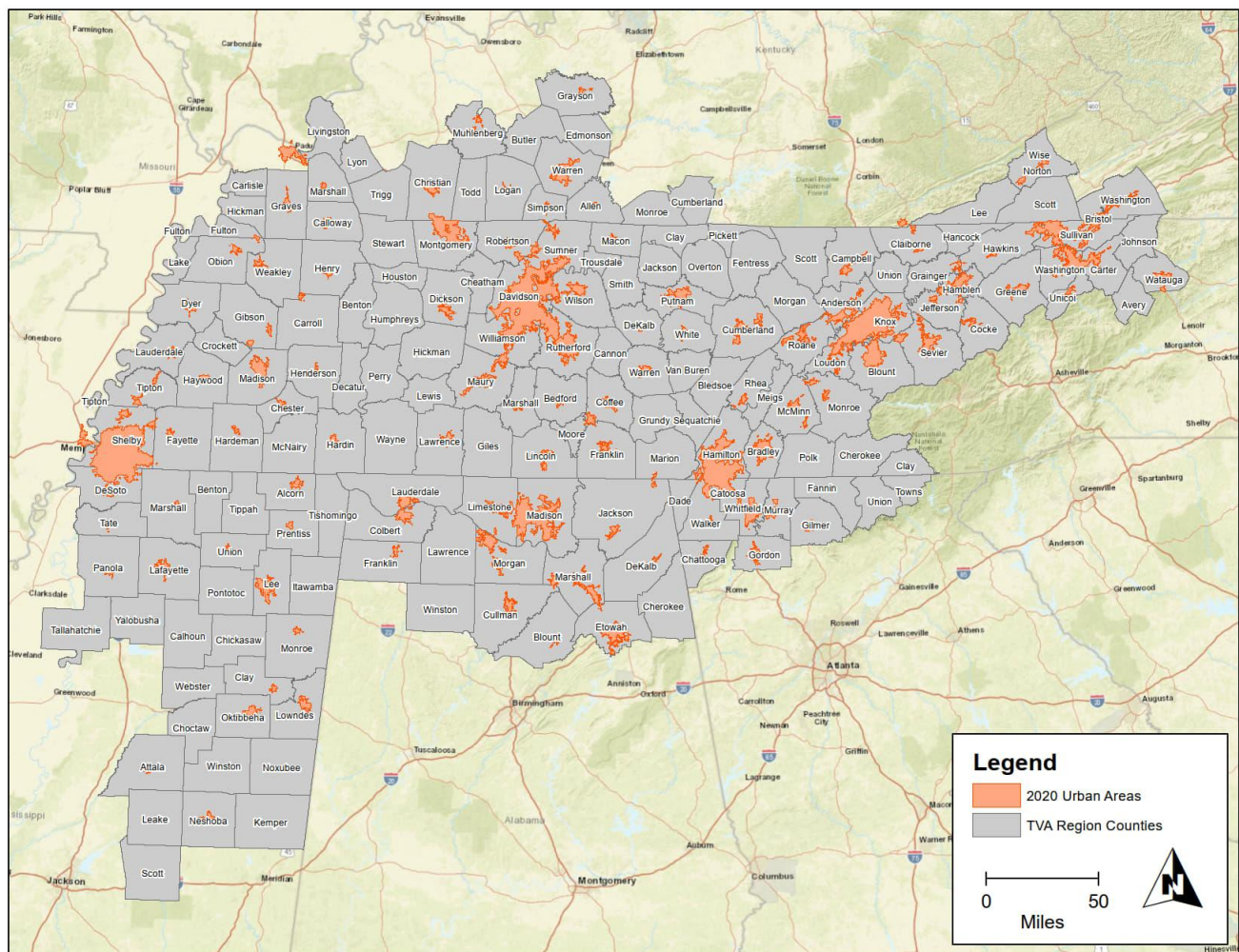
	EBCI	MBCI
Percent of Population under 5 years	4.9	9.0
Percent of Population between ages 25 and 54	32.1	37.29
Percent of Population 65 and over	17.4	8.7
Median Age	37.7	28.3
Percent of Population between ages 25 and 54	32.1	37.29
Graduated high school or higher, 25 years old and over	83.8	72.7
Attained bachelor's degree or higher, 25 years old and over	14.0	8.2
Military veterans in the civilian population 18 years and over	8.2	5.7
Population 16 years and over in labor force	2,875	2,917
Percent Employed Population 16 years and over in the labor force	91.3	89.4
Unemployment Rate	8.7	10.6
Employed in service occupations	32.2	43
Median household income	44,925	39,955
Percent of Individuals Living below the Poverty Level	21.0	42.8
Occupied Housing Units	3,324	1,976
Percent of owner-occupied units	73.0	79.8
Median Housing Value	137,900	71,800
Percent of civilian noninstitutionalized population with health insurance	62.3	65.6
Percent of civilian noninstitutionalized population with no health insurance	37.7	34.4

Source: USCB 2022d, USCB 2022e

4.8.2.2 Urban-Rural Distinctions

As shown in Figure 4-25, the TVA PSA included 120 separate USCB-designated urban areas in 2020. Urban areas composed approximately 5 percent of the TVA PSA and contained nearly 56 percent of the population (USCB 2023d, USCB 2023b). This is compared with the U.S. as a whole, where approximately 80 percent of the population resided within approximately 3.1 percent of the total land area in 2020. Across Division 6, approximately 59 percent of the population lived in urban areas (USCB 2023c, USCB 2024, Visual Capitalist 2020).

USCB considers all portions outside of designated urban areas to be rural areas. In 2020, approximately 95 percent of the TVA PSA was considered rural, accounting for almost 44 percent of the population in the TVA PSA (USCB 2023b, USCB 2023d). Twenty percent of the U.S. population was considered rural in the same year (USCB 2024).



Source: USCB 2023b, USCB 2023c

Figure 4-25: Urban and Rural Areas in the TVA PSA

In 2022, the three most populous counties in or partially within the TVA PSA were Shelby, Davidson, and Knox counties, Tennessee as shown in Table 4-15. Each county had a population greater than 430,000 residents, and greater than 50 percent of land was classified as urban in the 2020 Census (USCB 2023d). Nashville and portions of its metropolitan area encompass Davidson County, Tennessee, and Shelby County is primarily composed of the City of Memphis. Knox County is largely composed of the Knoxville metropolitan area. The population of Davidson and Knox counties increased 13.3 percent and 11.4 percent respectively between 2010 and 2022, while the population of Shelby County decreased 0.1 percent (USCB 2010, USCB 2022a).

In 2022, the three least populous counties in or partially within the TVA PSA were Pickett County, Tennessee, and Carlisle and Hickman counties, Kentucky, as shown in Table 4-15. The entirety of these counties was considered rural areas in 2020, as defined by the USCB (USCB 2023d). The population of each county declined between 2010 and 2022. The population of Hickman County decreased the most (8.4 percent); while the population of

Carlisle and Pickett declined in population 6.3 percent and 0.7 percent, respectively (USCB 2010, USCB 2022a).

Table 4-15: Population Data for the Most/Less Populous Counties in the TVA PSA

Geography	2010 Population	% Urban Population, 2010	2020 Population	% Urban Population, 2020	% Land classified as Urban, 2020	2022 Population	% Increase 2010 – 2022
Shelby County, TN	927,644	97.2	929,744	96.6	50.9	926,440	-0.1%
Davidson County, TN	626,681	96.6	715,884	96.9	58.6	709,786	13.3%
Knox County, TN	432,226	89.1	478,971	90.8	54.8	481,406	11.4%
Pickett County, TN	5,077	0.0	5,001	0.0	0.0	5,042	-0.7%
Carlisle County, KY	5,104	0.0	4,826	0.0	0.0	4,782	-6.3%
Hickman County, KY	4,902	0.0	4,521	0.0	0.0	4,491	-8.4%

Source: USCB 2010, USCB 2022a, USCB 2023d

4.8.2.3 Communities Near TVA Power Plants

Communities near TVA power plants are more likely to be affected by changes to the environment associated with building and operating power plants. Demographic indicators were obtained for a 3-mile radius surrounding TVA power plants. Indicators considered herein include minority, low-income, linguistic isolation, and age distribution population characteristics sources from ACS 2017-2021, as shown in Table 4-16. Sixteen TVA power plants have communities nearby with demographic characteristics that differ from the regional norms. For comparison, data available at the time of analysis is also provided for associated states and the U.S.

Comparative data for the 16 plants considered in this analysis indicate that three plant locations have minority percentages that are higher than their associated states: ACT and Lagoon Creek CC plants in Tennessee and Southaven CC in Mississippi. Both Allen and Southaven CC are located in the Memphis metropolitan area, while Lagoon Creek CC is in Brownsville, Tennessee, approximately 60 miles northeast of Memphis. The same plant locations, along with Bellefonte Nuclear in Alabama, and CUF and John Sevier CC in Tennessee, demonstrate higher percentages of low-income populations than their associated states. Eight of the 16 plants have higher percentages of the population over the age of 64 than their respective states. This is reflective of the overall higher median age of the TVA PSA, as discussed in Section 4.8.1.2. For the most part, data indicate that the numbers of people under age 5 or considered linguistically isolated surrounding the plant locations are not significant in comparison with associated states (USEPA 2023g). Appendix B-4 presents minority percentages for each county in the TVA PSA, including those in which the plants are located (see also Figure 1-1).

Table 4-16: Population Characteristics for Selected TVA Power Plants

Geography / Plant	Minority (%)	Low-Income (%)	Linguistically Isolated (%)	Under Age 5 (%)	Over Age 64 (%)
U.S.	39	31	5	6	17
Alabama	38	38	1	6	18
Bellefonte Nuclear	14	48	0	3	15
Colbert CT	11	31	0	2	37
Kentucky	16	37	1	6	17
SHF	13	35	0	6	13
Mississippi	45	43	1	6	17
Ackerman CC	17	24	0	4	23
Caledonia CC	20	22	0	5	16
Magnolia CC	12	33	0	7	28
Southaven CC	77	47	1	6	14
Tennessee	28	35	2	6	17
Allen CC, ACT	99	55	0	1	23
CUF	17	38	0	11	17
GAF, Gallatin CT	13	20	1	10	13
John Sevier CC	5	46	1	7	24
Johnsonville CT	12	29	0	6	15
KIF	10	32	0	3	23
Lagoon Creek CC	30	41	0	8	20
Sequoyah Nuclear	4	24	0	7	17
WBN	2	41	0	7	25

Source: USEPA 2023g

4.8.3 Economics

In this subsection, major industries and employment and income data are presented for the TVA PSA, as compared with Division 6 and the U.S. TVA's contribution to state revenues through its tax equivalent payments is also provided.

4.8.3.1 Regional Economy

The gross domestic product (GDP) for the TVA region for FY 2023 was estimated at \$685.5 billion, based on Bureau of Economic Analysis GDP data by state and Bureau of Labor Statistics county level employment data. In 2022, the top three industries for employment in the TVA PSA and Division 6, listed by rank highest to lowest, were: (1) educational services, health care, and social assistance industries; (2) manufacturing; and (3) retail trade. For the U.S., these were: (1) educational services, health care, and social assistance industries; (2) professional, scientific, management, administrative, and waste management industries; and (3) retail trade (USCB 2023f). TVA revenues in FY 2023 were \$12.1 billion, representing about 1.8 percent of the total TVA region economy.

In the TVA PSA and Division 6, the economy depends more on manufacturing than the U.S. as a whole. While the relative importance of manufacturing has been declining for years, this has occurred to a greater degree for the nation overall than for the TVA region, in the TVA PSA manufacturing jobs still employ 13.9 percent of the civilian working population, second among industrial sectors (USCB 2023f). Factors contributing to the high proportion of manufacturing include location with good access to markets in the Northeast, Midwest, Southwest, and the rest of the Southeast; good transportation; relatively low wages and cost of living; right-to-work laws; and abundant, relatively low-cost resources including land and electricity.

TVA plays an important role in the regional economy through its Economic Development program. TVA works to attract new businesses to the Tennessee Valley, engage with communities and existing companies to grow the economy, and partner with state, regional, and local economic development organizations to amplify job growth and capital investment in the region (TVA 2022b). TVA offers site selection services, incentives, research and technical assistance to help companies locate, stay, and expand existing operations in the Tennessee Valley (TVA 2020b). Development efforts target six key markets: aerospace and defense, automotive and mobility technologies, clean technologies, food and industrial technologies, information systems and security and life sciences (TVA 2023d). Table 4-17 shows the amount of capital investment by TVA for FY 2019 through FY 2025.

Table 4-17: TVA Capital Investment Between 2019 and 2025

FY	Capital Investment (in billions of U.S. dollars)
2019	\$8.9
2020	\$8.6
2021	\$8.8
2022	\$10.2
2023	\$9.2
2024	\$8.9
2025	\$6.6
Total	\$61.2

Source: TVA 2019b, TVA 2022b, TVA 2023d, TVA 2020c, TVA 2021b, TVA 2024a, TVA 2025a

4.8.3.2 TVA-Contributions to State Economies and Revenues

TVA produces approximately 92 percent of the electricity generated in Tennessee, a state that ranks 30th in the nation for total energy production, and seventh in the nation for production of hydroelectric power (USEIA 2023c, USEIA 2023e). TVA operations at BFN near Athens, Alabama is the major reason Alabama ranks fifth in the nation for nuclear power production (USEIA 2023d).

As required in the TVA Act, TVA makes tax equivalent payments, also known as payments in lieu of taxes, to states where TVA sells electricity or owns power system assets; these

states are the seven TVA PSA states and Illinois, where TVA owns coal reserves. TVA also makes payments directly to local governments where TVA owns power facilities. The tax equivalent payments total 5 percent of gross proceeds from the sale of power in the prior FY, with some exclusions.

Each state regulates how the payments are distributed to governmental entities across the state. In most of the eight states, the apportionment of funds is determined by the existence of TVA property and/or its value in proportion to the total value of TVA property in the state. Exceptions to this are in Alabama, Illinois, and Virginia. Illinois divides the majority of its funds among areas with TVA coal reserves. Rather than basing the distribution on the value of TVA property within its jurisdiction, Alabama and Virginia distribute payments to counties or cities receiving power services from TVA. Table 4-18 shows the amount of tax equivalent payments to states for TVA FYs 2019 through 2023. TVA's tax equivalent payments totaled \$600 million in FY 2025, with payments over the past 10 years totaling more than \$5.5 billion and more than \$17.5 billion since 1941.

Table 4-18: Tax Equivalent Payments by TVA to States Where TVA Produces Power or Acquired Lands

State	Tax Equivalent Payments (in millions of U.S. dollars, rounded)				
	2019	2020	2021	2022	2023
Alabama	\$85.8	\$87.6	\$79.3	\$82.6	\$97.8
Georgia	\$9.0	\$9.2	\$8.4	\$8.5	\$10.1
Illinois	\$.40	\$.40	\$.30	\$.40	\$.40
Kentucky	\$38.9	\$34.4	\$29.7	\$31.8	\$40.0
Mississippi	\$41.9	\$42.8	\$38.2	\$39.3	\$47.2
North Carolina	\$3.1	\$3.4	\$3.0	\$3.1	\$3.9
Tennessee	\$367.3	\$372.8	\$339.5	\$345.1	\$410.0
Virginia	\$1.3	\$1.2	\$1.1	\$1.1	\$1.3

Source: TVA 2019b, TVA 2020d, TVA 2021c, TVA 2022c

4.8.3.3 Employment

In 2022, the participation rate of the civilian labor force, defined as the percentage of the population aged 16 or more that is either working or actively looking for work, was estimated to be 5.1 million, or 60.1 percent, in the TVA PSA. In comparison, the participation rate of the civilian work force was less than the nation (62.2 percent) but more than Division 6 (59.2 percent). The unemployment rate in the TVA PSA was 5.0 percent, lower than the nation (5.3 percent) and Division 6 (5.3 percent) during the same time period. There was considerable geographic variation in unemployment rates with adjacent counties sometimes having large differences. Unemployment rates across the TVA PSA range from a low of 0.8 percent in Trousdale County, Tennessee, located within the Nashville-Davidson-Murfreesboro-Franklin, Tennessee, metropolitan area, to a high of 14.1 percent in the rural county of Kemper County, Mississippi (USCB 2023f).

In 2022, the TVA PSA and Division 6 had similar percentages of people employed in various occupations as shown in Table 4-19. The TVA PSA had a higher percentage of employees in production, transportation, and material moving fields (17.7 percent) as compared to the nation (13.1 percent) (USCB 2023f).

Table 4-19: Employment in Occupations in the TVA PSA, Division 6, and U.S.

Geography	Percent Employed in:				
	Mgt., Business, Science, and Arts	Service	Sales and Office	Natural Res., Construction, Maintenance	Production, Transportation, Material Moving
U.S.	41.0	16.8	20.5	8.7	13.1
Division 6	33.6	16.1	20.8	9.1	17.5
TVA PSA	36.5	15.7	20.9	9.2	17.7

Source: USCB 2023f

As discussed in Section 4.8.3.1, TVA's Economic Development program fosters job growth throughout the PSA by forming partnerships with state, regional, and local economic development organizations. TVA's efforts bring greater opportunities for businesses and working people in the cities and rural communities it serves. Table 4-20 shows the number of TVA-assisted jobs between 2019 and 2025. New and retained job numbers reported by TVA are certified and provided to TVA by its customers, defined as an entity that purchases or distributes power from TVA. New jobs are defined as newly created, paid positions (including contract jobs) at a facility of a TVA customer. Retained jobs are paid positions (including contract jobs) at a facility of a TVA customer that was created prior to the current TVA FY and that continue to be filled in the current TVA FY (TVA 2023d).

Table 4-20: TVA-Assisted Jobs Between 2019 and 2025

FY	New Jobs	Retained Jobs	Total Jobs
2019	21,400	45,100	66,500
2020	19,000	48,000	67,000
2021	22,550	58,350	80,900
2022	26,500	40,000	66,500
2023	12,275	46,125	58,400
2024	10,360	42,390	52,750
2025	9,316	43,254	52,570

Source: TVA 2019c, TVA 2020c, TVA 2021b, TVA 2022d, TVA 2023a, TVA 2024b, 2025a

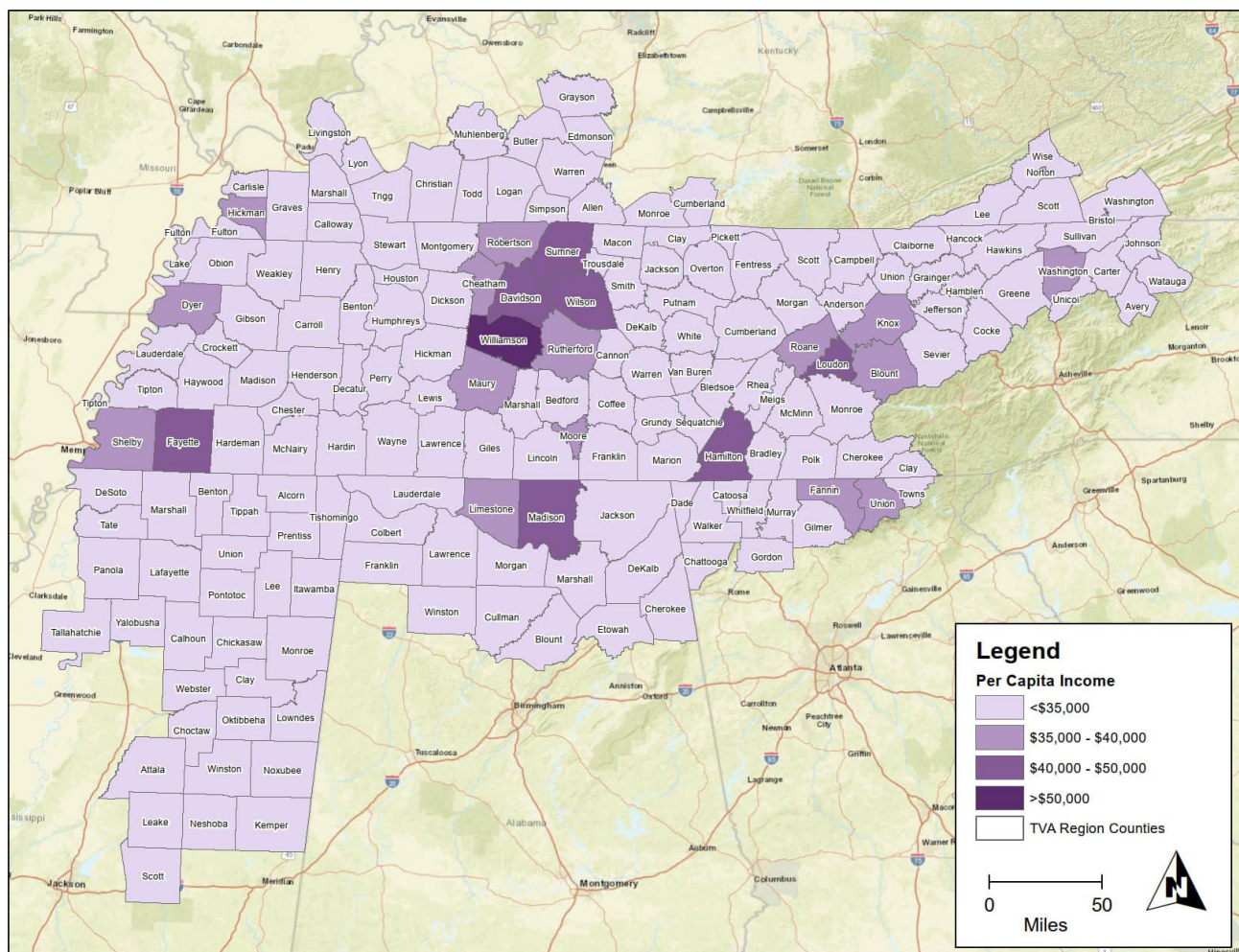
TVA Regional Employment

TVA employs a total of 5,118 people at 62 generating facilities throughout its PSA. BFN, near Athens, Alabama, accounts for just over 26 percent of the total number of TVA plant employees. Two other facilities, WBN near Spring City in East Tennessee, and Sequoyah Nuclear Plant near Soddy-Daisy, Tennessee (north of Chattanooga), together account for an

additional 36 percent of the total number of employees. The number of power plant employees has decreased in recent years as fossil plants have been retired.

4.8.3.4 Income

In 2022, per capita income in the TVA PSA ranged from \$19,695 (Lake County, Tennessee) to \$61,451 (Williamson County, Tennessee). Only five counties in the TVA PSA had incomes above the nation's per capita income of \$41,261. Four of the five were located in Tennessee (Williamson County, Davidson County, Wilson County, and Hamilton County). One county was located in Madison County, Alabama. Each of these counties were located within a metropolitan area. Per capita income in Division 6 was \$33,716. Within the TVA PSA, only 29 counties had per capita income greater than the Division, indicating that higher per capita income concentrates in few areas in the TVA PSA. Figure 4-26 illustrates the differences in per capita income rates of TVA-region counties (USCB 2023f).



Source: USCB 2023f, USCB 2023b

Figure 4-26: Per Capita Incomes of TVA PSA Counties

The TVA PSA considered for low-income communities consists of 181 counties and two independent cities in seven states, including all counties in Tennessee and portions of

Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia (see Appendix B-1 for a complete list of counties considered). Low-income populations were defined as those with poverty rates above the TVA PSA average rate of 14.8 percent. Additional low-income populations were identified at the census tract level using poverty rates reported in the 2022 ACS (USCB 2023e).

The percentage of the TVA PSA population living below the poverty level was 14.8 percent. Within the TVA PSA, 124 counties and two independent cities had poverty rates above the PSA average, as illustrated in Figure 4-27. The 2022 ACS estimates for per capita income and the percentage of the population living in poverty for PSA counties are included in Appendix B-2 (USCB 2023e).

A total of 1,196 census tracts in 178 counties or independent cities and seven states had poverty rates above the TVA PSA average. Low-income census tracts are in all but five counties of the TVA PSA. The per capita income levels and poverty rates from the 2022 ACS are included in Appendix B-3 (USCB 2023g).

PRELIMINARY

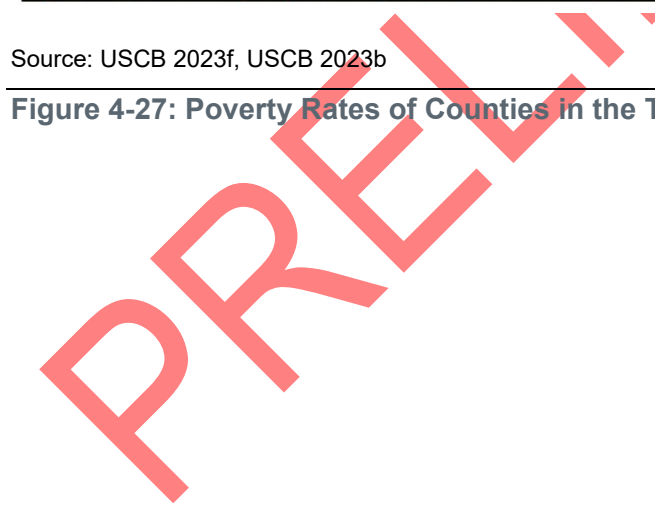


Figure 4-27: Poverty Rates of Counties in the TVA PSA

5 Anticipated Environmental Impacts

This chapter describes the anticipated environmental impacts of the portfolios resulting from the alternative strategies, sensitivities, and the Preferred Alternative. The chapter addresses the general process TVA uses to site new power facilities and the potential environmental impacts of the continued operation of TVA's supply-side generating facilities, facilities from which TVA purchases power through PPAs, and the generating facilities that TVA is likely to own or purchase power from in the future. The major supply-side generation resource types considered in the IRP include nuclear, hydroelectric, coal, natural gas, renewables, and storage (Figure 5-1). The chapter then describes the environmental impacts of distributed and demand-side resource types, including distributed generation, distributed storage, EE programs, and DR programs. These are followed by a description of the environmental impacts of the construction and upgrading of the transmission system necessary to support future generating facilities. Finally, this chapter describes potential mitigation measures and commitment of resources.

Major Resource Type(s)	 Nuclear	 Hydro	 Coal	 Gas	 Renewables	 Storage	 EE and DR
Resource Technologies	- Advanced pressurized water reactor - Light water small modular reactor - Gen IV small modular reactor	Hydro uprates	- Supercritical pulverized coal - Supercritical pulverized coal w/carbon capture	- Combined cycle - Combined cycle w/carbon capture - Combustion turbine - Aeroderivative - Reciprocating engine	- Utility scale solar - Distributed solar - Midwest wind - Southeast high-hub wind	- Pumped storage - Lithium-ion battery - Advanced chemistry battery - Distributed storage	- Energy efficiency - Demand response

Hydro - hydroelectric

Figure 5-1: Summary of Resource Options

5.1 Facility Siting and Review Processes

When planning new generating facilities, TVA uses several criteria to screen potential sites. Generating facilities are often needed in specific parts of the TVA PSA to support the efficient operation and reliability of the transmission system. Once a general area is identified, sites are screened by numerous engineering, environmental, and financial criteria. Specific screening criteria include regional geology and local terrain; proximity to major highways, railroads and barge access; proximity to major natural gas pipelines; proximity to high-voltage transmission lines; land use and land ownership; regional air quality; sources of process water; the presence of and proximity to floodplains; proximity to parks, natural areas and recreation areas; potential impacts to endangered and threatened species, wetlands, and historic properties; and potential impacts to low-income populations. Through this systematic process, TVA attempts to minimize the potential environmental impacts of the construction and operation of new generating facilities.

New transmission facilities are typically required to transmit power between two defined points or to improve transmission capacity and/or reliability in a defined area. As with generating facilities, potential transmission line routes, substation locations, and switching station locations are screened by numerous engineering, environmental and financial criteria. Specific screening criteria include slope; the presence of highways, railroads, and airports; land use and land ownership patterns; proximity to occupied buildings, parks and recreation areas; and potential impacts to endangered and threatened species, floodplains, waterways, wetlands, and historic properties. TVA also provides for and encourages participation by potentially affected landowners in this screening process.

TVA is not responsible for the siting and operation of natural gas pipelines that may have to be built to serve new natural gas plants. Instead, TVA purchases natural gas service from pipeline companies who are responsible for constructing and operating the pipeline. Construction and operation of natural gas pipelines are subject to various state and federal environmental requirements, depending on how and where constructed. If a pipeline is built specifically to serve a new TVA plant, TVA may be required to evaluate the potential environmental impacts.

The results of the site screening process, as well as the potential impacts of the construction and operation of generating and transmission facilities at the screened alternative locations, are described in comprehensive environmental review documents made available to the public, consistent with the requirements of NEPA. During this environmental review process, TVA consults with the appropriate SHPO on the potential impacts to historic properties and, as necessary, with the USFWS and relevant state agencies on the potential impacts to federal and/or state endangered and threatened species and their designated critical habitats.

Independent power producers, from whom TVA purchases power under long-term PPAs, typically use a site screening process like the TVA process described above for new generating facilities. Depending on the location of the facility, approval by state and/or local authorities may also be necessary. The action by TVA of entering into a long-term PPA is subject to the requirements of NEPA and other environmental laws and regulations, and TVA conducts comprehensive environmental reviews of generating facilities that independent power producers propose to construct in order to provide power to TVA under long-term PPAs.

5.2 Environmental Impacts of Supply-Side Resource Options

Because the locations of most future generating facilities are not known during the Integrated Resource Planning process, this assessment focuses on general impact areas, i.e., it is not location specific. TVA will address the site-specific effects associated with specific projects that are proposed to implement the IRP in subsequent tiered environmental reviews. Impact areas are described generally below and in detail in the following subsections.

Air Quality. The potential impacts to air quality are described by the direct emissions of SO₂, NO_x, and mercury, and are quantified by the amounts emitted per unit of electricity generated and the total amounts emitted under each of the alternative strategies and portfolios during the 25-year planning period.

Climate and Greenhouse Gases. GHG emissions are assessed for both direct emissions of CO₂, from the combustion of non-renewable carbon-based fuels, and life cycle GHG emissions, which include direct and indirect emissions of CO₂, CH₄, and N₂O. Life cycle GHG emissions include emissions from the construction, operation, and decommissioning of generating facilities; the extraction or production, processing, and transportation of fuels; and the management of spent fuels and other wastes. Because life cycle GHG emissions have not been specifically determined for TVA's generating facilities, the estimates used in this assessment are based on technology-specific resource estimates provided to TVA by the NLR, based off its seminal Life Cycle Analysis (LCA) Harmonization Project (see Section 5.5.2 and Appendix D for additional information). GHG emissions are provided for all four life cycle phases and broken out by the three primary GHGs of concern (CO₂, CH₄, and N₂O). Indirect emissions produced during the upstream, ongoing non-combustion, and downstream phases are calculated using emissions factors provided by NLR, which are based on either installed capacity (in kW) or per unit of electricity generated (in kWh). Where distinguishable and unless otherwise stated, the LCA values described below do not include impacts associated with the transmission and distribution of the electricity generated by the various facilities.

The 2026 IRP approach to evaluating life cycle GHG emissions for all generation resources discussed in this section, new or existing, is further detailed in Volume 2, Section 5.5.2. For coal- and natural gas-fired plants, the largest source of life cycle GHG emissions is CO₂ from the ongoing combustion phase. For nuclear, hydroelectric, wind, solar, biomass, pumped storage plants, and battery facilities, the largest source of life cycle GHG emissions is CO₂ from the upstream phase, representing emissions occurring during plant construction, including raw material extraction. For additional information, see Section 5.5.2 and Appendix D.

Water Resources. The impacts of water pollutants discharged from a generating facility are highly dependent on site- and facility-specific design features, including measures to control or eliminate the discharge of water pollutants, which are not addressed here. The impacts of the process water used and consumed by a thermal generating facility (primarily for cooling) depend on the characteristics of the source area of water withdrawals and of the water bodies where process water is discharged. The quantities of process water used and consumed are indicators of the magnitude of these impacts. Facilities with open-cycle cooling systems withdraw and discharge large quantities of water. Facilities with closed-cycle cooling systems use less water but consume (typically by evaporation) a large proportion of it. Water use and consumption are quantified by the volumes used and consumed per unit of

electricity generated and the total volumes used and consumed under each of the alternative strategies and portfolios. These water quantities are described for the TVA system, as well as by major river basin and whether from surface or groundwater sources.

Land Resources. Land requirements for the alternative strategies and portfolios are quantified by both the facility land requirements and life cycle land requirements. These land requirements are indicators of the potential for impacts to land-based resources such as vegetation, wildlife, endangered and threatened species, cultural resources (e.g., archaeological sites and historic structures), land use, prime farmland, visual/aesthetic resources, managed and natural areas, recreation, and aquatic resources. While this analysis assumes that the potential for impact increases with the land area affected, the kind of impact and its potential severity would vary depending on site-specific conditions and locations, as well as on the type of facility.

The facility land requirement is the land area permanently disturbed by the construction of the generating unit. It does not include adjacent lands that are part of the facility site and maintained in a natural or semi-natural state as buffers or exclusion zones. Facility land requirements were determined from a variety of sources, including characteristics of TVA facilities, both existing and under development; characteristics of comparable facilities recently constructed or proposed elsewhere in the country; and various published reports on this topic. The facility land requirement given for each strategy and portfolio is the total acreage permanently disturbed by the construction of new generating facilities during the planning period.

The life cycle land requirement is a measure of the land area transformed during the life cycle of a generating facility, expressed in terms of units of area per amount of electricity generated. This land includes the facility site; adjacent buffer areas; lands used for fuel extraction or production, processing, and transportation; and land used for managing spent fuels and other wastes. Some of the land areas, such as the facility site, are transformed for decades while others, such as some mine lands, are transformed for shorter time periods. These differing time periods are considered in the development of the LCA. The estimates used in the following descriptions are based on published LCAs (e.g., Fthenakis and Kim 2009, Jordaan et al. 2017). Published life cycle land requirement information is not available for some of the generating and storage facilities under consideration. For some other facilities, the available published information is based on facilities with substantial differences from current or proposed TVA facilities in important components such as the length of natural gas pipelines and therefore not readily applicable to TVA facilities.

Life cycle land requirements can also be expressed with a land-use metric that accounts for the total surface area occupied by the materials and products used by a facility, the time the land is occupied, and the total energy generated over the life of the facility (Spitzley and Keoleian 2005, AEFPERR 2009). The rank order by energy technology reported for a sample of U.S. facilities, from the smallest to the largest land requirements, is natural gas, nuclear,

coal, wind, solar PV, and conventional hydroelectric. The large land requirements for hydroelectric include the reservoirs, which typically have other uses; note that TVA is only considering uprates to its existing hydro facilities in the IRP, not new reservoirs. The topic of land intensity is further covered in Volume 1, Appendix J.

Fuel Consumption. The amount of fuel consumed relates to the potential impacts of the extraction or production, processing, and transportation of fuels. Fuel consumption is quantified by the amount consumed per unit of electricity generated and the total amount consumed under each of the alternative strategies and portfolios. In addition to coal, coal plants equipped with scrubbers or circulating fluidized bed boilers use limestone (CaCO_3) or slaked lime ($\text{Ca}[\text{OH}]_2$) as a reagent to reduce SO_2 emissions. The quantity of limestone or lime consumed is a function of the quantity and the SO_2 content of coal consumed. As with coal, the quarrying, processing, and transportation of limestone and lime affects air, water, and land resources.

Solid and Hazardous Waste. The potential for impacts from the generation and disposal of solid wastes are assessed by the quantities of coal ash, scrubber sludge (i.e., synthetic gypsum and related materials produced by flue gas desulfurization systems), and high-level radioactive waste (spent nuclear fuel). These are quantified by the amounts produced per unit of electricity generated and the total amounts under each of the alternative strategies and portfolios.

Socioeconomics. Generally, socioeconomics in the TVA PSA are impacted by larger trends throughout the U.S. Generally, new generating facilities have the potential to benefit the local communities through employment or tax equivalent payments. Conversely, as facilities reach end-of-life, this may result in the loss of local employment; however, due to anticipated growth of employment opportunities in the regional economy, employees may find alternative employment in other industries. Generally, while minimal impacts to socioeconomic resources are anticipated from TVA generation proposals, the potential adverse effects on all communities will be determined by a future site-specific analysis of impacts.

Following is a discussion of the environmental attributes of the generation options. Typical environmental characteristics of new supply-side resources selected in the capacity expansion plans are listed in Table 5-1. Some environmental characteristics listed in Table 5-1 are dependent on their location and on the detailed facility design and are difficult to quantify without more detailed engineering analyses. The various types of generating facilities are described in Volume 1, Section 2.6 and Volume 2, Section 2.1. It is important to note there are comprehensive environmental laws and regulations that address almost all activities associated with the construction and operation of new industrial facilities, particularly energy generation facilities. This regulatory umbrella ensures the environmental impacts associated with energy resources are acceptable and, in general, public health and the environment are adequately protected.

Table 5-1: Environmental Characteristics of New Supply-Side Resources Included in Alternative Strategies

Resource Option ¹		Summer NDC or Nameplate (MW)	Summer Full-Load Heat Rate (British thermal units [Btu]/kWh)	Storage Efficiency (%)	CO ₂ Emissions (lbs/MWh)	SO ₂ Emissions (lbs/MWh) ³	NO _x Emissions (lbs/MWh)	Hg Emissions (lbs/MWh)	Process Water Use (Gallons/MWh)	Process Water Consumption (Gallons/MWh)	Facility Land Requirements (Acres/MW)	Facility Land Requirements Permanently Disturbed (Acres)
Nuclear	APWR	1,110	10,132	-	-	-	-	-	1,289	859	0.40	460
	SMR – Light Water (First-of-a-Kind)	285	10,713	-	-	-	-	-	719	539	0.63	180
	SMR – Light Water (Nth-of-a-Kind)	285	10,713	-	-	-	-	-	719	539	0.63	180
	SMR – Gen IV (reactor / with storage)	345/500	8,308	-	-	-	-	-	719	539	0.63/0.08	229
Hydro	Hydro Uprates	200	-	-	-	-	-	-	-	-	-	-
Coal	SCPC	650	10,548	-	1,160	0.333	1.194	2.98E-09	82,445	329	0.69	449
	SCPC with CCS	650	10,548	-	116	0.333	1.194	2.98E-09	82,445	329	0.69	449
Gas	CC – 3x1x1	2,145	6,665	-	397	-	0.081	-	250	195	0.08	114
	CC with CCS – 2x1x1	1,430	7,832	-	40	-	0.081	-	250	195	0.08	114
	Frame CT– 4x	884	10,087	-	590	-	0.363	-	130	130	0.10	88
	Aero CT – 20x	1,060	9,392	-	548	-	0.337	-	130	130	0.08	85
	RICE – 24x	426	8,607	-	504	-	0.310	-	130	130	0.15	64
Solar	Solar Single-Axis Tracking (nameplate capacity)	50	-	-	-	-	-	-	-	-	7.30	365
Wind	Wind - Midwest	200	-	-	-	-	-	-	-	-	0.80	160
	Wind – Southeast High-hub	200	-	-	-	-	-	-	-	-	1.00	200
Storage	Pumped Storage	1,212	-	81	-	-	-	-	-	-	0.88	1,067
	Battery – Lithium-ion (4-hour)	50	-	85	-	-	-	-	-	-	0.08	4
	Battery – Advanced Chemistry (8-hour)	50	-	85	-	-	-	-	-	-	0.08	4

¹ APWR – Advanced Pressurized Water Reactor; SMR – Small Modular Reactor; Hydro – Hydroelectric power sources; CCS – Carbon Capture and Sequestration; CC – Combined Cycle; CT – Combustion Turbine; RICE – Reciprocating Internal Combustion Engine; SCPC – Supercritical Pulverized Coal

² Solar, wind and storage are in nameplate.

³ Trace amounts of SO₂ emissions (USEPA default emission rate of 0.0006 lb/million Btu [mmBtu] [40 CFR Part 75, Appendix D]) associated with sulfur-containing odorants added to pipeline-delivered natural gas not included.

5.2.1 Fossil-Fueled Generation

5.2.1.1 Coal – Existing Facilities

TVA currently operates 24 coal-fired generating units at 4 plant sites (see Section 2.3.1). FGD systems for SO₂ control and SCR systems for NO_x emissions control have been installed at 17 of these units. The plants with these FGD and SCR systems include TVA's largest coal units and total about 6,000 MW of generating capacity. The remaining coal-fired units use other methods to reduce SO₂ and NO_x emissions including the use of low sulfur coal (LSC), low-NO_x burners (LNB), and selective non-catalytic NO_x reduction systems.

While the life cycle GHG emissions for individual TVA coal plants have not been calculated, several studies have calculated these emissions for comparable coal plants. Spitzley and Keoleian (2005) found an emission rate of 1,060 tons CO₂ equivalent emissions (CO₂e) per GWh (961 kg/MWh) for pulverized coal (PC) boilers without advanced emissions control systems, comparable to seven of the SHF units. The National Energy Technology Laboratory (NETL; NETL 2010b) calculated a life cycle GHG emissions rate of 1,226 tons CO₂e/GWh (1,112 kg/MWh) for a PC plant equipped with an electrostatic precipitator, SCR, and scrubber, comparable to KIF, GAF, and two SHF units. NETL (2010c) calculated a life cycle GHG emissions rate of 1,045 tons CO₂e/GWh (948 kg/MWh) for a supercritical pulverized coal plant (SCPC) equipped with an electrostatic precipitator, FGD and SCR, comparable to CUF.

For the 2026 IRP, TVA partnered with NLR to source life cycle GHG emissions factors for use in a system-wide GHG life cycle assessment (see Section 5.5.2). Existing coal resources were split between subcritical designation, including KIF, GAF, and SHF, and supercritical designation which included CUF (Table 5-2). The largest source of life cycle GHG emissions from these coal plants is CO₂ from coal combustion, accounting for more than 80 percent of GHG emissions across all life cycle phases. The ongoing non-combustion phase contains the second largest source of life cycle GHG emissions, accounting for emissions associated with coal mining, coal transportation, and other ongoing activities required to keep the plant fueled and operational. The two primary GHG emissions in the ongoing non-combustion phase are CO₂ and CH₄. For additional information, see Section 5.5.2 and Appendix D.

Table 5-2: Coal Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Coal, Supercritical	867,240	Emissions Calculated Separately ¹	10	67,100
Coal, Subcritical	708,246	Emissions Calculated Separately ¹	4.9	67,100

¹Emissions are determined in the GHG LCA using individual plant heat rates and estimated carbon content of the fuel (~210 lbs/mmBtu for coal, depending on fuel basin)

The Red Hills plant in Mississippi, operated by a private entity under a long-term PPA with TVA, burns lignite coal from an adjacent surface mine. Relative to the average for TVA's coal plants, the Red Hills CO₂ emissions rate is high due to the low heat rate of the plant and low fuel energy content. Like the TVA coal plants with FGD systems, Red Hills uses limestone to reduce SO₂ emissions. The plant occupies about 320 acres, and its fuel cycle disturbs about 275 acres/year, equivalent to 0.09 acre/GWh of energy generated. It uses groundwater in a closed-cycle cooling system with no discharges to receiving water bodies.

Coal plants produce large quantities of ash and, if equipped with FGD systems, calcium-based residues (see Section 4.7). Although some of these CCR are recycled for a range of beneficial uses, large quantities are typically permanently stored in closed impoundments or landfills at or near coal plants. These facilities can occupy tens to hundreds of acres. TVA will continue to manage ash and other residues consistent with applicable law and regulatory requirements, including the USEPA's CCR Rule.

5.2.1.2 Coal – New Facilities

No new coal facilities were selected in any of the IRP portfolios based on cost and portfolio fit.

5.2.1.3 Natural Gas – Existing Facilities

The construction and operational impacts of TVA's recently constructed frame-type CT and CC plants are described in several EISs and EAs (see Appendix E). Natural gas-fired plants do not emit mercury and emit very little SO₂. Per the USEPA's *Compilation of Air Pollutant Emissions Factors from Stationary Sources* (AP-42) guidelines for natural gas combustion, "sulfur-containing odorants are added to natural gas for detecting leaks, leading to small amounts of SO₂ emissions (USEPA 2026b)." Direct emissions of NO_x (usually controlled by water or steam injection and/or SCR systems) and CO₂ are low relative to other fossil plants. CT plants require minimal amounts of process water. TVA's CC plants use closed-cycle cooling, as do most other CC plants.

In the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2), existing and new gas resources were split between CC, CC with carbon capture, and simple cycle Frame CT designations (including Frame CT, Aero CT, and RICE) (Table 5-3). The largest source of life cycle GHG emissions from gas plants without carbon capture is CO₂ from natural gas combustion. The ongoing non-combustion phase contains the second largest source of life cycle GHG emissions, accounting for emissions associated with gas extraction, gas transportation, methane leakage, and other ongoing activities required to keep the plant fueled and operational. The two primary GHG emissions in the ongoing non-combustion phase are CO₂ and CH₄. For the 2026 IRP, NLR performed an updated literature review for natural gas plants utilizing CCS, and the results of this review are reflected in the emission factor values. For additional information, see Section 5.5.2 and Appendix D.

Table 5-3: Natural Gas Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
CC	100,000	Emissions Calculated Separately ¹	62.00	4,070
CC with CCS	1,400,000	Emissions Calculated Separately ¹	110	4,300

CT	64,790	Emissions Calculated Separately ¹	70.00	2,600

¹Emissions are determined in the GHG LCA using individual plant heat rates and estimated carbon content of the fuel (~117 lbs/mmBtu for natural gas)

5.2.1.4 Natural Gas – New Facilities

Natural gas resource options in the IRP include CC, CC with CCS, frame CT, Aero CT, and RICE.

Land area requirements for CT and CC plants are based on those of TVA's newest frame-type CT and CC plants, which show little correlation between land area and capacity. Land area requirements for RICE and Aero CT plants are based on published reports or calculated from aerial photographs of existing plants elsewhere in North America. Fthenakis and Kim (2009) estimated a life cycle land requirement of approximately 0.076 acres/GWh for a natural gas-fired plant using gas from conventional sources. Jordaan et al. (2017) found a life cycle land requirement of 0.153 acres/GWh in an analysis of several CC and CT plants in Texas fueled by natural gas from the Barnett Shale area in Texas. The largest contributor to the land requirement was the pipeline infrastructure, which accounted for about 74 percent of the land requirement. Gathering pipelines, which connect well sites with transmission pipelines, were the largest component of the pipeline infrastructure. The power plant was also a large contributor to the land requirement, with lower efficiency CT plants requiring more land than higher efficiency CC plants.

TVA is not responsible for the siting and operation of natural gas pipelines that may be built to serve new natural gas plants. Instead, TVA purchases natural gas service from pipeline companies that are responsible for constructing and operating the pipeline. Construction and operation of natural gas pipelines are subject to site specific environmental reviews and compliance with various state and federal environmental requirements, rules and laws depending on how and where constructed. TVA may be required to evaluate potential environmental impacts associated with the construction of pipelines that would serve TVA facilities.

TVA's experience with constructing natural gas generation plants is generally consistent with these studies. TVA has reviewed numerous environmental review documents that address the construction of new natural gas plants to provide additional information on potential impacts associated with new natural gas plants. Table 5-4 includes generic construction impacts data (averages) associated with NEPA reviews of nine TVA projects between 2010 and 2025 (ALF Emission Control Project; Paradise and Colbert CT Plants; CUF Retirement; John Sevier Fossil Plant; and Johnsonville Aero CT Project; KIF Retirement; New Caledonia Gas Project; and A CT Project). The data includes associated pipeline infrastructure but excludes associated new transmission line construction. In each case, TVA constructed a new plant at or near an existing TVA facility; construction at previously disturbed sites

typically reduces impacts to the environment. The actual effects of future projects may vary greatly, with greater or lesser effects based on the nature and size of a particular project.

The construction of these TVA plants directly affected an average of 244.9 acres or approximately 0.3 acre per MW. Of the nine projects, the land requirements varied greatly, with the smallest project affecting only 51 acres (0.07 acre per MW), including transmission and pipeline infrastructure areas. Many of the impacts were temporary in nature and/or were mitigated in some manner. These projects historically have impacted an average of about 17.6 acres of floodplains (0.01 acre per MW) and 79.2 acres of prime farmland (0.05 acres per MW) and have required the clearing of 157.4 acres of forest (0.1 acre per MW). Average aquatic impacts include 5.8 acres of wetlands and forested wetlands affected (0.0004 acre per MW). A third of the projects affected streams, with impacts to an average of 1,705 linear feet (0.002 linear foot per MW) of streams. Four of the nine projects affected migratory birds of concern, and five of the nine projects affected federally listed endangered or threatened species (e.g., bat habitat impacts). The cultural and social impacts affected five of the nine projects, with impacts to parks and public lands to some degree, with the same number of projects resulting in negative visual effect in the area. There were no reported impacts on historic properties.

Table 5-4: Generic Construction Effects of Natural Gas Generation Plants (TVA Projects 2010-2025)

Land Use Effects	
Land Requirements	Average of 244.9 acres per project Range: 51 to 894 acres Average of 0.3 acre per MW Range 0.09 to 0.6 acre per MW
Floodplain Impacted (Acres)	Average of 17.6 acres per project Range: 0 to 150 acres Average of 0.01 acre per MW Range: 0 to 0.1 acre per MW 22% (2 of 9) of natural gas projects resulted in floodplain impacts
Prime Farmland Converted	Average of 79.2 acres per project Range: 0 to 586 acres Average of 0.05 acre per project Range: 0 to 0.4 acre per MW 33% (3 of 9) of natural gas projects resulted in prime farmland conversion
Land Cover Impacts	
Forest Cleared	Average of 157.4 acres per project Range: 0 to 696.2 acres Average of 0.1 acre per MW Range of 0 to 0.48 acre per MW 77% (7 of 9) of natural gas projects in forest clearing
Wetland Effects	

Wetland Area Affected	Average of 5.5 acres per project Range: 0 to 47.5 acres Average of 0.003 acre per MW Range: 0 to 0.03 acre per MW 66% (6 of 9) of natural gas projects affected wetlands
Forested Wetland Area Cleared	Average of 0.3 acre per project Range: 0 to 2.1 acres Average of 0.0002 acre per MW Range of 0 to 0.0014 acre per MW 33% (3 of 9) of natural gas projects resulted in forested wetland clearing
Stream Effects	
Stream Effects	Average of 1,705.6 linear feet per project Range of 0 to 14,018 linear feet Average of 0.002 linear foot per MW Range of 0 to 9.7 acres per MW 44% (4 of 9) of natural gas projects affected streams
Biological Effects	
Endangered and Threatened Species	66% (6 of 9) of natural gas projects affected federally listed endangered or threatened species or species proposed or candidates for listing
Migratory Bird Effects	44% (4 of 9) of natural gas projects resulted in effects to migratory birds of conservation concern
Cultural & Social Effects	
Historic Properties	None of the natural gas projects affected eligible Historic Properties
Parks and Public Lands	55% (5 of 9) of natural gas projects affected parks and public lands
Visual Effects	55% (5 of 9) of natural gas projects resulted in visual effects
Community Effects	May vary based on location

5.2.2 Nuclear Generation

5.2.2.1 Nuclear – Existing Facilities

The impacts of operating TVA's existing nuclear plants are described in previous EISs and other reports (see Appendix E). Nuclear power generation does not directly emit regulated air pollutants or GHGs.

In the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2), existing and expansion nuclear resources were split between traditional, large-scale nuclear reactors and small modular reactor (SMR) designations (Table 5-5). For the 2026 IRP, NLR performed an updated literature review for nuclear SMR technology and the results of this review are reflected in the emission factor values. The largest source of life cycle GHG emission from these plants is CO₂ from the Upstream phase. The Downstream phase contains the second largest source of life cycle GHG emissions, accounting for emissions associated with plant decommissioning. For additional information, see Section 5.5.2 and Appendix D.

Table 5-5: Nuclear Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Nuclear	483,552	NA	12	175,000
Nuclear SMR	810,000	NA	12	190,000

NA - Not applicable

TVA's nuclear plants occupy an average of 1,114 acres each and about 80 percent of this area is developed. Life cycle land metrics have not been determined for TVA's nuclear plants. Fthenakis and Kim (2009) estimated a life cycle land transformation of 0.023 acres/GWh for nuclear power. About half of this transformed land is the power plant site. Due to the evolving approach to the long-term disposal of spent fuel, the land required for offsite spent fuel disposal is excluded from this estimate.

5.2.2.2 Nuclear – New Facilities

Nuclear resource options available for selection include advanced pressurized water reactors, as well as light water and generation IV SMRs. The impacts of constructing and operating a one- or two-unit pressurized water reactor nuclear plant at the Bellefonte site in northeast Alabama are described in a 1974 EIS (TVA 1974).

In 2008, TVA completed an environmental report (TVA 2008) for a combined license application to the NRC for the construction and operation of a two-unit AP1000 nuclear plant on the Bellefonte site adjacent to two partially built pressurized water reactors. Most operational impacts would be comparable to those of TVA's existing nuclear plants except for water use (water withdrawn for cooling or other uses and then returned to the source) and water consumption (water withdrawn but not returned to its source). A new advanced pressurized water reactor would operate with closed cycle cooling; water use would be relatively low and water consumption relatively high compared to TVA's other thermoelectric plants. The environmental impacts of constructing and operating similar advanced pressurized water reactors at other sites in the U.S. have been described in EISs issued by the NRC.

The impacts of constructing and operating a SMR plant would be generally like those of TVA's existing nuclear plants and the other new nuclear generation options, but proportionately less due to the lower capacity of the small modular reactor plant. These impacts are described by NRC in the April 2019 Final EIS (NRC 2019) and by TVA in its July 2022 final Programmatic EIS for a new SMR plant at TVA's CRN in Roane County (TVA 2022e; TVA supplemented its July 2022 Programmatic EIS in 2025 to consider impacts associated with constructing, operating, and decommissioning the GE Hitachi Nuclear Energy BWRX-300 SMR unit at CRN). The use of modular construction for major plant components would reduce construction impacts at the plant site compared to a conventional pressurized water or advanced pressurized water reactor.

Progress is accelerating on emerging technologies such as advanced nuclear and advanced storage. TVA is collaborating with the DOE, Oak Ridge National Laboratory, Electric Power Research Institute (EPRI), universities, startup accelerators, and other industry partners to advance the viability and cost-effectiveness of these emerging technologies.

5.2.3 Renewable Generation

TVA's current renewable energy portfolio is dominated by the hydroelectric facilities at its dams and with PPAs for wind and solar energy, with solar most focused on in Strategy C. The following sections provide an overview of the environmental impacts of renewable generation from hydroelectric, wind, solar, and biomass facilities. The renewable resource options available for selection in the IRP include hydroelectric uprates at existing facilities, utility scale solar, distributed solar, Midwest wind, and Southeast high-hub wind.

5.2.3.1 Hydroelectric – Existing Facilities

Impacts of the operation of TVA's hydroelectric facilities are described in the *Reservoir Operations Study* (TVA 2004). Hydropower generation does not directly emit GHGs and its life cycle GHG emissions are among the lowest of the various types of generation.

In the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2), all existing and new hydro resources utilized the same emission factor estimates (Table 5-6).

Table 5-6: Hydroelectric Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Hydroelectric	1,100	NA	1.9	0

NA - Not applicable

The TVA hydroelectric generating system consists of 29 hydroelectric dams with 109 conventional hydroelectric generating units, the majority of which are on the Tennessee River and its tributaries. These 29 dams provide 3,783 MW of summer net capability. TVA manages the Tennessee River system via these dams in an integrated manner, which includes managing minimum river flows and minimum depths for navigation, reducing flood damage, generating low-cost hydroelectric power, maintaining flows that support habitat for fish and other aquatic species, maintaining water supply, and providing recreational opportunities for the Tennessee Valley. In addition, having cool water available helps TVA to meet thermal compliance and support normal operation of TVA's nuclear and fossil-fueled plants, while oxygenating water helps fish and other aquatic species remain healthy. TVA releases excess water (spills) through its dams to reduce flood damage to the Tennessee Valley. TVA typically spills only when all available hydroelectric generating turbines are operating at full capacity and water must still be released from a dam.

TVA's Hydro Life Extension Program, which replaced the Hydro Modernization Program, began in 2021 with a focus on recovering and preserving TVA's extensive hydroelectric fleet, improving efficiency and flexibility, and ensuring long-term reliability of these vital assets. Hydroelectric generation will continue to be an important part of TVA's energy supply in the future. It plays a vital role in providing low-cost power and enhances system flexibility which helps integrate other renewables into the power portfolio. These modernization efforts have been completed on 68 out of 109 conventional hydroelectric units, and allowed TVA to extend the operating life of its fleet and, in some cases, increase its MW output or increase overall unit efficiency without increasing footprint or releases.

5.2.3.2 Hydroelectric – New Facilities

Under all the alternatives, TVA would continue to modernize its hydroelectric units as part of its normal maintenance activities. The impacts of these upgrades have been described in EAs for many facilities (e.g., TVA 2005). While the upgrades generally do not change the volume of water used on a daily cycle, they can increase the rate of water passing through the turbines and result in small, periodic increases in downstream velocities. A potential consequence of the increased velocity is increased downstream bank erosion, which TVA mitigates as necessary by protecting stream banks with riprap or other techniques. Other environmental impacts of hydroelectric modernization are minimal, and there is typically no additional long-term conversion of land.

New hydroelectric pumped storage, which is partially discussed in Section 5.2.4, is one of several technologies that TVA is exploring to ensure the reliability and resiliency of the grid. TVA issued a Pumped Storage Hydroelectric EIS in November 2025 that evaluates a new pumped storage facility located near Pisgah, Alabama and expansion of the existing Raccoon Mountain facility. The Rorex Creek site near Pisgah would have a generation capacity of up to 1,600 MW. Completing the environmental review positions TVA to shorten the timeline for incremental pumped storage if the sites are included and approved in future plans. New pumped storage could be available by the mid-2030s.

While potential exists for hydropower generation in undeveloped stream reaches, this would be very expensive, disruptive, and have large environmental impacts. As a result, hydroelectric expansion options are limited to unit uprates as per Volume 1. The hydroelectric uprates expansion option was developed based on TVA's Hydro Life Extension Program assessments and is specific to opportunities across the TVA system. These expansions could involve major construction projects, although most construction activities would occur on the dam reservations.

5.2.3.3 Wind – Existing Facilities

A portion of TVA's renewable generation portfolio is wind generation from the upper Midwest and the Great Plains (Section 2.4). TVA currently purchases power from seven wind farms. TVA has completed EAs for wind farms in Tennessee and Kansas (TVA 2011b, TVA 2011c).

Impacts of wind farm construction include the clearing and grading of access roads and turbine sites and excavation for turbine foundations and electrical connections. Denholm et al. (2009) reported an average direct permanent impact area of 0.74 acre/MW, and a direct average temporary impact area of 1.73 acres/MW. These impact areas average somewhat smaller in mid-western croplands and somewhat larger in Great Plains grasslands/herbaceous areas and forested Appalachian ridges.

The total wind farm area tends to be much larger than the direct impact areas and nationwide averages 84 acres/MW or a capacity density of 1 MW/82 acres (Denholm et al. 2009). This density, while low relative to most other types of electrical generation, varies greatly due to different leasing practices by wind farm developers. Using a different analysis technique that incorporated capacity factor, Miller and Keith (2018) calculated an energy density of 1 MW/494 acres for windfarms constructed between 1998 and 2016. A very small proportion of this wind farm area is disturbed directly, and most land-use practices can continue on the remainder of the area. Land clearing and road and transmission line development for wind farms can, however, result in habitat fragmentation. Operational impacts include turbine noise, which can be audible for distances of a quarter mile or more, and the visual impacts of the turbines which can dominate the skyline. Operating turbines can also cause shadow flicker, the flickering effect caused when rotating wind turbine blades periodically cast shadows through constrained openings such as the windows on neighboring properties. The scale of the problem depends on several factors such as turbine height, wind speed and direction, position of the sun, distance from the turbine, local terrain, and amount of cloud cover. Modeling tools have been developed to quantify shadow flicker associated with existing and proposed windfarms. Shadow flicker has been reported to cause headaches and increase stress for some individuals.

Impacts to biological resources include habitat fragmentation, displacement of wildlife during and post- construction, and mortality of birds and bats from collision with turbines. The rates at which displacement or fatalities or injuries occur can be dependent on species (habitat requirements, typical flight path height, etc.). Injuries and collisions have been shown to be due to both the height of turbines as well as the motion. In addition to direct impacts to the immediate area impacted by the wind turbines, indirect effects can occur in the surrounding areas, such as habitat avoidance for bats and birds increasing in closer proximity to turbines, with measurable effects on birds up to 674 meters away (Barré et al. 2018, Marques et al. 2019). Bats can also die from trauma induced by air pressure changes caused by the rotating turbines (BLM 2005, Baerwald et al. 2008). Mortality and collision rates for both birds and bats are difficult to determine accurately, given limits to data accessibility and varying methods for data collection; therefore, impacts are likely underestimated (Allison et al. 2019, Schippers et al. 2020, Choi et al. 2020).

Loss et al. (2013) and Erickson et al. (2014) compiled information on bird collision mortality at wind farms across North America. Loss et al. (2013) estimated mean annual mortality

rates of 6.86 birds/turbine (3.86 birds/MW) for the eastern U.S. (including Tennessee and Illinois) and 2.92 birds/turbine (1.81 birds/MW) for the Great Plains (including Iowa and Kansas). This study also found an increase in mortality rate with turbine hub height. Erickson et al. (2014) estimated annual mortality rates for songbirds (passerines) of 2.58–3.83 birds/MW for the eastern U.S. (including Tennessee) and 2.15–3.96 birds/MW for the Plains region (including Illinois, Iowa, and Kansas). In comparing total estimated wind farm mortality of individual species of songbirds with their estimated continent-wide populations, Erickson et al. (2014) concluded less than 0.045 percent of the entire population of each species suffered mortality from collisions with turbines.

While the impacts of bird mortality are probably not significant in most areas, the impacts of bat mortality have greater potential for concern. The highest annual bat mortality rates, 20.8–69.6 bats/turbine (14.9–53.3 bats/MW) have been reported at wind farms on forested ridges in the eastern U.S. (Arnett et al. 2008, Hayes 2013). Annual rates at Midwest wind farms (i.e., much of the potential Midcontinent Independent System Operator [MISO] area) are lower, between 2.0 and 7.8 bats/turbine (2.7–8.7 bats/MW). Very limited bat mortality information is available from wind farms in the southern Great Plains (i.e., much of the potential Southwest Power Pool wind resource options), where one study found a mortality rate of 1.2 bats/turbine/year (0.8/MW) (Arnett et al. 2008). Common patterns detected in bat mortality studies include the following: (1) most fatalities occur in later summer and early fall; (2) most fatalities are of migratory, foliage- and tree-roosting species; and (3) most fatalities occur on nights with low wind speed (<6 meters/second) and 4) fatalities increase immediately before and after the passage of storm fronts (Arnett et al. 2008, Goldenberg et al. 2021).

The USFWS has developed guidelines (USFWS 2012) for the siting, development, and operation of wind farms. These voluntary guidelines include preliminary site screening, detailed site characterization studies, post-construction studies, and potential impact reduction and mitigation measures. Reducing the operation of wind turbines during periods of low wind speeds at night during seasons when bats are most active has been shown to be an effective measure for reducing bat mortality while having minimal effect on power generation (Arnett et al. 2011). Other mitigation measures for reducing collisions continue to be studied, including painting turbines, texturing them, using acoustic deterrents, and operational curtailment (May et al. 2020, TCU 2019, Romano et al. 2019, Smallwood and Bell 2020).

Wind turbines produce no direct emissions of air pollutants or GHGs. In the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2), all existing and new wind resources utilized the same emission factor estimates (Table 5-7).

Table 5-7: Wind Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Wind	619,000	NA	0.74	14,000

NA - Not applicable

5.2.3.4 Wind – New Facilities

Two options were modeled for possible expansion of wind energy generation, defined primarily where they are sited. The two wind resource options are Midwest and Southeast High-Hub. Midwest wind primarily comes from wind farms in the Midwest, although the IRP acknowledges that this resource option could be a proxy for other wind resources located out of the Tennessee Valley and transported via transmission agreements (e.g., from the Southwest Power Pool, or SPP). For the Southeast option, higher hub heights are necessary due to the relatively lower wind speeds in the region. These potential expansions are covered further in Volume 1, Appendix E.

TVA anticipates the developers of wind farms would follow USFWS guidelines (USFWS 2012). Land area requirements, based on the direct permanent impact area, are conservatively assumed to be 1 acre/MW for wind farms in the TVA PSA and 0.8 acre/MW for wind farms elsewhere. Larger areas are affected by the noise and visual impacts of wind turbines, as well as shadow flicker.

5.2.3.5 Solar – Existing Facilities

TVA owns approximately 1 MW of solar capability across nine operating solar installations. Through several programs, TVA purchases renewable power (primarily solar, some biomass) totaling 301 MW of capability. TVA has long-term PPAs for 1,438 MW of operating utility-scale solar nameplate capacity and has contracted for an additional 2,528 MW of solar nameplate capacity expected to come online over the next few years, including contracts signed in the latest procurement cycle. TVA obtains renewable energy credits from these sites, and the existing agreements extend through the late 2030s to early 2040s.

TVA assessed the potential impacts of small PV facilities in a programmatic EA (TVA 2014) and the impacts of larger solar facilities in other EAs listed in Appendix E. Most completed ground-mounted PV facilities have been constructed on previously cleared areas, frequently pasture, hayfield, or crop land, and most have required little grading to smooth or level the site. Several have been constructed on land classified under the Farmland Protection Policy Act as prime farmland. Although the construction and operation of the PV facility usually eliminates agricultural production on the area, it typically does not adversely affect long-term soil productivity or the ability to resume agricultural production once the PV facilities are removed when employing best practices (Cleveland and Sarkisian 2019). The construction of the PV facility frequently affects local scenery, but this effect is often minor because of the

low profile of the PV components and vegetative screening, either existing or planted as part of the PV facility development.

PV facilities produce no direct emissions of air pollutants or GHGs. In the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2), all existing and new solar resources utilized the same emission factor estimates (Table 5-8).

Table 5-8: Solar Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Solar	1,630,000	NA	9.4	37,800

NA - Not applicable

Land requirements and impacts for PV facilities vary greatly and depend on the type of installation and the type of land that would be impacted. Building-mounted systems require no additional land. Ground-mounted systems may be on canopies that provide shelter and thus, do not negatively impact land use. Land requirements for stand-alone ground-mounted systems vary with the type of mounting system. Fixed systems (with panels that do not move to track the movement of the sun) require less land than those with 1- or 2-axis tracking. The generation by tracking systems, however, is greater than from fixed systems. Ong et al. (2013) surveyed land requirements of U.S. PV projects between 1 and 20 MW capacity. Fixed-tilt systems required an average of 5.5 acres/MW_{AC} and single-axis tracking systems required an average of 6.3 acres/MW_{AC}. Based on the analysis of Ong et al. (2013), a review of 13 operating and proposed PV facilities in the TVA PSA, and 23 PV facilities elsewhere in the Southeast, new ground-mounted PV facilities are assumed to require 6.1 acres/MW_{DC} (7.2 acres/MW_{AC}) for fixed-tilt systems and 7.3 acres/MW_{DC} (8.6 acres/MW_{AC}) for single-axis tracking systems. As noted in Table 5-1, the facility land requirement assumed by TVA as an environmental characteristic was 7.3 acres/MW, which is consistent with these past studies and within the range of PV land use requirements identified in recent industry and academic literature. Bolinger and Bolinger (2022) estimated that 5.56 acres of land is required for each MW of solar power generation, and the Solar Energy Industries Association (2023) identified 10 acres/MW as a reasonable maximum for solar facilities.

5.2.3.6 Solar – New Facilities

New facilities for both utility-scale solar and distributed solar were considered in Volume 1. New utility-scale solar is increasing, in part driven by customers' demand through TVA's Green Invest Program. The impacts of new solar generating facilities included in the capacity expansion plans are expected to be like those described above for existing facilities. New building-mounted PV facilities, likely to be constructed as DER, would not require additional land and would have few other impacts. Future utility-scale PV facilities in the TVA region are likely to be multi-MW in size. An increasing proportion of recently constructed and proposed multi-MW solar facilities in the TVA region use single-axis tracking systems. These

systems require relatively flat ground and can be built on brownfield, cropland, or other greenfield sites. An increasing proportion of PV facilities have been and are expected to be constructed on cropland, where the amount of grading required to prepare the site is low relative to other land types. Expansion options for TVA include large single-axis tracking units.

Some of the impacts of developing solar facilities on agricultural and forested land could be reduced by developing solar facilities on sites that had been previously heavily disturbed, including brownfield sites. Numerous such potentially suitable sites occur across the TVA PSA. In 2019, TVA estimated that such sites comprise less than 3 percent of the land area occupied by TVA solar facilities. This proportion is unlikely to greatly increase as such sites infrequently provide the large, continuous area sought by developers of utility-scale solar facilities. Many brownfield sites also have restrictions on penetrating the ground surface, which increases solar construction costs.

The development of a solar facility on an agricultural site typically eliminates the agricultural production at least for the duration of facility operations, except in limited circumstances where the site is grazed by sheep or other livestock as a means of managing vegetation growth. Such grazing is, at present, rarely used in the TVA region. The conversion of the site to a solar facility, with a permanent grass and herbaceous vegetative cover, can reduce the runoff of silt and agricultural chemicals that often occurs from cropland. The maintenance of a permanent vegetative cover, particularly when composed of native plant species, can also increase local wildlife diversity (Beatty et al. 2017).

In 2024, TVA reviewed NEPA documents it has completed addressing solar construction projects between 2014 and 2023 (see Appendix E for the list of NEPA documents). Information gathered is generally consistent with these studies, with many TVA projects varying greater in size (from 2.0 to 12.2 acres per MW). Table 5-9 includes data from 44 NEPA documents addressing the average potential effects of 47 solar projects. These figures are associated with TVA's experience reviewing the potential effects of numerous past projects. As seen in the ranges included in the table, the effects of individual projects may vary greatly, with greater or lesser effects based on the nature and size of a particular project.

Over 80 percent of these projects resulted in effects to prime farmland and, on average, 104.9 acres of forests have been cleared (2.0 acres per MW). Aquatic impacts include 0.2 acres (0.007 acres per MW) of wetlands affected and an average of 2,433 linear feet (5.4 linear feet per MW) of streams affected. For almost all projects, TVA identified some effect to visual resources from the solar project.

Further discussion into the possible land use impacts of solar can be found in Section 5.5.4.

Table 5-9: Generic Construction Effects of Solar Generation Facilities (TVA Projects 2014-2023)

Land Use Effects	
Land Requirements (Acres of Solar Installation within a Site)	Average of 7 acres per MW Range 2.0-12.2 acres per MW Total acreage of projects: 17,257 acres
Floodplains filled per MW (Acres)	Average of 0.07 acre per MW Range: 0-1.5 acres per MW
Prime Farmland conversion	81% of solar projects resulted in non-permanent prime farmland conversion
Land Cover Effects	
Forest cleared	Average of 104.9 acres per project Range: 0-850 acres Average of 2.0 acres per MW Range of 1.0-13.2 acres per MW
Wetland Effects	
Area affected	Average of 0.21 acres per project Range: 0-3.9 acres Average of 0.007 acres per MW Range: 0–0.25 acres per MW
Forested wetland area cleared	Average of 0.33 acres per project Range: 0-4.26 acres Average of 0.01 acres per MW Range of 0-0.25 acres per MW
Stream Effects	
Stream effects	Average of 873 linear feet per project Range of 0-14,987 linear feet Average of 5.4 linear feet per MW Range of 0-41 acres per MW
Biological Effects	
Endangered and Threatened Species	48% of solar projects affected federally listed endangered or threatened species or species proposed or candidates for listing
State-Listed Species	48% of solar projects affected State-Listed endangered, threatened, or special concern species
Cultural and Social Effects	
Historic Properties ¹	3% of projects affected historic properties
Parks and Public Lands	7% of projects affected parks and public lands
Visual Effects	99% of solar projects resulted in visual effects (based on a review of 31 of the 45 projects)

¹Additional consultation for individual projects would be required and additional consultation with State Historic Preservation Officers and Tribes would be completed for site-specific activities.

5.2.3.7 Biomass – Existing Facilities

TVA purchases electricity generated from landfill gas and wood waste (see Section 2). The environmental impacts of this generation are beneficial overall, due to the avoidance of methane emissions and utilization of residues at wood and grain processing plants. The generating facilities have typically been built on heavily disturbed landfill or other industrial sites and occupy small land areas.

Biomass facilities are also addressed in the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2) and results are included in Table 5-10.

Table 5-10: Biomass Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Biomass	1,960	NA	6	35

NA - Not applicable

5.2.3.8 Biomass – New Facilities

The potential supply of biomass is greatly influenced by the price paid for biomass, which influences its profitability relative to the profitability of conventional crops. With higher prices, larger amounts of more productive farmland would likely be converted from food production to biomass production, and the western portion of the TVA region has the greatest potential for producing large energy crop supplies. Therefore, TVA is not further pursuing expansion via biomass at this time.

5.2.4 Energy Storage

5.2.4.1 Energy Storage - Existing Facilities

TVA owns and operates one large storage facility. The Raccoon Mountain Pumped Storage Plant has four generating units with a generating capability of 1,715 MW. TVA's Raccoon Mountain facility occupies about 1,050 acres and utilizes approximately 386,470 gallons of water per MWh of generation. Although Raccoon Mountain uses a large volume of water, none of this water is consumed and the only loss is from evaporation. The Raccoon Mountain Pumped Storage Plant's four generating units provide critical flexibility to the TVA system by storing water at off-peak times for use when demand is high.

In conjunction with several solar contracts, TVA has contracted for 370 MW of battery storage with 100 MW currently operating and the remainder expected to come online in the next few years, including contracts signed in the latest procurement cycle. Also, TVA is constructing a 20-MW/40-MWh battery facility in Vonore, Tennessee, to gain direct operational experience with battery storage operation.

In the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2), all existing and new pumped storage resources utilized the same emission factor estimates (Table 5-11).

Table 5-11: Pumped Storage Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Pumped Hydroelectric	310	NA	1.8	7

NA - Not applicable

GHG emissions from generation are a function of the GHG intensity of the electricity used in the pumping mode. The IRP's LCA incorporates forecasted generation from other TVA plants stored by the pumped hydro facility as a part of the underlying energy production forecast for each portfolio. Based on the 80 percent efficiency of energy conversion at Raccoon Mountain and 5 percent transmission loss factor (a function of distance from the energy source and load center), GHG emissions are approximately 1.3 times the energy source emissions. At TVA's 2022 CO₂ intensity of 658 lbs/MWh, the operation of Raccoon Mountain, as well as that of a future pumped storage facility, would emit about 855 lbs. of CO₂/MWh. This emissions rate would change over time as the system CO₂ intensity rate changes.

5.2.4.2 Energy Storage - New Facilities

Storage resource options available for selection in the IRP include pumped storage, lithium-ion battery, advanced chemistry battery, and distributed storage (Volume 1, Appendix E.12). The pumped storage option would use reversible turbine generators to pump water into a higher altitude reservoir during periods of excess power or use water flowing from the upper to lower reservoir to power the turbines when energy is needed (Section 5.2.3.2). Two different types of battery storage technologies were modeled. Lithium-ion is the prevalent technology today, and it is best suited for shorter storage duration, so a four-hour, 50-MW version was modeled. Advanced chemistry battery storage technologies are developing that would enable longer durations of storage, so an 8-hour, 50-MW version was modeled. Storage efficiency is modeled for all options due to the energy losses inherent in the conversion process and, in the case of pumped storage, the loss of water during storage. Storage efficiency represents the efficiency of one cycle (i.e., pumping/releasing water, charging/releasing battery power). Compressed air energy storage was not considered for the 2026 IRP.

The operational impacts of a new 1,212-MW pumped storage plant are expected to be like those of the Raccoon Mountain plant. Construction impacts would include the construction of the upper reservoir, excavation of the powerhouse and the tunnel connecting the upper and lower reservoirs, and construction of the discharge structure in the lower reservoir. If the lower reservoir is an existing reservoir, dredging of the discharge area and construction of an enclosure around the discharge structure would likely be required. If a new lower reservoir is required, additional impacts would result from the construction of the dam and reservoir and diversion of existing streams around or into the reservoirs.

Utility-scale battery storage facilities are assumed to resemble current storage systems using lithium-ion batteries, which typically consist of batteries, supervisory and power management system, heating and air conditioning (HVAC) system, and fire prevention system in modular shipping-style containers on a concrete pad with spill containment. Other components include electrical switching equipment and transformers. They are often constructed in association with a wind or solar generating facility or adjacent to an existing substation.

The impacts of constructing and operating utility-scale lithium-ion battery storage facilities in association with southern California solar facilities have been described by County of Imperial (2016) and Bureau of Land Management (BLM 2018). The 2018 Final Generic EIS (NYSDPS and NYSERDA 2018) describes the environmental impacts of the State of New York's initiative to deploy at least 1,500 MW of energy storage by 2025. The New York EIS reviewed various types of battery storage, including lithium-ion, as well as thermal and flywheel storage technologies. The land area required for battery storage facilities is typically only a few acres and construction-related impacts are minimal. Operational impacts are also minimal with adherence to typical mitigation measures, including RCRA regulations and best management practices.

In the system-wide GHG life cycle assessment conducted by TVA with support from NLR (Section 5.5.2), all currently contracted and new battery storage resources utilized the same emissions factor estimates (Table 5-12).

Table 5-12: Battery Emissions Factors by Phase

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Battery	527,000	NA	0	98,900

NA - Not applicable

Similar to pumped storage, GHG emissions from battery generation are a function of the GHG intensity of the electricity used when charging. The IRP's LCA incorporates forecasted generation from other TVA plants stored by the batteries as a part of the underlying energy production forecast for each portfolio.

5.3 Environmental Impacts of Energy Efficiency and Demand Response Resource Options

The sources of environmental impacts from the proposed expansion of TVA's EE and DR programs under the alternative strategies include the following:

- The reduction in or avoidance of generation resulting from EE measures. This reduction is highlighted in Volume 1, Appendix G.

- The change in the type of generation due to changes from on-peak to off-peak energy use resulting from DR programs. This change in load shape, and the resulting change in peak demand, is incorporated into the alternative strategies assessed in Section 5.5. Historically, most DR calls have been in emergency situations and shifted the time of electrical use with little net change in use and little environmental impact. More widespread employment of DR is likely to result in a small net reduction in electrical use and the associated impacts from its generation (Huber et al. 2011).
- The generation of solid waste resulting from building retrofits and the replacement of appliances, HVAC equipment, and other equipment to reduce energy use are addressed in Section 5.5.6.
- Adverse impacts to historic buildings from building retrofits that result in changes in their external appearance and associated historic integrity.

Programmatic environmental reviews of EE programs have been conducted by DOE (2015a) for the Hawai'i Clean Energy Initiative and by the Rural Utilities Service (USDA 2012) for its EE and Conservation loan program. DOE (2015a) concluded that EE programs would result in beneficial impacts from reduction of GHG emission and the potential for adverse impacts from EE actions is low with adherence to applicable regulations and best management practices. The Rural Utility Service (USDA 2012) identified a few areas of concern, including the potential presence of lead-based paint and asbestos containing material which would be mitigated with adherence to applicable regulations. The potential for adverse impacts to historic properties was low, but some EE activities resulting in the modification of the exterior of buildings would require additional project-specific reviews.

Most EE programs require that participating individuals and organizations pay a portion of the costs of their EE measures. Low-income residents frequently have a reduced ability to pay these costs and therefore are less likely to participate in such programs. TVA programs focused on investment in low-income communities, such as Home Uplift, can help mitigate these concerns. In addition, many low-income residents live in rental housing, and there are few EE programs targeting rental single-family and multi-family housing. Further information on these programs can be found in Volume 1, Appendix G.

5.4 Environmental Impacts of Transmission Facility Construction and Operation

As described in Volume 1, all the alternative strategies would require investments in transmission, which would result in the construction of new or upgraded transmission facilities. Table 5-13 provides a list of generic effects of these construction activities, based on TVA's past experience completing similar projects. This list was compiled by reviewing project planning documents for TVA transmission construction activities completed from 2005 through 2023. A total of 470 projects were included in this review (see Appendix E for a list of these projects). The actual effects of future projects are likely to vary greatly, with greater or lesser environmental effects based on the nature and size of a particular project.

TVA builds an average of 65 miles of new transmission lines per year along with several new substations and switching stations to increase capacity/reliability and serve new customers. The anticipated amount of construction for new or upgraded transmission facilities varies among the alternative strategies. All new generating facilities would require connections to the transmission system, either directly or through an interconnection with a LPC. The length of connecting transmission lines and the need for new substations and switching stations depend on the location and capacity of the facilities.

All strategies include timeline, technological, transmission, and/or market depth uncertainty and execution risks, which are amplified by load growth and regulatory impacts. Scenario 2 and the Supercharged Growth sensitivity included the highest level of forecasted load growth, which would drive the most extensive transmission upgrades (and associated environmental impacts) to both serve this additional load and interconnect new generation resources. Large resource additions like nuclear and natural gas plants typically require more robust transmission buildouts, including items like new substations and longer transmission lines for interconnection, along with significant upgrades to existing transmission assets in the local area. Localized environmental impacts associated with transmission would be expected to be greater for larger plants.

Inverter-based resources such as solar and battery storage (expected under all strategies but amplified in Strategy C) are typically more geographically dispersed and have a smaller capacity output per plant. These resources require relatively fewer traditional transmission upgrades per installation, typically resulting in fewer localized environmental impacts associated with transmission actions. However, the size and dispersed nature of these resources makes the scale of new and upgraded transmission projects more complex on a per MW basis compared to larger generating plants. Also, inverter-based resources typically require supplemental reactive resource transmission projects to ensure system stability and reliability that are not required for spinning generation. As the deployment of inverter-based solar and battery storage increases on the TVA system, the likelihood of more extensive network upgrades increases, given the growing interdependence of each system modification, thereby increasing the potential for associated environmental impacts.

The retirement or end-of-life of generating facilities can also result in the need for new or upgraded transmission facilities to maintain adequate power supply and reliability. The importation of wind energy from outside the TVA region would likely require transmission facility construction.

Table 5-13: Generic Effects of Transmission System Construction and Maintenance Activities (TVA Projects 2005-2023)

	Transmission Lines	Substations and Switching Stations
Land Use Impacts		
Land requirements	Average of 14.6 acres/line mile, range 3.03 – 100	Average of 10.8 acres, range 1 – 73 Median for 500 kV: 49.5 acres Median for <500 kV: 5.5 acres
Floodplain fill	0	Average of 0.1 acre; range 0 – 4; 1% affected floodplains
Prime farmland converted	0	Average of 7.9 acres; range 0 – 29.1; 2.3% affected prime farmland
Land Cover Impacts		
Forest cleared	Average of 5.15 acres/line mile for new lines; range 0 – 46.15; 23% cleared forest	Average of 4.27 acres; range 0 – 50; 3% cleared forest
Wetland Impacts		
Area affected	Average of 2.51 acres/line mile for new line; range 0 – 70.58; 29% affected wetlands Average of 1 acre/line mile of existing line; range 0 – 18.3; 15% affected wetlands	Average of 0.6 acre; range 0 – 1.84; 1% affected wetlands
Forested wetland area cleared	Average of 1.78 acres line/mile; range 0 – 44.5; 19% affected forested wetlands Average of 0.01 acre/line mile of existing line; range 0 – 18.3; 15% affected forest wetlands	-
Stream Impacts		
Stream crossings	Average of 2.89 per mile of new line; range 0 – 50; 25% crossed streams Average of 2.89 per mile of existing line; range 0 – 6.67; 11% crossed streams	Not Applicable
Forested stream crossings	Average of 0.96 crossings per mile of new line; range 0 – 17.65 crossings per mile; 13% crossed forested streams Average of 0.06 crossings per mile of existing line; range 0 – 2.5 crossings per mile; 1% crossed forested streams	Not Applicable
Endangered and Threatened Species	35 (7.8%) of 450 projects affected federally listed endangered or threatened species, or species proposed or candidates for listing 71 (15.7%) of 453 projects affected state-listed endangered, threatened, or special concern species	
Historic Properties	45 (10%) of 451 projects affected historic properties	
Parks and Public Lands	50 (12.3%) of 408 projects affected parks and public lands	

Note: Because some project planning documents did not contain all of the environmental data, the sample sizes for the various categories differ.

5.5 Environmental Impacts of Alternative Strategies and Associated Capacity Expansion Plans

Following is a discussion of the impacts of each alternative strategy on air quality, climate and GHGs, water resources, land resources, fuel consumption, solid and hazardous waste, and TVA-region socioeconomics over the 2026-2050 planning period. A full list of the environmental parameters of the nine portfolios can be found in Appendix C. The bar charts and time-series graphs in the following sections illustrate the average of the values for the three scenarios for each alternative strategy. The whisker bars on the bar charts show the range of the values of the three scenarios associated with each strategy. Where an “extended range” is indicated (box and whisker charts), the whisker bars on the charts represent the range of values included in other bar charts, with the additional range possible given the sensitivity analysis and Preferred Alternative. A full list and evaluation of the sensitivities can be found in Volume 1, Sections 3.9 and 3.10.

Alternative Strategies:

- A – Baseline Utility Planning
- B – Innovation
- C – Distributed

Scenarios:

- 1 – Reference
- 2 – Higher Growth
- 3 – Carbon Legislation

The environmental impacts of all alternative strategies and scenarios include impacts of the planning assumptions regarding expected end of life dates for coal facilities, subject to further evaluation, environmental review, and TVA Board approval, which would lead to decreased emissions of air pollutants, intensity of GHG emissions, and generation of coal waste, with some achieving or approaching zero. For most environmental resources, the adverse impacts would be greatest in Scenario 2, Higher Growth, and sometimes Scenario 1, Reference Case, and would be lowest under Scenario 3, Carbon Legislation. Each of the Scenarios also did not have much variation in general over the three strategies. Overall, the impacts between strategies did not differ as much as between scenarios, with most strategies having similar impacts on average, though a greater range of impacts.

Environmental effects discussed in Section 5.5 subsections are summarized as follows:

Air Quality, Climate, and Greenhouse Gases. All alternative strategies would result in significant long-term reductions in emissions of SO₂, NO_x, and mercury, based on expected end of life for existing coal units. The overall reductions in emissions under each strategy, averaged across the associated scenarios, show relatively little variation. However, there is large variation among both strategies and scenarios for mercury emissions. Total and annual direct emissions of CO₂, as well as CO₂ emission rates, also referred to as CO₂ intensity, would decrease under all alternative strategies. The variation among the strategies for both CO₂ emissions and emission rates is relatively small and much less than the variation among the scenarios associated with each strategy. All alternatives would result in the continued, significant, long-term reductions in CO₂ emissions from the generation of power

marketed by TVA. The reduction in CO₂ emissions would likely have small but beneficial impacts on the potential for associated climate change.

Water Resources. The volume of water withdrawn by thermal generating facilities, (i.e., nuclear, coal, and CC facilities) would decrease between 2026 and 2050 under all alternative strategies, based on expected end of life for existing coal units. There is a noticeable difference in water consumption between the strategies, with Strategy B, Innovation, requiring the most water, and Strategy C, Distributed, requiring the least. Water withdrawal remains similar among the strategies. The reductions in water consumption would have beneficial impacts; these impacts would generally be small and vary with the characteristics of the source area of the water withdrawal. The potential end-of-life of generating facilities, as described in Section 3.2.4, would result in minor, beneficial impacts to nearby rivers and waterways. However, the increases in water consumption could result in localized adverse impacts to aquatic ecosystems, that would likely be reduced through mitigation actions.

Land Resources. Land resources displayed a difference between strategies, with Strategy C, which focuses on distributed energy technologies such as solar, using more land than the remaining strategies. For all portfolios under Scenario 2 and 3, at least 90 percent of the land required for new generating and storage facilities is for utility-scale, single-axis tracking solar facilities. Only two sensitivities under Scenario 1, and under Case 1C, were over 90 percent. Relative to other types of generation, solar PV facilities have a high land requirement in relation to their generating capacity. Smaller land areas would be occupied by new natural gas-fired and battery storage facilities.

Fuel Consumption. All strategies lead to the eventual omission of coal as a fuel source, based on expected end of life for existing coal units. Fuel consumption changes little across strategies, though shows marked differences between scenarios, which may reflect changes in policy and investments. Slight differences between strategies can be seen for natural gas consumption, with Strategy A, Baseline Utility Planning, and Scenario 1 using the most natural gas resources. Among scenarios, decreases in natural gas and coal consumption are seen earlier and at a faster rate due to policy changes in Scenario 3.

Solid and Hazardous Waste. All alternative strategies would result in long-term reductions in the production of CCR, based on expected end of life for existing coal units. CCR production is eventually reduced to zero once the final coal unit reaches expected end of life. The quantity of CCR produced during the 2026-2050 planning period shows little variation between alternative strategies. It varies much more between the scenarios associated with each strategy and is greatest with Scenario 2 and lowest with Scenario 3. Full retirement or end of life for coal, CC, and CT plants (Section 3.2.3) would primarily result in a decrease in solid and hazardous waste produced. Concerning nuclear waste, while total nuclear consumption varies under all alternative strategies, TVA anticipates continuing to store spent fuel on the nuclear plant sites in spent fuel pools and dry casks until a centralized facility for long-term disposal and/or reprocessing is operating.

All strategies would lead to the eventual retirement of certain coal, gas or renewable energy facilities. Given that TVA would manage the removal and disposal of solid and hazardous wastes in accordance with local, state, and federal regulations, and recycle these wastes to the maximum extent possible, decommission of the end of life generation facilities would improve the overall quality of surrounding environmental resources.

Socioeconomics. Socioeconomic impacts, as quantified by the change to per capita income of TVA PSA residents that is attributable to the cost of operating of the TVA power system, are minimal across all strategies. The differences among the strategies in annual per capita income and employment of residents of the TVA PSA are small.

5.5.1 Air Quality

All alternative strategies, including sensitivities and the Preferred Alternative, would result in significant long-term reductions in total emissions and emission rates of SO₂, NO_x, and mercury (Table 5-14, Figure 5-2, Figure 5-3, Figure 5-4; Appendix C). A large portion of these reductions, especially for SO₂ and mercury, result from expected end of life for existing coal units, subject to further evaluation, environmental review, and TVA Board approval. These facilities reaching end of life account for the trends in emissions through 2040 portrayed in Figure 5-2, Figure 5-3, and Figure 5-4. After 2040, emissions of SO₂ and mercury generally cease with the expected end of life for coal facilities, with the exception of small amounts of SO₂ associated with sulfur-containing odorants added to natural gas for detecting leaks. Emission trends diverge after 2040 due to increased differences between the strategies. The effects on air quality from the partial and entire end-of-life at CT, CC, and coal facilities are included in the following discussion.

Variations in emissions of SO₂ and mercury between 2031 and 2039 are due to fewer regularly scheduled coal plant outages during this period. The variation is followed by the absence of emissions for 2040 in SO₂ and mercury, resulting from expected end of life for existing coal units. NO_x emissions also decrease in 2040 due to expected end of life. There is some variation in emissions among the associated strategies; however, this variation is much smaller than the differences between the scenarios (Figure 5-5, Figure 5-6, Figure 5-7). Emissions are greatest under Scenario 2, except for NO_x where Scenario 1 is greatest, and lowest under Scenario 3.

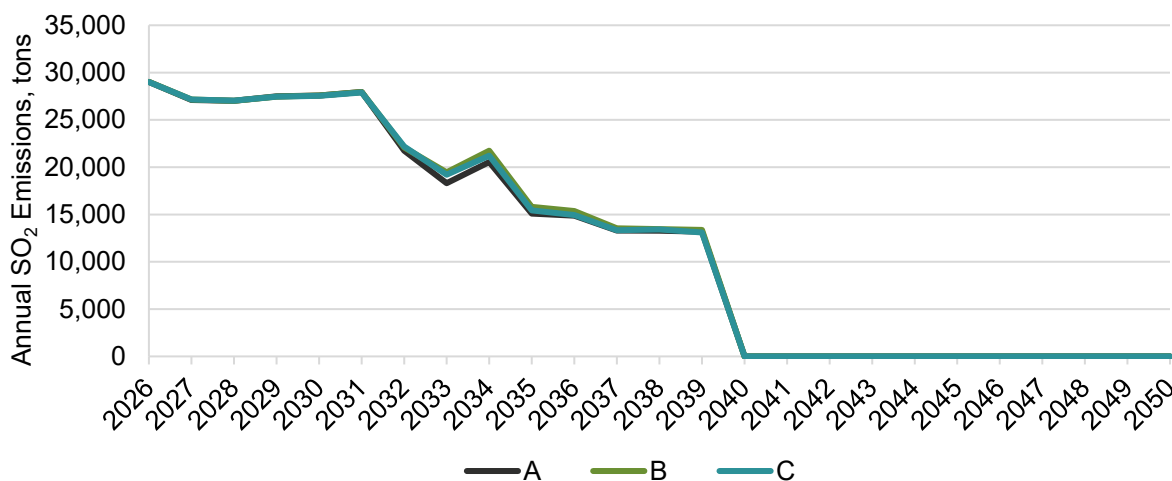
Table 5-14: Average Total, Annual, and Percent Reduction of Emissions of SO₂, NO_x, and Mercury by Alternative Strategy

	Alternative Strategy				
	A – Baseline	B	C	Scenario 1 Range ¹	Extended Range ²
SO₂					
Total emissions 2026-2050, tons	296,464	300,986	298,915	330,710 - 334,479	113,456 - 373,949

	Alternative Strategy				
Average Annual emissions (2026-2039 ³), tons	21,176	21,499	21,351	23,622 - 23,891	8,104 - 26,711
Percent reduction 2026-2050	>99.0 ³	>99.0 ³	>99.0 ³	>99.0 ³	>99.0 ³
NOx					
Total emissions 2026-2050, tons	248,958	243,329	240,541	277,078 - 289,891	175,357 - 332,119
Average Annual emissions, tons	9,958	9,733	9,622	11,083 - 11,596	7,014 - 13,285
Percent reduction 2026-2050	71.8	75.3	75.3	53.6 - 61.7	14.7 - 87.7
Mercury					
Total emissions 2026-2050, pounds	1,311	1,338	1,319	1,418 - 1,475	200 - 1,864
Average Annual emissions (2026-2039 ³), pounds	93.7	95.5	94.2	101.3 - 105.3	14.3 - 133.2
Percent reduction 2026-2050	100.0	100.0	100.0	100.0	100.0

Notes:

1. Scenario 1 Range is the minimum and maximum values for all alternative strategies.
2. Extended Range is the minimum and maximum values of all the scenarios across all alternatives and sensitivities, including the Preferred Alternative.
3. Average annual emissions for SO₂ and Mercury only calculated for the years prior to expected end of life for the coal units; trace amounts of SO₂ emissions (USEPA default emission rate of 0.0006 lb/mmBtu [40 CFR Part 75, Appendix D]) associated with sulfur-containing odorants added to pipeline-delivered natural gas not included



*Trace amounts of SO₂ emissions (USEPA default emission rate of 0.0006 lb/mmBtu [40 CFR Part 75, Appendix D]) associated with sulfur-containing odorants added to pipeline-delivered natural gas not included.

Figure 5-2: Trends in Emissions of SO₂ by Alternative Strategy Based on Averages of the Three Scenarios

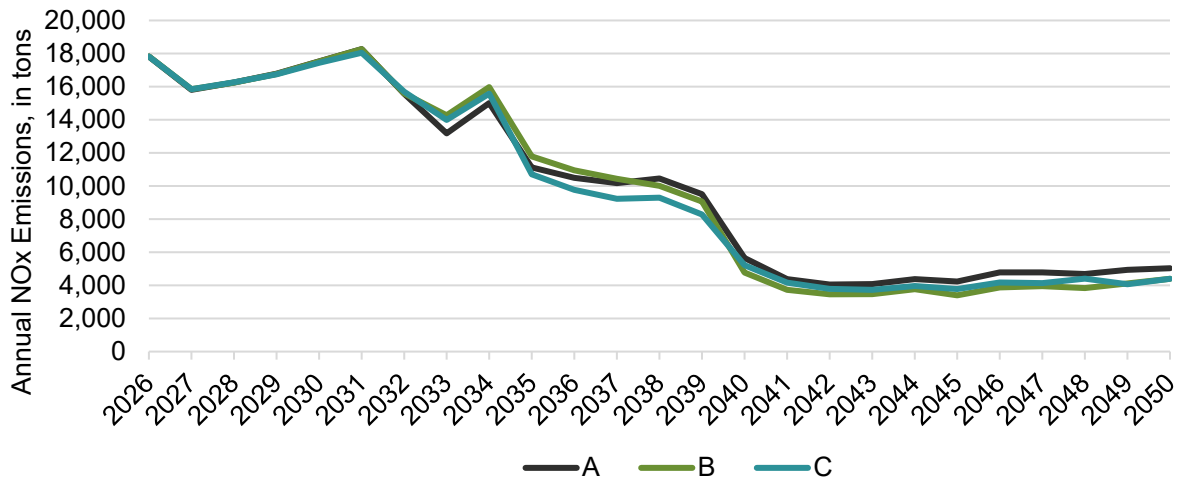


Figure 5-3: Trends in Emissions of NOx by Alternative Strategy Based on Averages of the Three Scenarios

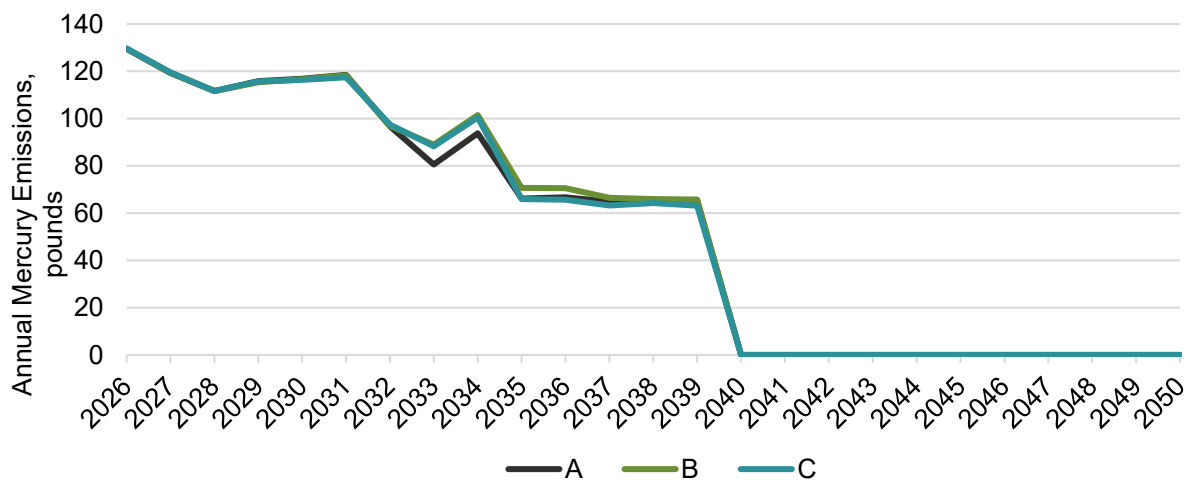
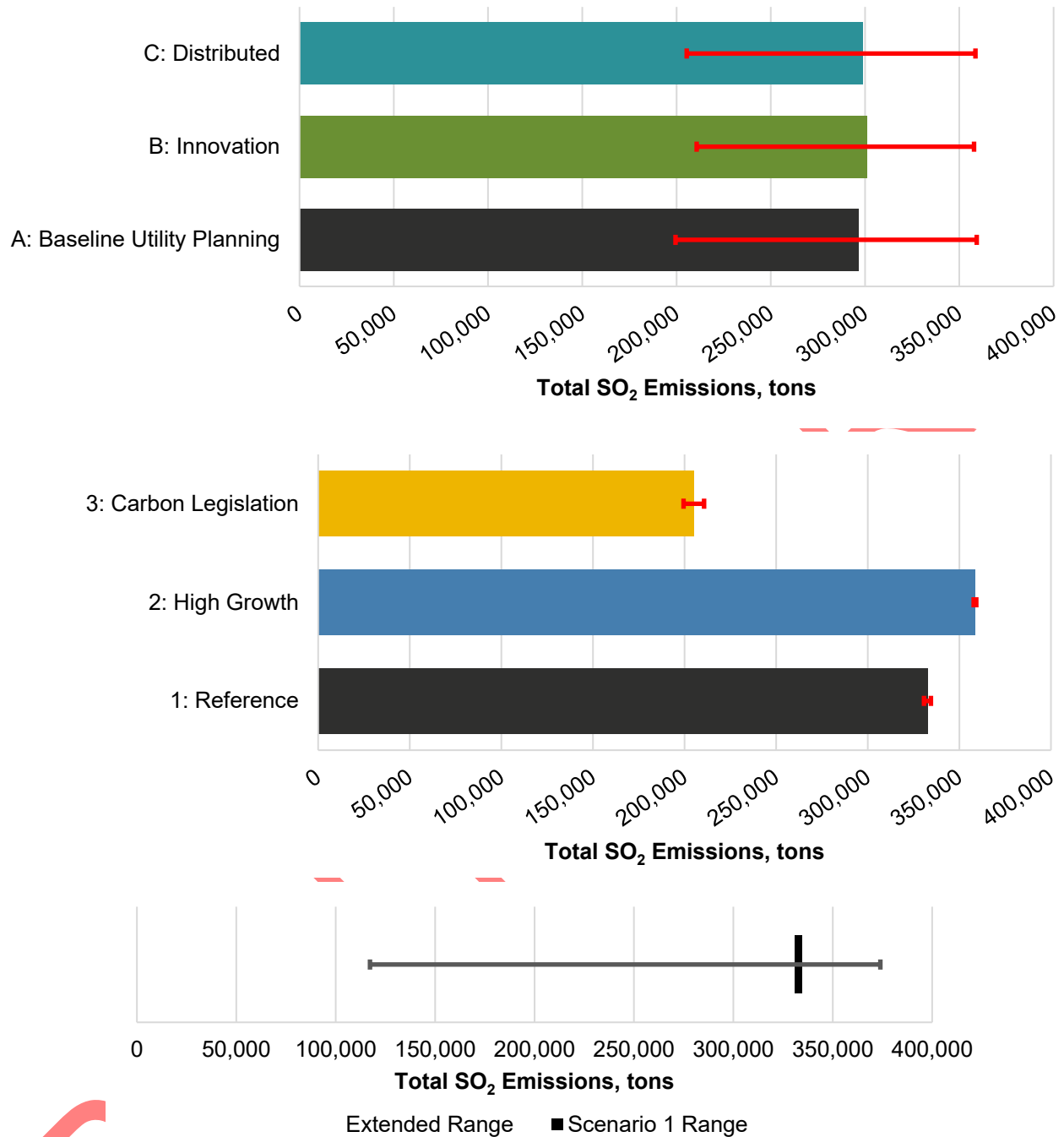
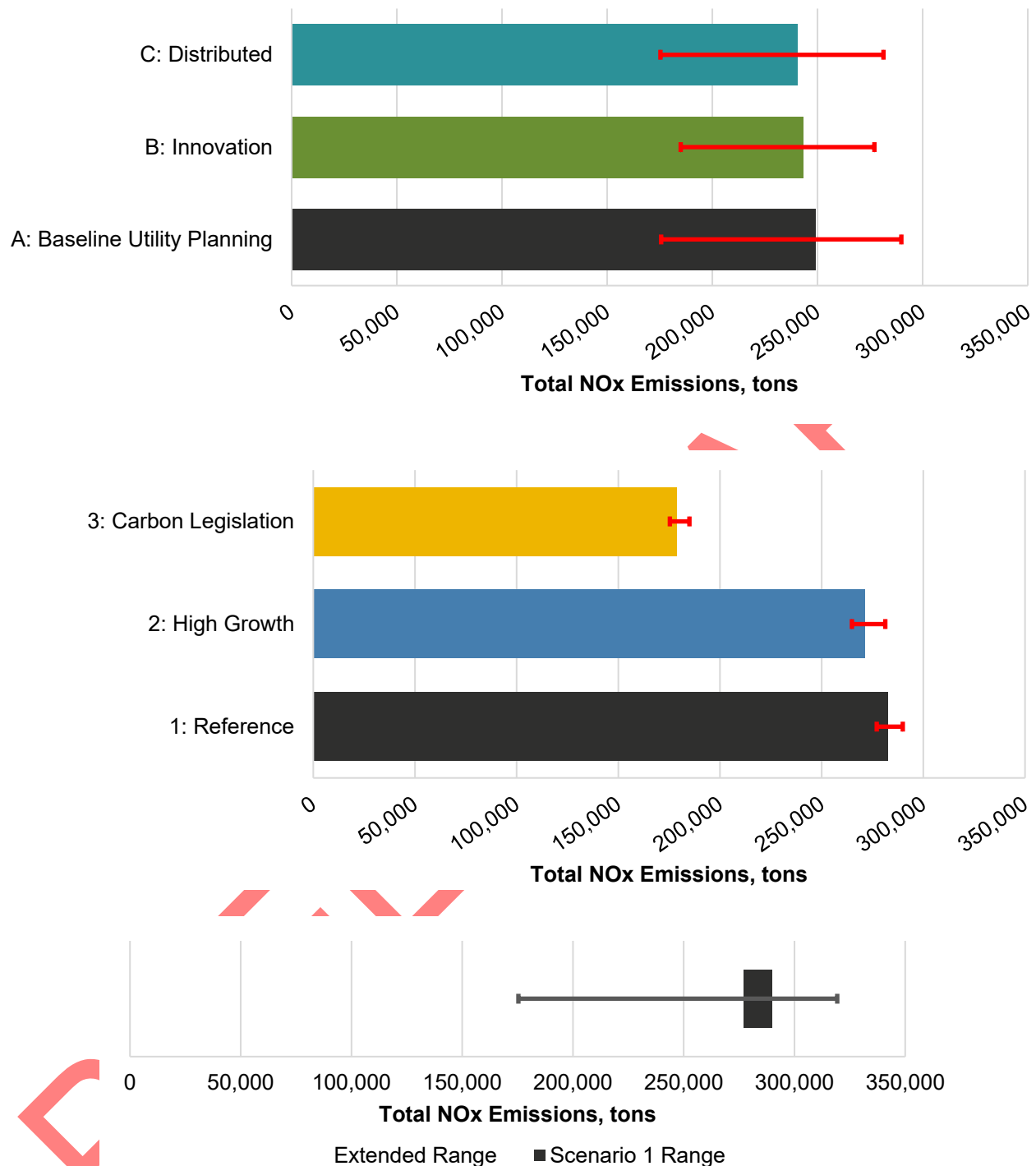


Figure 5-4: Trends in Emissions of Mercury by Alternative Strategy Based on Averages of the Three Scenarios



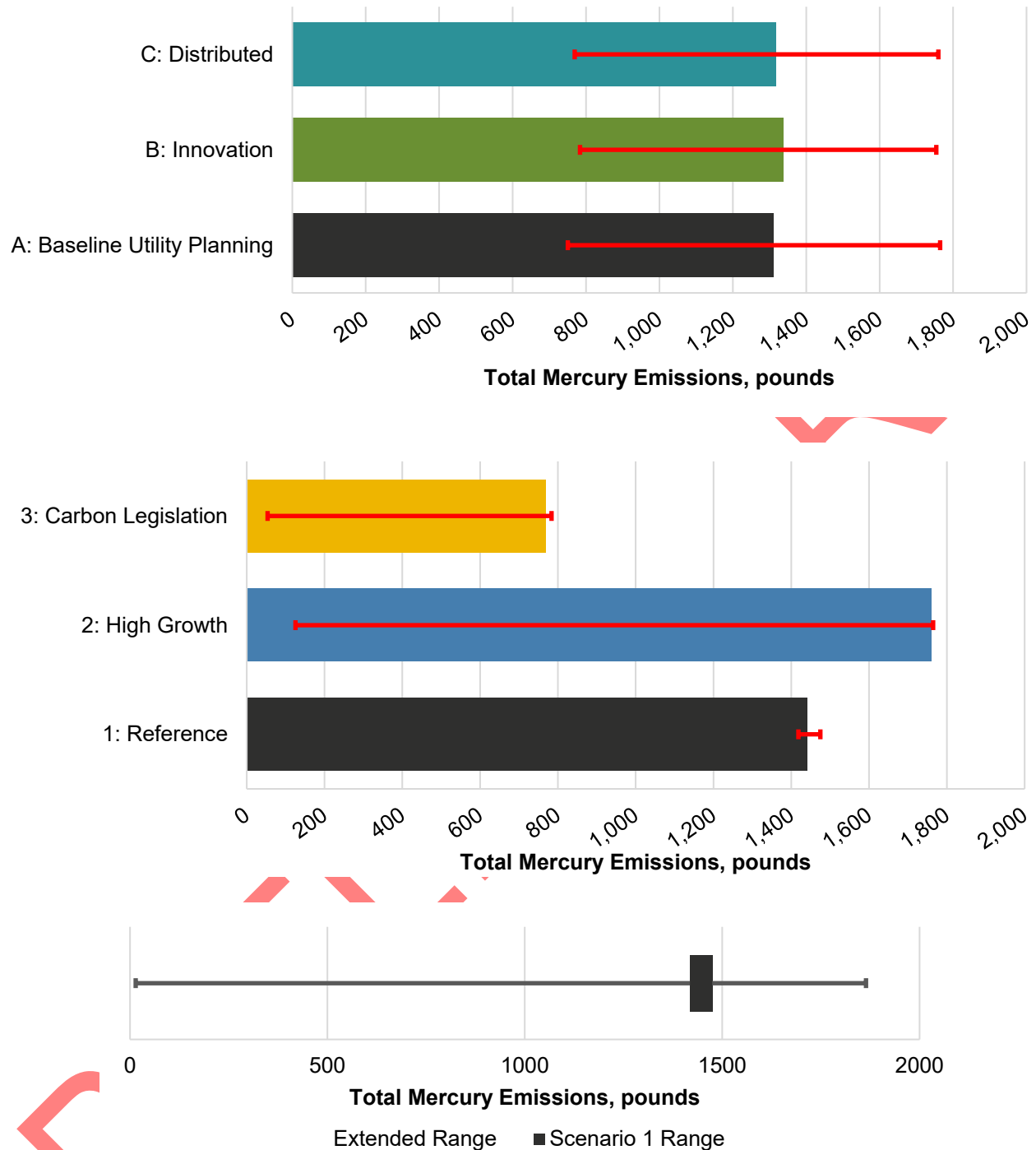
Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, and the strategies associated with each scenario.

Figure 5-5: Total 2026-2050 Emissions of SO₂ by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)



Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, and for the strategies associated with each scenario.

Figure 5-6: Total 2026-2050 Emissions of NOx by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)



Note: The error bars on the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, and the strategies associated with each scenario.

Figure 5-7: Total 2026-2050 Emissions of Mercury by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)

The overall reductions in emissions under each strategy show relatively little variation (Table 5-14). Emissions reductions for SO₂ and mercury were greatest under Strategy C,

Distributed, followed by Strategy A, Baseline Utility Planning. NO_x reductions, are also greatest for under Strategy C, followed closely by Strategy B, Innovation, due to the resources emphasized in these strategies.

The reductions in SO₂, NO_x and mercury emissions would continue recent trends in emissions of these air pollutants under all alternative strategies. Although there is larger variation under different scenarios for mercury emissions reductions still occur. Reductions would result in further small decreases in regional ambient concentrations of SO₂ and SO₄ (a component of acid deposition), regional haze, and fine particulates. TVA emissions of NO_x would also decrease by about 99 percent, since their 1995 peak, under all strategies. Although this continued decrease would likely result in reductions in regional NO_x and ozone concentrations, the air quality effect may be small as TVA emissions make up an increasingly small proportion of regional NO_x emissions.

5.5.2 Climate and Greenhouse Gases

5.5.2.1 Direct Combustion GHG Emissions

Total and annual direct combustion emissions of GHG in terms of CO₂, as well as CO₂ emission rates – also referred to as CO₂ intensity – decrease under all alternative strategies, including the Preferred Alternative, (Table 5-15, Figure 5-8, Figure 5-9, Appendix C) in the future. The variation among the strategies for both CO₂ emissions and emissions rates are relatively small and much less than the variation among the scenarios associated with each strategy (Figure 5-10 and Figure 5-11).

Strategy A, Baseline Utility Planning (the No Action Alternative), has the highest CO₂ emissions and CO₂ emissions rate and the least reductions. Strategy B, Innovation, has the lowest CO₂ emissions and emissions rates, although Strategy C is very similar. Within each strategy, Scenario 1 has the highest CO₂ emissions and emissions rates, followed by Scenario 2. Scenario 3 has the lowest emissions and emissions rates. The overall trends for both CO₂ emissions and emissions rates are very similar, with the percent reductions somewhat greater for emissions rates. Long-term decreases are primarily due to expected end of life for existing coal units as well as increased generation from lower-carbon or carbon-free resources. As compared to the baseline condition, Strategies B and C would result in similar reductions of GHG emissions as shown in Table 5-15.

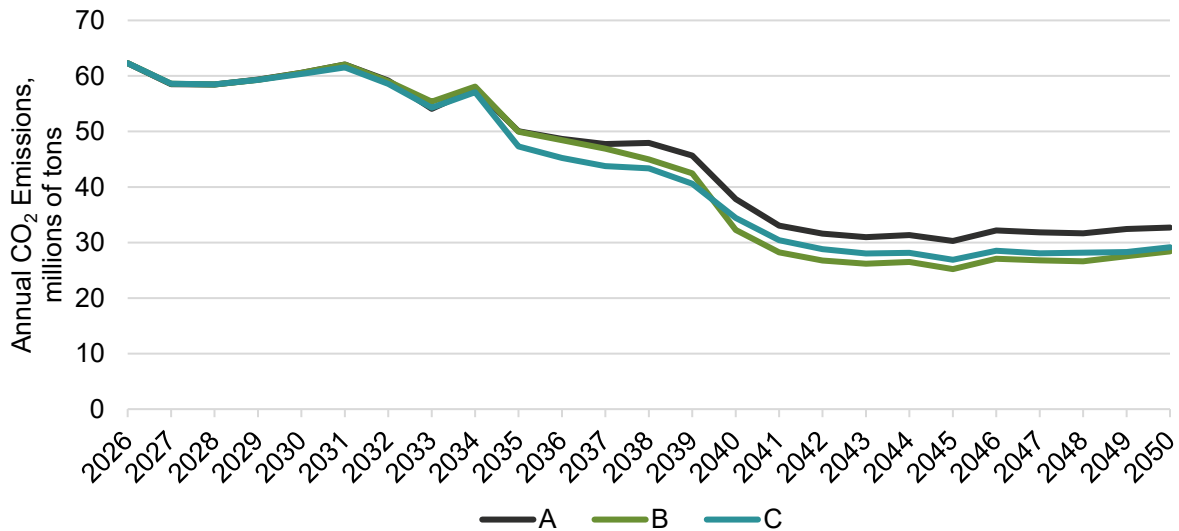
Table 5-15: Average 2026-2050 CO₂ Emissions and Emissions Rates, and Percent Changes by Alternative Strategy

	Alternative Strategy				
	A – Baseline	B	C	Scenario 1 Range ¹	Extended Range ²
Total CO ₂ emissions 2026-2050, million tons	1,128	1,068	1,070	1,167 - 1,298	837 - 1,298
Average Annual CO ₂ emissions, thousand tons, 2026-2050	45,125	42,722	42,785	46,663 - 51,916	33,464 - 51,916
Percent CO ₂ emissions reduction, 2026-2050	47.5	54.4	53.2	20.3 - 37.3	+6.8 - 70.9
Average Annual CO ₂ emissions rate, lbs/MWh, 2026-2050	463	440	443	489 - 542	370 - 563
Percent CO ₂ emissions rate reduction, 2026-2050	57.3	62.9	61.4	33.8 - 48.0	11.5 - 73.2
Percent Total CO ₂ emissions reduction compared to Baseline, 2026-2050	--	5.3	5.2	--	--

Notes:

1. Scenario 1 Range is the minimum and maximum values for all alternatives.

2. Extended Range is the minimum and maximum values of all the scenarios across all strategies, and sensitivities, including the Preferred Alternative.

**Figure 5-8: 2026-2050 Trends in Emissions of CO₂ by Alternative Strategy Based on Averages of the Three Scenarios**

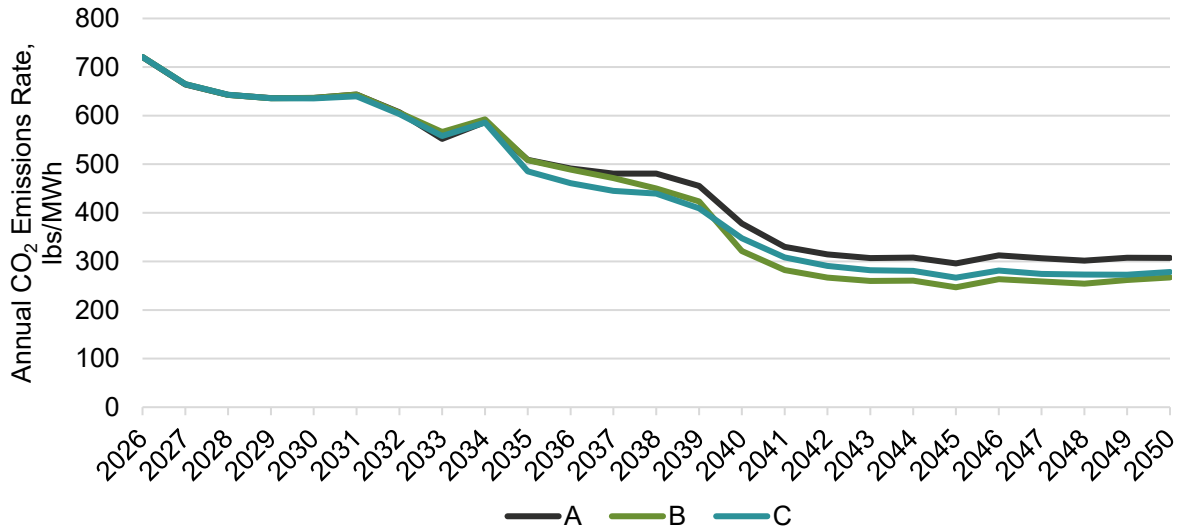
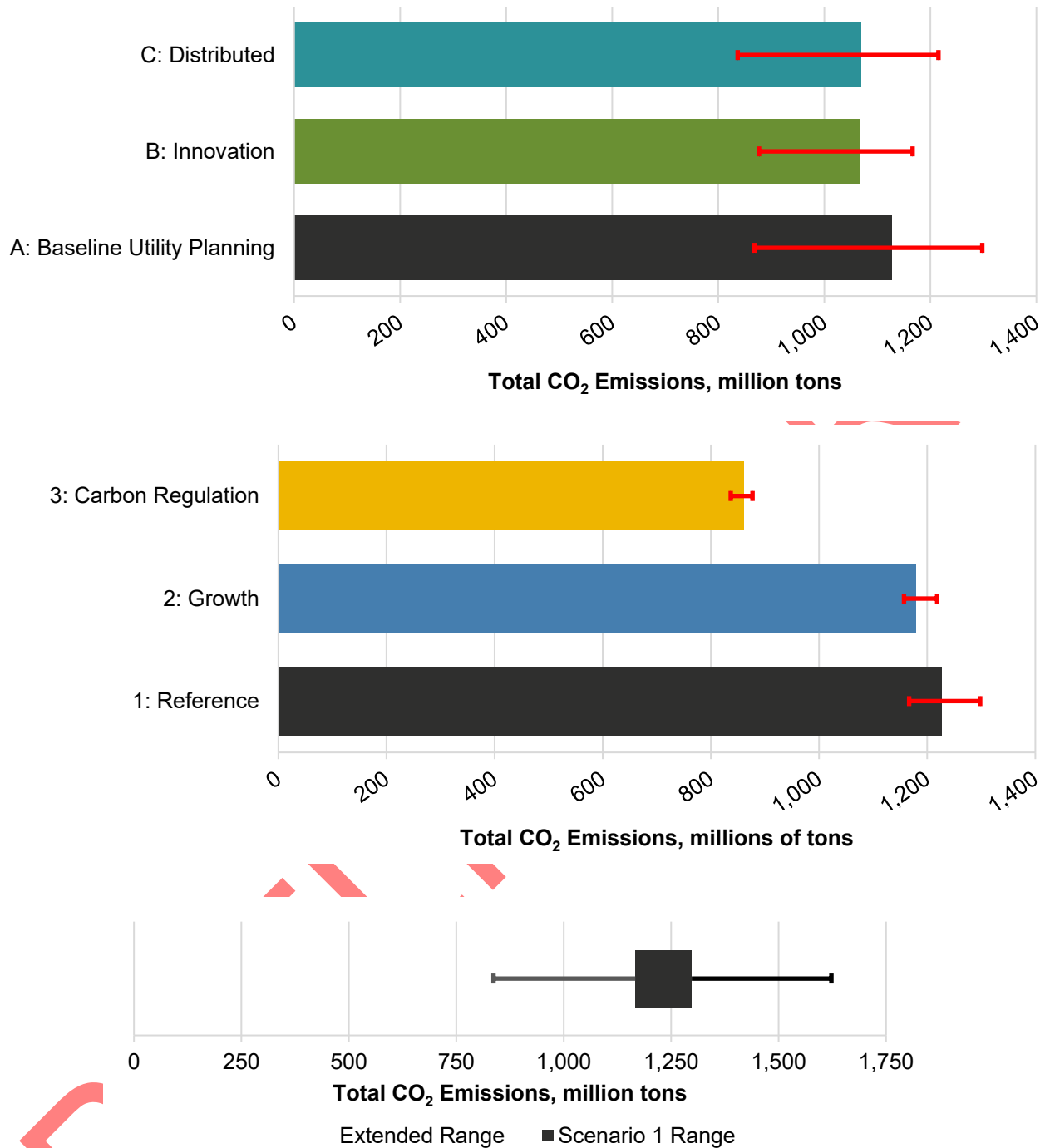


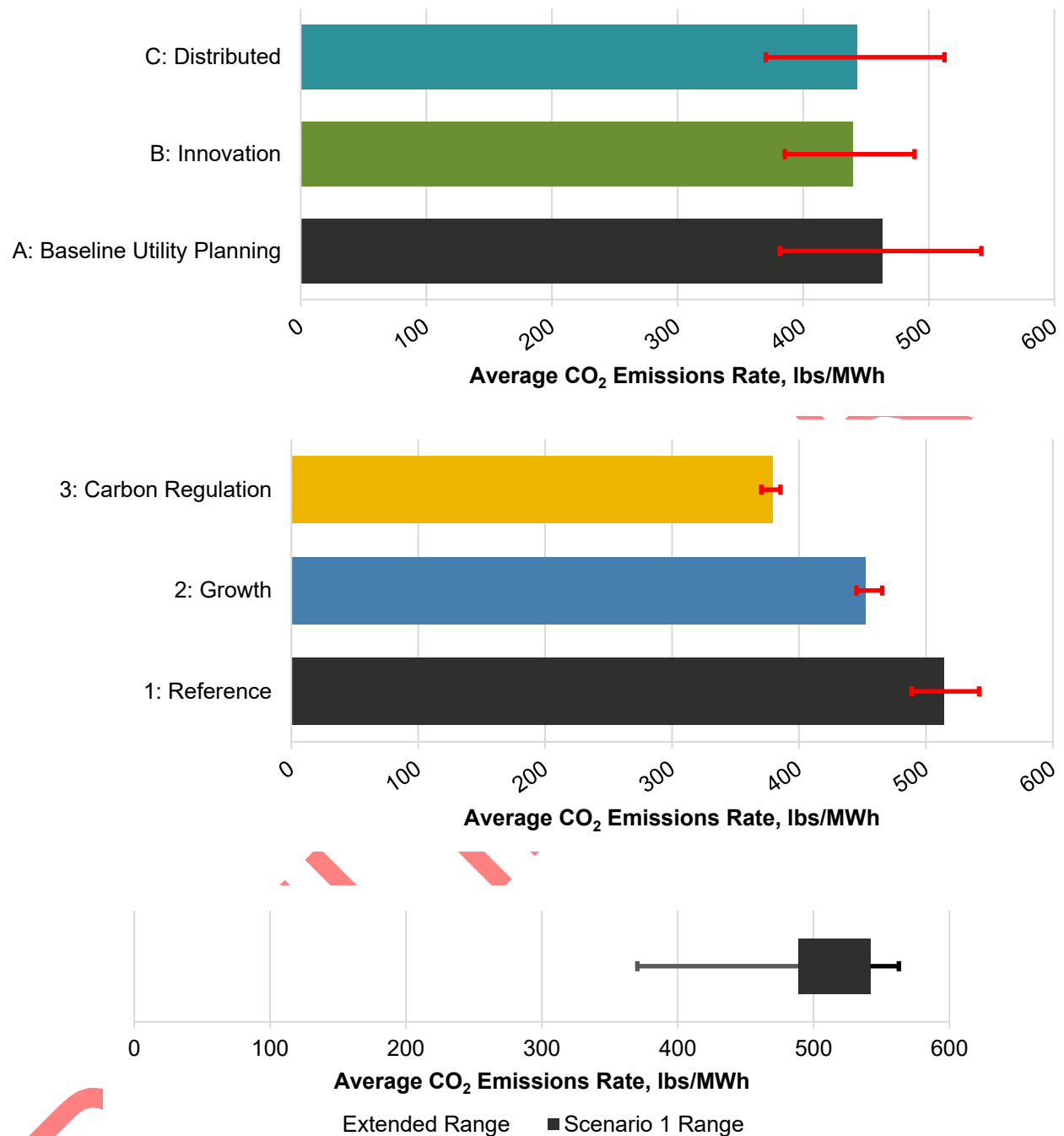
Figure 5-9: 2026-2050 Trends in CO₂ Emissions Rate by Alternative Strategy Based on Averages of the Three Scenarios

PRELIMINARY



Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, or strategies associated with each scenario. The error bar in the bottom chart indicates extended range.

Figure 5-10: 2026-2050 Total Emissions of CO₂ by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)



Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, or strategies associated with each scenario. The error bar in the bottom chart indicates extended range.

Figure 5-11: Average 2026-2050 CO₂ Emissions Rates by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)

5.5.2.2 Direct GHG Emissions Reduction and GHG Emissions Impact on Climate Change

Scope 1 GHG emissions are direct emissions from applicable sources owned, operated or controlled by TVA, including those emissions produced by energy generating facilities during operation (e.g., emissions associated with the generation of energy via fuel combustion in boilers, furnaces, etc. at natural gas, coal, and other facilities) and vehicles. Scope 2 GHG emissions are indirect emissions from the generation of power used by TVA, such as end use of electricity, steam, heating, and cooling from TVA buildings. Scope 3 GHG emissions are from sources not owned or controlled by TVA but related to TVA activities and include, among other things, business travel, employee commuting and contracted waste disposal (TVA 2020e). At the end of FY 2022, Scope 1 and 2 GHG emissions had been reduced by 64.1 percent, since 2008. Scope 3 emissions were reduced by 43.8 percent by the end of 2022 (TVA 2022f).

All alternative strategies, including the Preferred Alternative, would result in the continued, significant, long-term reductions in CO₂ emissions. By the end of 2050, averaged across scenarios, CO₂ emissions would be reduced by approximately 47.5 percent (Strategy A) to 54.4 percent (Strategy B), compared to 2026. However, under some sensitivities cases CO₂ emissions could be reduced by more than 70 percent or conversely increase by almost 7 percent.

The climate change impacts of GHG emissions, including CO₂ emissions, have been recently described in the Fifth NCA (USGCRP 2023). Chapter 22 of the assessment focuses on the Southeast, where there are predicted increases in climate stressors including extreme heat and precipitation events, and droughts. The Southeast frequently faces costly disasters related to weather and climate threats such as flooding, tropical storms, and hurricanes, which impact its infrastructure and agriculture. Health inequities are further exacerbated due to climate-related risks. Other issues include threats to the region's terrestrial and aquatic life, as land cover changes and urban development threaten unprotected biodiversity hotspots. Climate adaptation efforts also tend to be concentrated in wealthier communities, leaving under-resourced and more rural populations at a greater risk (USGCRP 2023). Other climate assessments, including the recent Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C (IPCC 2018), describe impacts worldwide.

While a reduction in CO₂ emissions reduce the potential for associated climate change, the full effects on climate in the TVA region and elsewhere would be difficult to quantify in the short term but may be seen over time.

5.5.2.3 Life Cycle GHG Emissions

In addition to the forecasted direct combustion CO₂ emissions discussed previously, TVA also developed life cycle GHG emissions forecasts to include upstream, ongoing non-combustion, and downstream GHG emissions for each studied alternative and sensitivity

cases. Beyond direct combustion emissions, all power generating resources include additional life cycle GHG emissions associated with their construction, ongoing operations, and their decommissioning at the end of their useful life. The 2026 IRP EIS incorporates a GHG life cycle analysis (GHG LCA) in its evaluation to help quantify a full accounting of cradle-to-grave GHG emissions. For its GHG LCA, TVA partnered with the NLR, which provided technical assistance, verified and generated harmonized LCA emission factors for each resource technology, and validated TVA's results by running select TVA cases through its own GHG LCA model. NLR's 2021 Los Angeles 100 percent Renewable Energy Study (LA100) included a GHG LCA evaluation, and TVA used this evaluation as a guide in the development of its own GHG LCA model and approach. NLR provided TVA with a technical report which includes documentation of NLR's scope of work as well as documentation of emission factors for each resource type. This report was produced when the laboratory NREL. The laboratory is now the NLR. A copy of this report is available as a supporting document on TVA's 2026 IRP website (www.tva.com/irp).

5.5.2.3.1 Overview of the Greenhouse Gas Life Cycle Analysis

A GHG LCA incorporates emissions from four distinct life cycle phases: upstream, ongoing non-combustion, ongoing combustion, and downstream, as shown in Figure 5-12. Upstream emissions are primarily associated with activities required for construction and commissioning of a new power generating asset, including raw material extraction, supply chain, manufacturing, and assembly. Ongoing non-combustion emissions are the annual emissions associated with keeping a plant operational, including plant maintenance and related emissions within the supply chain and fuel cycle. In the case of natural gas-fired plants, the fuel cycle ongoing non-combustion emissions include upstream methane leakage. Ongoing combustion emissions are the annual emissions associated with direct combustion through the burning of fossil fuels at a power plant. Therefore, only power plants that burn fossil fuels or other combustible materials include direct combustion emissions. Finally, downstream emissions are associated with activities required for decommissioning at the end of a plant's useful life, including dismantling, disposal, and returning the site to a brownfield state.

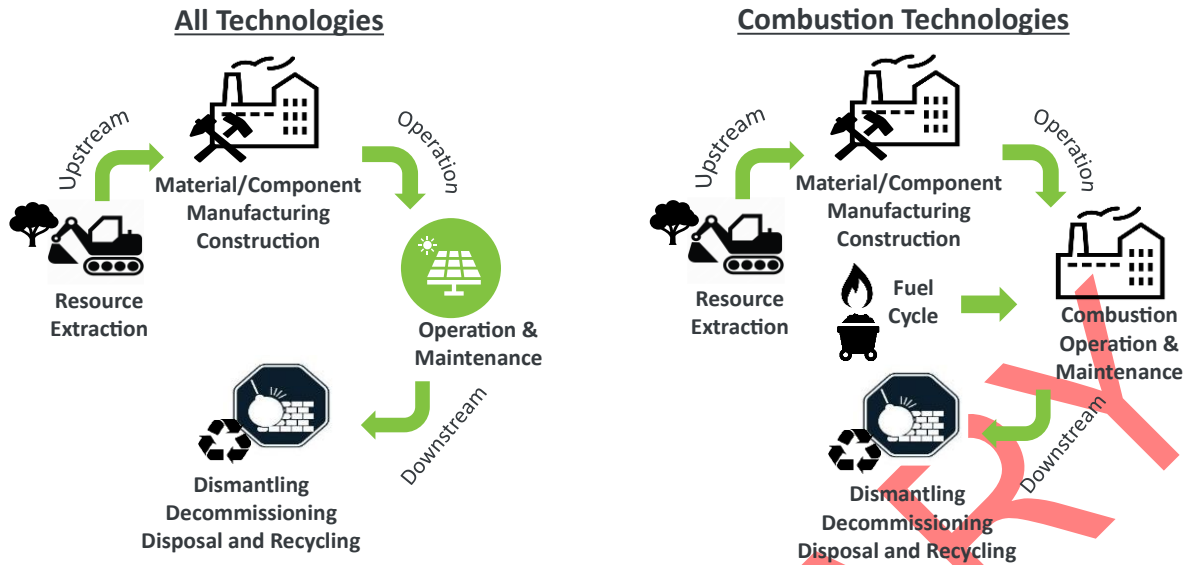


Figure 5-12: Overview of Life Cycle Phases for which Emissions are Incorporated into GHG LCA (source: NLR)

Emission factors are used to calculate the estimated emissions associated with upstream, ongoing non-combustion, and downstream activities. Emission factors represent the quantity of emissions (in grams) emitted on a unitized basis (either per installed kW or per kWh generated). Harmonized CO₂e emission factors were sourced from NLR for all resource technologies included in the 2026 IRP analysis. For upstream and downstream emissions, the emission factors are provided in terms of grams per installed capacity (g/kW). Ongoing combustion CO₂ emissions are calculated by the EnCompass model licensed through Yes Energy as a part of the development of portfolio energy plans in the IRP. For ongoing non-combustion emissions emission factors are provided in terms of grams per unit of generation (g/kWh). The value of emission factors for each electric power technology resource can be found in Table 5-16.

Table 5-16: CO₂e Emission Factors for all Life Cycle Phases, by Resource Type

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Coal, Supercritical	867,240	Emissions Calculated Separately ¹	10.00	67,100
Coal, Subcritical	708,246	Emissions Calculated Separately ¹	4.90	67,100
CC	100,000	Emissions Calculated Separately ¹	62.00	4,070
CC with CCS	1,400,000	Emissions Calculated Separately ¹	110	4,300
CT	64,790	Emissions Calculated Separately ¹	70.00	2,600

Electric Power Technology	One-Time Upstream GHG (CO ₂ e), g/kW	Ongoing Annual Combustion GHG (CO ₂ e), g/kW-hr	Ongoing Annual Non-Combustion GHG (CO ₂ e), g/kW-hr	One-Time Downstream GHG (CO ₂ e), g/kW
Diesel	1,021	Emissions Calculated Separately ¹	97.17	18
Hydro	1,100	NA	1.90	-
Nuclear	483,552	NA	12.00	175,000
Nuclear SMR	810,000	NA	12.00	190,000
Pumped Hydro	310	NA	1.80	7
Solar	1,630,000	NA	9.40	37,800
Wind	619,000	NA	0.74	14,000
Landfill Gas	64,790	NA	38.00	2,600
Biomass	1,960	NA	6.02	35
Battery	527,000	NA	-	98,900
Market Purchases	NA	Emissions Calculated Separately ¹	62.00	NA

NA – Not applicable

1 – Emissions are determined in the GHG LCA using individual plant heat rates and estimated carbon content of the fuel

Upstream emissions are assumed to occur in the year prior to the start of operations while downstream emissions are assumed to occur in the year following the final year of operations. Ongoing non-combustion emissions are calculated on an annual basis based on the amount of total generation each resource type produces in that year. Figure 5-13 shows an example of annual impacts for different resources.

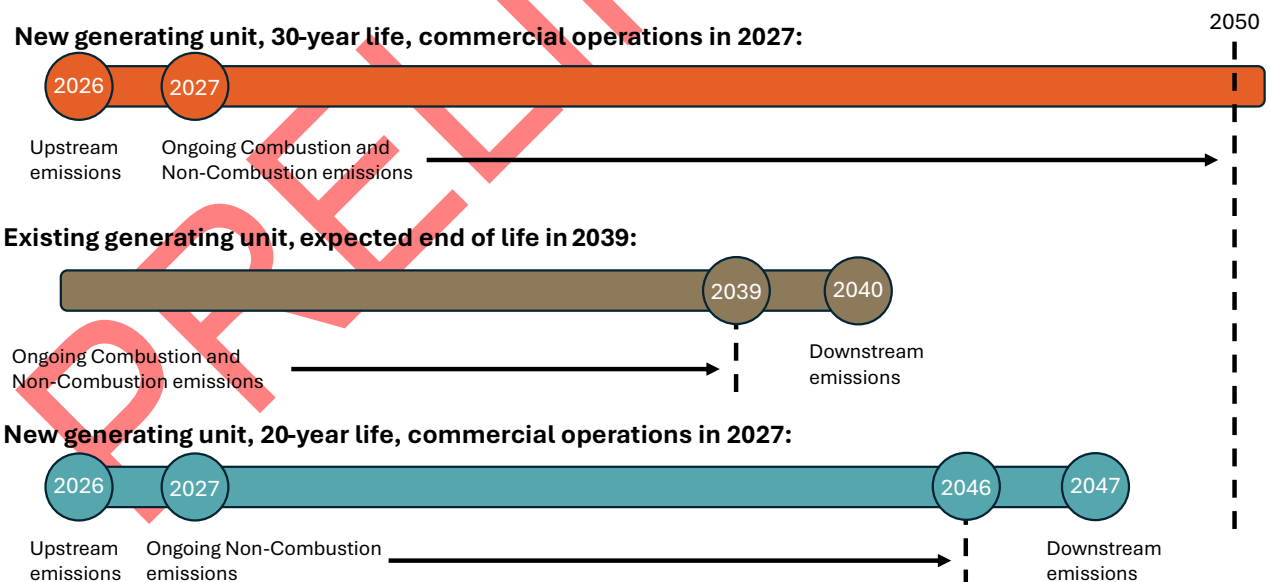


Figure 5-13: Life Cycle Phase Annual Impact Examples

5.5.2.3.2 2026 IRP Greenhouse Gas Life Cycle Analysis Approach

The results of the nine core portfolio and sensitivity cases from the 2026 IRP were pulled into TVA's GHG LCA model. These results included forecasted generation by unit, build and end-of-life schedules, and direct CO₂ emissions. The GHG LCA model utilized emission factors, provided by NLR, to calculate GHG emissions for each life cycle phase by year. GHGs included in the scope of the study included CO₂, CH₄, and N₂O. An overview of the process can be found in Figure 5-14.

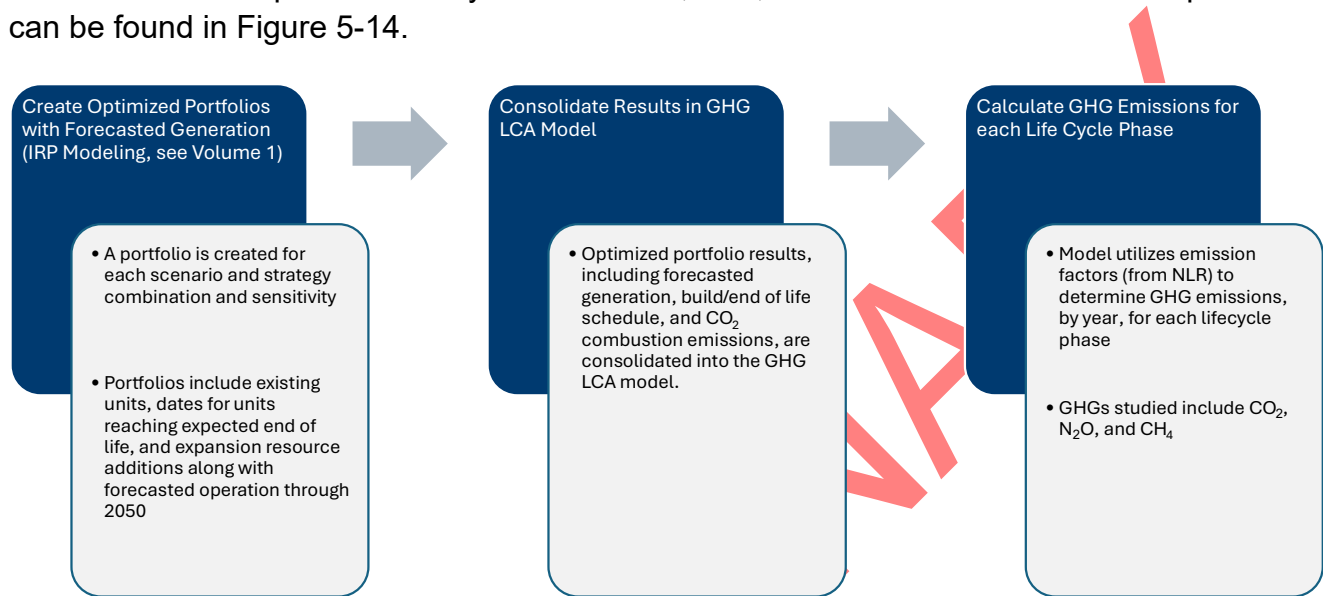


Figure 5-14: Overview of TVA's GHG LCA Approach

5.5.2.3.3 Key Assumptions

The scope of the 2026 IRP GHG LCA is calendar years 2026 through 2050. Emissions associated with activities occurring outside of this window are excluded from the study. Although many units will likely operate beyond 2050, there are too many unknown variables to account for their impacts beyond the study window of the IRP. Some of these unknown variables include changes in system load, unit generation, and other replacement assets elsewhere in the system beyond 2050.

A small number of resources included in the 2026 IRP study represent shorter-term PPAs where the asset was not built exclusively for TVA's use. An example of this could be a natural gas CC facility located outside the TVA region under a 2-year firm capacity contract. Since this facility was not built for the sole purpose of providing TVA with power and the facility is not likely to be retired at the end of the 2-year PPA, it would be incorrect for the GHG LCA to calculate and assign upstream and downstream emissions against the TVA system. As such, TVA identified and excluded these contracts from the upstream and downstream emissions calculations. However, the ongoing combustion and non-combustion emissions were calculated and assigned to the TVA system for the duration of these contracts.

TVA worked with NLR to disaggregate the CO_{2e} emission factors, shown in a prior section, into the three primary GHGs of concern: CO₂, N₂O, and CH₄. Disaggregation percentages were provided by NLR. TVA used these percentages, along with the latest 100-year global warming potential values for N₂O (273) and CH₄ (27.9) from the IPCC Sixth Assessment Report, to generate the following emission factor tables for each GHG (Table 5-17, Table 5-18, Table 5-19). Additional information regarding the disaggregation process can be found in NLR's technical support documentation, which is available as a supporting document on TVA's 2026 IRP website (www.tva.com/irp).

Table 5-17: CO₂ Emission Factors for all Life Cycle Phases, by Resource Type

Electric Power Technology	One-Time Upstream CO ₂ , g/kW	Ongoing Annual Combustion CO ₂ , g/kW-hr	Ongoing Annual Non-Combustion CO ₂ , g/kW-hr	One-Time Downstream CO ₂ , g/kW
Coal, Supercritical	812,013	Emissions Calculated Separately ¹	5.10	65,134
Coal, Subcritical	653,782	Emissions Calculated Separately ¹	2.64	65,134
CC	94,051	Emissions Calculated Separately ¹	31.47	3,951
CC with CCS	1,356,197	Emissions Calculated Separately ¹	61.06	4,174
CT	60,038	Emissions Calculated Separately ¹	35.53	2,524
Diesel	60,038	Emissions Calculated Separately ¹	49.32	18
Hydro	1,045	NA	1.81	-
Nuclear	478,319	NA	11.04	167,065
Nuclear SMR	801,234	NA	11.04	181,385
Pumped Hydro	294	NA	1.70	7
Solar	1,455,198	NA	8.47	36,692
Wind	567,827	NA	0.71	13,590
Landfill Gas	59,787	NA	36.30	2,524
Biomass	1,796	NA	5.78	34
Battery	481,113	NA	0	96,002
Market Purchases	NA	Emissions Calculated Separately ¹	31.47	NA

NA – Not applicable

¹ Emissions are determined in the GHG LCA using individual plant heat rates and estimated carbon content of the fuel.

Table 5-18: CH₄ Emission Factors for all Life Cycle Phases, by Resource Type

Electric Power Technology	One-Time Upstream CH ₄ , g/kW	Ongoing Annual Combustion CH ₄ , g/kW-hr	Ongoing Annual Non-Combustion CH ₄ , g/kW-hr	One-Time Downstream CH ₄ , g/kW
Coal, Supercritical	1,794	Emissions Calculated Separately ¹	0.17	43
Coal, Subcritical	1,810	Emissions Calculated Separately ¹	0.08	43
CC	188	Emissions Calculated Separately ¹	1.08	3
CC with Carbon Capture	1,147	Emissions Calculated Separately ¹	1.174	3

Electric Power Technology	One-Time Upstream CH ₄ , g/kW	Ongoing Annual Combustion CH ₄ , g/kW-hr	Ongoing Annual Non-Combustion CH ₄ , g/kW-hr	One-Time Downstream CH ₄ , g/kW
CT	150	Emissions Calculated Separately ¹	1.22	2
Diesel	150	Emissions Calculated Separately ¹	1.70	0
Hydro	2	NA	0.00	-
Nuclear	60	NA	0.03	237
Nuclear SMR	101	NA	0.03	257
Pumped Hydro	1	NA	0.00	0
Solar	5,763	NA	0.02	24
Wind	1,635	NA	0.00	9
Landfill Gas	151	NA	0.05	2
Biomass	6	NA	0.01	0
Battery	1,423	NA	-	63
Market Purchases	NA	Emissions Calculated Separately ¹	1.08	NA

NA – Not applicable

¹ Emissions are determined in the GHG LCA using individual plant heat rates and estimated carbon content of the fuel.**Table 5-19: N₂O Emissions Factors for all Life Cycle Phases, by Resource Type**

Electric Power Technology	One-Time Upstream N ₂ O, g/kW	Ongoing Annual Combustion N ₂ O, g/kW-hr	Ongoing Annual Non-Combustion N ₂ O, g/kW-hr	One-Time Downstream N ₂ O, g/kW
Coal, Supercritical	19	Emissions Calculated Separately ¹	0.000622	3
Coal, Subcritical	15	Emissions Calculated Separately ¹	0.000287	3
CC	3	Emissions Calculated Separately ¹	0.001199	0
CC with CCS	43	Emissions Calculated Separately ¹	0.001348	0
CT	2	Emissions Calculated Separately ¹	0.001353	0
Diesel	2	Emissions Calculated Separately ¹	0.001878	0
Hydro	0	NA	0.000038	-
Nuclear	13	NA	0.000755	5
Nuclear SMR	22	NA	0.000755	5
Pumped Hydro	0	NA	0.000045	0
Solar	51	NA	0.001872	2
Wind	20	NA	0.000015	1
Landfill Gas	3	NA	0.000737	0
Biomass	0	NA	0.000177	0
Battery	23	NA	-	4
Market Purchases	NA	Emissions Calculated Separately ¹	0.001199	NA

NA – Not applicable

¹ Emissions are determined in the GHG LCA using individual plant heat rates and estimated carbon content of the fuel.

5.5.2.3.4 Greenhouse Gas Life Cycle Analysis Results

Annual total GHG emissions were calculated for all four life cycle phases and all three primary GHGs in each of the nine core portfolios and sensitivity cases. A summary overview of each strategy's average performance is shown in Table 5-20. The first three columns demonstrate average strategy performance across all three scenarios. The final two columns provide the upper and lower bounds of the three Scenario 1 portfolios and the upper and lower bounds across all core portfolios and sensitivity cases, including the Preferred Alternative.

Table 5-20: Average Cumulative Life Cycle GHG Emissions (2026-2050, millions of short tons)

	Strategy A (Scenarios 1-3)	Strategy B (Scenarios 1-3)	Strategy C (Scenarios 1-3)		Scenario 1 Range (Strategies A-C)	Extended Range ¹
CO₂						
Average Cumulative Emissions, 2026-2050	1,248.860	1,185.049	1,197.300	Min	1,271.279	953.97
				Max	1,410.719	1,807.14
CH₄						
Average Cumulative Emissions, 2026-2050	2.510	2.300	2.385	Min	2.420	1.914
				Max	2.887	3.882
N₂O						
Average Cumulative Emissions, 2026-2050	0.030	0.029	0.029	Min	0.030	0.024
				Max	0.033	0.044

1. Extended Range is the minimum and maximum values of all the core portfolios and sensitivity cases, including the Preferred Alternative.

Average cumulative life cycle GHG emissions are highest for Strategy A, Baseline Utility Planning. Average cumulative life cycle GHG emissions are lowest for Strategy B, Innovation, followed closely by Strategy C, Distributed. Overall, the results from the LCA are directionally similar to combustion-only, direct emissions discussed in Section 5.5.2.1 because direct, combustion CO₂ emissions make up the largest share of overall life cycle GHG emissions for the overall TVA system in most years, for most cases.

As shown in the Extended Range column of Table 5-20, the lowest cases are approximately 24 percent lower than Strategy A averaged across all scenarios, with the carbon tax in Scenario 3 driving the lowest cumulative life cycle GHG emissions. Of the nine core portfolios, case 1A, Reference with Baseline Utility Planning, has the highest average cumulative life cycle GHG emissions, due to growing electric loads and moderate natural gas prices driving up the use of natural gas-fired generation. Meanwhile, case 3C, Carbon Legislation with Distributed, has the lowest average cumulative GHG emissions of the nine core portfolios, driven by the scenario's carbon tax and emphasis on distributed gas,

renewable, demand-side, and distributed generation resources which tend to have lower GHG emissions. The Extended Range includes the nine core portfolios and all sensitivities, including the Preferred Alternative. Of the sensitivities studied, Supercharged Growth has the highest average cumulative life cycle GHG emissions. The Higher Natural Gas Prices sensitivity has the lowest average cumulative life cycle GHG emissions.

5.5.2.3.5 Primary Life Cycle Phase Emissions by Greenhouse Gas

Of the three primary GHGs, CO₂ represents the largest volume of overall emissions. For CO₂, the highest emissions occur during the Ongoing Combustion phase, primarily due to the burning of fossil fuels. Typically, the Ongoing Non-Combustion phase emissions the second largest volume of CO₂, followed by Upstream and then Downstream emissions (Figure 5-15).

CH₄ accounts for significantly less volume of overall emissions compared to CO₂, but more than N₂O. In contrast to the other two GHGs, the highest emissions for CH₄ occur during the Ongoing Non-Combustion phase. This is due primarily to methane leakage, which occurs as a part of the natural gas supply chain and fuel procurement cycle. After Ongoing Non-Combustion, the highest emissions for CH₄ are produced in this order: Upstream, Ongoing Combustion, and Downstream (Figure 5-16).

N₂O accounts for the least amount of GHG life cycle emissions by volume overall. Similar to CO₂, the highest emissions are produced during Ongoing Combustion, followed by Ongoing Non-Combustion, Downstream, and Upstream (Figure 5-17).

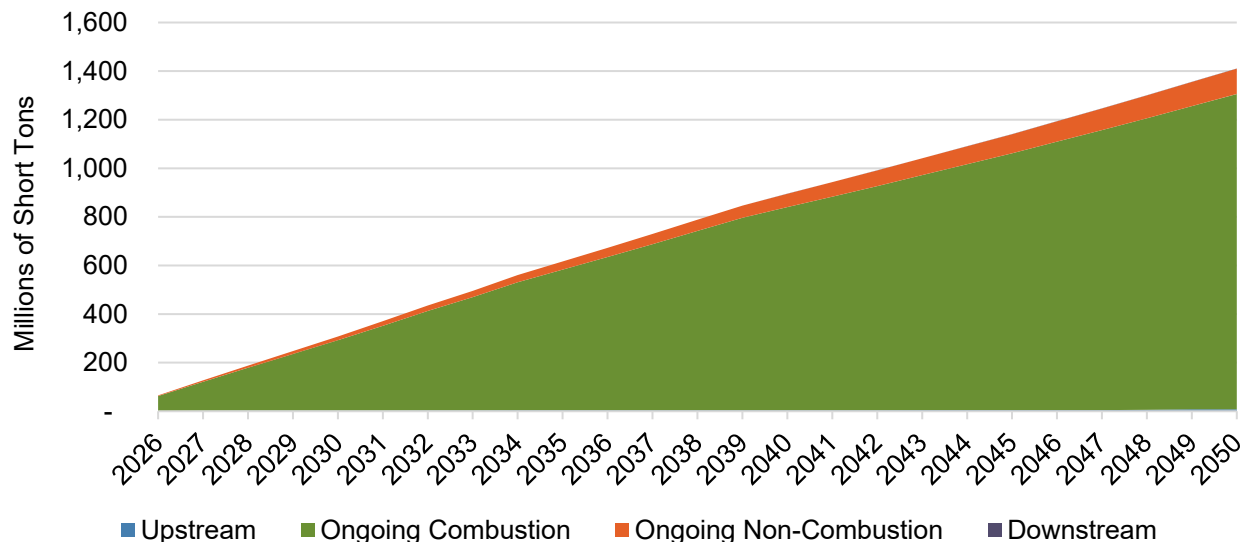


Figure 5-15: Cumulative CO₂ Emissions, Case 1A, 2026-2050

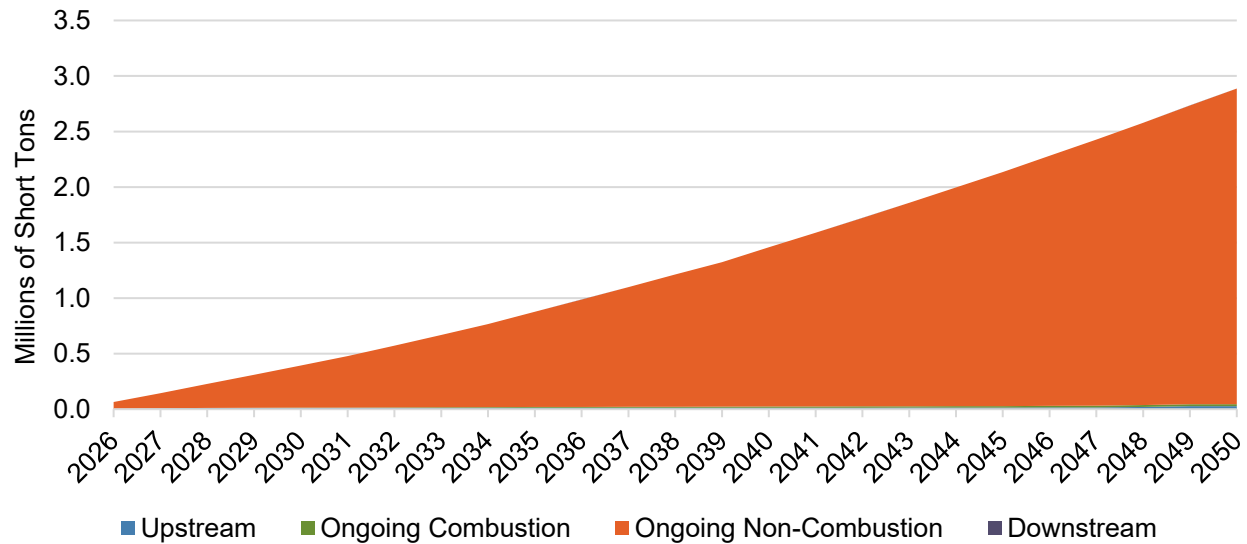


Figure 5-16: Cumulative CH₄ Emissions, Case 1A, 2026-2050

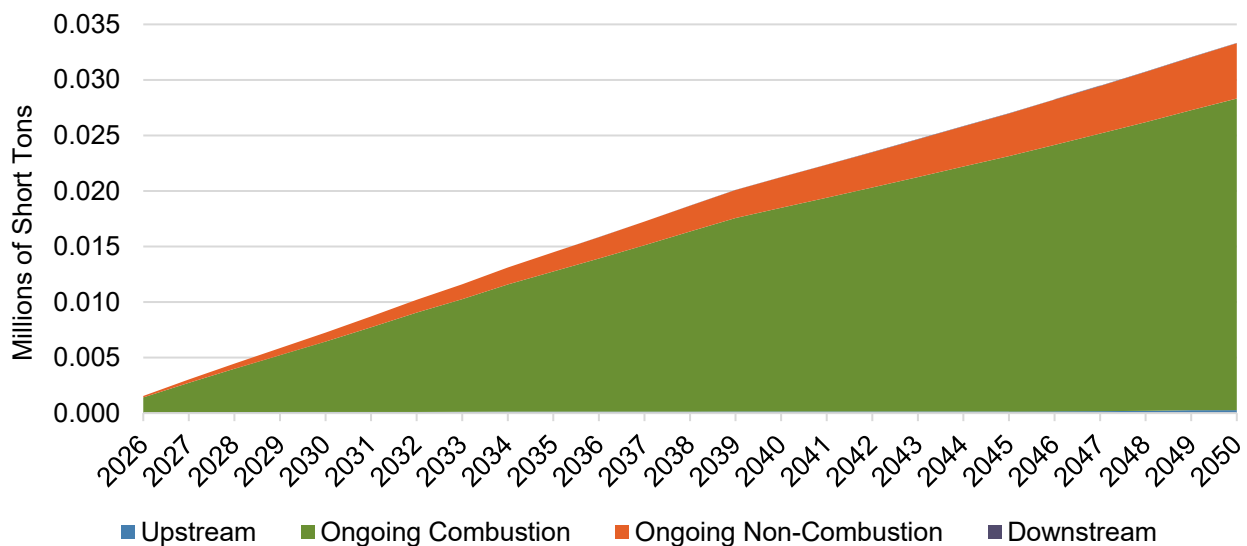


Figure 5-17: Cumulative N₂O Emissions, Case 1A, 2026-2050

5.5.2.4 Climate Change and Adaptation

TVA identified the following climate risks relevant to the TVA power system:

- Increased demand for cooling as the number of days over 95°F is expected to increase.
- Decreased efficiency of thermoelectric power plants due to higher temperatures.

- Increased instances of low DO levels, due to warmer waters.
- Drought and stresses on the water supply are expected to increase.
- Extreme weather can contribute to power outages and negatively impact energy infrastructure.
- Warmer air temperatures reduce transmission line capacity and may reduce the life expectancy of transformers.

Recent and projected trends in temperature and precipitation in the TVA region are described above in Section 4.3 and, for the larger Southeast, in the Fifth USGCRP (2023). Projected trends from climate change models include increases in average temperature, the number of days over 95°F, the number of nights over 75°F, and decreases in number of days below 32°F. Predicted trends in precipitation indicate that the Southeast has received more precipitation in the fall, but drier conditions in spring and summer, and is more drought prone due to increases in evapotranspiration (USGCRP 2023). The EPRI and TVA (2009) report described the effects of the forecast climate change based on the 2007 IPCC report in the TVA region. Potential effects due to climate change include more frequent and intense heat waves, increased damage from floods and major storm events, damage from thawing permafrost and sea ice, reduced freshwater availability during dry seasons, and harm to water resources, agriculture, wildlife, and ecosystems (TVA 2023d). The effects are likely to increase in magnitude by mid-century. Potential effects on water resources include increased water temperatures, increased stratification of reservoirs, reduced DO levels, and increased water demand for crop irrigation. Acidification of surface water through precipitation that deposits SO₄ and NO₃ aerosols can also cause adverse effects on aquatic life, especially in sensitive ecosystems (TVA 2023d). Potential effects on agriculture include increased plant evapotranspiration, altered pest and pathogen regimes, changes in the types of crops grown, and increased demand for electricity by confined livestock and poultry operations.

Potential effects on forest resources include increased tree growth, altered disturbance regimes, changes in forest community composition with declines in species currently at the southern limit of their ranges, and expansion of the oak-hickory and oak-pine forest types. Potential effects on fish and wildlife include range retractions and expansions, altered community composition, loss of cool to cold aquatic habitats and associated species such as brook trout, and increased threats to many endangered and threatened species.

The modeled higher air temperatures, the associated higher water temperatures, and the altered precipitation patterns that could result from climate change likely would affect the operation of TVA generating facilities. One likely effect is an increase in the demand for electricity. Warmer summer temperatures would result in more electricity used for air conditioning; this increase would likely be greater than the reduction in electricity used for space heating resulting from warmer winter temperatures. TVA's coal and nuclear plants predominantly use open-cycle cooling and discharge heated water to the river system (see Section 4.4.3). NPDES permits, required for the discharge of cooling water into rivers and

reservoirs, prescribe the maximum temperature of discharged water. Warmer gross river and reservoir temperatures would make meeting thermal discharge limits more difficult. For example, TVA had to reduce power generation at BFN in 2007, 2010, and 2011 because river temperatures were too high to receive discharge water from the plant without increasing ecological risk (GAO 2022). The NRC also sets safety limits at nuclear plants on the maximum temperature of intake water used in essential auxiliary and emergency cooling systems. When cooling water intake temperatures are high, power plants must reduce power production (derate) or use cooling towers (if available) to reduce the temperature of the discharged water and avoid non-compliance with thermal limits. If intake temperatures reach their limits, NRC requires the plants to shut down. Consequently, elevated water temperatures can reduce thermal generation by causing forced deratings, additional use of cooling towers (which reduces net generation), and/or nuclear plant shutdown.

Increased air and water temperatures also influence the operation of thermal power plants with cooling towers. TVA's CC plants and the Red Hills lignite-fueled plant use cooling towers as the primary cooling systems and its nuclear plants use cooling towers as auxiliary cooling systems. Increased condenser cooling water temperatures reduce the efficiency of power generation. Hotter, more humid air also reduces evaporation potential and the performance of cooling towers.

A 1993 TVA study (Miller et al. 1993) analyzed the relationships between extreme air and water temperatures and power plant operations based on historical meteorological and operational data. In the upper Tennessee River drainage, for each 1.0°F increase in air temperature from April through October, water temperatures increased by 0.25°F to almost 0.5°F, depending upon year and location in the TVA reservoir system. In general, air temperature effects cascade down the reservoir system. In the Tennessee River system, for both closed- and open-cycle plants in Tennessee (on or upstream of Chickamauga Reservoir) and in Alabama (on Wheeler Reservoir), this study found that the incremental impacts to operations from increased temperature were greatest during hot-dry years. Operation of most thermal power plants in the TVA power system was resilient to temperature increases during cold-wet and average meteorological years. The dominant meteorological variables affecting thermal plant performance were water temperature, and, for plants using cooling towers, humidity.

Changes in the operation of the Tennessee River system implemented in the Reservoir Operations Study (TVA 2004) provide TVA flexibility to adapt to some climate change impacts while minimizing the effects on thermal generation. The analyses in the Reservoir Operations Study were based on historical conditions and assume unusually high air temperatures and/or changes in precipitation last a relatively short time and are not long-term changes (Milly et al. 2008). TVA recently installed additional cooling capacity at BFN, and further adaptation, such as the installation of increased cooling capacity at other thermal

plants, may be necessary in the future given the forecast long-term increases in temperature.

While water resources are relatively abundant in the TVA PSA, climate stressors could change that abundance, either locally or regionally, leading to impacts and the need for adaptive measures by other sectors of the economy, as well as other aspects of the energy system (EPRI and TVA 2009). Increased precipitation during storms would increase flood risk, expand flood hazard areas, increase the variability of stream flows (i.e., higher high flows and lower low flows) and increase the velocity of water during high flow periods, thereby increasing erosion. On the other hand, intra-annual droughts, which are predicted to become more frequent and long-lasting in the Southeast, could reduce water availability for power plant operations that require water for cooling. During a drought from 2007 to 2008, coal prices doubled, forcing TVA to rely on additional natural gas to meet its needs, and even as the drought eased in 2008, hydroelectric generation was still only at 49 percent of normal operations (GAO 2022). These changes would have adverse effects on water quality and aquatic ecosystem health. Climate change also has the potential to affect outdoor recreation, including reservoir and stream-based recreation.

A 2014 Government Accountability Office report described a number of measures to help reduce climate-related risks and adapt the nation's energy systems to weather and climate-related impacts (GAO 2014). These measures generally fall into two categories — hardening and resiliency. Hardening involves making physical changes that improve the durability and stability of specific pieces of infrastructure; for example, elevating and sealing water-sensitive equipment, which makes it less susceptible to damage. In contrast, resiliency measures allow energy systems to continue operating after damage and allows them to recover more quickly; for example, installing back-up generators to restore electricity more quickly after severe weather events. TVA is continually evaluating the need for, and where necessary, implementing measures to increase the hardening and resiliency of its power system. According to a 2021 report, TVA has spent \$155 million since 2009 to protect certain nuclear assets from extreme flooding. After a flooding event in 2010, where it subsequently spent \$9 million to relocate a substation to higher ground, TVA then evaluated the vulnerability of all substations and switching stations (GAO 2022).

5.5.3 Water Resources

The coal-fired, nuclear, and natural gas-fired CC plants comprising a majority of TVA's energy supply require water to operate plant cooling systems and, particularly for coal plants, other plant processes. For each of these generating plants, the required quantity of water is directly proportional to the amount of power they generate (see Section 4.7). CT plants have very low water requirements, and wind and solar generating facilities require little to no water to operate. Potential impacts to water resources, except for discharges of cooling water, are generally greater from coal-fired generation than from other types of generation due to the various liquid waste streams from coal-fired plants and the potentially adverse water quality impacts from coal mining and processing. The impacts of water pollutants discharged from a

generating facility are highly dependent on site- and facility-specific design features, including measures to control or eliminate the discharge of water pollutants, which are not addressed here. Under all alternative strategies, TVA would continue to comply with the CWA by meeting state water quality standards and through compliance with NPDES permit requirements. A full list of average water resource requirements (withdrawals and consumption) for each of the nine core portfolios can be found in Appendix C.

Based on the model results, the volume of water withdrawn by thermal generating facilities, (i.e., nuclear, coal, and CC facilities) would decrease between 2026 and 2050 under all alternative strategies (Figure 5-18). As illustrated in Figure 5-18, the decrease value is similar for each strategy and ranges from 52.4 to 52.8 percent. All strategies result in a decrease of water withdrawal at roughly the same amounts. This is due primarily to expected end of life for existing coal units, making all strategies similar in their water withdrawal needs as these facilities come offline and future generation sources utilize less water withdrawal.

The annual average volume of water withdrawn varies by less than 1 percent among the strategies, whereas the annual average volume of water withdrawn varies around 9.6 percent among the scenarios associated with each strategy (Figure 5-19). The Sequoyah and Browns Ferry Nuclear Plants use the most cooling water, and the water use trends closely track the generation by these plants. Water use would generally decrease in the middle of the planning period then remain consistent due to expected end of life for existing coal units. In general, replacement generation has lower water use rates. Temporary spikes in water use for all strategies may occur due to projected timing of maintenance and refueling outages.

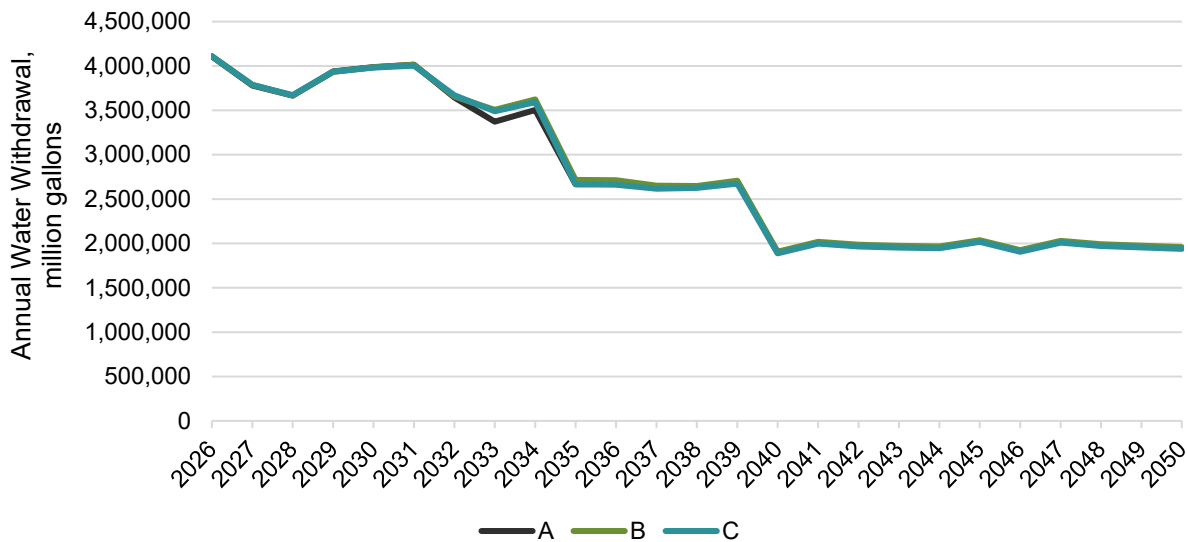
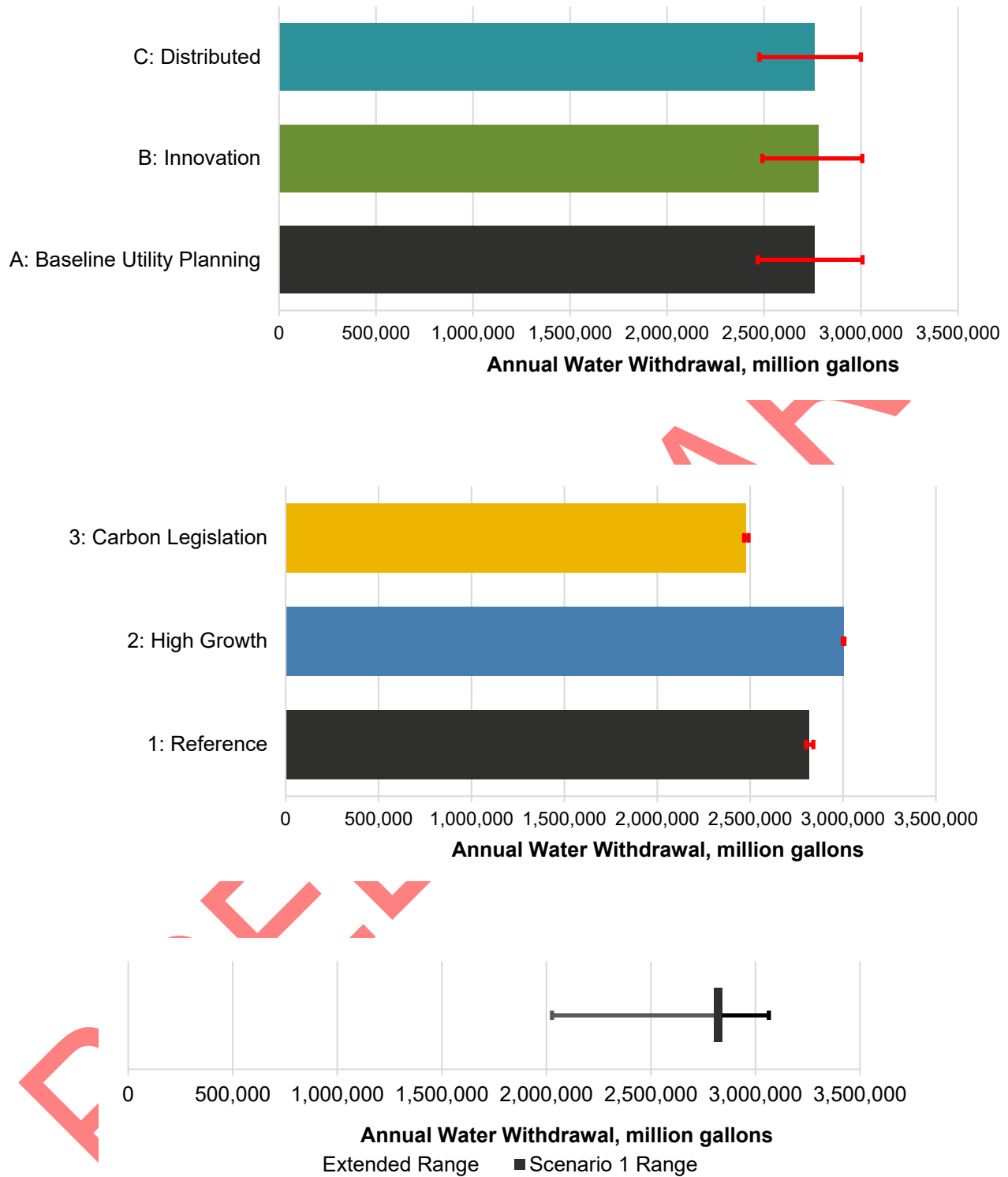


Figure 5-18: Trends in Water Withdrawal by Alternative Strategy Based on Averages of the Three Scenarios



Note: The error bars in the top chart indicate the maximum and minimum values for the scenarios associated with each alternative strategy.

Figure 5-19: Average Annual 2026-2050 Water Withdrawal by the Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)

The reductions in water use would result in localized beneficial impacts to aquatic ecosystems. The volume of water used by hydroelectric facilities is not included in Figure 5-18 and Figure 5-19.

Figure 5-20 and Figure 5-21 show the 2026-2050 trends and annual averages of water consumption by alternative strategy. The volume of water consumed is the quantity of water withdrawn from a water body, including both surface and groundwater sources, and evaporated in the closed-cycle cooling systems of thermal generating facilities instead of being discharged to a water body. This volume is typically less than 4 percent of the total quantity of water used under each alternative strategy.

Water consumption increases from 2026 to 2050 in all strategies on average and three of the sensitivities, due primarily to nuclear expansion within each strategy, with levels of nuclear expansion in each strategy being driven by the scenario in which it was studied. Water consumption is lowest in Strategy C, which focuses on distributed energy, and highest in Strategies B, which focuses on innovation and emerging technologies, such as advanced nuclear. The increases, averaged across scenarios associated with each alternative strategy, were least under Strategy C (4.9 percent) and greatest under Strategy B (27.4 percent). The variation in average annual water consumption (Figure 5-21) among alternative strategies is around 5 percent, with more variation seen among the scenarios (around 12 percent). Scenario 2 has the highest water consumption and Scenarios 1 and 3 have similar, lower water consumption. Among sensitivities, the super-charged load (Scenario 2) case has the highest water consumption, driven by need to keep up with demand for energy. The increases in water consumption would have some adverse impacts; however, these impacts would generally be small and vary with the characteristics of the source area of the water withdrawal.

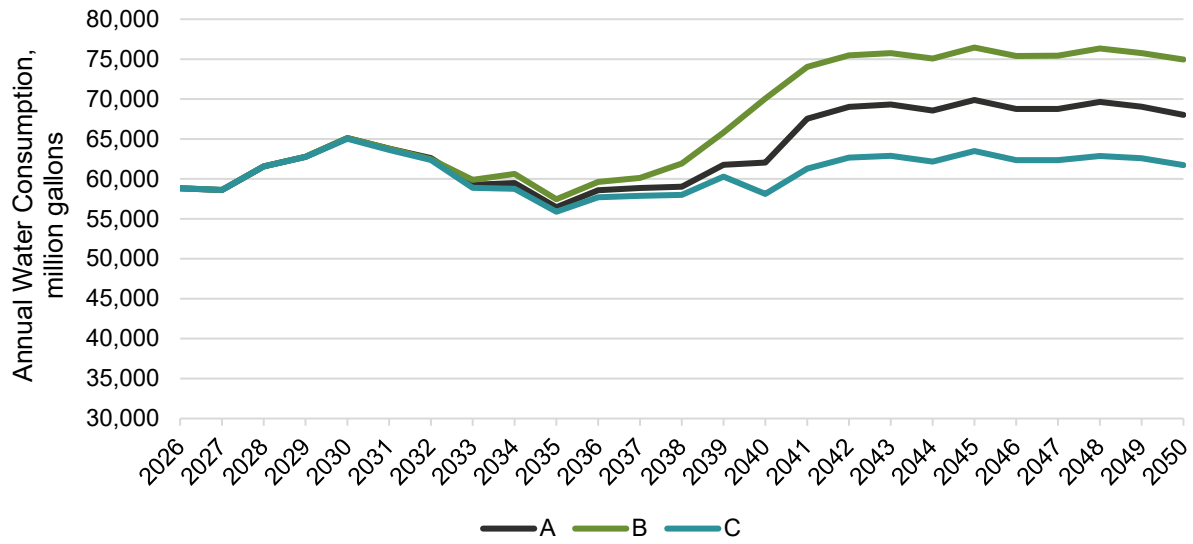
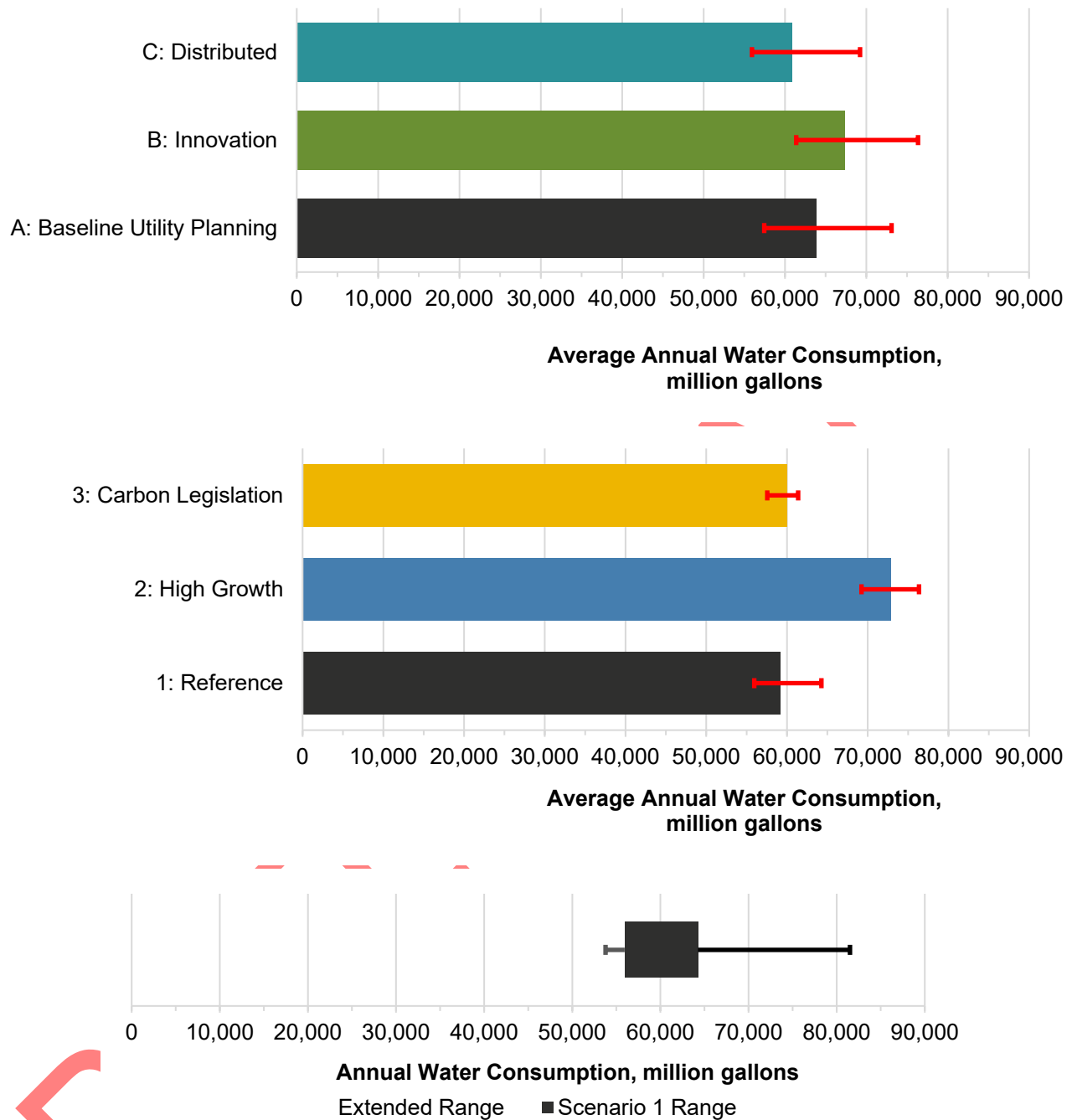


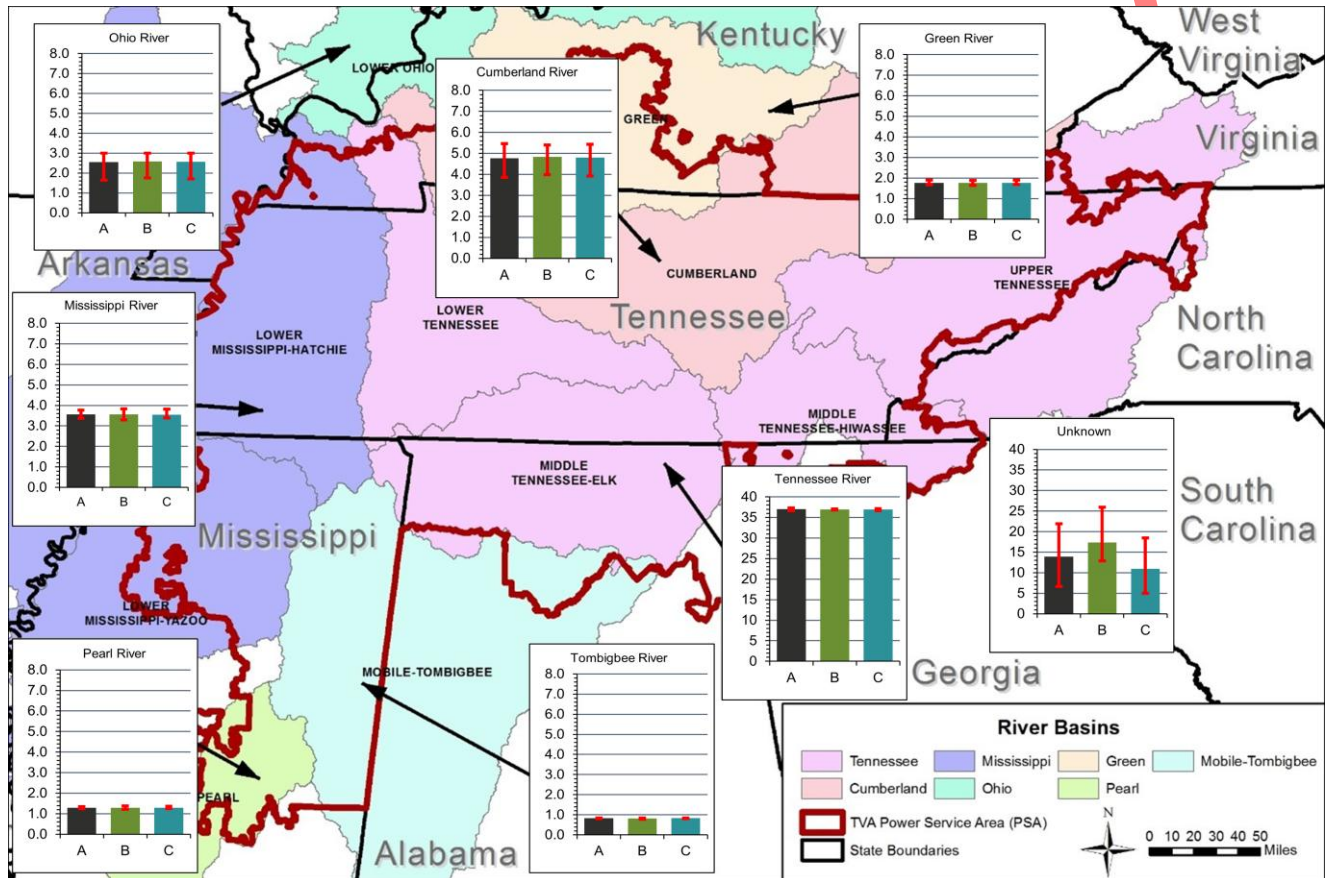
Figure 5-20: Trends in Average Annual Water Consumption by Alternative Strategy Based on Averages of the Three Scenarios



Note: The error bars in the top chart indicate the maximum and minimum values for the scenarios associated with each alternative strategy.

Figure 5-21: Average Annual 2026-2050 Water Consumption by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom).

Figure 5-22 shows water consumption projected for 2026-2050 by major river basin. A majority of the thermal plants providing power to TVA and consuming water are located in the Tennessee River Basin, and this accounts for its high volume of water consumption. Almost all of the water consumed in the Tennessee, Cumberland, Ohio, and Green River Basins is from surface water sources. Groundwater sources are primarily used in the Mississippi, Pearl, and Tombigbee River Basins. Unknown River refers to future generating facilities whose locations are presently unknown.



Note: All basins are on the same scale except for the Tennessee River and Unknown rivers, wherein a significantly larger amount of water is taken in.

Figure 5-22: Average Annual Water Consumption by Alternative Strategy and Major River Basin (in billion gallons)

5.5.4 Land Resources

TVA's existing power plant reservations have a total area of about 25,000 acres. This total does not include conventional hydroelectric plants, most of which are closely associated with multi-purpose dams and reservoirs. Many of the power plant reservations have large, relatively undisturbed areas and the actual area disturbed by facility construction and operation (the "facility footprint") totals about 18,000 acres. Much of the relatively undisturbed area on plant sites is forested and relatively little of it is considered prime farmland. The generating facilities from which TVA purchases power under PPAs (excluding hydroelectric plants and out-of-Valley wind farms) have a total area of about 20,900 acres; about 15,000 acres of this are occupied by solar facilities operating in late 2024. As noted

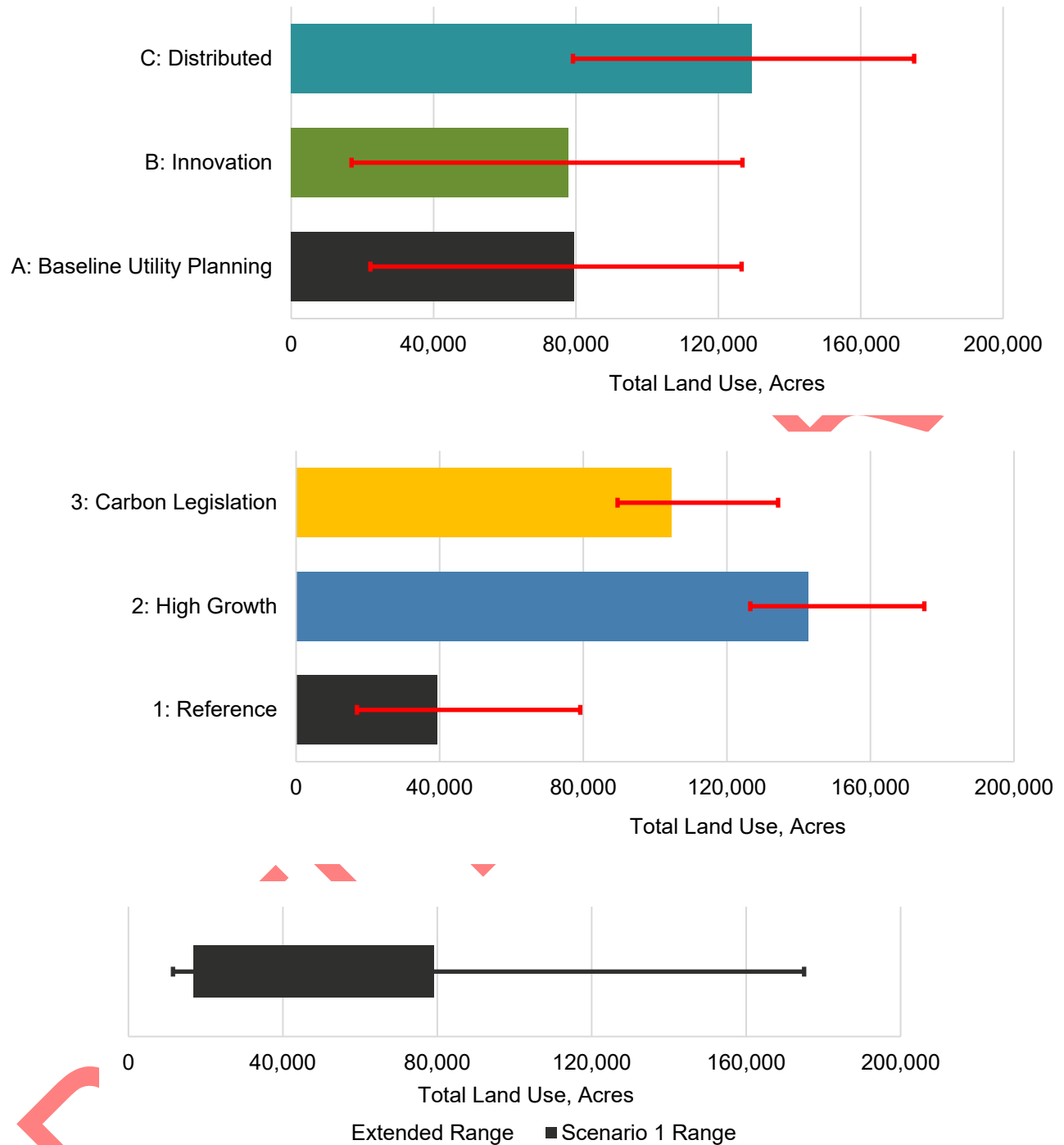
above, since 2014 to late 2024, TVA has reviewed and approved dozens of solar projects with facilities that affect or will affect over 17,000 acres (see Table 5-9).

Land requirements for new generating and storage facilities, excluding behind-the-meter DER, were determined from the capacity expansion plans and the resource type- and facility-specific land requirements given in Section 5.2. Where the indicated capacities translated to fractional facilities, the number of facilities was rounded up to the nearest whole number. Except for LPC flexible generation facilities, behind-the-meter solar facilities are assumed to be mostly building-mounted and would not result in additional land requirements. A small portion of these facilities could be ground-mounted; most of these are assumed to be on developed commercial or industrial sites and would result in minimal additional land requirements.

Expected end of life for existing CC and coal plants would not result in any immediate changes in land use. After facilities are retired, TVA would conduct a comprehensive review of the long-term management of the plant site, including the potential reuse or demolition of plant buildings and redevelopment of the site.

Land requirements for new generating and storage facilities, averaged across scenarios, range from about 129,484 acres for Strategy C to 77,964 acres for Strategy B (Figure 5-23). The land requirement for Strategy B and Strategy A are similar, although all strategies have large variation across scenarios. Scenarios have slightly less variation in land requirements across strategies, but differ greatly from each other, with the land requirement for Scenarios 2 being almost four times the land requirement for Scenario 1 (Figure 5-24). Across all scenarios, Scenario 2 has the largest land requirements for all strategies, followed by Scenario 3 then Scenario 1. Across all strategies, C has the largest requirements, with land requirements being similar for Strategies A and B. Incorporating sensitivity cases, land requirements for new facilities are highest under Scenario 2 (High Growth), Strategy C (Carbon Legislation) and lowest under Scenario 1 (Reference) and the Higher EE Availability and Deployment sensitivity.

Averages for all portfolios (Figure 5-24) indicate about 91 percent of the land required for new generating and storage facilities is for utility-scale, single-axis tracking solar facilities. For all portfolios under Scenario 2 and 3, at least 90 percent of the land required for new generating and storage facilities is for utility-scale, single-axis tracking solar facilities. Only two sensitivities under Scenario 1, and Case 1C, were over 90 percent, with the rest of the cases and sensitivities under Scenario 1 ranging from 71.3 to 86.7 percent solar land coverage. Relative to other types of generation, solar PV facilities have a high land requirement in relation to their generating capacity. Smaller land areas would be occupied by natural gas-fired and storage facilities. The selected storage facilities are utility-scale batteries, which have relatively small land requirements and are often located at existing power plants or substations. A full list of average land use requirements for each of the nine portfolios can be found in Appendix C.



Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, or strategies associated with each scenario.

Figure 5-23: Average Total Land Area for all New Generating Facilities by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)

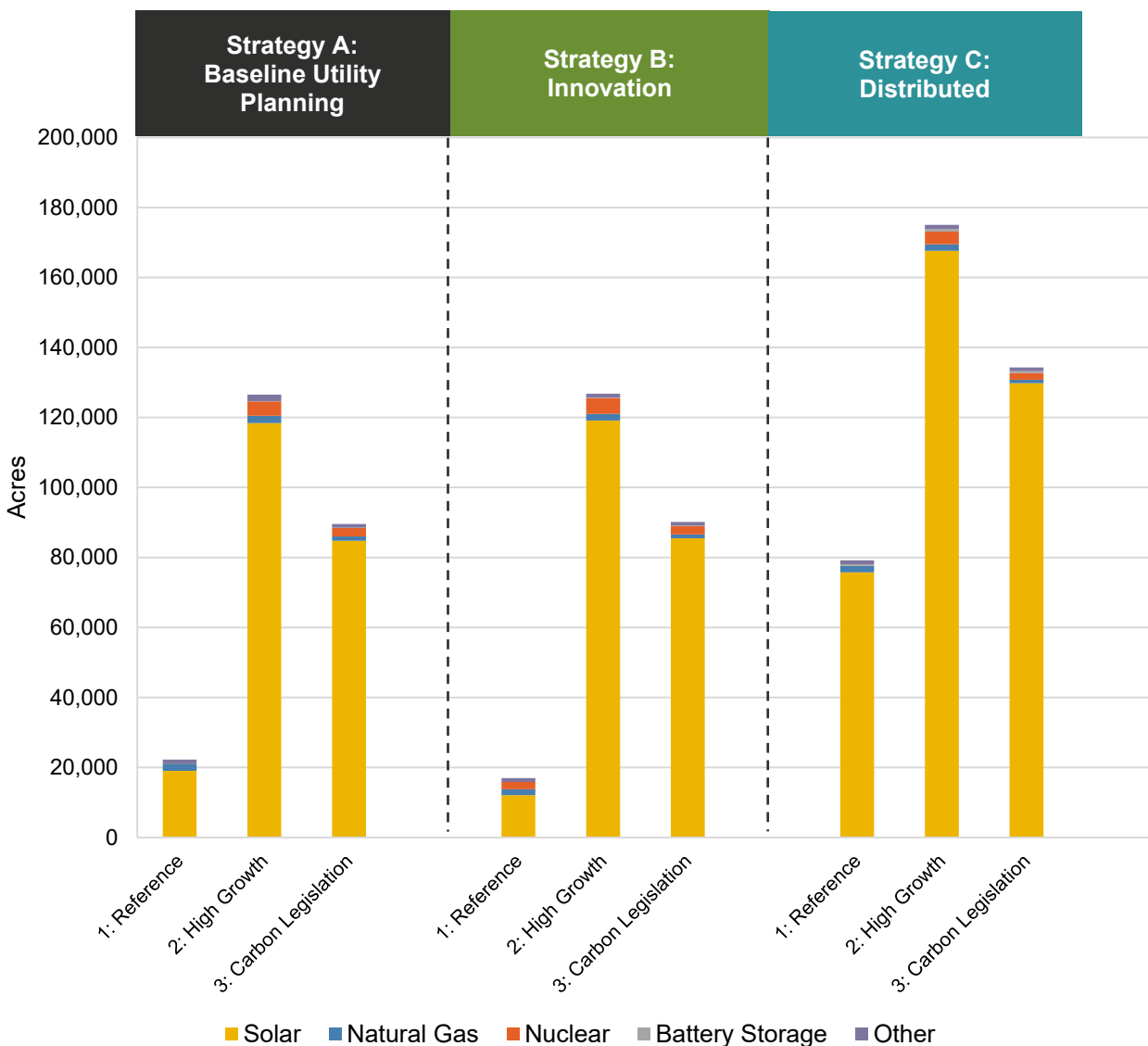


Figure 5-24: Land Requirements for New Generating Facilities by Type of Generation, Alternative Strategy, and Scenario

The majority of the land area occupied by utility-scale solar facilities constructed in the TVA PSA to date was previously in agricultural use as either cropland or pasture. Most of the remaining land area was previously forested. The majority of these solar facilities have been in the western portion of the TVA PSA, including western Tennessee, northern Mississippi, and northwest Alabama. There is a continued interest in developing solar facilities in these areas, primarily because of the presence of large tracts of relatively flat land in large ownerships and the region has the greatest solar generation potential in the TVA region (see Section 4.6.2).

Despite the large land requirements of utility-scale solar facilities, which typically displace agricultural operations, including grazing or, to a much smaller extent, forest, footprints occupy a proportionally small amount of land in the TVA PSA and the impacts of solar facilities on the land are low relative to other types of generating facilities. The construction of solar facilities typically does not require extensive excavation, and solar facilities have little associated permanent or semi-permanent infrastructure that hinders restoration of the site after the facility is dismantled. See Sections 5.2.3.5 and 5.2.3.6 for a more detailed discussion of the impacts of constructing and operating solar facilities.

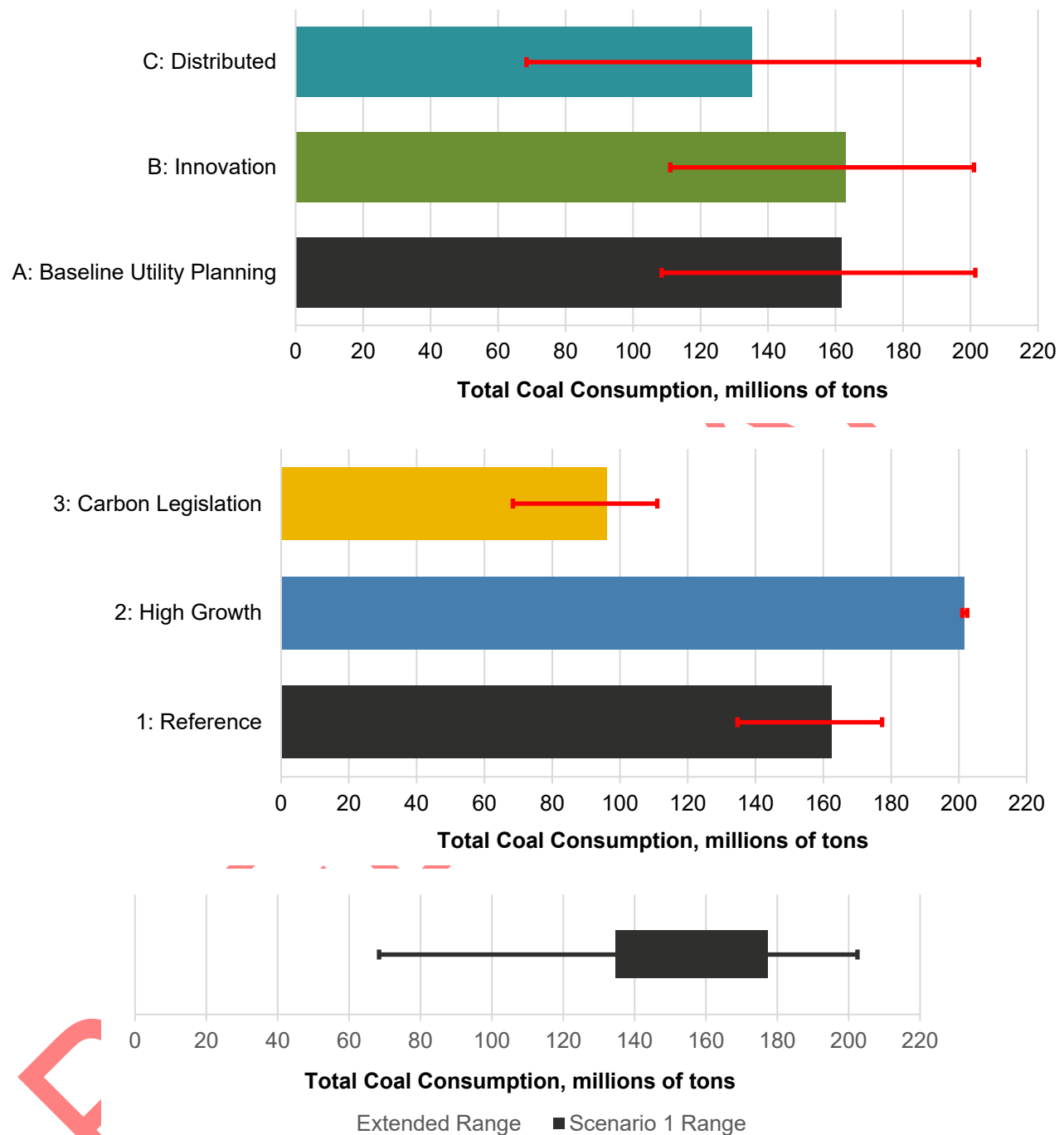
The land requirements illustrated in Figure 5-24 only include those for the generating and storage facility footprints and associated access roads. They do not include undisturbed portions of the power plant reservations, or the land area needed for extraction (e.g., mining, drilling), processing, and transportation of fuels or long-term disposal of wastes.

5.5.5 Fuel Consumption

The major fuels used for generating electricity would continue to be enriched uranium and natural gas in all of the alternative strategies, with expected end of life for existing coal units negating the need for coal after 2040.

5.5.5.1 Coal Consumption

The variation in coal consumption among the alternative strategies is relatively small (Figure 5-25). Among sensitivities, coal consumption is highest under the Extended Coal Sensitivity, High Gas Price Sensitivity, and Supercharged Load Sensitivity cases; although, the consumption is similar to that under Scenario 2. A full list of average fuel consumption for coal in each of the nine core portfolios can be found in Appendix C.



Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, or for the strategies associated with each scenario.

Figure 5-25: Average Total 2026-2050 Coal Consumption by TVA Plants by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)

5.5.5.2 Uranium Consumption

TVA presently uses about 195 tons/year of enriched uranium in its nuclear plants. Use of enriched uranium remains relatively constant throughout most of the planning period for all scenarios and strategies. Scenario 2, High Growth, incorporates the highest level of enriched uranium increases, due to the selection of many new nuclear plants driven by load growth and higher natural gas prices. Including sensitivities, uranium consumption is still highest under Scenario 2, with most consumption coming under Strategy B, which focuses on innovation and emphasizes advanced nuclear.

Environmental impacts from producing nuclear fuel include land disturbance, air emissions (including the emission of radioactive materials), and discharge of water pollutants from uranium mining, processing, tailings disposal, and fuel fabrication. The magnitude of these impacts is difficult to predict with certainty due to the great variability in potential sources for nuclear fuel. Any future use of surplus highly enriched uranium would also reduce overall uranium fuel cycle impacts as it would reduce the need for uranium mining and enrichment.

5.5.5.3 Natural Gas Consumption

About 336 billion standard cubic feet (SCF) of natural gas are planned for use in 2026 by TVA gas-fueled generating facilities and by gas facilities from which TVA purchased power under PPAs. Natural gas consumption during the 2026-2050 planning period varies between the alternative strategies and scenarios (Figure 5-26 and Figure 5-27). Across the strategies, gas consumption is highest under Scenario 1 and lowest under Scenario 3, with Scenario 3 volumes roughly 1.5 times those of Scenario 1. Among sensitivities, which are included in the Preferred Alternative, natural gas consumption is highest under Supercharged Load Sensitivity in Scenario 2 and lowest in under High Gas Price Sensitivity in Scenario 1. A full list of average fuel consumption for natural gas in each of the nine portfolios can be found in Appendix C.

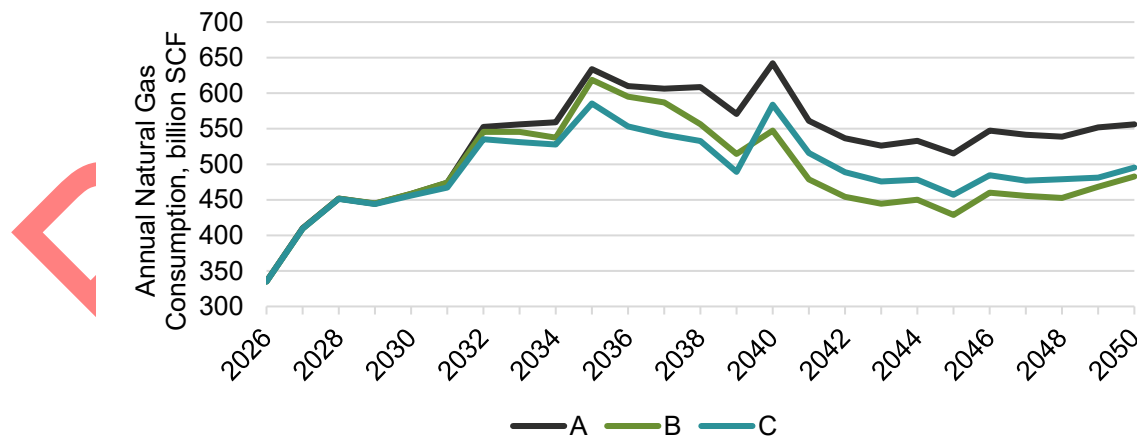
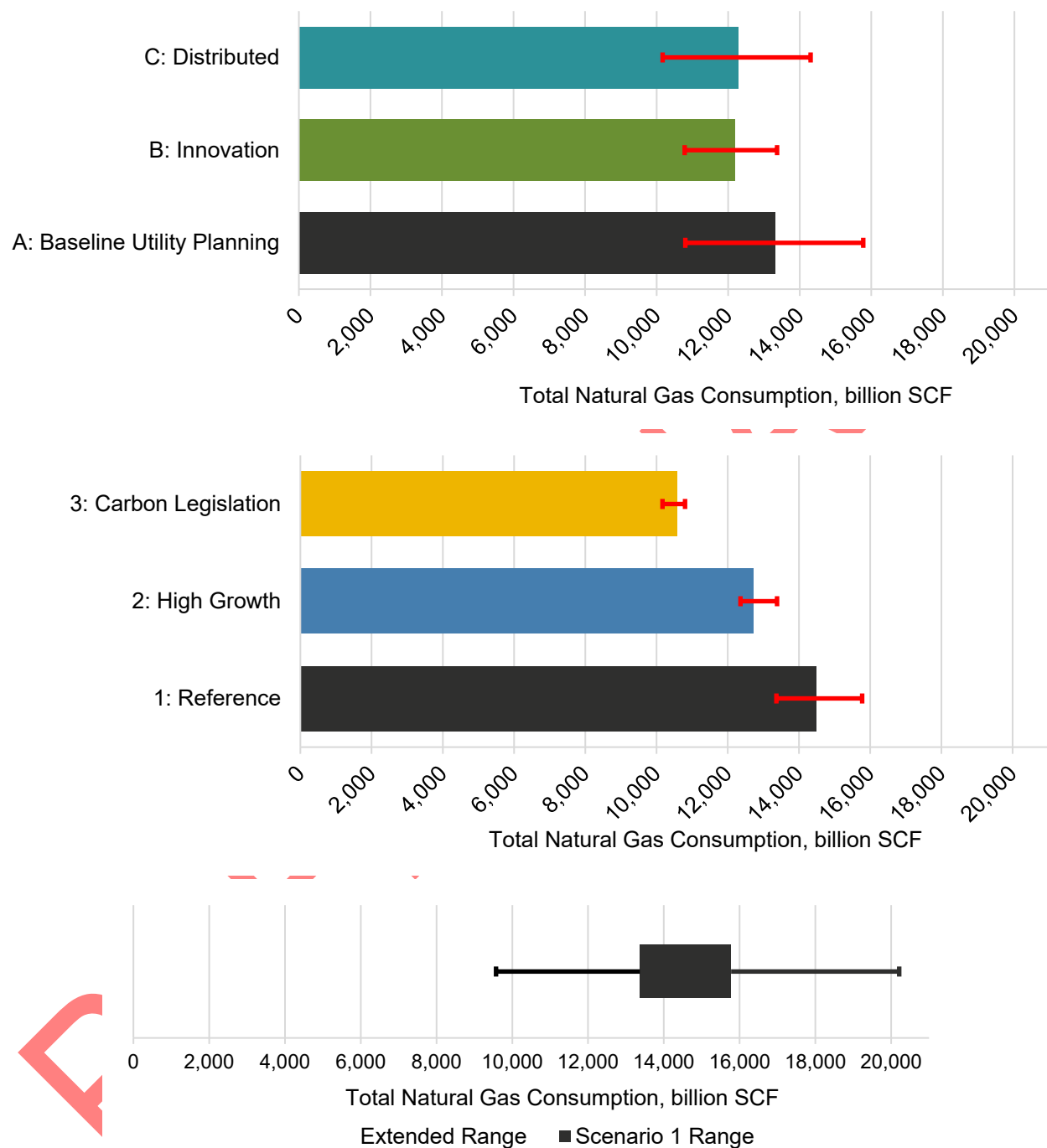


Figure 5-26: Trends in Average Annual Natural Gas Consumption by Alternative Strategy based on Averages of the Three Scenarios



Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, or strategies associated with each scenario.

Figure 5-27: Average Total 2026-2050 Natural Gas Consumption by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)

5.5.6 Solid and Hazardous Waste

The following sections describe the solid and hazardous waste impacts that could occur from operational facilities and from facilities as they reach expected end of life.

5.5.6.1 Coal Combustion Solid Wastes

Forecast production of CCR is directly correlated with forecast electricity demand and tempered by alternative energy production methods. As shown in Figure 5-28, all alternative strategies forecast production of CCR to increase from 2028 through 2031, then again from 2033 to 2034, before declining to zero CCR production by 2040 based on expected end of life for existing coal units. These end of life expectations apply to TVA's four active fossil plants, including 24 active generating units with a total capacity of 5,800 MW, subject to TVA Board approval and further environmental review.

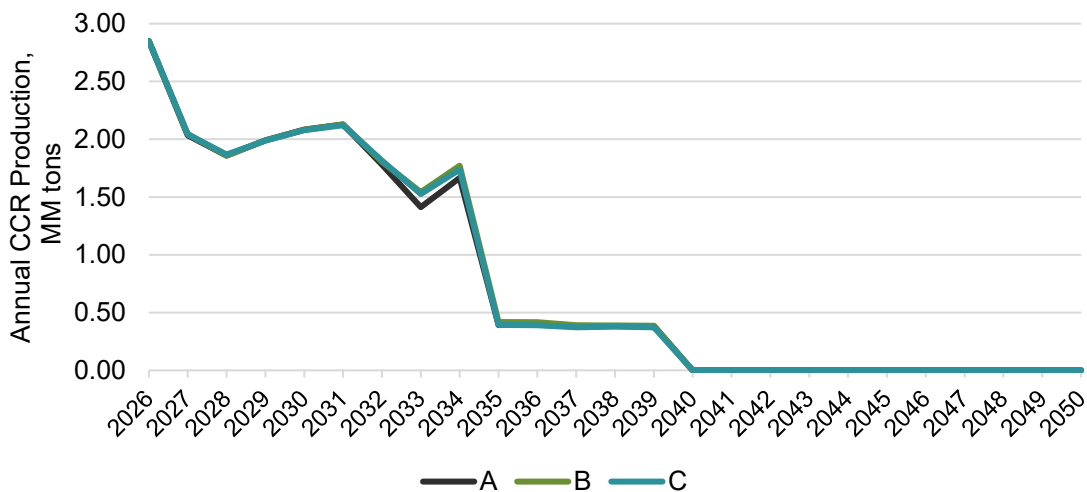
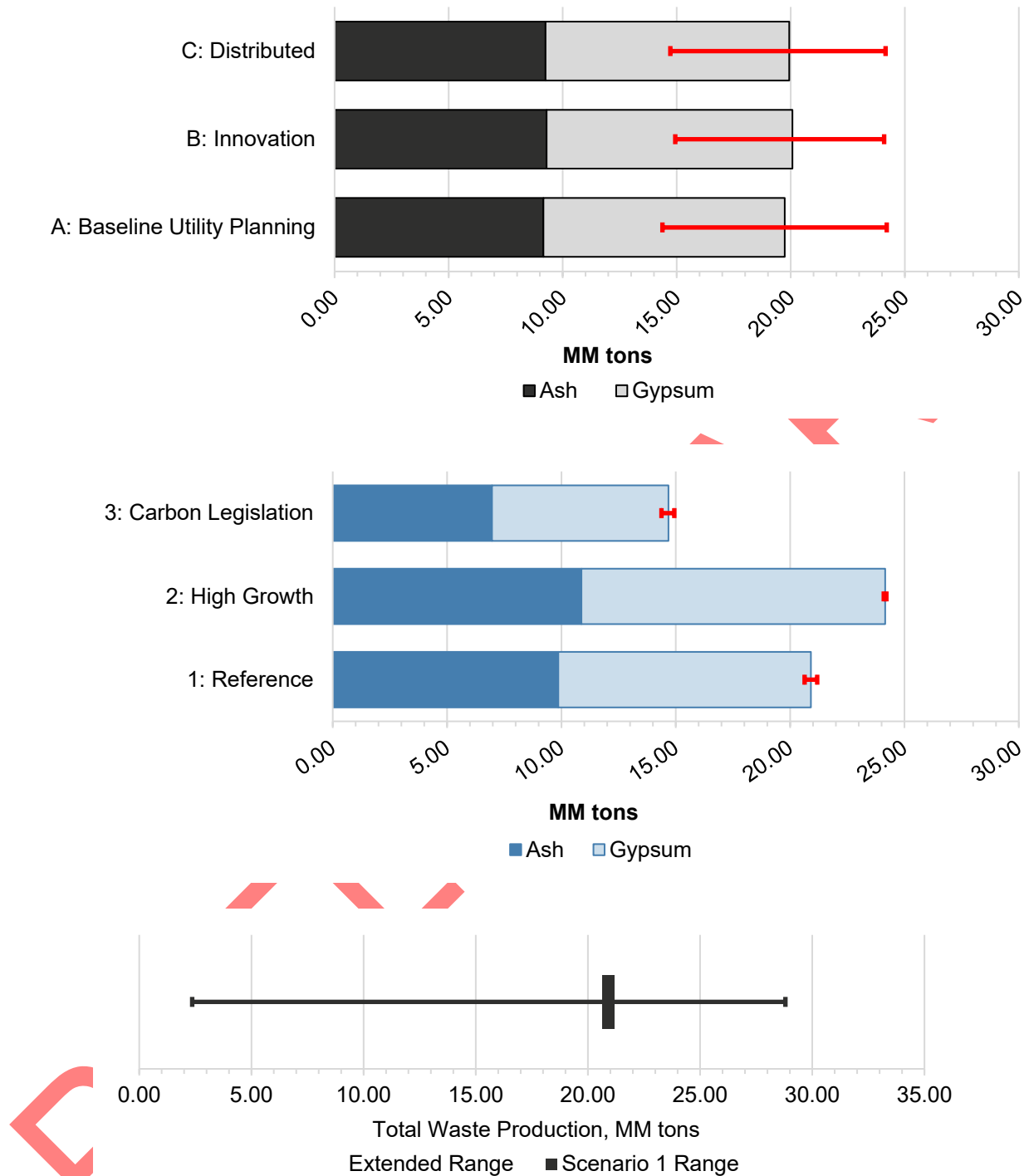


Figure 5-28: Trends in Average Annual Coal Combustion Residual (Combined Ash and Gypsum) Alternative Strategy based on Averages of the Three Scenarios

As shown in Figure 5-29, although the quantity of CCR produced during the 2026-2040 period shows little variation between alternative strategies on average, it varies markedly between the scenarios associated with each strategy. This variation among scenarios is greatest with Scenario 2 and lowest with Scenario 3. Energy demand in the High Growth scenario, Scenario 2, is driven by positive economic conditions and increasing electrification opportunities; thus, resulting in greater CCR production. Conversely the Carbon Legislation scenario, Scenario 3, features reductions in CCR production due to the carbon penalty reducing coal generation relative to the current Reference Case. Among sensitivities, which are included in the Preferred Alternative, CCR production is highest under the Later Coal End of Life and High Gas Price Sensitivities in Scenario 1, and lowest under the Low Gas Price and Earlier Coal End of Life Sensitivities in Scenario 1. The average CCR production, combined and split into ash and gypsum waste, for each of the nine portfolios can be found in Appendix C.



Note: The error bars in the top and middle charts indicate the maximum and minimum values for the scenarios associated with each alternative strategy, or strategies associated with each scenario, respectively.

Figure 5-29: Total Average 2026-2050 Coal Combustion Residual Production by Alternative Strategy (top), Scenario (middle), and the Range for Scenario 1 as well as the Extended Range to Encompass All Scenarios, Strategies, and Sensitivities, including the Preferred Alternative (bottom)

5.5.6.2 Impacts of Coal Facility End of Life

The end of life, or eventual retirement, of coal plants would cease coal burning operations and no additional CCR would be produced. Residual ash and coal dust would be washed from equipment and areas and would then be managed through the ash handling system. TVA would close the CCR units at sites as required pursuant to state and federal regulations, which could include groundwater monitoring, corrective measures, and post-closure care activities.

Any lighting ballasts containing PCBs would be removed and properly disposed of offsite during preliminary activities after power termination and during the early stages of demolition. Other materials that are removed and typically recycled in early end-of-life activities include used oils, glycols, and refrigerants. Consumer commodities (lubricants, aerosols, cleaners, etc.) are reused if possible, or sent for disposal if an outlet cannot be found. Laboratory chemicals would be evaluated for reuse or disposal on a case-by-case basis. Fuels would be used elsewhere or sent for recycling. Bulk chemicals/materials are typically recycled or disposed as applicable. Mercury devices, batteries, light bulbs, and e-waste are recycled.

Asbestos-containing materials in building structures and systems would be remediated as necessary to be protective of environment and worker health and safety, but full abatement would not occur until demolition activities are initiated.

Given that TVA would manage the removal and disposal of solid and hazardous wastes in accordance with local, state, and federal regulations, and recycle these wastes to the maximum extent possible, end of life of the coal facilities would improve the overall quality of surrounding environmental resources.

5.5.6.3 Impacts of Natural Gas Facility End of Life

Natural gas plants produce very small quantities of solid waste during normal operation and therefore the potential end of life of gas units would not affect solid and hazardous wastes. Facilities reaching end of life would only produce waste that would be created by any construction or demolition, similar to that of coal facility end of life.

5.5.6.4 Impacts of Renewable Facility Decommissioning

While solid waste is produced during construction of solar and wind generating facilities, very little solid waste results from normal operations of these facilities. At the end of their useful life, wind and solar generating facilities are decommissioned, dismantled, and sites are restored. Typically, during decommissioning the associated infrastructure (e.g., concrete pads and foundations, equipment, and electrical connections) would be removed, compacted areas would be scarified, and soils would be stabilized. The majority of decommissioned materials and equipment would be recycled, including the solar panels and the wind turbine tower and nacelles. The recycling of PV modules is anticipated to grow over the coming decades. Similarly, although composite materials comprising nacelle covers and turbine blades are currently challenging to recycle, anticipated advances in more readily recyclable

materials are anticipated to decrease waste. Alternative strategies considered by TVA that result in greater renewable generation would result in greater amounts of wastes with decommissioning.

5.5.6.5 Nuclear Waste

The trends in the production of high-level waste, which is primarily spent nuclear fuel and other fuel assembly components, parallel those of nuclear fuel requirements and differ some across strategies, although they differ more among scenarios. Beginning in 2034, all Strategies start to see an increase in nuclear consumption. By 2040, Strategy B and Scenario 2 have a larger increase in nuclear consumption while the trajectory of Strategies A, C, and Scenario 3 also increase, though not as markedly. Scenario 1 sees the least increase in nuclear consumption when averaged across strategies and is relatively steady. Variance in total nuclear consumption over the 2026 to 2050 period ranges from 2.0 percent (Cases 1A and 1C) up to 32.1 percent for the case with the highest consumption (Case 2B). TVA anticipates continuing to store spent fuel on the nuclear plant sites in spent fuel pools and dry casks until a centralized facility for long-term disposal and/or reprocessing is operating. TVA has constructed additional dry cask storage capacity to store more spent fuel on its nuclear plant sites. The production of low-level nuclear waste is expected to remain relatively constant.

5.5.6.6 Building Retrofits due to Energy Efficiency Programs

Building retrofits to reduce energy use, such as replacing windows and doors, produces solid wastes which are often disposed of in landfills. The disposition of old appliances, HVAC equipment, water heaters, and other equipment varies across the region with the local availability of recycling facilities. Old refrigerators and HVAC equipment may also contain hydrochlorofluorocarbon refrigerants (“freon”) whose use and disposal is regulated due to their harmful effects on stratospheric ozone (“the ozone layer”) and because of their high global warming potential. To reduce these harmful effects, HVAC contractors are required to reclaim and recycle these refrigerants from HVAC equipment being replaced.

5.5.7 Socioeconomics

The three scenarios evaluated in the IRP assume distinctly different economic conditions, as discussed in Chapter 2 and Appendix B of Volume 1. Generally, the largest influence on the TVA region economy are economic trends in the U.S. overall, as economic trends in the TVA region are highly correlated to the macroeconomic trends in the U.S. However, the large manufacturing base in the region tends to create potential for greater downward moves during periods of economic slowdown or recession. Similarly, demographic trends reflect this same volatility, where significant shifts in economic conditions directly influence population growth, household formation, and employment levels.

Within each scenario, the strategies evaluated would have varying but minor impacts on the TVA region economy for the reasons noted above. Differences are primarily due to the cost of electricity and impacts to the local economy related to building and contracting for new

generating resources. Often these impacts tend to be generally offsetting. As residents and businesses across the region use electricity, the difference in cost of electricity across the strategies would have the largest influence on regional income and employment. With respect to the System Average Cost metric, Strategy A is the lowest cost, Strategy C is the second lowest in cost, followed by Strategy B (Table 5-24). However, as mentioned previously, differences across the strategies would have minor impacts on the TVA region's economy as a whole.

Table 5-21: System Average Cost (2026-2050) for each Portfolio (\$/MWh)

Strategy	Scenario		
	1	2	3
A	\$78	\$96	\$93
B	\$83	\$98	\$94
C	\$80	\$98	\$94

In TVA's 2019 IRP, the results for the Valley economics metrics (changes in real per capital income and non-farm employment) were very similar across the strategies. There were two main reasons for this lack of differentiation, which are still true today. The relationship of TVA revenues to the Valley region economy as a whole is relatively small (as noted in Section 4.8.3.1, TVA's revenues represent about 1.8 percent of the total TVA regional GDP), and the portfolios evaluated share common elements. Given these factors and with input from the IRP Working Group, TVA did not include a similar economic metric in the 2026 IRP.

The construction and/or acquisition of facilities by TVA as well as the impacts of facilities reaching end of life would affect employment levels within the vicinity of a project location. Generally, when facilities reach end of life it may result in the loss of local employment in the counties in which they are located, which may have direct and indirect adverse impacts to the surrounding areas. TVA would help offset this employment loss by placing some interested employees in available positions across the TVA PSA, pre-empting the need to relocate for work. Proximity to more urbanized areas such as Memphis and Nashville may help offset the need for employees and associated family members to relocate. Employees may find alternative employment in other industries due to the growth of employment opportunities in the regional economy discussed in Section 4.8.3.1.

In addition, the construction, acquisition, or retirement of generation facilities would likely increase or decrease TVA's tax equivalent payments, also known as payments in lieu of taxes, to states where the facilities are located. These tax equivalent payments represent beneficial or adverse effects to local communities. The construction of new solar facilities and other energy resources by independent power producers from which TVA purchases power would not affect tax equivalent payments; these facilities would, however, likely pay other taxes to the local communities and states.

Because the IRP is programmatic and does not address the future siting and construction of generating facilities, site-specific analyses of socioeconomic impacts, including those affecting minority and low-income populations, are not possible at this time. However, before implementing a specific resource option, TVA will conduct a review of its potential socioeconomic impacts. This review will, as appropriate, address resource- and/or site-specific socioeconomic issues such as impacts on employment rates, housing, health and safety, schools, emergency services, water supply, wastewater treatment capacity, and local government revenues including TVA tax equivalent payments.

For facilities reaching end of life, beneficial impacts resulting from an increase in employment opportunities due to the short-term generation of jobs needed for deconstruction activities may benefit local populations. This would temporarily offset direct and indirect economic impacts caused by loss of employment due to the closing of the facility. As described above, TVA would help offset employment loss by placing some interested employees in available positions across the TVA PSA.

Activities associated with building retrofits and other residential, commercial, and industrial EE measures are likely to result in minor beneficial socioeconomic impacts to communities and individuals. For instance, residential EE efforts can result in reductions of cold-related illnesses and associated stress by making it easier for residents to heat their homes. However, reduced ventilation rates can adversely affect indoor air quality. In a review of this topic, Maidment et al. (2014) concluded that household EE measures have a net positive impact on health and the benefits are greatest for low-income populations.

Future rate increases could affect low-income populations more than other populations. Low-income populations also have limited ability to participate in EE programs that could reduce their future power bills.

5.6 Potential Mitigation Measures

As previously described, TVA's siting processes for generation and transmission facilities, as well as practices for modifying these facilities, are designed to avoid and/or minimize potential adverse environmental impacts. Potential impacts are also reduced through pollution prevention measures and environmental controls such as air pollution control systems, wastewater treatment systems, and thermal generating plant cooling systems. Based on the evolution of current and future policy or regulatory requirements, it may become necessary to evaluate additional environmental controls at existing or future generation facilities, particularly for coal and gas units. Options to meet future regulatory requirements could include technologies such as CCS, alternative fuel co-firing (such as hydrogen), or natural gas co- or re-firing of existing coal burners. TVA should continue to monitor advancements in these technologies and evaluate their potential future use if needed to meet regulatory requirements or as a cost-effective method of preserving existing infrastructure (i.e., co- or re-firing of existing coal burners with natural gas).

Other potentially adverse impacts can be mitigated by measures such as compensatory wetlands mitigation, payments to in-lieu stream mitigation programs and related conservation initiatives, enhanced management of other properties, documentation and recovery of cultural resources, and infrastructure improvement assistance to local communities.

TVA has developed standards for environmental protection and best management practices for construction, modification, and maintenance of generation and transmission facilities developed with consideration of state and federal permit requirements, and adherence to erosion and sediment control plans. TVA's best management practices are described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities – Revision 4* (TVA 2022g). TVA follows this and other related guidelines and specifications for implementation of site-specific projects available at <https://www.tva.com/energy/transmission/transmission-system-projects> that would implement the IRP's Preferred Alternative. The site-specific environmental reviews for future projects would include analysis of potential impacts, best management practices and mitigation measures required to reduce or avoid adverse effects.

5.7 Unavoidable Adverse Environmental Impacts

The adoption of an alternative strategy, including the Preferred Alternative, for meeting the long-term electrical needs of the TVA region has no direct environmental impacts. The implementation of the strategy; however, would result in unavoidable adverse environmental impacts. The nature and potential significance of the impacts would depend on the energy resource options eventually implemented under the strategy. Resource options in each strategy have associated adverse impacts that cannot be realistically avoided but which can often be minimized.

Under every alternative strategy, including the Preferred Alternative, TVA would continue to operate most of its existing generating units for the duration of the 25-year planning period. The exceptions are the coal units and a few of the older natural gas units which are expected to reach end of life during the planning period, subject to TVA Board approval and further environmental review. The exceptions are the coal units and a few of the older natural gas units which are expected to reach end of life during the planning period, subject to TVA Board approval and further environmental review. The operation of the generating units would continue to result in emissions of various air pollutants, water consumption, and waste generation, as applicable to each unit type.

The construction and operation of new generating facilities would unavoidably result in changes in land use unless new facilities are sited at existing plant sites. The conversion of land from a non-industrial use to an industrial use would unavoidably affect land resources such as farmland, wildlife habitat and scenery. All new facilities proposed by TVA would be subject to a site-specific NEPA review to analyze the potential adverse impacts of the proposed action.

5.8 Relationship Between Short-Term Uses and Long-Term Productivity of the Human Environment

The adoption and implementation of a long-term energy resource strategy, including the Preferred Alternative, would have various short- and long-term consequences. These depend, in part, on the actual energy resource options implemented. Option-specific and/or site-specific environmental reviews would be conducted before final implementation decisions are made to use certain energy resources and would examine potential environmental consequences in more detail.

In both the short and long term, TVA would continue to generate electrical energy to serve its customers and the public. The availability of adequate, reliable, and low-cost electricity is recognized as enhancing public health and welfare and will continue to sustain and increase the economic well-being of the TVA region.

The generation of electricity has both short- and long-term environmental impacts. Short-term impacts include those associated with facility construction and operational impacts, such as the consequences of exposure to the emission of air pollutants and consequences of thermal discharges. Potential long-term impacts include land alterations for facility construction and fuel extraction, the generation of nuclear waste that requires safe storage for an indefinite period, and the emission of GHGs that has potential climate change affects.

5.9 Irreversible and Irretrievable Commitments of Resources

The continued generation of electricity by TVA will irreversibly consume various amounts of non-renewable fuels (coal, natural gas, diesel, fuel oil, and uranium). The continued maintenance of TVA's existing generating facilities and the construction of new generating facilities will irreversibly consume energy and materials. The siting of most new energy facilities, except for wind and PV facilities, will irretrievably commit the sites to industrial use because of the substantial alterations of the sites and the relative permanence of the disturbances. The continued generation of nuclear power will produce nuclear wastes; therefore, a site or sites will have to be devoted to the safe storage of these wastes. Any such site would essentially be irretrievably committed to long-term storage of nuclear waste.

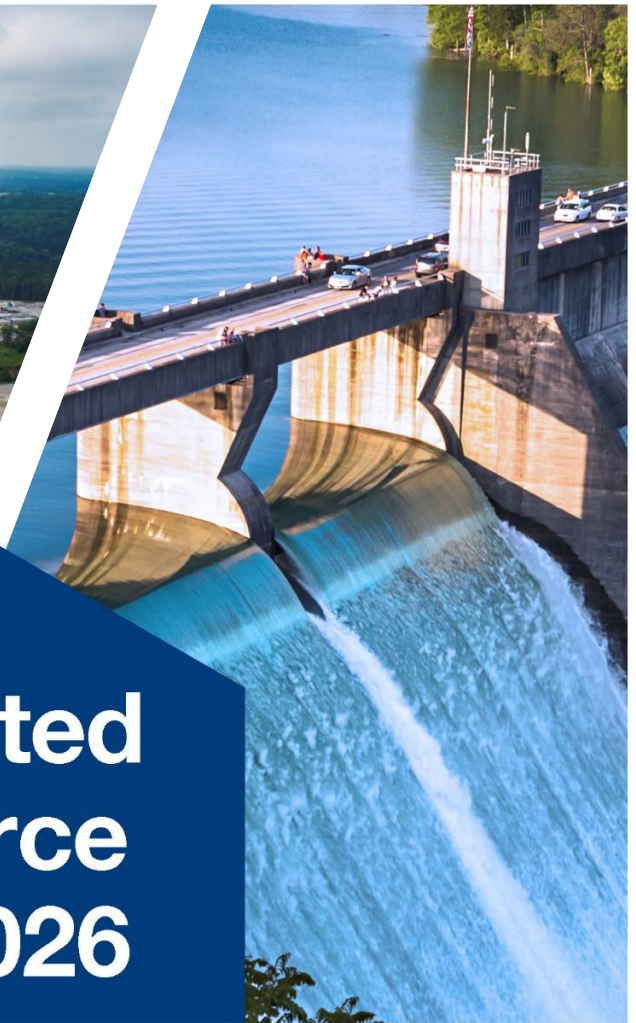
The alternative strategies, including the Preferred Alternative, contain varying amounts of EE and DR and renewable generation. Reliance on these resources lessens the irreversible commitment of non-renewable fuel resources but would still involve the irreversible commitment of energy and materials and, depending on the type of renewable generation, the irreversible commitment of generating sites.

5.10 NEPA Compliance Certification

Consistent with TVA NEPA procedures, TVA certifies that this document represents TVA's good-faith effort to fulfill the requirements of NEPA within the Congressional timeline

established at NEPA Section 107(g) and according to page limits established at NEPA Section 107(e) and that the NEPA process is substantially complete. In this document, TVA prioritizes documentation of the most important considerations required by NEPA within the Congressionally mandated page limits based on its expert judgement. Any considerations addressed briefly or unaddressed are, in TVA's judgment, comparatively not of a substantive nature that meaningfully inform the consideration of environmental effects and the resulting decision on how to proceed. In TVA's expert opinion, the factors mandated by NEPA have been thoroughly considered, and in TVA's judgement, the analysis contained in this document is adequate to inform and reasonably explain TVA's final decision regarding the proposed federal action.

PRELIMINARY



Integrated Resource Plan 2026

VOLUME 2 / APPENDIX

PRELIMINARY FINAL
JUNE 2026



Table of Contents

Appendix A - Federally Listed Species near TVA Generation Facilities.....	A-1
Appendix B - Socioeconomics.....	B-1
B.1 Counties within the TVA PSA	B-1
B.2 Limited-Income Counties in the TVA PSA	B-3
B.3 Low-Income Census Tracts in the TVA PSA	B-6
B.4 Minority Populations in the TVA PSA.....	B-32
Appendix C - Environmental Parameters of the Nine Capacity Expansion Plans.....	C-1
Appendix D - Life Cycle Greenhouse Gas Emissions	D-1
D.1 National Laboratory of the Rockies Partnership	D-1
D.2 Detailed Total Emissions	D-1
Appendix E - NEPA Documents Reviewed for Chapter 5 Generic Effects Tables.....	E-1
Appendix F - Literature Cited	F-1
Appendix G - List of Preparers	G-1
Appendix H - 2026 IRP - Comment Response Report.....	H-1
Appendix I - Index	I-1

PRELIMINARY



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Appendix A – Federally Listed Species near TVA Generation Facilities

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PRELIMINARY

Appendix A - Federally Listed Species near TVA Generation Facilities

Source: TVA Regional Natural Heritage Database, March 2026

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Allen						
	<i>Charadrius melodus</i>	piping plover	TN	-	-	E, T
	<i>Sterna antillarum athalassos</i>	interior least tern	TN	-	E	DL
Apalachia						
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Cryptobranchus alleganiensis alleganiensis</i>	eastern hellbender	NC	S3	SC	E, PE
	<i>Desmognathus aeneus</i>	seepage salamander	TN	S2	D	UR
	<i>Epioblasma florentina walkeri</i>	tan riffleshell	TN	S1	E	E
	<i>Myotis lucifugus</i>	little brown bat	NC	S3	SR	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	NC	S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	NC	S1S2	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	NC	S3	SR	PE
	<i>Pityopsis ruthii</i>	Ruth's golden aster	TN	S1	E	E
	<i>Platanthera integrilabia</i>	white fringeless orchid	TN	S2S3	E	T
	<i>Pleurobema oviforme</i>	Tennessee clubshell	TN	S2S3	-	PE
	<i>Pleuroaia barnesiana</i>	Tennessee pigtoe	NC	S1	E	PE
	<i>Pleuroaia dolabelloides</i>	slabside pearlymussel	TN	S2	E	E
	<i>Potamogeton tennesseensis</i>	Tennessee pondweed	TN	S2	T	UR
	<i>Venustaconcha trabalis</i>	Tennessee bean	TN	S1	-	E

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Blue Ridge Dam						
	<i>Bombus affinis</i>	rusty-patched bumble bee	GA	SH	E	E
	<i>Bombus pensylvanicus</i>	American bumblebee	GA	SNR	-	UR
	<i>Cryptobranchus alleganiensis</i>	hellbender	GA	T	R	PS
	<i>Desmognathus aeneus</i>	seepage salamander	TN	S2	D	UR
	<i>Glyptemys muhlenbergii</i>	bog turtle	GA	S2	E	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	GA	S3	T	DL
	<i>Helonias bullata</i>	swamp-pink	GA	S1	T	T
	<i>Isotria medeoloides</i>	small whorled pogonia	GA	S2	T	T
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	SR	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Pityopsis ruthii</i>	Ruth's golden aster	TN	S1	E	E
	<i>Vermivora chrysoptera</i>	golden-winged warbler	GA	S1S2	E	UR
Boone						
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Percina williamsi</i>	sickle darter	TN	S2	T	T
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Tsuga caroliniana</i>	Carolina hemlock	TN	S3	T	UR
Browns Ferry						
	<i>Campeloma decampi</i>	slender campeloma	AL	S1	SP	E
	<i>Cumberlandia monodonta</i>	spectaclecase	AL	S1	SP	E
	<i>Elassoma alabamiae</i>	spring pygmy sunfish	AL	S1	SP	T
	<i>Etheostoma boschungii</i>	slackwater darter	AL	S1	SP	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	AL	S4B	SP	DL
	<i>Lampsilis abrupta</i>	pink mucket	AL	S1	SP	E
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	AL	SX	SP	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	AL	S1	SP	E
	<i>Pleurobema plenum</i>	rough pigtoe	AL	S1	SP	E, XN
	<i>Pleuroaia barnesiana</i>	Tennessee pigtoe	AL	S1	PSM	PE
Brownsville						
	<i>Noturus gladiator</i>	piebald madtom	TN	S3	D	UR
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Caledonia						
	<i>Elliptio arca</i>	Alabama spike	MS	S1S2	-	UR
	<i>Lampsilis perovalis</i>	orange-nacre mucket	MS	S1	LE	T
	<i>Medionidus acutissimus</i>	Alabama moccasinshell	MS	S1	LE	T
	<i>Noturus munitus</i>	frecklebelly madtom	MS	S3	LE	PS:T
	<i>Obovaria unicolor</i>	Alabama hickorynut	MS	S1S2	-	UR
	<i>Pleurobema decisum</i>	southern clubshell	MS	S1	-	E
	<i>Pleurobema perovatum</i>	ovate clubshell	MS	S1	LE	E
Chatuge Dam						
	<i>Cryptobranchus alleganiensis alleganiensis</i>	eastern hellbender	NC	S3	SC	E, PE
	<i>Fusconaia subrotunda</i>	longsolid	NC	S1	E	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	NC	S3B, S3N	T	DL
	<i>Moxostoma sp. 2</i>	sicklefin redbreast	NC	S2	T	UR
	<i>Myotis lucifugus</i>	little brown bat	NC	S3	SR	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	NC	S2	T	E
	<i>Perimyotis subflavus</i>	tricolored bat	NC	S3	SR	PE
	<i>Pleurobema oviforme</i>	Tennessee clubshell	NC	S1	E	PE
	<i>Sarracenia oreophila</i>	green pitcher plant	NC	S1	E	E
	<i>Vermivora chrysoptera</i>	golden-winged warbler	NC	S2S3B	SC	UR
Cherokee Dam						
	<i>Cumberlandia monodonta</i>	spectaclecase	TN	S2S3	E	E
	<i>Epioblasma florentina walkeri</i>	tan riffleshell	TN	S1	E	E
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Io fluviatilis</i>	spiny riversnail	TN	S2	-	UR
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Lemiox rimosus</i>	birdwing pearlymussel	TN	S1	E	E, XN
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	NC	S1S2	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cicatricosus</i>	white wartyback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Chickamauga Dam						
	<i>Chrosomus saylori</i>	laurel dace	TN	S1	E	E
	<i>Cyprogenia stegaria</i>	fanshell	TN	S1	E	E, XN
	<i>Falco peregrinus</i>	peregrine falcon	TN	S1B	-	PS:LE
	<i>Fusconaia cor</i>	shiny pigtoe pearlymussel	TN	S1	E	E, XN
	<i>Isotria medeoloides</i>	small whorled pogonia	TN	S1	E	T
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Platanthera integrilabia</i>	white fringeless orchid	TN	S2S3	E	T
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleurobema plenum</i>	rough pigtoe	TN	S1	E	E, XN
	<i>Vermivora chrysoptera</i>	golden-winged warbler	TN	S3B	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Colbert						
	<i>Cumberlandia monodonta</i>	spectaclecase	AL	S1	SP	E
	<i>Cyprogenia stegaria</i>	fanshell	AL	S1	SP	E, XN
	<i>Dromus dromas</i>	dromedary pearlymussel	AL	SX	SP	E, XN
	<i>Epioblasma brevidens</i>	cumberlandian combshell	AL	S1	SP	E, XN
	<i>Epioblasma capsaeformis</i>	oyster mussel	AL	SX	SP	E, XN
	<i>Epioblasma obliquata obliquata</i>	purple catspaw	AL	SX	SP	E, XN
	<i>Epioblasma triquetra</i>	snuffbox	AL	S1	PSM	E
	<i>Fusconaia cuneolus</i>	fine-rayed pigtoe	AL	S1	SP	E, XN
	<i>Fusconaia subrotunda</i>	longsolid	AL	S1	PSM	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	AL	S4B	SP	DL
	<i>Hemistena lata</i>	cracking pearlymussel	AL	S1	SP,P1	E, XN
	<i>Lampsilis abrupta</i>	pink mucket	AL	S1	SP	E
	<i>Lemiox rimosus</i>	Birdwing Pearlymussel	AL	S1	SP	E, XN
	<i>Leptodea leptodon</i>	scaleshell	AL	SX	SP	E
	<i>Macrochelys temminckii</i>	alligator snapping turtle	AL	S3	SP	PT
	<i>Medionidus conradicus</i>	Cumberland moccasinshell	AL	S1	SP	PE
	<i>Myotis grisescens</i>	gray bat	AL	S2	SP	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	AL	S2	SP	E
	<i>Myotis sodalis</i>	Indiana bat	AL	S2	SP	E
	<i>Obovaria retusa</i>	ring pink	AL	SH	SP	E, XN
	<i>Obovaria subrotunda</i>	round hickorynut	AL	S2	PSM	T
	<i>Palaemonias alabamiae</i>	Alabama blind cave shrimp	AL	S1	SP	E
	<i>Percina tanasi</i>	snail darter	AL	S1	SP	DL
	<i>Plethobasus cicatricosus</i>	white wartyback	AL	S1	SP	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	AL	SX	SP	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	AL	S1	SP	E
	<i>Pleurobema oviforme</i>	Tennessee clubshell	AL	S1	PSM	PE
	<i>Pleurobema plenum</i>	rough pigtoe	AL	S1	SP	E, XN
	<i>Pleurobema rubrum</i>	pyramid pigtoe	AL	S1	SP	PT
	<i>Pleuroaia barnesiana</i>	Tennessee pigtoe	AL	S1	PSM	PE
	<i>Pleuroaia dolabelloides</i>	slabside pearlymussel	AL	S1	SP	E
	<i>Ptychobranchus subtentum</i>	fluted kidneyshell	AL	SX	SP	E
	<i>Speoplatyrhinus poulsoni</i>	Alabama cavefish	AL	S1	SP	E

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Cumberland						
	<i>Acipenser fulvescens</i>	lake sturgeon	TN	S1	E	UR
	<i>Apios priceana</i>	Price's potato-bean	KY	S1	E	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Macrochelys temminckii</i>	alligator snapping turtle	TN	S2S3	T	PT
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Perimyotis subflavus</i>	tricolored bat	KY	S2	T	PE
	<i>Pleurobema clava</i>	clubshell	TN	SH	E	E, XN
	<i>Quadrula cylindrica</i>	rabbitsfoot	TN	-	-	T
	<i>Vireo bellii</i>	Bell's vireo	KY	S2S3B	S	PS
Fort Loudoun Dam						
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
Gallatin						
	<i>Acipenser fulvescens</i>	lake sturgeon	TN	S1	E	UR
	<i>Ambystoma barbouri</i>	streamside salamander	TN	S2	E	UR
	<i>Dalea foliosa</i>	leafy prairie-clover	TN	S2S3	E	E
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Lesquerella perforata</i>	spring creek bladderpod	TN	S1	E	E
	<i>Macrochelys temminckii</i>	alligator snapping turtle	TN	S2S3	T	PT
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
Gleason						
	<i>Noturus gladiator</i>	piebald madtom	TN	S3	D	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Great Falls Dam						
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Etheostoma akatulo</i>	bluemask darter	TN	S1	E	E
	<i>Fundulus julisia</i>	barrens topminnow	TN	S1	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Pleurobema gibberum</i>	Cumberland pigtoe	TN	S1	E	E
Guntersville Dam						
	<i>Campeloma decampi</i>	slender campeloma	AL	S1	SP	E
	<i>Cryptobranchus alleganiensis</i>	hellbender	AL	S1S2	SP	PS
	<i>Cumberlandia monodonta</i>	spectaclecase	AL	S1	SP	E
	<i>Cyprogenia stegaria</i>	fanshell	AL	S1	SP	E, XN
	<i>Elassoma alabamae</i>	spring pygmy sunfish	AL	S1	SP	T
	<i>Epioblasma triquetra</i>	snuffbox	AL	S1	PSM	E
	<i>Etheostoma tuscumbia</i>	Tuscumbia darter	AL	S2	SP	UR
	<i>Falco peregrinus</i>	peregrine falcon	AL	SHB,S3N	SP	PS:LE
	<i>Fusconaia subrotunda</i>	longsolid	AL	S1	PSM	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	AL	S4B	SP	DL
	<i>Lampsilis abrupta</i>	pink mucket	AL	S1	SP	E
	<i>Macrochelys temminckii</i>	alligator snapping turtle	AL	S3	SP	PT
	<i>Myotis grisescens</i>	gray bat	AL	S2	SP	E
	<i>Myotis lucifugus</i>	little brown bat	AL	S3	SP	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	AL	S2	SP	E
	<i>Myotis sodalis</i>	Indiana bat	AL	S2	SP	E
	<i>Percina tanasi</i>	snail darter	AL	S1	SP	DL
	<i>Perimyotis subflavus</i>	tricolored bat	AL	S3	-	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	AL	SX	SP	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	AL	S1	SP	E
	<i>Pleurobema oviforme</i>	Tennessee clubshell	AL	S1	PSM	PE
	<i>Pleurobema plenum</i>	rough pigtoe	AL	S1	SP	E, XN
	<i>Pleurocera curta</i>	shortspire hornsnail	AL	S1S2	-	UR
	<i>Pleuonaia dolabelloides</i>	slabside pearlymussel	AL	S1	SP	E

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Hiwassee Dam						
	<i>Cryptobranchus alleganiensis alleganiensis</i>	eastern hellbender	NC	S3	SC	E, PE
	<i>Desmognathus aeneus</i>	seepage salamander	TN	S2	D	UR
	<i>Epioblasma florentina walkeri</i>	tan riffleshell	TN	S1	E	E
	<i>Fusconaia subrotunda</i>	longsolid	NC	S1	E	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	NC	S3B,S3N	T	DL
	<i>Moxostoma sp. 2</i>	sicklefin redhorse	NC	S2	T	UR
	<i>Myotis lucifugus</i>	little brown bat	NC	S3	SR	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	NC	S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	NC	S1S2	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	NC	S3	SR	PE
	<i>Pityopsis ruthii</i>	Ruth's golden aster	TN	S1	E	E
	<i>Platanthera integrilabia</i>	white fringeless orchid	NC	SH	SC-H	T
	<i>Pleurobema oviforme</i>	Tennessee clubshell	TN	S2S3	-	PE
	<i>Pleuroaia barnesiana</i>	Tennessee pigtoe	NC	S1	E	PE
	<i>Pleuroaia dolabelloides</i>	slabside pearlymussel	TN	S2	E	E
	<i>Potamogeton tennesseensis</i>	Tennessee pondweed	TN	S2	T	UR
	<i>Venustaconcha trabalis</i>	Tennessee bean	TN	S1	-	E
	<i>Zapus hudsonius</i>	meadow jumping mouse	NC	S3	WL	PS
John Sevier						
	<i>Erimonax monachus</i>	spotfin chub	TN	S2	T	T, XN
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Lemiox rimosus</i>	birdwing pearlymussel	TN	S1	E	E, XN
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Venustaconcha trabalis</i>	Tennessee bean	TN	S1	-	E
Johnsonville						
	<i>Charadrius melodus</i>	pipin plover	TN	-	-	E, T
	<i>Fimbristylis perpusilla</i>	Harper's fimbriatylis	TN	S1	E	UR
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Macrochelys temminckii</i>	alligator snapping turtle	TN	S2S3	T	PT
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Kemper County						
	<i>Strophitus radiatus</i>	rayed creekshell	MS	S2	-	UR
Kentucky Dam						
	<i>Alosa alabamae</i>	Alabama shad	KY	S1	E	UR
	<i>Apios priceana</i>	Price's potato-bean	KY	S1	E	T
	<i>Cumberlandia monodonta</i>	spectaclecase	KY	S1	E	E
	<i>Cyprogenia stegaria</i>	fanshell	KY	S1	E	E, XN
	<i>Falco peregrinus</i>	peregrine falcon	KY	S1B	E	PS:LE
	<i>Fusconaia subrotunda</i>	longsolid	KY	S3	S	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	KY	S3B, S3S 4N	S	DL
	<i>Lampsilis abrupta</i>	pink mucket	KY	S1	E	E
	<i>Myotis grisescens</i>	gray bat	KY	S2	T	E
	<i>Myotis lucifugus</i>	little brown bat	KY	S2	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	KY	S1	E	E
	<i>Perimyotis subflavus</i>	tricolored bat	KY	S2	T	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	KY	S1	E	E, XN
	<i>Pleurobema oviforme</i>	Tennessee clubshell	KY	S1	E	PE
	<i>Pleurocera curta</i>	shortspire hornsnail	KY	S2	S	UR
	<i>Quadrula cylindrica cylindrica</i>	smooth rabbitsfoot	KY	S2	T	T
	<i>Vireo bellii</i>	Bell's vireo	KY	S2S3B	S	PS

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Kingston						
	<i>Acipenser fulvescens</i>	lake sturgeon	TN	S1	E	UR
	<i>Conradina verticillata</i>	Cumberland rosemary	TN	S3	T	T
	<i>Cumberlandia monodonta</i>	spectaclecase	TN	S2S3	E	E
	<i>Epioblasma capsaeformis</i>	oyster mussel	TN	S1	E	E, XN
	<i>Erimonax monachus</i>	spotfin chub	TN	S2	T	T, XN
	<i>Fusconaia cuneolus</i>	fine-rayed pigtoe	TN	S1	E	E, XN
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Io fluvialis</i>	spiny riversnail	TN	S2	-	UR
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Lampsilis virescens</i>	Alabama lampmussel	TN	S1	E	E, XN
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Obovaria retusa</i>	ring pink	TN	S1	E	E, XN
	<i>Plethobasus cicatricosus</i>	white wartyback	TN	S1	E	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleuroaia dolabellodes</i>	slabside pearlymussel	TN	S2	E	E
	<i>Potamogeton tennesseensis</i>	Tennessee pondweed	TN	S2	T	UR
	<i>Spiraea virginiana</i>	Virginia spiraea	TN	S2	E	T
	<i>Venustaconcha trabalis</i>	Tennessee bean	TN	S1	-	E
	<i>Vermivora chrysoptera</i>	golden-winged warbler	TN	S3B	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Marshall						
	<i>Acipenser fulvescens</i>	lake sturgeon	KY	S1	E	UR
	<i>Cyprogenia stegaria</i>	fanshell	KY	S1	E	E, XN
	<i>Fusconaia subrotunda</i>	longsolid	KY	S3	S	T
	<i>Lampsilis abrupta</i>	pink mucket	KY	S1	E	E
	<i>Macrochelys temminckii</i>	alligator snapping turtle	KY	S1	E	PT
	<i>Obovaria retusa</i>	ring pink	KY	S1	E	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	KY	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	KY	S1	E	E
	<i>Pleurobema rubrum</i>	pyramid pigtoe	KY	S1	E	PT
	<i>Pleurocera curta</i>	shortspire hornsnail	KY	S2	S	UR
	<i>Potamilus capax</i>	fat pocketbook	KY	S2	T	E
	<i>Quadrula cylindrica</i>	rabbitsfoot	KY	S2	E	T
	<i>Quadrula cylindrica cylindrica</i>	smooth rabbitsfoot	KY	S2	T	T
	<i>Sterna antillarum athalassos</i>	interior least tern	KY	S1S2B	E	DL
Melton Hill Dam						
	<i>Accipiter striatus</i>	sharp-shinned hawk	TN	S3B	-	PS
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Cumberlandia monodonta</i>	spectaclecase	TN	S2S3	E	E
	<i>Cyprogenia stegaria</i>	fanshell	TN	S1	E	E, XN
	<i>Fusconaia cor</i>	shiny pigtoe pearlymussel	TN	S1	E	E, XN
	<i>Fusconaia cuneolus</i>	fine-rayed pigtoe	TN	S1	E	E, XN
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Obovaria retusa</i>	ring pink	TN	S1	E	E, XN
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cicatricosus</i>	white wartyback	TN	S1	E	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleuroaia dolabelloides</i>	slabside pearlymussel	TN	S2	E	E
	<i>Vermivora chrysoptera</i>	golden-winged warbler	TN	S3B	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Nickajack Dam						
	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	American hart's-tongue fern	TN	S1	E	T
	<i>Athearnia anthonyi</i>	Anthony's river snail	AL	S1	SP	E, XN
	<i>Cyprogenia stegaria</i>	fanshell	TN	S1	E	E, XN
	<i>Epioblasma triquetra</i>	snuffbox	AL	S1	PSM	E
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	AL	S2	SP	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Platanthera integrilabia</i>	white fringeless orchid	AL	S2	-	T
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	AL	SX	SP	E, XN
	<i>Pleuroaia dolabelloides</i>	slabside pearlymussel	AL	S1	SP	E
	<i>Scutellaria montana</i>	large-flowered skullcap	TN	S4	T	T
Norris Dam						
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Cumberlandia monodonta</i>	spectaclecase	TN	S2S3	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Obovaria retusa</i>	ring pink	TN	S1	E	E, XN
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cicatricosus</i>	white wartyback	TN	S1	E	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleuroaia dolabelloides</i>	slabside pearlymussel	TN	S2	E	E
	<i>Vermivora chrysoptera</i>	golden-winged warbler	TN	S3B	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
North Alabama Solar						
	<i>Elimia nassula</i>	round-rib elimia	AL	S1	-	UR
	<i>Epioblasma brevidens</i>	Cumberlandian combshell	AL	S1	SP	E, XN
	<i>Etheostoma tuscumbia</i>	Tuscumbia darter	AL	S2	SP	UR
	<i>Haliaeetus leucocephalus</i>	bald eagle	AL	S4B	SP	DL
	<i>Helianthus eggertii</i>	Eggert's sunflower	AL	S3	S	DL
	<i>Lampsilis abrupta</i>	pink mucket	AL	S1	SP	E
	<i>Leavenworthia crassa</i>	fleshy-fruit gladeceess	AL	S2	-	E
	<i>Myotis grisescens</i>	gray bat	AL	S2	SP	E
	<i>Pleuonaia barnesiana</i>	Tennessee pigtoe	AL	S1	PSM	PE
	<i>Ptychobranhus subtentum</i>	fluted kidneyshell	AL	SX	SP	E
Nottely Dam						
	<i>Cryptobranhus alleganiensis alleganiensis</i>	eastern hellbender	GA	-	-	PS:E,UR
	<i>Desmognathus aeneus</i>	seepage salamander	NC	S3	WL	UR
	<i>Glyptemys muhlenbergii</i>	bog turtle	GA	S2	E	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	GA	S3	T	DL
	<i>Moxostoma sp. 2</i>	sicklefin redhorse	NC	S2	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	GA	E	T	E
	<i>Perimyotis subflavus</i>	tricolored bat	NC	S3	SR	PE
	<i>Torreya taxifolia</i>	Florida torreya	GA	S1	E	E
Paradise						
	<i>Cryptobranhus alleganiensis alleganiensis</i>	eastern hellbender	KY	S2S3	S	E, PE
	<i>Cyprogenia stegaria</i>	fanshell	KY	S1	E	E, XN
	<i>Falco peregrinus</i>	peregrin falcon	KY	S1B	E	PS:LE
	<i>Fusconaia subrotunda</i>	longsolid	KY	S3	S	T
	<i>Gallinula galeata</i>	common gallinule	KY	S1S2B	T	PS
	<i>Haliaeetus leucocephalus</i>	bald eagle	KY	S3B,S3S 4N	S	DL
	<i>Lampsilis abrupta</i>	pink mucket	KY	S1	E	E
	<i>Perimyotis subflavus</i>	tricolored bat	KY	S2	T	PE
	<i>Pleurobema plenum</i>	rough pigtoe	KY	S1	E	E, XN
	<i>Pleurobema rubrum</i>	pyramid pigtoe	KY	S1	E	PT
	<i>Vireo bellii</i>	Bell's vireo	KY	S2S3B	S	PS

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Pickwick Landing Dam						
	<i>Athearnia anthonyi</i>	Anthony's river snail	AL	S1	SP	E, XN
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Cumberlandia monodonta</i>	spectaclecase	TN	S2S3	E	E
	<i>Cyprogenia stegaria</i>	fanshell	AL	S1	SP	E, XN
	<i>Dromus dromas</i>	dromedary pearlymussel	AL	SX	SP	E, XN
	<i>Epioblasma brevidens</i>	Cumberlandian combshell	AL	S1	SP	E, XN
	<i>Epioblasma capsaeformis</i>	oyster mussel	AL	SX	SP	E, XN
	<i>Epioblasma florentina florentina</i>	yellow-blossom pearlymussel	AL	SX	SP	DL
	<i>Epioblasma torulosa torulosa</i>	tuberculed blossom pearlymussel	AL	SX	SP	DL
	<i>Fusconaia cor</i>	shiny pigtoe pearlymussel	AL	S1	SP	E, XN
	<i>Fusconaia subrotunda</i>	longsolid	AL	S1	PSM	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Hemistena lata</i>	cracking pearlymussel	TN	S1	E	E, XN
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Lemiox rimosus</i>	birdwing pearlymussel	AL	S1	SP	E, XN
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Obovaria retusa</i>	ring pink	AL	SH	SP	E, XN
	<i>Obovaria subrotunda</i>	round hickorynut	AL	S2	PSM	T
	<i>Orconectes wrighti</i>	Hardin crayfish	TN	S2	E	UR
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cicatricosus</i>	white wartyback	TN	S1	E	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleurobema clava</i>	clubshell	TN	SH	E	E, XN
	<i>Pleurobema oviforme</i>	Tennessee clubshell	AL	S1	PSM	PE
	<i>Pleurobema plenum</i>	rough pigtoe	TN	S1	E	E, XN
	<i>Pleurobema rubrum</i>	pyramid pigtoe	AL	S1	SP	PT
	<i>Pleuonaia dolabelloides</i>	slabside pearlymussel	AL	S1	SP	E
	<i>Ptychobranchus subtentum</i>	fluted kidneyshell	AL	SX	SP	E
	<i>Quadrula cylindrica cylindrica</i>	smooth rabbitsfoot	AL	S1	SP	T
	<i>Quadrula intermedia</i>	Cumberland monkeyface	AL	SX	SP	E, XN
	<i>Toxolasma cylindrellus</i>	pale lilliput	AL	S1	SP	E

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Raccoon Mountain						
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Isotria medeoloides</i>	small whorled pogonia	TN	S1	E	T
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Platanthera integrilabia</i>	white fringeless orchid	TN	S2S3	E	T
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Pleurobema plenum</i>	rough pigtoe	TN	S1	E	E, XN
	<i>Scutellaria montana</i>	large-flowered skullcap	TN	S4	T	T
Sequoyah						
	<i>Chrosomus saylori</i>	laurel dace	TN	S1	E	E
	<i>Cyprogenia stegaria</i>	fanshell	TN	S1	E	E, XN
	<i>Dromus dromas</i>	dromedary pearlymussel	TN	S1	E	E, XN
	<i>Fusconaia cor</i>	shiny pigtoe pearlymussel	TN	S1	E	E, XN
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleurobema plenum</i>	rough pigtoe	TN	S1	E	E, XN
	<i>Scutellaria montana</i>	large-flowered skullcap	TN	S4	T	T
	<i>Vermivora chrysoptera</i>	golden-winged warbler	TN	S3B	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Shawnee						
	<i>Haliaeetus leucocephalus</i>	bald eagle	KY	S3B,S3S 4N	S	DL
	<i>Lampsilis abrupta</i>	pink mucket	KY	S1	E	E
	<i>Myotis lucifugus</i>	little brown bat	KY	-	-	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	KY	S1	E	E
	<i>Myotis sodalis</i>	Indiana bat	KY	S1S2	E	E
	<i>Perimyotis subflavus</i>	tricolored bat	KY	S2	T	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	KY	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	KY	S1	E	E
	<i>Potamilus capax</i>	fat pocketbook	KY	S2	T	E
	<i>Quadrula cylindrica cylindrica</i>	smooth rabbitsfoot	KY	S2	T	T
	<i>Sterna antillarum athalassos</i>	interior least tern	KY	S1S2B	E	DL
	<i>Vireo bellii</i>	Bell's vireo	KY	S2S3B	S	PS
S Holston Dam						
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Laterallus jamaicensis</i>	black rail	VA	S1B,S1N	LE	T
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Percina williamsi</i>	sickle darter	TN	S2	T	T
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Tsuga caroliniana</i>	Carolina hemlock	TN	S3	T	UR
Tellico Dam						
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Tims Ford Dam						
	<i>Epioblasma brevidens</i>	Cumberlandian combshell	TN	S1	E	E, XN
	<i>Etheostoma wapiti</i>	boulder darter	TN	S1	E	E, XN
	<i>Helianthus eggertii</i>	Eggert's sunflower	TN	S3	S	DL
	<i>Hemistena lata</i>	cracking pearlymussel	TN	S1	E	E, XN
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Quadrula cylindrica cylindrica</i>	smooth rabbitsfoot	TN	S3	T	T
	<i>Villosa fabalis</i>	rayed bean	TN	S1	E	E
Vonore Battery Storage						
	<i>Acipenser fulvescens</i>	lake sturgeon	TN	S1	E	UR
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
Watauga Dam						
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Isotria medeoloides</i>	small whorled pogonia	TN	S1	E	T
	<i>Minuartia godfreyi</i>	Godfrey's stitchwort	TN	S1	E	UR
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Tsuga caroliniana</i>	Carolina hemlock	TN	S3	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Watts Bar Nuclear						
	<i>Chrosomus saylori</i>	laurel dace	TN	S1	E	E
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Cyprogenia stegaria</i>	fanshell	TN	S1	E	E, XN
	<i>Dromus dromas</i>	dromedary pearlymussel	TN	S1	E	E, XN
	<i>Fusconaia cor</i>	shiny pigtoe pearlymussel	TN	S1	E	E, XN
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleurobema oviforme</i>	Tennessee clubshell	TN	S2S3	-	PE
	<i>Pleurobema plenum</i>	rough pigtoe	TN	S1	E	E, XN
	<i>Pleurobema rubrum</i>	pyramid pigtoe	TN	S1S2	-	PT
	<i>Scutellaria montana</i>	large-flowered skullcap	TN	S4	T	T
	<i>Vermivora chrysoptera</i>	golden-winged warbler	TN	S3B	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Watts Bar Dam						
	<i>Acipenser fulvescens</i>	lake sturgeon	TN	S1	E	UR
	<i>Chrosomus saylori</i>	laurel dace	TN	S1	E	E
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Cyprogenia stegaria</i>	fanshell	TN	S1	E	E, XN
	<i>Dromus dromas</i>	dromedary pearlymussel	TN	S1	E	E, XN
	<i>Fusconaia cor</i>	shiny pigtoe pearlymussel	TN	S1	E	E, XN
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Lampsilis abrupta</i>	pink mucket	TN	S2	E	E
	<i>Myotis grisescens</i>	gray bat	TN	S2	E	E
	<i>Myotis lucifugus</i>	little brown bat	TN	S3	T	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Myotis sodalis</i>	Indiana bat	TN	S1	E	E
	<i>Percina tanasi</i>	snail darter	TN	S2S3	T	DL
	<i>Perimyotis subflavus</i>	tricolored bat	TN	S2S3	T	PE
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	TN	S1	E	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	TN	S2S3	E	E
	<i>Pleurobema plenum</i>	rough pigtoe	TN	S1	E	E, XN
	<i>Pleurobema rubrum</i>	pyramid pigtoe	TN	S1S2	-	PT
	<i>Scutellaria montana</i>	large-flowered skullcap	TN	S4	T	T
	<i>Vermivora chrysoptera</i>	golden-winged warbler	TN	S3B	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Wheeler Dam						
	<i>Cumberlandia monodonta</i>	spectaclecase	AL	S1	SP	E
	<i>Cyprogenia stegaria</i>	fanshell	AL	S1	SP	E, XN
	<i>Epioblasma brevidens</i>	Cumberlandian combshell	AL	S1	SP	E, XN
	<i>Epioblasma capsaeformis</i>	oyster mussel	AL	SX	SP	E, XN
	<i>Epioblasma obliquata obliquata</i>	purple catspaw	AL	SX	SP	E, XN
	<i>Epioblasma triquetra</i>	snuffbox	AL	S1	PSM	E
	<i>Etheostoma tuscumbia</i>	Tuscumbia darter	AL	S2	SP	UR
	<i>Fusconaia cuneolus</i>	fine-rayed pigtoe	AL	S1	SP	E, XN
	<i>Fusconaia subrotunda</i>	longsolid	AL	S1	PSM	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	AL	S4B	SP	DL
	<i>Helianthus eggertii</i>	Eggert's sunflower	AL	S3	S	DL
	<i>Lampsilis abrupta</i>	pink mucket	AL	S1	SP	E
	<i>Leptodea leptodon</i>	scaleshell	AL	SX	SP	E
	<i>Macrochelys temminckii</i>	alligator snapping turtle	AL	S3	SP	PT
	<i>Medionidus conradicus</i>	Cumberland moccasinshell	AL	S1	SP	PE
	<i>Myotis grisescens</i>	gray bat	AL	S2	SP	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	AL	S2	SP	E
	<i>Myotis sodalis</i>	Indiana bat	AL	S2	SP	E
	<i>Obovaria retusa</i>	ring pink	AL	SH	SP	E, XN
	<i>Obovaria subrotunda</i>	round hickorynut	AL	S2	PSM	T
	<i>Palaemonias alabamiae</i>	Alabama blind cave shrimp	AL	S1	SP	E
	<i>Percina tanasi</i>	snail darter	AL	S1	SP	DL
	<i>Plethobasus cicatricosus</i>	white wartyback	AL	S1	SP	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	AL	SX	SP	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	AL	S1	SP	E
	<i>Pleurobema oviforme</i>	Tennessee clubshell	AL	S1	PSM	PE
	<i>Pleurobema plenum</i>	rough pigtoe	AL	S1	SP	E, XN
	<i>Pleuronaia barnesiana</i>	Tennessee pigtoe	AL	S1	PSM	PE
	<i>Pleuronaia dolabelloides</i>	slabside pearlymussel	AL	S1	SP	E
	<i>Ptychobranhus subtentum</i>	fluted kidneyshell	AL	SX	SP	E
	<i>Speoplatyrhinus poulsoni</i>	Alabama cavefish	AL	S1	SP	E
Wilbur Dam						
	<i>Cryptobranchus alleganiensis</i>	hellbender	TN	S3	E	PS
	<i>Haliaeetus leucocephalus</i>	bald eagle	TN	-	D	DL
	<i>Minuartia godfreyi</i>	Godfrey's stitchwort	TN	S1	E	UR
	<i>Myotis septentrionalis</i>	northern long-eared bat	TN	S1S2	T	E
	<i>Tsuga caroliniana</i>	Carolina hemlock	TN	S3	T	UR

Facility	Scientific Name	Common Name	State	State Rank	State Status	Federal Status
Wilson Dam						
	<i>Cumberlandia monodonta</i>	spectaclecase	AL	S1	SP	E
	<i>Cyprogenia stegaria</i>	fanshell	AL	S1	SP	E, XN
	<i>Epioblasma brevidens</i>	Cumberlandian combshell	AL	S1	SP	E, XN
	<i>Epioblasma capsaeformis</i>	oyster mussel	AL	SX	SP	E, XN
	<i>Epioblasma obliquata obliquata</i>	purple catspaw	AL	SX	SP	E, XN
	<i>Epioblasma triquetra</i>	snuffbox	AL	S1	PSM	E
	<i>Fusconaia cuneolus</i>	fine-rayed pigtoe	AL	S1	SP	E, XN
	<i>Fusconaia subrotunda</i>	longsolid	AL	S1	PSM	T
	<i>Haliaeetus leucocephalus</i>	bald eagle	AL	S4B	SP	DL
	<i>Hemistena lata</i>	cracking pearlymussel	AL	S1	SP,P1	E, XN
	<i>Lampsilis abrupta</i>	pink mucket	AL	S1	SP	E
	<i>Lemiox rimosus</i>	birdwing pearlymussel	AL	S1	SP	E, XN
	<i>Leptodea leptodon</i>	scaleshell	AL	SX	SP	E
	<i>Macrochelys temminckii</i>	alligator snapping turtle	AL	S3	SP	PT
	<i>Medionidus conradicus</i>	Cumberland moccasinshell	AL	S1	SP	PE
	<i>Myotis grisescens</i>	gray bat	AL	S2	SP	E
	<i>Myotis septentrionalis</i>	northern long-eared bat	AL	S2	SP	E
	<i>Myotis sodalis</i>	Indiana bat	AL	S2	SP	E
	<i>Obovaria retusa</i>	ring pink	AL	SH	SP	E, XN
	<i>Obovaria subrotunda</i>	round hickorynut	AL	S2	PSM	T
	<i>Palaemonias alabamæ</i>	Alabama blind cave shrimp	AL	S1	SP	E
	<i>Percina tanasi</i>	snail darter	AL	S1	SP	DL
	<i>Plethobasus cicatricosus</i>	white wartyback	AL	S1	SP	E, XN
	<i>Plethobasus cooperianus</i>	orange-foot pimpleback	AL	SX	SP	E, XN
	<i>Plethobasus cyphus</i>	sheepnose	AL	S1	SP	E
	<i>Pleurobema clava</i>	clubshell	AL	SX	SP	E, XN
	<i>Pleurobema oviforme</i>	Tennessee clubshell	AL	S1	PSM	PE
	<i>Pleurobema plenum</i>	rough pigtoe	AL	S1	SP	E, XN
	<i>Pleurobema rubrum</i>	pyramid pigtoe	AL	S1	SP	PT
	<i>Pleurocera corpulenta</i>	corpulent hornsnail	AL	S1	-	UR
	<i>Pleurocera curta</i>	shortspire hornsnail	AL	S1S2	-	UR
	<i>Pleuonaia barnesiana</i>	Tennessee pigtoe	AL	S1	PSM	PE
	<i>Pleuonaia dolabelloides</i>	slabside pearlymussel	AL	S1	SP	E
	<i>Ptychobranchus subtentum</i>	fluted kidneyshell	AL	SX	SP	E
	<i>Quadrula cylindrica cylindrica</i>	smooth rabbitsfoot	AL	S1	SP	T
	<i>Speoplatyrhinus poulsoni</i>	Alabama cavefish	AL	S1	SP	E
	<i>Villosa fabalis</i>	rayed bean	AL	SX	-	E



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Appendix B – Socioeconomics

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PRELIMINARY

Appendix B - Socioeconomics

B.1 Counties within the TVA PSA

State	County		
Alabama	Blount County Cherokee County Colbert County Cullman County DeKalb County	Etowah County Franklin County Jackson County Lauderdale County Lawrence County	Limestone County Madison County Marshall County Morgan County Winston County
Georgia	Catoosa County Chattooga County Dade County Fannin County	Gilmer County Gordon County Murray County Towns County	Union County Walker County Whitfield County
Kentucky	Allen County Butler County Calloway County Carlisle County Christian County Cumberland County Edmonson County	Fulton County Graves County Grayson County Hickman County Livingston County Logan County Lyon County	Marshall County Monroe County Simpson County Todd County Trigg County Warren County
Mississippi	Alcorn County Attala County Benton County Calhoun County Chickasaw County Choctaw County Clay County De Soto County Itawamba County Kemper County Lafayette County	Leake County Lee County Lowndes County Marshall County Monroe County Neshoba County Noxubee County Oktibbeha County Panola County Pontotoc County	Prentiss County Scott County Tallahatchie County Tate County Tippah County Tishomingo County Union County Webster County Winston County Yalobusha County
North Carolina	Avery County Cherokee County	Clay County Watauga County	

State	County		
Tennessee	Anderson County	Hamilton County	Morgan County
	Bedford County	Hancock County	Obion County
	Benton County	Hardeman County	Overton County
	Bledsoe County	Hardin County	Perry County
	Blount County	Hawkins County	Pickett County
	Bradley County	Haywood County	Polk County
	Campbell County	Henderson County	Putnam County
	Cannon County	Henry County	Rhea County
	Carroll County	Hickman County	Roane County
	Carter County	Houston County	Robertson County
	Cheatham County	Humphreys County	Rutherford County
	Chester County	Jackson County	Scott County
	Claiborne County	Jefferson County	Sequatchie County
	Clay County	Johnson County	Sevier County
	Cocke County	Knox County	Shelby County
	Coffee County	Lake County	Smith County
	Crockett County	Lauderdale County	Stewart County
	Cumberland County	Lawrence County	Sullivan County
	Davidson County	Lewis County	Sumner County
	Decatur County	Lincoln County	Tipton County
	DeKalb County	Loudon County	Trousdale County
	Dickson County	McMinn County	Unicoi County
	Dyer County	McNairy County	Union County
	Fayette County	Macon County	Van Buren County
	Fentress County	Madison County	Warren County
	Franklin County	Marion County	Washington County
	Gibson County	Marshall County	Wayne County
	Giles County	Maury County	Weakley County
	Grainger County	Meigs County	White County
	Greene County	Monroe County	Williamson County
	Grundy County	Montgomery County	Wilson County
	Hamblen County	Moore County	
Virginia Counties and Independent Cities	Lee County	Washington County	Bristol City
	Scott County	Wise County	Norton City

B.2 Limited-Income Counties in the TVA PSA

Geography	Population 16 years and Over	Per Capita Income (\$)	Poverty (%)
Lawrence County, Alabama	26,784	29,486	15.8
Colbert County, Alabama	46,692	30,724	15.9
Etowah County, Alabama	83,569	28,479	15.9
Franklin County, Alabama	24,985	24,874	16.6
Marshall County, Alabama	75,849	29,509	16.6
Winston County, Alabama	19,441	26,933	18.2
Jackson County, Alabama	43,027	27,695	18.6
DeKalb County, Alabama	56,883	24,915	20.2
Gilmer County, Georgia	26,144	34,412	14.8
Towns County, Georgia	11,180	33,443	15.3
Chattooga County, Georgia	19,821	21,576	19.9
Logan County, Kentucky	21,629	27,741	15.7
Muhlenberg County, Kentucky	25,111	31,621	16.3
Allen County, Kentucky	16,412	28,307	16.5
Christian County, Kentucky	54,414	25,973	16.7
Hickman County, Kentucky	3,724	38,895	16.7
Livingston County, Kentucky	7,432	31,024	16.8
Edmonson County, Kentucky	10,186	26,781	17.0
Warren County, Kentucky	107,619	34,201	17.2
Trigg County, Kentucky	11,426	30,172	18.2
Calloway County, Kentucky	31,421	27,850	18.7
Butler County, Kentucky	9,872	23,862	19.8
Graves County, Kentucky	28,886	28,978	19.8
Carlisle County, Kentucky	3,790	31,403	20.1
Monroe County, Kentucky	9,035	26,549	20.9
Grayson County, Kentucky	20,959	25,565	21.1
Todd County, Kentucky	9,432	30,252	21.1
Fulton County, Kentucky	5,273	19,960	27.4
Cumberland County, Kentucky	4,784	22,668	28.3
Webster County, Mississippi	7,802	27,836	15.8
Prentiss County, Mississippi	20,085	27,979	16.3
Monroe County, Mississippi	27,302	27,619	16.7
Pontotoc County, Mississippi	23,824	26,359	16.7
Tate County, Mississippi	22,445	28,306	16.7
Alcorn County, Mississippi	27,882	27,320	17.1
Benton County, Mississippi	6,299	24,690	17.6
Lowndes County, Mississippi	46,255	29,750	18.1
Calhoun County, Mississippi	10,644	24,192	18.8
Tippah County, Mississippi	17,150	27,762	18.9
Choctaw County, Mississippi	6,615	27,628	19.1
Tishomingo County, Mississippi	15,268	26,896	19.2
Marshall County, Mississippi	27,768	27,680	19.5
Lafayette County, Mississippi	46,935	32,536	19.6
Panola County, Mississippi	25,797	25,822	20.4
Yalobusha County, Mississippi	10,171	24,719	20.5

Geography	Population 16 years and Over	Per Capita Income (\$)	Poverty (%)
Leake County, Mississippi	17,041	25,662	21.0
Scott County, Mississippi	21,373	23,043	21.9
Kemper County, Mississippi	7,547	22,046	22.0
Clay County, Mississippi	14,892	24,702	23.0
Noxubee County, Mississippi	7,996	19,804	23.2
Attala County, Mississippi	13,759	27,625	23.6
Tallahatchie County, Mississippi	10,281	20,348	25.7
Winston County, Mississippi	14,208	27,743	26.0
Chickasaw County, Mississippi	13,269	21,968	26.6
Neshoba County, Mississippi	22,051	23,538	28.0
Oktibbeha County, Mississippi	43,626	28,221	28.5
Cherokee County, North Carolina	24,817	28,752	16.7
Watauga County, North Carolina	48,773	30,807	24.9
Smith County, Tennessee	16,117	31,446	14.9
Cannon County, Tennessee	11,799	30,234	15.1
Sullivan County, Tennessee	132,231	33,934	15.2
Anderson County, Tennessee	62,800	32,803	15.4
Meigs County, Tennessee	10,544	26,843	15.4
Crockett County, Tennessee	10,987	30,362	15.6
Greene County, Tennessee	58,501	28,237	15.6
Marshall County, Tennessee	27,611	32,225	15.6
Rhea County, Tennessee	26,860	26,678	15.7
Washington County, Tennessee	111,727	35,562	15.7
Chester County, Tennessee	14,082	24,788	15.8
Union County, Tennessee	16,123	28,174	15.9
Monroe County, Tennessee	38,029	27,356	16.0
Hardeman County, Tennessee	21,321	22,098	16.1
Lawrence County, Tennessee	34,372	26,865	16.1
Obion County, Tennessee	24,703	28,782	16.1
Dyer County, Tennessee	28,929	37,415	16.3
Marion County, Tennessee	23,698	29,314	16.3
Putnam County, Tennessee	65,684	29,419	16.3
Carroll County, Tennessee	22,845	26,818	16.4
Macon County, Tennessee	19,914	24,979	16.5
McNairy County, Tennessee	21,082	25,004	16.7
Unicoi County, Tennessee	14,956	27,930	16.7
Warren County, Tennessee	32,671	27,059	16.8
Coffee County, Tennessee	45,845	29,277	16.9
Hawkins County, Tennessee	47,568	28,648	16.9
Van Buren County, Tennessee	5,156	24,099	17.0
Hamblen County, Tennessee	51,238	27,845	17.1
White County, Tennessee	21,993	26,213	17.1
Overton County, Tennessee	18,398	29,556	17.3
Grainger County, Tennessee	19,744	26,545	17.6
Benton County, Tennessee	13,164	27,185	18.0
Henderson County, Tennessee	22,415	25,873	18.0
Lauderdale County, Tennessee	20,161	24,358	18.0

Geography	Population 16 years and Over	Per Capita Income (\$)	Poverty (%)
Carter County, Tennessee	47,403	28,321	18.1
Henry County, Tennessee	26,438	28,098	18.1
Shelby County, Tennessee	721,643	36,230	18.1
Grundy County, Tennessee	11,124	25,075	18.2
Madison County, Tennessee	79,529	31,380	18.2
Claiborne County, Tennessee	26,655	25,408	18.3
Lewis County, Tennessee	10,232	26,873	18.9
Weakley County, Tennessee	27,581	26,820	18.9
Decatur County, Tennessee	9,438	27,578	19.2
Campbell County, Tennessee	32,109	26,791	19.4
Hardin County, Tennessee	22,102	26,068	19.4
Wayne County, Tennessee	13,806	26,538	19.6
Jackson County, Tennessee	9,973	25,534	19.7
Cocke County, Tennessee	29,708	25,864	20.1
DeKalb County, Tennessee	16,416	27,684	20.2
Fentress County, Tennessee	15,403	24,595	20.2
Morgan County, Tennessee	17,542	27,320	20.9
Pickett County, Tennessee	4,201	27,259	21.0
Johnson County, Tennessee	15,396	26,627	21.6
Haywood County, Tennessee	14,396	26,031	21.9
Clay County, Tennessee	6,208	22,931	22.3
Sequatchie County, Tennessee	13,212	25,954	22.3
Scott County, Tennessee	17,387	22,273	25.7
Bledsoe County, Tennessee	12,644	24,241	26.0
Lake County, Tennessee	6,018	19,695	27.9
Hancock County, Tennessee	5,417	24,120	32.3
Bristol city, Virginia	13,904	30,419	17.0
Scott County, Virginia	18,094	26,681	17.0
Wise County, Virginia	30,055	23,702	19.9
Lee County, Virginia	18,676	23,257	26.0
Norton city, Virginia	3,138	27,666	29.1

Source: USCB 2023f

B.3 Low-Income Census Tracts in the TVA PSA

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 207.05; Colbert County; Alabama	913	26,663	14.8
Census Tract 9792.01; Lawrence County; Alabama	1,464	25,628	14.9
Census Tract 307.02; Marshall County; Alabama	3,175	38,894	14.9
Census Tract 9558.01; Cherokee County; Alabama	1,852	23,869	15.0
Census Tract 104.01; Etowah County; Alabama	3,232	21,477	15.0
Census Tract 9506.01; Jackson County; Alabama	3,195	23,851	15.0
Census Tract 310.01; Marshall County; Alabama	2,443	22,629	15.0
Census Tract 208.02; Colbert County; Alabama	2,850	28,554	15.1
Census Tract 9649.01; Cullman County; Alabama	3,035	37,422	15.2
Census Tract 9793; Lawrence County; Alabama	3,335	35,025	15.3
Census Tract 14.04; Madison County; Alabama	3,194	36,939	15.4
Census Tract 112.02; Madison County; Alabama	4,545	52,382	15.4
Census Tract 57.01; Morgan County; Alabama	1,697	29,545	15.4
Census Tract 57.03; Morgan County; Alabama	2,578	31,875	15.5
Census Tract 31; Madison County; Alabama	5,078	49,399	15.6
Census Tract 110.02; Etowah County; Alabama	3,855	22,382	15.7
Census Tract 505.02; Blount County; Alabama	2,911	32,678	15.8
Census Tract 304.01; Marshall County; Alabama	3,757	31,212	15.8
Census Tract 9561.02; Cherokee County; Alabama	1,918	24,271	15.9
Census Tract 9657; Winston County; Alabama	3,163	29,720	15.9
Census Tract 9729; Franklin County; Alabama	3,113	24,515	16.1
Census Tract 5.02; Madison County; Alabama	1,627	31,700	16.2
Census Tract 9642.02; Cullman County; Alabama	2,742	24,585	16.6
Census Tract 17; Etowah County; Alabama	1,124	26,497	16.8
Census Tract 111; Etowah County; Alabama	3,985	24,836	16.9
Census Tract 104.05; Madison County; Alabama	3,181	45,558	16.9
Census Tract 9558.02; Cherokee County; Alabama	2,318	31,300	17.0
Census Tract 9602; DeKalb County; Alabama	2,666	24,020	17.1
Census Tract 7.02; Madison County; Alabama	2,395	30,742	17.1
Census Tract 109.01; Lauderdale County; Alabama	3,090	30,844	17.3
Census Tract 9641; Cullman County; Alabama	5,145	28,445	17.4
Census Tract 9; Etowah County; Alabama	2,111	21,511	17.6
Census Tract 308.01; Marshall County; Alabama	3,815	31,889	17.6
Census Tract 501.07; Blount County; Alabama	2,042	23,043	17.7
Census Tract 9606.02; DeKalb County; Alabama	3,931	25,305	17.8
Census Tract 201.04; Limestone County; Alabama	2,743	27,553	17.8
Census Tract 9504; Jackson County; Alabama	1,806	38,913	17.9
Census Tract 206; Limestone County; Alabama	3,880	22,903	17.9
Census Tract 9510; Jackson County; Alabama	3,569	28,695	18.0
Census Tract 14.03; Madison County; Alabama	2,066	40,351	18.1
Census Tract 103; Etowah County; Alabama	2,326	23,128	18.2
Census Tract 6.02; Madison County; Alabama	1,798	30,976	18.5
Census Tract 9792.02; Lawrence County; Alabama	1,870	25,583	18.6
Census Tract 204.04; Limestone County; Alabama	2,513	58,030	18.6
Census Tract 25.02; Madison County; Alabama	2,852	22,233	18.7

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9605; DeKalb County; Alabama	5,303	23,222	18.8
Census Tract 308.04; Marshall County; Alabama	3,793	17,610	18.8
Census Tract 53.05; Morgan County; Alabama	4,650	27,137	18.9
Census Tract 203; Limestone County; Alabama	2,675	34,130	19.2
Census Tract 501.03; Blount County; Alabama	1,614	29,396	19.3
Census Tract 9611; DeKalb County; Alabama	2,602	23,331	19.3
Census Tract 106; Lauderdale County; Alabama	2,183	25,518	19.3
Census Tract 205; Limestone County; Alabama	2,384	24,036	19.3
Census Tract 9655.02; Winston County; Alabama	2,981	31,126	19.3
Census Tract 503.02; Blount County; Alabama	2,130	24,425	19.4
Census Tract 307.01; Marshall County; Alabama	2,775	31,594	19.4
Census Tract 202; Colbert County; Alabama	1,478	22,512	19.5
Census Tract 9733; Franklin County; Alabama	2,610	24,243	19.5
Census Tract 9503.01; Jackson County; Alabama	2,132	25,326	19.7
Census Tract 15; Madison County; Alabama	5,425	20,873	20.1
Census Tract 51.09; Morgan County; Alabama	3,636	23,010	20.1
Census Tract 9730; Franklin County; Alabama	3,922	19,369	20.2
Census Tract 6.01; Madison County; Alabama	1,097	29,506	20.4
Census Tract 501.05; Blount County; Alabama	4,113	32,880	20.5
Census Tract 9; Morgan County; Alabama	4,495	22,269	20.5
Census Tract 308.03; Marshall County; Alabama	2,005	23,045	20.6
Census Tract 106.25; Madison County; Alabama	4,405	22,280	20.8
Census Tract 9655.03; Winston County; Alabama	2,451	27,346	20.9
Census Tract 9557.01; Cherokee County; Alabama	2,547	25,478	21.2
Census Tract 9607.02; DeKalb County; Alabama	1,236	25,111	21.2
Census Tract 107; Etowah County; Alabama	2,970	26,449	21.2
Census Tract 208.01; Colbert County; Alabama	3,744	33,718	21.3
Census Tract 211.01; Limestone County; Alabama	3,040	28,553	21.4
Census Tract 8; Morgan County; Alabama	2,174	23,590	21.4
Census Tract 205; Colbert County; Alabama	4,126	26,362	21.7
Census Tract 6; Etowah County; Alabama	1,785	17,336	21.7
Census Tract 9614; DeKalb County; Alabama	3,039	31,060	21.8
Census Tract 9603.03; DeKalb County; Alabama	3,604	26,475	22.1
Census Tract 302.04; Marshall County; Alabama	1,432	30,844	22.2
Census Tract 306.02; Marshall County; Alabama	3,578	28,834	22.5
Census Tract 52.02; Morgan County; Alabama	3,793	27,008	22.5
Census Tract 507.02; Blount County; Alabama	2,259	24,848	22.6
Census Tract 9653; Cullman County; Alabama	3,729	25,619	23.0
Census Tract 102; Lauderdale County; Alabama	1,777	28,096	23.0
Census Tract 9608; DeKalb County; Alabama	3,532	19,388	23.1
Census Tract 9656.02; Winston County; Alabama	2,587	22,144	23.1
Census Tract 9609; DeKalb County; Alabama	3,227	23,645	23.2
Census Tract 305.02; Marshall County; Alabama	3,911	31,618	23.2
Census Tract 110; Lauderdale County; Alabama	3,670	26,385	23.3
Census Tract 312; Marshall County; Alabama	4,262	24,146	23.3
Census Tract 9655.01; Winston County; Alabama	1,525	23,570	23.4
Census Tract 108; Lauderdale County; Alabama	2,623	18,842	23.6

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 311; Marshall County; Alabama	3,634	22,889	23.6
Census Tract 309.03; Marshall County; Alabama	3,684	23,337	24.1
Census Tract 9737.01; Franklin County; Alabama	1,014	22,960	24.2
Census Tract 9795.02; Lawrence County; Alabama	3,034	29,820	24.2
Census Tract 9734; Franklin County; Alabama	1,945	23,618	24.4
Census Tract 9794; Lawrence County; Alabama	3,749	24,501	24.5
Census Tract 301.01; Marshall County; Alabama	1,665	20,613	24.5
Census Tract 201; Colbert County; Alabama	2,960	30,897	24.7
Census Tract 108; Etowah County; Alabama	2,315	34,421	24.9
Census Tract 210; Colbert County; Alabama	3,059	29,298	25.3
Census Tract 9659; Winston County; Alabama	1,866	21,463	25.4
Census Tract 5.01; Madison County; Alabama	1,596	21,242	25.5
Census Tract 310.02; Marshall County; Alabama	2,601	18,983	25.7
Census Tract 1; Morgan County; Alabama	3,559	22,400	25.9
Census Tract 9507; Jackson County; Alabama	3,658	32,148	26.0
Census Tract 9508; Jackson County; Alabama	3,458	27,246	26.1
Census Tract 9502; Jackson County; Alabama	2,822	28,990	26.2
Census Tract 9606.01; DeKalb County; Alabama	996	26,988	26.3
Census Tract 9650.02; Cullman County; Alabama	3,592	29,958	26.6
Census Tract 501.06; Blount County; Alabama	2,322	22,148	27.3
Census Tract 107; Lauderdale County; Alabama	1,028	14,658	27.4
Census Tract 9607.03; DeKalb County; Alabama	3,539	22,581	27.5
Census Tract 109.02; Lauderdale County; Alabama	3,395	29,019	27.7
Census Tract 9501.01; Jackson County; Alabama	2,389	21,901	28.1
Census Tract 9654.01; Cullman County; Alabama	2,793	20,158	28.5
Census Tract 24; Madison County; Alabama	2,788	21,210	28.5
Census Tract 56.02; Morgan County; Alabama	1,804	29,076	28.6
Census Tract 3.01; Madison County; Alabama	3,069	21,318	28.9
Census Tract 12; Etowah County; Alabama	2,163	26,936	29.5
Census Tract 23; Madison County; Alabama	4,404	20,903	29.5
Census Tract 9503.02; Jackson County; Alabama	2,520	22,071	29.9
Census Tract 5; Etowah County; Alabama	1,424	20,902	31.0
Census Tract 112; Etowah County; Alabama	2,201	25,029	31.1
Census Tract 54.05; Morgan County; Alabama	4,054	27,138	31.7
Census Tract 2; Etowah County; Alabama	2,537	18,933	32.0
Census Tract 9736; Franklin County; Alabama	1,081	21,089	32.2
Census Tract 104; Lauderdale County; Alabama	2,921	24,694	32.8
Census Tract 7.01; Madison County; Alabama	2,294	23,670	33.8
Census Tract 22; Madison County; Alabama	1,588	19,803	34.1
Census Tract 9506.02; Jackson County; Alabama	1,671	24,884	34.4
Census Tract 9613; DeKalb County; Alabama	4,158	20,787	35.2
Census Tract 13.01; Madison County; Alabama	3,080	18,711	35.5
Census Tract 7; Morgan County; Alabama	2,935	16,115	35.5
Census Tract 2.03; Madison County; Alabama	5,173	10,815	35.6
Census Tract 3.02; Madison County; Alabama	3,167	14,035	35.9
Census Tract 207; Limestone County; Alabama	1,914	28,442	36.7
Census Tract 8; Etowah County; Alabama	864	15,001	36.9

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9607.01; DeKalb County; Alabama	1,802	18,173	37.1
Census Tract 25.01; Madison County; Alabama	2,149	15,797	38.9
Census Tract 9601.01; DeKalb County; Alabama	1,414	22,419	39.0
Census Tract 10; Etowah County; Alabama	858	18,152	39.3
Census Tract 30; Madison County; Alabama	2,110	16,823	39.9
Census Tract 13; Etowah County; Alabama	2,312	21,427	40.1
Census Tract 203; Colbert County; Alabama	1,866	21,696	41.5
Census Tract 21; Madison County; Alabama	1,878	16,168	41.5
Census Tract 101; Lauderdale County; Alabama	2,007	12,400	41.9
Census Tract 3; Etowah County; Alabama	1,750	13,430	42.0
Census Tract 6; Morgan County; Alabama	1,987	16,191	43.4
Census Tract 12; Madison County; Alabama	2,145	13,548	43.6
Census Tract 7; Etowah County; Alabama	653	10,940	50.2
Census Tract 103; Lauderdale County; Alabama	948	15,330	60.6
Census Tract 9708.02; Gordon County; Georgia	1,632	31,506	14.8
Census Tract 803.01; Gilmer County; Georgia	1,908	30,347	15.0
Census Tract 15; Whitfield County; Georgia	5,187	26,931	15.0
Census Tract 307.02; Catoosa County; Georgia	3,755	27,878	15.1
Census Tract 11; Whitfield County; Georgia	3,693	20,343	15.2
Census Tract 401.02; Dade County; Georgia	3,072	23,792	15.5
Census Tract 2; Whitfield County; Georgia	3,783	27,020	15.5
Census Tract 9702.01; Gordon County; Georgia	2,745	35,677	15.6
Census Tract 104.01; Murray County; Georgia	2,034	20,818	15.6
Census Tract 9603.02; Towns County; Georgia	2,023	33,717	15.6
Census Tract 1.04; Union County; Georgia	2,195	32,709	16.2
Census Tract 206.02; Walker County; Georgia	3,778	22,778	16.4
Census Tract 208; Walker County; Georgia	2,347	31,192	16.5
Census Tract 101; Chattooga County; Georgia	2,069	25,825	16.6
Census Tract 9703.02; Gordon County; Georgia	4,014	25,981	16.6
Census Tract 802; Gilmer County; Georgia	5,400	35,078	17.4
Census Tract 104.02; Murray County; Georgia	2,198	23,606	17.4
Census Tract 1.01; Whitfield County; Georgia	3,048	29,350	17.4
Census Tract 9602; Towns County; Georgia	3,432	32,940	17.6
Census Tract 9706.02; Gordon County; Georgia	2,855	18,960	17.8
Census Tract 2.03; Union County; Georgia	1,833	34,257	18.1
Census Tract 203.01; Walker County; Georgia	4,279	25,834	18.3
Census Tract 9704; Gordon County; Georgia	4,922	32,643	18.4
Census Tract 101; Murray County; Georgia	2,762	28,902	18.6
Census Tract 805; Gilmer County; Georgia	3,530	29,806	18.7
Census Tract 203.02; Walker County; Georgia	4,247	24,384	20.0
Census Tract 105.01; Chattooga County; Georgia	2,332	11,259	20.1
Census Tract 1.01; Union County; Georgia	3,380	39,100	20.2
Census Tract 201.01; Walker County; Georgia	3,076	27,352	20.3
Census Tract 103; Chattooga County; Georgia	1,835	24,975	20.4
Census Tract 9707; Gordon County; Georgia	3,920	26,292	20.5
Census Tract 202; Walker County; Georgia	2,745	26,910	20.6
Census Tract 103; Murray County; Georgia	3,586	22,608	21.0

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9701.02; Gordon County; Georgia	1,704	28,152	21.1
Census Tract 9705; Gordon County; Georgia	4,034	31,695	21.9
Census Tract 803.02; Gilmer County; Georgia	3,172	28,884	22.5
Census Tract 207.02; Walker County; Georgia	3,554	15,438	22.9
Census Tract 3.01; Whitfield County; Georgia	2,940	25,137	22.9
Census Tract 105.02; Chattooga County; Georgia	2,767	21,390	23.3
Census Tract 804.01; Gilmer County; Georgia	2,328	36,492	23.5
Census Tract 201.02; Walker County; Georgia	1,848	21,297	23.6
Census Tract 207.01; Walker County; Georgia	2,133	21,653	24.1
Census Tract 10; Whitfield County; Georgia	3,002	19,329	26.1
Census Tract 5.02; Whitfield County; Georgia	5,865	23,493	26.3
Census Tract 305.01; Catoosa County; Georgia	2,331	24,280	26.4
Census Tract 4.01; Whitfield County; Georgia	5,200	20,734	27.2
Census Tract 209.02; Walker County; Georgia	1,580	24,655	29.2
Census Tract 104.02; Chattooga County; Georgia	2,066	17,659	30.3
Census Tract 102.02; Chattooga County; Georgia	2,410	17,999	31.1
Census Tract 9203; Edmonson County; Kentucky	1,157	27,436	14.8
Census Tract 9602.02; Muhlenberg County; Kentucky	2,600	40,555	14.9
Census Tract 2002; Christian County; Kentucky	2,847	26,201	15.1
Census Tract 9301; Monroe County; Kentucky	1,543	31,215	15.2
Census Tract 9602; Logan County; Kentucky	2,990	28,388	15.3
Census Tract 9704.01; Simpson County; Kentucky	3,728	25,940	15.3
Census Tract 9206; Allen County; Kentucky	2,599	25,197	15.7
Census Tract 108.05; Warren County; Kentucky	2,968	37,866	16.1
Census Tract 117.02; Warren County; Kentucky	2,895	24,805	16.1
Census Tract 9702.02; Trigg County; Kentucky	2,857	31,126	16.2
Census Tract 107.01; Warren County; Kentucky	4,573	30,386	16.4
Census Tract 9304; Monroe County; Kentucky	3,837	25,915	16.5
Census Tract 9202; Edmonson County; Kentucky	3,550	24,235	16.6
Census Tract 9701; Hickman County; Kentucky	3,724	38,895	16.7
Census Tract 107.02; Warren County; Kentucky	5,868	36,279	16.7
Census Tract 2009.01; Christian County; Kentucky	2,144	50,036	16.8
Census Tract 2013.01; Christian County; Kentucky	2,725	25,592	16.8
Census Tract 9601; Logan County; Kentucky	4,155	26,918	16.8
Census Tract 9602.01; Muhlenberg County; Kentucky	3,167	23,743	17.2
Census Tract 9701; Simpson County; Kentucky	2,046	35,361	17.2
Census Tract 9703; Simpson County; Kentucky	3,661	29,145	17.4
Census Tract 113; Warren County; Kentucky	3,665	26,620	17.4
Census Tract 9506; Grayson County; Kentucky	2,816	24,599	17.5
Census Tract 9506.02; Marshall County; Kentucky	1,980	29,020	17.5
Census Tract 108; Calloway County; Kentucky	2,821	27,792	17.7
Census Tract 401; Livingston County; Kentucky	2,357	28,966	17.7
Census Tract 9604; Logan County; Kentucky	3,684	25,207	17.8
Census Tract 209; Graves County; Kentucky	2,445	26,367	17.9
Census Tract 9703.02; Trigg County; Kentucky	1,679	28,132	18.1
Census Tract 9603; Carlisle County; Kentucky	1,160	25,477	18.3
Census Tract 9204.02; Edmonson County; Kentucky	3,076	30,352	18.4

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9605; Muhlenberg County; Kentucky	2,999	44,620	18.6
Census Tract 2005; Christian County; Kentucky	3,173	27,893	18.9
Census Tract 9203; Allen County; Kentucky	3,952	25,997	19.0
Census Tract 9603; Logan County; Kentucky	4,807	25,241	19.0
Census Tract 9704.02; Simpson County; Kentucky	1,787	25,710	19.2
Census Tract 402.02; Livingston County; Kentucky	2,513	27,193	19.3
Census Tract 9603; Muhlenberg County; Kentucky	3,027	25,872	19.3
Census Tract 9204; Allen County; Kentucky	3,384	31,376	19.4
Census Tract 9201; Allen County; Kentucky	2,795	29,477	19.5
Census Tract 103.04; Calloway County; Kentucky	3,069	25,409	19.5
Census Tract 202; Graves County; Kentucky	3,669	27,885	19.5
Census Tract 9304; Butler County; Kentucky	1,433	25,372	19.6
Census Tract 104; Calloway County; Kentucky	2,035	23,762	19.6
Census Tract 106.01; Calloway County; Kentucky	2,254	26,506	19.7
Census Tract 9604; Muhlenberg County; Kentucky	4,150	29,619	19.7
Census Tract 9501.01; Grayson County; Kentucky	835	31,844	20.4
Census Tract 9702.01; Trigg County; Kentucky	2,326	28,119	20.4
Census Tract 9504.02; Grayson County; Kentucky	3,918	23,947	20.8
Census Tract 9602; Fulton County; Kentucky	2,341	21,229	20.9
Census Tract 2007; Christian County; Kentucky	4,591	30,422	21.4
Census Tract 2013.04; Christian County; Kentucky	2,302	20,844	21.4
Census Tract 9504.01; Grayson County; Kentucky	1,669	31,725	21.7
Census Tract 9503; Grayson County; Kentucky	3,119	20,477	22.2
Census Tract 110.02; Warren County; Kentucky	5,786	22,663	22.3
Census Tract 9502; Cumberland County; Kentucky	1,684	24,217	22.4
Census Tract 2004; Christian County; Kentucky	2,233	20,076	22.6
Census Tract 108.01; Warren County; Kentucky	2,985	51,880	22.6
Census Tract 205; Graves County; Kentucky	3,098	25,211	22.7
Census Tract 9502; Todd County; Kentucky	4,189	30,680	22.8
Census Tract 9506.03; Marshall County; Kentucky	860	45,661	22.9
Census Tract 9501.02; Marshall County; Kentucky	1,819	28,577	23.4
Census Tract 105; Calloway County; Kentucky	2,539	26,000	23.5
Census Tract 9303; Monroe County; Kentucky	2,051	26,342	24.2
Census Tract 9607; Muhlenberg County; Kentucky	2,544	21,057	24.2
Census Tract 9302; Butler County; Kentucky	1,332	20,929	24.3
Census Tract 9502; Grayson County; Kentucky	2,454	20,023	24.8
Census Tract 9507; Grayson County; Kentucky	1,754	25,778	25.3
Census Tract 9602; Carlisle County; Kentucky	1,449	21,925	25.9
Census Tract 2001; Christian County; Kentucky	3,337	19,605	26.6
Census Tract 110.01; Warren County; Kentucky	3,305	18,365	27.3
Census Tract 109; Warren County; Kentucky	3,658	39,472	27.8
Census Tract 2008; Christian County; Kentucky	1,971	13,318	28.7
Census Tract 9505; Grayson County; Kentucky	2,472	27,906	28.8
Census Tract 203.02; Graves County; Kentucky	1,448	26,566	29.5
Census Tract 9501; Cumberland County; Kentucky	3,100	21,878	31.3
Census Tract 9601; Fulton County; Kentucky	2,932	19,065	31.3
Census Tract 203.01; Graves County; Kentucky	2,813	23,705	31.4

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9503; Todd County; Kentucky	1,788	27,926	31.6
Census Tract 104; Warren County; Kentucky	4,445	6,736	31.7
Census Tract 9302; Monroe County; Kentucky	1,604	24,058	32.1
Census Tract 9505.02; Marshall County; Kentucky	2,282	23,864	32.6
Census Tract 9701; Trigg County; Kentucky	2,152	25,837	32.6
Census Tract 108.04; Warren County; Kentucky	2,982	24,484	32.8
Census Tract 112; Warren County; Kentucky	3,444	24,321	32.8
Census Tract 201; Graves County; Kentucky	3,574	27,286	33.6
Census Tract 9303.02; Butler County; Kentucky	2,443	18,902	40.0
Census Tract 102; Warren County; Kentucky	2,597	15,122	40.6
Census Tract 2003; Christian County; Kentucky	2,612	14,386	44.2
Census Tract 103.03; Calloway County; Kentucky	2,833	15,297	49.0
Census Tract 105; Warren County; Kentucky	2,654	22,747	52.1
Census Tract 103; Warren County; Kentucky	2,760	13,508	56.6
Census Tract 103.01; Calloway County; Kentucky	2,667	5,764	56.7
Census Tract 101; Warren County; Kentucky	2,885	16,636	60.6
Census Tract 9801; Edmonson County; Kentucky	157	8,568	76.2
Census Tract 9504.03; Lafayette County; Mississippi	2,827	35,469	14.9
Census Tract 9504.04; Lafayette County; Mississippi	4,756	42,930	14.9
Census Tract 9501; Tate County; Mississippi	4,162	23,090	14.9
Census Tract 9504.01; Tippah County; Mississippi	3,992	27,418	14.9
Census Tract 9504; Calhoun County; Mississippi	2,283	24,699	15.0
Census Tract 9504.02; Tishomingo County; Mississippi	3,420	25,815	15.1
Census Tract 9504; Prentiss County; Mississippi	3,663	26,883	15.2
Census Tract 9501; Tallahatchie County; Mississippi	3,279	26,881	15.3
Census Tract 9503; Union County; Mississippi	3,589	31,110	15.3
Census Tract 9509.01; Lee County; Mississippi	2,184	39,421	15.4
Census Tract 9501; Tippah County; Mississippi	3,602	40,639	15.4
Census Tract 9503; Tallahatchie County; Mississippi	3,211	15,797	15.5
Census Tract 9502.02; Panola County; Mississippi	864	24,562	15.6
Census Tract 711.22; DeSoto County; Mississippi	1,673	36,104	15.7
Census Tract 9504; Panola County; Mississippi	4,197	25,795	15.8
Census Tract 9501.02; Prentiss County; Mississippi	1,780	38,949	15.8
Census Tract 9509.02; Lee County; Mississippi	2,718	30,033	16.0
Census Tract 603; Attala County; Mississippi	2,619	24,484	16.1
Census Tract 9502; Clay County; Mississippi	1,975	25,129	16.1
Census Tract 703.25; DeSoto County; Mississippi	2,543	26,027	16.1
Census Tract 604; Attala County; Mississippi	2,146	25,921	16.2
Census Tract 9504.01; Alcorn County; Mississippi	2,158	24,102	16.3
Census Tract 401; Leake County; Mississippi	2,204	35,562	16.3
Census Tract 9502.02; Lee County; Mississippi	4,114	27,001	16.4
Census Tract 705.23; DeSoto County; Mississippi	6,161	31,751	16.6
Census Tract 9504.02; Tippah County; Mississippi	2,048	16,962	16.6
Census Tract 405; Leake County; Mississippi	2,250	26,492	16.7
Census Tract 9501; Clay County; Mississippi	3,911	21,004	16.9
Census Tract 5; Lowndes County; Mississippi	3,261	29,396	16.9
Census Tract 205; Scott County; Mississippi	4,051	20,595	16.9

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9507; Alcorn County; Mississippi	3,201	22,809	17.0
Census Tract 9503.02; Lee County; Mississippi	3,366	27,255	17.0
Census Tract 703.10; DeSoto County; Mississippi	3,068	25,341	17.1
Census Tract 703.23; DeSoto County; Mississippi	3,916	23,755	17.1
Census Tract 9505.02; Panola County; Mississippi	3,240	29,646	17.2
Census Tract 9504; Union County; Mississippi	2,679	23,895	17.2
Census Tract 9501; Yalobusha County; Mississippi	2,876	26,183	17.3
Census Tract 602; Attala County; Mississippi	1,971	23,482	17.4
Census Tract 9502.01; Prentiss County; Mississippi	3,002	34,594	17.5
Census Tract 9505.02; Monroe County; Mississippi	3,245	30,945	17.6
Census Tract 9502; Webster County; Mississippi	2,843	25,010	17.6
Census Tract 705.21; DeSoto County; Mississippi	2,180	23,869	17.7
Census Tract 9505; Prentiss County; Mississippi	1,361	19,877	17.7
Census Tract 9502; Benton County; Mississippi	1,970	23,242	17.8
Census Tract 9501.01; Pontotoc County; Mississippi	2,697	32,451	18.0
Census Tract 9505; Pontotoc County; Mississippi	3,670	26,080	18.0
Census Tract 9505.07; Lafayette County; Mississippi	3,810	30,377	18.3
Census Tract 9502; Noxubee County; Mississippi	2,168	23,735	18.3
Census Tract 9503; Pontotoc County; Mississippi	4,298	26,170	18.4
Census Tract 9510.01; Lee County; Mississippi	2,828	24,394	18.6
Census Tract 9511.01; Lee County; Mississippi	2,079	25,047	18.7
Census Tract 9502.01; Monroe County; Mississippi	2,691	21,644	18.7
Census Tract 9501.02; Pontotoc County; Mississippi	4,985	23,400	18.7
Census Tract 9503.02; Prentiss County; Mississippi	2,829	34,931	19.0
Census Tract 9501; Noxubee County; Mississippi	3,574	18,633	19.3
Census Tract 9501.01; Tishomingo County; Mississippi	1,470	33,095	19.5
Census Tract 9502; Winston County; Mississippi	2,553	29,989	19.5
Census Tract 9502.02; Marshall County; Mississippi	3,467	33,020	19.9
Census Tract 206; Scott County; Mississippi	2,504	19,689	19.9
Census Tract 704.22; DeSoto County; Mississippi	2,121	20,644	20.0
Census Tract 10; Lowndes County; Mississippi	2,077	39,856	20.1
Census Tract 703.22; DeSoto County; Mississippi	3,194	25,573	20.2
Census Tract 9504.01; Chickasaw County; Mississippi	1,520	22,280	20.3
Census Tract 9506.04; Oktibbeha County; Mississippi	2,207	24,207	20.4
Census Tract 9502; Choctaw County; Mississippi	3,453	24,756	20.5
Census Tract 9502.02; Monroe County; Mississippi	2,835	24,606	20.5
Census Tract 9504.02; Chickasaw County; Mississippi	2,364	26,600	20.6
Census Tract 702.21; DeSoto County; Mississippi	2,911	28,577	20.6
Census Tract 404.02; Leake County; Mississippi	2,237	18,537	20.6
Census Tract 9503.01; Marshall County; Mississippi	3,077	32,869	20.7
Census Tract 704.21; DeSoto County; Mississippi	2,489	26,893	20.8
Census Tract 9501.02; Panola County; Mississippi	2,204	24,597	21.5
Census Tract 9501.02; Benton County; Mississippi	1,853	23,175	21.6
Census Tract 9503.01; Tate County; Mississippi	3,612	32,317	21.8
Census Tract 9504.01; Marshall County; Mississippi	2,233	26,784	22.0
Census Tract 201.01; Scott County; Mississippi	2,444	27,874	22.0
Census Tract 9503.02; Tate County; Mississippi	4,264	30,961	22.1

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 202; Scott County; Mississippi	3,645	24,223	22.4
Census Tract 9504; Tate County; Mississippi	5,164	21,053	22.5
Census Tract 9503; Calhoun County; Mississippi	2,466	21,959	22.6
Census Tract 704.11; DeSoto County; Mississippi	1,406	16,020	22.6
Census Tract 701.01; DeSoto County; Mississippi	2,492	29,412	22.7
Census Tract 9506.02; Lee County; Mississippi	3,035	32,568	22.8
Census Tract 9502; Yalobusha County; Mississippi	3,593	23,180	23.1
Census Tract 4.05; Lowndes County; Mississippi	4,682	22,415	23.2
Census Tract 9506; Monroe County; Mississippi	2,218	24,582	23.4
Census Tract 9502.01; Marshall County; Mississippi	2,948	22,817	23.5
Census Tract 9505; Calhoun County; Mississippi	1,981	21,227	23.6
Census Tract 9503; Alcorn County; Mississippi	2,985	34,583	23.7
Census Tract 407; Leake County; Mississippi	3,129	30,556	23.8
Census Tract 9504; Monroe County; Mississippi	2,598	21,299	24.1
Census Tract 107; Neshoba County; Mississippi	3,176	28,177	24.2
Census Tract 605; Attala County; Mississippi	2,689	47,572	24.3
Census Tract 9503.03; Lafayette County; Mississippi	1,610	27,030	24.4
Census Tract 104; Neshoba County; Mississippi	2,814	29,862	24.8
Census Tract 9507; Lee County; Mississippi	2,992	29,198	25.2
Census Tract 9505.02; Lafayette County; Mississippi	2,250	22,795	25.4
Census Tract 11; Lowndes County; Mississippi	1,221	27,113	25.8
Census Tract 9502; Tishomingo County; Mississippi	1,668	22,968	25.8
Census Tract 9503; Chickasaw County; Mississippi	4,126	21,110	26.2
Census Tract 9504; Winston County; Mississippi	2,523	31,233	26.2
Census Tract 9505.01; Marshall County; Mississippi	1,872	23,350	26.5
Census Tract 9507; Monroe County; Mississippi	1,815	29,203	26.9
Census Tract 703.24; DeSoto County; Mississippi	3,350	19,474	27.1
Census Tract 9506.01; Oktibbeha County; Mississippi	4,796	38,858	27.3
Census Tract 9502.01; Tippah County; Mississippi	3,522	23,327	27.7
Census Tract 7; Lowndes County; Mississippi	4,036	21,834	27.9
Census Tract 9503; Oktibbeha County; Mississippi	2,764	20,400	28.4
Census Tract 406; Leake County; Mississippi	4,537	21,249	28.5
Census Tract 9505.02; Alcorn County; Mississippi	2,308	17,385	28.8
Census Tract 9508; Monroe County; Mississippi	2,129	26,868	28.9
Census Tract 9501; Winston County; Mississippi	2,429	24,821	29.1
Census Tract 9502; Chickasaw County; Mississippi	2,485	18,637	29.2
Census Tract 9503; Choctaw County; Mississippi	1,285	20,780	29.2
Census Tract 9510.02; Lee County; Mississippi	2,941	20,651	29.2
Census Tract 9505.02; Marshall County; Mississippi	2,208	35,316	29.3
Census Tract 9504.01; Tishomingo County; Mississippi	2,623	26,532	29.3
Census Tract 9502.01; Oktibbeha County; Mississippi	3,212	29,639	29.4
Census Tract 201.02; Scott County; Mississippi	2,840	16,624	29.5
Census Tract 9505.04; Lafayette County; Mississippi	2,554	25,655	29.6
Census Tract 9502.02; Tippah County; Mississippi	1,711	18,965	29.6
Census Tract 106; Neshoba County; Mississippi	3,579	20,288	29.7
Census Tract 102; Neshoba County; Mississippi	2,385	20,370	29.9
Census Tract 9507.02; Oktibbeha County; Mississippi	3,012	32,456	30.8

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9501.02; Oktibbeha County; Mississippi	3,294	25,800	30.9
Census Tract 9504.02; Marshall County; Mississippi	4,093	15,538	31.2
Census Tract 9503; Webster County; Mississippi	1,309	21,914	31.4
Census Tract 9506.02; Panola County; Mississippi	1,871	13,721	31.7
Census Tract 9504.02; Oktibbeha County; Mississippi	2,255	28,425	32.1
Census Tract 9506.03; Oktibbeha County; Mississippi	2,274	47,548	32.4
Census Tract 9501; Chickasaw County; Mississippi	2,774	22,240	33.1
Census Tract 9502; Calhoun County; Mississippi	980	22,167	33.2
Census Tract 9502; Tallahatchie County; Mississippi	2,085	18,044	33.3
Census Tract 301; Kemper County; Mississippi	3,970	19,140	33.6
Census Tract 9504; Clay County; Mississippi	3,514	26,669	33.7
Census Tract 9503; Noxubee County; Mississippi	2,254	18,210	33.7
Census Tract 9501.02; Tishomingo County; Mississippi	1,191	25,651	34.1
Census Tract 9502.01; Alcorn County; Mississippi	2,783	21,086	34.4
Census Tract 606; Attala County; Mississippi	2,527	18,685	34.7
Census Tract 9501.01; Oktibbeha County; Mississippi	5,298	22,082	34.9
Census Tract 601; Attala County; Mississippi	1,807	22,346	35.0
Census Tract 9503.01; Prentiss County; Mississippi	2,459	16,844	35.1
Census Tract 9503.04; Lafayette County; Mississippi	2,032	27,561	35.4
Census Tract 9501.01; Panola County; Mississippi	2,990	14,595	35.4
Census Tract 704.12; DeSoto County; Mississippi	3,245	19,577	35.7
Census Tract 9503.01; Yalobusha County; Mississippi	1,623	23,508	36.0
Census Tract 204; Scott County; Mississippi	2,358	27,193	36.2
Census Tract 9.02; Lowndes County; Mississippi	1,825	28,577	36.3
Census Tract 9505; Oktibbeha County; Mississippi	3,558	26,313	37.3
Census Tract 9401; Neshoba County; Mississippi	3,288	15,227	38.6
Census Tract 9503; Winston County; Mississippi	3,174	23,623	40.1
Census Tract 8; Lowndes County; Mississippi	2,445	13,897	41.9
Census Tract 9503; Clay County; Mississippi	2,262	17,417	42.1
Census Tract 9502.04; Lafayette County; Mississippi	2,030	42,774	43.5
Census Tract 105; Neshoba County; Mississippi	2,581	21,693	45.1
Census Tract 9502.03; Lafayette County; Mississippi	2,704	25,802	46.0
Census Tract 9503.01; Lafayette County; Mississippi	6,213	8,404	49.0
Census Tract 6; Lowndes County; Mississippi	2,476	10,871	50.9
Census Tract 9504; Tallahatchie County; Mississippi	1,706	20,334	51.4
Census Tract 9504.01; Oktibbeha County; Mississippi	4,735	13,366	53.7
Census Tract 9502.01; Panola County; Mississippi	1,385	14,569	55.6
Census Tract 9305.02; Cherokee County; North Carolina	3,169	32,767	15.9
Census Tract 9303.02; Avery County; North Carolina	2,225	30,883	17.4
Census Tract 9207.03; Watauga County; North Carolina	5,270	39,658	17.7
Census Tract 9501.01; Clay County; North Carolina	2,516	34,744	18.6
Census Tract 9502.02; Clay County; North Carolina	2,318	23,387	20.9
Census Tract 9306.04; Cherokee County; North Carolina	1,504	24,760	22.9
Census Tract 9304.02; Cherokee County; North Carolina	1,589	27,543	23.0
Census Tract 9301.01; Cherokee County; North Carolina	2,021	27,293	23.1
Census Tract 9301.02; Cherokee County; North Carolina	1,741	23,312	23.5
Census Tract 9206.02; Watauga County; North Carolina	2,315	46,666	26.7

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 9304.01; Cherokee County; North Carolina	3,653	27,679	30.1
Census Tract 9205; Watauga County; North Carolina	7,387	11,327	38.9
Census Tract 9204; Watauga County; North Carolina	7,526	25,205	41.6
Census Tract 9206.01; Watauga County; North Carolina	6,322	17,068	62.3
Census Tract 102.01; Bradley County; Tennessee	2,121	32,463	14.8
Census Tract 9623; Carroll County; Tennessee	3,496	28,766	14.8
Census Tract 502; Hawkins County; Tennessee	4,112	23,100	14.8
Census Tract 9607; Lawrence County; Tennessee	3,196	27,140	14.8
Census Tract 14.01; Madison County; Tennessee	1,790	26,100	14.8
Census Tract 9203; Cocke County; Tennessee	3,962	34,753	14.9
Census Tract 9710.02; Coffee County; Tennessee	4,266	34,369	14.9
Census Tract 9502.02; Hickman County; Tennessee	2,714	25,819	14.9
Census Tract 106; Maury County; Tennessee	4,295	25,628	14.9
Census Tract 1020.01; Montgomery County; Tennessee	5,211	33,244	14.9
Census Tract 201.02; Shelby County; Tennessee	2,226	34,533	14.9
Census Tract 426; Sullivan County; Tennessee	3,112	32,383	14.9
Census Tract 611; Washington County; Tennessee	4,337	37,515	14.9
Census Tract 106; Blount County; Tennessee	3,577	23,985	15.0
Census Tract 9250.02; Monroe County; Tennessee	3,169	30,593	15.0
Census Tract 201.02; Sumner County; Tennessee	4,288	27,510	15.0
Census Tract 9633; Benton County; Tennessee	2,883	27,076	15.1
Census Tract 9550.03; Decatur County; Tennessee	1,955	23,903	15.1
Census Tract 48; Knox County; Tennessee	4,130	29,481	15.1
Census Tract 9554; Marshall County; Tennessee	3,529	31,413	15.1
Census Tract 9657; Obion County; Tennessee	3,648	28,088	15.1
Census Tract 206.35; Shelby County; Tennessee	2,198	30,951	15.1
Census Tract 413; Sullivan County; Tennessee	4,047	35,891	15.1
Census Tract 802; Unicoi County; Tennessee	5,002	28,267	15.1
Census Tract 9701.02; Chester County; Tennessee	2,869	28,858	15.2
Census Tract 1007; Hamblen County; Tennessee	4,684	27,972	15.2
Census Tract 9502; Hardeman County; Tennessee	5,702	12,402	15.2
Census Tract 706; Jefferson County; Tennessee	3,833	33,034	15.2
Census Tract 39.01; Knox County; Tennessee	3,382	34,639	15.2
Census Tract 63; Shelby County; Tennessee	2,180	42,802	15.2
Census Tract 112.01; Blount County; Tennessee	4,134	31,719	15.3
Census Tract 701.03; Cheatham County; Tennessee	3,292	29,420	15.3
Census Tract 9750; Rhea County; Tennessee	3,949	32,909	15.3
Census Tract 717; Carter County; Tennessee	2,794	29,273	15.4
Census Tract 104.01; Davidson County; Tennessee	4,620	29,237	15.4
Census Tract 173; Davidson County; Tennessee	2,428	28,185	15.4
Census Tract 602.01; Dickson County; Tennessee	2,857	26,002	15.4
Census Tract 9640.01; Dyer County; Tennessee	3,828	25,211	15.4
Census Tract 9609; Lawrence County; Tennessee	1,704	22,947	15.4
Census Tract 1016; Montgomery County; Tennessee	4,747	29,928	15.4
Census Tract 9650; Obion County; Tennessee	3,427	31,491	15.4
Census Tract 401.05; Rutherford County; Tennessee	3,282	28,142	15.4
Census Tract 9703.01; Cumberland County; Tennessee	3,009	27,955	15.5

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 137.02; Davidson County; Tennessee	3,326	36,226	15.5
Census Tract 908; Greene County; Tennessee	3,957	25,633	15.5
Census Tract 1304; Humphreys County; Tennessee	2,059	28,540	15.5
Census Tract 23; Knox County; Tennessee	2,854	28,926	15.5
Census Tract 9555; Marshall County; Tennessee	3,968	31,081	15.5
Census Tract 133; Davidson County; Tennessee	4,315	55,214	15.6
Census Tract 608; Fayette County; Tennessee	1,784	29,463	15.6
Census Tract 18; Hamilton County; Tennessee	2,244	33,762	15.6
Census Tract 9552; Marshall County; Tennessee	5,247	36,519	15.6
Census Tract 9708.01; Coffee County; Tennessee	3,141	30,124	15.7
Census Tract 9504; Hardeman County; Tennessee	4,129	25,919	15.7
Census Tract 9505; Hardeman County; Tennessee	3,360	25,002	15.7
Census Tract 9503; Wayne County; Tennessee	2,772	24,870	15.7
Census Tract 9301; McNairy County; Tennessee	3,284	24,362	15.8
Census Tract 427.03; Sullivan County; Tennessee	2,011	22,273	15.8
Census Tract 9252; Van Buren County; Tennessee	2,690	22,989	15.8
Census Tract 183.03; Davidson County; Tennessee	3,970	48,048	15.9
Census Tract 9606; Lawrence County; Tennessee	1,721	26,865	15.9
Census Tract 9654; Obion County; Tennessee	3,571	35,593	15.9
Census Tract 9754.02; Rhea County; Tennessee	2,759	29,379	15.9
Census Tract 206.58; Shelby County; Tennessee	4,673	26,325	15.9
Census Tract 156.29; Davidson County; Tennessee	4,294	25,898	16.0
Census Tract 157; Davidson County; Tennessee	1,382	34,213	16.0
Census Tract 31; Hamilton County; Tennessee	1,918	66,209	16.0
Census Tract 110.01; Hamilton County; Tennessee	1,697	26,607	16.0
Census Tract 9753; Rhea County; Tennessee	5,232	24,987	16.0
Census Tract 418; Rutherford County; Tennessee	3,912	29,568	16.0
Census Tract 9686; Weakley County; Tennessee	3,150	26,911	16.0
Census Tract 9506; Bedford County; Tennessee	6,049	24,473	16.1
Census Tract 715; Carter County; Tennessee	1,861	37,200	16.1
Census Tract 113; Davidson County; Tennessee	4,601	35,948	16.1
Census Tract 103.02; Davidson County; Tennessee	1,334	46,533	16.2
Census Tract 9201.01; DeKalb County; Tennessee	2,547	36,348	16.2
Census Tract 21; Knox County; Tennessee	2,253	23,253	16.2
Census Tract 9756.01; Lincoln County; Tennessee	5,076	27,943	16.2
Census Tract 420; Sullivan County; Tennessee	2,965	27,240	16.2
Census Tract 505.04; Williamson County; Tennessee	3,739	34,635	16.2
Census Tract 9503; Bedford County; Tennessee	2,804	30,836	16.3
Census Tract 103.01; Blount County; Tennessee	5,233	31,082	16.3
Census Tract 9704.01; Cumberland County; Tennessee	3,944	20,878	16.3
Census Tract 422; Rutherford County; Tennessee	4,011	29,445	16.3
Census Tract 407; Sullivan County; Tennessee	2,199	37,691	16.3
Census Tract 9507.01; Campbell County; Tennessee	1,732	27,913	16.4
Census Tract 605.02; Dickson County; Tennessee	2,789	35,426	16.4
Census Tract 62.08; Knox County; Tennessee	4,072	32,812	16.4
Census Tract 9707; McMinn County; Tennessee	3,809	33,344	16.4
Census Tract 804.01; Sevier County; Tennessee	2,577	36,038	16.4

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 16; Shelby County; Tennessee	2,961	43,312	16.4
Census Tract 431; Sullivan County; Tennessee	2,564	27,407	16.4
Census Tract 9506; Hardeman County; Tennessee	2,052	22,177	16.5
Census Tract 501; Hawkins County; Tennessee	3,543	24,938	16.5
Census Tract 75; Shelby County; Tennessee	922	34,999	16.5
Census Tract 711; Carter County; Tennessee	1,735	28,586	16.6
Census Tract 156.19; Davidson County; Tennessee	4,294	32,914	16.6
Census Tract 9202.02; DeKalb County; Tennessee	1,566	24,612	16.6
Census Tract 503.01; Hawkins County; Tennessee	3,939	27,118	16.6
Census Tract 602.03; Loudon County; Tennessee	2,505	19,981	16.6
Census Tract 9302; McNairy County; Tennessee	2,085	27,051	16.6
Census Tract 3; Madison County; Tennessee	3,606	33,415	16.6
Census Tract 9254.02; Monroe County; Tennessee	4,234	26,200	16.6
Census Tract 210.02; Anderson County; Tennessee	2,960	24,131	16.7
Census Tract 9205.02; Cocke County; Tennessee	4,120	27,768	16.7
Census Tract 9203; Hardin County; Tennessee	3,350	25,732	16.7
Census Tract 46.08; Knox County; Tennessee	2,354	33,632	16.7
Census Tract 9255.01; Monroe County; Tennessee	2,637	25,945	16.7
Census Tract 9753; Smith County; Tennessee	1,738	24,194	16.7
Census Tract 9302.02; Warren County; Tennessee	3,147	29,316	16.7
Census Tract 9208; Giles County; Tennessee	2,588	29,027	16.8
Census Tract 606; Loudon County; Tennessee	3,926	31,168	16.8
Census Tract 210.23; Shelby County; Tennessee	6,193	54,822	16.8
Census Tract 9302.01; Warren County; Tennessee	2,610	29,971	16.8
Census Tract 112.04; Hamilton County; Tennessee	4,510	37,769	16.9
Census Tract 9201; Hardin County; Tennessee	3,263	33,482	16.9
Census Tract 32; Knox County; Tennessee	2,679	23,962	16.9
Census Tract 103; Bradley County; Tennessee	2,939	22,171	17.0
Census Tract 9706; Claiborne County; Tennessee	4,058	31,787	17.0
Census Tract 161; Davidson County; Tennessee	2,038	46,981	17.0
Census Tract 9754; Lincoln County; Tennessee	3,549	28,590	17.0
Census Tract 3.03; Putnam County; Tennessee	1,723	22,497	17.0
Census Tract 305; Roane County; Tennessee	3,919	30,860	17.0
Census Tract 9755; Henderson County; Tennessee	3,197	24,722	17.1
Census Tract 9602; Lawrence County; Tennessee	2,282	23,612	17.1
Census Tract 102.05; Maury County; Tennessee	1,196	41,314	17.1
Census Tract 404.04; Rutherford County; Tennessee	2,416	31,782	17.1
Census Tract 205.11; Shelby County; Tennessee	1,992	36,989	17.1
Census Tract 201.01; Sumner County; Tennessee	2,829	26,746	17.1
Census Tract 9681.01; Weakley County; Tennessee	2,969	27,588	17.1
Census Tract 225; Shelby County; Tennessee	3,497	23,292	17.2
Census Tract 406.01; Tipton County; Tennessee	3,887	25,545	17.2
Census Tract 9508; Campbell County; Tennessee	2,106	28,899	17.3
Census Tract 164; Davidson County; Tennessee	4,381	24,509	17.3
Census Tract 9202; Giles County; Tennessee	3,936	27,924	17.3
Census Tract 9503.02; Hickman County; Tennessee	3,587	35,818	17.3
Census Tract 418; Sullivan County; Tennessee	3,569	30,132	17.3

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 430; Sullivan County; Tennessee	3,806	33,077	17.3
Census Tract 9630; Benton County; Tennessee	2,735	27,761	17.4
Census Tract 101; Bradley County; Tennessee	4,091	33,113	17.4
Census Tract 101.04; Hamilton County; Tennessee	3,188	30,634	17.4
Census Tract 108; Hamilton County; Tennessee	3,441	39,260	17.4
Census Tract 404.05; Rutherford County; Tennessee	3,366	32,517	17.4
Census Tract 427.02; Sullivan County; Tennessee	1,947	35,259	17.4
Census Tract 128.02; Davidson County; Tennessee	3,435	24,695	17.5
Census Tract 35.01; Knox County; Tennessee	2,446	45,391	17.5
Census Tract 505.03; Lauderdale County; Tennessee	1,856	27,791	17.5
Census Tract 406; Rutherford County; Tennessee	4,353	29,632	17.5
Census Tract 201; Anderson County; Tennessee	2,364	25,664	17.6
Census Tract 508; Hawkins County; Tennessee	4,094	28,382	17.6
Census Tract 410; Tipton County; Tennessee	2,306	24,999	17.6
Census Tract 9685; Weakley County; Tennessee	3,548	24,136	17.6
Census Tract 9664; Gibson County; Tennessee	3,860	20,986	17.7
Census Tract 9251.01; Pickett County; Tennessee	2,405	31,904	17.7
Census Tract 211.22; Shelby County; Tennessee	4,243	25,009	17.7
Census Tract 416; Sullivan County; Tennessee	2,199	31,234	17.7
Census Tract 217.52; Shelby County; Tennessee	4,172	29,606	17.8
Census Tract 103.03; Davidson County; Tennessee	4,180	31,647	17.9
Census Tract 9551.02; Decatur County; Tennessee	2,481	27,910	17.9
Census Tract 1005; Hamblen County; Tennessee	2,658	38,428	17.9
Census Tract 113.26; Hamilton County; Tennessee	5,114	43,527	17.9
Census Tract 504; Hawkins County; Tennessee	4,872	25,364	17.9
Census Tract 9253.02; Monroe County; Tennessee	2,788	22,229	17.9
Census Tract 1102; Morgan County; Tennessee	3,232	31,662	17.9
Census Tract 72; Shelby County; Tennessee	2,586	64,075	17.9
Census Tract 217.54; Shelby County; Tennessee	3,515	29,314	17.9
Census Tract 9703; Claiborne County; Tennessee	3,904	23,031	18.0
Census Tract 9709; Claiborne County; Tennessee	3,803	25,840	18.0
Census Tract 1017.01; Montgomery County; Tennessee	2,339	32,018	18.0
Census Tract 5004.02; Grainger County; Tennessee	4,237	28,071	18.1
Census Tract 9504; Hickman County; Tennessee	1,617	26,648	18.1
Census Tract 54.02; Knox County; Tennessee	2,698	30,211	18.1
Census Tract 108.20; Shelby County; Tennessee	3,210	25,731	18.1
Census Tract 9351; White County; Tennessee	4,923	28,934	18.1
Census Tract 9551; Clay County; Tennessee	2,064	25,975	18.2
Census Tract 9307; McNairy County; Tennessee	2,578	27,300	18.3
Census Tract 9301; Perry County; Tennessee	2,700	30,633	18.3
Census Tract 9250; Van Buren County; Tennessee	2,466	25,260	18.3
Census Tract 9354; White County; Tennessee	3,044	22,046	18.3
Census Tract 9552; Grundy County; Tennessee	3,476	20,009	18.4
Census Tract 308.02; Roane County; Tennessee	2,865	24,999	18.4
Census Tract 9502; Wayne County; Tennessee	4,405	27,147	18.4
Census Tract 703; Carter County; Tennessee	4,981	25,279	18.5
Census Tract 156.37; Davidson County; Tennessee	3,174	35,813	18.5

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 914; Greene County; Tennessee	2,316	25,173	18.5
Census Tract 1010.01; Montgomery County; Tennessee	3,342	23,660	18.5
Census Tract 118; Shelby County; Tennessee	4,639	31,953	18.5
Census Tract 910.01; Greene County; Tennessee	3,530	26,154	18.6
Census Tract 701.02; Jefferson County; Tennessee	4,436	32,847	18.6
Census Tract 503.01; Marion County; Tennessee	4,506	26,316	18.6
Census Tract 98; Shelby County; Tennessee	1,947	24,971	18.6
Census Tract 902; Trousdale County; Tennessee	2,438	26,165	18.6
Census Tract 9625; Carroll County; Tennessee	2,160	24,347	18.7
Census Tract 9705; Claiborne County; Tennessee	2,103	24,422	18.7
Census Tract 46.09; Knox County; Tennessee	4,015	30,021	18.7
Census Tract 9504; Campbell County; Tennessee	3,631	26,323	18.8
Census Tract 606.01; Dickson County; Tennessee	2,956	28,385	18.8
Census Tract 9305.02; McNairy County; Tennessee	4,154	23,299	18.8
Census Tract 402.01; Union County; Tennessee	3,200	24,396	18.8
Census Tract 9501; Campbell County; Tennessee	2,457	19,862	18.9
Census Tract 9602.01; Cannon County; Tennessee	1,907	26,194	18.9
Census Tract 1; Knox County; Tennessee	2,492	58,958	18.9
Census Tract 1019.06; Montgomery County; Tennessee	4,638	32,020	18.9
Census Tract 811.01; Sevier County; Tennessee	1,124	30,846	18.9
Census Tract 1107; Stewart County; Tennessee	3,723	30,345	18.9
Census Tract 9667.01; Gibson County; Tennessee	1,649	21,625	19.0
Census Tract 30; Hamilton County; Tennessee	1,664	23,888	19.0
Census Tract 502; Lauderdale County; Tennessee	2,568	28,386	19.0
Census Tract 703; Jefferson County; Tennessee	6,430	27,921	19.1
Census Tract 9252; Monroe County; Tennessee	4,207	32,330	19.1
Census Tract 9253.01; Monroe County; Tennessee	3,129	20,027	19.1
Census Tract 156.23; Davidson County; Tennessee	4,342	33,836	19.2
Census Tract 114.44; Hamilton County; Tennessee	3,068	22,882	19.2
Census Tract 9503; Hardeman County; Tennessee	3,323	26,060	19.2
Census Tract 1302; Humphreys County; Tennessee	1,708	22,361	19.2
Census Tract 217.21; Shelby County; Tennessee	3,312	22,789	19.2
Census Tract 9681.02; Weakley County; Tennessee	1,463	27,439	19.2
Census Tract 9708; Claiborne County; Tennessee	3,047	25,227	19.3
Census Tract 40; Knox County; Tennessee	3,937	27,506	19.3
Census Tract 46.15; Knox County; Tennessee	3,502	29,056	19.3
Census Tract 9506; Overton County; Tennessee	2,347	32,004	19.3
Census Tract 401.06; Rutherford County; Tennessee	3,520	22,571	19.3
Census Tract 605.01; Fayette County; Tennessee	3,602	30,687	19.4
Census Tract 9601; Franklin County; Tennessee	2,958	28,534	19.4
Census Tract 5001; Grainger County; Tennessee	3,840	20,195	19.4
Census Tract 903; Greene County; Tennessee	4,966	32,230	19.4
Census Tract 30; Knox County; Tennessee	4,070	27,360	19.4
Census Tract 59.11; Knox County; Tennessee	2,352	32,929	19.4
Census Tract 428.02; Sullivan County; Tennessee	3,540	21,143	19.4
Census Tract 911; Greene County; Tennessee	2,816	32,639	19.5
Census Tract 18; Knox County; Tennessee	2,122	30,531	19.5

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 106.02; Davidson County; Tennessee	2,914	28,182	19.6
Census Tract 107; Maury County; Tennessee	3,919	22,950	19.6
Census Tract 32; Hamilton County; Tennessee	2,886	31,946	19.7
Census Tract 220.24; Shelby County; Tennessee	2,464	23,190	19.7
Census Tract 9305; Warren County; Tennessee	4,106	22,136	19.7
Census Tract 9352; White County; Tennessee	3,471	27,365	19.7
Census Tract 901; Greene County; Tennessee	4,999	21,761	19.8
Census Tract 9202; Hardin County; Tennessee	4,025	27,491	19.8
Census Tract 3.05; Putnam County; Tennessee	2,460	27,676	19.8
Census Tract 9754.01; Rhea County; Tennessee	5,870	20,303	19.8
Census Tract 210.20; Shelby County; Tennessee	5,007	61,188	19.8
Census Tract 212.02; Anderson County; Tennessee	4,140	25,683	19.9
Census Tract 9509; Campbell County; Tennessee	2,401	30,628	19.9
Census Tract 9550.04; Decatur County; Tennessee	1,967	33,915	19.9
Census Tract 9705; McMinn County; Tennessee	3,353	25,315	19.9
Census Tract 156.34; Davidson County; Tennessee	8,893	29,465	20.0
Census Tract 23; Hamilton County; Tennessee	1,099	18,967	20.0
Census Tract 9504; Overton County; Tennessee	1,826	25,908	20.0
Census Tract 801; Unicoi County; Tennessee	2,025	27,468	20.0
Census Tract 210.01; Anderson County; Tennessee	2,093	25,812	20.1
Census Tract 9620; Carroll County; Tennessee	3,449	26,755	20.1
Census Tract 109; Maury County; Tennessee	2,720	29,092	20.1
Census Tract 9624; Carroll County; Tennessee	2,046	23,452	20.2
Census Tract 158.04; Davidson County; Tennessee	4,005	28,653	20.2
Census Tract 28; Knox County; Tennessee	3,386	21,691	20.2
Census Tract 37; Knox County; Tennessee	2,526	44,866	20.2
Census Tract 9750; Scott County; Tennessee	3,247	24,382	20.2
Census Tract 602; Sequatchie County; Tennessee	3,876	29,818	20.2
Census Tract 206.10; Shelby County; Tennessee	3,199	25,473	20.2
Census Tract 403; Sullivan County; Tennessee	2,131	30,279	20.2
Census Tract 402.02; Union County; Tennessee	4,941	25,848	20.2
Census Tract 9602.02; Cannon County; Tennessee	3,435	30,144	20.3
Census Tract 502.03; Marion County; Tennessee	2,275	22,391	20.3
Census Tract 104.02; Maury County; Tennessee	1,990	27,543	20.3
Census Tract 9659; Obion County; Tennessee	1,149	23,850	20.3
Census Tract 303.01; Roane County; Tennessee	2,708	42,957	20.3
Census Tract 9701; Claiborne County; Tennessee	2,118	21,493	20.4
Census Tract 9707; Claiborne County; Tennessee	4,734	22,643	20.4
Census Tract 402; Tipton County; Tennessee	1,683	23,734	20.4
Census Tract 9255.04; Monroe County; Tennessee	1,606	27,982	20.5
Census Tract 223.22; Shelby County; Tennessee	3,044	24,869	20.5
Census Tract 9704; Claiborne County; Tennessee	575	20,598	20.6
Census Tract 5004.01; Grainger County; Tennessee	2,256	20,075	20.6
Census Tract 602.01; Loudon County; Tennessee	3,734	27,123	20.6
Census Tract 9614; Crockett County; Tennessee	2,910	32,501	20.7
Census Tract 205.42; Shelby County; Tennessee	4,458	18,529	20.7
Census Tract 9306; Warren County; Tennessee	2,927	27,929	20.7

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 109.02; Hamilton County; Tennessee	620	34,290	20.8
Census Tract 222.10; Shelby County; Tennessee	3,592	23,054	20.8
Census Tract 223.21; Shelby County; Tennessee	2,760	20,528	20.8
Census Tract 804; Unicoi County; Tennessee	3,514	26,044	20.8
Census Tract 9621.02; Carroll County; Tennessee	2,851	30,192	20.9
Census Tract 158.06; Davidson County; Tennessee	3,348	22,332	20.9
Census Tract 9550.01; Decatur County; Tennessee	1,523	29,706	20.9
Census Tract 1017.02; Montgomery County; Tennessee	4,520	30,859	20.9
Census Tract 9612; Crockett County; Tennessee	1,401	32,182	21.0
Census Tract 174.02; Davidson County; Tennessee	4,831	37,292	21.0
Census Tract 9203; DeKalb County; Tennessee	4,301	29,347	21.0
Census Tract 1004; Hamblen County; Tennessee	5,487	25,751	21.0
Census Tract 505.01; Hawkins County; Tennessee	3,300	28,792	21.0
Census Tract 9502.01; Hickman County; Tennessee	3,363	27,360	21.0
Census Tract 9505.01; Overton County; Tennessee	3,557	32,282	21.0
Census Tract 714; Carter County; Tennessee	2,592	27,901	21.1
Census Tract 9702.01; Coffee County; Tennessee	3,132	26,160	21.1
Census Tract 156.28; Davidson County; Tennessee	2,972	26,964	21.1
Census Tract 49; Knox County; Tennessee	4,712	32,086	21.1
Census Tract 16.05; Madison County; Tennessee	2,877	32,418	21.1
Census Tract 201.01; Shelby County; Tennessee	2,675	24,292	21.1
Census Tract 9682.01; Weakley County; Tennessee	3,247	32,278	21.1
Census Tract 9650; Fentress County; Tennessee	3,012	24,756	21.2
Census Tract 15; Knox County; Tennessee	2,952	33,119	21.2
Census Tract 16.07; Madison County; Tennessee	4,218	31,161	21.2
Census Tract 110.04; Maury County; Tennessee	3,178	31,567	21.2
Census Tract 1021; Montgomery County; Tennessee	3,939	32,581	21.2
Census Tract 414.01; Rutherford County; Tennessee	5,385	39,640	21.2
Census Tract 81.20; Shelby County; Tennessee	4,366	22,526	21.2
Census Tract 619.04; Washington County; Tennessee	3,163	28,068	21.2
Census Tract 9631; Benton County; Tennessee	2,684	30,759	21.3
Census Tract 9503.01; Overton County; Tennessee	4,000	27,191	21.3
Census Tract 601.04; Sequatchie County; Tennessee	3,782	22,159	21.3
Census Tract 804.02; Sevier County; Tennessee	2,835	24,637	21.3
Census Tract 9643; Dyer County; Tennessee	4,429	27,727	21.4
Census Tract 9665.02; Gibson County; Tennessee	2,582	31,681	21.4
Census Tract 1104; Morgan County; Tennessee	3,210	37,306	21.4
Census Tract 428.01; Sullivan County; Tennessee	2,071	29,795	21.4
Census Tract 5003.01; Grainger County; Tennessee	2,657	26,577	21.5
Census Tract 9702; Lewis County; Tennessee	6,227	26,903	21.5
Census Tract 13; Madison County; Tennessee	4,848	24,390	21.5
Census Tract 7; Putnam County; Tennessee	2,842	22,975	21.5
Census Tract 806.01; Sevier County; Tennessee	3,488	31,546	21.5
Census Tract 9752; Smith County; Tennessee	4,772	29,787	21.5
Census Tract 9355; White County; Tennessee	2,985	22,246	21.5
Census Tract 304.02; Wilson County; Tennessee	3,504	26,960	21.5
Census Tract 9704.02; Coffee County; Tennessee	4,362	23,781	21.6

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 905.02; Greene County; Tennessee	1,313	41,538	21.6
Census Tract 1003; Montgomery County; Tennessee	4,625	30,274	21.7
Census Tract 417; Sullivan County; Tennessee	2,930	33,372	21.7
Census Tract 608; Washington County; Tennessee	2,264	34,133	21.7
Census Tract 9662; Gibson County; Tennessee	2,761	22,360	21.8
Census Tract 1011.02; Montgomery County; Tennessee	6,764	22,175	21.8
Census Tract 9501; Wayne County; Tennessee	3,859	20,247	21.8
Census Tract 9703.01; Chester County; Tennessee	1,247	25,584	21.9
Census Tract 9705.01; Cumberland County; Tennessee	2,520	26,631	21.9
Census Tract 9606; Franklin County; Tennessee	3,742	24,887	21.9
Census Tract 9551; Grundy County; Tennessee	1,424	26,993	21.9
Census Tract 202.02; Anderson County; Tennessee	3,828	36,502	22.0
Census Tract 15.01; Madison County; Tennessee	4,055	28,874	22.0
Census Tract 803.02; Robertson County; Tennessee	2,532	22,171	22.0
Census Tract 79; Shelby County; Tennessee	3,841	21,454	22.0
Census Tract 9502; Campbell County; Tennessee	1,844	26,047	22.1
Census Tract 144; Davidson County; Tennessee	2,553	40,562	22.1
Census Tract 416.02; Rutherford County; Tennessee	2,333	38,853	22.1
Census Tract 93; Shelby County; Tennessee	3,312	45,132	22.1
Census Tract 217.55; Shelby County; Tennessee	1,233	30,819	22.1
Census Tract 712; Carter County; Tennessee	3,050	24,141	22.2
Census Tract 709; Carter County; Tennessee	3,313	25,527	22.3
Census Tract 158.05; Davidson County; Tennessee	2,183	25,958	22.4
Census Tract 9604.01; Lawrence County; Tennessee	4,348	35,350	22.4
Census Tract 421.02; Rutherford County; Tennessee	3,458	21,024	22.4
Census Tract 88; Shelby County; Tennessee	4,913	16,186	22.4
Census Tract 9702; Chester County; Tennessee	4,355	17,993	22.6
Census Tract 9754; Henderson County; Tennessee	3,738	23,697	22.6
Census Tract 9603; Lawrence County; Tennessee	4,200	21,667	22.6
Census Tract 602.04; Loudon County; Tennessee	4,270	25,936	22.6
Census Tract 804.01; Robertson County; Tennessee	4,228	27,105	22.6
Census Tract 9753; Scott County; Tennessee	1,940	25,511	22.6
Census Tract 15; Shelby County; Tennessee	1,553	25,337	22.6
Census Tract 804.02; Robertson County; Tennessee	3,998	26,770	22.7
Census Tract 9203.01; Giles County; Tennessee	3,830	29,079	22.8
Census Tract 1008; Hamblen County; Tennessee	2,238	25,267	22.8
Census Tract 9205.02; Hardin County; Tennessee	1,272	20,101	22.8
Census Tract 913; Greene County; Tennessee	3,746	25,016	22.9
Census Tract 166; Davidson County; Tennessee	3,395	50,299	23.0
Census Tract 73; Shelby County; Tennessee	3,817	28,706	23.0
Census Tract 205.31; Shelby County; Tennessee	3,799	18,174	23.0
Census Tract 9510; Campbell County; Tennessee	1,828	21,738	23.1
Census Tract 9707; Coffee County; Tennessee	3,853	27,568	23.1
Census Tract 9602; Jackson County; Tennessee	1,912	26,602	23.1
Census Tract 9703; McMinn County; Tennessee	3,126	27,702	23.1
Census Tract 9304; McNairy County; Tennessee	1,728	24,073	23.1
Census Tract 227; Shelby County; Tennessee	6,148	18,465	23.1

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 407; Tipton County; Tennessee	3,931	23,847	23.1
Census Tract 9530; Bledsoe County; Tennessee	3,664	24,107	23.2
Census Tract 9701; Coffee County; Tennessee	2,965	26,010	23.2
Census Tract 9303.01; Haywood County; Tennessee	3,415	27,168	23.3
Census Tract 9251.01; Monroe County; Tennessee	3,708	24,157	23.3
Census Tract 1012.01; Montgomery County; Tennessee	1,778	26,771	23.3
Census Tract 308; Wilson County; Tennessee	5,602	27,710	23.3
Census Tract 189.05; Davidson County; Tennessee	2,440	36,854	23.4
Census Tract 9646; Dyer County; Tennessee	2,046	29,916	23.4
Census Tract 9563; Johnson County; Tennessee	4,812	24,511	23.4
Census Tract 505.04; Lauderdale County; Tennessee	1,945	22,637	23.5
Census Tract 60; Shelby County; Tennessee	1,487	18,912	23.5
Census Tract 9309; Warren County; Tennessee	1,730	24,342	23.5
Census Tract 419; Sullivan County; Tennessee	2,959	29,519	23.6
Census Tract 605.01; Washington County; Tennessee	3,804	23,341	23.6
Census Tract 9652.02; Fentress County; Tennessee	2,503	25,374	23.7
Census Tract 217.58; Shelby County; Tennessee	2,463	22,457	23.7
Census Tract 221.21; Shelby County; Tennessee	3,648	28,223	23.7
Census Tract 127.02; Davidson County; Tennessee	2,317	29,411	23.8
Census Tract 9205.01; Hardin County; Tennessee	3,179	23,951	23.8
Census Tract 9561; Johnson County; Tennessee	3,557	20,270	23.8
Census Tract 2; Madison County; Tennessee	4,602	27,771	23.8
Census Tract 9602; Meigs County; Tennessee	4,067	23,982	23.8
Census Tract 9703.01; Macon County; Tennessee	3,352	18,446	23.9
Census Tract 221.22; Shelby County; Tennessee	3,302	25,085	23.9
Census Tract 614.04; Washington County; Tennessee	2,983	60,045	23.9
Census Tract 156.13; Davidson County; Tennessee	4,123	20,478	24.0
Census Tract 182.04; Davidson County; Tennessee	2,578	36,894	24.0
Census Tract 124; Hamilton County; Tennessee	5,937	25,835	24.0
Census Tract 503.02; Marion County; Tennessee	2,569	35,518	24.0
Census Tract 9504; Wayne County; Tennessee	2,770	36,132	24.0
Census Tract 1103; Morgan County; Tennessee	4,770	15,948	24.1
Census Tract 9506.01; Campbell County; Tennessee	1,844	20,297	24.2
Census Tract 104.03; Davidson County; Tennessee	3,223	18,791	24.2
Census Tract 502.01; Marion County; Tennessee	3,311	26,700	24.2
Census Tract 205.32; Shelby County; Tennessee	4,990	27,384	24.2
Census Tract 408; Sullivan County; Tennessee	3,050	27,525	24.2
Census Tract 9550; Clay County; Tennessee	4,144	21,440	24.3
Census Tract 143; Davidson County; Tennessee	1,353	27,164	24.3
Census Tract 9302; Haywood County; Tennessee	1,198	31,407	24.3
Census Tract 39.02; Knox County; Tennessee	2,646	18,941	24.3
Census Tract 67; Knox County; Tennessee	2,182	29,416	24.3
Census Tract 414.07; Rutherford County; Tennessee	4,583	48,250	24.3
Census Tract 11; Shelby County; Tennessee	2,067	14,947	24.3
Census Tract 211.11; Shelby County; Tennessee	2,963	21,892	24.3
Census Tract 113.02; Bradley County; Tennessee	2,012	32,392	24.4
Census Tract 9694; Henry County; Tennessee	1,539	30,518	24.4

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 204; Anderson County; Tennessee	3,406	31,312	24.5
Census Tract 205; Anderson County; Tennessee	3,146	24,072	24.5
Census Tract 24; Knox County; Tennessee	3,619	22,536	24.5
Census Tract 409; Sullivan County; Tennessee	2,832	44,349	24.5
Census Tract 9698; Henry County; Tennessee	1,911	22,876	24.6
Census Tract 9305.01; McNairy County; Tennessee	1,869	21,683	24.6
Census Tract 421.01; Rutherford County; Tennessee	4,248	22,893	24.6
Census Tract 195.01; Davidson County; Tennessee	2,540	73,440	24.7
Census Tract 9551.01; Decatur County; Tennessee	1,512	22,554	24.7
Census Tract 9605; Franklin County; Tennessee	3,427	31,366	24.8
Census Tract 116; Hamilton County; Tennessee	5,401	27,237	24.8
Census Tract 123; Hamilton County; Tennessee	3,142	24,547	24.8
Census Tract 221.30; Shelby County; Tennessee	4,059	26,726	24.8
Census Tract 203; Sumner County; Tennessee	4,220	25,249	24.8
Census Tract 710; Carter County; Tennessee	2,115	24,374	24.9
Census Tract 507; Hawkins County; Tennessee	2,973	24,409	25.0
Census Tract 9670.02; Gibson County; Tennessee	2,739	23,301	25.1
Census Tract 221.32; Shelby County; Tennessee	2,038	28,668	25.1
Census Tract 9667.02; Gibson County; Tennessee	2,467	19,779	25.2
Census Tract 9692; Henry County; Tennessee	1,571	23,221	25.2
Census Tract 9251.02; Pickett County; Tennessee	1,796	21,491	25.2
Census Tract 803.01; Robertson County; Tennessee	2,132	24,451	25.2
Census Tract 221.11; Shelby County; Tennessee	4,003	30,131	25.2
Census Tract 156.20; Davidson County; Tennessee	5,152	26,205	25.3
Census Tract 165; Davidson County; Tennessee	4,551	15,784	25.4
Census Tract 9550; Grundy County; Tennessee	2,070	28,734	25.4
Census Tract 107; Bradley County; Tennessee	3,801	18,045	25.5
Census Tract 807.02; Sevier County; Tennessee	4,491	20,352	25.5
Census Tract 46; Shelby County; Tennessee	1,088	22,490	25.6
Census Tract 606.01; Washington County; Tennessee	3,032	35,196	25.6
Census Tract 610; Washington County; Tennessee	1,875	22,921	25.6
Census Tract 107.02; Davidson County; Tennessee	2,689	31,152	25.7
Census Tract 9564; Johnson County; Tennessee	4,034	25,082	25.7
Census Tract 609.02; Washington County; Tennessee	2,439	18,698	25.7
Census Tract 9304; Haywood County; Tennessee	2,745	22,045	25.8
Census Tract 27; Shelby County; Tennessee	1,433	35,397	25.8
Census Tract 66; Knox County; Tennessee	2,913	50,648	25.9
Census Tract 6; Madison County; Tennessee	1,506	30,598	25.9
Census Tract 9705.02; Cumberland County; Tennessee	3,315	21,774	26.0
Census Tract 156.18; Davidson County; Tennessee	5,673	29,926	26.0
Census Tract 427.04; Sullivan County; Tennessee	1,924	23,695	26.0
Census Tract 208; Anderson County; Tennessee	3,815	28,234	26.1
Census Tract 190.08; Davidson County; Tennessee	3,891	23,136	26.2
Census Tract 109.04; Hamilton County; Tennessee	2,497	41,663	26.2
Census Tract 226; Shelby County; Tennessee	2,940	19,152	26.2
Census Tract 19; Knox County; Tennessee	1,163	21,404	26.3
Census Tract 9751; Henderson County; Tennessee	3,137	22,473	26.4

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 118; Davidson County; Tennessee	2,239	47,881	26.5
Census Tract 190.03; Davidson County; Tennessee	2,878	20,475	26.5
Census Tract 9605; Hancock County; Tennessee	2,083	29,388	26.5
Census Tract 102.20; Shelby County; Tennessee	5,112	20,638	26.5
Census Tract 612; Washington County; Tennessee	3,244	31,372	26.5
Census Tract 9710.01; Coffee County; Tennessee	1,018	43,787	26.6
Census Tract 509; Hawkins County; Tennessee	2,602	22,219	26.6
Census Tract 9701; Macon County; Tennessee	3,807	21,842	26.6
Census Tract 1; Putnam County; Tennessee	4,217	23,045	26.6
Census Tract 613.01; Washington County; Tennessee	2,592	30,255	26.6
Census Tract 190.04; Davidson County; Tennessee	2,990	18,934	26.8
Census Tract 9753.02; Henderson County; Tennessee	3,036	22,694	26.8
Census Tract 25; Shelby County; Tennessee	2,362	29,235	26.8
Census Tract 1001; Hamblen County; Tennessee	4,735	20,317	26.9
Census Tract 102.10; Shelby County; Tennessee	4,119	19,730	27.0
Census Tract 9205.01; Cocke County; Tennessee	5,065	24,546	27.1
Census Tract 505.05; Lauderdale County; Tennessee	2,787	22,087	27.1
Census Tract 100.02; Shelby County; Tennessee	2,312	19,656	27.1
Census Tract 9307; Warren County; Tennessee	3,810	26,388	27.1
Census Tract 9604; Jackson County; Tennessee	1,622	24,492	27.2
Census Tract 308.01; Roane County; Tennessee	1,501	25,204	27.2
Census Tract 36; Shelby County; Tennessee	1,470	42,436	27.2
Census Tract 80; Shelby County; Tennessee	3,451	22,863	27.2
Census Tract 9504.02; Bedford County; Tennessee	5,137	20,946	27.3
Census Tract 9632; Benton County; Tennessee	1,669	27,014	27.3
Census Tract 181.01; Davidson County; Tennessee	3,630	41,748	27.3
Census Tract 912; Greene County; Tennessee	2,886	23,101	27.3
Census Tract 156.32; Davidson County; Tennessee	3,250	37,911	27.5
Census Tract 9602; Lake County; Tennessee	1,799	20,249	27.6
Census Tract 9501; Polk County; Tennessee	1,244	27,744	27.6
Census Tract 20; Shelby County; Tennessee	1,136	22,107	27.6
Census Tract 217.56; Shelby County; Tennessee	1,613	31,405	27.7
Census Tract 9503; Campbell County; Tennessee	1,578	21,828	27.8
Census Tract 9644.01; Dyer County; Tennessee	2,193	24,017	27.8
Census Tract 9693; Henry County; Tennessee	2,274	23,795	27.8
Census Tract 24; Shelby County; Tennessee	1,426	23,218	28.1
Census Tract 110.10; Shelby County; Tennessee	2,427	20,913	28.1
Census Tract 213.04; Anderson County; Tennessee	2,764	25,852	28.2
Census Tract 503.02; Hawkins County; Tennessee	3,203	24,213	28.2
Census Tract 9601; Lake County; Tennessee	4,219	19,402	28.3
Census Tract 701; Carter County; Tennessee	1,745	25,405	28.4
Census Tract 119; Davidson County; Tennessee	2,264	36,753	28.6
Census Tract 506; Lauderdale County; Tennessee	1,935	18,358	28.6
Census Tract 8; Putnam County; Tennessee	5,702	14,534	28.6
Census Tract 808.01; Sevier County; Tennessee	2,166	19,888	28.6
Census Tract 9532; Bledsoe County; Tennessee	3,966	21,455	28.8
Census Tract 1; Madison County; Tennessee	3,068	31,128	28.8

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 19; Hamilton County; Tennessee	2,550	22,501	28.9
Census Tract 46.10; Knox County; Tennessee	3,608	27,262	28.9
Census Tract 9702.02; McMinn County; Tennessee	2,942	22,841	28.9
Census Tract 9751.02; Scott County; Tennessee	3,347	24,424	28.9
Census Tract 20; Knox County; Tennessee	2,311	19,753	29.0
Census Tract 421; Sullivan County; Tennessee	4,456	34,168	29.0
Census Tract 9695.02; Henry County; Tennessee	3,121	25,273	29.1
Census Tract 403.05; Rutherford County; Tennessee	2,039	19,313	29.1
Census Tract 97; Shelby County; Tennessee	1,796	18,210	29.1
Census Tract 107.10; Shelby County; Tennessee	3,101	20,239	29.2
Census Tract 13; Hamilton County; Tennessee	1,685	29,051	29.3
Census Tract 107.20; Shelby County; Tennessee	2,394	23,132	29.3
Census Tract 1101; Morgan County; Tennessee	2,392	24,905	29.4
Census Tract 109.04; Davidson County; Tennessee	2,363	23,270	29.5
Census Tract 419; Rutherford County; Tennessee	3,354	22,885	29.5
Census Tract 62; Shelby County; Tennessee	1,462	19,566	29.6
Census Tract 68; Shelby County; Tennessee	1,422	18,801	29.6
Census Tract 220.23; Shelby County; Tennessee	1,552	22,180	29.7
Census Tract 34; Hamilton County; Tennessee	3,309	26,368	29.8
Census Tract 10; Madison County; Tennessee	1,674	17,872	29.9
Census Tract 3; Shelby County; Tennessee	530	13,353	29.9
Census Tract 405; Sullivan County; Tennessee	3,768	20,186	30.0
Census Tract 29; Hamilton County; Tennessee	2,254	31,649	30.1
Census Tract 136; Davidson County; Tennessee	4,860	19,266	30.2
Census Tract 21; Shelby County; Tennessee	1,022	19,187	30.2
Census Tract 105; Maury County; Tennessee	3,444	23,310	30.3
Census Tract 56; Shelby County; Tennessee	3,191	19,814	30.3
Census Tract 601.03; Sequatchie County; Tennessee	3,459	22,114	30.4
Census Tract 102.02; Bradley County; Tennessee	2,130	39,023	30.5
Census Tract 1002; Hamblen County; Tennessee	4,676	19,008	30.5
Census Tract 414.06; Rutherford County; Tennessee	4,206	33,643	30.5
Census Tract 9752; Scott County; Tennessee	4,896	18,174	30.6
Census Tract 12; Shelby County; Tennessee	2,417	19,700	30.6
Census Tract 156.14; Davidson County; Tennessee	3,098	29,985	30.8
Census Tract 9680; Weakley County; Tennessee	913	24,253	30.8
Census Tract 156.15; Davidson County; Tennessee	4,268	16,747	31.0
Census Tract 108; Blount County; Tennessee	2,398	25,994	31.1
Census Tract 108; Bradley County; Tennessee	2,530	18,159	31.1
Census Tract 706; Carter County; Tennessee	2,153	25,710	31.1
Census Tract 9601; Jackson County; Tennessee	1,650	24,725	31.1
Census Tract 57; Shelby County; Tennessee	1,942	16,175	31.1
Census Tract 220.26; Shelby County; Tennessee	1,268	18,132	31.1
Census Tract 402; Sullivan County; Tennessee	1,872	25,726	31.1
Census Tract 194.01; Davidson County; Tennessee	2,772	58,752	31.2
Census Tract 67; Shelby County; Tennessee	2,794	19,059	31.2
Census Tract 191.08; Davidson County; Tennessee	2,249	19,373	31.3
Census Tract 9303.02; Haywood County; Tennessee	2,384	19,697	31.7

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 620; Washington County; Tennessee	3,860	24,103	31.8
Census Tract 9202.01; DeKalb County; Tennessee	4,099	19,561	31.9
Census Tract 138; Davidson County; Tennessee	1,368	23,519	32.0
Census Tract 113; Shelby County; Tennessee	1,042	29,949	32.1
Census Tract 9656; Obion County; Tennessee	2,931	19,717	32.2
Census Tract 128.01; Davidson County; Tennessee	4,099	28,048	32.3
Census Tract 9651; Fentress County; Tennessee	3,575	19,006	32.3
Census Tract 304.01; Roane County; Tennessee	2,231	23,599	32.3
Census Tract 9531.02; Bledsoe County; Tennessee	3,562	23,061	32.4
Census Tract 24; Hamilton County; Tennessee	3,224	21,650	32.4
Census Tract 9702.01; McMinn County; Tennessee	1,768	20,531	32.4
Census Tract 112; Shelby County; Tennessee	782	16,666	32.4
Census Tract 9682.03; Weakley County; Tennessee	2,689	23,562	32.4
Census Tract 103; Shelby County; Tennessee	955	15,050	32.6
Census Tract 7; Madison County; Tennessee	2,590	22,257	32.7
Census Tract 9507.02; Campbell County; Tennessee	2,205	23,340	32.8
Census Tract 704; Carter County; Tennessee	1,528	20,303	33.1
Census Tract 606.02; Washington County; Tennessee	3,680	28,106	33.3
Census Tract 11; Hamilton County; Tennessee	1,572	28,786	33.4
Census Tract 9506.02; Campbell County; Tennessee	1,724	27,882	33.8
Census Tract 1002; Montgomery County; Tennessee	1,235	22,032	33.8
Census Tract 106.20; Shelby County; Tennessee	2,365	16,387	33.8
Census Tract 14; Knox County; Tennessee	1,738	13,696	34.0
Census Tract 65; Shelby County; Tennessee	1,634	20,655	34.0
Census Tract 109.03; Davidson County; Tennessee	5,092	25,130	34.1
Census Tract 27; Knox County; Tennessee	1,640	16,796	34.1
Census Tract 810.02; Sevier County; Tennessee	2,205	25,039	34.1
Census Tract 4; Madison County; Tennessee	2,418	19,834	34.2
Census Tract 9605.01; Lawrence County; Tennessee	3,788	19,126	34.5
Census Tract 601; Washington County; Tennessee	3,359	26,482	34.5
Census Tract 191.05; Davidson County; Tennessee	3,829	24,817	34.6
Census Tract 7; Shelby County; Tennessee	3,322	22,528	34.6
Census Tract 9644.02; Dyer County; Tennessee	2,154	23,733	34.7
Census Tract 106.10; Shelby County; Tennessee	4,156	21,545	34.7
Census Tract 30; Shelby County; Tennessee	2,266	41,440	34.8
Census Tract 9204.02; Hardin County; Tennessee	2,288	19,654	35.0
Census Tract 53; Shelby County; Tennessee	2,413	15,723	35.3
Census Tract 205.21; Shelby County; Tennessee	1,912	14,595	35.3
Census Tract 205.43; Shelby County; Tennessee	2,295	20,499	35.3
Census Tract 26; Hamilton County; Tennessee	1,697	21,012	35.5
Census Tract 108.10; Shelby County; Tennessee	4,477	19,703	35.5
Census Tract 8; Knox County; Tennessee	4,268	40,799	35.8
Census Tract 13; Shelby County; Tennessee	1,810	19,440	35.9
Census Tract 406; Sullivan County; Tennessee	2,600	20,362	36.0
Census Tract 207; Anderson County; Tennessee	1,226	21,596	36.1
Census Tract 9606; Hancock County; Tennessee	3,334	20,765	36.1
Census Tract 122; Hamilton County; Tennessee	1,665	16,348	36.2

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 110.20; Shelby County; Tennessee	952	31,532	36.4
Census Tract 26; Knox County; Tennessee	1,927	15,852	36.5
Census Tract 89; Shelby County; Tennessee	3,023	18,128	36.6
Census Tract 205.44; Shelby County; Tennessee	1,921	22,371	37.0
Census Tract 12; Hamilton County; Tennessee	2,620	21,234	37.1
Census Tract 9; Shelby County; Tennessee	1,916	22,379	37.2
Census Tract 69; Shelby County; Tennessee	1,933	21,809	37.3
Census Tract 159; Davidson County; Tennessee	2,820	22,859	37.4
Census Tract 203.02; Shelby County; Tennessee	2,360	21,910	37.4
Census Tract 9709; Coffee County; Tennessee	3,541	21,319	37.6
Census Tract 9553; Marshall County; Tennessee	3,288	15,089	37.6
Census Tract 37; Shelby County; Tennessee	1,058	26,028	38.0
Census Tract 87; Shelby County; Tennessee	3,604	20,969	38.0
Census Tract 4; Hamilton County; Tennessee	2,409	16,234	38.1
Census Tract 127.01; Davidson County; Tennessee	4,747	21,953	38.4
Census Tract 16; Hamilton County; Tennessee	2,191	30,424	38.6
Census Tract 217.31; Shelby County; Tennessee	1,970	13,602	38.8
Census Tract 70; Knox County; Tennessee	2,152	18,930	39.0
Census Tract 9202; Cocke County; Tennessee	4,466	19,192	39.2
Census Tract 100.01; Shelby County; Tennessee	2,610	18,618	39.3
Census Tract 609.01; Washington County; Tennessee	2,369	17,765	39.3
Census Tract 307; Wilson County; Tennessee	3,082	20,455	39.6
Census Tract 9751.01; Scott County; Tennessee	1,813	25,237	39.8
Census Tract 78.21; Shelby County; Tennessee	3,995	26,214	39.8
Census Tract 208; Sumner County; Tennessee	5,417	16,542	39.8
Census Tract 38; Shelby County; Tennessee	634	21,035	39.9
Census Tract 74; Shelby County; Tennessee	2,849	21,617	39.9
Census Tract 82; Shelby County; Tennessee	3,726	12,265	40.7
Census Tract 14; Shelby County; Tennessee	1,080	17,866	40.8
Census Tract 1009; Montgomery County; Tennessee	2,214	17,108	41.2
Census Tract 217.10; Shelby County; Tennessee	1,555	18,557	41.2
Census Tract 8; Madison County; Tennessee	1,299	16,570	41.9
Census Tract 81.10; Shelby County; Tennessee	1,513	15,163	41.9
Census Tract 78.22; Shelby County; Tennessee	1,154	22,923	42.4
Census Tract 4; Shelby County; Tennessee	1,046	17,382	42.7
Census Tract 78.10; Shelby County; Tennessee	1,609	16,613	42.8
Census Tract 29; Knox County; Tennessee	2,476	17,597	42.9
Census Tract 39; Shelby County; Tennessee	1,454	26,710	43.0
Census Tract 105; Shelby County; Tennessee	1,897	14,883	43.0
Census Tract 221.31; Shelby County; Tennessee	2,087	25,483	43.1
Census Tract 223.30; Shelby County; Tennessee	3,774	18,390	43.1
Census Tract 2; Shelby County; Tennessee	880	12,578	43.5
Census Tract 99.01; Shelby County; Tennessee	2,315	16,136	43.6
Census Tract 139; Davidson County; Tennessee	1,380	24,762	44.1
Census Tract 19; Shelby County; Tennessee	1,102	17,840	44.2
Census Tract 114.01; Shelby County; Tennessee	900	14,179	44.2
Census Tract 115; Shelby County; Tennessee	1,612	12,796	44.7

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 91; Shelby County; Tennessee	2,173	15,531	45.3
Census Tract 70; Shelby County; Tennessee	2,420	21,286	45.5
Census Tract 1003; Hamblen County; Tennessee	2,320	13,728	46.6
Census Tract 9; Madison County; Tennessee	1,600	15,483	46.6
Census Tract 3.04; Putnam County; Tennessee	3,778	16,143	46.7
Census Tract 68; Knox County; Tennessee	3,817	18,619	46.8
Census Tract 223.10; Shelby County; Tennessee	4,086	14,373	46.8
Census Tract 106.30; Shelby County; Tennessee	2,417	13,584	46.9
Census Tract 8; Shelby County; Tennessee	1,475	21,765	47.0
Census Tract 6; Shelby County; Tennessee	1,206	15,557	47.3
Census Tract 1008; Montgomery County; Tennessee	2,399	11,901	47.9
Census Tract 101.21; Shelby County; Tennessee	1,682	17,148	48.0
Census Tract 117; Shelby County; Tennessee	813	19,803	48.0
Census Tract 104; Bradley County; Tennessee	2,264	14,230	48.2
Census Tract 160; Davidson County; Tennessee	2,018	27,708	49.4
Census Tract 101.22; Shelby County; Tennessee	2,352	14,516	49.4
Census Tract 162; Davidson County; Tennessee	2,497	45,142	49.8
Census Tract 55; Shelby County; Tennessee	1,588	13,398	49.8
Census Tract 25; Hamilton County; Tennessee	3,431	18,188	49.9
Census Tract 28; Shelby County; Tennessee	2,231	16,995	49.9
Census Tract 217.57; Shelby County; Tennessee	1,717	18,833	50.5
Census Tract 205.23; Shelby County; Tennessee	2,164	13,096	51.1
Census Tract 222.20; Shelby County; Tennessee	3,887	17,307	51.4
Census Tract 111; Shelby County; Tennessee	1,291	18,765	51.9
Census Tract 114.02; Shelby County; Tennessee	3,348	16,102	52.4
Census Tract 142; Davidson County; Tennessee	1,928	12,426	52.7
Census Tract 1001; Montgomery County; Tennessee	1,350	13,975	52.8
Census Tract 5; Madison County; Tennessee	3,061	10,536	52.9
Census Tract 58; Shelby County; Tennessee	692	10,646	54.0
Census Tract 35.02; Knox County; Tennessee	2,080	25,565	55.0
Census Tract 193; Davidson County; Tennessee	3,018	22,695	57.5
Census Tract 11; Madison County; Tennessee	832	11,081	57.5
Census Tract 101.20; Shelby County; Tennessee	2,780	12,050	57.9
Census Tract 116; Shelby County; Tennessee	1,767	12,615	58.0
Census Tract 220.25; Shelby County; Tennessee	2,393	13,136	58.6
Census Tract 99.02; Shelby County; Tennessee	1,482	15,731	59.3
Census Tract 50; Shelby County; Tennessee	659	8,737	64.4
Census Tract 59; Shelby County; Tennessee	1,418	14,355	68.8
Census Tract 45; Shelby County; Tennessee	539	11,371	69.6
Census Tract 69.01; Knox County; Tennessee	4,124	10,996	69.7
Census Tract 69.02; Knox County; Tennessee	3,034	9,266	72.4
Census Tract 148; Davidson County; Tennessee	1,037	6,434	77.9
Census Tract 69.03; Knox County; Tennessee	2,227	9,761	79.0
Census Tract 9682.02; Weakley County; Tennessee	2,069	8,229	82.6
Census Tract 9.02; Knox County; Tennessee	3,061	4,852	96.1
Census Tract 109; Washington County; Virginia	3,808	26,902	15.0
Census Tract 9310; Wise County; Virginia	1,573	26,736	15.4

Geography	Population 16 Years and Over	Per Capita Income (\$)	Poverty (%)
Census Tract 306; Scott County; Virginia	3,358	25,001	15.5
Census Tract 101.01; Washington County; Virginia	2,754	32,527	15.9
Census Tract 304; Scott County; Virginia	3,038	28,322	16.2
Census Tract 9309; Wise County; Virginia	3,482	26,812	19.9
Census Tract 302; Scott County; Virginia	3,428	21,052	20.3
Census Tract 103.01; Washington County; Virginia	2,514	26,229	20.3
Census Tract 9307; Wise County; Virginia	2,712	19,897	21.9
Census Tract 9315; Wise County; Virginia	2,918	20,610	22.0
Census Tract 105.02; Washington County; Virginia	3,920	39,896	22.2
Census Tract 9504; Lee County; Virginia	2,092	25,950	22.4
Census Tract 9316; Wise County; Virginia	1,963	27,112	23.0
Census Tract 203; Bristol city; Virginia	1,938	20,437	23.9
Census Tract 9314; Wise County; Virginia	4,401	23,582	24.3
Census Tract 9503.02; Lee County; Virginia	2,579	12,921	26.2
Census Tract 201; Bristol city; Virginia	2,952	21,899	26.6
Census Tract 9501; Lee County; Virginia	2,224	19,173	27.4
Census Tract 9317; Wise County; Virginia	1,333	23,738	28.9
Census Tract 9601; Norton city; Virginia	3,138	27,666	29.1
Census Tract 303; Scott County; Virginia	2,509	23,050	30.4
Census Tract 9311; Wise County; Virginia	1,959	18,176	32.8
Census Tract 9505; Lee County; Virginia	3,878	21,393	36.0
Census Tract 202.01; Bristol city; Virginia	1,849	19,257	46.1
Census Tract 9503.01; Lee County; Virginia	1,528	19,876	50.4

Source: USCB 2023h

B.4 Minority Populations in the TVA PSA

Geography	2022 Population	% White Alone	% Minority Population	% Black or African American	% American Indian and Alaska Native	% Asian	% Native Hawaiian and Other Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic or Latino
Blount County, Alabama	59,077	85.7	14.3	1.2	0.1	0.2	0.2	0.1	2.8	9.7
Cherokee County, Alabama	25,069	90.7	9.3	4.0	0.5	0.1	0.0	0.1	2.8	1.9
Colbert County, Alabama	57,270	77.7	22.3	16.0	0.3	0.4	0.1	0.1	2.2	3.2
Cullman County, Alabama	88,284	90.8	9.2	1.1	0.3	0.3	0.0	0.1	2.8	4.6
DeKalb County, Alabama	71,680	79.1	20.9	1.5	0.5	0.1	0.0	0.5	2.9	15.4
Etowah County, Alabama	103,348	77.1	22.9	15.0	0.1	0.7	0.0	0.4	2.3	4.4
Franklin County, Alabama	32,011	75.2	24.8	4.2	0.2	0.1	0.0	0.2	1.5	18.4
Jackson County, Alabama	52,618	88.8	11.2	3.2	0.8	0.4	0.0	0.1	3.5	3.2
Lauderdale County, Alabama	94,329	83.4	16.6	9.7	0.2	0.6	0.1	0.1	2.8	3.0
Lawrence County, Alabama	33,116	76.3	23.7	10.2	5.0	0.3	0.1	0.0	5.6	2.5
Limestone County, Alabama	104,199	74.7	25.3	13.0	0.4	1.8	0.1	0.1	3.6	6.3
Madison County, Alabama	389,781	63.5	36.5	24.3	0.4	2.4	0.0	0.3	3.8	5.3
Marshall County, Alabama	97,923	79.1	20.9	2.7	0.1	0.6	0.1	0.2	2.1	15.1
Morgan County, Alabama	123,102	74.3	25.7	12.9	0.2	0.5	0.0	0.3	3.0	8.8
Winston County, Alabama	23,655	92.3	7.7	1.1	0.2	0.4	0.0	0.0	2.7	3.2
Catoosa County, Georgia	68,052	89.0	11.0	2.2	0.1	1.5	0.1	0.6	3.3	3.4
Chattooga County, Georgia	24,902	82.0	18.0	9.5	0.1	0.1	0.0	0.0	2.7	5.7
Dade County, Georgia	16,239	92.2	7.8	1.0	0.0	0.8	0.0	0.3	3.1	2.6
Fannin County, Georgia	25,436	93.1	6.9	0.3	0.0	0.5	0.0	0.4	3.0	2.8
Gilmer County, Georgia	31,519	84.3	15.7	0.5	0.2	0.4	0.0	0.1	2.1	12.4
Gordon County, Georgia	57,785	76.0	24.0	3.3	0.1	1.1	0.1	0.2	2.4	16.8
Murray County, Georgia	40,063	80.2	19.8	0.4	0.1	0.8	0.0	0.4	2.2	15.9
Towns County, Georgia	12,546	93.6	6.4	1.3	0.1	0.2	0.0	0.1	1.8	2.9
Union County, Georgia	24,880	92.9	7.1	0.6	0.2	0.2	0.0	0.0	2.4	3.8
Walker County, Georgia	68,065	89.9	10.1	3.9	0.2	0.6	0.0	0.1	2.8	2.7
Whitfield County, Georgia	103,033	56.6	43.4	3.2	0.1	1.5	0.0	0.1	1.8	36.8
Allen County, Kentucky	20,773	94.1	5.9	0.8	0.0	0.0	0.0	0.3	2.3	2.4
Butler County, Kentucky	12,365	93.7	6.3	0.4	0.1	0.7	0.0	0.0	1.4	3.8
Calloway County, Kentucky	37,345	88.7	11.3	3.4	0.2	1.6	0.3	0.4	2.7	2.8
Carlisle County, Kentucky	4,782	92.3	7.7	1.2	0.3	0.5	0.1	0.1	3.0	2.5
Christian County, Kentucky	72,766	64.7	35.3	19.7	0.1	1.2	0.3	0.4	5.1	8.4
Cumberland County, Kentucky	5,974	93.0	7.0	2.7	0.3	0.8	0.0	0.0	1.5	1.8
Edmonson County, Kentucky	12,179	95.2	4.8	0.8	0.1	0.0	0.0	0.0	2.3	1.6
Fulton County, Kentucky	6,480	69.8	30.2	23.6	0.4	0.0	0.9	0.0	3.8	1.5

Geography	2022 Population	% White Alone	% Minority Population	% Black or African American	% American Indian and Alaska Native	% Asian	% Native Hawaiian and Other Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic or Latino
Graves County, Kentucky	36,701	85.0	15.0	4.0	0.0	0.4	0.0	0.3	2.9	7.4
Grayson County, Kentucky	26,465	95.1	4.9	0.5	0.0	0.3	0.0	0.2	2.3	1.5
Hickman County, Kentucky	4,491	86.1	13.9	9.4	0.1	0.0	0.0	0.0	2.1	2.2
Livingston County, Kentucky	8,980	94.5	5.5	0.3	0.0	0.0	0.0	0.0	2.6	2.6
Logan County, Kentucky	27,498	88.1	11.9	5.8	0.0	0.4	0.0	0.2	2.3	3.1
Lyon County, Kentucky	8,721	87.9	12.1	6.5	0.5	0.7	0.1	0.3	1.6	2.5
Marshall County, Kentucky	31,706	96.0	4.0	0.6	0.3	0.2	0.0	0.0	1.0	1.8
Monroe County, Kentucky	11,331	93.2	6.8	2.6	0.1	0.2	0.0	0.0	0.8	3.2
Muhlenberg County, Kentucky	30,735	92.5	7.5	1.9	0.2	1.1	0.0	0.0	2.4	1.7
Simpson County, Kentucky	19,574	84.9	15.1	9.3	0.0	0.4	0.0	0.1	2.6	2.8
Todd County, Kentucky	12,281	85.1	14.9	8.0	0.0	0.1	0.0	0.4	1.6	4.8
Trigg County, Kentucky	14,154	87.1	12.9	6.3	0.0	0.3	0.0	0.4	3.3	2.5
Warren County, Kentucky	135,307	76.6	23.4	8.6	0.1	4.9	0.5	0.1	3.5	5.7
Avery County, North Carolina	17,679	87.5	12.5	3.6	0.8	0.5	0.0	0.0	2.4	5.1
Cherokee County, North Carolina	28,868	90.1	9.9	1.5	1.6	0.5	0.0	0.1	2.5	3.7
Clay County, North Carolina	11,186	91.7	8.3	1.0	1.1	1.1	0.1	0.0	1.1	3.9
Watauga County, North Carolina	54,540	91.1	8.9	1.7	0.3	1.4	0.0	0.1	1.5	4.0
Lee County, Virginia	22,287	92.1	7.9	4.0	0.1	0.3	0.0	0.0	1.4	2.1
Scott County, Virginia	21,536	96.1	3.9	1.2	0.1	0.1	0.2	0.1	0.8	1.5
Washington County, Virginia	53,985	94.8	5.2	1.7	0.1	0.5	0.0	0.1	1.3	1.6
Wise County, Virginia	36,105	90.8	9.2	4.6	0.1	1.1	0.0	0.2	1.9	1.3
Bristol city, Virginia	17,036	86.6	13.4	6.3	0.0	0.3	0.0	0.7	3.6	2.6
Norton city, Virginia	3,668	94.4	5.6	2.0	0.0	0.1	0.0	0.0	3.5	0.0
Alcorn County, Mississippi	34,717	80.8	19.2	9.4	0.1	0.4	0.1	0.1	5.6	3.5
Attala County, Mississippi	17,842	52.6	47.4	42.2	0.1	0.3	0.0	0.0	2.6	2.2
Benton County, Mississippi	7,637	60.1	39.9	32.9	0.0	0.4	0.1	0.0	3.3	3.1
Calhoun County, Mississippi	13,193	63.8	36.2	28.4	0.0	0.0	0.0	0.1	1.3	6.5
Chickasaw County, Mississippi	17,024	49.1	50.9	43.7	0.0	0.2	0.0	0.0	1.9	5.1
Choctaw County, Mississippi	8,208	67.0	33.0	29.2	0.1	0.4	0.0	0.2	1.3	1.8
Clay County, Mississippi	18,598	38.0	62.0	60.0	0.0	0.0	0.0	0.0	1.8	0.2
DeSoto County, Mississippi	186,214	59.8	40.2	30.8	0.1	1.3	0.0	0.2	2.7	5.2
Itawamba County, Mississippi	23,888	88.8	11.2	6.0	0.4	0.2	0.0	0.2	2.6	1.8
Kemper County, Mississippi	8,980	33.4	66.6	61.8	3.8	0.0	0.0	0.0	0.2	0.8
Lafayette County, Mississippi	56,172	69.9	30.1	23.3	0.1	2.3	0.0	0.1	1.6	2.6
Leake County, Mississippi	21,335	47.7	52.3	39.8	5.7	0.4	0.0	0.0	1.4	5.1
Lee County, Mississippi	83,343	63.7	36.3	29.7	0.1	1.0	0.2	0.5	1.8	3.0

Geography	2022 Population	% White Alone	% Minority Population	% Black or African American	% American Indian and Alaska Native	% Asian	% Native Hawaiian and Other Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic or Latino
Lowndes County, Mississippi	58,547	50.0	50.0	44.5	0.1	1.1	0.0	0.4	1.5	2.4
Marshall County, Mississippi	33,980	47.1	52.9	45.5	0.0	0.1	0.0	0.5	2.4	4.3
Monroe County, Mississippi	34,168	66.7	33.3	30.2	0.0	0.3	0.0	0.0	1.3	1.5
Neshoba County, Mississippi	28,970	57.7	42.3	22.8	16.0	0.6	0.1	0.7	1.9	0.2
Noxubee County, Mississippi	10,261	25.6	74.4	73.6	0.4	0.0	0.0	0.0	0.2	0.3
Oktibbeha County, Mississippi	51,388	56.0	44.0	36.6	0.1	3.1	0.1	0.1	2.3	1.8
Panola County, Mississippi	33,157	46.9	53.1	49.6	0.1	0.3	0.4	0.1	1.9	0.6
Pontotoc County, Mississippi	31,202	75.1	24.9	14.4	0.2	0.0	0.0	0.1	2.8	7.5
Prentiss County, Mississippi	24,945	79.9	20.1	10.7	0.1	2.5	0.0	1.0	4.3	1.5
Scott County, Mississippi	27,943	48.7	51.3	35.6	0.1	0.1	0.0	0.2	3.5	11.8
Tallahatchie County, Mississippi	12,621	34.9	65.1	61.4	0.0	0.1	0.0	0.2	1.5	1.9
Tate County, Mississippi	28,094	64.2	35.8	30.4	0.0	0.0	0.1	0.0	1.8	3.4
Tippah County, Mississippi	21,769	77.1	22.9	14.5	0.0	0.0	0.0	0.4	3.2	4.7
Tishomingo County, Mississippi	18,837	91.0	9.0	1.3	0.4	0.6	0.0	0.4	2.7	3.5
Union County, Mississippi	27,880	77.2	22.8	15.7	0.2	0.2	0.0	0.6	1.6	4.6
Webster County, Mississippi	9,942	78.2	21.8	18.5	0.1	0.8	0.0	0.1	0.8	1.6
Winston County, Mississippi	17,741	49.6	50.4	46.7	0.5	0.1	0.0	0.0	1.6	1.5
Yalobusha County, Mississippi	12,499	57.8	42.2	38.3	0.2	0.1	0.0	0.0	1.0	2.6
Anderson County, Tennessee	77,337	87.6	12.4	3.2	0.3	1.3	0.1	0.6	3.6	3.4
Bedford County, Tennessee	50,533	75.2	24.8	6.5	0.3	0.3	0.0	0.5	3.7	13.6
Benton County, Tennessee	15,933	91.4	8.6	1.9	0.1	1.1	0.8	0.0	2.9	1.8
Bledsoe County, Tennessee	14,816	87.3	12.7	5.7	0.3	0.1	0.0	0.2	3.3	3.0
Blount County, Tennessee	135,951	89.9	10.1	2.6	0.1	0.7	0.0	0.2	2.6	3.8
Bradley County, Tennessee	108,859	83.9	16.1	4.6	0.2	1.0	0.0	1.0	2.5	6.9
Campbell County, Tennessee	39,397	95.9	4.1	0.3	0.0	0.4	0.0	0.0	1.6	1.7
Cannon County, Tennessee	14,481	92.9	7.1	2.5	0.1	0.0	0.0	0.0	1.7	2.7
Carroll County, Tennessee	28,381	84.0	16.0	8.8	0.1	0.3	0.0	0.0	3.6	3.1
Carter County, Tennessee	56,315	92.9	7.1	2.2	0.1	0.5	0.0	0.0	1.6	2.7
Cheatham County, Tennessee	41,184	90.2	9.8	1.9	0.2	0.5	0.0	0.7	2.5	3.8
Chester County, Tennessee	17,392	84.6	15.4	10.3	0.0	0.2	0.0	0.6	1.4	2.9
Claiborne County, Tennessee	32,092	94.7	5.3	0.8	0.1	0.8	0.0	0.0	2.1	1.5
Clay County, Tennessee	7,592	93.9	6.1	0.7	0.4	0.6	0.0	0.0	1.7	2.8
Cocke County, Tennessee	36,186	92.5	7.5	1.2	0.5	0.5	0.1	0.0	2.4	2.8
Coffee County, Tennessee	58,080	86.7	13.3	3.8	0.0	1.3	0.2	0.4	2.3	5.2
Crockett County, Tennessee	13,955	72.0	28.0	11.0	0.6	0.5	0.1	0.0	4.3	11.5
Cumberland County, Tennessee	61,552	93.8	6.2	0.8	0.2	0.3	0.0	0.1	1.7	3.2

Geography	2022 Population	% White Alone	% Minority Population	% Black or African American	% American Indian and Alaska Native	% Asian	% Native Hawaiian and Other Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic or Latino
Davidson County, Tennessee	709,786	55.6	44.4	26.0	0.1	3.6	0.1	0.5	3.6	10.6
Decatur County, Tennessee	11,483	91.0	9.0	2.4	0.0	0.1	0.0	0.0	2.9	3.6
DeKalb County, Tennessee	20,209	87.0	13.0	1.6	0.3	0.4	0.0	0.1	2.1	8.4
Dickson County, Tennessee	54,563	88.2	11.8	3.6	0.2	0.1	0.0	0.4	3.3	4.2
Dyer County, Tennessee	36,818	78.3	21.7	13.3	0.1	0.5	0.0	0.0	4.1	3.8
Fayette County, Tennessee	42,228	66.7	33.3	26.9	0.0	0.7	0.0	0.2	2.2	3.2
Fentress County, Tennessee	18,642	95.3	4.7	0.3	0.0	0.3	0.1	0.0	2.1	1.8
Franklin County, Tennessee	42,980	87.7	12.3	4.8	0.0	0.6	0.1	0.2	2.8	3.8
Gibson County, Tennessee	50,455	75.9	24.1	16.0	0.2	0.3	0.0	0.1	4.5	3.0
Giles County, Tennessee	30,317	82.7	17.3	8.8	0.1	0.1	0.0	0.4	4.6	3.3
Grainger County, Tennessee	23,648	93.0	7.0	0.9	0.2	0.1	0.3	0.1	1.7	3.6
Greene County, Tennessee	70,399	92.0	8.0	1.7	0.1	0.5	0.0	0.2	2.3	3.3
Grundy County, Tennessee	13,550	94.8	5.2	0.4	0.2	0.3	0.0	0.0	2.7	1.6
Hamblen County, Tennessee	64,531	80.3	19.7	3.1	0.2	0.9	0.4	0.3	2.6	12.3
Hamilton County, Tennessee	367,193	70.1	29.9	17.7	0.1	1.9	0.0	0.4	3.6	6.2
Hancock County, Tennessee	6,726	96.2	3.8	0.6	0.0	0.5	0.0	0.1	1.9	0.7
Hardeman County, Tennessee	25,519	53.9	46.1	39.4	0.6	0.4	0.0	0.1	3.6	2.0
Hardin County, Tennessee	26,824	90.9	9.1	3.4	0.3	0.1	0.0	0.1	2.7	2.6
Hawkins County, Tennessee	57,107	94.1	5.9	1.0	0.1	0.5	0.1	0.1	2.3	1.8
Haywood County, Tennessee	17,806	43.7	56.3	50.0	0.0	0.1	0.0	0.4	1.4	4.3
Henderson County, Tennessee	27,845	86.5	13.5	8.2	0.1	0.1	0.1	0.1	2.2	2.7
Henry County, Tennessee	32,305	86.4	13.6	7.4	0.5	0.4	0.0	0.0	2.5	2.8
Hickman County, Tennessee	24,996	89.6	10.4	3.4	0.5	0.9	0.0	0.2	2.5	2.9
Houston County, Tennessee	8,253	91.0	9.0	3.4	0.3	0.3	0.2	0.0	1.9	2.8
Humphreys County, Tennessee	19,032	90.4	9.6	1.2	0.2	0.8	0.0	0.9	3.7	2.7
Jackson County, Tennessee	11,730	93.3	6.7	0.7	0.1	0.0	0.1	0.0	3.4	2.4
Jefferson County, Tennessee	55,017	91.0	9.0	1.7	0.1	0.6	0.0	0.4	2.4	3.9
Johnson County, Tennessee	17,982	90.4	9.6	3.6	0.6	0.2	0.0	0.3	2.7	2.3
Knox County, Tennessee	481,406	81.1	18.9	8.2	0.1	2.3	0.1	0.4	3.2	4.8
Lake County, Tennessee	6,898	65.8	34.2	25.5	0.7	0.2	0.1	0.0	4.7	2.9
Lauderdale County, Tennessee	25,171	58.8	41.2	34.4	0.4	0.2	0.0	0.3	3.2	2.9
Lawrence County, Tennessee	44,377	92.2	7.8	1.4	0.0	0.4	0.1	0.4	2.9	2.5
Lewis County, Tennessee	12,637	92.1	7.9	1.2	0.0	1.1	0.0	0.0	3.0	2.6
Lincoln County, Tennessee	35,365	85.4	14.6	6.2	0.1	0.7	0.0	0.1	3.6	3.9
Loudon County, Tennessee	55,507	86.3	13.7	1.2	0.1	1.0	0.0	0.4	1.4	9.6
McMinn County, Tennessee	53,532	87.1	12.9	3.4	0.1	0.8	0.0	0.1	4.1	4.5

Geography	2022 Population	% White Alone	% Minority Population	% Black or African American	% American Indian and Alaska Native	% Asian	% Native Hawaiian and Other Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic or Latino
McNairy County, Tennessee	25,895	89.1	10.9	5.9	0.3	0.6	0.0	0.1	1.7	2.4
Macon County, Tennessee	25,365	90.3	9.7	0.6	0.1	0.4	0.0	0.0	3.3	5.3
Madison County, Tennessee	98,644	54.5	45.5	37.1	0.1	1.0	0.1	0.5	2.5	4.3
Marion County, Tennessee	28,852	90.9	9.1	2.9	0.1	0.5	0.0	0.1	3.5	2.1
Marshall County, Tennessee	34,567	84.4	15.6	4.7	0.3	0.6	0.0	0.6	3.4	6.0
Mauzy County, Tennessee	102,002	78.0	22.0	10.8	0.2	0.9	0.0	0.1	3.3	6.6
Meigs County, Tennessee	12,839	90.4	9.6	2.4	0.0	0.5	0.0	0.4	5.1	1.2
Monroe County, Tennessee	46,489	88.0	12.0	1.8	0.1	0.4	0.0	0.2	4.9	4.6
Montgomery County, Tennessee	222,305	60.9	39.1	19.6	0.2	2.3	0.3	0.6	5.3	10.7
Moore County, Tennessee	6,558	92.3	7.7	3.7	0.5	0.9	0.0	0.0	2.1	0.5
Morgan County, Tennessee	21,124	90.5	9.5	4.7	0.3	0.2	0.0	0.0	2.7	1.6
Obion County, Tennessee	30,670	80.1	19.9	10.5	0.1	0.2	0.1	0.2	3.7	5.1
Overton County, Tennessee	22,576	95.5	4.5	1.3	0.1	0.3	0.0	0.0	1.0	1.9
Perry County, Tennessee	8,432	90.9	9.1	0.4	0.5	2.2	0.0	0.0	5.0	1.0
Pickett County, Tennessee	5,042	95.2	4.8	0.3	0.0	0.0	0.0	0.0	2.3	2.2
Polk County, Tennessee	17,620	90.6	9.4	0.4	0.3	0.2	0.0	0.2	6.0	2.2
Putnam County, Tennessee	80,157	87.2	12.8	2.1	0.1	1.0	0.0	0.0	2.8	6.7
Rhea County, Tennessee	33,031	88.0	12.0	1.7	0.1	0.5	0.0	0.3	3.9	5.5
Roane County, Tennessee	53,777	91.2	8.8	2.7	0.2	0.6	0.0	0.1	2.8	2.2
Robertson County, Tennessee	73,297	81.4	18.6	7.1	0.1	0.7	0.0	0.6	2.5	7.7
Rutherford County, Tennessee	343,727	67.5	32.5	15.0	0.1	3.6	0.0	0.3	4.3	9.1
Scott County, Tennessee	21,917	96.8	3.2	0.3	0.2	0.4	0.0	0.3	1.8	0.2
Sequatchie County, Tennessee	16,065	92.3	7.7	0.5	0.4	0.3	0.1	0.3	2.2	4.0
Sevier County, Tennessee	98,455	88.4	11.6	0.9	0.2	1.2	0.0	0.3	2.1	6.9
Shelby County, Tennessee	926,440	34.5	65.5	53.6	0.1	2.9	0.0	0.3	1.9	6.8
Smith County, Tennessee	20,034	90.5	9.5	1.7	0.1	0.4	0.0	0.3	3.8	3.2
Stewart County, Tennessee	13,724	90.1	9.9	0.7	0.1	0.5	0.8	0.0	4.2	3.6
Sullivan County, Tennessee	158,722	92.4	7.6	1.9	0.1	0.8	0.0	0.3	2.3	2.2
Sumner County, Tennessee	196,845	81.1	18.9	8.2	0.1	1.6	0.0	0.3	2.9	5.7
Tipton County, Tennessee	61,116	74.5	25.5	18.5	0.1	0.6	0.0	0.7	2.7	2.9
Trousdale County, Tennessee	11,596	81.9	18.1	11.8	0.4	0.2	0.0	0.0	2.8	2.9
Unicoi County, Tennessee	17,845	91.3	8.7	0.3	0.4	0.2	0.0	0.0	2.0	5.9
Union County, Tennessee	19,860	95.1	4.9	0.5	0.0	0.0	0.0	0.1	2.3	2.0
Van Buren County, Tennessee	6,182	95.1	4.9	0.1	0.4	0.2	0.0	0.0	3.2	0.9
Warren County, Tennessee	41,163	84.1	15.9	2.6	0.2	0.4	0.1	0.0	3.0	9.5
Washington County, Tennessee	133,282	87.4	12.6	3.7	0.1	1.5	0.0	0.1	3.4	3.9

Geography	2022 Population	% White Alone	% Minority Population	% Black or African American	% American Indian and Alaska Native	% Asian	% Native Hawaiian and Other Pacific Islander	% Some Other Race	% Two or More Races	% Hispanic or Latino
Wayne County, Tennessee	16,325	88.9	11.1	4.8	0.1	0.1	0.1	0.1	3.5	2.4
Weakley County, Tennessee	32,946	85.5	14.5	7.9	0.2	1.2	0.1	0.3	1.9	3.0
White County, Tennessee	27,420	92.7	7.3	1.8	0.1	0.3	0.2	0.0	2.0	2.9
Williamson County, Tennessee	248,897	82.7	17.3	3.9	0.0	5.1	0.0	0.4	2.8	5.1
Wilson County, Tennessee	149,096	82.1	17.9	6.9	0.1	1.9	0.0	1.0	3.1	5.0

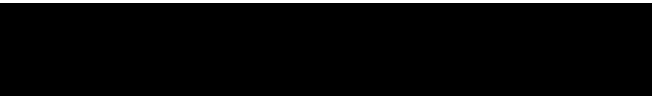
Source: USCB 2022b

County has a minority population greater than the TVA PSA average of 26.7%

County has a minority population greater than 50%



**Appendix C –
Environmental Parameters
of the Nine Capacity
Expansion Plans**



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Appendix C - Environmental Parameters of the Nine Capacity Expansion Plans

Total 2026 – 2050 SO₂ Emissions, tons

Strategy	Scenario		
	1	2	3
A	330,710	359,234	199,449
B	334,479	357,813	210,664
C	332,790	358,569	205,386

Total 2026 – 2050 NO_x Emissions, tons

Strategy	Scenario		
	1	2	3
A	289,891	281,284	175,698
B	277,078	267,932	184,976
C	281,391	264,875	175,357

Total 2026 – 2050 Mercury Emissions, pounds

Strategy	Scenario		
	1	2	3
A	1,418	1,765	751
B	1,475	1,754	784
C	1,428	1,760	769

Total 2026 – 2050 CO₂ Emissions, thousand tons

Strategy	Scenario		
	1	2	3
A	1,297,904	1,218,397	868,077
B	1,166,567	1,160,728	876,889
C	1,215,245	1,157,055	836,609

Average Annual CO₂ Emission Rate (2026-2050), pounds/MWh

Strategy	Scenario		
	1	2	3
A	542	466	382
B	489	445	385
C	513	447	370

Average Annual Water Withdrawal, million gallons

Strategy	Scenario		
	1	2	3
A	2,801,857	3,007,364	2,467,508
B	2,839,928	3,006,191	2,490,973
C	2,809,749	2,998,820	2,475,880

Average Annual Water Consumption, million gallons

Strategy	Scenario		
	1	2	3
A	57,452	73,100	61,123
B	64,265	76,354	61,381
C	55,944	69,229	57,554

Total 2026 – 2050 Coal Consumption, million tons

Strategy	Scenario		
	1	2	3
A	175	201	108
B	177	201	111
C	135	202	68

Total 2026 – 2050 Natural Gas Consumption, billion standard cubic feet

Strategy	Scenario		
	1	2	3
A	15,776	13,386	10,802
B	13,367	12,442	10,784
C	14,304	12,358	10,169

Total 2026-2050 Waste (Coal Combustion Residuals) Production, MM tons

Strategy	Scenario		
	1	2	3
A	20.63	24.21	14.37
B	21.18	24.09	14.94
C	20.92	24.16	14.72

Total 2026 – 2050 Ash Production, MM tons

Strategy	Scenario		
	1	2	3
A	9.77	10.89	6.80
B	9.92	10.85	7.11
C	9.89	10.87	6.98

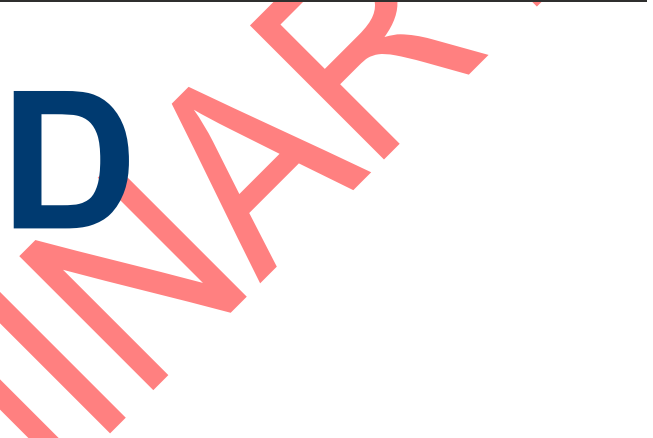
Total 2026 – 2050 Gypsum Production, MM tons

Strategy	Scenario		
	1	2	3
A	10.86	13.31	7.57
B	11.26	13.24	7.82
C	11.02	13.28	7.74

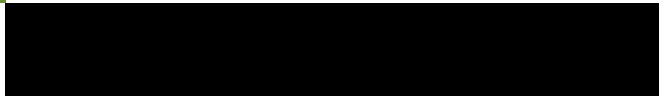
Land Use, total acres

Strategy	Scenario		
	1	2	3
A	22,245	126,527	89,553
B	16,952	126,774	90,166
C	79,161	175,012	134,279

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Appendix D – Life Cycle Greenhouse Gas Emissions



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Appendix D - Life Cycle Greenhouse Gas Emissions

D.1 National Laboratory of the Rockies Partnership

TVA partnered with the National Laboratory of the Rockies (NLR) (formerly the National Renewable Energy Laboratory, or NREL) for technical expertise while performing the greenhouse gas life cycle analysis (GHG LCA). The GHG LCA model used for the 2026 IRP was developed in tandem with NLR's methods and guidance. NLR provided TVA with a technical report in February 2025 which explains the scope of NLR's work with TVA for the GHG LCA and documents values used in TVA's LCA study. This report was produced when the laboratory operated as the National Renewable Energy Laboratory (NREL). The laboratory is now the National Laboratory of the Rockies (NLR). A copy of this report is available as a supporting document on TVA's 2026 IRP website (www.tva.com/irp).

D.2 Detailed Total Emissions

The following tables include detailed annual emissions for three select IRP cases. These three cases represent a baseline portfolio (Table D-1), the portfolio with the highest total GHG emissions (Table D-2), and the portfolio with the lowest total GHG emissions (Table D-3). Detailed tables for all core portfolios and sensitivities, together reflective of the Preferred Alternative, will be made available as a supporting data file on the IRP website at tva.com/irp.

Table D-1: Detailed Total Emissions, by Year (short tons), Life Cycle Phase, and per GHG, for Portfolio 1A, Reference Case with Baseline Utility Planning (Baseline Portfolio)

1A Phase	GHG	2026	2027	2028	2029	2030	2031
Upstream	CO ₂	769,228	1,253,422	505,332	276,704	53,264	117,007
	CH ₄	2,712	4,689	1,890	1,058	157	293
	N ₂ O	26	44	19	10	2	4
Ongoing Combustion	CO ₂	61,916,232	57,543,592	56,975,729	56,337,958	56,914,494	59,250,466
	CH ₄	639	643	661	657	668	697
	N ₂ O	1,383	1,278	1,241	1,221	1,225	1,277
Ongoing Non-Combustion	CO ₂	2,618,223	2,973,119	3,188,740	3,228,491	3,286,845	3,360,929
	CH ₄	61,203	73,881	80,906	80,821	82,127	85,036
	N ₂ O	142	154	164	169	173	175
Downstream	CO ₂	-	209	31,878	2	0	1,513
	CH ₄	-	0	21	0	0	1
	N ₂ O	-	0	1	0	0	0
1A Phase	GHG	2032	2033	2034	2035	2036	2037
Upstream	CO ₂	222,379	132,584	551,520	2,382	-	-
	CH ₄	444	392	1,365	6	-	-
	N ₂ O	6	6	20	0	-	-
Ongoing Combustion	CO ₂	61,093,003	56,168,700	60,821,238	51,856,942	51,824,869	53,172,201
	CH ₄	735	701	738	704	700	715
	N ₂ O	1,314	1,201	1,304	1,167	1,168	1,201
Ongoing Non-Combustion	CO ₂	3,536,184	3,693,035	3,648,205	4,086,627	4,079,815	4,097,376
	CH ₄	91,541	95,941	95,606	110,320	109,418	110,517
	N ₂ O	182	187	186	197	198	198
Downstream	CO ₂	8,235	39,799	-	194,458	40	3,033
	CH ₄	5	26	-	127	0	2
	N ₂ O	0	2	-	9	0	0

1A Phase	GHG	2038	2039	2040	2041	2042	2043
Upstream	CO ₂	-	222,379	392	-	-	222,379
	CH ₄	-	444	1	-	-	444
	N ₂ O	-	6	0	-	-	6
Ongoing Combustion	CO ₂	54,664,588	53,477,075	44,056,900	43,163,838	43,567,066	44,786,107
	CH ₄	738	717	726	711	717	738
	N ₂ O	1,236	1,209	925	905	914	940
Ongoing Non-Combustion	CO ₂	4,154,933	4,113,006	4,733,239	4,699,195	4,730,228	4,799,118
	CH ₄	112,941	110,270	133,064	131,070	132,030	134,986
	N ₂ O	200	199	218	218	218	220
Downstream	CO ₂	-	15,992	148,041	4,147	9,181	8,186
	CH ₄	-	10	97	3	6	5
	N ₂ O	-	1	6	0	0	0
1A Phase	GHG	2044	2045	2046	2047	2048	2049
Upstream	CO ₂	-	-	481,224	148,253	1,042,652	1,633,331
	CH ₄	-	-	1,906	296	4,129	6,425
	N ₂ O	-	-	17	4	37	58
Ongoing Combustion	CO ₂	44,908,352	44,517,177	47,629,735	47,752,782	47,454,413	48,691,571
	CH ₄	740	734	787	790	782	804
	N ₂ O	943	935	1,002	1,006	997	1,024
Ongoing Non-Combustion	CO ₂	4,878,108	4,871,930	5,034,440	5,056,372	5,119,736	5,190,732
	CH ₄	138,026	136,935	144,208	144,385	146,415	149,334
	N ₂ O	222	221	225	226	227	230
Downstream	CO ₂	7,168	12,005	32,390	28,606	15,782	23,661
	CH ₄	5	8	21	19	10	15
	N ₂ O	0	1	1	1	1	1
1A Phase	GHG	2050	Cumulative (2026-2050)				
Upstream	CO ₂	148,253	7,782,685				
	CH ₄	296	26,946				
	N ₂ O	4	269				
Ongoing Combustion	CO ₂	49,358,552	1,297,903,578				
	CH ₄	815	18,058				
	N ₂ O	1,038	28,052				
Ongoing Non-Combustion	CO ₂	5,237,927	104,416,554				
	CH ₄	150,800	2,841,779				
	N ₂ O	234	4,983				
Downstream	CO ₂	32,157	616,485				
	CH ₄	21	403				
	N ₂ O	1	27				

Table D-2: Detailed Total Emissions (short tons), by Year, Life Cycle Phase, and per GHG, for Portfolio Supercharged Growth (SG) Sensitivity (Representing the Highest Total GHG Portfolio Studied)

SG Phase	GHG	2026	2027	2028	2029	2030	2031
Upstream	CO ₂	769,228	1,253,422	505,332	276,704	3,069,269	1,240,400
	CH ₄	2,712	4,689	1,890	1,058	11,490	2,948
	N ₂ O	26	44	19	10	116	43
Ongoing Combustion	CO ₂	63,966,793	63,594,704	68,472,000	73,766,540	78,756,482	81,431,233
	CH ₄	665	712	795	857	950	990
	N ₂ O	1,429	1,415	1,494	1,617	1,720	1,779
Ongoing Non-Combustion	CO ₂	2,711,845	3,180,634	3,575,991	3,830,162	4,344,725	4,523,097
	CH ₄	64,408	80,963	94,145	101,374	118,387	123,886
	N ₂ O	146	162	181	194	215	227
Downstream	CO ₂	-	209	31,878	2	0	1,513
	CH ₄	-	0	21	0	0	1
	N ₂ O	-	0	1	0	0	0
SG Phase	GHG	2032	2033	2034	2035	2036	2037
Upstream	CO ₂	503,957	117,007	901,319	641,483	503,429	503,429
	CH ₄	1,197	293	947	445	63	63
	N ₂ O	17	4	26	19	14	14
Ongoing Combustion	CO ₂	79,771,871	80,774,740	86,250,998	74,529,930	74,227,889	74,374,311
	CH ₄	992	1,026	1,095	1,054	1,048	1,052
	N ₂ O	1,722	1,744	1,868	1,657	1,650	1,654
Ongoing Non-Combustion	CO ₂	4,958,807	5,301,408	5,451,946	6,029,391	6,091,229	6,143,267
	CH ₄	139,223	149,929	156,266	173,842	173,354	173,740
	N ₂ O	243	257	263	281	286	290
Downstream	CO ₂	8,235	39,799	-	194,458	40	3,033
	CH ₄	5	26	-	127	0	2
	N ₂ O	0	2	-	9	0	0
SG Phase	GHG	2038	2039	2040	2041	2042	2043
Upstream	CO ₂	503,821	3,152,286	3,494,802	2,909,548	2,983,674	2,625,842
	CH ₄	64	8,224	9,666	9,592	9,740	10,041
	N ₂ O	14	102	115	99	101	92
Ongoing Combustion	CO ₂	75,201,887	73,587,702	59,423,876	52,071,269	50,521,355	49,148,985
	CH ₄	1,067	1,039	982	856	830	805
	N ₂ O	1,673	1,637	1,250	1,091	1,057	1,026
Ongoing Non-Combustion	CO ₂	6,236,537	6,230,075	6,650,422	6,336,738	6,312,585	6,317,632
	CH ₄	175,501	172,144	181,866	163,995	160,178	158,064
	N ₂ O	295	297	319	318	324	330
Downstream	CO ₂	-	15,992	148,041	4,147	9,181	8,186
	CH ₄	-	10	97	3	6	5
	N ₂ O	-	1	6	0	0	0
SG Phase	GHG	2044	2045	2046	2047	2048	2049
Upstream	CO ₂	2,464,623	2,965,359	2,855,798	2,773,495	2,464,623	2,554,372
	CH ₄	9,675	11,117	10,758	10,542	9,675	9,824
	N ₂ O	87	105	100	98	87	89
Ongoing Combustion	CO ₂	50,822,046	50,597,958	52,160,442	51,088,520	51,510,853	53,199,566
	CH ₄	831	827	853	835	843	872
	N ₂ O	1,058	1,054	1,087	1,064	1,074	1,111
Ongoing Non-Combustion	CO ₂	6,469,276	6,501,888	6,599,901	6,584,640	6,635,958	6,753,305
	CH ₄	162,553	161,870	165,822	163,843	164,412	168,428
	N ₂ O	341	347	353	358	364	372
Downstream	CO ₂	7,168	12,005	32,390	28,606	15,782	23,661
	CH ₄	5	8	21	19	10	15
	N ₂ O	0	1	1	1	1	1

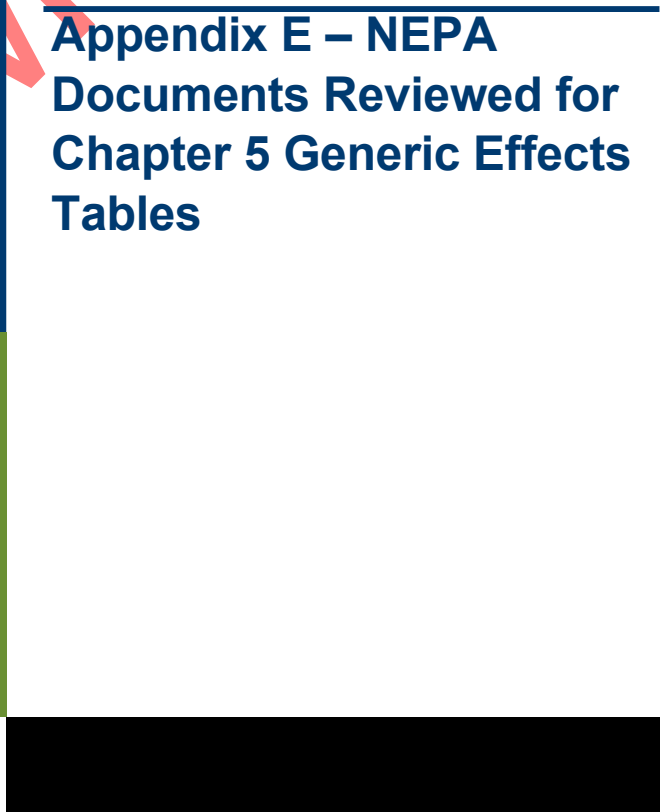
SG Phase	GHG	2050	Cumulative (2026-2050)
Upstream	CO ₂	1,046,330	43,079,551
	CH ₄	2,974	139,687
	N ₂ O	38	1,477
Ongoing Combustion	CO ₂	53,574,300	1,622,826,249
	CH ₄	877	22,753
	N ₂ O	1,117	35,049
Ongoing Non-Combustion	CO ₂	6,844,933	140,616,391
	CH ₄	171,065	3,719,259
	N ₂ O	380	7,143
Downstream	CO ₂	32,157	616,485
	CH ₄	21	403
	N ₂ O	1	27

PRELIMINARY

Table D-3: Detailed Total Emissions (short tons), by Year, Life Cycle Phase, and per GHG, for Portfolio 3C, Carbon Legislation with Distributed (Representing the Lowest Total GHG Portfolio Studied)

3C Phase	GHG	2026	2027	2028	2029	2030	2031
Upstream	CO ₂	769,228	1,253,422	505,332	276,704	1,763,411	906,800
	CH ₄	2,712	4,689	1,890	1,058	6,823	3,325
	N ₂ O	26	44	19	10	64	35
Ongoing Combustion	CO ₂	61,339,992	56,782,789	54,542,575	54,881,759	56,491,596	56,795,342
	CH ₄	632	634	645	639	649	652
	N ₂ O	1,369	1,260	1,187	1,189	1,217	1,223
Ongoing Non-Combustion	CO ₂	2,598,608	2,937,242	3,206,767	3,167,572	3,155,340	3,168,595
	CH ₄	60,533	72,654	81,555	78,737	77,600	77,739
	N ₂ O	141	152	164	166	168	172
Downstream	CO ₂	-	209	31,878	2	0	1,513
	CH ₄	-	0	21	0	0	1
	N ₂ O	-	0	1	0	0	0
3C Phase	GHG	2032	2033	2034	2035	2036	2037
Upstream	CO ₂	1,380,893	1,158,514	1,187,496	1,119,776	1,855,794	893,346
	CH ₄	3,801	3,357	3,429	3,236	6,384	2,573
	N ₂ O	48	42	43	40	63	29
Ongoing Combustion	CO ₂	48,224,176	39,591,453	40,382,436	36,623,575	33,527,576	29,858,935
	CH ₄	668	595	590	552	507	477
	N ₂ O	1,005	823	840	783	710	619
Ongoing Non-Combustion	CO ₂	3,747,992	3,866,936	3,763,528	3,812,980	3,724,346	3,701,833
	CH ₄	97,924	99,712	96,004	95,929	90,961	89,014
	N ₂ O	192	198	197	201	201	204
Downstream	CO ₂	8,235	39,799	-	194,458	40	3,033
	CH ₄	5	26	-	127	0	2
	N ₂ O	0	2	-	9	0	0
3C Phase	GHG	2038	2039	2040	2041	2042	2043
Upstream	CO ₂	921,936	1,052,447	2,014,895	2,014,895	2,014,895	1,763,180
	CH ₄	2,644	3,043	6,855	6,855	6,855	6,823
	N ₂ O	30	37	71	71	71	64
Ongoing Combustion	CO ₂	28,915,730	25,496,133	25,366,582	22,276,641	20,333,496	19,103,917
	CH ₄	460	406	408	359	329	310
	N ₂ O	599	523	519	458	419	395
Ongoing Non-Combustion	CO ₂	3,646,032	3,507,002	3,517,791	3,344,585	3,238,755	3,168,162
	CH ₄	86,237	79,003	79,395	71,086	65,758	62,328
	N ₂ O	204	203	205	203	203	204
Downstream	CO ₂	-	15,992	148,041	4,147	9,181	8,186
	CH ₄	-	10	97	3	6	5
	N ₂ O	-	1	6	0	0	0
3C Phase	GHG	2044	2045	2046	2047	2048	2049
Upstream	CO ₂	1,763,180	1,763,180	1,763,180	1,821,684	1,763,180	1,763,180
	CH ₄	6,823	6,823	6,823	6,969	6,823	6,823
	N ₂ O	64	64	64	66	64	64
Ongoing Combustion	CO ₂	19,240,205	17,675,952	18,697,476	17,735,318	17,309,042	17,545,342
	CH ₄	307	283	299	284	276	279
	N ₂ O	392	361	382	363	352	356
Ongoing Non-Combustion	CO ₂	3,185,960	3,100,332	3,161,415	3,111,369	3,100,141	3,119,104
	CH ₄	62,506	58,071	61,055	58,212	56,979	57,846
	N ₂ O	208	208	211	213	215	217
Downstream	CO ₂	7,168	12,005	32,390	28,606	15,782	23,661
	CH ₄	5	8	21	19	10	15
	N ₂ O	0	1	1	1	1	1

3C Phase	GHG	2050	Cumulative (2026-2050)
Upstream	CO ₂	58,504	33,549,050
	CH ₄	147	117,582
	N ₂ O	2	1,197
Ongoing Combustion	CO ₂	17,871,259	836,609,299
	CH ₄	285	11,527
	N ₂ O	363	17,709
Ongoing Non-Combustion	CO ₂	3,140,095	83,192,482
	CH ₄	58,405	1,875,241
	N ₂ O	221	4,872
Downstream	CO ₂	32,157	616,485
	CH ₄	21	403
	N ₂ O	1	27



**Appendix E – NEPA
Documents Reviewed for
Chapter 5 Generic Effects
Tables**

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PRELIMINARY

Appendix E - NEPA Documents Reviewed for Chapter 5

Generic Effects Tables

The following eight NEPA documents (available at www.tva.gov/nepa) addressing nine TVA projects were reviewed in compiling information presented in *Table 5-2 (Generic Construction Effects of Natural Gas Generation Plants (TVA Projects 2010-2025))*:

- Allen Fossil Plant Emission Control Project Environmental Assessment, August 2014
- Paradise and Colbert Combustion Turbine Plants Environmental Assessment, June 2021
- Cumberland Fossil Plant Retirement Final Environmental Impact Statement, December 2022
- John Sevier Fossil Plant Addition of Gas-Fired Combustion Turbine/Combined-Cycle Generating Capacity and Associated Gas Pipeline Environmental Assessment, March 2010
- Johnsonville Aeroderivative Combustion Turbine Project Environmental Assessment, July 2022
- Kingston Fossil Plant Retirement Final Environmental Impact Statement (February 2024)
- New Caledonia Gas Plant Project Final Environmental Impact Statement (January 2025)
- Allen Aeroderivative Combustion Turbine Project Final Environmental Impact Statement (July 2025)

To compile information for *Table 5-4 (Generic Construction Effects of Solar Generation Facilities (TVA Projects 2014-2023))*, TVA reviewed the following 44 environmental documents that analyzed impacts at 47 solar projects (available at www.tva.gov/nepa):

- Bellefonte Solar Energy Center Project Environmental Assessment, April 2020
- Cumberland Solar Farm Environmental Assessment, January 2018
- Elora Solar Energy Center Project Environmental Assessment, February 2020
- Five Western North Carolina Solar Farms Environmental Assessments (5 documents), March and April 2014
- Golden Triangle I Solar and Battery Energy Storage (BESS) Project Draft Environmental Assessment, December 2020
- Golden Triangle II Solar Facility and BESS Project Environmental Assessment, May 2022
- Haywood Solar Farm Environmental Assessment, March 2017
- Horus Kentucky 1 Solar Project Environmental Assessment, December 2021
- Houston, Mississippi Solar Farms Environmental Assessment, June 2016
- Jackson Solar Project Environmental Assessment, March 2019
- JEA Industrial Community Solar Environmental Assessment, March 2019
- Jonesborough Solar Site Environmental Assessment, October 2017
- Knoxville Utilities Board Solar Project Environmental Assessment, October 2020
- Latitude Solar Center Environmental Assessment, August 2016
- Logan County Solar Environmental Assessment, January 2023
- Marshall Properties Solar Farm Environmental Assessment, March 2014
- Memphis Solar Project Environmental Assessment, December 2018
- Millington Solar Farm Environmental Assessment, December 2017
- Moore County Solar Project Final Environmental Impact Assessment, December 2022
- Muscle Shoals Solar Project Environmental Assessment, November 2019
- Naval Air Station Meridian Solar Farm Environmental Assessment, April 2017 (U.S. Department of the Navy)
- North Alabama Utility-Scale Solar Project Final Environmental Impact Statement, May 2022
- Optimist Solar and BESS Project Environmental Assessment, September 2022
- Purchase of Power Generated at Brownsville, Tennessee Solar Facility, March 2017
- Providence Solar Center Environmental Assessment, March 2016
- Pulaski Energy Park Expansion Environmental Assessment, April 2014

- Ridgely Energy Farm Environmental Assessment, April 2021
- River Bend Solar Project Environmental Assessment, November 2015
- Selmer North I Solar Project Environmental Assessments, October 2016
- Selmer North II Solar Project Environmental Assessments, August 2016
- Skyhawk Solar Project Environmental Assessment, January 2021
- Silicon Ranch (SR) Bell Buckle Solar Project Environmental Assessment, November 2021
- SR Canadaville Solar Environmental Assessment, July 2022
- SR McKellar Solar Project Environmental Assessment, May 2021
- SR Millington II Solar Project Environmental Assessment, August 2022
- Starkville Solar Facilities Environmental Assessment (3 locations were analyzed separately), February 2014
- Volunteer Electric Cooperative – Gaynor Solar Project, July 2023
- Wildberry Solar Center Environmental Assessment, June 2016
- WR Graceland Solar Project Environmental Assessment, September 2022
- Yum Yum Solar Project Environmental Assessment, December 2019

To compile information for Table 5-5 (Generic Effects of Transmission System Construction and Maintenance Activities (TVA Projects 2005-2023), TVA reviewed records of the following 470 transmission-related projects:

Environmental Impact Statements	Completion Date
500-kV Transmission Line in Middle Tennessee	1-Oct-2005
Rutherford-Williamson-Davidson Power Supply Improvement Project	1-Apr-2008

Environmental Assessments	Completion Date
Algood 161-KV Transmission Line	1-May-2008
Anderson 500-kV Substation and Associated System Modifications	9-Dec-2020
Artesia-West Columbus Power System Improvements	31-Aug-2020
Ashland, Mississippi 161-kV Delivery Point	1-Jun-2016
Biggersville, MS	1-Jan-2010
Bradley 500-KV Substation and Transmission Line - Southeast Area Power Improvement Project	1-Jun-2005
Bridgeport Alabama Power Supply Upgrade	1-Feb-2008
Burkesville, KY 161-kV Transmission Line	9-Mar-2012
Burlison 161-kV Transmission Line	May-27-2011
Calhoun, Georgia – Area Power System Improvements	1-Apr-2016
Calpine's Morgan Energy Center Transmission Line	1-Sep-2005
Center Point to Moss Lake Substation, N. Georgia	1-Aug-2007
Columbus Air Force Base 161-kV Substation and Transmission Line	1-Sep-2005
Eagle Creek 161-kV Transmission Line	8-Oct-2020
East Franklin-Triune 161-KV Transmission Line Tap to Clovercroft 161-KV Substation	1-Nov-2006
Etowah Power Supply Improvement Project	1-Mar-2005
Five Points-Homewood 161-kV Transmission Line	1-Mar-2006
Florence-South Jackson 115-kV Transmission Line - Mississippi	1-Nov-2010
Gallatin Fossil Plant-Angeltown 161-kV Transmission Line and Switching Station	Oct-8-2010
Helicon, Alabama Power Supply Improvement Project	Apr-7-2011
Hillsboro 161-kV Transmission Line	Dec-17-2012
Holly Springs-Miller 161-KV Transmission Line Tap to Coldwater Substation	1-Aug-2007
Kelsey Road-Byrdstown 161-kV Transmission Line and Switching Station	Jan-31-11
Kirkmansville-Clifty City Power Improvement Project	1-Feb-2005

Environmental Assessments	Completion Date
Madison-Charity Lane 161-kV Transmission Line	Jul-9-2013
Memphis Regional Megasite Power Supply	1-Feb-2016
Memphis Regional Megasite Power Supply SEA	1-Jun-2022
Monroe, TN-Provide 161-KV Delivery Point	1-Dec-2008
Montgomery-Oakwood Transmission Line	1-Feb-2007
Montpelier, Mississippi 161-kV Transmission Line	1-Feb-2017
Moscow-Miller Power System Improvements	16-Oct-2019
Murfreesboro-East Franklin and Pinhook-Radnor 161-KV Transmission Lines	1-Mar-2007
New Transmission Line to Bolivar Substation	1-Nov-2006
North Dayton Power System Improvements	30-Oct-2020
ORNL Primary 161-kV Substation and Transmission Line Connection	1-May-2005
Oxford-Coffeerville, Mississippi 161 kV Transmission Line	28-Feb-2019
Putnam-Cumberland, Tennessee Improve Power Supply Project	Nov-13-2013
Ranger North Carolina Substation 161-kV Delivery Point	1-Apr-2005
RedHills-Kosciusko 161-kV Transmission Line	1-Jan-2017
Replacement Ocoee Transmission Line	1-Nov-2006
Replacement of Structure 7 - Kentucky Hydroelectric Plant-Gilbertsville 69-kV Transmission Line, KY Dam Reservation	Jun-15-2010
Rugby-Sunbright Power Supply Improvements	1-Feb-2017
Selmer-West Adamsville 161-kV Transmission Line and Switching Station	1-Jan-2015
SeverCorr 2-Catalpa Crk-Lowndes County Power Supply Improvement Project	1-Jan-2008
South Pittsburg 161-kV Delivery Point	20-Aug-2014
Starkville and Columbus, Mississippi - Power Supply Improvements	Jul-9-2010
Supplement to the Wacker Chemi Poly 11 Request for TVA Land Use and Section 26a Approval	Jul-21-2011
Transmission Line Tap to New BGMU Substation	1-Dec-2006
TVA System Operations Center and Power System Supply	19-Feb-2020
Union-Rally Hill 161-kV Transmission System Improvements	Aug-8-2010
Union-Tupelo No. 3 161-kV Transmission Line	1-Oct-2014
Volunteer-East Knox Bulk Transmission Project	Dec-03-2012
Watts Bar Hydro Plant-Great Falls Hydro Plant 161-kV Transmission Line Tap to Spencer & Great Falls Hydro Plant-Spencer 46-kV Transmission Line Retirement and Removal	1-Feb-2016
Weir 161-kV Transmission Line	1-Jan-2006
West Batesville-North Oakland, Mississippi 161-kV Transmission Line	27-Oct-2017
West Pleasant Hill 161-KV Transmission Line	1-May-2006
West Point-SeverCorr 161-KV Transmission Line	1-Mar-2006

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Wrigley-Dickson District- Retire 12.1 miles of TL	19-Mar-2001	32051
Polk Tennessee Delivery Point	10-Mar-2008	17616
Improve Power Supply in Huntsville, TN Area	25-Mar-2008	17898
Park City 161-kV Substation-Provide Delivery Point	8-Oct-2008	19175
Resaca North and Resaca South-Construct Tap Line	4-Nov-2008	19510
Locust Fork-Ketona Transmission Line-Relocation for Alawest	22-Dec-2008	19727
Revision-Gallatin-Murfreesboro 161-kV Uprate	1-Jan-2009	17348
Campbelltown 161-kV Delivery Point	22-Jan-2009	18085
Parsons, TN 161-kV Substation-Provide Delivery Point	6-Feb-2009	19104

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Milligan College 161-kV Substation-Provide Delivery Point	15-Apr-2009	20291
Jena, TN 161-kV Substation-Provide Delivery Point	21-Apr-2009	20251
Fanin 161-kV Delivery Point	23-Apr-2009	20326
Revision-Marshall-C33 161-kV TL-Reconductor	21-May-2009	18236
Wheeler-Maury 161-kV TL-Uprate/Reconductor Project	7-Jul-2009	20704
North Cowan-161-kV Substation and Connections	31-Jul-2009	19691
Moccasin 161-kV Substation-Install Capacitor Bank	29-Sep-2009	21154
Revision 2-Johnsonville-South Jackson 161-kV TL Uprate	7-Jan-2010	20346
Volkswagen Chattanooga-Provide 161-kV Delivery Point	15-Jan-2010	20430
Revision 1-Alvaton 161-kV Delivery Point	11-Feb-2010	20719
Elysian Fields - Craighead 161-kV TL - Reconductor Section	25-Mar-2010	21986
Revision 1-Taylor-McFerrin 161-kV Delivery Point	8-Apr-2010	18084
Cloudland Canyon, GA. 230-kV SS - Provide 230-kV Deliver Point - Project No. 203515	27-Apr-2010	22236
Owl Hollow, TN-Provide 161-kV Delivery Point	9-Jun-2010	20709
Rainsville 161-kV Substation-Provide Delivery Point - Project 201470	28-Jun-2010	22511
County Line Rd., AL. 161-kV SS - Provide Delivery Point - PN 201326	8-Jul-2010	22640
Madison Farley #1 & #2 161-kV TL Uprate - Project 104432	19-Aug-2010	22884
Cordova - Freeport 500-kV TL - Relocation for Memphis BFI Landfill - Project No. 203551	24-Aug-2010	22939
East Batesville, MS 161-kV SS - Provide Delivery Point & Breakers - Project No. 200417	23-Sep-2010	23121
Hemlock Semiconductor, TN 161-kV Substation-Provide Delivery Point	6-Oct-2010	21876
Kingston 161-kV Substation-Provide Delivery Point	9-Oct-2010	21215
Wheeler Mountain, TN. 161-kV - Provide Delivery Point - PN.104032	18-Oct-2010	23209
Byrd Springs, AL SS - Provide 161-kv Delivery Point - PN 200527	18-Oct-2010	23243
Widows Creek Fossil Plant - Install Capacitor Banks - PN 203604	20-Oct-2010	23192
Morris 161-kV Delivery Point	21-Oct-2010	23012
Gibbs Lane, TN. 161-kV SS - Provide Delivery Point - PN 203592	17-Nov-2010	23398
Chapel Hill, TN. 161-kv SS - Provide 161-kV Deliver Point - 202366	24-Jan-2011	23661
New Albany - Ripley 161-kV TL - Relocate for MDOT - PN 203914	9-Feb-2011	23756
Rockvale, TN Provide Delivery Point Project Number 107008,	28-Mar-2011	23634
201460 - Niles Ferry, TN. SS - Provide Delivery Point - PN 201460	8-Apr-2011	23283
Tiptonville-Ridgley 161kV Reconductor Project Number 205943	15-Apr-2011	24209
S. Philadelphia MS, Provide 161-KV Delivery Point Project Number: 103581	18-Apr-2011	23671
Southwest Bruce 161-kV Delivery Point - Project No. 102907,	9-May-2011	24200
Shelby-Cordova # 2 500-KV TL	27-Jul-2011	24367
North Knoxville – Eagle Bend 161-kV TL – Relocate for Chestnut Ridge Landfill - Project No. 204353	15-Aug-2011	24860
Niota, TN. 161-kV SS - Provide Delivery Point - Project No. 107345	24-Aug-2011	24950
Mt. Vernon Road Provide Delivery Point Project Number: 200588	31-Aug-2011	24966
Goodlettsville, Tn 161kV Substation - Improve Power Supply	26-Sep-2011	25105
Widows Creek - Rock Springs 230kV T.L. Relocate for GADOT Project 400459	17-Oct-2011	25292
Redstone Arsenal No. 1 161-kV SS – Relocate Substation - 205768	20-Oct-2011	25321
Ripley, TN. 161-kV SS - Supply Loop Feed and Install Breakers - 202363	27-Oct-2011	25355
Greeneville, TN. 161-kV SS - Install 161-kV Capacitor Banks - 400180	6-Dec-2011	25512
Bells 161-kV Delivery Point - Project 202094 - line and substation expansion	5-Jan-2012	25466
Occidental, TN. 161-kV SS - Provide Delivery Point - 205922/205946	17-Jan-2012	25696
Revision - Lake Lowndes 161-kV Delivery Point - Project 104651	19-Jan-2012	25166

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Guntersville - Goosepond 161-kV TL - Up-rate/Reconductor - 203607	30-Jan-2012	23736
Shipps Bend, Tn. 161-kV SS - Provide Delivery Point - 204641	8-Feb-2012	25819
Rarity Pointe, TN 161kV Substation Provide 161kV Delivery Point (Fort Loudoun EC)	9-Apr-2012	26122
East Simpson Ky 161-KV Provide Delivery Point - Project 106988	2-May-2012	23329
Calvert-South Calvert 161-kV TL - Reconductor - Project 402465	15-May-2012	25549
Holly Springs - Miller 161-kV TL - Relocate for MDOT - 203883	18-May-2012	26434
Revision - Beulah Grove 161-kV Delivery Point - Project 204615	31-May-2012	26143
East Point - Fairview 161-kV TL - Uprate - 204098 - W.O. 4497A - reconductor and select pole modifications	13-Jun-2012	26592
Guntersville - Decatur 161kV Transmission Line Reconductor Decatur - Priceville Section	13-Jul-2012	26722
Bridgeport, Al SS Slack Span Delivery Point Project Number 200587	13-Jul-2012	26773
Paradise - Wilson - New Hardinsburg 161-kV TL - Modify Protection and Associated Equipment for 3-Terminal TL(BREC) - 403390	14-Aug-2012	26893
Revision - Marshall-Calvert #1 and #2 161-kV TL Reconductor - Project 204542	5-Sep-2012	23266
HCA, TN 161kV Substation Provide Delivery Point	14-Sep-2012	27032
Wilson HP - Shoals 161kV TL Reconductor Line	23-Oct-2012	27314
Finley SS - Amoco 161-kV TL - Up-Rate - 206051	24-Oct-2012	27312
Montgomery-Clarksville #1 / Montgomery-Savage 161kV TL CIP Relocation	25-Oct-2012	27334
Waverly, MS161 kV Substation Provide Delivery Point (4 County EPA)	30-Oct-2012	27381
Wilson HP - Reynolds 161kV TL Reconductor Line	31-Oct-2012	27344
Lexington 161-kV SS - Convert to 161-kV Operation - 102383 - 44K87 & 43Q84.	26-Nov-2012	27471
Widows Creek - East Point 500-kV TL - Relocate for Duck River Reservoir - 400139	3-Dec-2012	26220
South Limestone, AL. 161-kV SS - Provide Delivery Point - 404798	10-Dec-2012	27518
Jackson Avenue, Alabama 161 kV Substation Provide Delivery Point	20-Dec-2012	27591
Replacement of two spans of OPGW on the Murfreesboro-Smyrna 161kV TL	23-Jan-2013	27758
Wilson-Shoals 161-KV TL – Reconductor, Material Laydown Yard	25-Jan-2013	27792
Construction Laydown Yard - Chesterfield - Montgomery 161-kV SS - Convert to 161-kV Operation	25-Jan-2013	27800
Volunteer-East Knox Bulk Transmission Project - Construction Laydown Yard - Project 102350	12-Feb-2013	27905
C33-Marshall 161-kV TL Uprate and Reconductor - Project 206074	1-Mar-2013	26892
Montgomery, TN. 161-kV SS - Convert To 161-kV Operation - 202006	1-Mar-2013	27329
Trinity - Browns Ferry NP 161 & 500-kV TL - Uprate & Install OPGW - 206087	12-Mar-2013	28027
Toray, AL. 161-kV SS - Provide Delivery Point (JWEMC) - 407271	29-Apr-2013	28284
Ardmore - Fayetteville 161kV TL Reconductor Ardmore-Park City Line Section	30-Apr-2013	27299
Marshall-Golo-Mayfield 161-kV TL - Uprate and Reconductor - Project 402468	29-May-2013	28469
Centerville, TN. 161-kV SS - Relocate Substation - Project No. 205814	10-Jun-2013	28547
Colbert Fossil Plant - Install Capacitor Bank	11-Jul-2013	28681
Mecca Pike 161-kV Delivery Point - Project 205908	22-Jul-2013	28347
Oak Level, KY. 161-kV SS - Provide Delivery Point (West Kentucky RECC) - Project No. 403949	22-Jul-2013	28755
Johnsonville – McEwen 69-kV TL – Retire, Acquire, and Relocate Sections of TL - Project No. 406030	22-Jul-2013	28767
John Sevier-White Pine #2 161-kV TL Uprate - Project 400456, W.O. 310CT (conductor replacement)	31-Jul-2013	28787
Bethel Valley, TN. 161-kV SS - Construct SS and TL Feeds for ORNL - 406588	5-Aug-2013	28515
Revision - Hartselle-Cullman 161-kV TL Uprate - Project 400209	13-Aug-2013	27894

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Georgetown, TN. 161-kV Substation - Provide Delivery Point (VEC) - Project No. 107018	19-Aug-2013	28909
Trinity -Caddo 161-kV Transmission Line Uprate - reconductoring	3-Sep-2013	28967
Cordova-Benton 500kV Uprate	5-Sep-2013	28108
Athens-Ardmore 161kV TL Rebuild - Project 206089 - reconductor entire line and replace many structures	11-Sep-2013	28134
Revision - Browns Ferry-Athens 161-kV TL Rebuild - Project 206083	2-Oct-2013	27943
Lake Kathy, Ga - Provide Delivery Point	23-Oct-2013	29248
Geraldine 161 kV Substation	24-Oct-2013	27276
Colbert Shoals 161-kV TL - Reconductor Shoals - Tuscumbia - Woodmont TL Section - Project No. 400207	4-Nov-2013	29336
Barkley Hydro Plant - Oakwood Switching Station 161kV TL Uprate	6-Nov-2013	29377
GAF Scrubber - TL Feeds and associated Relay and Yard Work	13-Nov-2013	28940
Trinity Hills, TN. 161-kV SS - Provide Delivery Point - 407583	14-Nov-2013	29446
161-kV Delivery Point at Flex Drive	19-Nov-2013	29411
Colbert FP-Oakland 161kV TL Reconductor and Uprate	2-Dec-2013	29419
Triathlon 161-kV Delivery Point - Project 409174	4-Dec-2013	29360
Northwest Area Fiber Project - Install Fiber Optic Equipment - Project: 206093	9-Jan-2014	29687
Volunteer-North Knoxville 161kV TL Reconductor	10-Jan-2014	29695
Construction Laydown Yard - Trinity - Decatur - Guntersville 161-kV TL- Reconductor	15-Jan-2014	28554
Construction Laydown Yard - Apalachia - East Cleveland No. 1 & No. 2 161-kV TL - Uprate	16-Jan-2014	29738
Guntersville - Farley 161-kV TL - Uprate - Project No. 203609	17-Jan-2014	23640
Apalachia - East Cleveland No. 1 161-kV TL - Reconductor/Uprate & Install Fiber Optic Cable - Project No. 205213 & 406589.	22-Jan-2014	29188
Westbourne-Jellico 69-kV Transmission Line (L3874) Retirement	14-Feb-2014	29903
Cornersville 161-kV Delivery Point - Project 400251	21-Feb-2014	29835
Waynesboro, TN 161 kV Substation - Provide Delivery Point	25-Feb-2014	28270
East Calvert, South Calvert, and Calvert Substations - Calvert Area Improvements - Project No. 406878,406901,& 406907.	25-Feb-2014	28662
Marshall Area Projects - Construction Laydown Yard	6-Mar-2014	30067
Martintown-Enterprise 46-kV Transmission Line (L2712) - Install 46-kV Sectionalizing Switch - Project: 103446	4-Apr-2014	30192
Center Hill-Str. 117 (Baxter) 46-kV Transmission Line - Transmission Line Retirement - Project: 402666	4-Apr-2014	30221
Cross Plains Capacitor Bank Addition	1-May-2014	30141
Paradise-Peabody 69-kV Transmission Line (L3857) - Transmission Line Retirement - Project: 402660	6-May-2014	30385
Center Point - Moss Lake 115/230-kV TL - GADOT Replace Structure - Project No. 413028	12-May-2014	30406
Pickwick HP - Kimberly Clark 161-kV Transmission Line (L5877) - Partial Reconductor - Project: 409552	21-May-2014	30349
Mississippi Silcon, MS 161-kV Substation (Direct Serve) - Provide Delivery Point - Project: 410270	23-Jul-2014	30813
Wolf Creek - Huntsville 161-kV TL - Uprate - Project No. 205216	28-Jul-2014	30866
Widow's Creek - Reese Ferry 161-kV TL - Reconductor & Widow's Creek - Nickajack 161-kV TL - Uprate - Projects 403986 & 403989	19-Aug-2014	30235
Roane-Harriman 161kV NERC Alert	24-Sep-2014	31243
Lafayette-Str. 4 (L3050) and Lafayette-Str. 172 (Scottsville) (L3355) 69-kV Transmission Lines Retirement - Project: 402660	25-Sep-2014	31211

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Transpark, Kentucky 161kV delivery point	29-Sep-2014	31251
Winchester-Hillsboro 46-kV Transmission Line - Transmission Line Retirement - Project 202139	16-Oct-2014	31345
Project No. 400210 - Spring Creek-Nance 161kV Transmission Line Uprate	20-Nov-2014	31580
Belfast-Cornersville 46-kV Transmission Line - TL Retirement - Project 400251	15-Jan-2015	31882
Hankook, TN. 161-kV Substation - Provide Delivery Point - Project No. 412721	20-Jan-2015	31244
Union-Tupelo #3 161-kV Transmission Line - Construction Laydown Yard - Project 400236	2-Feb-2015	31961
Laydown Area associated with East Bowling Green - Summershade 161kV Project	2-Feb-2015	31973
Colbert - Stateline No. 1 161-kV TL - Uprate - 206039	10-Feb-2015	32012
East Bowling Green - Summer Shade 161-kV Uprate	19-Feb-2015	31680
TL Retirement- Rockwood Dist-Spring City TL- Retire 18.878 miles of TL	19-Mar-2015	32050
Great Falls-Sparta TL2437 Retirement	14-Apr-2015	31960
Temporary Construction Laydown Area - Wilson - Oakland 161-kV TL Uprate	15-Apr-2015	32393
Wilson HP-Oakland 161-kV TL - Reconductor - Project 400215	1-May-2015	32105
Vesta Road, TN - Provide 161-kV Delivery Point	5-Jun-2015	32245
John Sevier - Volunteer 161-kV TL - Uprate - Project No. 205211	22-Jun-2015	30392
Dover-Erin 69kV Transmission Line - TL Retirement-Retire approximately 10 miles of TL - Project 402667	13-Jul-2015	32708
Hopkinsville-Casky-Edgoten 161-kV Transmission Line Uprate	17-Jul-2015	32988
Fontana-Peppertree 13-kV TL Relocation/Rebuild - Project 418958	24-Jul-2015	32974
Widows Creek-Bryant-Oglethorpe #1 161-kV Transmission Line - Uprate - 206037-31A5H	21-Aug-2015	33161
Plateau 500-kV Substation - Borrow Area	14-Sep-2015	33268
Athens-Etowah Power Supply Improvement - Project 409013	23-Sep-2015	33321
Covington-Dyersburg 161-kV TL Uprate - Project 406725	5-Oct-2015	32399
Lynnville, TN. 161-kV Substation - Provide Delivery Point - 409288	7-Dec-2015	33768
Paradise CC Plant, KY. - Provide 161-kV Interconnection - 412718	22-Dec-2015	32008
Center Hill-Smithville 46kV Transmission Line Retirement	17-Feb-2016	33171
Cullman - Moulton 161-kV TL - Medium NERC Alert - Project 406572	24-Feb-2016	34199
Selmer West Adamsville Access Road Alterations	25-Feb-2016	34268
Battery Hill Access Road Improvement - Project: 422462	7-Mar-2016	34308
Construction Laydown Yard - Lynnville 161-kV TL - Provide Delivery Point	9-Mar-2016	34303
Kingston-Rockwood-Roane Brookfield Smokey Mountain Hydro 161kV TL Uprate	10-Mar-2016	34306
Wilson - Trinity OHGW Replacement - Project 107319	15-Mar-2016	34320
Morgan, AL 161-kV Delivery Point - Project 418783	21-Mar-2016	34425
Smithville, TN 161kV Transmission Line Delivery Point for Smithville Electric System (SES) PN: 420637	28-Mar-2016	34348
Franklin, KY 161-kV Substation- Project: 420182	8-Apr-2016	34114
Cordova - Haywood 500kV Uprate - Project 202879	21-Apr-2016	34662
Deerbrook 161-kV Delivery Point - Project 413337	26-Apr-2016	34598
Allen CC Plant Interconnection - 414013	28-Apr-2016	34310
John Sevier FP - Phipps Bend No 3 161kV Uprate	9-May-2016	32760
L3803-2 Gallatin-Hartsville-Westmoreland (69 kV) 7.78 miles Line Retirement.	12-May-2016	33990
L3808 Rogersville-Fitts Gap (69 kV) 15.197 miles Transmission Line Retirement	12-May-2016	34009
Johnsonville-Lawrenceburg 161kV TL - Lightning Mitigation - 404668	16-May-2016	34718
L3351-1 N.E. Johnson City-Erwin No. 2 (1.19 miles) Transmission Line Retirement.	19-May-2016	34003
Transmission Line Laydown Yard-Spencer, TN area projects	8-Jun-2016	34963

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Wheeler - Ardmore OHGW Replacement - 107319	15-Jun-2016	34967
Oxford-CR 300 46-kV TL - Construct 161-kV TL - Project 422806	15-Jun-2016	35004
421225 Davis Ferry 161kV Delivery Point for Loudon Utilities	17-Jun-2016	35018
Calhoun, GA area Projects-Construction Laydown Yard	30-Jun-2016	35031
Loopers Farm – Alpha 230 KV 31GP1	5-Jul-2016	35105
Selmer West Adamsville 161-kV TL Segment Reroute	7-Jul-2016	35130
Starkville - Sturgis 161kV TL NERC Alert Remediation - Medium Priority - Project: 421234	11-Jul-2016	34265
Sequoyah - Watts Bar HP 161-kV TL	2-Aug-2016	35290
TL Retirement-L2447 Huntsville-Scottsboro (Str 125-Str 167 & Str 200-S) 46 kV TL (5.858 miles).	8-Aug-2016	34055
Nolensville-Elysian Fields TL Reconductor - Project 202004	15-Aug-2016	35337
Murfreesboro-Smyrna 161-kV TL Reconductor - Project 202004	15-Aug-2016	35339
Murfreesboro Road-Airport 161-kV TL Reconductor - Project 202004	15-Aug-2016	35340
Relocation of Dover-Erin 69-kV TL Easement for Cumberland Landfill	12-Sep-2016	35475
Cox Road Delivery Point - 421830	26-Sep-2016	35463
Clay - Aberdeen 161-kV Uprate - Project 420116	3-Oct-2016	35140
Center Hill-Smithville 46kV Transmission Line Demolition	21-Oct-2016	35093
Bluefield, MS. 161-kV Substation - Provide Delivery Point – 417652	21-Oct-2016	35669
Westbourne-Jellico 69-kV Transmission Line (L3874) Retirement Phase 1 - Emergency Work PN: 402659	8-Nov-2016	35595
Temporary Construction Laydown Yard: Deerbrook 161-kV Delivery Point - Project 413337	21-Nov-2016	35864
Weyerhaeuser-S. Macon NERC MP L5316 31IPT	22-Nov-2016	35858
Southeast Huntsville, AL. 161-kV Substation - Provide Delivery Point (Huntsville Utilities) - 409812	22-Nov-2016	35862
Buck Island Delivery Point - Project No. 414719	28-Nov-2016	35813
Clay-Starkville (West Point) 161-KV T.L. NERC Medium Priority Remediation L5675 31K1P	28-Nov-2016	35880
Colbert-Pickwick	5-Dec-2016	35856
Broadview, TN 161kV DP for DREMC	8-Dec-2016	34477
Weakley-Dyersburg 1 161 KV TL 415149	21-Dec-2016	35282
Pine Ridge, TN. 161-kV Switching Station - Provide Delivery Point (Y12-UPF) - 422917	4-Jan-2017	36047
Guntown-Turner Park 46kV Transmission Line (L2470), Structures 570D, 571, 572, and 578 - Line Retirement	23-Jan-2017	35982
Demolition of the Englewood-Madisonville 69 KV transmission line (L3056).	23-Feb-2017	34987
Oakland, Alabama OPGW Fiber line ROW Clearing	23-Feb-2017	36125
North Huntsville-Limestone L5836 TL Medium Priority NERC Alert - Project Number 421234	24-Feb-2017	36120
Guthrie Kentucky Purchase R.O.W - 418551	2-Mar-2017	36361
Indorama 161-kV – Provide Temporary 161-kV Feed to Indorama - 427179	8-Mar-2017	36421
Gallatin Industrial 161kV Delivery Point for Gallatin Electric Department PN: 413061	9-Mar-2017	36392
North Wilkey, KY 161kV Delivery Point for WRECC 422432	10-Mar-2017	36377
Ider, AL 161-kV Substation - Provide Delivery Point - 414720	14-Mar-2017	35930
Widows Creek FP - Provide Temporary Power Feed (NAEC) - 403988	27-Mar-2017	33975
Battery Hill TL Work - Install Moccasin Loop, Nickajack HP Loop, and OPGW - Widows Creek - Battery Hill NO.1 and NO.2 Reconductor - Project: 422462/422119	28-Mar-2017	34659
Pulaski-Fayetteville 161kV Medium NERC Alert - L5904 PN: 421234	16-Apr-2017	36643
Tupelo - Turner Park 161kV Transmission Line - 415148	18-Apr-2017	36539

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Retire Portions of the Kingston - Rockwood - Roane 161kV TL - Project: 419583	26-Apr-2017	36656
Summer Shade - Summer Shade Tap 161kV Upgrade Tap Section Capacity PN: 415148, 425422, 421558	12-May-2017	36788
East Chickamauga, GA. 161-kV Substation - Provide Delivery Point - 407532	15-Jun-2017	36976
Jackson - Bud Crockett 161-kV TL - Medium Priority NERC Alert - 31J70 - 415148	27-Jun-2017	37031
Kittrell, TN 161-KV Delivery Point PN: 421320	2-Jul-2017	36980
Dalton B Smith 161kV Provide Transmission Line Delivery Point PN: 417829	2-Jul-2017	37030
Widows Creek - Rock Springs OPGW Installation - 426396	5-Jul-2017	36616
Sturgis - Louisville 161kV TL - OPGW Replacement - 417191	6-Jul-2017	37037
Northeast College 161-kV Substation Provide Slack Span Delivery Point Project Number: 424945	18-Jul-2017	37149
North Dayton, TN 161kV Delivery Point PN: 403139	15-Aug-2017	37261
Wildberry Solar Center Interconnection - Project: 428114	21-Aug-2017	37313
Temporary Construction Laydown Yard : Bluefield 161-kV Delivery Point - Project 417652	22-Aug-2017	37314
Bolivar-Bolivar Dist #2 46kV Transmission Line (L2659), Structures 4-17 - Line Retirement	23-Aug-2017	36039
Project 419888 - Replace Microwave System	23-Aug-2017	36255
John Sevier-Cherokee No.1 NERC Medium Priority PN: 415148	24-Aug-2017	37130
Cordova - Shelby L6089 500-kV Capacity Increase	30-Aug-2017	37234
Pinewood, TN. 161-kV Substation - Provide Delivery Point - 407530	30-Aug-2017	37359
Martintown - Enterprise 46kV TL - L2712 - Lightning Mitigation - 404668	30-Aug-2017	37399
Singleton to Kosciusko Transmission Line Rebuild	1-Sep-2017	36877
Watts Bar HP - Great Falls HP 161kV Transmission Line Relocation Section PN: 428834	5-Sep-2017	37430
Mountain Home Road Delivery Point - 409294	11-Sep-2017	34964
Longtown 161-kV Delivery Point - Project 414684	14-Sep-2017	37478
Alcoa Substation - TPS Material Storage Laydown Yard	20-Sep-2017	37511
Widows Creek - Rock Springs NAMP - Project 421234	26-Sep-2017	36620
Beckwith Connector Project - South Nashville-Green River 161-kV TL (L5029) - 425987	2-Oct-2017	37554
Nickajack Hydro Plant Reservation - TPS Material Storage Laydown Yard.	4-Oct-2017	36682
Van Vleet, MS Microwave - Replace Unlicensed MW CKT 8613 - Project: 413168	4-Oct-2017	37536
Waynesboro-Howenwald 69kV Transmission Line (L3882), Structures 1-25 and 175-244 - Line Retirement	6-Oct-2017	36040
Columbia Dist-Str 234 Lewisburg #2 46kV Transmission Line (L2468) - Line Retirement	6-Oct-2017	36178
Montgomery-Clarksville #3 161-kV TL - Construct - 202004	12-Oct-2017	36526
Newtown, TN 161kV Substation Provide Delivery Point-Metering & UFLS, 429471	16-Oct-2017	37604
Colbert - Pickwick 161-kV TL(Pickwick - Str. 74) - Install Fiber - 429445	16-Oct-2017	37606
Gallatin - Lebanon No. 1 Tap to Lebanon Industrial Park Replace Switch PN: 421558 L5781	16-Oct-2017	37628
Moscow Microwave Repeater Station - 413168	17-Oct-2017	36988
Coosa River - Centre Rebuild River Crossing - 425124	8-Nov-2017	36843
Spring Creek, TN. 161-kV Substation - Provide Delivery Point - 425096 - 31MMD, 33MQD, & 33MQI.	13-Nov-2017	36736
Colbert - Oakland 161-kV TL (Str. 74 - Str. 66) - Install Fiber - 429445	29-Nov-2017	37827
Westbourne - Jellico 69kV Transmission Line Retirement PN: 430042	7-Dec-2017	36730
Construction Laydown Yard – Ashland, MS 161-kV TL 405784	11-Dec-2017	37920
Project Flash Switching Station and 161-kV TL Connection Project Number 432262,	21-Dec-2017	37400

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
SNS - ORNL 161kV Reconductor PN: 424633 & Bethel Valley 161kV Loop Kingston FP - Ft Loudon PN: 426017	3-Jan-2018	36762
House 161-kV Delivery Point - Project 409942	5-Jan-2018	35050
House 161-kV Delivery Point - Project 409942	15-Jan-2018	35050
Shawnee Area Reconfiguration - Project 409329, 421127, 421229	20-Jan-2018	34272
Removing 2.93 miles of L2420 segment 3 of Columbia-Jongo 46 kV Transmission Line.	23-Jan-2018	36373
Johnsonville -Monsanto 161kV TL Replace Structure 98 - 31OUX - 431609	1-Feb-2018	37665
Sequoyah NP - Chickamauga Hydro 161-kV TL (L5043) - Install OPGW Project Number: 432352	15-Feb-2018	38236
Colbert - Wilson 161-kV TL - Install Fiber - 429445	27-Feb-2018	38289
Harriman, TN 161kV Switching Station - Install Breakers - Project: 419583	13-Mar-2018	35932
Counce - Hickory Valley L5216 MP NERC - Project Number 415148	13-Mar-2018	37190
Colbert - Reynolds #2 L5793 MP NERC - 415148	13-Mar-2018	38136
Construction Laydown Yard - Montpelier, MS. 161-kV SS - Provide Delivery Point	16-Mar-2018	37369
Union City - Samburg 69kV Transmission Line (L3860) Retirement	20-Mar-2018	36185
Latitude Solar Interconnection - Project: 430779	22-Mar-2018	38469
Gallatin-West Cookeville 161kV OPGW Installation PN; 432352	22-Mar-2018	38532
Sequoyah NP- Watts Bar HP 161-kV TL (L-5047) – Install OPGW Project Number 432352	23-Mar-2018	38165
Limestone-Jetport 161-kV TL (L5922) Install OPGW Project Number: 429445	27-Mar-2018	38581
Artesia 161-kV Delivery Point and Switching Station Construction	28-Mar-2018	37268
Johnsonville FP - Lawrenceburg 161-kV TL - Medium Priority NERC Alert	9-Apr-2018	37659
Wilson-Wheeler 161-kV TL (L5123) - Install OPGW Project Number: 429445	12-Apr-2018	38566
Wheeler-Nance (L5669) & Nance-Trinity (L5832) 161-kV TL Install Fiber Project Number: 429445	16-Apr-2018	38578
Superior Graphite #2 Provide Delivery Point PN: 432937	30-Apr-2018	38649
Science Hill, TN 161-kV Switching Station Install Capacitor Banks	3-May-2018	37127
Redstone Gateway, AL 161-kV Delivery Point - Project number 423388	3-May-2018	38764
Gallatin - Center Hill-West Cookeville, Gallatin - Cordell Hull, Cordell Hull - West Cookeville MPNA	8-May-2018	37083
Huntsville-Jetport 161-kV TL (L5146) Install OPGW Project Number: 429445	14-May-2018	38838
N. Nash.-Str.24 to Str.24A-W. Nash. (NES Whites Creek)161-kV TL-Install OPGW-PN: 432352	22-May-2018	38936
Cordova - Benton OPGW L6125 - Project Number 417191	29-May-2018	38925
Tusculum - Jonesborough 161kV Transmission Line Reconductor PN: 431164	29-May-2018	38937
Construction of 0.86-Acre LayDown Yard Within the Existing Jackson 500-kV Substation Reservation	21-Jun-2018	39076
West Greene, TN 161kV Transmission Line Delivery Point PN: 425432	12-Jul-2018	39063
Winton, AL 161-kV Switching Station & TL Loop - Project: 409268	10-Aug-2018	36793
Paradise - Montgomery 500kV Capacity Increase PN: 406884	21-Sep-2018	37464
Sullivan - NE Johnson City 161kV TL L5005 MPNA PN: 421234	21-Sep-2018	39623
Construction Laydown Yard: West Batesville - North Oakland Project: Project Number 413286	10-Oct-2018	39090
Jackson - Haywood 161-kV TL - LPC fix span 349-350 & 355-356 - 425997	12-Oct-2018	38823
Woodland Mills 161-kV Delivery Point	18-Nov-2018	31559
West Centerville-Monsanto 161kV TL MPNA L5101 PN: 415148	27-Nov-2018	37908
West Trousdale, TN 161kV Delivery Point PN: 431057	27-Nov-2018	38905
Racer, KY. 161-kV Substation - Provide Delivery Point - PN: 410513	30-Nov-2018	39250
Oakland Laydown Yard - 413286	10-Dec-2018	39468

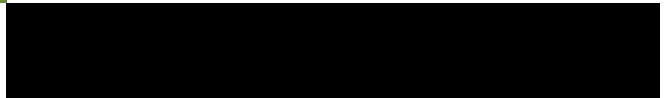
Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Counce, TN 161-kV Switching Station - Convert to Double Breaker & Add Two Lines - Project: 424553	17-Dec-2018	36873
Russellville Industrial Park, AL. 161-kV Substation - Provide Delivery Point.	18-Dec-2018	38308
Horn Lake-Allen 161-kV TL Rebuild	10-Jan-2019	39769
Town Creek, AL 161-kV substation - Provide delivery point. Project: 435304	10-Jan-2019	39789
Bud Crockett, TN 161-kV Switching Station - Provide Slack Span Delivery Point - Project: 416952	16-Jan-2019	40146
Dumplin Valley - Pigeon Forge WO: 31PBQ PN: 407277	29-Jan-2019	40287
New Johnsonville, TN. 161-kV Substation - Provide Delivery Point - 430383 - 31ODT.	4-Feb-2019	38755
Clay MS 500-kV Laydown Yard	14-Feb-2019	39826
Sandtown 161-kV Delivery Point: 426571	25-Feb-2019	36956
Construction Laydown Yard - Alcoa Substation	25-Feb-2019	39042
Guthrie, KY. 161-kV Substation - Provide Delivery Point to Pennyryle RECC - 435580	27-Feb-2019	38223
North Starkville Delivery Point - Project Number 432320	11-Mar-2019	39362
Provide 161-kV Delivery Point - Paducah Gaseous Diffusion Plant (PGDP) - Project: 434276	13-Mar-2019	38380
Oxford-Coffeeville 161-kV TL - Construction Laydown Yard - Project 420142	19-Mar-2019	40658
West Ringgold - Alpha 115/230-kV TL - GA DOT Relocation - PN: 433434	26-Mar-2019	39680
Wolf Creek HP - Summer Shade No. 1 MPNA L5700 PN: 415148	18-Apr-2019	38671
Douglas HP-Pigeon Forge 161kV TL L5693 MPNA PN: 415148	24-Apr-2019	39696
Sedalia, KY. 161-kV Delivery Point - PN: 430142	20-May-2019	39253
Sewell, AL 161-kV Substation and Transmission Line Project Number 435704	29-May-2019	39541
Springfield-Logan Aluminum 161kV MPNA L5310 PN: 415148	29-May-2019	40373
Singleton-Leake Laydown Yard Project Number 409032	17-Jun-2019	41122
Construction Laydown Yard - Counce Area Projects	20-Jun-2019	41143
Piperton, TN 161-kV substation: Provide delivery point. Project: 441422 - WO: 33U9W; Project: 441576	21-Jun-2019	40829
Vonore, TN 161kV Substation Construct and 161kV Transmission Line PN: 429909	2-Jul-2019	37841
Blackjack, MS 161-kV SS- Provide Delivery Point - 429943	12-Jul-2019	37403
Miser, TN 161kV Transmission Line Delivery Point PN: 435339	17-Jul-2019	40141
Mayfield 161-kV Substation Laydown	23-Jul-2019	41267
Longino 161 kV Delivery Point: 426568	24-Jul-2019	36955
SW Starkville Delivery Point - 430440	3-Sep-2019	37926
Construction Laydown Yard -Philadelphia Area Projects	28-Oct-2019	41810
McMinnville-Manchester 161kV MPNA L5696 PN: 430018	4-Nov-2019	40374
West Lewisburg, TN. 161-kV Substation - Provide Delivery Point for LES - 434970	8-Nov-2019	38711
Ryan Creek, AL 161-kV Delivery Point - Project Number 490093	30-Jan-2020	39361
Flowood, MS 161 kV Delivery Point - Project Number 429122 -	2-Apr-2020	39359
South Medina, TN. 161-kV Delivery Point - PN: 441019	28-May-2020	40874
Flowood Temporary Transmission Laydown Yard	29-Jul-2020	42832
Fontana Area System Improvements- PWR REPLACE L1914 PN: 532634	15-Sep-2020	43344
Shelby - Dell 500-kV Transmission Line Relocation - 442893	2-Oct-2020	39672
Shady Grove 161-kV Delivery Point - PN: 438332	20-Oct-2020	42181
Mineral Wells - West Pleasant Hill - 436014 - W.O. 64A01	28-Oct-2020	41670
Madisonville - Vonore Construct 161kV TL - Project: 409409	4-Dec-2020	41812
North Gallatin, TN 161-kV Switching Station and Loop Line. Project: 439098 - Work Orders: Multiple	17-Dec-2020	42028
Sweet Home, AL 161-kV Transmission Line: 440238	10-Feb-2021	42018

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Construction Laydown Yard - Shady Grove 161-kV TL Project.	22-Feb-2021	44794
W Oktibbeha 161-kV DP: 441647	1-Mar-2021	42014
Sweet Home Laydown Yard WO:31S5V	10-Mar-2021	44984
Kenlake, KY. 161-kV Substation - Provide Delivery Point - PN: 410521	16-Mar-2021	41584
Davis Gap 161-kV Transmission Line DP: 441235	16-Mar-2021	42015
Pond Creek 161- KV Delivery Point - 615175	16-Mar-2021	42430
Allen - Horn Lake TL and Re-conductor: 500370	17-Mar-2021	42013
Madison-Flash #2 161-kV Transmission Line. Funding Project: FP614903 - Work Orders: Multiple	18-Mar-2021	42267
Hwy 412 Re-conductor Laydown Yard	23-Mar-2021	45108
Temporary Laydown Yard: Madison-Flash TL Project. Project: 443762	13-Jul-2021	45253
South West Point 161-kV Delivery Point - 442746	16-Jul-2021	42286
North Desoto 161 - KV Delivery Point - 440387	5-Aug-2021	42429
Santa Fe TN161kV Slack Span Delivery Point Project: 430220 WO: 31OOX	1-Sep-2021	42591
North Lawrenceburg, TN 161-kV Substation - Provide Delivery Point to LUS- Project: 200922	3-Sep-2021	44425
Construction Laydown Yard - Murray, KY.	16-Sep-2021	44024
Fox Hollow Tie Line and Substation PN: 433070	20-Sep-2021	39943
Mary Haughton Delivery Point PN:531115	3-Nov-2021	43669
Construction Laydown Yard - Decatur, AL.	10-Nov-2021	46831
Fontana Phase 2 Transmission Work - 533962	16-Nov-2021	43910
Transmission Line (L5190) Upgrades for Yum Yum Solar	18-Nov-2021	44484
Horus, KY Laydown Yard Q388 WO:2T113 PN:535290	3-Dec-2021	46725
Alcoa-Nixon Road 161-kV TL. Project: 443430	6-Jan-2022	44826
Strategic Fiber Benefit-Haywood/Brownsville, Jackson, and S. Jackson switching stations. Project: 531962	24-Jan-2022	47340
Construction Laydown Yard - TVA Lagoon Creek	25-Feb-2022	47611
Pilot Oak KY 161kV Delivery Point	11-Apr-2022	43357
Temporary Construction Laydown Yard - Fayette County, TN	19-Apr-2022	47990
Gladstone, AL 161-kV Switching Station and Loop Line. Project: 533772	22-Apr-2022	45858
Temporary Construction Laydown Yard - Marshall County, MS	10-May-2022	48112
Construction Laydown Yard - Memphis Regional Megasite Power Supply	27-May-2022	48195
Tupelo Area Fiber Work : PN: 533698, 533699, 533706, 533707, 533708, 533709	16-Jun-2022	48273
FP629008 Strategic Fiber Benefit Implementation Albertville, AL and Geraldine, AL – Install Fiber Optic Equipment (539625)	29-Jun-2022	48392
Trade, AL 161-kV Substation - Provide Delivery Point. Project: 438921	8-Aug-2022	46028
Project Night Sky - TVA Ultium, TN 161kV Switching Station and Loop Line. Project: 539168	11-Aug-2022	47184
Limestone-Harding Spring 161-kV Transmission Line: Install OPGW. Project: 533773	11-Aug-2022	48540
AP 40 Line Relocation L3305 (E. Cleveland - McDonald 161kV TL) WO: 2T02M, Project: 532602	18-Aug-2022	43940
Temporary Laydown Yard - Mercer, TN. Project: 534347 - Work Order: 31SEY	23-Aug-2022	48727
Tiptonville-Hwy 412 TL (L5931) Upgrades. Project: 535291	29-Aug-2022	46210
Provide Cantrell Flats, TN 161-kV slack span delivery point. Project: 438641	30-Aug-2022	42262
South Okolona, MS 161-kV substation - Provide delivery point. Project: 542351	1-Sep-2022	48794
Temporary Construction Lay Down Yard - Knoxville Area Projects	19-Sep-2022	48943
Elizabethton - Cranberry #2 161-KV TL - 437516	29-Sep-2022	41831
Morristown Laydown yard expansion	21-Oct-2022	48506

Categorical Exclusion Checklist (CEC) Reviews	Completion Date	CEC #
Guntersville - Goose Pond L5683 Str 433 to Dam Emergency Fiber Replacement	25-Oct-2022	49120
Burnsville - Tri-State Commerce 443434	8-Nov-2022	47395
Colbert - Cherokee MPNERC L5668 - PN:443187	8-Nov-2022	48046
License Agreement: 2.3-acre Preliminary Site (Cullman County, AL). Project: 438921	14-Nov-2022	49235
Braytown - Wartburg 537493	17-Nov-2022	47392
Gallatin-Cairo Bend Reconductor 2T06C 532033	21-Nov-2022	47200
Construction laydown yard - Hanceville, AL. Project: 438921	11-Jan-2023	49125
Browns Ferry River Crossing Assessment on L6074 Structures 23-26 and L6078 Structures 25-28	26-Jan-2023	49433
North Madisonville, TN 161-kV Delivery Point. Project: 540361	26-Jan-2023	49527
Flat Fork 69-KV Expansion	31-Jan-2023	47975
Powell Chapel Road, TN 46-kV Substation - Metering & Delivery Point - FP: 629843 - PN: 537573	6-Feb-2023	47972
Mountain City, TN 161-kV Delivery Point. Project: 541594 -	15-Feb-2023	48384
Ludlow, MS PN: 530475	21-Mar-2023	45946
Sanford Road Delivery Point - PN: 541285-FP630045	29-Mar-2023	49949
Northeast New Albany, MS 161kV Delivery Point - FP: 629734 - PN: 537013	10-Apr-2023	47779
Wheeler - Maury 161-kV TL - Reconductor Str. 1-232A - PN: 532588	12-Apr-2023	46355
Tiptonville-New Madrid 161-kV TL - Reconductor & Build Second Line - PN: 529154	12-Apr-2023	48399
Hertz 161kV Delivery Point to Microvast	17-Apr-2023	48307
North Green Street, MS 161-kV Delivery Point - FP: 628675	2-May-2023	47964
Gallatin-Portland 161-kV TL Loop into North Gallatin. Project: 533421	11-May-2023	47568
Thacker, MS 161-kV Delivery Point	15-May-2023	48050
Hardin Valley, TN 161-kV Delivery Point. Project: 441716	24-May-2023	47201
Berlin, AL DP PN:543434, 544883,539329	25-May-2023	49339
NAEC Fiber Request at Widow's Creek – Dark Fiber Lease/Splicing	1-Jun-2023	50303
Lawrenceburg-Anderson-Pulaski 161-kV (L5021, L5117) MPNA OPGW - PN: 500500, 537971, 537992, 540829, 540926, 540927, 540928	2-Jun-2023	47712
Tiny Town Provide 161kV Delivery Point	5-Jun-2023	48005
Lawrenceburg Area Temporary Construction Laydown Area	12-Jun-2023	50363
Claysville, AL 161-kV Delivery Point - 539720, 542083, 542089	26-Jun-2023	48035
Winstead, TN 161-kV Delivery Point - FP: 629992 - PN: 540583, 541439, 541760	28-Jun-2023	49434
VZW L5292 OPGW Replacement	3-Jul-2023	49792
East Cleveland - NE Benton TL OPGW Repair	6-Jul-2023	50592
Tower Installation - Beech Grove, TN Microwave - PN: 536993	3-Aug-2023	49622



Appendix F – Literature Cited



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PRELIMINARY

Appendix F - Literature Cited

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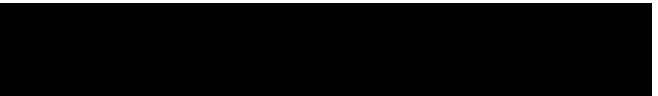
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PRELIMINARY



Appendix G – List of Preparers



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PRELIMINARY

Appendix G - List of Preparers

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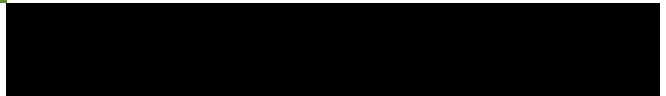
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Appendix H – 2025 IRP – Comment Response Report



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PRELIMINARY

Appendix H - 2026 IRP - Comment Response Report

Table of Contents

H.1	Introduction.....	H-1
H.2	Responses to Comments	H-2
H.2.1	Integrated Resource Planning	H-2
H.2.1.1	Economic Development and National Security.....	H-2
H.2.1.2	Emissions	H-2
H.2.1.3	Energy Efficiency	H-2
H.2.1.4	Goals and Targets	H-3
H.2.1.5	Implementation	H-5
H.2.1.6	IRP Purpose and Need	H-7
H.2.1.7	IRP Working Group.....	H-7
H.2.1.8	Life Cycle Analysis.....	H-7
H.2.1.9	Metrics	H-9
H.2.1.10	Modeling	H-10
H.2.1.10.1	Advanced Technologies.....	H-10
H.2.1.10.2	Coal.....	H-11
H.2.1.10.3	Demand-side Management.....	H-12
H.2.1.10.4	Distributed Energy Resources	H-13
H.2.1.10.5	Electric Load and Gas Price Forecasts.....	H-13
H.2.1.10.6	Federal Incentives.....	H-14
H.2.1.10.7	Gas	H-15
H.2.1.10.8	General	H-18
H.2.1.10.9	Long-duration Storage	H-21
H.2.1.10.10	Nuclear.....	H-22
H.2.1.10.11	Renewables	H-23
H.2.1.10.12	Social Costs	H-23
H.2.1.10.13	Solar and Storage	H-23
H.2.1.10.14	Storage	H-24
H.2.1.10.15	Technology Advancements.....	H-25
H.2.1.10.16	Wind.....	H-25
H.2.1.11	Power Supply Mix	H-26
H.2.1.12	Process.....	H-26
H.2.1.13	Process and Public Involvement.....	H-29
H.2.1.14	Public Involvement.....	H-31

H.2.1.15	Scenarios	H-32
H.2.1.16	Sensitivity Analysis	H-34
H.2.1.17	Strategies.....	H-37
H.2.1.18	Strategy Assessment and Implementation	H-40
H.2.2	Energy Resource Options.....	H-40
H.2.2.1	Carbon Capture and Sequestration	H-40
H.2.2.2	Coal	H-40
H.2.2.3	Demand-side Management	H-43
H.2.2.4	Distributed Energy Resources	H-43
H.2.2.5	Diverse Portfolio	H-44
H.2.2.6	Energy Efficiency	H-46
H.2.2.7	Energy Transition and Decarbonization.....	H-46
H.2.2.8	Fossil Fuels.....	H-50
H.2.2.9	Geothermal	H-52
H.2.2.10	Hydroelectricity	H-52
H.2.2.11	Hydrogen	H-52
H.2.2.12	Least-cost Planning	H-53
H.2.2.13	Natural Gas.....	H-53
H.2.2.14	Nuclear	H-57
H.2.2.15	Nuclear and Gas.....	H-58
H.2.2.16	Renewables	H-59
H.2.2.17	Renewables and Energy Efficiency	H-61
H.2.2.18	Renewables and Storage	H-61
H.2.2.19	Solar.....	H-63
H.2.2.20	Storage	H-64
H.2.2.21	Wind.....	H-65
H.2.3	Energy Infrastructure	H-65
H.2.3.1	Building Codes.....	H-65
H.2.3.2	Demand Response	H-65
H.2.3.3	Demand-Side Management.....	H-66
H.2.3.4	Distributed Energy Resources	H-67
H.2.3.5	Distributed Energy Resources and Demand-side Management.....	H-70
H.2.3.6	Electric Vehicles	H-70
H.2.3.7	Electrification	H-71
H.2.3.8	Emerging Technology Research	H-71
H.2.3.9	Energy Efficiency	H-71

H.2.3.10	Extreme Weather	H-72
H.2.3.11	Fossil Site Repurposing	H-73
H.2.3.12	Implementation	H-73
H.2.3.13	Large Customers	H-74
H.2.3.14	Large Customers and/or LPCs	H-74
H.2.3.15	Municipality Sustainability Goals	H-74
H.2.3.16	Natural Gas Pipelines	H-75
H.2.3.17	Nuclear Licensing and Operations.....	H-75
H.2.3.18	Pipeline Infrastructure	H-75
H.2.3.19	Power System.....	H-76
H.2.3.20	Power System - National	H-76
H.2.3.21	Power System - TVA	H-76
H.2.3.22	Process for Adding New Resources	H-77
H.2.3.23	Renewables for Local Communities	H-78
H.2.3.24	River System Management	H-78
H.2.3.25	Transmission and Distribution Planning	H-78
H.2.3.26	Transmission Planning	H-79
H.2.3.27	TVA and LPC Coordination	H-82
H.2.4	Economics	H-82
H.2.4.1	Advanced Energy Innovation.....	H-82
H.2.4.2	American Energy Future	H-82
H.2.4.3	Financial Plan and Debt Ceiling.....	H-82
H.2.4.4	Incentives - Federal	H-83
H.2.4.5	Incentives - TVA	H-83
H.2.4.6	Large Customers	H-86
H.2.4.7	Rate Structure.....	H-87
H.2.4.8	Renewable Programs	H-87
H.2.4.9	Socioeconomics.....	H-87
H.2.5	Environmental Impacts	H-89
H.2.5.1	Air Quality and Emissions	H-89
H.2.5.2	Climate Change	H-96
H.2.5.3	Energy Mix.....	H-96
H.2.5.4	Energy Transition and Decarbonization.....	H-96
H.2.5.5	Environmental Impacts	H-98
H.2.5.6	Environmental Protection.....	H-101
H.2.5.7	Health and Safety	H-101

H.2.5.8	Land Use	H-102
H.2.5.9	Mitigation Measures.....	H-104
H.2.5.10	Public Health and Safety	H-104
H.2.5.11	Public Involvement.....	H-106
H.2.5.12	Socioeconomics.....	H-106
H.2.5.13	Solar Siting	H-107
H.2.5.14	Solid and Hazardous Waste	H-107
H.2.5.15	Threatened and Endangered Species	H-109
H.2.5.16	Water Resources	H-110
H.2.5.17	Wildlife	H-111
H.2.6	Other.....	H-111
H.3	Index of Commenters	H-115
H.3.1	Individual Commenters	H-115
H.3.2	Form Commenters.....	H-128
H.3.2.1	Evergreen Form Letter.....	H-128
H.3.2.2	Clean Energy Form Letter	H-132
H.3.2.3	Coal Form Letter.....	H-133
H.3.2.4	Illinois Coal Form Letter.....	H-135
H.3.2.5	Millington, TN Form Letter	H-137

H.1 Introduction

The draft Integrated Resource Plan (IRP) and Environmental Impact Statement (EIS) were released on September 23, 2024, and the formal notice of their availability was published in the Federal Register on September 27, 2024. This initiated the public comment period, which closed on December 11, 2024. Chapter 2 of Volume 1 (IRP) includes a description of TVA efforts to engage stakeholders and the public, as well as advise them of the availability of the draft IRP and EIS and encourage them to review and comment on the documents. TVA also held a series of two virtual and 10 in-person public meetings to describe the project and to accept comments on the draft IRP and EIS. The in-person meetings were held across the seven-state region in Antioch (Nashville), Tenn., Bristol, Va., Chattanooga, Tenn., Hopkinsville, Ky., Huntsville, Ala., Memphis, Tenn., Murphy, N.C., Oak Ridge, Tenn., Rossville, Ga., and Starkville, Miss. About 600 members of the public attended the public webinars and in-person open houses, representing a 32 percent increase in open house public participation from the last IRP.

In total, TVA received more than 2,500 official public comments on the draft IRP and EIS. Comments could be submitted through the online portal (www.tva.com/irp), via email or U.S. mail, or submitted at an in-person open house meeting during the public comment period. About 900 comments were submitted through the online portal, and the balance were largely submitted via email. In total, about 1,900 of the online and email submittals contained form letters that favored renewable energy and urged TVA toward decarbonization, while 40 submittals requested that no solar or wind farms be located in their community. TVA received two form letters related to coal mining, one that opposed new coal mining in Illinois (not specifically related to the IRP or EIS) and another that generally focused on keeping coal in the ground. Collectively, these accounted for over 600 submittals. About 70 discrete emails and letters were also submitted, including letters from agencies, a government representative, about 20 non-governmental organizations, and other organizations and individuals. Comments were received from individuals and entities in Tennessee, other Southeast states, California, New York, and other states across the nation.

These comment submissions were carefully reviewed and comments with similar themes were summarized, resulting in about 380 individual comment statements. This appendix provides these comment statements and TVA's responses to them. The comments and responses are categorized into six broad topics – integrated resource planning, energy resource options, energy infrastructure, economics, environmental impacts, and other. Most of these topics are further categorized into more specific issues. Key themes from public comments include:

- Support for more renewable energy generation and calls for decarbonization
- For/against certain resource technologies (e.g., nuclear, gas, coal, renewables)
- Environmental considerations, such as concerns about climate change, extreme weather, the environment, wildlife, and pollution
- Economic considerations, such as benefits or costs of programs, maintaining a ratepayer focus, and rebates or incentives
- Power infrastructure considerations, such as reliability, decentralization, using existing infrastructure, benefits of storage, and concerns about high demand data centers

The balance of this appendix, organized by the six broad topic areas, includes the summary and unique comment statements on the draft IRP and EIS, along with TVA's response.

H.2 Responses to Comments

H.2.1 Integrated Resource Planning

H.2.1.1 Economic Development and National Security

1. The IRP does not address how existing methane generators will enhance national security or economic development, except by provision of additional capacity. (*Commenter: Carlson Swafford – Eco Demo Law PLLC*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

H.2.1.2 Emissions

2. Explain discrepancies in direct emissions between the IRP and the draft EIS. For instance, while the IRP Appendix J shows the net-zero 2050 goal achieved (no direct emissions) for all strategies in Scenario 4, Appendix D of the draft EIS shows 1,578,711 short tons of CO₂ combustion emissions and 4,337,508 short tons of non-combustion CO₂ emissions in 2050 for Scenario 4D ("Net-zero Regulation with Distributed and Demand Side Focus"). (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: As a result of key changes in the electric utility landscape in 2025 (see Section 2.2 of Volume 1), TVA updated baseline IRP assumptions which included a streamlined set of scenarios. As such, the Scenario 4 referenced in this comment is no longer included in the IRP analysis.

In Volume 1, the environmental responsibility metrics section includes CO₂ Direct Emissions which focuses on direct emissions from combustion. Volume 2 includes information on both direct emissions of greenhouse gasses as well as on a combination of direct and indirect emissions within the greenhouse gas lifecycle analysis (LCA) (see Section 5.5.2 of Volume 2). For the LCA, all generating resources are assigned non-combustion emissions, including renewables. Non-combustion emissions are based on emission factors provided by the National Laboratory of the Rockies.

H.2.1.3 Energy Efficiency

3. We're interested in understanding how TVA's investments in EE compares to the range outlined in the 2019 IRP, as the data currently makes it difficult to assess whether the actions align with the recommendations. We request TVA provide additional clarification and / or more consistent data that would enable an apples-to-apples comparison between the 2019 IRP recommendations and the actions taken since. (*Commenter: Ann Livingston – Southeast Sustainability Directors Network*)

Response: While IRP results typically highlight capacity, energy efficiency (EE) impacts are best understood on an annual energy basis (GWh saved). The 2019 IRP included EE impacts using an FY 2018 base year (basis for all values shown here), with the first few years of forecasted EE based on the FY 2019 business plan and expansion EE available starting in 2020. 2019 IRP case 1A (Current Outlook with Base Case strategy) included approximately 456 cumulative GWh of energy savings between 2018 and 2025. Over that same time period, 2019 IRP case 3D (Valley Load Growth with Promote Efficient Load Shape strategy) included approximately 524 cumulative GWh of energy.

These values compare to approximately 900 cumulative GWh of actual energy savings achieved from 2018 to 2025. Since installations occur throughout the year, TVA projects that the full impact of actual EE deployment from 2018 to 2025 will result in approximately 1,050 GWh of full year annual savings. Actual GWh savings were

calculated using "as-planned" values that are still pending final evaluation, measurement, and validation or other reviews.

H.2.1.4 Goals and Targets

4. TVA should target net-zero emissions in its IRP. (*Commenters: Grace Levin – City of Knoxville, TN, Joe Franklin, Kathryn, Madison Rollings – City of Chattanooga, Audra Morelock, Leigh Huffman – City of Memphis, Tiffany, Jonathan Geldof – ACORE, Ken Jones, Ntale Kajumba – EPA Region 4, Nicholas Poggioli, Mark Jorgen Nicoson, Scott Dunbar – Clean Energy Buyers Association, John Todd Waterman, Kent Minault, Richard Henighan, Brant Miller, Patricia Miller, Joanne Logan, Gabriela Sarri-Tobar – Center For Biological Diversity, Leah McCord – CleanUpTVA Coalition, Kendra Abkowitz – Metropolitan Government of Nashville and Davidson County, Cortney Piper – Tennessee Advanced Energy Business Council, Ann Livingston – Southeast Sustainability Directors Network, Pam Jones, Daniel Joranko, Nathaniel Bass, Leigh Huffman – Shelby County Government*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

5. TVA should not engage in activities or capacity expansion that produce greenhouse gas emissions, especially by building new gas plants. (*Commenters: Mary Cawthorn, Claire Broome, Julie Grower, Gabriela Sarri-Tobar – Center for Biological Diversity, Leah McCord – CleanUpTVA Coalition, Katherine Brubaker – EDF, Rachael Maitland – Tennessee Department of Environment and Conservation, Evergreen Form Letter Commenters, Clean Energy Form Letter Commenters, Trey Bussey – SELC, et al., William "Bill" Bell – 4-County EPA, Bonnie Swinford – Sierra Club*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

6. TVA should confirm renewable energy as a priority as an outcome of this IRP and/or set clear minimum goals for solar and storage additions. (*Commenters: Gaylene Sloane, Gil Hough – TenneSEIA, Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

7. The IRP should align with TVA's stated goals in the 2021 Strategic Intent and Guiding Principles and/or its most recent Carbon Report, both which include goals to achieve more carbon reduction than is represented in the draft IRP. (*Commenters: Katherine Brubaker – EDF, Ntale Kajumba – EPA Region 4*)

Response: TVA does not set a goal or target for emissions in its IRP based on the requirements of Section 113 of the Energy Policy Act of 1992. TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with the Act. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

8. TVA's IRP should do more in the carbon reduction space and should result in a more ambitious decarbonization strategy. (*Commenter: Katherine Brubaker – EDF*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals:

low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

H.2.1.5 Implementation

9. Please explain how TVA will track performance on IRP recommendations and metrics, movement in signposts that may impact implementation, and/or how future asset-specific decisions will tie back to IRP recommendations. (*Commenters: Jan Berry – Citizens' Climate Education, Kendra Abkowitz - Metropolitan Government of Nashville and Davidson County, Shalin Mody*)

Response: The IRP recommendations provide strategic direction for the future power system, establishing a strong planning foundation and informing TVA's next long-range financial plan. Included within the recommendations are the power supply mix ranges through 2040 and 2050 which establish guardrails by which future resource additions will be bound. The Strategic Portfolio Direction outlines recommended actions for TVA staff to pursue in the near-term based on insights gained in the IRP analysis. Finally, TVA identified key signposts to monitor that will provide insights into potential impacts to recommended actions between now and 2040 and will ultimately guide portfolio decisions beyond 2040. Movement in key signposts can signal potential shifts in the portfolio mix and indicate the appropriate timing for the next IRP.

A key next step in implementing the IRP recommendations is translating the IRP's strategic direction into an executable asset strategy from an operational, commercial, and financial perspective. A successful asset strategy also relies on partnering with TVA customers, especially on the distributed and demand-side aspects of the plan, and with other key stakeholders. Site-specific aspects of actions that are later proposed to implement the IRP strategic direction will be addressed and considered in tiered environmental reviews and subject to any required TVA Board approvals. For more information, please see Chapter 4 of Volume 1.

10. TVA should provide clear market signals for solar and storage procurement. (*Commenter: Gil Hough – TenneSEIA, Farah Mandich – US General Services Administration*)

Response: The IRP's Strategic Portfolio Direction includes recommended actions to add firm, dispatchable storage to maintain system reliability and improve system efficiency and pursue solar to reduce total system costs or meet customer needs. Within this guidance, the IRP recommendations provide coverage for 1 to 5 GW (1 to 8 GW nameplate) of storage additions and 2 to 5 GW (3 to 12 GW nameplate) of solar additions through

2040. TVA plans to continue evaluating all storage and solar offers submitted through competitive request-for-proposals. For more information on the IRP Recommendations, please see Chapter 4 of Volume 1.

11. TVA should increase transparency into procurement and interconnection processes. (*Commenter: Zachary Stines – New Leaf Energy*)

Response: The IRP's Strategic Portfolio Direction includes recommended actions to add firm, dispatchable storage to maintain system reliability and improve system efficiency and pursue solar to reduce total system costs or meet customer needs. Within this guidance, the IRP recommendations provide coverage for 1 to 5 GW (1 to 8 GW nameplate) of storage additions and 2 to 5 GW (3 to 12 GW nameplate) of solar additions through 2040. TVA plans to continue evaluating all storage and solar offers submitted through competitive request-for-proposals. For more information on the IRP Recommendations, please see Chapter 4 of Volume 1.

TVA is actively working to streamline the process for interconnecting new resources and reduce associated timelines. Reducing interconnection timelines will help support and accelerate the deployment of all power resources.

12. TVA needs to enhance its engagement of communities that are impacted by existing generation resources and/or may be impacted by potential sites for future generation resources. (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: TVA looks for ways to expand its outreach to communities that may be impacted by changes and additions to the power generation portfolio. The Regional Energy Resource Council and IRP Working Group both highlighted the importance of continuing to enhance community outreach as the IRP recommendations are implemented, and this will be an increased emphasis for TVA moving forward.

13. TVA should create an annual process for procuring solar and storage resources that is adaptable to updated outlooks for load growth and environmental regulations, similar to that of Duke Energy and Dominion Energy. (*Commenter: Whit Cox – Southern Renewable Energy Association*)

Response: The IRP's Strategic Portfolio Direction includes recommended actions to add firm, dispatchable storage to maintain system reliability and improve system efficiency and pursue solar to reduce total system costs or meet customer needs. Within this guidance, the IRP recommendations provide coverage for 1 to 5 (1 to 8 GW nameplate) of storage additions and 2 to 5 (3 to 12 GW nameplate) of solar additions through 2040. TVA plans to continue evaluating all storage and solar offers submitted through competitive request-for-proposals.

Additionally, TVA identified key signposts to monitor that will provide insights into potential impacts to recommended actions between now and 2040 and will ultimately guide portfolio decisions beyond 2040. Changing market conditions, including electricity demand, and evolving policy and regulations are highlighted in the IRP recommendations as key uncertainties to monitor and could signal potential shifts in the portfolio mix. For more information on the IRP Recommendations, please see Chapter 4 of Volume 1.

14. The Alabama Department of Environmental Management (ADEM or the Department) has reviewed TVA's Draft 2025 IRP and programmatic EIS. The Department has no comments at this time. Please submit any additional updates that pertain to TVA's activities in Alabama to the Department. (*Commenter: Alabama Department of Environmental Management*)

Response: Thank you for your comment. It has been noted by TVA.

15. Several power purchase agreements for combined cycle gas have expired in 2023 and 2024. Additionally, Zion Energy Center is set to expire in 2025. TVA does not explain plans to replace this purchased power in the IRP EIS Section 3. We recommend that TVA replace these gas contracts with contracts for power that has lower carbon emissions. (*Commenter: Jan Berry – Citizens' Climate Education*)

Response: Site-specific or contract-specific actions proposed to implement IRP strategic direction are addressed in tiered environmental reviews. While the IRP recommends resource mixes for the future, plans to replace specific contracts are out of scope of the IRP.

16. The IRP does not clearly show plans for purchased power reflected in the graphics associated with development of scenarios. For example, please clearly describe the segment labeled “Economic Purchases” in IRP EIS Figures 3-5 and 3-7. (*Commenter: Jan Berry – Citizens’ Climate Education*)

Response: The IRP identifies potential resource types but does not dictate the method of acquiring those types, whether it be through a program, power purchase agreement, or constructing an asset. Site-specific or contract-specific actions proposed to implement IRP strategic direction are addressed in tiered environmental reviews. Additionally, TVA may make economic purchases of market power, and these modeled “spot purchases” are what is represented as Economic Purchases on the total energy charts.

H.2.1.6 IRP Purpose and Need

17. TVA frames the purpose and need of the IRP as addressing increasing electricity demand and responding to residents’ and businesses’ demands for carbon reductions and renewable energy options. In accordance with NEPA, TVA should be actively addressing the vital role it plays regarding energy demand, including the ability to drive demand reductions, and the role it should play regarding carbon reductions and clean energy. (*Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: TVA’s integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible.

Pursuant to Section 113, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA’s least-cost planning requirements, please see section 2.1 of Volume 1.

H.2.1.7 IRP Working Group

18. The Sierra Club appreciates the opportunity to participate with delegates to the TVA IRP Working Group in this IRP cycle. There are ways in which the Working Group could be improved, however. For example, loosening strictures of confidentiality over materials prepared by TVA as part of the process would better enable Working Group delegates to communicate with internal organizational stakeholders; it would also enhance the ability of Working Group members to communicate with the larger public, both to help educate them on TVA’s IRP process and progress and to help gather and convey to TVA concerns, information, and insights from the public. Similarly, many IRP Working Group members were constrained from working with external technical experts; this hindered the ability of the Working Group to contribute as fully as might have been otherwise, to the diminishment of the IRP process. (*Commenter: Zachary Fabish – The Sierra Club*)

Response: New to this IRP, TVA made summaries of IRP Working Group meetings and materials available to the public on TVA’s IRP website. Some information provided to the IRP Working Group was confidential, sensitive, or privileged, and therefore some precautions were taken with respect to that information. Going forward, TVA will continue to look for ways to further leverage the expertise of the Working Group members.

H.2.1.8 Life Cycle Analysis

19. TVA should provide clarity on its life cycle analysis, specifically about how greenhouse gas emissions were accounted for, which social cost numbers were used in the analysis, and which inflation rate was used to state

in 2024 dollars. (*Commenters: Rebecca McGrew – NACCO Natural Resources, Ntale Kajumba – EPA Region 4, Kurtis Weatherford – The Institute for Policy Integrity at NYU School of Law*)

Response: Details on how the greenhouse gas (GHG) life cycle analysis (LCA) was developed are included in Volume 2, Section 5.5.2.3 and Appendix D. For its GHG LCA, TVA partnered with the National Laboratory of the Rockies (NLR), which provided technical assistance, verified and generated harmonized LCA emission factors for each resource technology, and validated TVA's results by running select TVA cases through its own GHG LCA model. NLR provided TVA with a technical report which includes documentation of NLR's scope of work as well as documentation of emission factors for each resource type. This report was produced when the laboratory operated as the National Renewable Energy Laboratory (NREL). The laboratory is now the National Laboratory of the Rockies (NLR). A copy of this report is available as a supporting document on TVA's 2026 IRP website (www.tva.com/irp).

A social cost analysis is not included in the final EIS.

20. TVA should be more transparent about the discount rate used for the life cycle assessment analysis (LCA). (*Commenter: Zachary Fabish – The Sierra Club*)

Response: Details on how the greenhouse gas (GHG) life cycle analysis (LCA) was developed are included in Volume 2, Section 5.5.2.3 and Appendix D. The discount rate referenced in this comment relates to the associated social cost analysis which was included in the Draft EIS but is not included in the Final EIS.

21. The IRP should present direct and indirect emissions for each portfolio combination rather than an average across scenarios and/or include each year. (*Commenters: Lindsay Hanna – The Nature Conservancy, Katherine Brubaker – EDF, Ntale Kajumba – EPA Region 4*)

Response: In the draft and final IRP and EIS, TVA included information on direct and indirect greenhouse gas emissions. The IRP CO₂ emissions metrics reported average direct emissions on a mass and intensity basis for 2026-2050 for each portfolio. IRP Volume 1, Appendix J includes trend charts for direct emissions and intensity by year. Volume 2 (EIS) contains additional information on direct emissions, along with information on indirect emissions derived from the life cycle analysis, or LCA (Volume 2, Section 5.5.2.3 and Appendix D). Upon draft and final IRP release, TVA published supporting data files including direct emissions mass and intensity by year for each portfolio and the yearly data associated with the LCA.

22. The life cycle analysis should include other non-carbon pollutants including particulates and/or sulfur hexafluoride. (*Commenters: Rosalie Bright, Ntale Kajumba – EPA Region 4, Nathaniel Bass*)

Response: TVA, in consultation with the National Laboratory of the Rockies (NLR), performed a greenhouse gas life cycle analysis (GHG LCA) in order to identify "cradle to grave" GHG emissions forecasts for upstream, operational, and downstream activities for the core portfolios and sensitivities. This analysis included all three primary greenhouse gases of concern, namely CO₂, N₂O, and CH₄. Particulate matter is out of scope for a GHG LCA, but is a criteria pollutant regulated under the Clean Air Act (see Volume 2, Section 4.2).

If some electrical equipment (e.g., electrical switchgear, circuit breakers) contains the GHG sulfur hexafluoride gas there may be a potential for minor leaks, mostly associated with maintenance or long-term equipment degradation. Through routine preventative maintenance programs, leaking equipment would be identified and remedied or replaced. As such, their emissions are expected to be minimal or negligible. In addition, due to newer equipment, more efficient operation and maintenance techniques, and leak detection, these features would minimize sulfur hexafluoride emissions.

H.2.1.9 Metrics

23. TVA should not include energy curtailment ratio as one of the metrics in the strategy assessment, as the costs of curtailed energy are already included in each portfolio's projected cost. (*Commenters: Gil Hough – TenneSEIA, Lindsay Hanna – The Nature Conservancy, Farah Mandich – US General Services Administration*)

Response: The expected average energy curtailment ratio was a metric used for the first time in this IRP to lend insight into potential operational challenges that would have to be managed at high curtailment levels. The full set of metrics were determined prior to completing the analysis. Curtailment in and of itself is not necessarily bad and associated costs are already considered in the analysis. The energy curtailment ratio metric provided operational insights for consideration when evaluating tradeoffs between IRP strategies.

24. The land use requirement assumption used for solar is inaccurate and should be revised to reflect more reasonable estimates that take into account agrivoltaics, brownfield siting options using existing interconnections, opportunities to site solar on water bodies, etc. (*Commenters: Jamie McClanahan, Drs. Joe and Sarah Schiller, Maggie Shober – Southern Alliance for Clean Energy, Ntale Kajumba – EPA Region 4, Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: While strategy assessments were relative, TVA mistakenly labeled the unit of measure for the land use metric as Acres/MWh instead of Acres/GWh in draft IRP metric tables. Several commenters pointed out the labeling error, and it has been corrected in the final IRP.

Utility-scale solar farms typically require about 7 acres of land per installed megawatt of nameplate capacity. The majority of solar power purchase agreements currently operating and under contract are sited on greenfield property. TVA strives to leverage brownfield options for siting any resource type when practical and will pursue suitable opportunities for solar as they arise, such as the ongoing project to install solar on the Shawnee fossil plant reservation. Agrivoltaics, or dual-use solar that combines solar energy production with agricultural activities on the same land, is an emerging approach that may reduce solar land use impact in the future.

25. The land use metric and EIS downplay the environmental impact of distributed solar and other distributed resources. The land use metric should account for land required for additional transmission infrastructure that distributed systems require and for land that will be disturbed by others deploying distributed solar. (*Commenter: Rebecca McGrew – NACCO Natural Resources*)

Response: The IRP land use metric makes an assumption that distributed solar uses zero land. Distributed solar typically utilizes existing structures, such as residential and business rooftops and facility parking areas, or available land that has already been disturbed. While most distributed solar likely would be implemented in this manner, there would be the potential for some portion to be implemented on undisturbed land. Significant additions of all resource types typically require additional investments in the transmission system. Where possible, TVA prefers to utilize brownfield sites with existing infrastructure and easements. As the IRP is not site-specific, potential land use impacts of related transmission or distribution infrastructure were not included in the land use metric for any resource type.

26. TVA should further define and explain the risk metrics included in the scorecard, as well as provide details of the ranges of values used to calculate them. (*Commenters: Lindsay Hanna – The Nature Conservancy, Rebecca McGrew – NACCO Natural Resources, Jan Berry – Citizens' Climate Education*)

Response: In the final IRP, TVA simplified the descriptions of the risk metrics to make them easier to understand. IRP Volume 1, Appendix I contains additional detail on the metrics, including formulas. TVA also has added information on the range of present value of revenue requirements from stochastic analysis to this appendix.

27. TVA should describe how it weighted metrics and/or focused on key metrics in the analysis and in developing recommendations. (*Commenter: Lindsay Hanna – The Nature Conservancy*)

Response: Metrics are not weighted, but are rather used to illustrate tradeoffs between the alternative strategies studied. The strategy assessments in Volume 1, Section 3.7 discuss the metrics and tradeoff considerations that TVA found most meaningful and insightful.

28. At minimum, TVA should present the Flex Resource Coverage Ratios for the year 2035 and should adjust its model assumptions to ensure flexibility in the short-term. (*Commenter: Rebecca McGrew – NACCO Natural Resources*)

Response: Based on the review of draft results and stakeholder feedback, TVA made the decision to remove the flexible resource coverage ratio in the final IRP. The old metric's results provided confidence that the optimization model was performing well at selecting a resource mix that effectively meets both capacity need and the pattern of energy needs. To best align with the operational goals of diversity, reliability, and flexibility final IRP now includes the P95 Average Unserved Energy Ratio along with Operating Cost Stability and Expected Average Energy Curtailment Ratio.

29. TVA seems to assume that CO₂ metrics can stand in for air pollution and climate change impacts. However, there are other air pollutants to also account for, with differing social and public health impacts. They were discussed in the DEIS and should be mentioned in the DIRP. (*Commenter: Rosalie Bright*)

Response: In IRP metrics, TVA reported CO₂ direct releases, CO₂ intensity, water consumption intensity, waste intensity, and land use intensity. While these metrics are helpful in identifying high-level key tradeoffs between the portfolios, the EIS appropriately goes into further detail on air pollution and climate related emissions.

H.2.1.10 Modeling

H.2.1.10.1 Advanced Technologies

30. Related to carbon capture and sequestration (CCS) and hydrogen cofiring, further analysis and discussion of feasibility is needed to address aspects such as operational effectiveness, retrofitting demands, and the necessary infrastructure to support CCS and hydrogen co-firing. (*Commenters: Rachael Maitland – Tennessee Department of Environment and Conservation, Whit Cox – Southern Renewable Energy Association*)

Response: In the IRP analysis, CCS modeling is built on research identifying storage locations near or within the TVA footprint, the necessary pipeline length, and other costs to capture carbon at existing combined cycle sites. Carbon capture technologies have been demonstrated at several sites around the world, and the underlying technologies have been proven at reasonable scales. However, risks do remain in scaleup and sequestration. In order to understand and reduce these risks, TVA is monitoring developments within the industry and exploring test wells to confirm viability in the region. TVA will utilize the findings of this work to make informed decisions on carbon capture, if needed in the future, as both the technology and public policy environment develop.

The strategy assessment in the IRP acknowledges that technological risks are greatest in portfolios with more reliance on emerging technologies, including carbon capture and sequestration.

31. TVA should reexamine the large range of potential costs and risks associated with relying on advanced technologies that are not fully developed, such as small modular reactors (SMR) and/or carbon capture and sequestration (CCS). (*Commenters: Zachary Fabish – The Sierra Club, Cortney Piper – Tennessee Advanced Energy Business Council, James Richards – Nuclear Innovation Alliance, Whit Cox – Southern Renewable Energy Association, Markey and Cohen – Congress of the United States*)

Response: In the IRP analysis, TVA modeled several emerging technologies as resource options, including advanced nuclear, advanced storage, and carbon capture and sequestration (CCS) as a control technology for gas or coal. For small modular reactors, TVA used cost estimates informed by direct experience exploring designs for the Clinch River Nuclear Site that reflect all-in costs and a higher level of confidence than NREL moderate case forecasts. For carbon capture and sequestration, TVA used recent project experience, discussions with equipment manufacturers, and insights from R&D efforts to capture both the base natural gas plant cost plus the infrastructure required to capture, transport, and store CO₂ (see response to comment #30). Between the release of the draft and final IRP, TVA updated cost estimates for the CC with CCS expansion option which included an increase in both the forecasted upfront capital cost (for capture equipment) and ongoing fixed O&M (for transportation and storage). The IRP also speaks to the potential portfolio implications of faster or slower progress on technology readiness timelines (see Volume 1, Section 4.4.3).

H.2.1.10.2 Coal

32. Coal should not be retired so soon, as coal units are a reliable, low cost, and firm dispatchable resource, including the Red Hills power purchase agreement. TVA should reevaluate its overnight capital cost assumptions for coal and other resources to ensure they appropriately reflect operational capabilities, along with considering reliability performance during extreme weather events. (*Commenter: Rebecca McGrew – NACCO Natural Resources*)

Response: Previously announced coal retirements and planning assumptions have been re-evaluated, including taking steps to continue operations at Cumberland and Kingston to reduce total system cost and reliability risks, subject to permitting and regulatory requirements (see Volume 1, Section 2.4.4). Although the IRP contains expected end of life dates for existing TVA-owned coal units, these dates are subject to additional site-specific TVA Board approval and further environmental review.

TVA's current power purchase agreement with the Red Hills lignite plant expires in 2032. TVA will continue to evaluate future market offers, both for new contracts or extensions, received on a one-off basis in the context of least-cost planning and the IRP's strategic direction.

For new resource needs, IRP modeling considers estimated build costs (overnight capital costs), net dependable capacity, and operating characteristics and costs to derive the least-cost portfolio to meet system needs for each scenario and strategy combination. New coal was not selected in any core portfolios or sensitivities (See Volume 1, Chapter 3).

The IRP includes planning assumptions for coal plant end of life based on anticipated regulatory requirements, age, and/or material condition. As these dates are subject to further environmental review and TVA Board approval, sensitivities evaluating both earlier and later coal end of life dates were studied. The earlier case assumed full coal fleet end of life by 2034, while the later case assumed operation of all existing coal units through the end of 2039. Results show minor impacts to incremental capacity by 2040 and 2050; rather, it is the timing of resource additions that differs (See Volume 1, Section 3.10.2).

33. TVA should lock in the retirement dates for its existing coal assets and not consider extending them to meet future load growth. --- TVA should plan to retire the Shawnee coal plant before January 1, 2032, to avoid investments in co-firing and other environmental compliance equipment that the final 111 rule, or other future carbon regulations, requires. (*Commenter: Zachary Fabish – The Sierra Club*)

Response: Previously announced coal retirements and planning assumptions have been re-evaluated, including taking steps to continue operations at Cumberland and Kingston to reduce total system cost and reliability risks, subject to permitting and regulatory requirements (see Volume 1, Section 2.4.4). Although the IRP contains expected end of life dates for existing TVA-owned coal units, these dates are subject to additional site-specific TVA Board approval and further environmental review.

The IRP includes planning assumptions for coal plant end of life based on anticipated regulatory requirements, age, and/or material condition. As these dates are subject to further environmental review and TVA Board approval, sensitivities evaluating both earlier and later coal end of life dates were studied. The earlier case assumed full coal fleet end of life by 2034, while the later case assumed operation of all existing coal units through the end of 2039. Results show minor impacts to incremental capacity by 2040 and 2050; rather, it is the timing of resource additions that differs (See Volume 1, Section 3.10.2).

In 2025, the U.S. Environmental Protection Agency (EPA) announced intentions to provide regulatory relief across multiple rules affecting existing coal and future natural-gas generation. This included a proposed rule to repeal all greenhouse gas emissions standards for the power sector under Section 111 of the Clean Air Act (the “2024 GHG Rule”). EPA has indicated intentions to finalize the proposed repeal of the 2024 GHG Rule in the Spring of 2026. To account for the possibility that current regulatory efforts are stalled or new legislation or regulatory actions are taken in the future, Scenario 3 - Carbon Legislation includes a forecasted carbon tax to serve as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions. (See Volume 1, Section 2.4.4)

34. EDF is concerned that TVA’s IRP includes two coal expansion options to fill expected capacity gaps. These options encompass Supercritical Pulverized Coal (SPC) and SPC with CCS. While this coal expansion is raised as a possibility, the IRP fails to clearly convey which portfolios would pursue SPC with CCS versus strictly SPC. (Commenter: Katherine Brubaker – EDF)

Response: The IRP allowed for the selection of either Supercritical Pulverized Coal or Supercritical Pulverized Coal with CCS, but neither expansion resource was selected in any of the portfolios or the sensitivity analyses.

H.2.1.10.3 Demand-side Management

35. TVA should value and promote demand-side management, including energy efficiency (EE) and demand response (DR), in the IRP. In TVA’s draft IRP, the ranges for EE and DR are lower than many other utilities, and TVA should model higher potential for these resources. (Commenters: Jan Berry – Citizens’ Climate Education, Ann Livingston – Southeast Sustainability Directors Network, Leigh Huffman – Shelby County Government, Leigh Huffman – City of Memphis, Lindsay Hanna – The Nature Conservancy, Nathaniel Bass, Maggie Shober – Southern Alliance for Clean Energy, Trey Bussey – SELC, et al., Grace Levin – City of Knoxville, TN, Gabriela Sarri-Tobar – Center for Biological Diversity, Mark Jorgen Nicoson, Markey and Cohen – Congress of the United States)

Response: TVA leveraged a 2022 Energy Programs Potential Study completed by DNV, a global leader in energy program consulting, as well as subsequent market experience to develop the energy efficiency (EE) and demand response (DR) resource options modeled in the IRP. Within the IRP analysis, strategies B (Innovation) and C (Distributed) both emphasized DR while strategy C also emphasized EE as well. Based on public feedback, TVA also conducted a sensitivity evaluating the potential impact of greater EE availability and deployment beyond what was modeled in the core cases. The IRP analysis indicates the potential for EE deployment to reduce energy needs, particularly between now and 2040, and for DR programs to grow with the system and the use of smart technologies.

The IRP Recommendation’s strategic portfolio direction states that complementary deployment of demand-side resources should also remain central to satisfying capacity requirements, providing economic energy, and/or meeting customer needs. Further, it includes recommended actions to utilize demand response and behind-the-meter resources to enable near-term interconnection of new industrial loads and partner with customers to leverage cost-effective energy efficiency and demand response. For more on IRP recommendations, see Volume 1, Chapter 4.

H.2.1.10.4 Distributed Energy Resources

36. Distributed generation, especially rooftop solar, should be sufficiently modeled and incentivized.

(Commenters: Carlson Swafford – Eco Demo Law PLLC, Rachael Maitland – Tennessee Department of Environment and Conservation, Tracy O'Neill – Preserve Cheatham County, Jake Duncan – Vote Solar, Gabriela Sarri-Tobar – Center for Biological Diversity, Doug Carlson, Scott Noethen – TenneSEIA – Distributed Committee)

Response: The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP Recommendation's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on IRP recommendations, see Volume 1, Chapter 4.

H.2.1.10.5 Electric Load and Gas Price Forecasts

37. TVA should be transparent about load and natural gas price forecasts, as well as account for gas price fluctuations and the potential for higher than forecasted gas prices. *(Commenters: Madison Rollings – City of Chattanooga, Trey Bussey – SELC, et al., Gabriela Sarri-Tobar – Center for Biological Diversity, Leigh Huffman – City of Memphis)*

Response: To forecast electricity demand, TVA uses statistical and mathematical models that link electricity sales to several key drivers, including growth in overall economic activity, changes in underlying demographics, energy substitution, and changes in consumer usage through technology. This forecast also considers influences of factors such as regulations, electrification adoption across all sectors, and national energy efficiency adoption. To explore a range of realistically possible and differentiated futures, TVA varied these key uncertainties in alignment with each scenario narrative to create cohesive forecasts. This approach resulted in a range of potential scenarios with varied load forecasts to evaluate. For more on scenario design and load forecasting, see Volume 1, Chapter 2 and Appendix B. After portfolios were generated for each scenario and strategy combination, stochastic analysis quantified the risk associated with fluctuations in electricity demand, fuel and market power prices, generating unit performance, and operating and capital costs for each portfolio. To address the potential for even higher load growth than is included in scenario 2 (High Growth) as well as the potential for a prolonged period of stagnant growth, TVA performed upper and lower bounding sensitivities for load growth (see Volume 1, Section 3.10.1).

Natural gas is an important fuel source for U.S. power generation, and it is also exported to other countries. Forecasts for gas prices are driven by many factors, such as supply and demand, inflation, and export volumes. To create this forecast, TVA uses an industry standard model (GPCM) that simultaneously considers data such as pipeline capacity and transportation costs, expected consumption by sector, and cost of supply by basin. The modeling approach starts with near-term market costs, blending into a fundamental forecast driven by the underlying drivers, and also considers other industry forecast benchmarks. Annual price forecasts reflect the average gas price expected over the course of a year. For more on gas price forecasts, see Volume 1, Section 2.4.5 and Appendix B.5. Prices will fluctuate during the year, primarily due to supply and demand forces that are often weather driven, and fluctuations were evaluated using stochastic analysis. The Operating Cost Stability metric is used to measure the relative expected volatility of each portfolio, and results indicate that portfolios with higher reliance on natural gas expansion have slightly higher volatility in operating costs. Recognizing that fundamental natural gas prices could trend higher or lower than estimated, TVA performed

two sensitivities to evaluate the impacts of higher or lower long-term gas price trajectories on expansion plans. For more on these sensitivities, see Volume 1, Section 3.10.3.

38. TVA should account for near-term load growth driven by data centers in its IRP. (*Commenters: Mark Acker, Zachary Fabish – The Sierra Club, Scott Hendrix – Tombigbee Electric Power Association, Rachael Maitland – Tennessee Department of Environment and Conservation, John E Long Jr, Randy E Carroll*)

Response: The Reference case (Scenario 1) and the High Growth case (Scenario 2) do include forecasted growth in electric demand from all sectors, including industrial growth, which includes data centers. During review of draft results, IRP Working Group members and public comments raised questions about more extreme growth in electrification potential, data centers, and other electricity-intensive industries. To address this, TVA conducted a sensitivity, Supercharged Growth, that assumes more rapid and sustained growth in electricity demand above what is already included in the High Growth scenario. (see Volume 1, Section 2.4.2 and Section 3.10.1)

39. Recent events indicate that "weather normal" patterns are no longer the norm. TVA should incorporate extreme weather assumptions into the IRP. (*Commenters: Lauren Wibe, Cortney Piper – Tennessee Advanced Energy Business Council, Kent Minault, Nancy Hardin, Jan Berry – Citizens' Climate Education, Ntale Kajumba – EPA Region 4, Sean M Mcgrath*)

Response: The load forecasting process accounts for regional warming trends, which are reflected in the load forecasts for the three scenarios and two load sensitivities in the IRP. The planning reserve margin, the excess capacity that TVA maintains above forecasted peak load to ensure reliability, accounts for variation from normal temperatures, including higher volatility in winter temperatures and temperature-correlated outages. The stochastic analysis, which drives risk informed and operational metrics, also accounts for the potential of much higher than expected load, which could be driven by extreme weather. For more on these topics, see the following sections within Volume 1: Appendix B.4, Appendix D.1, Section 3.7, and Section 3.10.

40. TVA should not model load growth as a fixed outcome of economic growth because load growth can be significantly decoupled from economic growth through aggressive energy efficiency implementation. (*Commenters: William "Bill" Bell – 4-County EPA, Drs. Joe and Sarah Schiller*)

Response: TVA forecasters modeled multiple drivers of load, including estimates for household growth, industrial growth, and electrification across all sectors that increase demand as well as growth in behind-the-meter generation and evolving codes and standards that reduce demand. To explore a range of realistically possible and differentiated futures, TVA varied the key uncertainties in alignment with each scenario narrative to create cohesive forecasts. For more on scenario design and load forecasting, see Volume 1, Chapter 2 and Appendix B. IRP modeling also included the option to select TVA-driven energy efficiency programs, as well as demand response programs, to derive the lowest cost portfolio for each scenario and strategy combination.

41. Please describe how the expanding network of electric vehicle charging infrastructure has been incorporated into IRP modeling. (*Commenter: Lauren Wibe*)

Response: To forecast electricity demand, TVA uses statistical and mathematical models that link electricity sales to several key drivers, including growth in overall economic activity, changes in underlying demographics, energy substitution, and changes in consumer usage through technology. This forecast also considers influences of factors such as regulations, electrification adoption across all sectors, and national energy efficiency adoption. For more on scenario design and load forecasting, see Volume 1, Chapter 2 and Appendix B.

H.2.1.10.6 Federal Incentives

42. TVA should account for risk associated with Inflation Reduction Act (IRA) tax credits for clean energy resources that may not be renewed or may be overridden in the future. (*Commenters: Jan Berry – Citizens'*

Climate Education, Rebecca McGrew – NACCO Natural Resources, James Richards – Nuclear Innovation Alliance)

Response: The One, Big, Beautiful Bill Act (OBBA) was signed into law on July 4, 2025. OBBA included updates to investment tax credit (ITC) opportunities available for renewable, storage, and nuclear resources. All IRP scenarios reflect the impacts of the OBBA on resource costs and national and regional energy prices.

The IRP Working Group and other stakeholders had questions about how different the results would look if future resource cost trajectories were higher or lower than estimated for key resource types. Some public comments also highlighted a desire to understand the potential impact if the market depth and adoption of energy efficiency programs were higher than estimated. As such, the IRP includes sensitivities exploring lower renewable and storage costs, lower gas resource costs, earlier or later coal end of life, and higher EE availability and deployment. (See Volume 1, Section 3.10.2)

The IRP Recommendations identify a number of key signposts, including evolving policy and regulations. Signposts related to policy and regulations include the potential for higher or lower tax credits and incentives and their implications on the future portfolio. (See Volume 1, Section 4.4.2)

43. I do not understand and/or agree with the assumption that TVA would pursue the Investment Tax Credit rather than the Production Tax Credit (PTC) where available, as the PTC generally results in a lower leveled cost over a project's lifetime. *(Commenter: Farah Mandich – US General Services Administration)*

Response: TVA considered and evaluated the relative benefits of utilizing the Investment Tax Credit (ITC) versus Production Tax Credit (PTC). In general, the choice of the ITC versus the PTC depends on capacity factor and capital cost. Due to lower solar irradiance in the Tennessee Valley, TVA determined that it is likely more beneficial to claim the ITC for solar resources, or at least very close to the same cost benefit over the life of the asset. When it comes to implementation, TVA would evaluate each project on a case-by-case basis to ensure the most beneficial tax credit is utilized.

H.2.1.10.7 Gas

44. More clarity is needed on which resources were forced in the model. The IRP should not force in new gas builds. *(Commenters: Lindsay Hanna – The Nature Conservancy, Jamie McClanahan, Maggie Shober – Southern Alliance for Clean Energy, Trey Bussey – SELC, et al., Ellen Faby, William "Bill" Bell – 4-County EPA, Drs. Joe and Sarah Schiller, David Bordenkircher, Pam Jones, Mary Cawthorn)*

Response: IRP resource additions include several projects that are anticipated to come online over the next few years. TVA Board-approved projects and signed contracts with third-party developers for solar, gas, and storage additions were included as resource additions, along with the first few years of demand-side program volumes. These include 2 GW of combined cycle gas, 2 GW of frame and aeroderivative gas projects, 3 GW (nameplate) of solar projects, and 0.3 GW of battery storage projects. Beyond the near-term assumptions for Board-approved and contracted projects, the IRP optimization model derives the least-cost plan for each scenario and strategy combination.

45. TVA does not fully evaluate the costs and challenges of building the natural gas distribution infrastructure associated with natural gas resource additions, including gas pipelines, laterals, and compressor stations. *(Commenters: Doug Carlson, Maggie Shober – Southern Alliance for Clean Energy, Zachary Fabish – The Sierra Club, Ntale Kajumba – EPA Region 4, Trey Bussey – SELC, et al.)*

Response: Additions of new gas-fired resources typically require new or expanded gas pipeline infrastructure. The TVA region has a robust gas pipeline network, and future siting efforts will seek to leverage existing pipelines and minimize the need for infrastructure expansion to the extent possible. Estimated costs that would be passed on to TVA from gas pipeline operators expanding and/or upgrading pipeline networks were included in ongoing fixed costs for gas plants, as these are typically paid for over time as a part of a long-term supply

agreement. As the IRP is not site-specific, related costs associated with the balance of other recent gas projects served as the basis for estimates that were added to gas costs and adjusted for inflation. Also, additional information on general impacts of new or expanded pipeline infrastructure has been included in the EIS.

46. Natural gas commodity prices could be higher than modeled and are volatile, which could negatively affect customer's rates. *(Commenters: Lindsay Hanna – The Nature Conservancy, Ntale Kajumba – EPA Region 4, Ann Livingston – Southeast Sustainability Directors Network, Rebecca McGrew – NACCO Natural Resources, Mark Jorgen Nicoson, Leigh Huffman – City of Memphis, Kendra Abkowitz - Metropolitan Government of Nashville and Davidson County, Madison Rollings, Markey and Cohen – Congress of the United States, Maggie Shober – Southern Alliance for Clean Energy)*

Response: Natural gas is an important fuel source for U.S. power generation, and it is also exported to other countries. Forecasts for gas prices are driven by many factors, such as supply and demand, inflation, and export volumes. To create this forecast, TVA uses an industry standard model (GPCM) that simultaneously considers data such as pipeline capacity and transportation costs, expected consumption by sector, and cost of supply by basin. The modeling approach starts with near-term market costs, blending into a fundamental forecast driven by the underlying drivers, and also considers other industry forecast benchmarks. Annual price forecasts reflect the average gas price expected over the course of a year. Prices will fluctuate during a year, primarily due to supply and demand forces that are often weather driven. The Operating Cost Stability metric is used to measure the relative expected volatility of each portfolio, and results indicate that portfolios with higher reliance on natural gas expansion have slightly higher volatility in operating costs. Recognizing that fundamental natural gas prices could trend higher or lower than estimated, TVA performed a sensitivity to evaluate the impacts of higher and lower long-term natural gas prices on expansion plans and total system costs. For more on this sensitivity, see Volume 1, Section 3.10.3.

47. How has TVA considered the potential for natural gas fuel supply disruptions in its IRP modeling and in its planning and operations? *(Commenters: Ntale Kajumba – EPA Region 4, Jonathan Geldof – ACORE)*

Response: TVA's planning reserve margin accounts for variation from normal temperatures, including higher volatility in winter temperatures and temperature-correlated outages which can occur at gas plants or in the gas delivery system during extreme cold temperatures. TVA made significant investments during 2023 to further harden its generating resources, which improved cold weather performance during winter storms in 2024 and 2025 that set new peak records. Weather-related reliability risks also are mitigated through contractual agreements, such as gas firm transportation, or through the use of onsite fuel oil backup.

48. The IRP favors fossil fuel resources by underestimating the financial and environmental costs associated with building fossil fuel generation and pipelines and weather-related reliability risks. The IRP also inadequately assesses the technology risks of hydrogen and carbon capture and sequestration. *(Commenters: Lindsay Hanna – The Nature Conservancy, Markey and Cohen – Congress of the United States, Richard Henighan, Gabriela Sarri-Tobar – Center for Biological Diversity, William "Bill" Bell – 4-County EPA, Trey Bussey – SELC, et al., Jan Berry – Citizens' Climate Education, Zachary Fabish – The Sierra Club)*

Response: Gas build costs were estimated based on recent project experience and discussions with equipment manufacturers. The TVA region has a robust gas pipeline network, and future siting efforts will seek to leverage existing pipelines and minimize the need for infrastructure expansion to the extent possible. Estimated costs that would be passed on to TVA from gas pipeline operators expanding and/or upgrading pipeline networks were included in ongoing fixed costs for gas plants, as these are typically paid for over time as a part of a long-term supply agreement. As the IRP is not site-specific, related costs associated with the balance of other recent gas projects served as the basis for estimates that were added to gas costs and adjusted for inflation. Weather-related reliability risks are mitigated through contractual agreements, such as gas firm transportation, or

through the use of onsite fuel oil backup. Also, additional information on general impacts of new or expanded pipeline infrastructure has been included in the EIS.

Hydrogen is not included as a fuel source option in the Final IRP; however, based on the evolution of current and future policy or regulatory requirements, it may become necessary to evaluate additional environmental controls at existing or future generation facilities, particularly for coal and gas units. Options to meet future regulatory requirements could include alternative fuel co-firing (such as hydrogen).

For carbon capture and sequestration, TVA used recent project experience, discussions with equipment manufacturers, and insights from R&D efforts to capture both the base natural gas plant cost plus the infrastructure required to capture, transport, and store CO₂ (see response to comment #30). Between the release of the draft and final IRP, TVA updated cost estimates for the CC with CCS expansion option which included an increase in both the forecasted upfront capital cost (for capture equipment) and ongoing fixed O&M (for transportation and storage).

The IRP also speaks to the potential portfolio implications of faster or slower progress on technology readiness timelines (see Volume 1, Section 4.4.3).

49. TVA makes a conservative assumption by modeling CHP for heat only without including the ability for cooling with an absorption chiller. Also, it appears that only industrial CHP is considered without considering CHP for commercial facilities (e.g., hospital complexes, industrial parks). TVA could refine this model input to improve the economics of scenarios that include CHP systems. (Commenter: Jan Berry – Citizens' Climate Education)

Response: The Final IRP no longer includes forecasted adoption of Combined Heat and Power (CHP) in the Distributed Generation model, as these projects tend to be very specialized and are difficult to forecast accurately. Strategy C, Distributed, emphasizes smaller natural gas generators, which are more modular and can be sized and adapted to meet both local and system needs. A program which bundles CHP generators could be a potential option to meet deployment of distributed, smaller natural gas generators during implementation of the IRP Recommendations.

50. I have some questions that the Draft IRP does not address:

- Are combined cycle (CC) plants not the most fuel-efficient natural gas plants?
- What is the cost to have the CT and aeroderivative plants and its staff on standby?
- What is the cost of building a CT plant compared to a CC plant?
- Is there a cost difference in the indefinite quantity of natural gas required to be available and on standby for the peaking (CT) plants as compared to the fuel required for baseload (CC) plants?
- Factoring in the answers to the above questions, what is the true cost of solar generation? Of Wind Power? (Commenter: Marty Crowder)

Response: Appendix E includes the key assumptions used to model each of the utility scale resource options. A key assumption contributing to resource selection is the cost to construct a particular resource per installed megawatt, along with fixed and variable operating and maintenance (O&M) costs. Fixed O&M cost would include staff required to operate the plant, including in standby status. Depending on how an asset's dispatch costs compare to others in the fleet determines how much energy a resource will provide, which can vary over time with the changing resource mix and dispatch costs. The model TVA uses to optimize the portfolio considers all these factors to derive the least-cost portfolio for each scenario and strategy combination.

51. TVA does not clearly articulate the modeled build out of natural gas and how those plants will contribute to the grid (baseload vs. peaking). TDEC notes there are potential regulatory, operational, and environmental considerations in building out gas plants intended for base vs. peaking load and requests that TVA provide additional context concerning how the planned gas builds will support the grid. (Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation)

Response: Please refer to Volume 1, Appendix A.6 "Identifying Resource Options" for a discussion on resource options and dispatch roles, along with Section 3.4 "Energy Plans" that depicts the estimated generation for the nine core portfolios in the IRP.

H.2.1.10.8 General

52. I do not understand and/or agree with the first year available for selection. Please provide rationale for choosing the first year available for each resource type. (*Commenters: James Richards – Nuclear Innovation Alliance, Maggie Shober – Southern Alliance for Clean Energy, Farah Mandich – US General Services Administration*)

Response: First year available assumptions are a modeling vehicle to simulate the practical ability to construct or procure new resources and bring them online, so the analysis will generate executable portfolios. First year available assumptions for all resource types are based on recent experience designing, permitting, and constructing new generating assets and procuring new resources through Request for Proposal processes. While first year available assumptions are useful in modeling, they do not preclude TVA from adding a resource sooner than modeled if an earlier timeline is achievable for a given project.

53. I do not understand and/or agree with the annual build limits for resources, especially for renewables and storage. Please provide rationale for setting this limit and/or consider modifying or removing for each resource type. (*Commenters: Martha Ward, Rebecca Cummings, Roger Stout, Gil Hough – TenneSEIA, Drs. Joe And Sarah Schiller, Lindsay Hanna – The Nature Conservancy, Maggie Shober – Southern Alliance for Clean Energy, Zachary Fabish – The Sierra Club, William "Bill" Bell – 4-County EPA, Trey Bussey – SELC, et al., Whit Cox – Southern Renewable Energy Association, Zachary Stines – New Leaf Energy, Farah Mandich – US General Services Administration, Cortney Piper – Tennessee Advanced Energy Business Council, Markey and Cohen – Congress of the United States*)

Response: Best practice in utility planning is to use annual limits as the modeling vehicle for simulating the practical ability to construct or procure new resources, so the analysis will generate executable portfolios. The IRP analysis includes annual limits for all resource types based on recent experience designing, permitting, and constructing new generating assets and procuring new resources through Request for Proposal processes. For example, the market capability for solar has increased, and this is reflected with solar limits that are more than double the limits used in the 2019 IRP. In the High Growth scenario and Supercharged Growth sensitivity, most annual limits were increased to reflect additional build or procurement potential resulting from increased economic productivity at a national level. For additional information on limits, see Volume 1, Section 2.6.4.

TVA's IRP sets overall strategic direction and planning guidance. A key next step in implementing the IRP recommendations is translating the IRP's strategic portfolio direction into an executable asset strategy from an operational, commercial, and financial perspective. Implementation decisions will be made on a site-specific basis, subject to further environmental review and within TVA's least-cost framework. Modeling parameters do not limit the amount of a given resource that actually can be added in a given year if cost-competitive, as long as cumulative additions are within the ranges studied in the IRP.

54. TVA should test a broader view of future resource cost assumptions. (*Commenters: Zachary Fabish – The Sierra Club, James Richards – Nuclear Innovation Alliance*)

Response: Volume 1, Section 2.6.5 describes the general methodology for developing resource cost assumptions, and additional details are included in Appendix E. For utility-scale options, TVA utilizes a combination of direct experience with recent projects, market-based request for proposal responses, industry expertise working with equipment manufacturers, and industry forecasts to inform resource costs.

The IRP Working Group and other stakeholders had questions about how different the results would look if future resource cost trajectories were higher or lower than estimated for key resource types. Some public

comments also highlighted a desire to understand the potential impact if the market depth and adoption of energy efficiency programs were higher than estimated. As such, the IRP includes sensitivities exploring lower renewable and storage costs, lower gas resource costs, earlier or later coal end of life, and higher EE availability and deployment. (See Volume 1, Section 3.10.2)

55. TVA should reflect the lower costs assumed in the cost promotions in the cost-related metrics. (*Commenters: Zachary Fabish – The Sierra Club, William "Bill" Bell – 4-County EPA*)

Response: While the draft IRP used a combination of artificially lower costs and required minimum additions to emphasize resources in a given strategy, the final IRP only uses required minimum additions.

The IRP Working Group and other stakeholders had questions about how different the results would look if future resource cost trajectories were higher or lower than estimated for key resource types. Some public comments also highlighted a desire to understand the potential impact if the market depth and adoption of energy efficiency programs were higher than estimated. As such, the IRP includes sensitivities exploring lower renewable and storage costs, lower gas resource costs, earlier or later coal end of life, and higher EE availability and deployment. (See Volume 1, Section 3.10.2)

56. The IRP misrepresents costs, as renewable energy is becoming cheaper and gas generation is dependent on a volatile commodity market in which costs are likely to increase. TVA should model a more representative range of renewable energy resource costs. (*Commenters: Courtney Piper – Tennessee Advanced Energy Business Council, Zachary Fabish – The Sierra Club, Corinne Rovetti*)

Response: For utility-scale options, TVA utilizes a combination of direct experience with recent projects, market-based request for proposal responses, industry expertise working with equipment manufacturers, and industry forecasts to inform resource costs. Gas expansion estimates were based on recent project experience and discussions with equipment manufacturers. Solar and battery storage costs in the near-term are based on market offers submitted through recent, competitive requests for proposal, with long-term forecasts including adjustments for continued technological advancements. Finally, wind expansion costs were sourced from the 2024 National Laboratory of the Rockies' (NLR) (formerly the National Renewable Energy Laboratory, or NREL) Annual Technology Baseline and incorporate transmission wheeling estimates to deliver this energy. For additional information, see Volume 1, Section 2.6.5 and Appendix E.

The final IRP also includes a lower renewable and storage costs sensitivity to evaluate the impact of lower than estimated costs to build or procure renewable and storage resources. See Volume 1, Section 3.10.2.

IRP modeling considers fundamental forecasts for natural gas commodity prices, which were developed for each scenario, when optimizing for lowest cost for each portfolio. Then, a probabilistic analysis was used to vary gas prices to develop risk and operational metrics that provide insights on the potential impact of price volatility. Finally, additional sensitivity analysis was performed that varied fundamental gas prices, which could be higher or lower than estimated. Core portfolio results and their associated metrics, along with the sensitivity analysis, were considered in developing IRP recommendations, which result in a resource portfolio that continues to provide affordable, reliable, and resilient power. Also, TVA executes a financial hedging program with the objective of reducing fuel cost volatility by protecting against natural gas prices fluctuations within established risk tolerances that are reviewed annually by the TVA Board.

57. TVA should revise its resource costs to better align with publicly available sources. (*Commenters: Lindsay Hanna – The Nature Conservancy, Fred Stafford, James Richards – Nuclear Innovation Alliance, Zachary Fabish – The Sierra Club*)

Response: Volume 1, Section 2.6.5 describes the general methodology for developing resource cost assumptions, and additional details are included in Appendix E. For utility-scale options, TVA utilizes a

combination of direct experience with recent projects, market-based request for proposal responses, industry expertise working with equipment manufacturers, and industry forecasts to inform resource costs.

The IRP Working Group and other stakeholders had questions about how different the results would look if future resource cost trajectories were higher or lower than estimated for key resource types. Some public comments also highlighted a desire to understand the potential impact if the market depth and adoption of energy efficiency programs were higher than estimated. As such, the IRP includes sensitivities exploring lower renewable and storage costs, lower gas resource costs, earlier or later coal end of life, and higher EE availability and deployment. (See Volume 1, Section 3.10.2)

58. The IRP leaves out trends in corporate and consumer preferences. More companies are sensitive to climate change and will relocate elsewhere if TVA does not move away from gas generation and to renewable energy. (*Commenter: Corinne Rovetti*)

Response: The IRP speaks to evolving customer expectations related to specific types of generation and/or higher clean energy program demand as a key signpost (see Volume 1, Sections 1.2 and 4.4.1).

59. TVA should explain how firm capacity is accredited to all resource types, and the same methodology should be used to account for firm capacity for all resource types. TVA should lower the net dependable capacity for thermal resources to reflect performance during recent winter reliability events. (*Commenters: Gil Hough – TenneSEIA, Rebecca McGrew – NACCO Natural Resources, Lindsay Hanna – The Nature Conservancy, Gabriela Sarri-Tobar – Center for Biological Diversity, Trey Bussey – SELC, et al., Whit Cox – Southern Renewable Energy Association, Zachary Stines – New Leaf Energy*)

Response: Firm capacity is also known as net dependable capacity (NDC). NDC is the maximum dependable capacity at seasonal peak demand times less all known adjustments, such as transmission restrictions, station service needs, and fuel derates. NDC, which is used in TVA's capacity planning models, is typically determined by performance testing during the respective season, because weather conditions and peak coincidence affect generating capability. For variable energy resources like solar and wind, net dependable capacities for each season are determined by looking at the historical output at typical seasonal peak times (late afternoon in the summer and early morning in the winter) as a percentage of nameplate capacity. TVA uses both summer and winter net dependable capacities of units in resource planning analysis, given the dual-peaking nature of the system.

TVA has not risk-adjusted the NDC of gas assets due to several factors. Forced outages for all resource types are captured in TVA's planning reserve margin study, including temperature correlated outages. TVA's gas assets have typically performed well during extreme weather events. TVA made significant investments during 2023 to further harden its generating resources, which improved cold weather performance of gas assets during winter storms in 2024 and 2025 that set new peak records. To additionally support reliability of gas-fired plants, TVA typically contracts for a high level of fuel delivery priority and/or invests in a backup fuel source on site, depending on the expected operations profile of a particular plant.

60. TVA should evaluate and analyze how increased interregional transfer capability could impact and/or reduce reserve margin requirements and potentially mitigate extreme weather risks. (*Commenters: Whit Cox – Southern Renewable Energy Association, Jonathan Geldof – ACORE, Jan Berry – Citizens' Climate Education*)

Response: TVA looks for cost-effective interregional transmission opportunities. TVA is a sponsor in the Southeastern Regional Transmission Planning (SERTP) process and is very involved in the planning and implementation for FERC Orders 890, 1000, and 1920. TVA and other sponsors and stakeholders are actively engaging to develop a plan to ensure we are compliant with Order 1920. Its implementation will guide SERTP as we evaluate regional and interregional transmission solutions/alternatives and ensure that TVA and SERTP are measuring a range of benefits these facilities could provide. We are excited to evaluate multi-valued transmission projects as a part of SERTP and see where this path takes TVA.

Expanded interregional transmission can open up additional opportunities to contract for capacity from outside the system and/or to import additional power purchases on the spot market. TVA's planning reserve margin study considers the ability to import power to support system reliability (see Volume 1, Section D.1 for more information on planning reserve margin).

61. I do not understand and/or agree with the assumption that gas generation is needed to enable more solar. Numerous scientific studies show that solar combined with storage provides just as reliable and resilient a power system as one where solar is paired with gas. (*Commenters: William "Bill" Bell – 4-County EPA, Drs. Joe and Sarah Schiller*)

Response: Portfolio optimization in the IRP analysis indicates that adding a combination of gas and storage is the least-cost path to enabling more solar resources and maintaining reliability of the TVA power system. Utilities in other regions that have added significant amounts of solar and storage are also finding the need to add gas resources, especially to ensure reliability.

62. TVA makes substantial assumptions that drive up its planning reserve margin. The load forecast error is higher than some surrounding utilities, and it is unclear if the ability to import market power is fully considered. (*Commenter: Trey Bussey – SELC, et al.*)

Response: IRP Volume 1, Section D.1 summarizes the key inputs and results of TVA's planning reserve margin study, and it provides a benchmarking comparison to peer utilities. While the load forecast error from non-weather-related drivers of +/-7% may be somewhat higher than other utilities, it aligns with historical experience in the TVA region. The study also considers the recent experience importing market purchases at times of peak demand, ranging from 1,000 to 4,750 MW during the summer and 0 to 4,500 MW during the winter. As shown in Section D.1, TVA performed a sensitivity analysis to evaluate the impact of imported market purchases. If TVA could import only 50% of historically experienced levels or none at all, the planning reserve margin would be 3% and 8% higher, respectively. Section D.1 also includes a benchmarking comparison that shows that TVA's planning reserve margin is not an industry outlier, and that other utility's reserve margins also reflect a shift towards winter risk.

63. Improve IRP modeling capabilities to better reflect the dynamics of a high renewable energy and storage resource portfolio and shifting reliability needs. TVA should pursue improvements to its modeling capabilities that it can implement in its next IRP study process to better reflect the resource adequacy and operational needs of its system in a future with higher winter reliability risks, more weather-dependent resources, greater storage resources, and higher load growth. (*Commenter: Whit Cox – Southern Renewable Energy Association*)

Response: With each IRP, TVA has improved its modeling capabilities and will continue to strive for enhancements over time. For example, TVA upgraded to the EnCompass model to leverage its multi-user functionality and enhanced ability to consider the chronology of energy needs in resource selection. TVA and other utilities are learning more each year about how changes in weather and electricity usage trends are impacting demand. Also, resource adequacy studies that simulate the future planning reserves needed to ensure reliability are informative, but nothing replaces real-world experience operating a power system with a significantly different mix of new resource types in the future that will inform future studies. Additionally, TVA is collaborating and will continue to collaborate with other utilities on storage modeling approach in integrated resource planning.

H.2.1.10.9 Long-duration Storage

64. TVA should model longer duration storage and correctly capture the value of that in modeling. (*Commenters: Zachary Fabish – The Sierra Club, Trey Bussey – SELC, et al., Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: In the IRP, TVA modeled two forms of long-duration storage resource options, including pumped storage and advanced chemistry batteries. Advanced chemistry batteries were assumed to have 8 hours of storage, and they also served as a proxy for other long-duration storage technologies that are yet to be commercialized. TVA performed a sensitivity to test the potential impacts if future costs for renewable and storage technologies, including advanced storage, were lower than estimated (see Volume 1, Sections 3.9 and 3.10.2).

Form Energy is one of the more advanced emerging long-duration technologies, but TVA has seen limited pilot/demo performance success to merit specific inclusion. One challenge for storage technologies is storage efficiency (losses) that can detract from the value, and this is one area of focus to improve as emerging storage technologies are developed and scaled for potential commercialization. The IRP analysis indicates value in storage of 8 hours or more, and TVA plans to further study various long-duration storage technologies, including Form Energy and others and potentially support pilot/demo projects. Additionally, TVA is collaborating and will continue to collaborate with other utilities on storage modeling approach in integrated resource planning.

65. In addition to pumped storage, TVA should explore and model a long-duration storage option to reflect emerging technologies that could potentially store energy for longer durations, such as 50 hours or more. *(Commenters: Joyce Blumenshine, David Bezanson, Jan Berry – Citizens' Climate Education, Trey Bussey – SELC, et al., Cortney Piper – Tennessee Advanced Energy Business Council, Sean M Mcgrath, Markey and Cohen – Congress of the United States)*

Response: In the IRP, TVA modeled two forms of long-duration storage resource options, including pumped storage and advanced chemistry batteries. Advanced chemistry batteries were assumed to have 8 hours of storage, and they also served as a proxy for other long-duration storage technologies that are yet to be commercialized. TVA performed a sensitivity to test the potential impacts if future costs for renewable and storage technologies, including advanced storage, were lower than estimated (see Volume 1, Sections 3.9 and 3.10.2).

Form Energy is one of the more advanced emerging long-duration technologies, but TVA has seen limited pilot/demo performance success to merit specific inclusion. One challenge for storage technologies is storage efficiency (losses) that can detract from the value, and this is one area of focus to improve as emerging storage technologies are developed and scaled for potential commercialization. The IRP analysis indicates value in storage of 8 hours or more, and TVA plans to further study various long-duration storage technologies, including Form Energy and others and potentially support pilot/demo projects. Additionally, TVA is collaborating and will continue to collaborate with other utilities on storage modeling approach in integrated resource planning.

H.2.1.10.10 Nuclear

66. There is minimal nuclear expansion by 2035 in the IRP results. Do first year available assumptions influence those results? *(Commenters: Madison Rollings, James Richards – Nuclear Innovation Alliance)*

Response: Yes, first year available assumptions influenced the results cited. The process of designing, permitting, licensing, and constructing new nuclear resources is typically lengthy, and recent nuclear additions in the U.S. have exceeded original timeline estimates. However, progress is accelerating on advanced nuclear technologies. The first-of-a-kind light water small modular reactor (SMR) is expected to be available beginning in 2033, with estimated cost and timeline efficiencies on additional installations. The first year available for large advanced reactors is 2038, and the first year available for next-generation SMRs is 2041. The final IRP adjusted the first milestone reporting year from 2035 to 2040, and as such the IRP results overview now reflects the additional nuclear expansion potential available through 2040. First year available assumptions do not preclude nuclear capacity from being added sooner than assumed in modeling, as long as total additions for each resource stay within the bounds of the IRP ranges.

67. With regard to small nuclear reactors and other nuclear generation sources, TVA assumes that some of these will be available for commercial use by 2033. Given the low TRL and ARL scores, the history of regulatory requirements and timeframes of existing nuclear sources, and the remaining questions related to disposal of spent nuclear fuel, these timelines are not realistic. (*Commenter: Rebecca McGrew – NACCO Natural Resources*)

Response: Small modular reactor (SMR) technology for electric utility use is still developing. Leveraging work TVA has done to advance the potential to deploy SMRs at the Clinch River site, light water SMRs are assumed to be available in 2033. The IRP analysis acknowledges and considers that technology risks are greatest in portfolios with more reliance on emerging energy technologies, such as Strategy B. Slower progress on technology and adoption readiness may result in increasing the need for gas, solar, and storage in the long term, as described in Volume 1, Section 4.4.3.

68. [The IRP] Assumes water cooled small modular reactors (SMR) even though the SMR demonstration at Clinch River is a salt-cooled reactor. TVA could refine this model input to improve the economics of scenarios that include SMRs. (*Commenter: Jan Berry – Citizens' Climate Education*)

Response: In the IRP analysis, three nuclear expansion options are available to fill the expected capacity gap, including generation III+ advanced pressurized water reactors and light water small modular reactors (SMR) and generation IV SMRs. TVA is currently collaborating with industry partners to advance light water SMR design at Clinch River and partnering with Oak Ridge National Laboratory (ORNL) and Kairos Power to accelerate the next generation of cost-effective nuclear power. Refer to Volume 1, Section 4.3 for more details on IRP recommendations.

H.2.1.10.11 Renewables

69. TVA's draft IRP made many improvements to how it modeled renewable energy compared to the 2019 IRP. However, some work remains to bring TVA's modeling into a future that can fully benefit from the diversity and reliability of variable resources (i.e. solar and wind) and energy-limited resources (i.e. storage and hydro). (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.1.10.12 Social Costs

70. TVA should include social cost of carbon as a part of the financial cost for each modeled portfolio. (*Commenters: Madison Rollings – City of Chattanooga, William "Bill" Bell – 4-County EPA, Nathaniel Bass, Zachary Fabish – The Sierra Club, Markey and Cohen – Congress of the United States, Rosalie Bright, Lauren Wibe, Ann Livingston – Southeast Sustainability Directors Network, Grace Levin – City of Knoxville, TN, Drs. Joe and Sarah Schiller, Jamie McClanahan, Daniel Joranko*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, portfolio optimization in the IRP analysis evaluates impacts of expansion paths on system cost that encompasses only those costs that are "direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance."

H.2.1.10.13 Solar and Storage

71. TVA should model alternative net dependable capacity (NDC) curves for solar and storage that reflect different load shapes and renewable resource penetration. (*Commenter: Zachary Stines – New Leaf Energy*)

Response: A summary of TVA's NDC study for solar, wind, and storage is included in Volume 1, Appendix D. TVA evaluated summer and winter peak performance of solar and wind at various penetration levels to develop the solar and wind NDC curves used in the IRP. TVA also evaluated summer and winter peak performance of

storage with an assumed level of solar penetration and at various levels of storage penetration to develop the storage NDC curves used in the IRP. As TVA's power system evolves, TVA will reevaluate solar, wind, and storage NDCs at increasing levels of penetration.

72. TVA should model solar and storage together in a combined option to capture their synergistic benefit. *(Commenters: Gil Hough – TenneSEIA, Jake Duncan – Vote Solar, Maggie Shober – Southern Alliance for Clean Energy, Gabriela Sarri-Tobar – Center for Biological Diversity, Pam Jones, Lindsay Hanna – The Nature Conservancy, Jan Berry – Citizens' Climate Education, David Bezanson, Markey and Cohen – Congress of the United States)*

Response: While solar and storage resource options were modeled separately, the optimization model that TVA uses (EnCompass) is able to evaluate most of their synergistic benefits. In general, portfolios with high levels of renewable expansion also resulted in higher adoption of storage resources. As IRP recommendations are implemented, TVA will continue to consider adding cost-effective co-located solar and storage, similar to several sites already operating or expected to come online over the next several years.

H.2.1.10.14 Storage

73. The IRP does not properly account for the flexibility benefit of storage. *(Commenters: Gil Hough – TenneSEIA, Trey Bussey – SELC, et al.)*

Response: TVA accounted for the flexibility benefit of storage in IRP modeling in two ways. First, the optimization model used recognizes the flexibility benefit of storage at an hourly granularity in a similar manner to how it recognizes the operating characteristics of all resources. TVA recently upgraded to the EnCompass optimization model in part to leverage its enhanced ability to consider the chronology of energy needs in resource selection, which is particularly useful when modeling renewables and storage. Most of the flexibility benefit of storage can be captured at an hourly granularity. Based on a study TVA performed to understand the additional flexibility value of storage to manage sub-hourly fluctuations in load, TVA also applied a sub-hourly flexibility benefit to the ongoing annual fixed cost of storage resource options. Additionally, TVA is continuing to collaborate with other utilities on ways to improve storage modeling approach in integrated resource planning.

74. The IRP should model storage as available sooner than 2029 and/or increase or completely remove the annual build limits. *(Commenters: Trey Bussey – SELC, et al., Maggie Shober – Southern Alliance for Clean Energy)*

Response: Best practice in utility planning is to use annual limits as the modeling vehicle for simulating the practical ability to construct or procure new resources, so the analysis will generate executable portfolios. The IRP analysis includes annual limits for all resource types based on recent experience designing, permitting, and constructing new generating assets and procuring new resources through Request for Proposal processes. For example, the market capability for solar has increased, and this is reflected with solar limits that are more than double the limits used in the previous IRP. In the High Growth scenario and Supercharged Growth sensitivity, most annual limits were increased to reflect additional build or procurement potential resulting from increased national economic productivity. For additional information on limits, see Volume 1, Section 2.6.4. While first year available and annual limits are useful in modeling, these assumptions do not preclude TVA from adding a resource sooner than modeled if an earlier timeline is achievable for a given project.

75. The IRP should include an additional option for long-duration storage beyond pumped storage with its own ELCC and NDC. *(Commenter: Maggie Shober – Southern Alliance for Clean Energy)*

Response: In the IRP, TVA modeled two forms of long-duration storage resource options, including pumped storage and advanced chemistry batteries. Advanced chemistry batteries were assumed to have 8 hours of storage, and they also served as a proxy for other long-duration storage technologies that are yet to be commercialized. TVA performed a sensitivity to test the potential impacts if future costs for renewable and

storage technologies, including advanced storage, were lower than estimated (see Volume 1, Sections 3.9 and 3.10.2).

Form Energy is one of the more advanced emerging long-duration technologies, but TVA has seen limited pilot/demo performance success to merit specific inclusion. One challenge for storage technologies is storage efficiency (losses) that can detract from the value, and this is one area of focus to improve as emerging storage technologies are developed and scaled for potential commercialization. The IRP analysis indicates value in storage of 8 hours or more, and TVA plans to further study various long-duration storage technologies, including Form Energy and others and potentially support pilot/demo projects. Additionally, TVA is collaborating and will continue to collaborate with other utilities on storage modeling approach in integrated resource planning.

H.2.1.10.15 Technology Advancements

76. TDEC encourages TVA to clarify whether the IRP includes an assumption of technological advancement, including anticipated advancements in solar net capacity, energy storage, and energy efficiency technologies that might impact future load growth projections. (*Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: Volume 1, Section 2.6.5 describes the general methodology for developing resource cost assumptions, and additional details are included in Appendix E. For utility-scale options, TVA utilizes a combination of direct experience with recent projects, market-based request for proposal responses, industry expertise working with equipment manufacturers, and industry forecasts to inform resource costs. Solar and battery storage costs in the near-term are based on market offers submitted through recent, competitive requests for proposal, with long-term forecasts including adjustments for continued technological advancements. Demand response program options included a residential smart thermostat program that reflects the impact of evolving technology and adoption in that space.

The IRP Working Group and other stakeholders had questions about how different the results would look if future resource cost trajectories were higher or lower than estimated for key resource types. Some public comments also highlighted a desire to understand the potential impact if the market depth and adoption of energy efficiency programs were higher than estimated. As such, the IRP includes sensitivities exploring lower renewable and storage costs, lower gas resource costs, earlier or later coal end of life, and higher EE availability and deployment. (See Volume 1, Section 3.10.2) In practice, the costs studied in these sensitivity cases could be the result of additional technology improvements.

H.2.1.10.16 Wind

77. External wind assumptions need to be adjusted to include the recent award from DOE's Grid Resilience and Innovation Partnerships (GRIP) program. (*Commenters: Maggie Shober – Southern Alliance for Clean Energy, Jonathan Geldof – ACORE, Ann Livingston – Southeast Sustainability Directors Network*)

Response: TVA's DOE GRIP award funding will be used to support investments in transmission grid capacity, reduce outage times, and create the first interconnection tie between TVA and the Southwest Power Pool (SPP). It will also be used to support distribution-level reliability and resiliency projects, in partnership with TVA's local power companies. Transmission system upgrades, in particular the tie-line connection to SPP, could allow TVA access to more sources of competitively-priced market power. TVA will continue to evaluate future market offers received on a one-off basis in the context of least-cost planning and the IRP's strategic direction.

78. TVA should calculate the flexibility benefits of various levels of wind penetration and include those benefits in its modeling of wind energy resources. (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: The optimization model recognizes the cost and operating characteristics of wind as it determines the least-cost portfolio to meet system needs in each scenario and strategy combination. Per IRP analysis results, the IRP's Recommended Actions include limiting new wind resources given cost and portfolio fit challenges.

H.2.1.11 Power Supply Mix

79. Reviewing the draft IRP, it seems that fossil fuel use is still the dominant source of energy production and plans seem to establish that fossil fuels will continue their domination. On page 59 in TVA's SEC 10-K document, it was reported that as of September 30, 2023, the summer net energy capability was calculated to include 25.6 % nuclear, 18.1 % coal, 39.3% gas-oil, and 16.9% hydro. The 57.4 % use of fossil fuels does not comport with positive work on the climate crisis. Renewable energy was not mentioned in this table.

(Commenter: Mary Ellen DeClue)

Response: TVA's 10-K reports summer net capability, which is similar to capacity, and it includes a table showing capacity associated with renewable and non-renewable power purchases. The 10-K also reports the power supply, which represents the energy generated by each major resource type. TVA's portfolio has evolved over the years to a more diverse and reliable mix of generation resources. As reported in the 10-K, in Fiscal Year (FY) 2025, TVA delivered nearly 168 billion kilowatt-hours of electricity to customers from a power supply that was 33% nuclear, 35% natural gas, 18% coal-fired, 10% hydro, and 4% wind and solar. Additionally, TVA programmatic energy efficiency efforts reduced power demand by approximately 257 GWh of net incremental savings.

H.2.1.12 Process

80. Which strategy/scenario combination will TVA choose out of the 30 cases? How are the recommendations going to be chosen? *(Commenters: Madison Rollings – City of Chattanooga, Ann Livingston – Southeast Sustainability Directors Network)*

Response: To develop IRP recommendations, TVA considered the results from the nine core portfolios, metrics, sensitivities, and environmental review to identify the strategic portfolio direction. Metrics assessed how the strategies performed across the scenarios, helping to identify a set of recommended actions that are grounded in least-cost planning and performs well in a constantly changing business environment.

For more on 2026 IRP recommendations, please see Volume 1, Chapter 4.

81. TVA should incorporate integrated system planning into its approach to merge transmission planning into the IRP planning process. TVA should also take into account distributed resource planning. Integrated system planning can help drive increasingly efficient and resilient solutions. *(Commenters: Jan Berry – Citizens' Climate Education, Gil Hough – TenneSEIA, Jake Duncan – Vote Solar, Jonathan Geldof – ACORE, Maggie Shober – Southern Alliance for Clean Energy, Zachary Fabish – The Sierra Club, Curtis Landry Baysinger, Ntale Kajumba – EPA Region 4, Scott Dunbar – Clean Energy Buyers Association, Tracy O'Neill – Preserve Cheatham County, Farah Mandich – US General Services Administration)*

Response: Preparing for local and regional load growth, as well as understanding when and where retirements will likely occur and new generation will be needed, are key inputs into transmission planning. TVA has initiated development of a more strategic transmission process, that will incorporate stakeholder input. This process will consider strategic direction from the IRP, along with the locational aspects of connecting load and generation, to enable the efficient evolution of the power system. TVA will incorporate additional elements of transmission planning into future IRPs to more fully integrate system planning.

In 2020, TVA and local power companies began a multi-year collaborative effort to transform the region's existing transmission and distribution grids into a more flexible, resilient, and integrated system to meet

customer expectations and changing market conditions. This initiative focused on foundational capabilities for grid transformation, regional guidelines, enhanced operational coordination and end-user experience, and integrated planning.

82. TVA should publish an interim report, which should include the results of additional analysis based on draft IRP public comments and a recommended near-term action plan, and then give the public an opportunity to review and provide additional comments before the IRP is finalized. *(Commenters: Gabriela Sarri-Tobar – Center for Biological Diversity, Leah McCord – CleanUpTVA Coalition, Markey and Cohen – Congress of the United States, Shirley Moulton, Lindsay Hanna – The Nature Conservancy, Maggie Shober – Southern Alliance for Clean Energy, Anonymous 11, Ellen Faby)*

Response: TVA's IRP process entails engaging stakeholders and the public throughout the process, along with completing an environmental review that meets the requirements of the National Environmental Policy Act (NEPA). After public scoping, TVA produced a scoping report to summarize public input that helped frame the effort. TVA then developed the IRP approach, key assumptions, and analysis with feedback from the IRP Working Group, a group of stakeholders with wide-ranging viewpoints that reviewed and challenged IRP inputs and assumptions, analyzed outputs, designed evaluation criteria, and evaluated results. Public comments on the draft IRP helped inform additional analysis that was considered in developing the IRP recommendations. The additional analysis and preliminary recommendations were reviewed by the IRP Working Group and the Regional Energy Resource Council, and when finalized, were included in the final IRP and EIS for Board review and consideration.

IRP recommendations incorporate power supply mix ranges, strategic portfolio direction, and key signposts and implications. The strategic portfolio direction includes a set of recommended actions, as well as additional information on planned actions for existing resources and mature resource additions. In this IRP, TVA expanded the discussion of key signposts to include directional implications to the resource mix.

83. TVA should delay the IRP and revise it based on the current administration's goals and policies. *(Commenters: Jack Keeling, Rebecca McGrew – NACCO Natural Resources)*

Response: Timely IRPs are important to ensure that TVA is positioned to make resource decisions when needed. TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

As noted in Section 2.2 of Volume 1, throughout the Spring and Summer of 2025 a number of key changes in electric utility landscape occurred, such as updated tax credit phase-outs under the One Big Beautiful Bill Act, Executive Orders and regulatory relief actions, and strong electricity demand growth. All of these changes to U.S. energy policy and the external landscape have been reflected in the final IRP analysis.

84. TVA should choose a preferred portfolio and/or identify a near-term action plan that identifies near-term resource needs, procurement plans, transmission considerations, and risk analysis. *(Commenters: Kent Minault, Ann Livingston – Southeast Sustainability Directors Network, Joanne Logan, Richard Henighan, Audra Morelock, Gabriela Sarri-Tobar – Center For Biological Diversity, Farah Mandich – US General Services Administration, Leah McCord – CleanUpTVA Coalition, Maggie Shober – Southern Alliance for Clean Energy, Lindsay Hanna – The Nature Conservancy, Zachary Fabish – The Sierra Club, Trey Bussey – SELC, et al., Brant Miller, Patricia Miller, Katherine Brubaker – EDF, Zachary Stines – New Leaf Energy, Scott Dunbar – Clean Energy Buyers Association, Jake Duncan – Vote Solar, Markey and Cohen – Congress of the United States, Gil Hough – TenneSEIA, Whit Cox – Southern Renewable Energy Association)*

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

TVA's Strategic Portfolio Direction also contains a set of Recommended Actions addressing the existing resource fleet, supply-side resource additions, demand-side resource additions, and grid and innovation enablement. For more on the IRP recommendations, see Volume 1, Chapter 4.

85. The Center's Scoping Comments specifically explained that TVA must meaningfully address the climate crisis, greenhouse gas emissions reductions, and impacts on protected species. Yet, the Draft IRP/DEIS fails to adequately address these matters or explain why TVA has chosen to ignore the Center's comments.

(Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Pursuant to Section 113 of the Energy Policy Act of 1992, portfolio optimization in the IRP analysis evaluates impacts of expansion paths on system cost that encompasses only those costs that are "direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance." For more on TVA's least-cost planning requirements, please see Section 3.1 of Volume 1.

In the draft and final IRP and EIS, TVA included information on direct and indirect greenhouse gas emissions (see Volume 1, Chapter 3 and Appendix J and Volume 2, Section 5.5.2.3 and Appendix D). Information related to endangered and threatened species can be found in Volume 2, Chapters 4 and 5. Volume 2 is a programmatic environment analysis that does not itself authorize any site-specific actions. While site- and implementing action-specific impact analyses are not possible at this time, the EIS quantifies the land area requirements for implementing the alternative strategies. The land area requirements associated with power generation facilities provide an indicator of the potential for impact to many biological resources. Threatened and endangered species were highlighted in the discussion given the additional mandate TVA has to consider effects to these species.

TVA has added text to Section 4.5.3 to clarify that TVA has made a broad no effect determination at the programmatic EIS level because of both the inability to quantify effects across the entire TVA region and the conceptual (i.e., not site specific) nature of the proposed actions in the programmatic EIS. As the IRP is implemented with site-specific actions, TVA would conduct site-specific analysis and consult with the U.S. Fish and Wildlife Service per Section 7 of the Endangered Species Act procedures as warranted. TVA will conduct the appropriate detailed impact analyses when it proposes actions to implement the IRP. TVA will consider mitigation of any impacts through siting and facility design processes at the time additional environmental reviews are conducted for site-specific actions implementing the IRP.

86. The IRP modeling process is not objective. *(Commenters: Drs. Joe and Sarah Schiller)*

Response: Thank you for your comment. It has been noted by TVA.

87. The TVA Board should secure an independent consultant for future IRPs to provide the Board impartial technical analysis and advice in order to make an informed decision. This independent consultant should emulate the role filled by state consumer advocate offices in regulated IRP proceedings. *(Commenter: Jake Duncan – Vote Solar)*

Response: Thank you for your comment. It has been noted by TVA.

88. I urge TVA board members to look to the future of our collective well-being and abandon this IRP. *(Commenter: Bonnie Swinford – Sierra Club)*

Response: Thank you for your comment. It has been noted by TVA.

89. TVA should be commended for the significant amount of work it has invested in the IRP process. TDEC appreciates the outreach that TVA has provided to date and hopes the engagement with stakeholders will continue as TVA works to finalize the IRP and implement future energy strategies. We encourage TVA to continue considering the environmental, regulatory, and technological factors impacting Tennessee's energy landscape. *(Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation)*

Response: Thank you for your comment. It has been noted by TVA.

90. You have my full support for the project. It's comprehensible and thoughtful, making smart use of the resources God gave us. *(Commenter: Barbara Britton)*

Response: Thank you for your comment. It has been noted by TVA.

91. Please continue doing whatever it is that you're doing. I moved to the Shoals in 2020 from Texas where we were part of a system that used fossils, wind farms and solar. Our electric bill was twice as high as it is here. *(Commenter: Paul Brevard)*

Response: Thank you for your comment. It has been noted by TVA.

92. You will be the future -kudos to you for your courage and commitment. *(Commenter: Diana M. Williams)*

Response: Thank you for your comment. It has been noted by TVA.

H.2.1.13 Process and Public Involvement

93. TVA should be more transparent throughout the IRP process, including clarity on assumptions behind key scenario and resource inputs, access to modeling data for independent analysis, and/or cost assessments for all new projects. *(Commenters: Ann Livingston – Southeast Sustainability Directors Network, Cortney Piper – Tennessee Advanced Energy Business Council, Trey Bussey – SELC, et al., Jonathan Geldof – ACORE, Maggie Shoher – Southern Alliance for Clean Energy)*

Response: TVA utilized the proprietary EnCompass capacity expansion and production cost simulation package, licensed through Yes Energy, as the primary modeling tool for the IRP analysis. EnCompass is also used as the primary resource planning tool by a number of other utilities in the Southeast and across the nation. Additional information on how the model works is included in Volume 1, Section 2.7.

Based on public input during the previous IRP and during scoping, TVA proactively provided additional information and data tables for the 2026 IRP. Information related to scenarios, strategies, and resource options was shared publicly during IRP public webinars and Regional Energy Resource Council (RERC) meetings, and TVA shared additional detail in the draft IRP report. In addition to energy and peak demand forecast charts, the draft IRP report included corresponding data tables. An expanded list of resource cost and characteristic assumptions also was included, along with links to supporting studies and/or study summaries. To supplement information in the reports, TVA provided corresponding data tables on the IRP website coincident with draft IRP

release for public review. Informed by public comments on the draft IRP, TVA shared additional information on sensitivities and preliminary IRP recommendations during an RERC meeting and a public webinar. Coincident with final IRP release, TVA provided updated information on TVA's IRP website.

94. TVA should increase transparency in how stakeholder feedback influences TVA's analysis and recommendations as the IRP is finalized. Demonstrating how feedback has influenced the IRP will increase trust in TVA's stakeholder engagement process, especially from draft to final. *(Commenters: Ann Livingston – Southeast Sustainability Directors Network, Leigh Huffman – Shelby County Government, Leigh Huffman – City of Memphis, Kendra Abkowitz - Metropolitan Government of Nashville and Davidson County, Farah Mandich – US General Services Administration, Jake Duncan – Vote Solar)*

Response: In the 2026 IRP, TVA added a sub-section in Volume 1, Section 2.2.2 to highlight key areas where stakeholder input influenced the IRP approach and analysis. Informed by public comments during scoping and draft IRP review, along with IRP Working Group and RERC input during IRP development, TVA incorporated additional elements into this IRP. Key areas of influence were related to expanding engagement efforts, exploring potential impacts of substantial electrification, expanding solar and storage resource potential, understanding opportunities and risks of emerging energy technologies, ensuring diverse resource portfolios, and evaluating key planning assumption risks through sensitivity analysis. Public comments were particularly useful in informing sensitivity analysis focused on electricity demand changes, resource costs and availability, and natural gas commodity prices. For more on sensitivity analysis, see Volume 1, Sections 3.9 and 3.10. The full set of IRP results - including the nine core portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming the IRP recommendations.

95. TVA should host a public hearing to present the draft IRP and allow the public, expert witnesses, and stakeholders to provide statements that will be considered and incorporated into the final IRP. *(Commenters: Jake Duncan – Vote Solar, Jonathan Geldof – ACORE, Gabriela Sarri-Tobar – Center For Biological Diversity, Leah McCord – CleanUpTVA Coalition, Zachary Fabish – The Sierra Club, Dennis Lynch, Audra Morelock, Pam Jones, Brant Miller, Patricia Miller, Farah Mandich – US General Services Administration)*

Response: The IRP Working Group, a group of 24 stakeholders with broad-ranging viewpoints, met approximately monthly to provide input on all key aspects of the IRP. Members were selected to provide input into the process and technical aspects of the project from their differing perspectives. A smaller working group was beneficial to facilitating deeper discussions and open dialogue. The Working Group members provided input that influenced the scenarios and strategies, challenged assumptions, refined the resource options, and strengthened the analysis and recommendations, and they also kept their constituents informed.

During IRP development, TVA hosted public webinars and participated in Regional Energy Resource Council meetings to provide progress updates on the IRP and opportunities for public involvement, including question and answer sessions in the webinars. The public is also invited to provide input during TVA Board public listening sessions. Upon draft IRP release, TVA held 10 open houses across all seven states and two public webinars to share draft analysis and results, provide ample opportunity for questions, and encourage the public to provide comments on the draft IRP. All input received was reviewed and considered as the IRP analysis and recommendations were finalized.

96. TVA should allow for anyone interested to attend IRP Working Group meetings. *(Commenters: Dennis Lynch, Gabriela Sarri-Tobar – Center for Biological Diversity, Zachary Fabish – The Sierra Club, Farah Mandich – US General Services Administration, Whit Cox – Southern Renewable Energy Association)*

Response: TVA established the IRP Working Group to represent a various stakeholder interests. The 24 members represented local power companies, customer associations, academia and research, state governments, environmental non-government organizations, community stakeholders, and special interests. Members were selected to provide input into the process and technical aspects of the project from their

differing perspectives. A smaller working group was beneficial to facilitating deeper discussions and open dialogue. Summaries of meetings were posted on TVA's IRP website for the public to view and follow the progress of IRP development. The public also was able to ask questions about these materials at public webinars and provide input at other public meetings.

97. TVA should release an interim report including additional analysis and allow for public comments on the interim report that will be considered before finalizing the IRP. (*Commenters: Audra Morelock, Pam Jones, Brant Miller, Patricia Miller, Farah Mandich – US General Services Administration*)

Response: TVA's IRP process entails engaging stakeholders and the public throughout the process, along with completing an environmental review that meets the requirements of the National Environmental Policy Act (NEPA). After public scoping, TVA produced a scoping report to summarize public input that helped frame the effort. TVA then developed the IRP approach, key assumptions, and analysis with feedback from the IRP Working Group, a group of stakeholders with wide-ranging viewpoints that reviewed and challenged IRP inputs and assumptions, analyzed outputs, designed evaluation criteria, and evaluated results. Public comments on the draft IRP helped inform additional analysis that was considered in developing the IRP recommendations. The additional analysis and preliminary recommendations were reviewed by the IRP Working Group and the Regional Energy Resource Council, and when finalized, were included in the final IRP and EIS for Board review and consideration.

98. TVA should perform IRPs more often. Most utilities develop IRPs every 1-3 years, which allows utilities to be more flexible in responding to changes in the sector and allows regulators to be more responsive to changes and public input. (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: TVA explores a wider range of potential future scenarios in its IRPs than most utilities do, which increases their longevity. TVA's IRP includes key signposts related to changing market conditions, evolving policy and regulations, and emerging technologies. Movement in key signposts can signal potential shifts in the portfolio mix and indicate the appropriate timing for the next IRP.

99. TVA should streamline and extend its public comment period, making it easier for stakeholders to ask questions and request documentation throughout the entire process. (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: For the draft IRP, TVA extended the comment period from 60 to 75 days. Based on public input on prior IRPs, TVA provided additional information in the draft IRP and in supporting data files made available on the IRP website upon draft IRP release to facilitate public review of key assumptions and portfolio results. TVA responded to clarifying questions during the comment period as soon as possible and will continue to look for ways to streamline responses to clarifying questions in future IRPs. TVA also has included some clarifying information in the final IRP based on public comments received, which will also enhance future IRPs.

H.2.1.14 Public Involvement

100. Provide ample opportunity for public involvement during the IRP and particularly during future site selection for system resources, so that communities that may be potentially affected can meaningfully engage in the decision-making process. (*Commenters: Anonymous 8, Tracy O'Neill – Preserve Cheatham County, Nathaniel Bass, Maggie Shober – Southern Alliance for Clean Energy, Jake Duncan – Vote Solar*)

Response: TVA offered multiple avenues for public involvement during the IRP. Engagement opportunities included public scoping to help frame the effort, public webinars with Q&A during IRP development, RERC and Board meetings with public listening sessions, and ten open houses across the seven-state region and public webinars with Q&A to present the draft IRP for public comment. TVA also leveraged ongoing regional engagements to personalize interactions and utilize local forums to convey information about the IRP to the public. TVA strives to reach and gain valuable input from all the communities we serve so their opinions on the

future power system can be considered. Site specific aspects of actions that are later proposed to implement the IRP will be addressed in tiered analysis and environmental reviews.

101. Increase public access to IRP data, such as modeling data, supporting studies, and portfolio and CO₂ emissions data. (*Commenters: Jake Duncan – Vote Solar, Maggie Shoher – Southern Alliance for Clean Energy, Simon Mahan – Southern Renewable Energy Association, Katherine Brubaker – EDF, Ann Livingston – Southeast Sustainability Directors Network, Shalin Mody, Lindsay Hanna – The Nature Conservancy*)

Response: TVA utilized the proprietary EnCompass capacity expansion and production cost simulation package, licensed through Yes Energy, as the primary modeling tool for the IRP analysis. EnCompass is also used as the primary resource planning tool by a number of other utilities in the Southeast and across the nation. Additional information on how the model works is included in Volume 1, Section 2.7.

Based on public input during the previous IRP and during scoping, TVA proactively provided additional information and data tables for the 2026 IRP. Information related to scenarios, strategies, and resource options was shared publicly during IRP public webinars and Regional Energy Resource Council (RERC) meetings, and TVA shared additional detail in the draft IRP report. In addition to energy and peak demand forecast charts, the draft IRP report included corresponding data tables. An expanded list of resource cost and characteristic assumptions also was included, along with links to supporting studies and/or study summaries. To supplement information in the reports, TVA provided corresponding data tables on the IRP website coincident with draft IRP release for public review. Informed by public comments on the draft IRP, TVA shared additional information on sensitivities and preliminary IRP recommendations during an RERC meeting and a public webinar. Coincident with final IRP release, TVA provided updated information on TVA's IRP website.

102. We request that TVA explain how public and stakeholder feedback will influence its siting decisions for major new energy investments. (*Commenter: Ann Livingston – Southeast Sustainability Directors Network*)

Response: TVA looks for ways to expand its outreach to communities that may be impacted by changes and additions to the power generation portfolio. The Regional Energy Resource Council and IRP Working Group both highlighted the importance of continuing to enhance community outreach as the IRP recommendations are implemented, and this will be an increased emphasis for TVA moving forward.

103. Any chance for public involvement with new infrastructure? (*Commenter: Shalin Mody*)

Response: TVA added general information related to infrastructure needs associated with IRP recommendations to the IRP executive summary and Volume 1, Chapter 4. Site-specific aspects of actions that are later proposed to implement the IRP will be addressed in tiered environmental reviews. These tiered reviews will include more specific information on infrastructure related to proposed alternatives for public review and comment.

H.2.1.15 Scenarios

104. The scenarios and ranges studied in the IRP are too broad to inform planning decisions, making it difficult for stakeholders to provide comments on TVA's plan. TVA should identify which scenarios are more or less probable and/or consider weighting the portfolio outcomes to inform planning decisions. (*Commenters: Brant Miller, Patricia Miller, Vicki Christensen, Emily Cathcart, Joe Franklin, David Bordenkircher, Jan Berry – Citizens' Climate Education, Lindsay Hanna – The Nature Conservancy, Katherine Brubaker – EDF, Ellen Faby, Leigh Huffman – Shelby County Government, Shirley Moulton, Maggie Shoher – Southern Alliance for Clean Energy, Gabriela Sarri-Tobar – Center for Biological Diversity, Drs. Joe and Sarah Schiller*)

Response: Exploring potential scenarios and strategies in the IRP is fundamental to ensuring TVA is well prepared to meet the region's energy needs however the future unfolds between now and 2050. The scenarios project varying rates of load growth, which when taken together, along with the Low Load and Supercharged Growth sensitivities, reflect expectations for growth and continued electrification of the economy. To account for

the possibility that current regulatory relief efforts are rolled back or stalled or that new legislation or regulatory actions are taken in the future, TVA included Scenario 3, Carbon Legislation. Metrics assessed how the strategies performed across the scenarios, helping to identify tradeoffs and a long-range plan that is grounded in least-cost planning and performs well in a constantly changing business environment. Public comments helped inform the additional analysis performed and were considered in developing the IRP's strategic direction.

105. TVA should develop a systematic approach to use this scenario-based planning framework for transmission projects. (*Commenter: Jonathan Geldof – ACORE*)

Response: TVA has used scenarios to some extent in transmission planning, such as higher load scenarios. TVA plans to utilize the IRP scenarios and recommendations more fully in its nascent strategic transmission planning process to further integrate system planning.

106. TVA should comply with the official greenhouse gas (GHG) regulations that are modeled in Scenario 6. Other scenarios should be updated to reflect the letter of the law. (*Commenters: Ntale Kajumba – EPA Region 4, Drs. Joe and Sarah Schiller, William "Bill" Bell – 4-County EPA, Lindsay Hanna – The Nature Conservancy, Scott Dunbar – Clean Energy Buyers Association*)

Response: As a result of key changes in the electric utility landscape in 2025 (see Section 2.2 of Volume 1), TVA updated baseline IRP assumptions which included a streamlined set of scenarios. One of these key changes was the U.S. EPA announcing intentions to provide regulatory relief across several rules, including the GHG Rule. As such, the Scenario 6 referenced in this comment is no longer included in the IRP analysis.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. See Volume 1, Section 2.4.4 for additional information.

107. TVA should make scenario inputs more readily available to the public, especially related to economic drivers, and provide further details on the methods and analysis used to develop them. TVA should describe how scenario inputs inform likely or representative scenarios. (*Commenters: Ntale Kajumba – EPA Region 4, Lindsay Hanna – The Nature Conservancy*)

Response: IRP Volume 1, Appendix B includes information on scenario design and development. To develop the scenarios to explore in the IRP, TVA considered IRP Working Group feedback and public input to brainstorm and refine possible scenarios. Scenarios were influenced by key uncertainties such as electricity demand, environmental policy and regulations, macro-economic trends, and other factors. Appendix B includes forecasts for the key uncertainties identified, along with rationale for how the forecasts were developed and how they differed from the reference case.

Volume 1, Appendix A includes information on the fundamentals of integrated resource planning, and some details have been added to explain methodology for developing economic forecasts. To inform electricity demand forecasts, TVA first develops forecasts for economic and demographic variables that are key drivers of demand. Key macroeconomic variables include U.S. Gross Domestic Product (GDP) and measures of inflation, such as the U.S. GDP – Implicit Price Deflator and U.S. Treasury rates. To develop a consensus forecast, TVA looks at several sources, including Moody's Analytics, the Congressional Budget Office (CBO), the Federal Reserve, the Conference Board, and other publicly available sources. Only Moody's and CBO provide long-term forecasts, while other sources inform the short-term outlook. Only Moody's provides regional and county level data projections. Key regional demographic and economic variables include population, number of households, and employment. TVA utilizes Moody's forecasts at the regional and county level, adjusted for recent Bureau of the Census updates, to forecast demographic trends for districts within the TVA region and for the region as a whole. In some cases, regional projections are adjusted to be consistent with consensus macroeconomic forecasts and to reflect TVA economic development customer expansions.

108. In scenarios 4 (Net-Zero Regulation) and 5 (Net-Zero Regulation Plus Growth), the TVA uses the Interagency Working Group (IWG) and the EPA's (2023) social cost (SC) of GHG as a proxy for future regulations that would be needed to achieve net-zero goals. Specifically, these SC-GHG estimates are used as the basis of a carbon emissions tax, which the TVA uses to reach Net-Zero. Although the SC-GHG are not intended for that purpose, the EPA recognizes the utility of using a carbon price for planning of these scenarios and that the SC-GHG could help inform this approach.

Recommendations: a) Include a consistent methodology across scenarios when using a proxy approach.

b) Clarify why the carbon tax only appears after 2034 in scenarios 4 and 5 (IRP page 3-9).

c) Clarify why scenarios 4 and 5 use two different SC-GHG values to estimate the future carbon emissions tax, and why scenario 4 uses the EPA SC-GHG, while scenario 5 uses the IWG SC-GHG.

d) Clarify why the discount rates used are not consistent between the application of the SC-GHG as a basis for a carbon emissions tax in Scenarios 4 and 5 and the calculation of the net present value (NPV) of the social costs of emissions in Section 5 of the draft EIS. For example, the carbon tax for scenario 4 uses a 2.5% discount rate, while the draft EIS uses a 2% discount rate to monetize impacts using the SC-GHG. If the TVA continues to use the SC-GHG as a proxy for future regulation, the EPA recommends that the TVA include further justification of the application and decisions about timeline and discount rates.

e) If the TVA plans to use a carbon tax for planning, it should use one that is more consistent across scenarios and in line with the literature, internal discounting practices, net-zero goals, and modeling. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: As a result of key changes in the electric utility landscape in 2025 (see Section 2.2 of Volume 1), TVA updated baseline IRP assumptions which included a streamlined set of scenarios. One of these key changes was the U.S. EPA announcing intentions to provide regulatory relief across several rules, including the GHG Rule. As such, scenarios 4 and 5 referenced in this comment are no longer included in the IRP analysis.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. The carbon tax assumptions used in the Carbon Legislation scenario are not based on any specific forecasts, regulations, or legislative proposals. Rather, the carbon tax forecast uses the same trajectory studied in TVA's 2019 IRP (from the Double Decarbonization sensitivity), with adjustments to start in 2032 and ramp-up five years later. Given current U.S. energy policy and priorities, a 2032 start date for this carbon tax was seen as the earliest possible effective date of future regulatory or legislative action. See Volume 1, Section 2.4.4 for additional information.

109. The IRP mentioned the EPA release of the final Greenhouse House Rule, you can scratch that one off. The Trump administration is going to eliminate burdensome regulations. (*Commenter: Stephen Gustav Weber*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.1.16 Sensitivity Analysis

110. TVA should explore the potential impacts of changes in resource costs and availability that could be driven by higher or lower than estimated costs and/or changes in the ability to realize IRA tax credits. (*Commenter: James Richards – Nuclear Innovation Alliance*)

Response: Please refer to Volume 1, Sections 3.9 and 3.10.2 for a summary and discussion of sensitivity analysis results that explored the impacts of differences in resources costs and availability.

111. Model several additional sensitivity cases that better reflect the future power system related to the entry of renewable energy and storage resources. Run additional scenarios that include the Final EPA GHG Rule for a range of lower and higher load projections, similar to Scenarios 2, 3 and 4. These scenarios should not include an assumed CO₂ price and should include reasonable limits and costs for hydrogen-fired CC and CC with CCS. (*Commenter: Whit Cox – Southern Renewable Energy Association*)

Response: Please refer to Volume 1, Sections 3.9 and 3.10 for a summary and discussion of the various sensitivity analyses that TVA performed related to electricity demand changes, resource costs and availability, and natural gas commodity prices.

112. Model several additional sensitivity cases that better reflect the future power system related to the entry of renewable energy and storage resources. Run sensitivities with limited or no availability of hydrogen-fired gas CCs and CC with CCS in Strategies A, C, D and E across all scenarios to reflect the significant uncertainty about the technological development and costs of these technologies and the risks of relying on not-yet-available resources to serve future demand; (*Commenter: Whit Cox – Southern Renewable Energy Association*)

Response: Please refer to Volume 1, Sections 3.9 and 3.10 for a summary and discussion of the various sensitivity analyses that TVA performed related to electricity demand changes, resource costs and availability, and natural gas commodity prices. Specifically, the Lower Renewable and Storage Costs sensitivity explores the portfolio impacts if renewable and storage costs decline faster than forecasted and/or tax credits are extended. Hydrogen was not included as an alternative fuel in the Final IRP. Finally, Scenario 3, Carbon Legislation, reflects the impact of potential future carbon legislation designed to reduce power sector emissions.

113. It would be beneficial for TVA to describe further what it believes is the appropriate response when discussing the impact of increased weather risk and resulting increased PRMs [planning reserve margins]. TVA needs to provide a clearer description of how the PRM is applied and how it interacts with specific resources' capacity contributions in its modeling. (*Commenter: Farah Mandich – US General Services Administration*)

Response: In optimization modeling, TVA applied 18% summer and 26% winter reserve margins, and each modeled resource option received credit for its net dependable capacity (NDC) in a given year towards meeting the reserve margins in each season. Solar, wind, and storage resources have curves to reflect changing NDC over time as installation of each resource on the TVA power system increases. See Volume 1, Appendix D for additional information on the planning reserve margin study and net dependable capacity study.

114. Question: How will the factors considered in the sensitivity analysis be weighted?

- Load variations
- Weather risk
- TVA net-zero aspirations
- Variations in carbon regulations and emissions
- Commodity price risks
- Variations in resource costs and deployment (*Commenter: Jan Berry – Citizens' Climate Education*)

Response: Please refer to Section 3.9 and 3.10 in Volume 1 of the IRP for a summary and discussion of the sensitivities performed as a part of this IRP process. These sensitivities included electricity demand changes, resource costs and availability, and natural gas commodity prices. The full set of IRP results - including the nine portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming IRP recommendations.

115. Throughout SACE's comments we include recommendations for additional analyses. Here is a list of these analyses and sensitivities in one place:

- A Strategy that combines renewable energy, storage, and distributed technologies. We recommend TVA do this by combining all the promotions used in Strategies C and D to observe the variations in the optimized mix of all of these commercial-ready technologies and programs across all six Scenarios.
- Calculate an ELCC and thus NDC for a resource that combines solar and storage, and rerun all Strategy and Scenario combinations with that solar plus storage as an additional option while maintaining the standalone solar and standalone storage as options.

- Sensitivity on at least Scenarios 1, 3, 5, and 6 that removed the annual build limits on solar and storage and makes both resources available starting in 2026.
- Sensitivity on at least Scenarios 1, 3, 5, and 6 that removes all near-term gas builds that were forced into the model, including all capacity at Cumberland, Kingston, New Caledonia, Allen, and Cheatham County.
- A further sensitivity that combines the two previous sensitivity: no annual limits on solar and storage, solar and storage available in 2026, and no gas forced into the model.
- Sensitivity that includes the 800 MW intertie with SPP and adjusts the cost for Midwest wind accordingly.
- Sensitivity that includes a long-duration storage technology other than pumped hydro, and to run that sensitivity that TVA calculates the ELCC and NDC for that long-duration storage technology.
- Sensitivity that updates key wind resource assumptions: a flexibility benefit based on its generation profile complementing solar resources, and a calculation of an additional wind PPA resource based on the PTC.
- A sensitivity that assumes TVA achieves and then sustains energy efficiency levels of at least 1% of retail sales, after a reasonable ramp rate from current levels. (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: As a result of key changes in the electric utility landscape in 2025 (see Section 2.2 of Volume 1), TVA updated baseline IRP assumptions which included a streamlined set of strategies. As such, strategies C and D referenced in this comment are no longer included in the IRP analysis. TVA considered feedback received throughout the IRP process, including from the IRP Working Group, RERC, and the public when refining these updated strategies. In effect, the final IRP's Distributed strategy, Strategy C, includes elements from both strategies C and D included in the draft IRP.

A summary of TVA's NDC study for solar, wind, and storage is included in Volume 1, Appendix D. TVA evaluated summer and winter peak performance of solar and wind at various penetration levels to develop the solar and wind NDC curves used in the IRP. TVA also evaluated summer and winter peak performance of storage with an assumed level of solar penetration and at various levels of storage penetration to develop the storage NDC curves used in the IRP. By modeling solar and storage as separate resources, it provided the capacity expansion model with the maximum flexibility to optimize the selection of all resources. As TVA's power system evolves, TVA will reevaluate solar, wind, and storage NDCs at increasing levels of penetration.

In the IRP, TVA modeled two forms of long-duration storage resource options, including pumped storage and advanced chemistry batteries. Advanced chemistry batteries were assumed to have 8 hours of storage, and they also served as a proxy for other long-duration storage technologies that are yet to be commercialized. TVA performed a sensitivity to test the potential impacts if future costs for renewable and storage technologies, including advanced storage, were lower than estimated (see Volume 1, Sections 3.9 and 3.10.2).

Form Energy is one of the more advanced emerging long-duration technologies, but TVA has seen limited pilot/demo performance success to merit specific inclusion. One challenge for storage technologies is storage efficiency (losses) that can detract from the value, and this is one area of focus to improve as emerging storage technologies are developed and scaled for potential commercialization. The IRP analysis indicates value in storage of 8 hours or more, and TVA plans to further study various long-duration storage technologies, including Form Energy and others and potentially support pilot/demo projects. Additionally, TVA is collaborating and will continue to collaborate with other utilities on storage modeling approach in integrated resource planning.

Best practice in utility planning is to use annual limits as the modeling vehicle for simulating the practical ability to construct or procure new resources, so the analysis will generate executable portfolios. The IRP analysis includes annual limits for all resource types based on recent experience designing, permitting, and constructing new generating assets and procuring new resources through Request for Proposal processes. For example,

the market capability for solar has increased, and this is reflected with solar limits that are more than double the limits used in the 2019 IRP. These limits should be viewed as long-term, average annual limitations as unique circumstances or future project timing may allow TVA to exceed these limits in some years during implementation of TVA's Asset Strategy. Cumulative limits for the entire study period also apply to model physical limitations for certain resources, such as uprate potential at existing hydro plants.

Furthermore, sections 3.9 and 3.10 in Volume 1 of the IRP include a summary and discussion of the sensitivities performed as a part of this IRP process. These sensitivities included electricity demand changes, resource costs and availability, and natural gas commodity prices. Within resource costs and availability, TVA explored the potential for lower renewable and storage costs as well as higher EE availability and deployment, which were both added in response to public feedback. The full set of IRP results - including the nine portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming IRP recommendations.

116. Do you have [extreme rainfall or flooding events] planning in your data bank? *(Commenter: Gary Hughes)*

Response: As it relates to the power system planning performed in the IRP, the stochastic risk-analysis varies hydro-electric generation to simulate both lower and higher than expected hydro generation as a result of drought or heavy rainfall conditions.

As a part of its overall mission, TVA manages a system of dams across the entire Tennessee River and its tributaries to control flooding and reduce flood-related damages. In addition to flood control, TVA utilizes these dams to balance the additional priorities of navigation, power generation, water supply, water quality, and river-based recreation.

H.2.1.17 Strategies

117. TVA should pursue Strategy C (Carbon-free Commercial Ready Focus) as it has lower cost and less risk, and it is the most environmentally responsible. *(Commenters: Mary Cawthorn, Richard Cawthorn, Karen L. Mason, Vicki Christensen, Paul Slentz, Emma Rushton, Mary Tankersley, Cortney Piper – Tennessee Advanced Energy Business Council, Melissa Harris, Irene Boyd, Laura Edwards, Elizabeth C. Garber, Hannah E Cruse, Jim and Paula Grout, Lindsay Hanna – The Nature Conservancy, Marybeth Stone, David And Tish Rainey, Daniel Joranko, Whit Cox – Southern Renewable Energy Association, Zachary Fabish – The Sierra Club, Pam Jones, Sandra Smith, Bonnie Swinford – Sierra Club, Joyce Blumenshine, Angelica Lance, Scott Dunbar – Clean Energy Buyers Association)*

Response: The full set of IRP results - including the nine portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming IRP recommendations. In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

118. TVA should pursue Strategy D (Distributed and Demand-side Focus). *(Commenters: Lindsay Hanna – The Nature Conservancy, Jake Duncan – Vote Solar, Ann Livingston – Southeast Sustainability Directors Network, Scott Noethen – TenneSEIA – Distributed Committee, Blake Elder – Coalition for Community Solar Access)*

Response: The full set of IRP results - including the nine portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming IRP recommendations. In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

119. TVA should analyze and/or pursue a strategy that combines Strategy C (Commercial Ready Carbon-free Focus) and Strategy D (Distributed and Demand-side Focus). *(Commenters: Maddie Petty, Kent Minault, David Bordenkircher, William "Bill" Bell – 4-County EPA, Jake Duncan – Vote Solar, Gabriela Sarri-Tobar – Center For Biological Diversity, Jamie McClanahan, Maggie Shober – Southern Alliance for Clean Energy, Zachary Fabish – The Sierra Club, Zachary Stines – New Leaf Energy, Scott Dunbar – Clean Energy Buyers Association, Farah Mandich – US General Services Administration, Markey and Cohen – Congress of the United States, Lindsay Hanna – The Nature Conservancy, Drs. Joe And Sarah Schiller, Ellen Faby, Ntale Kajumba – EPA Region 4, Gil Hough – TenneSEIA)*

Response: As a result of key changes in the electric utility landscape in 2025 (see Section 2.2 of Volume 1), TVA updated baseline IRP assumptions which included a streamlined set of strategies. As such, strategies C and D referenced in this comment are no longer included in the IRP analysis. TVA considered feedback received throughout the IRP process, including from the IRP Working Group, RERC, and the public when refining these updated strategies. In effect, the final IRP's Distributed strategy, Strategy C, includes elements from both strategies C and D included in the draft IRP.

Strategy C, Distributed, emphasizes distributed technologies such as batteries, renewables, and demand-side programs to reduce reliance on central station generation and utilize virtual power plants. At the utility scale, this strategy would emphasize battery storage and smaller natural gas generators, such as aeroderivative combustion turbines and reciprocating internal combustion engines, which are more modular and can be sized and adapted to meet both local and system needs. This strategy also emphasizes utility scale solar where individual solar farms are often smaller in capacity compared to traditional thermal generation and are therefore more distributed across the service territory. Finally, this strategy includes increased incentives to encourage customers to install distributed generation and participate in demand-side management (DSM) programs. Distributed generation includes distributed solar and storage while DSM options include energy efficiency and demand response programs.

120. Strategy B is an infeasible strategy, as the carbon-free innovation resources are unlikely to ever be economically viable. *(Commenters: Drs. Joe and Sarah Schiller)*

Response: As a result of key changes in the electric utility landscape in 2025 (see Section 2.2 of Volume 1), TVA updated baseline IRP assumptions which included a streamlined set of strategies. As such, strategy B referenced in this comment is no longer included in the IRP analysis. TVA considered feedback received throughout the IRP process, including from the IRP Working Group, RERC, and the public when refining these updated strategies. While the final IRP's strategy B, Innovation, is similar to the draft IRP's strategy B, it does remove emphasis on carbon capture and sequestration (CCS) technologies.

Informed by direct experience exploring designs for potential small modular reactors (SMRs) at the Clinch River Nuclear Site, TVA used refined forecasts for new nuclear resources that reflect all-in costs plus risk

contingencies and may be higher than some industry estimates. The refined nuclear forecasts utilize information from structured estimate determination efforts. Additionally, the IRP also speaks to the potential portfolio implications of faster or slower progress on technology readiness timelines (see Volume 1, Section 4.4.3). Finally, the IRP analysis acknowledges and considers that technological risks are greatest in portfolios with more reliance on emerging energy technologies, such as strategy B.

121. TVA should analyze and/or pursue a strategy that combines Strategy C (Commercial Ready Carbon-free Focus) and the nuclear elements of Strategy B to promote nuclear alongside commercial-ready renewable and storage options. (*Commenters: Andrew Callender, Scott Dunbar – Clean Energy Buyers Association, Francis Lamberts*)

Response: The full set of IRP results - including the nine portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming IRP recommendations. In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

122. I support incorporating elements of Strategy E (Resiliency Focus) in IRP recommendations. (*Commenter: Rosalie Bright*)

Response: The full set of IRP results - including the nine portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming IRP recommendations. In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

123. Which of the strategies has the highest risk for technology maturity and which has the highest risk for successful maintenance? (*Commenter: Shalin Mody*)

Response: As noted in the IRP's strategy assessment, technological risks are greatest in portfolios with more reliance on emerging energy technologies, such as Strategy B. The expected maintenance costs associated with each resource option were estimated and considered in modeling.

124. The IRP has too many Strategies that functionally overlap and are not independent. (*Commenters: Drs. Joe and Sarah Schiller*)

Response: As a result of key changes in the electric utility landscape in 2025 (see Section 2.2 of Volume 1), TVA updated baseline IRP assumptions which included a streamlined set of strategies. TVA considered feedback received throughout the IRP process, including from the IRP Working Group, RERC, and the public

when refining these updated strategies. See Volume 1, Section 2.5.2 and Appendix C for more information on strategy design and differentiation across strategies.

H.2.1.18 Strategy Assessment and Implementation

125. Consider environmental justice (EJ) in how IRP strategies are evaluated, including how they support EJ aspects such as mitigating energy burdens, balancing residential and business needs, and prioritizing environmental equity. As site-specific actions are contemplated, integrate EJ into planning processes from the beginning and solicit EJ community input. Consider site-specific consequences such as air and water quality impacts and other social disparities to refine plans. *(Commenters: Gabriela Sarri-Tobar – Center for Biological Diversity, Leigh Huffman – City of Memphis, Ntale Kajumba – EPA Region 4, Jake Duncan – Vote Solar, Joe Franklin, Tracy O'Neill – Preserve Cheatham County, Leigh Huffman – Shelby County Government, Kendra Abkowitz - Metropolitan Government of Nashville and Davidson County, Mary Ellen DeClue, Maggie Shober – Southern Alliance for Clean Energy, Ann Livingston – Southeast Sustainability Directors Network)*

Response: While the IRP is not site-specific, the IRP and EIS provide insights into potential impacts to communities across the region. For example, the average system cost metric is directionally indicative of overall trends in customer bills (Strategy A is the lowest cost strategy overall), and metrics related to CO₂ are directionally indicative of air quality trends in the region (Strategies B and C have the lowest air emissions). Site-specific aspects of actions that are later proposed to implement the IRP strategic direction will be addressed and considered in tiered environmental reviews. TVA will engage with communities that may be affected at that time so that they can meaningfully participate in the decision-making process.

For additional information, see response to comment #318 below.

H.2.2 Energy Resource Options

H.2.2.1 Carbon Capture and Sequestration

126. TVA should avoid investing in or deploying nascent carbon capture and sequestration technology as it is ineffective and prohibitively expensive. Carbon storage relies on specific types of geology and expensive pipelines, and it is showing early signs of problems. *(Commenters: Gabriela Sarri-Tobar – Center for Biological Diversity, Zachary Fabish – The Sierra Club, Zdravka Tzankova, PhD, Maggie Shober – Southern Alliance for Clean Energy, Daniel Joranko)*

Response: In the IRP analysis, CCS modeling is built on research identifying storage locations near or within the TVA footprint, the necessary pipeline length, and other costs to capture carbon at existing combined cycle sites. Carbon capture technologies have been demonstrated at several sites around the world, and the underlying technologies have been proven at reasonable scales. However, risks do remain in scaleup and sequestration. In order to understand and reduce these risks, TVA is monitoring developments within the industry and exploring test wells to confirm viability in the region. TVA will utilize the findings of this work to make informed decisions on carbon capture, if needed in the future, as both the technology and public policy environment develop.

The strategy assessment in the IRP acknowledges that technological risks are greatest in portfolios with more reliance on emerging technologies, including carbon capture and sequestration.

H.2.2.2 Coal

127. TVA should not build additional coal resources and take all existing coal resources offline as quickly as possible due to concerns regarding climate change, air and water pollution, harmful coal combustion byproducts, impacts of coal mining, and other environmental impacts. *(Commenters: Mary Larrabee, Rev. Aline Gaston Russell, D.Min., Katherine Brubaker – EDF, Joyce Blumenshine, David Bordenkircher, David Yoder, Lindsay Hanna – The Nature Conservancy)*

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

No new coal plants were selected in any of the IRP portfolios.

In February 2026, the TVA Board authorized TVA to take steps to allow for the continued operation of the Cumberland and Kingston fossil plants, subject to compliance with applicable permitting and regulatory requirements, to meet rapidly increasing demand for electricity and address associated reliability concerns in the TVA region. TVA also re-evaluated and updated planning assumptions related to end-of-life expectations for all coal units, alongside updates to resource cost assumptions across all technologies, as applicable. See Volume 1, Section 2.4.4 for more information.

128. I am grateful for your commitment to retiring coal plants by 2035 and decreasing coal usage to 14%, but selling TVA rights to coal companies will only further contribute to climate change. Please hold onto these rights and do what you can to keep coal in the ground! (*Commenters: Coal Form Letter Commenters*)

Response: Thank you for your comment, it has been noted by TVA

129. TVA should refrain from retiring coal plants prematurely before new, cost-effective generation is online to ensure TVA can continue to meet growing electricity demand. (*Commenters: Scott Hendrix – Tombigee Electric Power Association, Eric Coons, Mitch Brown, David Beckler, John E Long Jr, Rebecca McGrew – NACCO Natural Resources*)

Response: In February 2026, the TVA Board authorized TVA to take steps to allow for the continued operation of the Cumberland and Kingston fossil plants, subject to compliance with applicable permitting and regulatory requirements, to meet rapidly increasing demand for electricity and address associated reliability concerns in the TVA region. TVA also re-evaluated and updated planning assumptions related to end-of-life expectations for all coal units, alongside updates to resource cost assumptions across all technologies, as applicable. See Volume 1, Section 2.4.4 for more information.

130. TVA should not retire existing coal plants, as they provide fuel security and have relatively stable fuel prices, and should explore opportunities in traditional and/or clean coal technologies that are cost-effective and reliable. (*Commenters: Rebecca McGrew – NACCO Natural Resources, Gene Acree, Charles Fletcher, Wesley Howell, William Roy*)

Response: In February 2026, the TVA Board authorized TVA to take steps to allow for the continued operation of the Cumberland and Kingston fossil plants, subject to compliance with applicable permitting and regulatory requirements, to meet rapidly increasing demand for electricity and address associated reliability concerns in the TVA region. TVA also re-evaluated and updated planning assumptions related to end-of-life expectations for all coal units, alongside updates to resource cost assumptions across all technologies, as applicable. See Volume 1, Section 2.4.4 for more information.

The IRP study includes a supercritical pulverized coal expansion resource option, both with and without carbon capture and sequestration (see Volume 1, section 2.6). Including these resource options meets TVA's requirements under Section 113 of the Energy Policy Act of 1992 to "evaluate the full range of existing and incremental resources." New coal was not selected in any core portfolios or sensitivities (See Volume 1, Chapter 3).

131. None of TVA's five strategies includes the Red Hills Project after the expiration of the current Power Purchase Agreement in 2032. In fact, coal is not contemplated in the IRP at all after 2035. But the Red Hills

Project provides reliable power with no fuel delivery disruptions, and it should remain a critical component of the TVA system. (*Commenter: Rebecca McGrew – NACCO Natural Resources*)

Response: Supercritical pulverized coal and supercritical pulverized coal with and/or without carbon capture were available for selection in all cases, but none were selected in portfolio optimization.

TVA's current power purchase agreement with the Red Hills lignite plant expires in 2032. TVA will continue to evaluate future market offers, both for new contracts or extensions, received on a one-off basis in the context of least-cost planning and the IRP's strategic direction.

132. Convert Coal plants into Natural Gas Plants with large storage batteries to level out the energy demands and the utility Duck Curve. (*Commenter: Greg Johanson*)

Response: As noted in the IRP Recommendations chapter: based on the evolution of current and future policy or regulatory requirements, it may become necessary to evaluate additional environmental controls at existing or future generation facilities, particularly for coal and gas units. Options to meet future regulatory requirements could include technologies such as carbon capture and sequestration, alternative fuel co-firing (such as hydrogen), or natural gas co- or re-firing of existing coal burners. TVA should continue to monitor advancements in these technologies and evaluate their potential future use if needed to meet regulatory requirements or as a cost-effective method of preserving existing infrastructure (i.e., co- or re-firing of existing coal burners with natural gas). See Volume 1, Section 4.3.3 for additional information.

IRP Recommended Actions include adding firm, dispatchable storage to maintain system reliability and improve system efficiency. See Volume 1, Section 4.3.1 for additional information.

133. TVA should lock in the retirement dates for its existing coal assets and not consider extending them to meet future load growth. TVA should plan to retire the Shawnee coal plant before January 1, 2032, to avoid investments to enable gas co-firing that the final 111 rule would otherwise require. (*Commenter: Zachary Fabish – The Sierra Club*)

Response: In 2025, the U.S. Environmental Protection Agency (EPA) announced intentions to provide regulatory relief across multiple rules affecting existing coal and future natural-gas generation. This included a proposed rule to repeal all greenhouse gas emissions standards for the power sector under Section 111 of the Clean Air Act (the "2024 GHG Rule"), as well as a final rule authorizing state permit writers to extend compliance deadlines under the Effluent Limitation Guidelines (ELG) for steam electric generating units. EPA has indicated intentions to finalize the proposed repeal of the 2024 GHG Rule in the Spring of 2026.

In February 2026, the TVA Board authorized TVA to take steps to allow for the continued operation of the Cumberland and Kingston fossil plants, subject to compliance with applicable permitting and regulatory requirements, to meet rapidly increasing demand for electricity and address associated reliability concerns in the TVA region. TVA also re-evaluated and updated planning assumptions related to end-of-life expectations for all coal units, alongside updates to resource cost assumptions across all technologies, as applicable. See Volume 1, Section 2.4.4 for more information.

The 2026 IRP includes planning assumptions for coal plant end of life based on anticipated regulatory requirements, age, and/or material condition. As these dates are subject to further environmental review and TVA Board approval, sensitivities evaluating both earlier and later coal end of life dates were studied. The earlier case assumed full coal fleet end of life by 2034, while the later case assumed operation of all existing coal units through the end of 2039. Results show minor impacts to incremental capacity by 2040 and 2050; rather, it is the timing of resource additions that differs. See Volume 1, Section 3.10.2 for more information.

H.2.2.3 Demand-side Management

134. TVA should invest significantly more in energy efficiency and demand response programs, as the cheapest and cleanest megawatts are the ones that are never produced. (*Commenters: Kent Minault, Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: TVA leveraged a 2022 Energy Programs Potential Study completed by DNV, a global leader in energy program consulting, and subsequent market experience to develop the energy efficiency (EE) and demand response (DR) resource options modeled in the IRP. TVA also conducted a sensitivity evaluating the potential impact of greater EE market depth beyond what was modeled in the core cases. The IRP analysis indicates the potential for EE deployment to reduce energy needs, particularly between now and 2040, and for DR programs to grow with the system and the use of smart technologies.

TVA is in the process of ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study. The IRP recommends partnering with TVA customers to leverage cost-effective EE and DR program potential. For more on IRP recommendations, see Volume 1, Chapter 4.

H.2.2.4 Distributed Energy Resources

135. I support rooftop solar. (*Commenters: Haskell Crow, Art Levin, Daniel G Avery, Karyl Stoia, Rev. Clifford Bahlinger, Dianne G Brause, Donna Ciolli*)

Response: IRP Recommended Actions include collaborating with local power companies on the evolution of distributed generation programs, which could include distributed solar. See Volume 1, Section 4.3.1 for additional information.

136. I support TVA promoting and incentivizing distributed solar deployment (e.g., residential, commercial, rooftop, etc.) paired with onsite storage, which reduces customer bills, is good for the environment, provides local resiliency, and doesn't require additional land use. (*Commenters: Rev. Clifford Bahlinger, Sheila Bowers, John Christensen, Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

IRP Recommended Actions include collaborating with local power companies on the evolution of distributed generation programs, which could include distributed solar. See Volume 1, Section 4.3.1 for additional information.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

137. I support TVA encouraging deployment of distributed solar (e.g., residential, commercial, rooftop, etc.), which reduces customer bills and the need for centralized resources, is good for the environment, provides local resiliency, and doesn't require additional land use. *(Commenters: Philip Johnston, Roger Kurtz, Taffy Williams, Don and Cindy Davis, John Flynn, Shannon Stoney, Cheryl Haywood, Bonnie Swinford – Sierra Club, Dr. Marhta Wetteman, Pete McCarthy, Maureen C Johnson, Regina Brayer, Anonymous 10, Rev. Clifford Bahlinger, Clean Energy Form Letter Commenters, Ann Livingston – Southeast Sustainability Directors Network)*

Response: The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

IRP Recommended Actions include collaborating with local power companies on the evolution of distributed generation programs, which could include distributed solar. See Volume 1, Section 4.3.1 for additional information.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.2.5 Diverse Portfolio

138. TVA should utilize and deploy all forms of energy, such as nuclear, renewables, natural gas, and storage, to ensure a diverse and reliable electricity supply at the lowest cost. *(Commenters: Nathan Janeway, Stephen Gustav Weber, Sean M Mcgrath, Rebecca McGrew – NACCO Natural Resources, Randy E Carroll, Larry Bruff Sanders – 4-County EPA, Jay Gilliland – 4-County EPA, Johnny Johnson – 4-County EPA, Thomas "Marty" Crowder – 4-County EPA, Michael Ray Banks – 4-County EPA, William Russell Dodds – 4-County EPA, Cynthia Willett, Justin Hatcher)*

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 2.1 of Volume 1.

Maintaining resource mix diversity is fundamental to TVA's ability to provide affordable, reliable, and resilient energy to the residents, businesses, and industries in the region. A diverse portfolio reduces fuel price risk and reliability risks associated with single modes of failure. The major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). They were available for selection in all cases, resulting in a varied mix of diverse portfolios for evaluation.

139. I support a diverse mix of energy resources and carbon capture innovation. (*Commenters: Nathaniel Bass, Rebecca McGrew – NACCO Natural Resources*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 2.1 of Volume 1.

Maintaining resource mix diversity is fundamental to TVA's ability to provide affordable, reliable, and resilient energy to the residents, businesses, and industries in the region. A diverse portfolio reduces fuel price risk and reliability risks associated with single modes of failure. The major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). Coal and natural gas resources included options for carbon capture and sequestration. They were available for selection in all cases, resulting in a varied mix of diverse portfolios for evaluation.

In the IRP analysis, CCS modeling is built on research identifying storage locations near or within the TVA footprint, the necessary pipeline length, and other costs to capture carbon at existing combined cycle sites. Carbon capture technologies have been demonstrated at several sites around the world, and the underlying technologies have been proven at reasonable scales. However, risks do remain in scaleup and sequestration. In order to understand and reduce these risks, TVA is monitoring developments within the industry and exploring test wells to confirm viability in the region. TVA will utilize the findings of this work to make informed decisions on carbon capture, if needed in the future, as both the technology and public policy environment develop.

140. The power system is not currently set up for solar, and solar can be costly. I support the resource additions that TVA says are needed. (*Commenter: Brian Weaver*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

141. TVA should develop its long-term resource plan with a more holistic view of resource options—both supply- and demand-side. (*Commenter: Zachary Fabish – The Sierra Club*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. Maintaining resource mix diversity is fundamental to TVA's ability to provide affordable, reliable, and resilient energy to the residents, businesses, and industries in the region. A diverse portfolio reduces fuel price risk and reliability risks associated with single modes of failure. To help accomplish this, the IRP analysis considered a wide range of supply-side, distributed, and demand-side resources. The major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on the resource options considered in the IRP, see Volume 1, section 2.6.2.

142. The US needs to use ALL forms of energy. (*Commenter: Charles F Niccum*)

Response: Thank you for your comment, it has been noted by TVA.

143. All need electricity - thank you. (*Commenter: Suzanne P. Lamborn*)

Response: Thank you for your comment, it has been noted by TVA.

144. My parents were young when the TVA was created, one of Roosevelt's gifts to the nation. They rejoiced in his ability to ground this country in positive infrastructure building to assure a healthy future for their children and successors. These days we must act, as never before, as agents for clean water and air, and as ombudsmen for the health of nature. The Integrated Resource Plan is yet another step toward our more secure future. (*Commenter: Lee Hirstein*)

Response: Thank you for your comment, it has been noted by TVA.

H.2.2.6 Energy Efficiency

145. TVA should allow for and commit to implement higher annual levels of energy efficiency in its modeling and planning. (*Commenter: Bonnie Swinford – Sierra Club*)

Response: Achievable energy program potential varies with evolving codes and standards and from region to region. To better understand achievable potential, TVA commissioned DNV, a global leader in energy program consulting, to perform a study for the region in 2022. Energy program resource options for the IRP were developed based on the study, subsequent market experience, and other program knowledge. The study indicated 10-year energy efficiency (EE) potential ranging from 2-7% of sales, which was less than the 1% of annual sales industry norm that is sometimes quoted. Reporting of utility programmatic EE impacts is not fully consistent across the industry, as some utilities appear to report a portion of market-driven impacts (or naturally occurring impacts with evolving codes and standards) in their numbers.

Furthermore, sections 3.9 and 3.10 in Volume 1 of the IRP include a summary and discussion of the sensitivities performed as a part of this IRP process. These sensitivities included electricity demand changes, resource costs and availability, and natural gas commodity prices. Within resource costs and availability, TVA explored the potential for higher EE availability and deployment, which was added in response to public feedback. The full set of IRP results - including the nine portfolios, metrics, sensitivities, and EIS - provided robust analysis to consider in forming IRP recommendations.

H.2.2.7 Energy Transition and Decarbonization

146. TVA should be a national leader by transitioning away from fossil fuels and moving to 100% clean energy, including nuclear, hydro, solar, wind, storage, energy efficiency, and demand response. I support substantially increasing clean energy deployment to save consumers money, reduce emissions, improve public health, and/or protect the planet from the impacts of climate change. (*Commenters: Chuck Rocco, Joan Marx Woodward, Wendy Martin, Donna Z Carswell, Dana Burke, Carole Nadler, Kathryn, Sally Carlson-Bancroft, Kenneth Jobe, Bill Kingston, Michael Bleicher, Constance Minerovic, William Schmidt, Mary A Weber, Crys Zinkiewicz, Aimee Jackson, Bonnie Swinford – Sierra Club, Clean Energy Form Letter Commenters, Gabriela Sarri-Tobar – Center for Biological Diversity, Joyce Blumenshine, Jamie McClanahan*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

147. TVA should adopt a plan that aggressively decarbonizes its generation portfolio by transitioning away from fossil fuels and increasing the use of all forms of clean energy generation such as nuclear, hydro, solar, wind, biofuels, storage, energy efficiency. This will benefit the environment, and savings can be passed along to ratepayers. *(Commenters: Elizabeth Mooney, Paul, Nancy Munro, Anonymous 4, Rebecca Jackson, Anne Curtis, Courtney Shea, Stella Melton, Pamela F. Hindle, ML Linn, Claudio Mosse, Josh Dohmen, Roxanne O'Guin, Jane Donelon, Margaret Traina, Ruth Moore, Barbara D. Gholz, Jan Jones, Nancy and Sam Bills, Jared Sullivan, Diane Banks, Andrew Callender, Debra Owens, Albert T Tahhan, Gary Overby, David L Isaacs, Bob, Mary Ellen Weiner, Anonymous 1, Christa Bergman Brown, Jim Wells, Rebecca Canright, Cornelia Teed, Darcy Skarada, Evergreen Form Letter Commenters, Paul Gregg, Daniel Joranko, Corinne Rovetti, Elizabeth Rowland, Willis, Bonnie Swinford – Sierra Club)*

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an

uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

148. We support TVA's overall goal of decarbonization and its three-pronged mission of power generation, environmental stewardship, and economic development. This requires investment in advanced energy technologies - both commercial ready and emerging - as well as in expanding energy efficiency and demand response programs. Decarbonization is crucial not only for environmental reasons but also for economic competitiveness, particularly as businesses and communities increasingly prioritize sustainability. *(Commenter: Cortney Piper – Tennessee Advanced Energy Business Council)*

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program "evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost";
- System cost encompasses only those costs that are "direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance"; and
- In addition to cost, the planning process will also consider "necessary features for system operation," including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

As TVA implements IRP recommendations, TVA will seek to support customer needs through existing, expanded, and/or new programs. The discussion of signposts in Volume 1, section 4.4.1 notes that if TVA experiences higher clean energy program demand, the resource portfolio is likely to have more programmatic solar and storage, potential to expand existing programs, and/or potential for advanced nuclear partnerships.

149. TVA has an obligation to rapidly decarbonize based on various federal regulations (e.g., Energy Act of 2020) and orders (e.g., Executive Orders 13990 and 14008) which commit federal agencies to "reduce climate pollution" and "deploy clean energy technologies and infrastructure" and commit the nation to "a carbon pollution-free electricity sector no later than 2035." *(Commenters: Ntale Kajumba – EPA Region 4, Gabriela Sarri-Tobar – Center for Biological Diversity, Joe Franklin, Corinne Rovetti, Elizabeth Rowland)*

Response: The Energy Act of 2020 contains no legal mandate to decarbonize and Executive Orders 13990 and 14008 have been revoked. Nevertheless, TVA notes that under all strategies analyzed in the IRP, the long-term intensity of TVA greenhouse gas emissions decrease.

150. TVA should be a national leader by transitioning away from fossil fuels and moving to 100% renewable energy. I support substantially increasing renewable and energy storage deployment and expanding energy efficiency programs to save consumers money, reduce emissions, improve public health, and/or protect the planet from the impacts of climate change. *(Commenters: Emma Owens, Angela T Kantola, Sharon Hart, Donald W. Henderson, Ph.D., Judy Frazer Brouillette, Donna Brown, d'Anne Y Macneil, Jeffrey V Wilson, Tony Guzdia, Linda Sullivan, L Sen, Connie Schmidt, Ellen T Wright, Rebecca Canright, Michael R Marquardt, William Claiborn, Christopher Hamilton, Marge Heggison, Penelope Andrews, Margaret Speer Goodwin, Joe*

Galliani, Candace Colby, Kathleen Maffei, Nancy Power, Sandra Gardiner, David Crim, Anne M Cassebaum, Robert Stuart, Tom Scheel, Rita Heinz, Clifford Spencer, Russell Novkov, Nicole Taylor, Margo Salone, Don Kelley, Jane Fleishman, Ivan Fuentes, Lee H., Richard Cawthorn, Charlene M. Woodcock, Anonymous 8, Amy Smart, Claire Shoun, Suzanne Wedekind, Michele Panucci, Brant Miller, Patricia Miller, Thomas Jackson, Christopher Brooks, Russell Buchi, Valetta Seymour, Crys Zinkiewicz, Maureen Linda May, Elizabeth C. Hunley, Carolyn Nevin, Lynn Billingham, Francis Lamberts, Clean Energy Form Letter Commenters, William Vanderveer, Bonnie Swinford – Sierra Club, Ann Ercelawn, Illinois Coal Form Letter Commenters, Warren Clay Hodgkiss, Paul Slentz, Emma Rushton, Melissa Harris, Irene Boyd, Laura Edwards, Hannah E Cruse, Jim and Paula Grout, Marybeth Stone, David And Tish Rainey, Gabriela Sarri-Tobar – Center for Biological Diversity, Nathaniel Bass)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

151. TVA should adopt a plan that aggressively decarbonizes its generation portfolio by transitioning away from fossil fuels and increasing the use of renewables (utility and distributed) and energy storage, along with expanding energy efficiency programs. *(Commenters: Brenda, James S Powers, Jordan Williams, Rebecca Cummings, Dwayne R Thomas, Mindy Phypers, Margie Lachman, Richard Frye, Julie Turner, Jill Stephenson, Piotr Sliwka, Robert Stine, Lorraine Stehn, Jane Donelon, Michael Goldberg, Susan Fleming, Cecelia Byrnes, Anonymous 2, William Kadish, Stephen Weissman, Philip A. Lefcourt, Thomas E. Hoffman, Janet Stanko, Dana Ginn, M'lou Christ, David Berney Needleman, Mary Ann Harmon, Michael Begley, David Dietrich, Jan Jennings, Susan Henning, Joyce Holdread, Richard Hassinger, Joseph A Duvivier, Richard S Nadler, Alfred Jonas Md, Jennifer Parker, Adrienne Hudson, Katherine Jain, Lucille Serody, Joe Galliani, Morris Applebaum, Linda Look, Karen Jaques, Joanne L Gates, Ann Ercelawn, Sita Jamieson, Lyle Courtsal, Joe Franklin, Karen Orton Hodges, Joaquim M Pujals, Anonymous 8, Caleb Haynes, Anthony Prince, Valetta Seymour, Mary Tankersley, Peter J Cowley, Magdalen Mitchel, Joan Tomlinson, Anne Hoos, Miriam Mimms, Carol F Smith, Karen McIntyre, Janice Speck, Bonnie Swinford – Sierra Club, Evergreen Form Letter Commenters, David Rouse, Joseph M Staples, John Pike, Patrick Bosold, Ellen Faby, Timothy Dwight, Alan Leiserson, Rebecca Jackson, John Beirs, Corinne Rovetti, Elizabeth Rowland, John Goeke, Dennis Lynch, Gail Troy, Sara*

Bielaczyc, Claire Broome, Ophelia Paine, Katherine Brubaker – EDF, Trey Bussey – SELC, et al., Mitch Carpen, Marjorie McCloy, Doug Carlson, Rev. Aline Gaston Russell, D.Min., Travis Donoho, Susan Isaacs, Lisa Scharin)

Response: Please see the response to comment 150.

152. TVA should adopt a plan that aggressively decarbonizes its generation portfolio by transitioning away from fossil fuels and increasing the use of energy efficiency and renewables, such as solar (rooftop and utility-scale), wind, and energy storage. *(Commenters: Elizabeth C. Garber, Karen McIntyre, Michele Panucci, Bonnie Swinford – Sierra Club, Markey and Cohen – Congress of the United States, Joyce Blumenshine, Katherine Brubaker – EDF, Holley E Roberts, Marilyn Long, William Rueth, Brian Cribbs, Gabriela Sarri-Tobar – Center for Biological Diversity)*

Response: Please see the response to comment 150.

153. Use a Clean Energy Performance Plan, which is now used in 4 states, to incentivize utilities and CCAs to generate more clean energy and less dirty while decreasing electric rates/kWh. *(Commenter: David Bezanson)*

Response: Please see the response to comment 150.

154. Please continue to LISTEN to those you serve whose health depends on your decisions. *(Commenter: Mary Tankersley)*

Response: Thank you for your comment. It has been noted by TVA.

H.2.2.8 Fossil Fuels

155. TVA should not build new fossil fuel plants, including coal and natural gas plants and supporting infrastructure, as these resources contribute to climate change and expose customers to harmful air emissions and regulatory uncertainties. *(Commenters: John Goeke, Marilyn Long, Barbara Arko Hargrove, Sofia Montemayor-Thomas, Ellyn Z Musser, George Gatcomb, Sandra Cobb, John S Sonin, David Christman, Ray Batch, Harvey Hild, Thomas Morrow, Hannah E Cruse, Jessica Gibbons-Benton, Holley E Roberts, James Holtslag, Peggy Phelps, Lee Crowe, Gabriela Sarri-Tobar – Center For Biological Diversity, Nancy Stetten, Carolyn Nevin, Rosalie Bright, Mary Ellen DeClue, Bonnie Swinford – Sierra Club, Lindsay Hanna – The Nature Conservancy, D. J. Rosebaugh)*

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

156. TVA should not build new fossil fuel plants as these resources expose customers to volatile commodity prices and higher electric bills. *(Commenters: Cheryl Haywood, Mary Cawthorn, Evergreen Form Letter Commenters, Rebecca McGrew – NACCO Natural Resources, David Bordenkircher, Lindsay Hanna – The Nature Conservancy, D. J. Rosebaugh, Emma Owens, Gabriela Sarri-Tobar – Center for Biological Diversity)*

Response: When optimizing for lowest cost for each portfolio, IRP modeling considers the total costs associated with each resource technology. These include costs to construct or procure a resource, as well as fixed operating costs and variable operating costs like fuel. Modeling includes fundamental forecasts for natural gas commodity prices, which were developed for each scenario. Then, a probabilistic analysis was used to vary gas prices to develop risk metrics that provide insights on the potential impact of price volatility. Finally, additional sensitivity analysis was performed that varied fundamental gas prices, which could be higher or lower than estimated. Core portfolio results and their associated metrics, along with the sensitivity analysis, were

considered in developing IRP recommendations, which result in a resource portfolio that continues to provide affordable, reliable, and resilient power. Also, TVA executes a financial hedging program with the objective of reducing fuel cost volatility by protecting against natural gas prices fluctuations within established risk tolerances that are reviewed annually by the TVA Board.

157. TVA does not acknowledge the multiple risks associated with building new fossil gas infrastructure. A general risk is that future carbon-limiting technologies such as green hydrogen and carbon capture and storage might not be available in a timely and affordable manner to meet CAA section 111 requirements for combustion turbines. (*Commenters: Maggie Shober – Southern Alliance for Clean Energy*)

Response: The TVA region has a robust gas pipeline network, and future siting efforts will seek to leverage existing pipelines and minimize the need for infrastructure expansion to the extent possible. Estimated costs that would be passed on to TVA from gas pipeline operators expanding and/or upgrading pipeline networks were included in ongoing fixed costs for gas plants, as these are typically paid for over time as a part of a long-term supply agreement.

In 2025, the U.S. Environmental Protection Agency (EPA) announced intentions to provide regulatory relief across multiple rules affecting existing coal and future natural-gas generation. This included a proposed rule to repeal all greenhouse gas emissions standards for the power sector under Section 111 of the Clean Air Act (the "2024 GHG Rule"), as well as a final rule authorizing state permit writers to extend compliance deadlines under the Effluent Limitation Guidelines (ELG) for steam electric generating units. EPA has indicated intentions to finalize the proposed repeal of the 2024 GHG Rule in the Spring of 2026.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

The strategy assessment in the IRP acknowledges that technological risks are greatest in portfolios with more reliance on emerging technologies, including carbon capture and sequestration.

158. TVA should include costs to society at large, such as the social cost of greenhouse gas emissions, when performing least-cost analysis. (*Commenters: Nathaniel Bass, Rosalie Bright, Doug Carlson, Joyce Blumenshine, Marjorie McCloy*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, portfolio optimization in the IRP analysis evaluates impacts of expansion paths on system cost that encompasses only those costs that are "direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance."

159. TVA should utilize gas and coal resources to ensure low cost and reliable electricity, which are critical elements of least-cost planning. (*Commenters: Joyce Elaine Phillips, Thomas Christopher, Michael Pendergrass, Rebecca McGrew – NACCO Natural Resources*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

In February 2026, the TVA Board authorized TVA to take steps to allow for the continued operation of the Cumberland and Kingston fossil plants, subject to compliance with applicable permitting and regulatory

requirements, to meet rapidly increasing demand for electricity and address associated reliability concerns in the TVA region. TVA also re-evaluated and updated planning assumptions related to end-of-life expectations for all coal units, alongside updates to resource cost assumptions across all technologies, as applicable. See Volume 1, Section 2.4.4 for more information.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.2.9 Geothermal

160. TVA should explore renewable geothermal technologies as a part of its energy mix. (*Commenters: Tom Valente, Lawrence Emerson, G Ann Campbell*)

Response: Geothermal is a viable emerging technology that is gaining traction in certain geographic areas. Additional technological advancement in drilling to improve the costs is needed. Deployment is expected in the Western part of the U.S. where the geography is more favorable. It is uncertain if and when the technology would be deployed in the TVA region, which would generally require significantly deeper wells for reasonable production.

H.2.2.10 Hydroelectricity

161. TVA should expand hydroelectricity production, which could include exploring water-to-motion devices. (*Commenters: R Jins, Ronald B. Borgquist, Mike Peek*)

Response: IRP recommendations include the potential for up to 1 GW of hydro additions. TVA is currently investing to extend the life of the hydro fleet, leveraging cost-effective ways to increase output. TVA also routinely evaluates market opportunities, which could include hydro options. TVA provides flood control, navigation, land management, and natural resource stewardship for the Tennessee River watershed, and hydroelectric generation is one of several objectives of managing the river system. As water supply is a limited resource, TVA evaluated hydro uprates as the most impactful options to expand hydroelectricity production in the region. The IRP range for hydro additions does provide latitude for other cost-effective ways to increase hydro output that may be identified as the IRP is implemented.

162. The Tennessee Valley Authority led the nation in capturing hydroelectric energy for the people, not for-profit corporations. I urge TVA to continue its honorable dedication to power FOR the people! Thank you. (*Commenter: Meryle A. Korn*)

Response: Thank you for your comment, it has been noted by TVA.

H.2.2.11 Hydrogen

163. TVA should future-proof all new gas turbines to be compatible with hydrogen as a potential fuel source. (*Commenter: Jan Berry – Citizens' Climate Education*)

Response: Hydrogen is not included as a fuel source option in the final IRP; however, based on the evolution of current and future policy or regulatory requirements, it may become necessary to evaluate additional environmental controls at existing or future generation facilities, particularly for coal and gas units. Options to meet future regulatory requirements could include alternative fuel co-firing (such as hydrogen). TVA will monitor advancements in this technology and evaluate its future use if needed to meet regulatory requirements or as a cost-effective method of preserving existing infrastructure. See Volume 2, Section 5.6 for more information.

164. TVA should not rely on hydrogen in its plans. Hydrogen is a potent greenhouse gas with 100 times the warming power of CO₂ over a 10-year period and is net-energy negative, meaning it takes more energy to produce than the hydrogen itself generates when combusted. Even the EPA has expressed doubt that hydrogen combustion will be a feasible option for carbon reduction by 2035. Currently, more than 99% of hydrogen is made from fossil fuels, otherwise known as "blue hydrogen." Hydrogen use for co-firing also poses serious public safety concerns related to leakage during transportation and health harming nitrogen oxides (NO_x) that are produced from combustion. (*Commenters: Gabriela Sarri-Tobar – Center for Biological Diversity, Zdravka Tzankova, PhD, Maggie Shoher – Southern Alliance for Clean Energy*)

Response: Hydrogen was not included as an alternative fuel in the final IRP. However, based on the evolution of current and future policy or regulatory requirements, it may become necessary to evaluate additional environmental controls at existing or future generation facilities, particularly for coal and gas units. Options to meet future regulatory requirements could include alternative fuel co-firing (such as hydrogen). TVA will monitor advancements in this technology and evaluate its future use if needed to meet regulatory requirements or as a cost-effective method of preserving existing infrastructure. See Volume 2, Section 5.6 for more information.

165. Consider options to explore hydrogen potential, such as pilot projects or agreements related to producing hydrogen from excess nuclear or renewable generation. (*Commenters: Martha Ward, Rebecca Cummings, Roger Stout, Wayne Stroessner, Jan Berry – Citizens' Climate Education*)

Response: Hydrogen is not included as a fuel source option in the final IRP; however, based on the evolution of current and future policy or regulatory requirements, it may become necessary to evaluate additional environmental controls at existing or future generation facilities, particularly for coal and gas units. Options to meet future regulatory requirements could include alternative fuel co-firing (such as hydrogen). TVA will monitor advancements in this technology and evaluate its future use if needed to meet regulatory requirements or as a cost-effective method of preserving existing infrastructure. See Volume 2, Section 5.6 for more information.

H.2.2.12 Least-cost Planning

166. TVA improperly elevates a desire for "decarbonization" over keeping rates "as low as are feasible." TVA cannot properly fulfill its statutory mission of supplying adequate and reliable power by limiting itself to power sources with admittedly poor Net Dependable Capacities and ignoring the proven reliability of coal. (*Commenter: Rebecca McGrew – NACCO Natural Resources*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

H.2.2.13 Natural Gas

167. I would like to see less reliance on natural gas over time. (*Commenters: Steven G. Driese, John Wright, Bonnie Swinford – Sierra Club*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery

of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

168. I'm concerned that TVA's draft integrated resource plan could lead to the buildout of more natural gas power plants that would increase pollution in my community, resulting in impacts to air quality, water quality, and public health. *(Commenters: Zdravka Tzankova, PhD, Katherine Brubaker – EDF, Gabriela Sarri-Tobar – Center for Biological Diversity, Markey and Cohen – Congress of the United States, Cheryl Haywood, Mary Cawthorn, Evergreen Form Letter Commenters, Travis Donoho, Emma Owens)*

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. Rather, the EIS includes general discussions of resources within the TVA region. These descriptions are followed by a discussion of how impacts to these resources would be addressed during facility siting and review processes when specific proposals to implement the IRP are considered.

TVA will conduct the appropriate detailed impact analyses, when it proposes actions to implement the IRP. TVA will consider mitigation of any impacts through siting and facility design processes at the time additional environmental reviews are conducted for site-specific actions implementing the IRP. Additionally, TVA will coordinate and consult with federal and state agencies pursuant to requirements.

169. I oppose the proposed natural gas buildout proposed in the IRP due to environmental impacts and methane leakage concerns. *(Commenters: Zdravka Tzankova, PhD, Miranda Tidwell, Emily Cathcart, Martha Ward, Holley E Roberts, Rebecca Cummings, Roger Stout, Ira Kaplan, Leah McCord – CleanUpTVA Coalition, Nathaniel Bass, Markey and Cohen – Congress of the United States, Lawrence McConnell, Joyce Blumenshine, David Bordenkircher, Susan Isaacs)*

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal

partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. Rather, the EIS includes general discussions of resources within the TVA region. These descriptions are followed by a discussion of how impacts to these resources would be addressed during facility siting and review processes when specific proposals to implement the IRP are considered.

TVA will conduct the appropriate detailed impact analyses, when it proposes actions to implement the IRP. TVA will consider mitigation of any impacts through siting and facility design processes at the time additional environmental reviews are conducted for site-specific actions implementing the IRP. Additionally, TVA will coordinate and consult with federal and state agencies pursuant to requirements.

170. TVA should not build new gas plants that will accelerate the climate crisis and reduce air and water quality. TVA should instead add renewable energy resources that are lower cost, have less risk, and/or will help achieve net-zero sooner. *(Commenters: Ben Cornfield, David Riall, Brigid Cannon, Alan Leiserson, Zdravka Tzankova, PhD, Gabriela Sarri-Tobar – Center for Biological Diversity, Doug Carlson)*

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity

requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

171. TVA should not construct the proposed gas plant at Cheatham County. (*Commenters: Lawrence McConnell, Tracy O'Neill – Preserve Cheatham County, Joyce Blumenshine, Valetta Seymour, Elen Roser, Virginia Gaylord*)

Response: Based upon feedback received during TVA's public scoping process and listening sessions with the Board of Directors, TVA is exploring alternatives to the 900-megawatt simple cycle combustion project proposed for Cheatham County. With input from the TVA Board of Directors, the site off Lockertsville Road is no longer TVA's preferred alternative. TVA is evaluating other middle Tennessee sites that will support economic development and address the increasing power demand across the system.

172. New pipelines to support natural gas generation can cause damage to impacted ecosystems, farms, and homes, so I hope TVA will avoid new pipelines when possible and minimize the impacts of current and new pipelines. (*Commenters: Nathaniel Bass, Nancy Hardin*)

Response: Additions of new gas-fired resources typically require new or expanded gas pipeline infrastructure. The TVA region has a robust gas pipeline network, and future siting efforts will seek to leverage existing pipelines and minimize the need for infrastructure expansion to the extent possible.

173. The future of energy requires that old, inefficient natural gas plants must be replaced with modern, flexible engine or aero power plants, which are significantly more efficient, produce fewer emissions and can run on a variety of fuels. (*Commenter: Cortney Piper – Tennessee Advanced Energy Business Council*)

Response: TVA employs a diverse resource mix to meet the region's energy demand. New combined cycle, frame combustion turbine, and aeroderivative capacity is being added by 2028 to address capacity requirements, provide grid support, and enhance system flexibility. Actions that are later proposed to implement the IRP strategic direction will evaluate future system needs to support reliability, flexibility, and resiliency.

174. I support TVA's use of natural gas-fired power plants as this is a proven technology with an abundant fuel source, helps meet growing energy needs, provides flexibility, reduces emissions compared to coal, and is low cost. (*Commenters: Hoyt Smith, Linda Murphy, Ramsey Abbott, Harry Eich, Alex Crowell, Robert Winland, Dean Knight, Floyd Miller, Ghol Long*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

175. Only use methane coming from landfills where it is an anaerobic byproduct of food and yard waste decomposing after they have been buried. This "beneficial" use of landfill methane is occurring at many landfills across the United States. (*Commenter: Bonnie Swinford – Sierra Club*)

Response: Thank you for your comment, it has been noted by TVA.

H.2.2.14 Nuclear

176. I oppose nuclear energy due to its extremely high costs to build. (*Commenters: Karen Jaques, Paul, Joyce Blumenshine, Francis Lamberts, Richard Henighan*)

Response: The resource planning optimization model that TVA uses (EnCompass) seeks to determine the lowest cost resource plan, considering key inputs and constraints such as expected load growth, planning reserve margins, existing resources, and the costs and operating characteristics of new resource options. Nuclear resource additions can be a good fit to support long-term load growth while mitigating fuel volatility and regulatory risks. While nuclear units have high build and fixed costs, they are dispatchable, have low operating costs, and large energy output. For more on the IRP recommendations, please see Volume 1, Chapter 4.

177. I oppose nuclear energy due to safety and environmental concerns. (*Commenters: Michelle Kurtz, Marge Heggison, Robert Stuart, Jan Berry – Citizens' Climate Education, Gabriela Sarri-Tobar – Center for Biological Diversity, Karen Jaques, Paul, Joyce Blumenshine, Francis Lamberts, Beth Jane Freeman*)

Response: Nuclear plants generate large amounts of electricity in a safe, reliable, and cost-effective way. Nuclear power also provides environmentally friendly electricity. TVA nuclear plants have multiple safety systems in place to keep our workforce and the communities we serve safe. Safety systems include physical barriers that protect against radiation release and multiple layers of redundant and diverse backup power systems to keep reactors sufficiently cooled, even in the most extreme or unlikely events. The nuclear industry is among the most thoroughly tested and regulated industries in the world. TVA nuclear plants operate with oversight by the U.S. Nuclear Regulatory Commission, which has inspectors physically stationed at each site. Industry organizations, such as the Institute of Nuclear Power Operations and the World Association of Nuclear Operators, work to ensure that the industry achieves the highest level of safety and reliability through plant evaluations, training, accreditation, events analysis, and information exchange.

Safety and environmental protocols are strictly followed for spent nuclear fuel. During refueling outages that occur about every two years, about one-third of the nuclear fuel in a reactor needs to be replaced. Like all U.S. nuclear power plants, TVA stores used nuclear fuel in spent fuel pools where the fuel continues to cool before being moved to dry storage. These pools are robust constructions made of reinforced concrete several feet thick, with steel liners. The water is typically about 40 feet deep and serves both to shield the radiation and cool the fuel rods. As the pools near capacity, all utilities, including TVA, move some of the older used fuel into dry cask storage. In dry cask storage, fuel that has been cooled in the pool for several years is surrounded by inert gas inside a container called a cask, or steel cylinder that contains the spent fuel. Each cylinder is surrounded by additional steel, concrete, or other material to provide radiation shielding to workers and members of the public. Also, information about risks and best management practices around nuclear plant wastewater and thermal plant cooling systems can be found in section 4.4.2.3 of the EIS.

178. I support TVA building additional nuclear plants. (*Commenters: Brian Ueleke, Gary H Hensley, Harry Eich, Randall Dillehay, David Mcglumphy, Rachael Maitland – Tennessee Department of Environment and Conservation, Robert Winland, Scott Hendrix – Tombigee Electric Power Association, Dus Rigers, Mike Peek, Thad Huff, Mary Larrabee, Willis, Mark Acker*)

Response: In the IRP analysis, three nuclear expansion options are available to fill the expected capacity gap, including generation III+ advanced pressurized water reactors and light water small modular reactors (SMR) and generation IV SMRs.

As stated in the IRP's strategic portfolio direction, TVA should continue collaborating with industry and federal partners to pursue the potential deployment of advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. For more on the IRP recommendations, please see Volume 1, Chapter 4.

179. TVA should collaborate and work to deploy advanced nuclear technologies like small modular reactors (SMRs) that support growing load and are carbon-free, safe, and reliable. (*Commenters: Charles Thomas, Rachael Maitland – Tennessee Department of Environment and Conservation, Cortney Piper – Tennessee Advanced Energy Business Council, Mark Kirshe, Stella Melton*)

Response: In the IRP analysis, three nuclear expansion options are available to fill the expected capacity gap, including generation III+ advanced pressurized water reactors and light water small modular reactors (SMR) and generation IV SMRs.

As stated in the IRP's strategic portfolio direction, TVA should continue collaborating with industry and federal partners to pursue the potential deployment of advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. For more on the IRP recommendations, please see Volume 1, Chapter 4.

180. TVA should finish the Bellefonte nuclear plant to increase the contribution of clean nuclear power on the TVA system. (*Commenters: Thomas Wiser, John McGay, Mark Kirshe, Dus Rigers, John Wright*)

Response: In the IRP analysis, three nuclear expansion options are available to fill the expected capacity gap, including generation III+ advanced pressurized water reactors and light water small modular reactors (SMR) and generation IV SMRs.

As stated in the IRP's strategic portfolio direction, TVA should continue collaborating with industry and federal partners to pursue the potential deployment of advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. For more on the IRP recommendations, please see Volume 1, Chapter 4.

IRP recommendations are strategic and at a system level rather than site specific. Site-specific aspects of actions that are later proposed to implement the IRP will be addressed in tiered environmental reviews.

181. I support nuclear fusion technology. (*Commenters: Madison, Thomas Morrow*)

Response: Nuclear fusion is a promising technology, but its technology readiness level remains too low to be included in the IRP study. In order to prepare for this emerging technology, TVA is collaborating with Type One Energy on Project Infinity to potentially deploy a pilot stellarator fusion power plant, named Infinity Two, at its former Bull Run Fossil site. TVA plans to continue industry partnerships to advance the development of next-generation nuclear technologies, including Generation IV reactors and fusion energy systems.

182. TVA should construct gigawatt-scale advanced nuclear plants, such as an AP1000, which are licensed and proven to provide clean, safe, and reliable baseload energy. (*Commenters: Michael Mclean, Mark Kirshe*)

Response: In the IRP analysis, three nuclear expansion options are available to fill the expected capacity gap, including generation III+ advanced pressurized water reactors and light water small modular reactors (SMR) and generation IV SMRs.

As stated in the IRP's strategic portfolio direction, TVA should continue collaborating with industry and federal partners to pursue the potential deployment of advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.2.15 Nuclear and Gas

183. I support TVA adding nuclear and gas resources. (*Commenters: James Mitchell, William Roy*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.2.16 Renewables

184. I oppose TVA overinvesting or focusing on solar and wind resources as they cost more, provide less power, and generate no power when the sun or wind are not present. Solar and wind also require large amounts of land, including prime farmland. (*Commenters: Larry Bruff Sanders – 4-County EPA, Jay Gilliland – 4-County EPA, Johnny Johnson – 4-County EPA, Thomas "Marty" Crowder – 4-County EPA, Michael Ray Banks – 4-County EPA, William Russell Dodds – 4-County EPA, Harry Eich, Anthony Szabo, Stephen Gustav Weber, Shawn Edmondson, Alex Crowell, Bill Mahathey, Justin Hatcher*)

Response: Maintaining resource mix diversity is fundamental to TVA's ability to provide affordable, reliable, and resilient energy to the residents, businesses, and industries in the region. A diverse portfolio reduces fuel price risk and reliability risks associated with single modes of failure. The major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). They were available for selection in all cases, resulting in a varied mix of diverse portfolios for evaluation. All resource types have relative advantages and considerations, as summarized in Volume 1, section 2.6.2.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes recommended actions to pursue solar to reduce total system costs or meet customer needs and further states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

185. I support TVA adding more renewables. (*Commenters: Dan Silver, George Waybright, Cristian Pantano, Vivian J. Elliott, Harry Harrison, Jim Neal, Jeff Twine, KGH Nicholes, Judith Ciani, John Pasqua, Ken Canty, Eugene Falik, Lisa Scharin, Bhasker Patel, Amy Anderson, Jack E Strasburg, Lawrence Emerson, Jo Boyd, Gia Murray, Anonymous 7, Jane McColgan, Dr. William M Smith Jr., Pa Pire, Jeffery Graham Roush, Wendy Henry, Angela Schieferecke, Joyce Frohn, Michelle Darbro, Mark Spinner, Emil Kirberg, Richard Miller, Gary Bushey, Joshua Angelus, Larry Little, Virginia M. Jones, Jessica Gibbons-Benton, Gayle Ray, Joan Tomlinson, Dale Tomlinson, Coal Form Letter Commenters*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes recommended actions to pursue solar to reduce total system costs or meet customer needs and further states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

186. I support TVA adding more renewable resources, such as solar and wind, which contribute to a cleaner environment and lower utility bills for customers. *(Commenters: Vetrel E Degraphenreed Smith, Valetta Seymour, Phil Heinlein, Cindy Davenport, Zdravka Tzankova, PhD, Stephen Serafino, Valerie, Patricia Dion, Kathryn Hill, Paul Levesque, Tom Valente, Tom Butch, James N Herther, Alec And Sandy McDougall, Edward J Costello, Lynne Firestone, Caleb Merendino, Mark Smith, Karen Spradlin, Leslie Weinberg, Jered Cargman, Hartson Doak, Kendall Nygard, Matilda Phillips, Pam Nelson, Wayne Stroessner, Jennifer T. Schultz, Carole Goldfarb, John Ordway, Beth Jane Freeman, Jim Stack, Ruth Swenson, Marianna Mejia, Robert New, Alex Stavis, Beverly Ann Conroy, Timothy D Birthisel, Mark Hughes, Hillary Straus, Lisa Scharin, Robert Moore, Dan Doepker, Daniel Schwartz, John Ailey, Ray Batch, Duane Gore, William Shirey, Wilson Knox Bagwell, Sandie Popiel, Sandra Carman, Theresa Acerro, Sari Rose Schneider, Gabriel J. Gomes, John T Voehringer, Connie Skvir, Mercedes Lackey, Beau Bennett, Gabriele Holland, Doug, Deborah Mazzaferro, Ernie, Dennis Knaack, Veronica Blake, Milton Naylor, Roxanne O'Guin, Alan Fister, Elisa Friedman, Gray Kay, Rosanne Lovely, Cynthia Willett, Bonnie Swinford – Sierra Club, Valerie Fulcher – Virginia Department of Environmental Quality, Francis Lamberts, Dr. Marhta Wetteman)*

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes recommended actions to pursue solar to reduce total system costs or meet customer needs and further states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

187. I support TVA adding more renewable resources, such as wind and solar, battery storage, and geothermal, which result in a cleaner environment and lower, more stable utility bills for customers. *(Commenters: Eric Spray, Bonnie Swinford – Sierra Club, G Ann Campbell)*

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes recommended actions to pursue solar to reduce total system costs or meet customer needs; add firm, dispatchable storage to maintain system reliability and improve system efficiency; and further states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

Geothermal is a viable emerging technology that is gaining traction in certain geographic areas. Additional technological advancement in drilling to improve the costs is needed. Deployment is expected in the Western part of the U.S. where the geography is more favorable. It is uncertain if and when the technology would be deployed in the TVA region, which would generally require significantly deeper wells for reasonable production.

H.2.2.17 Renewables and Energy Efficiency

188. I support TVA adding more renewable resources, such as wind and solar, battery storage, and energy efficiency which result in a cleaner environment and lower, more stable utility bills for customers. (*Commenter: Lawrence McConnell*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes recommended actions to pursue solar to reduce total system costs or meet customer needs; add firm, dispatchable storage to maintain system reliability and improve system efficiency; partner with customers to leverage cost-effective energy efficiency and demand response; and further states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.2.18 Renewables and Storage

189. TVA should allow for and commit to implement higher annual levels of clean energy technologies such as solar, wind, and battery storage (including hybrid options such as solar plus storage) in its planning. (*Commenters: Lindsay Hanna – The Nature Conservancy, Bonnie Swinford – Sierra Club*)

Response: Best practice in utility planning is to use annual limits as the modeling vehicle for simulating the practical ability to construct or procure new resources, so the analysis will generate executable portfolios. The

IRP analysis includes annual limits for all resource types based on recent experience designing, permitting, and constructing new generating assets and procuring new resources through Request for Proposal processes. For example, the market capability for solar has increased, and this is reflected with solar limits that are more than double the limits used in the previous IRP. In the High Growth scenario and Supercharged Growth sensitivity, most annual limits were increased to reflect additional build or procurement potential resulting from increased national economic productivity. For additional information on limits, see Volume 1, Section 2.6.4.

TVA's IRP sets overall strategic direction and planning guidance. A key next step in implementing the IRP recommendations is translating the IRP's strategic portfolio direction into an executable asset strategy from an operational, commercial, and financial perspective. Implementation decisions will be made on a site-specific basis, subject to further environmental review and within TVA's least-cost framework. Modeling parameters do not limit the amount of a given resource that actually can be added in a given year if cost-competitive, as long as cumulative additions are within the ranges studied in the IRP.

190. TVA should pursue more robust renewable and storage targets in IRP recommendations, as the ranges included in the draft IRP make it unclear how TVA plans to proceed. (*Commenters: Katherine Brubaker – EDF, Zachary Fabish – The Sierra Club, Maggie Shober – Southern Alliance for Clean Energy, Dr. Marhta Wetteman*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes recommended actions to pursue solar to reduce total system costs or meet customer needs; add firm, dispatchable storage to maintain system reliability and improve system efficiency; and further states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. TVA will evaluate new solar addition proposals to either lower system costs or meet customer needs utilizing regular procurement cycles. For more on the IRP recommendations, please see Volume 1, Chapter 4.

191. I am against TVA using renewable energy sources like solar, wind, and battery storage due to their high costs, negative impacts to wildlife, and the environmental impacts associated with raw materials extraction. (*Commenters: Linda Murphy, Gbol Long*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 2.1 of Volume 1.

Maintaining resource mix diversity is fundamental to TVA's ability to provide affordable, reliable, and resilient energy to the residents, businesses, and industries in the region. A diverse portfolio reduces fuel price risk and reliability risks associated with single modes of failure. The major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). They were available for selection in all cases, resulting in a varied mix of diverse portfolios for evaluation.

All resource types have relative advantages and considerations, as summarized in Volume 1, section 2.6.2. Impacts to the natural environment are discussed in Chapter 4 of the EIS.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

H.2.2.19 Solar

192. TVA should give priority to substantially increasing solar power generation. Solar is better for the environment than fossil fuels, which contribute to climate change, and it is cost-effective. *(Commenters: Valerie Fulcher – Virginia Department of Environmental Quality, Chris Constantine, Caroline Chesebrough, Michelle Linakis, Nancy LaPlaca, Jay Blackman, Holly Pope, Pam Zimmerman, Lorella Howard, Jason A Carney, Bonnie Swinford – Sierra Club, Mike Peek, Thad Huff, Mary Larrabee, Sheila Bowers, Genette Foster, Zachary Fabish – The Sierra Club)*

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, TVA considers the full range of existing and incremental resources in order to provide adequate and reliable service at the lowest system cost. As such, the major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). For more on TVA's least-cost planning requirements, please see section 2.1 of Volume 1.

Maintaining resource mix diversity is fundamental to TVA's ability to provide affordable, reliable, and resilient energy to the residents, businesses, and industries in the region. A diverse portfolio reduces fuel price risk and reliability risks associated with single modes of failure. The major resource types evaluated in the IRP include nuclear, hydro, coal, natural gas, renewables, storage, and energy efficiency and demand response (EE and DR). They were available for selection in all cases, resulting in a varied mix of diverse portfolios for evaluation. All resource types have relative advantages and considerations, as summarized in Volume 1, section 2.6.2. Impacts to the natural environment are discussed in Chapter 4 of the EIS.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

193. I support TVA adding more solar. *(Commenters: Elizabeth Queener, Karen Fedorov, Joe Franklin, Lee Bartell, Don Bronkema, Victoria Coursey, Philip Johnson, Myles Davis, Susan Welsford, Alice Gem, Julie Smith, Robyn Reichert, Kathryn Davidson, Helen Swartzfager, Jane Leatherman Van Praag, Tom Pielach's, Shelley Pierucci, James S Roberts, Martha R. O'Kennon, Annie McCann, Diane Jones, Anonymous 10)*

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

194. I installed solar in 2013 and my TEP bill was \$100 this month because of you. Outrageous. (*Commenter: Anne Clock*)

Response: Thank you for your comment, it has been noted by TVA

H.2.2.20 Storage

195. Finding a suitable site for pumped storage is difficult. Raccoon Mountain has a natural bowl at the top, which is rare and it helps prevent risk of flooding in nearby valleys. (*Commenter: Stephen Gustav Weber*)

Response: The IRP analysis includes the option of an additional pumped storage plant, similar to Raccoon Mountain, available beginning in the mid-2030s. This resource option was based on recent environmental review related to suitable pumped storage sites in the region.

196. TVA should add storage to capture excess electricity during periods of low demand and meet peak demand needs, which will offset the need for fossil fuels which saves customers money and is better for the environment. (*Commenter: James Stuart Kantor, Beau Bennett*)

Response: The IRP analysis recognizes the benefits of storage. In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes the recommended action to add firm, dispatchable storage to maintain system reliability and improve system efficiency. TVA will evaluate new storage options to support reliability, resiliency, and system flexibility. For more on the IRP recommendations, please see Volume 1, Chapter 4.

197. TVA should add significant amounts of storage to complement renewables. (*Commenters: Sheila Bowers, Genette Foster, Zachary Fabish – The Sierra Club, Jan Berry – Citizens' Climate Education, Cortney Piper – Tennessee Advanced Energy Business Council, Doug, John T Voehringer, Milton Naylor, Bonnie Swinford – Sierra Club*)

Response: The IRP analysis recognizes the benefits of storage. In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee

Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes the recommended action to add firm, dispatchable storage to maintain system reliability and improve system efficiency. TVA will evaluate new storage options to support reliability, resiliency, and system flexibility. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.2.21 Wind

198. TVA should add more wind generation, which provides more output in the winter when TVA has a greater need for capacity. (*Commenter: Jonathan Geldof – ACORE*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes a recommended action which concludes that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.3 Energy Infrastructure

H.2.3.1 Building Codes

199. TVA could insist that state and local building codes require that buildings be placed on a site for maximum solar effectiveness. Further, those codes could require maximum insulation and window installations. (*Commenter: Ken Rawn*)

Response: Building codes are established by state and local governments and are not under the jurisdiction of TVA.

H.2.3.2 Demand Response

200. TVA should focus its demand response programs on the industrial and commercial sectors because they provide higher value. (*Commenter: Jan Berry – Citizens' Climate Education*)

Response: The IRP analysis evaluated demand response resource (DR) options for the residential, commercial, and industrial sectors. Based on the options modeled, a mix of residential, commercial, and industrial DR was selected across the portfolios, with the largest potential impact anticipated to be in the

commercial and industrial sectors. For more information on demand response in portfolio results and how demand response was modeled, see Volume 1, section 3.5 and Appendix G.

H.2.3.3 Demand-Side Management

201. TVA should consider avoided costs and grid benefits associated with peak demand reduction, along with opportunities for other end-use customer arrangements that support the grid. (*Commenter: Carlson Swafford – Eco Demo Law PLLC*)

Response: The IRP analysis evaluated energy efficiency and demand response resource options for the residential, commercial, and industrial sectors. The analysis considered the potential avoided costs at different levels of deployment across the portfolios. For more information on how energy efficiency and demand response were modeled in the IRP, see Volume 1, Appendix G. Also, TVA is collaborating with customers on the evolution of demand-side and distributed resource programs.

202. I support expanding energy efficiency and/or demand response programs across all sectors, which would reduce the need for centralized power resources. (*Commenters: Ophelia Paine, Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP's strategic portfolio direction also includes recommended actions to utilize demand response and behind-the-meter resources to enable near-term interconnection of new industrial loads; and partner with customers to leverage cost-effective energy efficiency and demand response. For more on the IRP recommendations, please see Volume 1, Chapter 4.

203. TVA should align its expectations for demand-side management with industry best practices and norms across all sectors (commercial, industrial, and residential). (*Commenters: Lindsay Hanna – The Nature Conservancy, Carlson Swafford – Eco Demo Law PLLC, Maggie Shober – Southern Alliance for Clean Energy*)

Response: Achievable energy program potential varies with evolving codes and standards and from region to region. To better understand achievable potential, TVA commissioned DNV, a global leader in energy program consulting, to perform a study for the region in 2022. Energy program resource options for the IRP were developed based on the study, subsequent market experience, and other program knowledge. The study indicated 10-year energy efficiency (EE) potential ranging from 2-7% of sales, which was less than the 1% of annual sales industry norm that is sometimes quoted. Reporting of utility programmatic EE impacts is not fully consistent across the industry, as some utilities appear to report a portion of market-driven impacts (or naturally occurring impacts with evolving codes and standards) in their numbers.

The IRP analysis evaluated demand-side management program options for the residential, commercial, and industrial sectors. Based on public comments, TVA also conducted a sensitivity to understand the impacts if EE availability and deployment were greater than forecasted. TVA has been ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study.

The IRP's strategic portfolio direction includes recommended actions to utilize demand response and behind-the-meter resources to enable near-term interconnection of new industrial loads; and partner with customers to leverage cost-effective energy efficiency and demand response. For more on the IRP recommendations, please see Volume 1, Chapter 4.

204. TVA's IRP did not include appropriate levels of energy efficiency and/or demand response that would lower costs and risks, improve reliability, reduce emissions, improve aging housing stock and public health, and/or strengthen the local economy. (*Commenters: Lindsay Hanna – The Nature Conservancy, Kendra Abkowitz - Metropolitan Government of Nashville and Davidson County, Grace Levin – City of Knoxville, TN, Leigh Huffman – Shelby County Government, Leigh Huffman – City of Memphis, Katherine Brubaker – EDF*)

Response: Achievable energy program potential varies with evolving codes and standards and from region to region. To better understand achievable potential, TVA commissioned DNV, a global leader in energy program consulting, to perform a study for the region in 2022. Energy program resource options for the IRP were developed based on the study, subsequent market experience, and other program knowledge. The study indicated 10-year energy efficiency (EE) potential ranging from 2-7% of sales, which was less than the 1% of annual sales industry norm that is sometimes quoted. Reporting of utility programmatic EE impacts is not fully consistent across the industry, as some utilities appear to report a portion of market-driven impacts (or naturally occurring impacts with evolving codes and standards) in their numbers.

The IRP analysis evaluated demand-side management program options for the residential, commercial, and industrial sectors. Based on public comments, TVA also conducted a sensitivity to understand the impacts if EE availability and deployment were greater than forecasted. TVA has been ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study.

The IRP's strategic portfolio direction includes recommended actions to utilize demand response and behind-the-meter resources to enable near-term interconnection of new industrial loads; and partner with customers to leverage cost-effective energy efficiency and demand response. For more on the IRP recommendations, please see Volume 1, Chapter 4.

205. We request that the \$1.5 billion allocation for DSM be detailed, with specifics on how this investment will be spent across EE and DR efforts. (*Commenter: Ann Livingston – Southeast Sustainability Directors Network*)

Response: The FY24-FY28 budget allocation of spend for energy efficiency (EE) and demand response (DR) efforts totals \$1.5 billion, with \$841 million for DR programs, \$637 million for EE programs, and \$46 million for electrification programs. This funding supports expansion of demand-side management programs across the business and industry and residential sectors, and it also supports low-income EE programs.

H.2.3.4 Distributed Energy Resources

206. Distributed energy resources, such as solar and storage, provide local resiliency and are immune to physical and cyber attacks. (*Commenter: John Pike*)

Response: The IRP analysis evaluated distributed solar and storage, as well as smaller gas turbines such as reciprocating internal combustion engines and aeroderivative CTs. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

207. TVA should provide guidance to local power companies in rural communities on how best to build local resilience by adding distributed generation, such as community solar, energy storage, and microgrid projects. (*Commenter: Shannon Stoney*)

Response: The construction and interconnection of small scale solar is primarily focused on the local level, with end use customers and local power companies being the concerned parties. TVA aided local power

companies with small scale solar support from 2020 – 2025, which was an effort to assist with the early adoption period of residential rooftop solar. The tools developed during that period have been made available to local power companies for their use and include contractor vetting standards, solar installation best practices, interconnection processes, and commissioning requirements. Small scale solar adopters are encouraged to work with their local power companies to understand contractors with the best reputation within their service footprint.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

208. TVA should expand the Generation Flexibility program above 5% so that local power companies could increase deployment of distributed generation and storage to increase resiliency and reliability. *(Commenters: Jake Duncan – Vote Solar, Blake Elder – Coalition for Community Solar Access, Gabriela Sarri-Tobar – Center for Biological Diversity, Francis Lamberts, Zachary Stines – New Leaf Energy, Scott Dunbar – Clean Energy Buyers Association, Maggie Shober – Southern Alliance for Clean Energy, Rachael Maitland – Tennessee Department of Environment and Conservation, Markey and Cohen – Congress of the United States, Gil Hough – TenneSEIA)*

Response: TVA has provided local power company partners the flexibility to generate up to 5% of their own energy to meet consumer demand for new renewables and address other local needs. The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. The Generation Flexibility program is a mechanism that could be used to achieve this DG adoption. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

209. TVA should assess and restructure existing programs for distributed generation and storage to ensure these resources are appropriately valued and effective incentives and program options are available to end-use consumers for projects they may be considering. *(Commenters: Scott Noethen – TenneSEIA – Distributed Committee, Maggie Shober – Southern Alliance for Clean Energy)*

Response: The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

210. TVA should prioritize and pursue higher amounts of distributed energy resources to relieve pressure from growing demand, as well reduce the need for centralized power resources and transmission upgrades that have longer lead times. Distributed resources leverage private investment and provide resiliency and environmental benefits. *(Commenters: David Bezanson, Shannon Stoney, Scott Noethen – TenneSEIA – Distributed Committee, Lee Brown, Rebecca Cummings, Tim Berarducci, Barry McLaughlin, Tracy O'Neill –*

Preserve Cheatham County, Brant Miller, Patricia Miller, Shalin Mody, Scott, Anonymous 8, Taffy Williams, Nathaniel Bass, Cortney Piper – Tennessee Advanced Energy Business Council, Maggie Shoher – Southern Alliance for Clean Energy, Jamie McClanahan, Gabriela Sarri-Tobar – Center for Biological Diversity)

Response: The IRP analysis evaluated distributed solar and storage, as well as smaller gas turbines such as reciprocating internal combustion engines and aeroderivative CTs. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

211. TVA should support and/or subsidize community solar to distribute energy burden, contribute to decarbonization, and enable broader access to renewables. *(Commenters: Kathryn, Blake Elder – Coalition for Community Solar Access, Jordan Williams)*

Response: The IRP analysis evaluated distributed solar and storage as resource options. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

Community solar is one of the options for deploying distributed solar, where local power companies see interest in and demand for this application in their area.

212. For solar additions, TVA should maximize the use of structures already available, such as roofs of parking areas and commercial buildings, residential roofs, offshore floating barges, barns, and garages for these panels, rather than use vast acres of undisturbed land. *(Commenters: Cheryl Haywood, Roselie Bright, Kendra Abkowitz – Metropolitan Government of Nashville and Davidson County)*

Response: While distributed solar can be installed on already existing structures or smaller areas of already disturbed land, a significant portion of solar will be at utility scale. Utility-scale solar farms typically require about 7 acres of land per installed megawatt of nameplate capacity. The majority of solar power purchase agreements currently operating and under contract are sited on greenfield property. TVA strives to leverage brownfield options for siting any resource type when practical and will pursue suitable opportunities for solar as they arise, such as the ongoing project to install solar on the Shawnee fossil plant reservation. Agrivoltaics, or dual-use solar that combines solar energy production with agricultural activities on the same land, is an emerging approach that may reduce solar land use impact in the future.

213. Every home should be energy independent! (*Commenter: Victoria Coursey*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.3.5 Distributed Energy Resources and Demand-side Management

214. TVA should promote virtual power plants to offset load growth, reduce utility investment and emissions, and enhance local resiliency to avoid power interruptions. TVA should work with vendors of distributed solar and battery storage and smart appliances to explore what is achievable. (*Commenters: David Bezanson, Maggie Shober – Southern Alliance for Clean Energy, Dennis Lynch, Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: The IRP analysis evaluated distributed solar, storage, and gas resources, along with demand-side management opportunities through energy efficiency and demand response programs. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources. These resources could be managed as virtual power plants in some applications. The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

215. The TVA's 2025 Draft IRP and EIS does not adequately examine distributed energy resources, energy efficiency, and demand management sufficient to satisfy NEPA's EIS requirements. (*Commenter: Carlson Swafford – Eco Demo Law PLLC*)

Response: The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

Achievable energy program potential varies with evolving codes and standards and from region to region. To better understand achievable potential, TVA commissioned DNV, a global leader in energy program consulting, to perform a study for the region in 2022. Energy program resource options for the IRP were developed based on the study, subsequent market experience, and other program knowledge. The study indicated 10-year energy efficiency (EE) potential ranging from 2-7% of sales, which was less than the 1% of annual sales industry norm that is sometimes quoted. Reporting of utility programmatic EE impacts is not fully consistent across the industry, as some utilities appear to report a portion of market-driven impacts (or naturally occurring impacts with evolving codes and standards) in their numbers.

The IRP analysis evaluated demand-side management program options for the residential, commercial, and industrial sectors. Based on public comments, TVA also conducted a sensitivity to understand the impacts if EE availability and deployment were greater than forecasted. TVA has been ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study.

The IRP's strategic portfolio direction includes recommended actions to utilize demand response and behind-the-meter resources to enable near-term interconnection of new industrial loads; and partner with customers to leverage cost-effective energy efficiency and demand response. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.3.6 Electric Vehicles

216. TVA should pursue research, development, and deployment of bidirectional charging and generation of electric vehicle batteries. (*Commenters: John Beirs, David Bezanson*)

Response: TVA has participated in collaborative research led by the Electric Power Research Institute (EPRI) and other entities that explores how electric vehicle batteries might be used in a bidirectional manner and leveraged as a grid resource in the future. TVA will continue to monitor technology advancements and potential in this regard.

H.2.3.7 Electrification

217. TVA should encourage and appropriately plan for electrification in the region, as well as provide increasingly cleaner electricity to support growing electric vehicle and industry uses. (*Commenters: Courtney Piper – Tennessee Advanced Energy Business Council, Rosanne Lovely, Lawrence Emerson, Anonymous 9*)

Response: All IRP scenarios include growing load driven by population, employment, and industrial (primarily data center) growth as well as continued adoption of EVs. TVA explored different levels of demand growth across the three scenarios and two additional load sensitivities (see Volume 1, Sections 2.4 and 3.10.1). Also, TVA will continue to work with industries in the region that are looking to increase the electrification and efficiency of their processes and make strategic investments in the transmission system that prepare for growth.

H.2.3.8 Emerging Technology Research

218. TVA is encouraged to continue to collaborate with higher education institutions and the Oak Ridge National Laboratory (ORNL) to advance research in energy storage, grid modernization, and efficiency technologies to foster the region's leadership in sustainable energy technologies and align TVA's resources with broader advancements in the energy sector. (*Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: TVA is partnering with ORNL to accelerate the next generation of cost-effective nuclear power and sponsoring promising advanced storage startup companies. TVA also is participating in industry partnerships, such as those led by EPRI, and exploring long-duration storage through participation in utility collaborations. TVA looks forward to continuing its collaborations with higher education institutions in the region on research and accelerator programs for emerging energy technologies.

H.2.3.9 Energy Efficiency

219. TVA's Energy Programs Potential Study summary report is too broad and significantly undervalues the potential of industrial, commercial, and residential energy efficiency. (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: TVA leveraged a 2022 Energy Programs Potential Study completed by DNV, a global leader in energy program consulting, and subsequent market experience to develop the energy efficiency (EE) and demand response (DR) resource options modeled in the IRP. TVA also conducted a sensitivity evaluating the potential impact of greater EE market depth beyond what was modeled in the core cases. The IRP analysis indicates the potential for EE deployment to reduce energy needs, particularly between now and 2040, and for DR programs to grow with the system and the use of smart technologies.

TVA is in the process of ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study. The IRP recommends partnering with TVA customers to leverage cost-effective EE and DR program potential. For more on IRP recommendations, see Volume 1, Chapter 4.

220. TVA should maximize the development and support of energy efficiency programs. (*Commenters: Dennis Lynch, Richard Henighan, Francis Lamberts, Bonnie Swinford – Sierra Club, Dr. Martha Wetteman, Valetta Seymour*)

Response: TVA leveraged a 2022 Energy Programs Potential Study completed by DNV, a global leader in energy program consulting, and subsequent market experience to develop the energy efficiency (EE) and demand response (DR) resource options modeled in the IRP. TVA also conducted a sensitivity evaluating the potential impact of greater EE market depth beyond what was modeled in the core cases. The IRP analysis indicates the potential for EE deployment to reduce energy needs, particularly between now and 2040, and for DR programs to grow with the system and the use of smart technologies.

TVA is in the process of ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study. The IRP recommends partnering with TVA customers to leverage cost-effective EE and DR program potential. For more on IRP recommendations, see Volume 1, Chapter 4.

221. TVA should increase its efforts to reduce energy demand through public education and/or by striving to increase current LPC participation in EnergyRight programs up to as high as 100%. (*Commenters: Martha Ward, Rebecca Cummings, Roger Stout, Ann Livingston – Southeast Sustainability Directors Network, Amy Smart*)

Response: TVA leveraged a 2022 Energy Programs Potential Study completed by DNV, a global leader in energy program consulting, and subsequent market experience to develop the energy efficiency (EE) and demand response (DR) resource options modeled in the IRP. TVA also conducted a sensitivity evaluating the potential impact of greater EE market depth beyond what was modeled in the core cases. The IRP analysis indicates the potential for EE deployment to reduce energy needs, particularly between now and 2040, and for DR programs to grow with the system and the use of smart technologies.

TVA is in the process of ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study. The IRP recommends partnering with TVA customers to leverage cost-effective EE and DR program potential. For more on IRP recommendations, see Volume 1, Chapter 4.

H.2.3.10 Extreme Weather

222. TVA should maximize distributed generation and/or storage in order to increase resiliency in the face of extreme weather. (*Commenters: Gabriela Sarri-Tobar – Center for Biological Diversity, Markey and Cohen – Congress of the United States*)

Response: The IRP analysis evaluated distributed solar and storage as resource options. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

223. TVA should account for risks to the system related to gas resource performance in extreme weather in its planning. (*Commenters: Lindsay Hanna – The Nature Conservancy, Ntale Kajumba – EPA Region 4, Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: Forced outages for all resource types are captured in TVA's planning reserve margin study, including temperature correlated outages. TVA's gas assets have typically performed well during extreme

weather events. TVA made significant investments during 2023 to further harden its generating resources, which improved cold weather performance of gas assets during winter storms in 2024 and 2025 that set new peak records. To additionally support reliability of gas-fired plants, TVA typically contracts for a high level of fuel delivery priority and/or invests in a backup fuel source on site, depending on the expected operations profile of a particular plant. Based on all these factors, TVA has not risk-adjusted the net dependable capacity of gas assets.

H.2.3.11 Fossil Site Repurposing

224. TVA should convert TVA and TVA-contracted coal and gas plant sites to sites that could host solar, wind, and battery storage resources. (*Commenter: Edward Main*)

Response: As coal and gas plants reach end of life, the potential to utilize sites for replacement generation is considered. TVA strives to leverage brownfield options for siting any resource type when practical and will pursue suitable opportunities for solar as they arise, such as the ongoing project to install solar on the Shawnee fossil plant reservation. Utility-scale solar farms typically require about 7 acres of land per installed megawatt of nameplate capacity, so opportunities to utilize retiring fossil sites for new solar installations will be somewhat limited. Siting of storage resources considers brownfield opportunities, optimal siting to support the transmission system, and other factors.

H.2.3.12 Implementation

225. In regard to the never-used Phipps Bend power plant site -- although TVA froze construction decades ago, might it finally be opened in some capacity. (*Commenter: Bella Croton*)

Response: The IRP evaluates the resources TVA might employ over the next 25 years to meet the energy needs of the TVA region based on least-cost planning principles. TVA considers the option to utilize existing sites, and site-specific actions that are later proposed to implement the IRP will be addressed in tiered environmental reviews.

226. It is critical that every ratepayer has access to TVA's suite of programs to maximize individual and systemic benefit. We encourage TVA to work with local stakeholders to support increased participation in current and future program offerings. (*Commenter: Grace Levin – City of Knoxville, TN*)

Response: The IRP's strategic portfolio direction includes recommended actions to partner with customers to leverage cost-effective energy efficiency and demand response and to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4. LPCs have local expertise from ongoing interactions with ratepayers to help inform the evolution of demand-side and distributed resource programs.

227. TDEC encourages TVA to consider legal provisions [related to wind installation locations in Tennessee] within the IRP and to address how they may impact the feasibility, siting, and development of wind energy projects in the state. (*Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: IRP recommendations are strategic and at a system level rather than site specific. Site-specific aspects of actions that are later proposed to implement the IRP will be addressed in tiered environmental reviews, which will consider legal provisions that pertain to siting for a particular resource.

The IRP's strategic portfolio direction includes a recommended action which states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.3.13 Large Customers

228. TVA should deprioritize incoming high-energy users (data centers, bitcoin mining, etc.) and prioritize lower system cost and reduced environmental impacts for its residential and other customers. (*Commenters: Robert Stuart, Wren, Francis Lamberts, Gabriela Sarri-Tobar – Center for Biological Diversity, Tracy O'Neill – Preserve Cheatham County*)

Response: TVA's mission includes economic development and TVA remains focused on efforts to enable job creation across the region. TVA does not recruit data centers or related industries. TVA has an obligation to serve our customers, such as in the case of Memphis Light, Gas and Water (MLGW) that serves xAI. TVA works closely with local power companies and communities when a business is interested in locating in the Valley region. TVA can establish when and under what system conditions we can serve a new large energy user. For instance, a customer could enroll in a demand response program where the customer agrees to reduce their load at peak times.

Additionally, high-energy use customers are financially motivated to become more efficient energy users over time, as energy is typically one of their largest business expenses.

H.2.3.14 Large Customers and/or LPCs

229. TVA should allow and plan for additional opportunities for large customers and/or LPCs to pursue renewable and clean energy resources. This could be accomplished through expansion of the Green Invest program, allowing customers to enter into sleeved PPA contracts, and/or allowing customers to contract directly for these resources. A program could also be developed for other commercial and industrial customers that is less focused on additionality. (*Commenters: Cortney Piper – Tennessee Advanced Energy Business Council, Scott Dunbar – Clean Energy Buyers Association, Maggie Shober – Southern Alliance for Clean Energy, Whit Cox – Southern Renewable Energy Association, Scott Dunbar – Clean Energy Buyers Association*)

Response: About half of TVA's current solar capacity comes from its Green Invest program, connecting large customers with large-scale solar developers, and some of the Green Invest solar sites also have battery storage. Green Invest and other programs will continue to evolve to meet changing customer and system needs.

The IRP Recommendation's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on IRP recommendations, see Volume 1, Chapter 4.

H.2.3.15 Municipality Sustainability Goals

230. The success of municipality sustainability goals depend on TVA continuing to decrease the emission intensity of grid energy through increased investment in lower-carbon generation, grid infrastructure, and demand-side efficiency. (*Commenters: Madison Rollings – City of Chattanooga, Grace Levin – City of Knoxville, TN, Kendra Abkowitz – Metropolitan Government of Nashville and Davidson County, Leigh Huffman – Shelby County Government*)

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary

deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

H.2.3.16 Natural Gas Pipelines

231. I am in favor of natural gas pipelines where needed. (*Commenters: David Chastain, Fred Christoffer*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.3.17 Nuclear Licensing and Operations

232. TVA should consider infrastructure updates required for the safe operation of its nuclear fleet beyond license extensions in future IRPs. TVA also should further explore the longer-term implications of the Accelerating Deployment Versatile Advanced Nuclear Clean Energy Act (ADVANCE Act) in its future IRPs, particularly regarding licensing, spent fuel, and radioactive waste management, which are crucial to sustaining a safe and resilient nuclear energy sector in the region. (*Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: Safety of nuclear plant operations is a top priority for TVA. Inherent in license renewals is continued investment in the units and related infrastructure to ensure safe operation based on the latest guidance from the Nuclear Regulatory Commission and global nuclear organizations. TVA will consider the implications of the ADVANCE Act on potential future nuclear deployment and operations and in future planning.

H.2.3.18 Pipeline Infrastructure

233. The IRP did not adequately account for the financial and environmental costs or the safety concerns and risks associated with pipelines for natural gas, hydrogen, and/or carbon capture and sequestration (CCS). (*Commenters: Nathaniel Bass, Gabriela Sarri-Tobar – Center for Biological Diversity, Rachael Maitland – Tennessee Department of Environment and Conservation, Lindsay Hanna – The Nature Conservancy*)

Response: The final IRP includes general information on how TVA will seek to work with pipeline operators to leverage existing pipelines and minimize the need for infrastructure expansion to the extent possible (see Volume 1, section 4.3.2), and additional information also is included in the EIS. Site-specific aspects of actions that are later proposed to implement the IRP strategic direction will be addressed and considered in tiered environmental reviews including information related to pipelines where relevant. The CCS resource options assume general estimates for costs associated with capturing, transporting, and storing captured carbon emissions. The strategy assessment in the IRP acknowledges that technological risks are greatest in portfolios with more reliance on emerging technologies, which would include carbon capture and sequestration.

234. I am opposed to additional natural gas pipelines and support clean energy resource additions. (*Commenter: Bonnie Swinford – Sierra Club*)

Response: The final IRP includes general information on how TVA will seek to work with pipeline operators to leverage existing pipelines and minimize the need for infrastructure expansion to the extent possible (see Volume 1, section 4.3.2), and additional information also is included in the EIS. Site-specific aspects of actions that are later proposed to implement the IRP strategic direction will be addressed and considered in tiered environmental reviews including information related to pipelines where relevant.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal

partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

H.2.3.19 Power System

235. TVA should prioritize reliability and minimize the possibility of power disruptions by ensuring sufficient amounts of generation capacity, particularly baseload and dispatchable resources. (*Commenters: Rebecca McGrew – NACCO Natural Resources, Frankie L Moorman, Randy E Carroll, Marty Crowder, Donald Wallace, Sean M Mcgrath*)

Response: TVA places a high priority on power reliability, which is modeled in the IRP. To accommodate rapid load growth in the TVA region, TVA has been adding and continues to add a diverse mix of new power resources to meet power demand. TVA also has been ramping up investments in energy efficiency and demand management programs for the region's residents and businesses. To address risks from extreme winter events, TVA made significant investments during 2023 to further harden its generating resources, which improved cold weather performance during winter storms in 2024 and 2025.

H.2.3.20 Power System - National

236. I support development of a modernized network of high-voltage utility transmission lines across the nation, combined with smart grid technology, to interconnect the nation's renewable energy sources and enable a national market for buying and selling. (*Commenter: Greg Johanson*)

Response: TVA looks for cost-effective interregional transmission opportunities. TVA is a sponsor in the Southeastern Regional Transmission Planning (SERTP) process and is very involved in the planning and implementation for FERC Orders 890, 1000, and 1920. TVA and other sponsors and stakeholders are actively engaging to develop a plan to ensure we are compliant with Order 1920. Its implementation will guide SERTP as we evaluate regional and interregional transmission solutions/alternatives and ensure that TVA and SERTP are measuring a range of benefits these facilities could provide. We are excited to evaluate multi-valued transmission projects as a part of SERTP and see where this path takes TVA.

237. Privatize the National Renewable energy industry removing the utilities control over the industrial scale project. (*Commenter: Greg Johanson*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.3.21 Power System - TVA

238. TVA should share and coordinate with adjacent utilities to allow balancing of supply and demand across "boundaries." (*Commenter: Dennis Lynch*)

Response: TVA is able to purchase power from neighboring utilities on the spot market if necessary. TVA analyzes the risk associated with import capability in its periodic reserve margin study. Planning reserve margin is the excess capacity that TVA maintains beyond forecasted peak load to provide reliable service to customers while keeping rates low. Maintaining additional capacity accounts for uncertainty in the amount of load and available generation on a future peak day.

239. Power curtailments should be a last resort, and TVA should communicate proactively with stakeholders regarding capacity challenges and contingency plans to minimize disruptions. (*Commenter: Sean M Mcgrath*)

Response: TVA agrees that power curtailments are the last resort during emergency conditions. TVA has a proactive communications process with customers, elected officials, and stakeholders during high load events.

This process ensures transparency and helps minimize possible disruptions, and it has been successfully used during summer heat waves and winter storms.

240. TVA should create a program that allows access to the TVA transmission system, so that other utilities can benefit from use of the public resource. (*Commenter: Dennis Lynch*)

Response: As defined in section 1.15 of TVA's Transmission Service Guidelines, any "Eligible Customer" can request transmission service on the TVA transmission system. TVA's Transmission Service Guidelines are posted on TVA's publicly available OASIS (open access same time information system) site (<https://www.oasis.oati.com/tva/>).

241. I would like to see TVA generating excess power for sale and distribution to the grid. (*Commenter: Eric Coons*)

Response: TVA's ability to generate excess power for sale and distribution to the grid is limited by the TVA Act. Section 15d(a) of the Act restricts the territory in which TVA can sell or deliver TVA power. TVA can only engage in the construction and/or the purchase of generating capacity as needed to supply electricity demands in the service area. As a result, any other sales permitted under 15d(a) are limited to the generation from power system resources that is not needed to meet native load obligations.

242. TVA is on the same trail that California blazed and that Texas is following. California and Texas are reducing emissions, but at a high price of unreliability. And the electric bills have not gone down but have increased in both states. (*Commenter: Marty Crowder*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.3.22 Process for Adding New Resources

243. To meet increasing electricity demand, TVA will need to invest in new generating and transmission capacity quickly and efficiently to provide affordable, reliable, resilient, and increasingly cleaner power to its customers. (*Commenters: David Beckler, James Mitchell, Cody Durham, Mitch Brown, Jonathan Geldof – ACORE, Sean M Mcgrath, Scott Noethen – TenneSEIA – Distributed Committee*)

Response: To accommodate rapid load growth in the TVA region, TVA has been adding and continues to add a diverse mix of new power resources to meet power demand. TVA also has been ramping up investments in energy efficiency and demand management programs for the region's residents and businesses. TVA is making strategic investments in the transmission system to enable growth and new power generation resources. To complement transmission investments, TVA is actively working to streamline the process for interconnecting new resources and reduce associated timelines. Reducing interconnection timelines will help support and accelerate the deployment of all power resources.

244. TVA needs to streamline its development and approval processes for all generation types and invest to create transmission capacity to keep up with growing demand. (*Commenters: Sean M Mcgrath, Scott Noethen – TenneSEIA – Distributed Committee*)

Response: To accommodate rapid load growth in the TVA region, TVA has been adding and continues to add a diverse mix of new power resources to meet power demand. TVA also has been ramping up investments in energy efficiency and demand management programs for the region's residents and businesses. TVA is making strategic investments in the transmission system to enable growth and new power generation resources. To complement transmission investments, TVA is actively working to streamline the process for interconnecting new resources and reduce associated timelines. Reducing interconnection timelines will help support and accelerate the deployment of all power resources.

245. Interconnection timelines are challenging, making it difficult to address near-term resource needs, so TVA needs to streamline the interconnection process and related transmission and NEPA processes. *(Commenters: David Bezanson, Whit Cox – Southern Renewable Energy Association, Maggie Shober – Southern Alliance for Clean Energy, Zachary Stines – New Leaf Energy, Jonathan Geldof – ACORE, Sean M Mcgrath, Scott Noethen – TenneSEIA – Distributed Committee, Markey and Cohen – Congress of the United States, Gil Hough – TenneSEIA)*

Response: TVA is making strategic investments in the transmission system to enable growth and new power generation resources. To complement transmission investments, TVA is actively working to streamline the process for interconnecting new resources and reduce associated timelines. Reducing interconnection timelines will help support and accelerate the deployment of all power resources.

H.2.3.23 Renewables for Local Communities

246. TVA should ensure that renewable energy projects also serve local communities and are not exclusive to industrial demands. *(Commenter: Tracy O'Neill – Preserve Cheatham County)*

Response: In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP Recommendation's strategic portfolio direction includes recommended actions to pursue solar to reduce total system costs or meet customer needs and to collaborate with local power companies on the evolution of distributed generation programs. For more on IRP recommendations, see Volume 1, Chapter 4.

H.2.3.24 River System Management

247. The lake operating guide has lake levels going down starting at Labor Day, going to winter pool and not recovering to summer pool until mid April. With increasing demand for power I would suggest only dropping the water from mid November to recovering to summer pool in late March would increase water availability for power generation and still allow the dropping for environmental needs in the coldest months. More people enjoy fall on the water when the kids are back in school but may currently be unable to do so, especially since you are currently dropping even earlier than the operating guide. *(Commenter: Jim Diehl)*

Response: TVA manages to certain pool levels across the year to meet the multipurpose mission of the river system including flood control, navigation, recreation, and power generation. TVA will continue to explore cost-effective and practical ways to increase output of the hydro system while balancing these priorities.

H.2.3.25 Transmission and Distribution Planning

248. TVA should work with local power companies and large customers to enable microgrids that improve grid resilience and reduce environmental impacts. *(Commenters: Pam Nelson, Wayne David Wallace, Sheila Bowers, William Rueth, Cortney Piper – Tennessee Advanced Energy Business Council, Gabriela Sarri-Tobar – Center for Biological Diversity)*

Response: The IRP analysis evaluated distributed solar and storage as resource options. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

H.2.3.26 Transmission Planning

249. The IRP should account for line losses in the IRP analysis and find ways to invest in improving system efficiency. (*Commenters: Gabriela Sarri-Tobar – Center for Biological Diversity, Carlson Swafford – Eco Demo Law PLLC*)

Response: Electric load forecasts for each IRP scenario include an estimate for energy losses during transmission from power generation sources to power consumers. For the purpose of the IRP, TVA assumed these line losses remain constant at current levels. However, TVA is always looking for cost-effective ways to minimize transmission losses as the power system evolves, and local power companies also are always considering ways to make their distribution systems more efficient.

250. TVA should speak to the actions it will take to allow for more wind on its grid, such as studies of barriers to the technology and the transmission needs to enable Southeast high-hub and Midwest wind. (*Commenter: Maggie Shober – Southern Alliance for Clean Energy*)

Response: TVA has initiated development of a more strategic transmission process, that will incorporate stakeholder input. This process will consider strategic direction from the IRP, along with the locational aspects of connecting load and generation, to enable the efficient evolution of the power system. TVA will incorporate additional elements of transmission planning into future IRPs to more fully integrate system planning. As part of evaluating wind options specifically, TVA considers the transmission upgrades and ongoing reservation costs which may be required.

The IRP's strategic portfolio direction includes a recommended action which states that given cost and portfolio fit challenges, suspend wind additions until relative economics improve. For more on the IRP recommendations, please see Volume 1, Chapter 4.

251. While TVA is not FERC-jurisdictional, TVA should continue to follow FERC guidelines for transmission planning and investment, which offers economic and reliability benefits to its ratepayers. (*Commenters: Jonathan Geldof – ACORE, Zachary Fabish – The Sierra Club*)

Response: While TVA is not FERC-jurisdictional, TVA follows FERC guidelines for transmission planning and investment. TVA is investing in the transmission system for anticipated needs, expanding the use of grid-enhancing and grid-supporting technologies, and streamlining processes for interconnecting new resources. TVA will realize benefits from these efforts, as well as expand regional ties where cost-competitive.

252. TVA should invest in modernizing the grid and leverage grid-enhancing technologies. (*Commenters: Maggie Shober – Southern Alliance for Clean Energy, Gabriela Sarri-Tobar – Center for Biological Diversity, Sean M McGrath, Cortney Piper – Tennessee Advanced Energy Business Council, Scott Dunbar – Clean*

Energy Buyers Association, Tracy O'Neill – Preserve Cheatham County, Jonathan Geldof – ACORE, Gia Murray)

Response: As demand and supply change, TVA is optimizing existing and new infrastructure and expanding the use of grid-enhancing and grid-supporting technologies, such as advanced conductors and STATCOMS, as well as exploring dynamic line ratings, to manage more complex two-way flows and support the grid of the future.

253. The IRP should account for the cost of maintaining grid reliability and/or grid stability through the energy transition. (*Commenters: Rebecca McGrew – NACCO Natural Resources, Ntale Kajumba – EPA Region 4*)

Response: TVA places a high priority on power reliability and grid stability and follows North American Electric Reliability Corporation (NERC) guidelines. The IRP analysis modeled meeting planning reserve margin requirements in all portfolios.

Additionally, TVA performed a study to evaluate the Net Dependable Capacity (NDC) of solar, wind, and storage resources. NDC is a measurement of a resource's ability to produce energy at times of peak demand, expressed as a percentage of nameplate capacity. NDC decreases over time with increasing installation of solar, wind, and battery storage resources on the system. Solar output is relatively high at the typical summer peak late in the afternoon but is substantially less at the typical winter peak early in the morning. Wind generation is more variable overall and is generally higher in winter than in summer. Battery storage NDC is generally higher with more hours of storage duration.

254. TVA should proactively explore where additional interregional transmission can benefit its system. (*Commenter: Jonathan Geldof – ACORE*)

Response: TVA looks for cost-effective interregional transmission opportunities. TVA is a sponsor in the Southeastern Regional Transmission Planning (SERTP) process and is very involved in the planning and implementation for FERC Orders 890, 1000, and 1920. TVA and other sponsors and stakeholders are actively engaging to develop a plan to ensure we are compliant with Order 1920. Its implementation will guide SERTP as we evaluate regional and interregional transmission solutions/alternatives and ensure that TVA and SERTP are measuring a range of benefits these facilities could provide. We are excited to evaluate multi-valued transmission projects as a part of SERTP and see where this path takes TVA.

Expanded interregional transmission can open up additional opportunities to contract for capacity from outside the system and/or to import additional power purchases on the spot market. TVA's planning reserve margin study considers the ability to import power to support system reliability (see Volume 1, section D.1 for more information on planning reserve margin).

255. TVA should consider areas of load growth on the system and opportunities to site generating assets in locations that best support that growth, contribute to grid resilience and stability, and mitigate risks during power outages. (*Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: Preparing for local and regional load growth, as well as understanding when and where retirements will likely occur and new generation will be needed, are key inputs into transmission planning. TVA has initiated development of a more strategic transmission process, that will incorporate stakeholder input. This process will consider strategic direction from the IRP, along with the locational aspects of connecting load and generation, to enable the efficient evolution of the power system. As demand and supply change, TVA is optimizing existing and new infrastructure and expanding the use of grid-enhancing and grid-supporting technologies, such as advanced conductors and STATCOMS, as well as exploring dynamic line ratings, to manage more complex two-way flows and support the grid of the future.

256. TVA should implement proactive local and regional transmission planning processes that identify cost-effective backbone network upgrades needed to support new generation resources and higher load in advance of need. TVA should also consider working with other RTO and energy companies throughout the Southeast to promote grid stability and transmission upgrades. (*Commenters: Jonathan Geldof – ACORE, Whit Cox – Southern Renewable Energy Association, Markey and Cohen – Congress of the United States*)

Response: TVA has traditionally utilized an annual load forecast and generation resource plan to analyze transmission needs over a 10-year horizon, identifying constraints on the power system and addressing them through corrective action plans like network upgrades. In the past few years, TVA extended studies of the power system up to 15 years out to incorporate anticipated major system changes, such as large resource retirements and additions. The analysis identifies large transmission projects to help interconnect future generation, both planned and unplanned, and to increase TVA's capability to serve future load growth and economic development. TVA has initiated development of a more strategic transmission process, that will incorporate stakeholder input. This process will consider strategic direction from the IRP, along with the locational aspects of connecting load and generation, to enable the efficient evolution of the power system. TVA will incorporate additional elements of transmission planning into future IRPs to more fully integrate system planning.

In addition, TVA is a sponsor in the Southeastern Regional Transmission Planning (SERTP) process and is very involved in the planning and implementation for FERC Orders 890, 1000, and 1920. TVA and other sponsors and stakeholders are actively engaging to develop a plan to ensure we are compliant with Order 1920. Its implementation will guide SERTP as we evaluate regional and interregional transmission solutions/alternatives and ensure that TVA and SERTP are measuring a range of benefits these facilities could provide. We are excited to evaluate multi-valued transmission projects as a part of SERTP and see where this path takes TVA.

257. TVA should pursue transmission investments in order to optimize existing infrastructure, decrease future system costs, increase grid reliability, enable the expansion of solar and storage, and/or avoid new generation construction. (*Commenters: Richard Henighan, Tracy O'Neill – Preserve Cheatham County, Ntale Kajumba – EPA Region 4, Gabriela Sarri-Tobar – Center for Biological Diversity, Rebecca McGrew – NACCO Natural Resources*)

Response: Additions of new energy resources of all types typically require additional investments in the transmission system. Generally, these investments include optimizing existing infrastructure through projects such as reconductoring transmission lines and upgrading substations, along with building new transmission infrastructure such as transmission lines, substations, and other devices that support system reliability and stability. Where possible, TVA prefers to utilize brownfield sites with existing infrastructure and easements. TVA is also expanding its use of grid-enhancing and grid-supporting technologies, such as advanced conductors and STATCOMS, as well as dynamic line ratings, to greater leverage the existing transmission system when adding new generation and storage to the system. TVA is also working to streamline processes for interconnecting new resources and will expand regional ties where cost competitive.

258. TVA should utilize zonal modeling and identify renewable energy zones to facilitate interconnecting clean energy resources and new load, optimize transmission investments, and reduce interconnection costs and timelines. (*Commenter: Jonathan Geldof – ACORE*)

Response: Preparing for local and regional load growth, as well as understanding when and where retirements will likely occur and new generation will be needed, are key inputs into transmission planning. TVA has initiated development of a more strategic transmission process, that will incorporate stakeholder input. This process will consider strategic direction from the IRP, along with the locational aspects of connecting load and generation, to enable the efficient evolution of the power system. TVA will incorporate additional elements of transmission planning into future IRPs to more fully integrate system planning. TVA is making strategic investments in the

transmission system to enable growth and new power generation resources. To complement transmission investments, TVA is actively working to streamline the process for interconnecting new resources and reduce associated timelines. Reducing interconnection timelines will help support and accelerate the deployment of new generation of all types over the coming years.

259. Recognize that the period of system upgrade under the 2025 IRP and installation of new or replacement switchgears represents the ideal time to switch to SF6 free switchgears given that the life of a switchgear is over 30 years. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: TVA uses switchgear units that are manufactured to meet industry standards. While some older existing electrical equipment may contain SF6 gas, which could have minor leaks, mostly associated with maintenance or long-term equipment degradation, newer switchgear and breakers would be installed with more efficient operation and maintenance techniques and leak detection, and these features would minimize SF6 emissions. TVA is not aware of an SF6-free alternative that is a proven mature technology and is readily available for high voltage levels. A system-wide review of SF6 switchgear conversion would be outside the scope of this analysis; however, TVA actively monitors evolving technology for future consideration and for demonstrated market experience would like to see some experience on the market with proven reliability at these voltages before implementation.

H.2.3.27 TVA and LPC Coordination

260. Both the Tennessee Valley Authority and Mississippi Power Company are working to build the needed generation and transmission assets to meet the loads of the future. We constantly work with our wholesale energy suppliers to be sure a balance between availability and affordability remains. (*Commenter: Randy E Carroll*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.4 Economics

H.2.4.1 Advanced Energy Innovation

261. TVA could work more closely with startups by creating innovation grants or partnering on pilot projects, like it did with the Spark Cleantech Accelerator at the 2024 Opportunities in Energy event. (*Commenter: Cortney Piper – Tennessee Advanced Energy Business Council*)

Response: TVA is sponsoring promising startup companies through Oak Ridge National Laboratory (ORNL), Electric Power Research Institute (EPRI), and other innovation programs to spur development of advanced energy projects. As noted in Chapter 1 of Volume 1, Strategic Partnerships are a key enabler and foundational element to providing affordable, reliable, and resilient energy.

H.2.4.2 American Energy Future

262. It is time for Americans to stop supporting foreign nations with our purchase of oil. These nations have horrible human rights violations! (*Commenter: Mary Strom*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.4.3 Financial Plan and Debt Ceiling

263. With growing energy demand, TVA will likely experience debt ceiling pressure and may need to pursue alternative methods for financing. To alleviate pressure, TVA should pursue investment partnerships and/or other avenues for large customers, whether served through a local power company or directly by TVA, to drive additional clean energy and advanced energy deployment with shared cost/benefit. (*Commenters: Michael*

Scalf, Cortney Piper – Tennessee Advanced Energy Business Council, Scott Dunbar – Clean Energy Buyers Association, Jonathan Geldof – ACORE, Trey Bussey – SELC, et al.)

Response: The IRP will inform TVA's next long-range financial plan. TVA must balance a number of key financial factors when considering how to meet demand growth in the future. Our least-cost planning principle of low-cost considers overall rate competitiveness and affordability for the end-use customer. The TVA Act has set a statutory debt ceiling of \$30 billion, and TVA will comply with that requirement. Traditionally, TVA has issued bonds, notes, and other evidences of indebtedness to fund investments in new generation resources, then passes those costs on to customers over a period of time generally aligned with a risk-informed view of the operating life of those assets. TVA has and could leverage other forms of financing that do not count against the statutory debt limit, and TVA could explore new programs with customers and/or third parties as a method to deliver on the electricity needs of the region.

H.2.4.4 Incentives - Federal

264. TVA should take advantage of the Inflation Reduction Act and other federal incentives for clean energy resources. *(Commenters: Rebecca Cummings, Bonnie Swinford – Sierra Club, Evergreen Form Letter Commenters, Markey and Cohen – Congress of the United States, Gabriela Sarri-Tobar – Center for Biological Diversity)*

Response: All IRP scenarios reflect the impacts of the One, Big, Beautiful Bill Act (OBBB), which included updates to investment tax credit (ITC) opportunities available for renewable, storage, and nuclear resources. For more information of how ITC incentives were modeled, see Volume 1, section 2.4.4. As power resources are constructed or procured, TVA is pursuing avenues that leverage federal incentives such as the OBBB.

H.2.4.5 Incentives - TVA

265. It would be helpful if TVA could provide support to property owners looking for reputable contractors for rooftop solar installations. *(Commenter: Joanne Groshardt)*

Response: The construction and interconnection of small scale solar is primarily focused on the local level, with end use customers and local power companies being the concerned parties. TVA aided local power companies with small scale solar support from 2020 – 2025, which was an effort to assist with the early adoption period of residential rooftop solar. The tools developed during that period have been made available to local power companies for their use and include contractor vetting standards, solar installation best practices, interconnection processes, and commissioning requirements. Small scale solar adopters are encouraged to work with their local power companies to understand contractors with the best reputation within their service footprint.

266. TVA should provide strong incentives to promote distributed energy resources, including some as microgrid installations, that can support demand at peak times and during outages. *(Commenters: Martha Ward, Rebecca Cummings, Roger Stout)*

Response: The IRP analysis evaluated distributed solar and storage as resource options. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

267. TVA should explore policies and incentives that encourage more widespread adoption of distributed resources such as solar, storage, wind, and geothermal. This could reduce demand on the central grid, increase the amount of clean energy, and provide more localized energy resilience. (*Commenters: Martha Ward, Rebecca Cummings, Roger Stout, Dennis Lynch, Sara Bielaczyc, Nathaniel Bass, Nancy Hardin, Carlson Swafford – Eco Demo Law PLLC, Jon Hamilton, Cortney Piper – Tennessee Advanced Energy Business Council*)

Response: The IRP analysis evaluated distributed solar and storage as resource options. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

Geothermal is a viable emerging technology that is gaining traction in certain geographic areas. Additional technological advancement in drilling to improve the costs is needed. Deployment is expected in the Western part of the U.S. where the geography is more favorable. It is uncertain if and when the technology would be deployed in the TVA region, which would generally require significantly deeper wells for reasonable production.

268. TVA should financially incentivize consumers to make energy efficiency improvements and reduce demand at peak times. (*Commenters: C. B. Folks, Ken Rawn*)

Response: Achievable energy program potential varies with evolving codes and standards and from region to region. To better understand achievable potential, TVA commissioned DNV, a global leader in energy program consulting, to perform a study for the region in 2022. Energy program resource options for the IRP were developed based on the study, subsequent market experience, and other program knowledge. The study indicated 10-year energy efficiency (EE) potential ranging from 2-7% of sales, which was less than the 1% of annual sales industry norm that is sometimes quoted. Reporting of utility programmatic EE impacts is not fully consistent across the industry, as some utilities appear to report a portion of market-driven impacts (or naturally occurring impacts with evolving codes and standards) in their numbers.

The IRP analysis evaluated demand-side management program options for the residential, commercial, and industrial sectors. Based on public comments, TVA also conducted a sensitivity to understand the impacts if EE availability and deployment were greater than forecasted. TVA has been ramping up investments in residential, commercial, and industrial EE and DR programs using insights from the potential study.

The IRP's strategic portfolio direction includes recommended actions to utilize demand response and behind-the-meter resources to enable near-term interconnection of new industrial loads; and partner with customers to leverage cost-effective energy efficiency and demand response. For more on the IRP recommendations, please see Volume 1, Chapter 4.

269. Advertise your incentive program much better. a. Work with local utilities to promote the program more aggressively. b. Create a lottery system with multiple prizes at different levels for anyone who participates in the program. c. Incentivize local communities to promote the incentives by providing awards to each county and/or municipality based on participation rates. (*Commenters: Martha Ward, Rebecca Cummings, Roger Stout*)

Response: Thank you for your comment. It has been noted by TVA.

270. TVA should consider TVA Flex 3.0, in which it allows the States and local governments to promulgate their own incentives, or decline to do so, and let the economics speak for themselves. (*Commenter: Carlson Swafford – Eco Demo Law PLLC*)

Response: Thank you for your comment. It has been noted by TVA.

271. TVA should encourage consumers to make rooftop solar and other distributed resource investments by offering incentives such as rebates, financing, and other programs to improve affordability, along with implementing net-metering (individual and/or group) to enable customers to sell excess solar power back to TVA. (*Commenters: Scott, Sharon K Ammons, Rev. Clifford Bahlinger, Stephanie McDaniel-Gilman, Mark Jorgen Nicoson, Tyler Oliveira, Kathryn, Carlson Swafford – Eco Demo Law PLLC, Jan Berry – Citizens' Climate Education, Gabriela Sarri-Tobar – Center for Biological Diversity, Tracy O'Neill – Preserve Cheatham County, Madison Rollings, Nancy Mitchell, Beau Bennett, Ray Batch, Tom Scheel, Patrick Belton, Anonymous 10, Joe Franklin*)

Response: The IRP analysis evaluated distributed solar and storage as resource options. These distributed resources were emphasized as a part of Strategy C, Distributed. Distributed resources can play a role in enhancing local resiliency and they can offset the need for some centralized power resources.

The IRP analysis includes baseline forecasts for distributed generation (DG) adoption for each scenario and forecasts for higher levels of adoption when promoted in the Distributed strategy. To model the varying levels of DG adoption before and after incentives, TVA uses an approach similar to the National Laboratory of the Rockies' Distributed Market Demand Model, which simulates potential adoption of a given resource as a function of payback period. For more information on DG modeling, please see Volume 1, Appendix F.

The IRP's strategic portfolio direction includes a recommended action to collaborate with local power companies on the evolution of distributed generation programs. For more on the IRP recommendations, please see Volume 1, Chapter 4.

End-use customer hosted generation, such as rooftop solar, must align with TVA's current net-metering policy. This policy states that any compensation for electricity produced by an electric consumer from an eligible onsite generation source that is delivered to the local distribution facilities, or otherwise to TVA, may only be made under, and in accordance with, rates, metering, and billing arrangements approved by TVA and determined by TVA to be consistent with its regulatory and wholesale power contract requirements. Additionally, residential customers have the option to enroll in TVA's Dispersed Power Production program, which compensates customers for energy at TVA's avoided cost.

272. TVA should incentivize farmers to install solar with battery on their properties and collaborate on the best way to utilize the land for power generation and agriculture. (*Commenters: Martha Ward, Rebecca Cummings, Roger Stout*)

Response: Utility-scale solar farms typically require about 7 acres of land per installed megawatt of nameplate capacity. The majority of solar power purchase agreements currently operating and under contract are sited on greenfield (undisturbed) property. TVA strives to leverage brownfield (previously disturbed) options for siting any resource type when practical and will pursue suitable opportunities for solar as they arise, such as the ongoing project to install solar on the Shawnee fossil plant reservation. Agrivoltaics, or dual-use solar that

combines solar energy production with agricultural activities on the same land, is an emerging approach that may reduce land impacts of solar installations in the future.

273. I had solar panels put on my roof only to have my electric bill go down from \$149 to \$139. This is by far less than I thought it would be. Ameren sent me an email when I was having the solar panels put on my roof. They said "don't expect your electric bill to go down much" and it definitely didn't. (*Commenter: Mark Hartnagle*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.4.6 Large Customers

274. Data centers and other high energy use customers should pay commensurately for their energy and/or supply their own energy to avoid overburdening other customers. (*Commenters: Nathaniel Bass, Dennis Lynch, Tracy O'Neill – Preserve Cheatham County, Bonnie Swinford – Sierra Club, Trey Bussey – SELC, et al., Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: TVA's mission includes economic development and TVA remains focused on efforts to enable job creation across the region. TVA does not recruit data centers or related industries. TVA has an obligation to serve our customers, such as in the case of Memphis Light, Gas and Water (MLGW) that serves xAI. TVA works closely with local power companies and communities when a business is interested in locating in the Valley region. TVA can establish when and under what system conditions we can serve a new large energy user. For instance, a customer could enroll in a demand response program where the customer agrees to reduce their load at peak times.

Additionally, high-energy use customers are financially motivated to become more efficient energy users over time, as energy is typically one of their largest business expenses.

275. Many large commercial and industrial customers have sustainability goals, and an expansion emphasizing clean energy would encourage them to expand or locate in the region. Additionally, TVA should leverage the opportunity to collaborate with these customers through vehicles like investment partnerships to significantly expand the use of clean energy resources in the region and minimize environmental impacts. (*Commenters: Tracy O'Neill – Preserve Cheatham County, Zdravka Tzankova, PhD, Cortney Piper – Tennessee Advanced Energy Business Council, Nathaniel Bass, Scott Dunbar – Clean Energy Buyers Association, Ntale Kajumba – EPA Region 4, Mark Acker*)

Response: The alternative strategies studied in the IRP, Strategy B - Innovation and Strategy C - Distributed, both offer opportunities to leverage partnerships to facilitate deployment of their emphasized resources. In the long-form narrative associated with the Innovation strategy TVA states that, "TVA would increase efforts in research and development to advance and deploy [technologies like advanced nuclear and long duration storage]...[which] could be executed through partnerships with the federal government or other organizations" (see Volume 1, Appendix C, page C-1). Additionally, the narrative associated with the Distributed strategy notes that "this strategy would require the use of existing and potentially expanded customer partnerships and programmatic solutions to increase uptake of these distributed resources." (see Volume 1, Appendix C, page C-2). In all cases, TVA must ensure that customer partnerships offer balanced and fair incentive structures that do not disrupt grid reliability or lead to higher costs for other non-participating customers. For additional information on Strategy Design, please see Volume 1, Appendix C.

Additionally, the IRP Recommendation's Strategic Portfolio Direction notes that Complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs. Finally, the discussion of signposts in Volume 1, section 4.4 notes that if TVA experiences higher clean energy program demand, then the resource portfolio is likely to have more programmatic solar and storage, potential to expand existing programs, and/or potential for advanced nuclear partnerships.

H.2.4.7 Rate Structure

276. Eliminate the discriminatory Grid Access Charge, which is designed to discourage investments in distributed energy. TVA should reverse its 2018 rate changes, which unfairly discourage businesses and homeowners from rooftop solar projects. (*Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: The IRP is a strategic planning effort to understand how the TVA power system will need to evolve to meet the region's future energy needs, and rate structure is out of scope for the IRP. A key next step in implementing the IRP recommendations is translating the IRP's strategic direction into an executable asset strategy and financial plan, which would reflect the most recent Board-approved rate structure.

277. Devise a tiered rate structure for all users (government, business, nonprofits, individuals) that has a mid-tier rate that is double that of the lowest tier. And the highest tier would have a rate that is double that of the mid tier. Tier would be determined by usage history and income level. (*Commenter: David Bezanson*)

Response: The IRP is a strategic planning effort to understand how the TVA power system will need to evolve to meet the region's future energy needs, and rate structure is out of scope for the IRP. A key next step in implementing the IRP recommendations is translating the IRP's strategic direction into an executable asset strategy and financial plan, which would reflect the most recent Board-approved rate structure.

H.2.4.8 Renewable Programs

278. TDEC recommends that TVA include information on current programs and policies to promote residential, commercial, and industrial solar growth both for direct customers and those served by LPCs. EPA programs such as the Greenhouse Gas Reduction Fund (GGRF) and Solar for All support behind-the-meter solar installations, which could positively impact power demand and load management across TVA's territory. By highlighting these efforts and assessing their future impact, TVA could offer stakeholders a more accurate view of the renewable energy landscape at different scales. (*Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: Thank you for your comment. It has been noted by TVA.

279. Revamp your current rebate system that requires the contractor to do the paperwork. (*Commenters: Martha Ward, Rebecca Cummings, Roger Stout*)

Response: Thank you for your comment. It has been noted by TVA.

H.2.4.9 Socioeconomics

280. Rural, disadvantaged and energy communities especially stand to gain the most from these advancements and from federal grants and incentives; but they need technical support and a framework so projects get done safely, efficiently and within a reasonable timeframe. (*Commenter: Jon Hamilton*)

Response: Thank you for your comment. It has been noted by TVA.

281. First and foremost, TVA must prioritize providing low-cost and reliable power to their customers to support a healthy economy and keep the lights on. (*Commenters: Harry Eich, Rebecca McGrew – NACCO Natural Resources, Frankie L Moorman, Lynn Billingham*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

282. TVA should invest in affordable clean energy sources, such as renewables, distributed resources, and energy efficiency, to enable cost reductions to ratepayers and align with least-cost planning. (*Commenters: Anonymous 8, Lynn Billingham, Gabriela Sarri-Tobar – Center for Biological Diversity, Susan Henning, Francis Lamberts, Evergreen Form Letter Commenters, Jordan Williams*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

283. TVA's gas expansion is increasing the price of energy for all ratepayers, and it is particularly affecting communities of color and low-income communities that experience some of the highest energy burdens. (*Commenters: Susan Henning, Anonymous 8, Francis Lamberts, Evergreen Form Letter Commenters, Leah McCord – CleanUpTVA Coalition, Gabriela Sarri-Tobar – Center for Biological Diversity, Markey and Cohen – Congress of the United States*)

Response: It is necessary for TVA to add or procure new power generation resources to meet the growing energy needs of the region. Currently, TVA is adding a mix of gas, storage, and solar based on least-cost planning principles (low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible). TVA executes a financial hedging program with the objective of reducing fuel cost volatility by protecting against natural gas prices fluctuations within established risk tolerances that are reviewed annually by the TVA Board.

While TVA's demand-side portfolio serves customers across all segments, TVA also maintains targeted support for households and communities with higher energy burdens. TVA introduced its Home Uplift program in 2018, in partnership with local power companies and communities. By FY 2019, about 1,300 Valley residences were retrofitted with more energy efficient technology for heating and cooling, water heating, and insulation. This number grew to about 7,900 retrofitted residences by the end of FY 2025, reducing system energy needs by more than 28,000 megawatt hours, benefitting low-income households. TVA provides matching funds for local power companies and local communities to support this program. Additionally, the School Uplift program provides education and efficiency improvements to schools within TVA's service territory, which has especially benefited low-income communities. These initiatives complement TVA's broader EE strategy and remain part of TVA's base-level EE investments.

284. Prioritizing renewable energy resources like solar and wind will not only reduce carbon footprint but will also drive economic growth and create jobs in the region. (*Commenters: Valerie, Dan Silver, Raymond Holder, Taffy Williams, Mitch Carpen*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

The IRP Recommendation's strategic portfolio direction includes recommended actions to pursue solar to reduce total system costs or meet customer needs and to collaborate with local power companies on the evolution of distributed generation programs. For more on IRP recommendations, see Volume 1, Chapter 4.

H.2.5 Environmental Impacts

H.2.5.1 Air Quality and Emissions

285. TVA must act in accordance with applicable federal, state, and local laws and regulations, and recommended best management practices for TVA to take regarding its facilities and actions. These actions and recommendations covered the topics addressed in the IRP EIS including Air Quality and Emissions, Cultural Resources, Land Use, Solid and Hazardous Waste, Water Resources, and Wildlife. (*Commenter: Valerie Fulcher – Virginia Department of Environmental Quality*)

Response: The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. Rather, the EIS includes general discussions of resources within the TVA region. These descriptions are followed by a discussion of how impacts to these resources would be addressed during facility siting and review processes when specific proposals to implement the IRP are considered.

TVA will conduct the appropriate detailed impact analyses, when it proposes actions to implement the IRP. TVA will consider mitigation of any impacts through siting and facility design processes at the time additional environmental reviews are conducted for site-specific actions implementing the IRP. Additionally, TVA will coordinate and consult with federal and state agencies pursuant to requirements.

286. CCS can have negative air quality impacts in some circumstances. While sulfur dioxide and particulate matter in a generator's exhaust stream must be strictly controlled for post-combustion CCS equipment to function correctly, increased fuel burning due to the CCS energy penalty can increase emissions of other air pollutants such as nitrogen oxide. CCS can also result in increased emissions of ammonia, which can result in formation of secondary particulate matter, depending on factors such as location and weather. (*Commenter: Zachary Fabish – The Sierra Club*)

Response: Carbon capture and sequestration benefits and current affected environments are addressed in Section 4.5.1.1 (Geologic Carbon Dioxide Sequestration Potential) of Volume 2. Potential emissions reductions given different resource uses are addressed in Section 5.5.2.3 (Life Cycle GHG Emissions). Volume 1 Appendix J.3 and J.4 also cover CO₂ Emissions and CO₂ Intensity, respectively.

Further effects of CCS and air quality impacts will be addressed, as appropriate, with regard to future projects at the time those projects are being proposed.

287. The Draft IRP/DEIS considers “five gas expansion options . . . to fill the expected capacity gap,” one of which is a combined cycle (“CC”) unit with carbon capture and sequestration (“CCS”) with an assumed 90% capture rate for CO₂ emissions, and two others which assume a “robust hydrogen market develops by the early 2030s.” Many of the basic assumptions underlying the Draft IRP analysis are fundamentally flawed and render its conclusions untenable. TVA’s sea change in relying upon these technologies is particularly surprising given that just last year TVA joined utilities and trade associations in expressing profound concern about their ability to comply with CCS and hydrogen blending guidelines in EPA’s draft greenhouse gas emission standards rule. *(Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity)*

Response: For carbon capture and sequestration, TVA used recent project experience, discussions with equipment manufacturers, and insights from R&D efforts to capture both the base natural gas plant cost plus the infrastructure required to capture, transport, and store CO₂ (see response to comment #30). Between the release of the draft and final IRP, TVA updated cost estimates for the CC with CCS expansion option which included an increase in both the forecasted upfront capital cost (for capture equipment) and ongoing fixed O&M (for transportation and storage).

The IRP also speaks to the potential portfolio implications of faster or slower progress on technology readiness timelines (see Volume 1, Section 4.4.3). The strategy assessment in the IRP acknowledges that technological risks are greatest in portfolios with more reliance on emerging technologies, which would include carbon capture and sequestration.

288. The Draft IRP/DEIS fails to substantively grapple with the social cost of carbon capture, namely the resulting air pollution, potential health problems, economic costs and overall contributions to climate change. *(Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity)*

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, portfolio optimization in the IRP analysis evaluates impacts of expansion paths on system cost that encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance.”

Carbon capture and sequestration benefits and current affected environments are addressed in Section 4.5.1.1 (Geologic Carbon Dioxide Sequestration Potential) of Volume 2. Potential emissions reductions given different resource uses are addressed in Section 5.5.2.3 (Life Cycle GHG Emissions). Volume 1 Appendix J.3 and J.4 also cover CO₂ Emissions and CO₂ Intensity, respectively.

Further effects of CCS and air quality impacts will be addressed, as appropriate, with regard to future projects at the time those projects are being proposed.

289. Instead of creating long-range plans to mitigate carbon emissions and sacrifice reliability based on climate models that contradict observed data, I request that TVA do additional research into man-made impacts on climate change. Create its own model with reliable emissions and climate data. Then present it to your customers, the citizens that live in the areas served by the local power companies. The 2025 Integrated Resource Plan needs to take care of the needs that we are sure of: We need affordable, safe, and reliable power now. Utilize proven technology and available [sic] and our abundant natural resources to provide that power. *(Commenter: Marty Crowder)*

Response: TVA uses the output of widely used climate models such as the Fifth National Climate Assessment (USGCRP 2023) and the Intergovernmental Panel on Climate Change Assessment Reports that follow the best practices and standards set forth by the World Climate Research Programme, The World Climate Research Programme runs the Coupled Model Intercomparison Project that makes sure all models use the same data, and compares their results, which are relatively similar. These models use data and provide results on a regional level allowing for better understanding of what is and may be impacted by changing conditions. Use of these models eliminates the need for TVA to create its own model. Climate change effects and model outputs

are addressed in Volume 2, Sections 4.3.1 (climate normals and trends), 4.3.4 (climate adaptation), 5.2.1 (effects of fossil fuel generation), 5.5.2 (climate and greenhouse gases), and Appendix D (life cycle analysis).

290. Provide a more detailed evaluation of climate resilience/adaptation planning, such as including discussion of specific measures that the TVA will consider in the planning process, like scour monitoring, flood protections such as control reservoirs, recirculating water for cooling, underground transmission lines, and other designs to increase robustness. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: Section 5.5.2.5 of the EIS provides an overview of TVA's consideration of climate change and adaptation. It is not intended to be a detailed discussion of potential measures that would be considered during project planning. Specific measures would be identified in subsequent environmental reviews when projects that would implement the IRP strategic direction are proposed.

291. In its final EIS, TVA should primarily use the 2023 EPA estimates for the social cost of greenhouse gases (SC-GHG) analysis because they are the best available government climate-damage estimates; because the Working Group and the White House Council on Environmental Quality encouraged agencies to use values that reflect the best available evidence; and because other federal agencies are already using these estimates to monetize the climate damages associated with their actions. If the Working Group estimates remain in the final EIS, they should only be used in a sensitivity analysis to provide context for the primary analysis. TVA should also include language on why it is using the 2023 EPA estimates and amend one sentence where it misleadingly states that it will use the estimates at a 2.5% discount rate. (*Commenters: Jason A. Schwartz – Institute for Policy Integrity at NYU School of Law*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, portfolio optimization in the IRP analysis evaluates impacts of expansion paths on system cost that encompasses only those costs that are "direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance."

Details on how the greenhouse gas (GHG) life cycle analysis (LCA) was developed are included in Volume 2, Section 5.5.2.3 and Appendix D. For its GHG LCA, TVA partnered with the National Laboratory of the Rockies (NLR), which provided technical assistance, verified and generated harmonized LCA emission factors for each resource technology, and validated TVA's results by running select TVA cases through its own GHG LCA model. NLR provided TVA with a technical report which includes documentation of NLR's scope of work as well as documentation of emission factors for each resource type. This report was produced when the laboratory operated as the National Renewable Energy Laboratory (NREL). The laboratory is now the National Laboratory of the Rockies (NLR). A copy of this report is available as a supporting document on TVA's 2026 IRP website (www.tva.com/irp).

A social cost analysis is not included in the Final EIS.

292. The EIS fails to consider the carbon intensity of all of the above [resources in front of or behind the meter], effectively only analyzing scenarios based on TVA's Scope I emissions. (*Commenter: Carlson Swafford – Eco Demo Law PLLC*)

Response: In the IRP analysis, distributed generation resources are modeled as supply-side resources to ensure that they are treated on a consistent and integrated basis. Distributed generation, such as rooftop solar, reduces generation that would otherwise be required from TVA facilities. Distributed solar facilities, for example, do not generate combustion emissions and this is captured within the analysis in Volume 2, Section 5.5.2.

293. Recommendation: Increase transparency and add additional detail to the presentation of emissions in chapter 5. The GHG emissions are only presented as averages across scenarios, and not by strategy/scenario combination. In describing the alternatives (page 3-1), the TVA notes "Multiple strategies, which represent business decisions within TVA's control, are modeled against multiple scenarios, which represent uncertain

futures outside of TVA's control." The text should more clearly describe differences across strategies and scenarios that are caused by factors that the TVA controls. The use of averages across scenarios makes it difficult to determine if differences between alternatives are caused by the TVA decisions or uncertain future conditions. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: Section 2.7.3 and Appendix J of Volume 1 include a review of environmental metrics across each of the strategies studied. Within Appendix J, Sections J.6 and J.7 include graphs outlining expected CO₂ emissions for each of the nine core portfolios through time, both in mass emissions and intensity (lbs/MWh). As a part of Volume 2's greenhouse gas life cycle assessment (Volume 2, Section 5.5.2.3 and Appendix D), TVA is providing a detailed data file at www.tva.com/IRP which outlines each portfolios full forecasted life cycle emissions for CO₂, N₂O, and CH₄.

294. Carbon Dioxide Equivalents: In the draft EIS, discussions about GHG emissions focus primarily on CO₂. For example, page 5-30 reads "Total and annual direct combustion emissions of GHG in terms of CO₂..." It is unclear from this discussion if only CO₂ emissions are being quantified, or if emissions of other GHGs (methane (CH₄) and Nitrogen dioxide (N₂O)) are being quantified and converted into CO₂ equivalent(e). Recommendation: Quantify all GHGs emissions and identify when emissions have been converted into CO₂e. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: Greenhouse gas (GHG) emission analysis in Volume 2, Section 5.5.2.1 focuses on CO₂, not CO₂e. In addition to the forecasted direct combustion CO₂ emissions, TVA also developed life cycle GHG emissions forecasts for CO₂, N₂O, and CH₄ to include upstream, ongoing non-combustion, and downstream GHG emissions for each studied alternative and select sensitivities in Volume 2, Section 5.5.2.3.

295. The draft EIS provides a discussion of regional and local climate change impacts and briefly mentions resilience and hardening measures in section 5.5.2.5. However, the following statement on page 4-17 of the draft EIS, which discusses the predicted impacts of climate change in the Southeast, appears misleading: "the 4th NCA report, however, notes that Southeast temperatures have not increased in the last century, contrary to climate model projections of what should have happened with the increase in atmospheric GHG concentrations that has already occurred."

Additionally, a statement later in the same paragraph says hot days have decreased in the Southeast over the past century. This language can be interpreted to imply that climate change is not affecting the temperatures in the Southeast. This statement is inconsistent with data presented in chapter 2 of the 4th National Climate Assessment (NCA) which states, "since the early 1960s, the Southeast has been warming at a similar rate as the rest of the United States"⁹ and includes data supporting this in figure 2.4.

For further perspective, note Figure 22.17 in the updated 5th NCA: "The Southeast faces some of the highest economic risks related to energy infrastructure damage without proactive adaptation measures in place—such as energy utilities and policymakers' anticipating climate risks to electrical grid infrastructure and investing upfront in strengthening these systems in advance of any damages. As shown in the [Figure 22.17] maps, in 2050 under an intermediate scenario (RCP4.5), proactive adaptation (a) could save as much as twice the total costs (in 2017 dollars) of no adaptation (b). These costs could be passed onto consumers. Adapted from Fant et al. 2020." We recommend that TVA amend the language referencing the 4th NCA report to more accurately represent the effects of climate change on the Southeast. Use the more recent 5th NCA wherever applicable. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: TVA acknowledges in Section 4.3.3 of the EIS that climate change is affecting the region and that trends predict that the region faces very high economic risks and costs due to climate change. Additional information from the 5th NCA report was also included in the section.

296. TVA's conclusion violates NEPA. It is well-established that NEPA requires a robust consideration of the impacts of a project's GHG emissions in relation to climate change. Thus, although some "speculation is . . .

implicit in NEPA,” agencies may not “shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry.” (*Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. While TVA did not use air pollution modeling to analyze air quality impacts, the long-term intensity of greenhouse gas emissions decrease under all strategies. Further effects to air and water quality will be addressed, as appropriate, with regard to future projects at the time those projects are being proposed.

297. Moving away from fossil fuels is necessary to decrease pollution and lower emissions, thereby improving the ecosystem by allowing for clean air and water. (*Commenters: Michael Whitten, Shirley McCarthy, Juliet Cunningham*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

Potential emissions reductions given different resource uses, strategies and scenarios are addressed primarily in Volume 2, Sections 4.2 and 5.5.1 (Air Quality), and 4.3 and 5.5.2 (Climate and Greenhouse Gases), along with their environmental impacts, with other data included in Appendix J of Volume 1. Further effects to air and water quality will be addressed, as appropriate, with regard to future on-site projects at the time those projects are being proposed.

298. There is too much carbon in the atmosphere; there is too much disinformation on the subject also. I support my national government doing everything it can including the Integrated Resource Plan to solve these problems and turn around the continuing natural disasters if it isn't too late. (*Commenter: Cheryl Herr-Rains*)

Response: Thank you for your comment. It has been noted by TVA.

299. It is a horrible idea to turn what was originally a facility for producing electricity into one that will produce an environmentally disastrous CO₂ producing gas fuel. (*Commenter: Don C. Price*)

Response: Thank you for your comment. It has been noted by TVA.

300. I demand and expect that TVA comply with federal rules on cutting harmful emissions. (*Commenter: Jane Fleishman*)

Response: TVA complies with all applicable state and federal laws, rules, and regulations relating to air emissions.

301. TVA attempts to minimize the impact of its fossil fuel-heavy portfolio by comparing its own GHG emissions to the national average. TVA tries to dwarf its already unacceptable emissions rate to give itself a free pass for building more fossil gas and to slow walk the transition away from fossil fuels. TVA should be doing all that it can to cut emissions by speeding up the retirement of its coal plants and planning an energy future free of fossil gas and false solutions. (*Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least-cost planning requirements, please see section 3.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

Potential emissions reductions given different resource uses, strategies and scenarios are addressed primarily in Volume 2, Sections 4.2 and 5.5.1 (Air Quality), and 4.3 and 5.5.2 (Climate and Greenhouse Gases), along with their environmental impacts, with other data included in Appendix J of Volume 1. Further effects to air quality will be addressed, as appropriate, with regard to future on-site projects at the time those projects are being proposed.

302. On page 5-2, in the Climate and Greenhouse Gases section, it's good that the entire life cycle of the combusted energy sources was included, although there is a confusing last sentence. Please clarify whether the full life cycle impacts were calculated for all combusted energy sources. (*Commenter: Rosalie Bright*)

Response: Yes, the greenhouse gas life cycle analysis (Volume 2, Section 5.5.2.3) includes the entire life cycle for all power generating resources, both combustion and non-combustion. For more information, see Volume 2, Section 5.5.2.3.

303. The Draft 2025 IRP also claims that TVA has lowered power system CO₂ emissions by around 60% since 1995 because of coal plant retirements. Draft EIS at 4-16. While this is welcome progress, TVA's fixation on carbon emissions overlooks other dangerous climate-warming emissions like methane that have a material impact on the region, thereby distorting the harm of an increasingly methane gas-filled future. (*Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: To complement the portfolio optimization in the IRP, TVA engaged experts at the National Laboratory of the Rockies (NLR) to develop a best-in-class approach for greenhouse gas (GHG) life cycle analysis, or LCA. The LCA identifies full "cradle to grave" GHG emissions forecasts for upstream, operational, and downstream activities for the nine core portfolios and sensitivities. This analysis included all three primary greenhouse gases of concern, namely CO₂ (carbon dioxide), N₂O (nitrous oxide), and CH₄ (methane). GHG emissions associated with the "fuel cycle," which would include upstream methane leakage, is included in the ongoing non-combustion phase of the analysis. (See Volume 2, Section 5.5.2.3 for more information).

The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities and supporting infrastructure such as gas

pipelines. IRP implementation projects would be the subject of a separate environmental review for the site-specific action with opportunities for public involvement.

304. On page 5-2, the Air Quality section mentions the major non-carbon air pollutants: sulfur dioxide (SO₂), nitrogen oxides (NO_x), and mercury. It should also include particulates. The generation of these pollutants throughout the life cycle should be considered. (*Commenter: Rosalie Bright*)

Response: TVA addresses criteria air pollutants such as particulate matter in Section 4.2.2 of the EIS. The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. IRP implementation projects would be the subject of a separate environmental review for the site-specific action with opportunities for public involvement. The site-specific review would include information on particulates, if relevant. See also TVA's response to comment 22 above.

305. Section 5.5: Air Quality, Climate, and Greenhouse Gases / Section 5.5.2.2 Direct GHG Emissions Reduction and GHG Emissions Impact on Climate Change-. The first section states "The variation among strategies for both CO₂ emissions and emissions rates is relatively small and much less than the variation among the scenarios associated with each strategy" and both of these sections state "the reduction in CO₂ emissions would have small but beneficial impacts on the potential for associated climate change". These statements minimize the role that TVA plays in decarbonizing the utility sector in the United States and downplays the 2% of total United States Electricity Emissions that TVA contributes. TNC recommends that TVA further describe what would be defined as minimal vs. material difference in emissions between strategies. (*Commenter: Lindsay Hanna – The Nature Conservancy*)

Response: TVA's statement in the EIS that the variation among the alternative strategies is relatively small does not, as asserted by the commenter, minimize the importance of TVA's emissions reductions; nor does the statement that anticipated reductions by TVA in CO₂ emissions would have small effects on climate change, which is a problem that is global in scale that results from global GHG emissions. The differences of emissions between strategies are displayed and quantified in tables and figures in Section 5.5.2.1.

306. Air Quality Impacts: The sentences, "The actual effects on climate in the TVA region and elsewhere would be small and difficult to quantify," on page 5-34, and "The effects are likely to be relatively modest over the next decade and increase in magnitude by mid-century," on page 5-45, inappropriately downplay the impact on climate change.

The second sentence in the following discussion on page 5-34, "The Southeast frequently faces costly disasters related to weather and climate threats such as flooding, tropical storms, and hurricanes, which impact its infrastructure and agriculture. Health inequities are further exacerbated due to climate-related risks, and rising air pollution also threatens human health," is incorrect, because criteria air pollutant emissions are on a downward trend since the 1980s, as discussed on the EPA's Air Quality—National Summary webpage. Recommendation: Amend the referenced sentences to avoid inappropriately characterizing air quality and climate change conditions. (*Commenter: (Ntale Kajumba – EPA Region 4)*)

Response: TVA has reviewed each of the sentences cited in this comment and made revisions in the final EIS for clarity.

307. TNC recommends modifying the description of Scope 1 emissions by identifying the source of the emissions, including energy resources owned and operated by TVA. (*Commenter: Lindsay Hanna – The Nature Conservancy*)

Response: See Volume 2, Section 5.5.2.2 for a full definition of Scope 1 emissions.

H.2.5.2 Climate Change

308. Recommendation: Clarify the sentence regarding the decrease in “hot days” on page 4-17 to provide additional context by including information from the 5th NCA that provides more information on the decrease in very hot days in central and eastern regions: “This does not, however, mean the central and eastern US are not affected by heat. The impacts of extreme high temperatures are more severe if such conditions persist for several days, and overall, multiday heatwaves have become hotter, more frequent, larger, and longer lasting in recent decades.” (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: Section 4.3.3 of the final EIS has been updated to incorporate this information.

H.2.5.3 Energy Mix

309. The EIS does not distinguish between resources in front of and behind the meter. (*Commenter: Carlson Swafford – Eco Demo Law PLLC*)

Response: The IRP analysis evaluated distributed solar and storage resources, as well as programmatic energy efficiency and demand response. Distributed resources would be installed behind the meter by end-use consumers, along with investments in measures that make businesses and homes more energy efficient. All of these resources would be considered behind-the-meter but are modeled as supply-side resources in the IRP for evaluation purposes.

H.2.5.4 Energy Transition and Decarbonization

310. TVA should not seek to aggravate this unfortunate trend [of increasing extreme weather disasters]... (*Commenter: Francis Lamberts*)

Response: The draft EIS considers CO₂ and global warming impacts, and portfolios have been evaluated against metrics to determine the environmental impact. The programmatic EIS broadly addresses the effects of power production on the environment, including climate change, the effects of climate change on the Valley, and air emissions and water use in TVA’s power operations.

311. TVA stated that the IRP was prepared considering “weather-normal trends.” What is weather-normal in 2024 and what is expected through 2035? The IRP needs to include not only plans for power production but for remediation and for restoring facilities that have been and may be damaged due to climate change-related weather events through 2035. (*Commenter: Dr. Marhta Wetteman*)

Response: Weather is a key driver of electric load. Electricity demand forecasts are typically expressed in terms of normal weather conditions. Normalizing for typical weather conditions allows load forecasters to identify the relationship between trends in electricity demand and long-term drivers, including economic activity, population changes, and climate trends. TVA normalizes the load forecast for weather based on data from 23 weather stations located across the region with proportional load weights. The weather normalization process accounts for regional trends that show an increase in Cooling Degree Days (CDD) and a decrease in Heating Degree Days (HDD) over the period from 1960 to 2020. CDD and HDD represent the total number of degrees above 65°F or below 65°F, respectively, across all days for a given period, which drives space conditioning needs. This trend is incorporated in all IRP scenarios. For more information, see Volume 1, Appendix B.

In optimization modeling, TVA applied 18% summer and 26% winter reserve margins, and each modeled resource option received credit for its net dependable capacity (NDC) in a given year towards meeting the reserve margins in each season. Solar, wind, and storage resources have curves to reflect changing NDC over time as penetration on the TVA power system increases. TVA performed a sensitivity analysis to test the potential impact of increasing winter risk that could drive a higher winter reserve margin. See Volume 1, Sections 4.10 and 4.11.3 for a discussion of this sensitivity.

312. The world has changed since the 2019 IRP. The climate crisis has deepened, with historic droughts threatening the Duck River, rolling blackouts during Winter Storm Elliott, record-breaking tornado damage in Kentucky, and devastating flooding in Waverly, Tennessee in 2021 and across the Southeast during Hurricane Helene. Between 1980 and 2000, there were 25 billion-dollar disasters in Tennessee. Since 2019, Tennessee has faced 40. Since the 2019 IRP, TVA has pursued one of the largest buildouts of methane gas plants in the country. TVA has proposed 9 new methane gas plants while slow- walking growth on solar, wind, battery storage, energy efficiency, and demand response. As a result, the proportion of total electricity TVA generates from carbon- free sources is lower than in 2019. And since 2023, despite promises to hold rates flat, TVA has raised rates twice—totaling nearly 10%—partly to pay for new methane gas plants. These rate hikes exacerbate the already-high energy burden communities across the region face. Even before the latest rate hikes, 40% of all households in Shelby County, Tennessee experienced high energy burden, which disproportionately harms Black and low-wealth communities. (*Commenter: Trey Bussey – SELC, et al.*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the final IRP, Scenario 3, Carbon Legislation, includes a carbon tax which serves as a proxy for current and potential future legislation and/or regulatory actions seeking to reduce greenhouse gas emissions, which is an uncertainty outside of TVA's control. Capacity expansion results as well as environmental metric performance, including CO₂ direct emissions and CO₂ intensity, for scenario 3 portfolios can be found in Chapter 3 of Volume 1.

While TVA's demand-side portfolio serves customers across all segments, TVA also maintains targeted support for households and communities with higher energy burdens. TVA introduced its Home Uplift program in 2018, in partnership with local power companies and communities. By FY 2019, about 1,300 Valley residences were retrofitted with more energy efficient technology for heating and cooling, water heating, and insulation. This number grew to about 7,900 retrofitted residences by the end of FY 2025, reducing system energy needs by more than 28,000 megawatt hours, benefitting low-income households. TVA provides matching funds for local power companies and local communities to support this program. Additionally, the School Uplift program provides education and efficiency improvements to schools within TVA's service territory, which has especially benefited low-income communities. These initiatives complement TVA's broader EE strategy and remain part of TVA's base-level EE investments.

H.2.5.5 Environmental Impacts

313. TVA must acknowledge its responsibility for the massive, irrevocable harm caused by the greenhouse gasses it generates – and what this IRP plans to continue generating. TVA must also acknowledge its responsibility for its share of upstream methane leakage, which makes fracked gas as harmful to the climate than the coal it's replacing. (*Commenter: John Todd Waterman*)

Response: To complement the portfolio optimization in the IRP, TVA engaged experts at the National Laboratory of the Rockies (NLR) to develop a best-in-class approach for greenhouse gas (GHG) life cycle analysis, or LCA. The LCA identifies full “cradle to grave” GHG emissions forecasts for upstream, operational, and downstream activities for the nine core portfolios and sensitivities. This analysis included all three primary greenhouse gases of concern, namely CO₂ (carbon dioxide), N₂O (nitrous oxide), and CH₄ (methane). GHG emissions associated with the “fuel cycle,” which would include upstream methane leakage, is included in the ongoing non-combustion phase of the analysis. (See Volume 2, Section 5.5.2.3 for more information).

314. Federal Code provides direction to Federal Agencies for EIS requirements and code 40 CFR 1502.10(a)1 states that agencies shall use a format for EIS that will encourage good analysis and clear presentation of the alternatives, including the proposed action. The Draft EIS does not identify a proposed action, and therefore does not provide that clear presentation. While Appendix C provides the sort of cross cutting analysis that is necessary to compare portfolio options, there is lacking an overall comparison across categories. TNC recommends that for the Final IRP, TVA provides the required Summary that outlines the environmental impacts of each portfolio option, including the environmentally preferable portfolio options. (*Commenter: Lindsay Hanna – The Nature Conservancy*)

Response: The programmatic EIS considers each Strategy (A-C) as potential Action Alternatives. The final EIS identifies a Preferred Alternative in Section 3.4 which includes the Power Supply Mix Ranges through 2040 and through 2050 and Strategic Portfolio Direction. Section 3.5 includes a summary comparison of environmental impacts of the alternatives.

315. Please include soil erosion prevention environmental requirements for all aspects of the IRP that result in disturbing soil as a clear part of implementing the 2025 Integrated Resource Plan. (*Commenter: Doug Colclasure*)

Response: The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. A site-specific environmental review will be conducted when a new generation project is planned, alongside the project planning process and typically would include an opportunity for public involvement.

316. TVA also ignores the large land losses caused by fossil methane gas extraction in its analyses. (*Commenters: Drs. Joe and Sarah Schiller, William "Bill" Bell – 4-County EPA*)

Response: As noted in Section 5.2 of the EIS ("Land Resources" discussion, page 5-3), TVA quantifies "land requirements" by both the facility land requirements and life cycle land requirements. The life cycle land requirement is a measure of the land area transformed during the life cycle of a generating facility, expressed in terms of units of area per amount of electricity generated. This land measure includes lands used for fuel extraction or production, processing, and transportation.

317. There is no mention of all the water, land and air these projects will harm - not to mention the fact that we know these pipelines leak. (*Commenter: Holley E Roberts*)

Response: TVA will conduct the appropriate detailed impact analyses when it proposes actions to implement the IRP. While site- and implementing action-specific impact analyses are not possible at this time, the EIS generally describes the water, land and air impacts associated with the alternative generation resources. TVA

addresses environmental impacts of the IRP actions to water resources (Section 5.5.3), land resources (Section 5.5.4), and air quality (Section 5.5.1) in Volume 2 (EIS).

TVA is not responsible for the siting and operation of natural gas pipelines that may have to be built to serve new natural gas plants. Instead, TVA purchases natural gas service from pipeline companies that are responsible for constructing and operating the pipeline. Construction and operation of natural gas pipelines are subject to various state and federal environmental requirements, depending on how and where constructed. Typically, when a pipeline is built specifically to serve a new TVA plant, TVA would evaluate the potential environmental impacts.

318. TVA does not appear to consider Environmental Justice or equity impacts in its strategy evaluations. Can TVA explain how it plans to integrate EJ considerations into its decision-making process for future power plants or major facility projects. Also, we would like for TVA to adopt a more comprehensive siting strategy that truly reflects TVA's duty as a public resource steward. (*Commenters: Ann Livingston – Southeast Sustainability Directors Network, Gabriela Sarri-Tobar – Center for Biological Diversity, Maggie Shober – Southern Alliance for Clean Energy, Curtis Landry Baysinger, Ntale Kajumba – EPA Region 4, Madison Rollings*)

Response: In early 2025, Executive Orders addressing Environmental Justice were revoked and the CEQ regulations that implemented those orders were rescinded. As required by NEPA, TVA will continue to evaluate the environmental effects of future projects on all communities. When siting for generation projects and transmission line, TVA considers a wide variety of land options, including brownfields. For new projects, TVA has an established set of criteria that includes environmental, socioeconomic, economic development and energy/ transmission considerations. TVA works to avoid flood hazards, forested areas, national parks and forests, endangered species and critical habitats, historic places, streams and wetlands. In addition, TVA considers farmland protection, cultural resources and heritage sensitivity, and visual and sound implications on nearby communities.

TVA conducts a comprehensive environmental review under the National Environmental Policy Act for each new generation project in order to identify, avoid, minimize or mitigate any impacts to biological, cultural, community and socioeconomic resources. For new generation sites, TVA would prioritize the use of pre-disturbed brownfields over greenfield sites. For transmission line projects, TVA considers multiple route segment options and applies these criteria, then combines the route segments to choose the route.

319. On page 5-24, in Socioeconomic and Environmental Justice, TVA should consider more than individual incomes and employment. Social justice communities are also heavily concerned with impacts on property values, smells, noise (which can impact health), and their health. (*Commenter: Doug Colclasure*)

Response: When actions that would implement the IRP are proposed by TVA in the future, TVA would conduct site-specific environmental reviews to consider the potential impacts of those proposals on communities. In the tiered reviews, TVA would consider social and economic impacts to communities, including effects relating to economics, aesthetics, and public health.

320. By hardening infrastructure—in other words, reinforcing the region's reliance on polluting and fragile fossil fuel systems—TVA fails to minimize climate risk. Instead, TVA is putting lives at risk by delaying the transition to a distributed, renewable energy system. TVA's fossil fuel-centered approach to disaster response sends communities, disproportionately rural, low-income communities and communities of color, into a cycle of climate disasters and energy injustice. They will continue to be overburdened by increased exposure to pollution that exacerbate health conditions like respiratory illnesses, frequent and longer-lasting blackouts, and higher utility costs that lead to debt and potentially life-threatening utility disconnections. (*Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals:

low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

321. Limit dumping of recycled materials in lands that have no means to deal with these issues. (*Commenter: Lee Crowe*)

Response: When actions that would implement the IRP are proposed by TVA in the future, TVA would conduct site-specific environmental reviews to address the potential impacts of those proposals. During construction and operation of its facilities, TVA properly disposes of waste materials consistent with applicable regulations and requirements.

322. Section 4.9.5 identifies communities with EJ concerns near TVA power plants, but only 16 plants are included in the analysis without an explanation for why these plants were selected. The TVA currently has more plants, and the draft EIS outlines operational changes for some plants not included in the analysis. Further, this list of current plant locations may not be indicative of where the TVA's future operations may be sited. In short, this analysis does not contextualize the impacts of actions the draft EIS takes as given on communities with EJ concerns (e.g., coal plant retirements), nor does it attempt to contextualize potential impacts from the more uncertain aspects of the TVA's IRP. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: As noted in Section 4.8.2.3 of the EIS, the sixteen power plants addressed in the analysis are those that have communities nearby with demographic characteristics that differ from the regional norms. In early 2025, Executive Orders addressing the consideration of environmental justice in federal agency decision making were revoked. In addition, EO 14154 (Unleashing American Energy) directed the Council on Environmental Quality to remove their NEPA implementing regulations, including provisions addressing environmental justice communities; the rescission of CEQ regulations was finalized in early 2026. As required by NEPA, TVA will continue to evaluate the environmental effects of future projects on all communities.

H.2.5.6 Environmental Protection

323. Many commenters expressed general concern for the environment, earth and natural world, or support and/or opposition in relation to actions that impact the environment, lead to changes in weather and/or climate, and lead to conservation actions. (*Commenters: Carolyn Nieland, Thomas Nieland, Joanne, Sharon Baker, Jacqueline Knable, Paul J Palla, H Ande, Laura I Fries, Barbara Leinbachl, Deirdre Sandstrom, Patricia Rowell, Karmaletha Brown, John Bloom, Eugenia Stoker, Rachel Mercedes Verdugo, KGH Nicholes, Elaina Valzania, Carol Ann Brady, Helen Hays, Noel Parenti, Sharon Paltin, Priscilla Martinez, Margo Wyse, Lisa Scharin, Bob Bartlett, Barbara Coy, Lynda Daniels, Key Gloria, Charles Fletcher, Peter Scott, Cecile Lemay, Jane Foster, Sister Carol, Felipe Alvarez, Pawiter Singh Parhar, Vicki Smith, Robby Robinson, Derek Benedict, Paul Slentz, Valetta Seymour, Melissa Harris, Laura Edwards, Hannah E Cruse, Jim and Paula Grout, David And Tish Rainey, Rosanne Lovely, Rev. Aline Gaston Russell, D.Min., Evergreen Form Letter Commenters*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

H.2.5.7 Health and Safety

324. On page 5-4, coal ash should be described as "toxic coal ash" due to its large concentrations of heavy metals. This would be analogous to TVA's listing of "high-level radioactive waste". (*Commenter: Rosalie Bright*)

Response: The term is well understood. It is not necessary to revise them with additional descriptors, as suggested.

325. On page 5-6, section 5.2.1.1, the last paragraph should summarize the problems with storing coal ash or converting it into other products: ongoing risks of heavy metals and other toxins leaking or leaching from either

storage or the items, such as roadbeds and building supplies, that coal ash is used for [2-3]. (*Commenter: Rosalie Bright*)

Response: The paragraph has been updated to address TVA's management of these materials, which is subject to extensive requirements to ensure such impacts do not occur.

326. On page 3-14, in Figure 3-13, under Considerations, please:

- For Nuclear, change "Spent fuel disposal" to "Radioactive spent fuel disposal" to reflect the real long term harms that can come from radioactive spent fuel.
- For Hydro, add "Ecological impacts from dams and heated water".
- For Nuclear, Coal, and Gas, add "Ecological impacts from heated water" and "Dependence on unreliable water supply".
- For Coal, change "Waste disposal" to "Toxic Waste disposal", since one major problem with coal ash (the waste after coal combustion) is heavy metals and other toxins [2-3].
- For both Coal and Gas, add "Harmful air pollutants", to reflect the public health problems with emissions of particulates, NOx, etc., as summarized in the DEIS.
- Under Advantages, please:
- For Renewables, add "Resiliency of widespread small installations".
- For Renewables and Storage Advantages, add "Rapidly developing technology to improve performance". (*Commenter: Rosalie Bright*)

Response: Because the terms used by TVA in its EIS (cited in the comment) are well understood, it is not necessary to revise them with additional descriptors, as suggested.

H.2.5.8 Land Use

327. Please do not sacrifice prime farmland and disrupt food production. Support responsible agricultural practices. (*Commenters: Harry Eich, Timothy D Birthisel*)

Response: Land use and agricultural land changes are addressed in Sections 4.5 (current land and agricultural uses) and 5.5.4 (effects to land resources) in Volume 2, and metrics are also addressed in Appendix J.3 of Volume 1. A full list of average land use requirements for each of the nine portfolios can be found in Volume 2, Appendix C.

See Sections 5.2.3.5 and 5.2.3.6 in Volume 2 for a more detailed discussion of the impacts of constructing and operating solar facilities, including possible benefits.

Utility-scale solar farms typically require about 7 acres of land per installed megawatt of nameplate capacity. The majority of solar power purchase agreements currently operating and under contract are sited on greenfield property. TVA strives to leverage brownfield options for siting any resource type when practical and will pursue suitable opportunities for solar as they arise, such as the ongoing project to install solar on the Shawnee fossil plant reservation. Agrivoltaics, or dual-use solar that combines solar energy production with agricultural activities on the same land, is an emerging approach that may reduce solar programs and land use impact in the future.

TVA will consider best practices for land use, including possible use of already disturbed land, such as brownfield sites, when it proposes actions to implement the IRP.

328. Commonwealth of Virginia Department of Environmental Quality submitted numerous recommendations and requirements for activities conducted in the state to address environmental impacts to natural resources, state parks, dam safety, transportation, flood risk, and energy efficiency issues. (*Commenter: Valerie Fulcher – Virginia Department of Environmental Quality*)

Response: Because the IRP does not identify specific actions to be implemented, the EIS does not specify the types of mitigation measures, best management practices, and procedures that will be implemented by TVA to address potential environmental impacts. When actions that would implement the IRP are proposed by TVA in the future, TVA would conduct additional environmental review and identify relevant mitigation measures, BMPs, and other actions to address environmental impacts. TVA would also coordinate with the Commonwealth of Virginia to ensure that transportation, flood risk, and energy efficiency issues are appropriately considered and addressed during future TVA decision making processes.

329. TVA should explore land reuse opportunities for solar installations, such as brownfields, former generation sites, and capped landfills. Reusing these areas for solar not only leverages existing infrastructure but also minimizes new land impacts and promotes sustainable redevelopment. (*Commenters: David Stiles, Rachael Maitland – Tennessee Department of Environment and Conservation, Valerie Fulcher – Virginia Department of Environmental Quality, Rosalie Bright*)

Response: TVA prioritizes the use of current TVA generation sites for new generation, while also considering regulatory and technical constraints at a given site.

TVA is evaluating opportunities to repurpose coal combustion residual (CCR) units at our former and current fossil sites for solar generation. This program is currently piloting the first of these types of solar deployments (Project Phoenix) at Shawnee Fossil Plant in Paducah, KY. In addition to evaluating the efficacy of this pilot, TVA is also working with regulators to finalize the closure strategy for these units, which would impact potential solar generation.

330. Lastly, the reliance upon solar generation in several of the models, does not seem to fully take into account the impact on land usage and availability. We would hope that this impact would be fully taken into account. While we are agnostic on the utility of solar energy as part of the generation mix, it should be considered at what costs to the land and region as a whole, both now and in the future. We ask that this issue be revisited and weighed properly in consideration. (*Commenter: Scott Hendrix – Tombigbee Electric Power Association*)

Response: TVA considered these impacts in its review. TVA assessed the potential impacts of solar facilities on land usage in Sections 5.2.3.5 (Solar - Existing Facilities) and 5.2.3.6 (Solar - New Facilities) of Volume 2. Table 5-9 (Generic Construction Effects of Solar Generation Facilities (TVA Projects 2014-2023)) provides a summary of effects identified in environmental reviews of solar projects, including land use effects.

331. We don't want any solar panel utilities or battery storage facilities or wind utilities on farmland or within 1000 feet of residences. Keep solar and battery storage facilities and wind power plants on previously zoned industrial sites! (*Commenters: Millington Form Letter Commenters*)

Response: When selecting a site for any new generating facility, TVA considers a wide variety of land options, including brownfields. TVA has an established set of criteria that includes environmental, economic development and energy/ transmission considerations. TVA works to avoid flood hazards, forested areas, national parks, critical habitats, historic places, streams and wetlands. In addition, TVA considers farmland protection, cultural/heritage sensitivity, visual and sound implications on nearby communities. TVA conducts a comprehensive environmental review under the National Environmental Policy Act for each solar project in order to identify, avoid, minimize or mitigate any impacts to biological, cultural and socioeconomic resources. TVA would prioritize the use of pre-disturbed brownfields; however, as is the case for many brownfields, there is a cost to recover the site that sometimes precludes it from being acceptable.

TVA is in the process of assessing the effectiveness of constructing utility-scale solar on closed ash storage areas near our coal plants. The first of these would be at Shawnee Fossil Plant near Paducah, Kentucky. TVA

is also currently analyzing the best ways to repurpose closed fossil plants, which may include the addition of some solar/storage technologies.

H.2.5.9 Mitigation Measures

332. Expand the discussion of mitigation in section 5.6 of the draft EIS to include “best management practices, standard operating procedures, adaptive management practices, and comprehensive mitigation measures” as recommended by the December 18, 2014, memo from the Council on Environmental Quality (CEQ) on the Effective Use of Programmatic NEPA Reviews. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: TVA has added additional text to Section 5.6 and a link to a TVA.com webpage that includes links to *TVA Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities* and related guidelines and specifications for environmental protection specifications for construction, modification and maintenance of TVA facilities and transmission lines.

333. Identify, consider, and commit to reasonable mitigation measures to avoid, minimize, or compensate for potential adverse environmental effects (e.g., GHG emissions and climate change effects), including those that go beyond regulatory compliance and permitting requirements, such as Best Available Control Technology level controls at all replacement generation projects and mitigation for SF6 emissions. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: Because the IRP does not identify specific actions to be implemented, the programmatic EIS does not specify the types of mitigation measures, best management practices, and procedures that will be implemented by TVA to address potential environmental effects to GHG emissions and climate change effects. When actions that would implement the IRP are proposed by TVA in the future, TVA would conduct additional environmental review and identify relevant mitigation measures, BMPs, and other actions to address those environmental impacts.

334. Describe how mitigation will influence selection of alternatives and be identified and monitored in subsequent project phases that tier from the IRP, consistent with the CEQ guidance. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: When actions that would implement the IRP are proposed by TVA in the future, TVA would conduct site-specific environmental reviews that tier from the IRP EIS. The environmental reviews will identify routine and non-routine mitigation measures. TVA tracks and monitors non-routine mitigation measures to ensure compliance, consistent with CEQ guidance.

335. We (the Commonwealth of Virginia Department of Environmental Quality) have several pollution prevention recommendations that may be helpful in constructing or operating this facility: DEQ’s Office of Pollution Prevention provides information and technical assistance relating to pollution prevention techniques and EMS. (*Commenter: Valerie Fulcher – Virginia Department of Environmental Quality*)

Response: The Commonwealth of Virginia Department of Environmental Quality submitted numerous recommendations regarding pollution and outlined requirements for activities in the state that may result in pollution. TVA has an Environmental Management System and appreciates the recommendations for additional pollution prevention for future actions. When actions that implement the IRP are proposed by TVA in the future, TVA will conduct additional site-specific environmental reviews that tier from the IRP EIS and identify relevant mitigation measures, BMPs, and other actions to address environmental impacts.

H.2.5.10 Public Health and Safety

336. The Objectives of Resource Planning and the IRP metrics should include the estimated costs and benefits of the impacts of the plans on public health. A plan that costs the least may actually turn out to be the most expensive for the resulting healthcare cost, lost work productivity, and deaths suffered by impacted people. The

DEIS analyzed "social costs", which included health costs, and that analysis should be reflected here. Further, because public health and other social costs are direct and quantifiable, they should be included, as they were in the DEIS. (*Commenter: Rosalie Bright*)

Response: Pursuant to Section 113 of the Energy Policy Act of 1992, portfolio optimization in the IRP analysis evaluates impacts of expansion paths on system cost that encompasses only those costs that are "direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance."

TVA's integrated resource planning is grounded in least-cost planning principals, in alignment with Section 113 of the Energy Policy Act of 1992. These least cost principles include balancing the following goals: low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. For more on TVA's least cost-planning requirements, please see Section 3.1 of Volume 1.

337. As there are Environmental Justice implications in resource selection, an assessment of the public health impacts of different resource strategies should be included in the NEPA review. (*Commenter: Gil Hough – TenneSEIA*)

Response: The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. Rather, the EIS includes general discussions of resources within the TVA region. TVA will conduct the appropriate detailed impact analyses when it proposes actions to implement the IRP.

338. On page 5-4, for Environmental Justice, TVA says it will do an assessment of potential health impact to communities. It is implied that it will only consider direct exposures. I'm confident the communities also want an assessment of the indirect health effects of overall air pollution and greenhouse gases because they will be at risk from them, as well. In fact, the health and social effects (as described in the DEIS) of each energy source, in the quantities of energy proposed, are of interest to everyone and should be reported here. (*Commenter: Rosalie Bright*)

Response: The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. Rather, the EIS includes general discussions of resources within the TVA region. TVA will conduct the appropriate detailed impact analyses when it proposes actions to implement the IRP.

339. Beginning on page 5-42, TVA includes human health in its calculations of the social costs of greenhouse gases. Please mention much earlier in the DEIS, and also in the DIRP, that TVA is addressing human health, even if it is combined with other types of impacts. (*Commenter: Rosalie Bright*)

Response: Human health is an important consideration and was addressed in several sections of the IRP environmental analysis. In addition to addressing human health in its Climate and Greenhouse Gases section (Section 5.5.2), human health is addressed in other sections of the EIS, including Section 4.2.4 (Hazardous Air Pollutants), Section 4.4.2 (Surface Water), Section 4.5.2 (Vegetation and Wildlife), and Section 5.5.7 (Socioeconomics).

340. Please consider your TVA residents and the added harms from burning millions more tons of coal and increasing use of methane gas plants and adjust your 2025 IRP for a cleaner and safer energy future. (*Commenters: Illinois Coal Form Letter Commenters*)

Response: TVA's integrated resource planning is grounded in least-cost planning principles, in alignment with Section 113 of the Energy Policy Act of 1992. These least-cost principles include balancing the following goals:

low cost, risk informed, environmentally responsible, reliable and resilient, diverse, and flexible. Specifically, in conducting least-cost planning, TVA must comply with the following requirements in Section 113 of the Energy Policy Act of 1992:

- The least-cost planning program “evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service...at the lowest system cost”;
- System cost encompasses only those costs that are “direct and quantifiable net costs for an energy resource over its available life, including production, transportation, utilization, waste management, and environmental compliance”; and
- In addition to cost, the planning process will also consider “necessary features for system operation,” including diversity of resources, reliability, dispatchability, and other factors of risk.

Based on these requirements, TVA does not set a goal or target for emissions in its IRP. For more on TVA's least-cost planning requirements, please see Section 2.1 of Volume 1.

In the near term, the IRP Recommendation's Strategic Portfolio Direction states that TVA's IRP analysis reaffirms the importance of adhering to least-cost planning principles to ensure the continued delivery of affordable, reliable, and resilient power to the Tennessee Valley. The results underscore that no single resource will fully meet future system needs; rather, maintaining a diverse portfolio remains essential. In the near-term, TVA should prioritize the addition of firm, dispatchable resources, particularly natural gas and storage, to address capacity requirements. TVA should also continue collaborating with industry and federal partners to prepare for the potential deployment of firm, dispatchable advanced nuclear technologies, which could support long-term load growth while mitigating fuel volatility and regulatory risks. Finally, complementary deployment of solar, demand-side, and distributed generation resources should be used to satisfy capacity requirements, provide economic energy, and/or meet customer needs.

H.2.5.11 Public Involvement

341. Finally, the Sierra Club encourages TVA to make public in a docket or other publicly available online resource all public comments and testimony it receives on the IRP as soon as possible and before issuance of the final IRP. By making such material available without being requested, TVA could help ensure that commenters in particular and the general public at large are better able to see commonalities and points of divergence among people submitting information to TVA as part of the Draft IRP process. (*Commenter: Zachary Fabish – The Sierra Club*)

Response: TVA has made all public comments and testimony received during the draft IRP and EIS public comment period available on the [tva.com/irp](https://www.tva.com/irp) webpage.

H.2.5.12 Socioeconomics

342. TVA's EIS does not adequately address potential impacts to communities with environmental justice concerns. TVA's analysis is not as detailed as it should be. (*Commenter: Ntale Kajumba – EPA Region 4*)

Response: The discussion on impacts to low-income communities, minority communities, and Tribes are addressed in the final EIS in Section 5.5.7. In the discussion, TVA explains that because the IRP is programmatic, the plan and EIS do not address the future siting and construction of generating facilities nor provide site-specific analyses of the potential impacts to nearby communities of a proposal. In the section, TVA describes the general impacts associated with various generation resources, including the potential system average costs of the nine different core portfolios.

In January 2025, Executive Orders addressing the consideration of environmental justice in federal agency

decision making were revoked. In addition, EO 14154 (Unleashing American Energy) directed the Council on Environmental Quality to remove their NEPA implementing regulations, including provisions addressing environmental justice communities. CEQ's rescission of its procedures were finalized in early 2026. As required by NEPA, TVA will continue to evaluate the environmental effects of future projects on all communities. For future site-specific projects to implement the IRP, TVA will conduct a comprehensive environmental review for each new project in order to identify, avoid, minimize or mitigate any impacts to biological, cultural, community and socioeconomic resources.

H.2.5.13 Solar Siting

343. Plan agrivoltaics on crop and grazing pastures. (*Commenter: David Bezanson*)

Response: TVA is open to what might be possible for additional use of solar farms. Currently there are no plans for concurrent use of solar farms, but TVA works closely with research partners and solar developers to vet ideas in the future. Some of TVA's existing solar projects where TVA purchases the power utilize sheep grazing as a method of site maintenance. This practice is implemented by the solar developer and/or owner.

344. Among [TVA's false assumptions] is the assertion that commercially ready renewable energy strategies have the largest impact on land resources. This statement mistakenly assumes that all the land on which solar development occurs is lost to agriculture. This completely ignores the growing agrivoltaics movement that is finding ways to leverage solar to keep land in agriculture. It also ignores the nascent and rapidly expanding opportunity to site solar on water bodies—a resource TVA has in abundance. (*Commenter: William "Bill" Bell – 4-County EPA*)

Response: TVA is open to what might be possible for additional use of solar farms, including agrivoltaics and water body siting. Currently there are no plans for concurrent use of solar farms, but TVA works closely with research partners and solar developers to vet ideas in the future.

345. TNC recommends that TVA acknowledge in the EIS that smart solar siting has the potential to reduce impacts to wildlife by following the mitigation hierarchy:

- Avoidance: Using natural resource mapping data to avoid areas of conservation concern;
 - Minimization: Designing utility-scale solar facilities with wildlife-friendly fencing or unfenced wildlife passageways; retaining or planting vegetation/trees in buffers; buffering streams and wetlands; planting native and pollinator vegetation; and protecting and restoring onsite wildlife habitat features (e.g., wetlands); and
 - Compensatory mitigation: Offsetting impacts by undertaking conservation activities elsewhere.
- (*Commenter: Lindsay Hanna – The Nature Conservancy*)

Response: TVA reviews all solar sites prior to awarding purchase power agreements and approving solar projects for construction by third party solar companies. TVA's subject matter experts conduct a project screening review of all proposed solar projects to determine potential on-site constraints and sensitive resources. TVA's Transmission organization also reviews to determine upgrade needs and feasibility. The project screening and Transmission reviews inform TVA's decision-making process by outlining potential impacts, which helps determine which projects receive a purchase power agreement. The NEPA environmental review is also critical in informing developers of additional site constraints identified during field studies and mitigation requirements after a purchase power agreement is signed during the design phase.

H.2.5.14 Solid and Hazardous Waste

346. We encourage all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately. This includes securing and preventing leakage from coal ash "lagoons." (*Commenter: Valerie Fulcher – Virginia Department of Environmental Quality*)

Response: TVA will follow all applicable state and federal regulations and include best management practices for pollution and solid waste management when it proposes actions to implement the IRP. Solid and hazardous waste is addressed in Volume 1, Appendix J.5 (Waste Intensity), and Volume 2, Sections 4.7 (Affected Environment - Solid and Hazardous Waste), 5.5.5 (Fuel Consumption Anticipated), and 5.5.6 (Waste Impacts Anticipated).

347. TVA should clarify the safe and secure storage and "disposal" of spent fuel rods, including those already in facilities. (*Commenters: Jan Berry – Citizens' Climate Education, Robert Stuart, Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: Solid and hazardous waste is addressed in Volume 1, Appendix J.5 (Waste Intensity), and Volume 2, Sections 4.7 (solid and hazardous waste affected environment), 5.5.5 (fuel consumption anticipated), and 5.5.6 (waste impacts anticipated), with nuclear waste being specifically addressed in Sections 4.7.2 (current) and 5.2.2 (anticipated impacts).

After it is removed from the reactor, spent fuel is stored at the nuclear plants in pools (steel lined, concrete vaults filled with water) inside the plant. Currently, TVA, like other utilities, stores spent fuel at all three nuclear plants in above-ground dry storage casks constructed of concrete and metal and placed on concrete pads inside of the plant security perimeter.

TVA anticipates continuing to store spent fuel, after material is significantly cooled, on the nuclear plant sites in spent fuel pools and dry casks until a centralized facility for long-term disposal and/or reprocessing is operating. TVA has constructed additional dry cask storage capacity to store more spent fuel on its nuclear plant sites. The production of low-level nuclear waste is expected to remain relatively constant, but could grow in portfolios with nuclear expansion.

348. IRP EIS pp.4-55, Mixed Waste. After stating that there is no place to dispose of mixed waste, the table shows that mixed waste was disposed of in 2017. This narrative begs two questions: 1) where was the waste sent for disposal; 2) what is done with the waste that can't be disposed of? (*Commenter: Jan Berry – Citizens' Climate Education*)

Response: TVA states in its mixed waste discussion that it is "extremely difficult" to find a permitted outlet for disposal of mixed wastes (Section 4.7.2), not that there is no place for mixed waste disposal. TVA disposes of these wastes consistent with state and federal laws, rules, and regulations.

349. The IRP analysis includes five metrics related to environmental responsibility—direct CO₂ emissions, CO₂ intensity, waste consumption intensity, waste intensity, and land use intensity. Waste intensity is similar across all portfolios given similar assumptions regarding end-of-life dates for coal plants and a limited analysis of waste byproducts. TDEC recommends that TVA expand its waste considerations to include waste associated with non-coal energy sources, recognizing that as coal is phased out, other energy technologies, including renewable and nuclear, will require comprehensive waste management strategies. Currently, the IRP's focus on coal combustion residuals limits TVA's ability to adequately plan for future waste from decommissioned solar panels, batteries, and nuclear materials. (*Commenter: Rachael Maitland – Tennessee Department of Environment and Conservation*)

Response: Comment noted. TVA disposes of waste consistent with state and federal laws, rules and regulations. The IRP EIS is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction, operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. Rather, the EIS includes general discussions of resources within the TVA region. TVA will conduct the appropriate detailed impact analyses, when it proposes actions to implement the IRP, including waste management.

H.2.5.15 Threatened and Endangered Species

350. The Center for Biological Diversity (CBD) submitted comments regarding TVA's handling of listed species and impacts to wildlife species in general.

In its comments, CBD states that in its Draft IRP/DEIS, TVA neglected to:

- Adequately address the impacts of TVA's ongoing operations on threatened and endangered species;
- Analyze the impacts of any of the activities contemplated in the IRP to any specific listed or proposed-listed species, or to any specific species' proposed or designated critical habitat;
- Address any specific impacts to countless non-listed species of conservation concern for any impacts arising from TVA's programmatic activities as reflected in the IRP;
- Perform any impacts analysis to any specific species or its habitat whatsoever;
- Include a section on species impacts in Chapter 5 ("Anticipated Environmental Impacts"), only providing one page of content describing in the most abstract generalities topics related to the broad swath of imperiled species in the TVA operating region.

Because TVA's operations "may affect" numerous listed species, CBD states that TVA must, at minimum, obtain a Biological Opinion concerning/evaluating the adverse impacts of its operations on these species that will include measures TVA is required to take to minimize harms/those impacts, as well as insure that TVA's activities are not likely to jeopardize any listed species or adversely modify critical habitat.

CBD states that TVA has failed to carry out any conference or consultation duties in conjunction with the preparation of the IRP and DEIS. Before issuing a FEIS, TVA must remedy these omissions by, at a minimum, preparing a programmatic biological assessment for listed species and their critical habitat. For programmatic planning actions such as TVA's IRP, the BA is an appropriate first step in determining whether formal consultation with federal wildlife agencies may be required. Without a programmatic biological assessment, TVA cannot meet its obligation to insure that its actions are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat.

Additionally, CBD suggests TVA's duties to prepare a programmatic biological assessment and confer with the Services must be carried out simultaneously with the preparation of the IRP's EIS. TVA also:

- Must confer with the Services regarding the impacts of agency action to species proposed for listing under the ESA, and for impacts to proposed critical habitat;
- Should perform a similarly thorough examination of the impacts of every other aspect of the IRP to determine on which species Section 7 consultation is required;
- Must confer and consult on all species indicated by the U.S. Fish and Wildlife Service's IPaC system as being potentially present, for example, in the coal mining regions from which TVA derives its coal; and
- TVA should preemptively initiate the ESA Section 7 conference process for these species because of the likelihood of a listing decision and critical habitat designation being made by the Services before TVA has a chance to act on its final IRP.

Finally, TVA's search for potentially affected species and habitats must be broad and all-encompassing. CBD recommends that the FEIS must fully explore/analyze the reasonably foreseeable environmental impacts/effects of:

- Cradle-to-the-grave operations on listed and proposed species and their habitat and designated or proposed critical habitat areas at every stage along TVA's supply chain and energy production and distribution infrastructure;
- Dam and impoundment construction and operation, and the coal industry's activities, and specific impacts of the construction, maintenance and operation of utility infrastructure and road infrastructure on each species and on all others for which impacts can be reasonably foreseen;

- Road construction and operation activities resulting from and occurring due to TVA's operations, or coal and fracked gas energy sources, on all amphibians present in the TVA region;
 - [TVA's] full suite of activities on species among many other impacted species and critical habitats; and
 - Unavoidable adverse impacts to all species and their habitat including listed or proposed species, and non-listed species, and their designated and proposed critical habitat within TVA's sphere of influence.
- (Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity)

Response: The IRP EIS (Volume 2) is a programmatic environment analysis that does not itself authorize any site-specific actions, such as the construction and operation of new generating facilities. Consequently, the EIS does not contain site-specific analyses of the potential impacts of each of the IRP alternatives on these resources. Rather, the EIS includes general discussions of aquatic life (Section 4.4.4), vegetation and wildlife (Section 4.5.2), and threatened and endangered species (Section 4.5.3) within the TVA region. These descriptions are followed by a discussion of how impacts to these resources would be addressed during facility siting and review processes when specific proposals to implement the IRP are considered (Section 5.1). Threatened and endangered species were highlighted in the discussion given the additional mandate TVA has to consider effects to these species.

TVA has revised Section 4.5.3 to clarify that TVA has made a broad no effect determination at the programmatic EIS level because of both the inability to quantify effects across the entire TVA region and the conceptual (i.e., not site specific) nature of the proposed actions in the programmatic EIS. As the IRP is implemented with site-specific actions, TVA would conduct site-specific analysis and consult with the U.S. Fish and Wildlife Service per Section 7 of the Endangered Species Act procedures as warranted.

TVA will consider mitigation of any impacts through siting and facility design processes at the time additional environmental reviews are conducted for site-specific actions implementing the IRP.

H.2.5.16 Water Resources

351. In addition to risks posed by the capture equipment, there is a risk that carbon dioxide injected into saline aquifers could migrate into groundwater or induce seismicity in surrounding areas. Moreover, as carbon dioxide is injected into geologic formations, the increased pressure will necessitate the removal of brine which may be contaminated with heavy metals, naturally occurring radioactive material, or other contaminants. (Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity)

Response: Carbon capture and sequestration is addressed in Volume 2, Section 4.5.1.1 (Geologic Carbon Dioxide Sequestration Potential). When the CO₂ capacity of the formation into which it is being injected has been reached or when the pressure of the formation or injection well has reached a pre-determined level, CO₂ injection stops and the wells are permanently sealed and monitored (NETL 2010a, NETL 2015). The suitability of a particular underground formation for CO₂ storage is described for several different geologic formations in the text. Further effects of sequestration will be addressed, as appropriate, with regard to future projects at the time those projects are being proposed.

352. On April 24, 2024, the EPA issued a final rule: Supplemental Effluent Limitations Guidelines (ELG) and Standards for the Electric Power Generating Point Source Category...update references to and quotations of language from the proposed ELG rule to reflect the final rule and its contents. (Commenter: Ntale Kajumba – EPA Region 4)

Response: The text in the final EIS has been updated to reflect the latest USEPA rulemaking relating to ELGs.

353. TVA acknowledges in its Draft IRP/DEIS lifecycle emissions analysis that the extraction, processing and transportation of fossil fuels harms water quality. The process of extracting gas through fracking requires massive amounts of water, depleting vital water resources that communities near extraction sites rely on. Furthermore, chemicals used in fracking pollute aquifers and drinking water with dangerous toxins such as

petroleum hydrocarbons, including benzene and xylene. About 55 fracking chemicals could cause cancer. (*Commenter: Gabriela Sarri-Tobar – Center for Biological Diversity*)

Response: Natural gas units play an important part in ensuring reliability of the bulk electric system and enhancing system flexibility. IRP implementation projects would be the subject of a separate environmental review for the site-specific action with opportunities for public involvement.

354. TNC recommends that TVA expand this section to consider not just GHG impacts of pumped storage, but all potential ecosystem and social impacts. (*Commenter: Lindsay Hanna – The Nature Conservancy*)

Response: TVA will conduct tiered NEPA reviews for future site-specific actions to implement the IRP. These reviews will include analyses of the site-specific effects of those proposed actions, tiering from this IRP EIS only to the extent that the information necessary to conduct any site-specific analysis is already covered in the EIS. TVA has prepared an EIS to assess the potential impacts of proposed pumped storage facilities. The final EIS was released in November 2025.

H.2.5.17 Wildlife

355. Best management practices need to be put in place to protect natural resources including: planting of native pollinator plants in the buffer areas of the planned facilities (E9), development of an invasive species management plan for these projects (E9), placement of wind turbines where they will not harm birds (107), and a bird deterrent system on wind turbines. (*Commenters: Valerie, Valerie Fulcher – Virginia Department of Environmental Quality*)

Response: Because the IRP does not identify specific actions to be implemented, the EIS is a programmatic review and does not specify the types of mitigation measures, best management practices, and procedures that will be implemented by TVA to address potential environmental impacts. When actions that would implement the IRP are proposed by TVA in the future, TVA would conduct additional environmental review and identify relevant mitigation measures, BMPs, and other actions to address environmental impacts.

TVA has implemented special measures to improve habitat for certain projects and will consider best practices to protect natural resources in the site-specific environmental reviews that will be completed when it proposes actions to implement the IRP. TVA also considers mitigation of any impacts through siting and facility design processes at the time additional environmental reviews are conducted for site-specific actions.

H.2.6 Other

356. Please do not succumb to political pressure for the latest woke agenda or political crony that will line the pockets of China or some other foreign adversary. (*Commenter: Harry Eich*)

Response: Thank you for your comment.

357. Common Sense !!!! (*Commenter: Larry Benvenuti*)

Response: Thank you for your comment.

358. Please make decisions based on Sustainability & Integrity rather than greed & deceit. (*Commenter: Scott Laxier*)

Response: Thank you for your comment.

359. PLEASE, DO THE RIGHT THING (YOU'LL FEEL SOOOO GOOD!!!) (*Commenter: Alene Carol Burrell*)

Response: Thank you for your comment.

360. Please Listen to Us. Thanks (*Commenter: Tina Brown*)

Response: Thank you for your comment.

361. My Transition Pasadena and Foothills Citizens Climate Lobby groups are calling for all our communities to support each other's goals of ecological changes in government, corporations and hyperlocal economies.
(*Commenter: Mary Fitzgerald*)

Response: Thank you for your comment.

362. Climate Crisis Deniers CANNOT claim to love their Children, OR their Children's Children!!! (*Commenter: Sven Erik Pedersen*)

Response: Thank you for your comment.

363. Electricity for buildings has been the return of profit from services across the land as long as I could remember but starting it's run was a hardship for property owners on that which would have been a homeplace to setting goods to be like a light upon a hill to the townspeople within the dark. Time and space helped Electricity to work worldwide outside to inside a cell captured a theory vital to all. A light, a generator, and a line of a special end plugs currently compatibility components taking innovation into a profitable turn. Perhaps the overture from foreigners to the ship leading to World War 1 helped along future needs but it was also the want to of dominant men. Those people and these people including us have been alive but as I have been away from great health I had been always placing payments to KUB. Time doesn't wait when space becomes filled in to turn over more generations I hope the Electricity Company continues to profit marginal to setting goods and then to services world wide at a low cost. Thank you. (*Commenter: Angel*)

Response: Thank you for your comment.

364. Debris should have a place to walk across into Arkansas (*Commenter: Mary Ann Bell*)

Response: Thank you for your comment.

365. Disaster Preparedness Need: Natural and Terrorist Attack

Use recent disasters as a guide.

- North Carolina, Hurricane Helene
 - FEMA failure.
 - Politicization. Ignored Trump supporters
 - Unprepared urbanize staff (didn't drive down "bad" roads)
 - Water was initial primary (!) need. Wells were contaminated.
 - There was no mention of sewer lift stations being damaged, but damaged lift stations will quickly required maintenance for health and safety reasons.
 - No electronic transactions, unable to purchase goods
 - Local volunteers
 - Public agencies projected long term reconstruction plans
 - Constructed temporary roads and paths

RECOMMENDATIONS

Emergency Health and Safety Electricity Needs:

- Seek immediate funding from the incoming Trump Administration to safeguard TVA's (and partners?) electronics from EMPs.
- TVA: Harden all basic electronics which support electricity generation from the plant to the local level.
 - Power plant operation
 - Dams, general operation
 - Maintenance Vehicles

- Transfer stations
- Emergency Vehicles
- Supply chain operations vehicles (Planes, trains, automobiles)

Work with all Local Utilities to safeguard the following

- Water: Local/Regional pumps for water towers. Essential needs:
 - Drinking
 - Residential sewer operation
 - Fire fighting
- Sewer: Local sewer pump stations
- Transfer stations

Work with State/County/Regional Public Safety to safeguard

- All vehicles need hardening
 - Police
 - Fire
 - Utilities
 - Other disaster preparedness (Admin/managers/staff)

Work with communications to safeguard

- Cell towers
- TV/Radio Stations
- Emergency Broadcast

Work with Military and National Guard to safeguard their vehicles and communications. (*Commenter: David Nelson*)

Response: Thank you for your comment. Public safety and the protection of TVA facilities and infrastructure remains a TVA priority.

366. I am asking for your support for taking to stop big oil and please take action and as soon as possible. (*Commenter: Bonnie Swinford – Sierra Club*)

Response: Thank you for your comment.

H.2.6.1 Comments Out of Scope

367. Federal regulations and incentives for green energy are fine. However, I think it's time to privatize the TVA. (*Commenter: Michael Ball*)

Response: Thank you for your comment. This subject is outside the scope of this review.

368. Please either build a miniature Golod Energy Pyramid, &/or initiate The Venus Project. (*Commenter: Anonymous 6*)

Response: Thank you for your comment. This subject is outside the scope of this review.

369. Like our manatee,s [sic] these underwater giants simply want to co-exist with mankind. Please remember that the maker of us all created these creatures and gave them their territory. Mankind is the invader and we should be the party who makes it possible for us to co-exist. (*Commenter: Christine Barwick*)

Response: Thank you for your comment. This subject is outside the scope of this review.

370. Does TVA, as a independent agency, have spending authority in Florida or esp Puerto Rico? Reconstructing it's [sic] grid as a majority decentralized wind/solar/tidal system could be a demonstration for regional reorientation for Texas independent grid or the N.E. states dependent on coal. (*Commenter: Gary Albrecht*)

Response: Thank you for your comment. This subject is outside the scope of this review.

371. The Tennessee Valley Waterways Authorities has plenty of resources and my ideas for the next 55 years so that this area does not become a food desert would be to have a global hydroponics desalination farms process to grow a [sic] abundance of fresh hydroponics farms foods along the Tennessee Valley Waterways Authorities because food needs water and the riverbanks of the Tennessee Valley Waterways Authorities is a great place to start but I am just a poor older adult lady that has many experiments in my head like filtering the water with the desalination process before it comes in contact with the hydroponics farms systems to have cleaned filtered water grow the food to have and abundance of foods to prevent this areas from becoming a food desert. (*Commenter: Angle Marie Davis*)

Response: Thank you for your comment. This subject is outside the scope of this review.

372. To make decisions which will result in more longwall mining of coal - or mining of coal by any method - ignores the impact that mining has already had on Illinois farmland and on the citizens who depend on it for a livelihood and for food. (*Commenter: Rev. Aline Gaston Russell, D.Min.*)

Response: Thank you for your comment. This subject is outside the scope of this review.

373. The 12 M tons of coal burned by TVA during both 2022 and 2023 may have come from the Sugar Camp Mine in Illinois. Foresight Energy is the owner of Sugar Camp Mine and Deer Run Mine that is a few miles away from my home. Believe me, farmers are invaded by the coal operator and the control over their property is gone. IDNR has been wonderful to coal operators, but its obligations to the state of Illinois and to coalfield residents are not met. Longwall mining has damaged farmland, water resources, economic development, and emits methane. Who wants to breathe coal dust, to endure flooded fields, and to drive over cracked-bumpy roads? (*Commenter: Mary Ellen DeClue*)

Response: Thank you for your comment. This subject is outside the scope of this review.

374. Pledge and ensure TVA will keep your Illinois coal rights in the ground. TVA claims to be ending its use of coal as part of its move to clean energy systems. The future of the approximately 64,689 acres TVA coal rights in the area of the Sugar Camp Mine in Franklin, Jefferson, and Hamilton Counties, Illinois, is a critical concern. Similar concerns extend to other areas of Illinois, such as the Pond Creek Mine, Williamson County, and other TVA coal rights in the state. It is difficult to comprehend how TVA can claim to be ending coal usage while enabling coal mining to continue across tens of thousands of acres for many decades ahead. (*Commenter: Joyce Blumenshine*)

Response: Thank you for your comment. This subject is outside the scope of this review.

375. If TVA is committed to moving to clean energy, we ask you to stop decades of more harmful climate change impacts from coal and declare that you will not facilitate the mining of any more coal from its Illinois mineral rights. We urge you to know that longwall mining of your TVA coal rights causes prime farmland subsidence in Illinois, making flat, efficient-to-farm fields uneven, and causing long-term drainage problems. I ask TVA to carefully consider the costs of climate change caused by mining and burning your 680 million tons of Illinois coal rights. This will only add to the rapid progress of climate change. Clearly, the impacts of Hurricane Helene on TVA residents and communities show climate change is worse and can turn life up-side-down for tens of thousands of TVA residents. The human suffering and losses, and billions of dollars in damages to your people should tell TVA that it is more important for you to keep your Illinois coal rights and keep that coal in the ground. (*Commenter: Illinois Coal Form Letter Commenters*)

Response: Thank you for your comment. This subject is outside the scope of this review.

376. I am writing to urge you to solidify this commitment by holding onto your remaining mineral rights. TVA has enough coal in reserves -- to the point that they are scheduled to close coal plants by 2035 -- and handing

these rights over to coal companies will only make your clean energy goals impossible to achieve. If you sell these rights, coal mine operations will only cause more damage to water, air, farms, and homes in nearby communities. The coal will then be sold to other countries, creating greenhouse gas emissions through transportation and burning. (*Commenter: Coal Form Letter Commenters*)

Response: Thank you for your comment. This subject is outside the scope of this review.

377. I would like to start by saying you are impacting many homes along with decreasing home values through this effort. My farm neighbors this large block of land where I live. Over 100 areas of run-off comes from this land travels through my property. My livestock drinks water from the run off caught in ponds from this property that would impact my livestock and property once dirt work starts. There are also proven facts of solar panel equipment leaching out harmful chemicals into the soil which would drain onto my property. Also, Indian artifacts have been found along the ditch that runs through the property of Tim May. If this project proceeds forward I will be contacting my lawyer to proceed with legal action! (*Commenter: Shane Whitfield*)

Response: Thank you for your comment. This subject is outside the scope of this review.

378. However, I was not impressed with the coal ash "lagoon", as it were, which did not seem to be secure. It has had leaks since then, and we can do better, especially with coal firing in drastic, overdue decline. [at Kingston plant]. (*Commenter: Dale Tomlinson*)

Response: Thank you for your comment. This subject is outside the scope of this review.

379. Vote vote vote (*Commenter: Abiodun Badejo*)

Response: Thank you for your comment. This subject is outside the scope of this review.

380. Everyone needs the ability to vote whether by mail or at the ballot box. (*Commenter: Claudia Rushlow*)

Response: Thank you for your comment. This subject is outside the scope of this review.

381. Democrats and independent voters must work together. We are the future of our Democracy! (*Commenter: Patricia Roles*)

Response: Thank you for your comment. This subject is outside the scope of this review.

H.3 Index of Commenters

Following is a list of the commenters, their affiliations, and the identification number(s) of the comment statements to which they contributed. In a few cases, handwritten names were difficult to read and the names listed below are TVA's best interpretations. This index is divided into two sections. The first section lists those who submitted individual comments. The second section lists the signers of each of the form-style comments. Form-style comments are identified by the name of the form (as listed above in Section H.1).

H.3.1 Individual Commenters

Anonymous 1, Retired, Las Vegas, NV, 147
Anonymous 2, 151
Anonymous 4, 147
Anonymous 6, B.A.I., Muncie, IN, 368
Anonymous 7, 185
Anonymous 8, Nashville, TN, 100, 150, 151, 210, 282, 283
Anonymous 9, 217

Anonymous 10, 137, 193, 271
Anonymous 11, Self, Bristol, VA, 82
Abbott, Ramsey, Maryville, TN, 174
Abkowitz, Kendra, Metropolitan Government of Nashville and Davidson County, Nashville, TN, 4, 9, 46, 94, 125, 204, 212, 230
Acerro, Theresa, Chula Vista, CA, 186
Acker, Mark, TVA Employee, Madison, AL, 38, 178, 275
Acree, Gene, 130
Ailey, John, Ailey Solar Electric, Tullahoma, TN, 186
Alabama Department of Environmental Management, 14
Albrecht, Gary, Brandon, MS, 370
Alvarez, Felipe, Mississippi Realty, New York, NY, 323
Ammons, Sharon K, Memphis, TN, 271
Ande, H, South St. Paul, MN, 323
Anderson, Amy, Spring Hill, FL, 185
Andrews, Penelope, Hermon, ME, 150
Angel, Knoxville, TN, 363
Angelus, Joshua, Joshua M Angelus, Waterbury, CT, 185
Applebaum, Morris, Interfaith Green Network, Berwyn, IL, 151
Arko Hargrove, Barbara, Hammond, IL, 155
Avery, Daniel G, Retired, Butte, MT, 135
Badejo, Abiodun, Wooster, OH, 379
Bahlinger, Rev. Clifford, St Luke Lutheran, Cordova, TN, 135, 137, 271
Baker, Sharon, Goshen, IN, 323
Ball, Michael, Brighton, MI, 367
Banks, Michael Ray, 4-County EPA, Columbus, MS, 138, 184
Banks, Diane, Nashville, TN, 147
Bartell, Lee, Eastham, MA, 193
Bartlett, Bob, Nature Conservancy, White Bear Lake, MN, 323
Barwick, Christine, Johnson City, TN, 369
Bass, Nathaniel, Self, Oak Ridge, TN, 4, 22, 35, 70, 100, 139, 150, 158, 169, 172, 210, 233, 267, 274, 275
Batch, Ray, Lake Oswego, OR, 155, 186, 271
Beckler, David, Administrator Annual Council for TVA Annual Employees, and Advisor, NABTU, Lenoir City, TN, 129, 243
Begley, Michael, Denver, CO, 151
Beirs, John, Hillshire Hive, Asheville, NC, 151, 216
Bell, Mary Ann, Citizen, Memphis, TN, 364
Bell, William "Bill", 4-County Electric Power Association, Columbus, MS, 5, 40, 44, 48, 53, 55, 61, 70, 106, 119, 316, 344
Belton, Patrick, Nashville, TN, 271
Benedict, Derek, Lynnwood, WA, 323
Bennett, Beau, US Native Power, Reno, NV, 186, 196, 271
Benvenuti, Larry, Marathon, USA, 357
Berarducci, Tim, Farragut, TN, 210
Bergman Brown, Christa, Potsdam, NY, 147
Berry, Jan, Citizens' Climate Education, Greenback, TN, 9, 15, 16, 26, 35, 39, 42, 48, 49, 60, 65, 68, 72, 81, 104, 114, 163, 165, 177, 197, 200, 271, 347, 348
Bezanson, David, PhD, Santa Cruz, CA, 65, 72, 153, 210, 214, 216, 245, 277, 343
Bielaczyc, Sara, Nashville, TN, 151, 267
Billingham, Lynn, Maryville, TN, 150, 281, 282
Bills, Nancy and Sam, 147

Birthisel, Timothy D, Terra Sub Aqua, Asheville, NC, 186, 327
Blackman, Jay, Sierra Club, East Meadow, NY, 192
Blake, Veronica, Port Huron, MI, 186
Bleicher, Michael, Morrow, GA, 146
Bloom, John, Las Cruces, NM, 323
Blumenshine, Joyce, Peoria, IL, 65, 117, 127, 146, 152, 158, 169, 171, 176, 177, 374
Bob, Human Race, Chicago, IL, 147
Bordenkircher, David, Nashville, TN, 44, 104, 119, 127, 156, 169
Borgquist, Ronald B, Innova Concept Engineering, Inc., Columbus, OH, 161
Bosold, Patrick, Self, Fairfield, IA, 151
Bowers, Sheila, Santa Monica, CA, 136, 192, 197, 248
Boyd, Jo, Johnson City, TN, 185
Boyd, Irene, Nashville, TN, 117, 150
Brady, Carol Ann, Valley Forge, PA, 323
Brause, Dianne G, Satellite Beach, FL, 135
Brayer, Regina, Montgomery, TX, 137
Brenda, AL, 151
Brevard, Paul, AL, 91
Bright, Roselie, Retired Epidemiologist, 22, 29, 70, 122, 155, 158, 212, 302, 304, 324, 325, 326, 329, 336, 338, 339
Britton, Barbara, Lebanon, TN, 90
Bronkema, Don, Washington, DC, 193
Brooks, Christopher, Knoxville, TN, 150
Broome, Claire, Berkeley, CA, 5, 151
Brown, Lee, Franklin, TN, 210
Brown, Donna, LCV, Minden City, MI, 150
Brown, Karmaletha, Sugar Creek, MO, 323
Brown, Tina, North Chesterfield, VA, 360
Brown, Mitch, Boilermakers, Big Rock, TN, 129, 243
Brubaker, Katherine, Environmental Defense Fund, Washington, DC, 5, 7, 8, 21, 34, 84, 101, 104, 127, 151, 152, 168, 190, 204
Bruff Sanders, Larry, 4-County Electric Power Association, Columbus, MS, 138, 184
Buchi, Russell, TIPL, Nashville, TN, 150
Burke, Dana, Frankfort, IL, 146
Burrell, Alene Carol, Tucson, AZ, 359
Bushey, Gary, Citizen, Wakefield, NH, 185
Bussey, Trey, Southern Environmental Law Center, Energy Alabama, Sierra Club, Appalachian Voices, Young Gifted & Green, Alabama Rivers Alliance, and Protect Our Aquifer, Nashville, TN, 5, 35, 37, 44, 45, 48, 53, 59, 62, 64, 65, 73, 74, 84, 93, 151, 263, 274, 312
Butch, Tom, Salem, OH, 186
Byrnes, Cecelia, Bronx, NY, 151
Callender, Andrew, Cookeville, TN, 121, 147
Campbell, G Ann, Dalton, GA, 160, 187
Cannon, Brigid, Columbus, OH, 170
Canright, Rebecca, Comeback Farm Organic Produce, Asbury, NJ, 147, 150
Canty, Ken, Dudley, MA, 185
Cargman, Jered, Bisbee, AZ, 186
Carlson, Doug, Resident, Chattanooga, TN, 36, 45, 151, 158, 170
Carlson-Bancroft, Sally, TIPL, Nashville, TN, 146
Carman, Sandra, Woonsocket, RI, 186
Carney, Jason A, Tennessee Solar Energy Association (TSEA), Nashville, TN, 192

Carol, Sister, Sisters of the Most Precious Blood of O'Fallon, Missouri, O'Fallon, MO, 323
Carpen, Mitch, Jersey City, NJ, 151, 284
Carroll, Randy E, EMEPA, Meridian, MS, 38, 138, 235, 260
Carswell, Donna Z, Huntingdon Valley, PA, 146
Cassebaum, Anne M, Elon, NC, 150
Cathcart, Emily, Watertown, TN, 104, 169
Cawthorn, Mary, Maryville, TN, 5, 44, 117, 156, 168
Cawthorn, Richard, Maryville, TN, 117, 150
Chastain, David, Athens, AL, 231
Chesebrough, Caroline, Cleveland Heights, OH, 192
Christ, M'Lou, Seattle, WA, 151
Christensen, John, Eastern Panhandle Central Labor Council WV, Martinsburg, WV, 136
Christensen, Vicki, Louisville, TN, 104, 117
Christman, David, Athens, GA, 155
Christoffer, Fred, Knoxville, TN, 231
Christopher, Thomas, Maben, MS, 159
Ciani, Judith, Inverness, CA, 185
Ciolli, Donna, Chula Vista, CA, 135
Claiborn, William, Venice, FL, 150
Clock, Anne, Tucson, AZ, 194
Cobb, Sandra, Moreland Hills, OH, 155
Colby, Candace, Freeport, IL, 150
Colclasure, Doug, Self, Oak Ridge, TN, 315, 319
Conroy, Beverly Ann, Oak Park, IL, 186
Constantine, Chris, Las Vegas, NV, 192
Coons, Eric, United Association, Castalian Springs, TN, 129, 241
Cornfield, Ben, Crieve Hall Bagel Co, Nashville, TN, 170
Costello, Edward J, Santa Monica, CA, 186
Coursey, Victoria, Retired RN, Phoenix, AZ, 193, 213
Courtsal, Lyle, Port Townsend, WA, 151
Cowley, Peter J, Homeowner in Knoxville, Knoxville, TN, 151
Cox, Whit, Southern Renewable Energy Association, Little Rock, AR, 13, 30, 31, 53, 59, 60, 63, 84, 96, 111, 112, 117, 229, 245, 256
Coy, Barbara, Sarasota, FL, 323
Cribbs, Brian, Grand Island, NY, 152
Crim, David, Brookport, IL, 150
Croton, Bella, Kingsport, TN, 225
Crow, Haskell, Jacksonville, AR, 135
Crowder, Thomas "Marty", 4-County Electric Power Association, Columbus, MS, 138, 184
Crowder, Marty, Ackerman, MS, 50, 235, 242, 289
Crowe, Lee, Cookeville, TN, 155, 321
Crowell, Alex, Costa Electronics, Gallatin, TN, 174, 184
Cruse, Hannah E, Charlotte, TN, 117, 150, 155, 323
Cummings, Rebecca, Unicoi, TN, 53, 151, 165, 169, 221, 264, 266, 267, 269, 272, 279
Cunningham, Juliet, Hyde Park, MA, 297
Curtis, Anne, Tennessee Interfaith Power and Light, Chattanooga, TN, 147
Daniels, Lynda, Sierra Club, Carlsbad, CA, 323
Darbro, Michelle, Fort Lauderdale, FL, 185
Davenport, Cindy, Oceanside, CA, 186
Davidson, Kathryn, Austin, TX, 193
Davis, Myles, Milford, MI, 193

Davis, Don and Cindy, Piney Flats, TN, 137
Davis, Angle Marie, Self, Rogersville, AL, 371
DeClue, Mary Ellen, Litchfield, IL, 79, 125, 155, 33
DeGraphenreed Smith, Vetrel E, Nashville, TN, 186
Diehl, Jim, Homeowner living on Wheeler Lake, Athens, AL, 247
Dietrich, David, Blue Hill, ME, 151
Dillehay, Randall, Spring City, TN, 178
Dion, Patricia, Strongsville, OH, 186
Doak, Hartson, Humanity, Pearl City, HI, 186
Dodds, William Russell, 4-County Electric Power Association, Columbus, MS, 138, 184
Doepker, Dan, Tiffin, OH, 186
Dohmen, Josh, Self, Huntsville, AL, 147
Donelon, Jane, Brunswick, ME, 147, 151
Donoho, Travis, Third Act Tennessee, Knoxville, TN, 151, 168
Doug, Reynolds, IN, 186, 197
Smith, William M, Jr, Lake Placid, FL, 185
Driese, Steven G, Knox Climate Watch, Knoxville, TN, 167
Dunbar, Scott, Clean Energy Buyers Association, 4, 81, 84, 106, 117, 119, 121, 208, 229, 252, 263, 275
Duncan, Jake, Vote Solar, Chattanooga, TN, 36, 72, 81, 84, 87, 94, 95, 100, 101, 118, 119, 125, 208
Durham, Cody, Tishomingo County Electric Power Association, Tishomingo, MS, 243
DuVivier, Joseph A, NRDC, AAAS, UCS, Fort Bragg, CA, 151
Dwight, Timothy, Solar Integrators, Iowa City, IA, 151
Edmondson, Shawn, Natchez Trace EPA, Houston, MS, 184
Edwards, Laura, Seat Hubbard UMC, Nashville, TN, 117, 150, 323
Eich, Harry, Bowling Green, KY, 174, 178, 184, 281, 327, 356
Elder, Blake, Coalition for Community Solar Access, 118, 208, 211
Elliott, Vivian J, Tarpon Springs, FL, 185
Emerson, Lawrence, Electric Vehicle Association of San Diego, National City, CA, 160, 185, 217
Ercelawn, Ann, Nashville, TN, 150, 151
Ernie, Citizen, Washington, NJ, 186
Fabish, Zachary, The Sierra Club, Washington, DC, 18, 20, 31, 33, 38, 45, 48, 53, 54, 55, 56, 57, 64, 70, 81, 84, 95, 96, 117, 119, 126, 133, 141, 190, 192, 197, 251, 286, 341
Faby, Ellen, Clinton, TN, 44, 82, 104, 119, 151
Falik, Eugene, Solutions by Design, Far Rockaway, NY, 185
Fedorov, Karen, Bealeton, VA, 193
Firestone, Lynne, Evanston, IL, 186
Fister, Alan, Nashville, TN, 186
Fitzgerald, Mary, Transition, Citizens Climate Lobby, Pasadena, CA, 361
Fleishman, Jane, Third Act TN, Nashville, TN, 150, 300
Fleming, Susan, CVF, Salt Lake City, UT, 151
Fletcher, Charles, YZMC, Mountain Center, CA, 323, 130
Flynn, John, Sewanee, TN, 137
Folks, C.B., Maryville, TN, 268
Foster, Jane, National City, CA, 323
Foster, Genette, Pasadena, CA, 192, 197
Franklin, Joe, Third Act TN, Johnson City, TN, 4, 104, 125, 149, 151, 193, 271
Frazer Brouillette, Judy, Columbus, GA, 150
Freeman, Beth Jane, Wantagh, NY, 177, 186
Friedman, Elisa, Personal, Nashville, TN, 186
Fries, Laura I, Feline Fairies Cat Rescue, St. Augustine, FL, 323
Frohn, Joyce, Oshkosh, WI, 185

Frye, Richard, Yakima, WA, 151
Fuentes, Ivan, Orlando, FL, 150
Fulcher, Valerie, Virginia Department of Environmental Quality, Richmond, VA, 186, 192, 285, 328, 329, 335, 346, 355
Galliani, Joe, Redondo Beach, CA, 150, 151
Garber, Elizabeth C, Individual, Nashville, TN, 117, 152
Gardiner, Sandra, Retired, Lexington, MA, 150
Gatcomb, George, Rochester, NH, 155
Gates, Joanne L, Peterborough, NH, 151
Gaylord, Virginia, Self, Ashland City, TN, 171
Geldof, Jonathan, ACORE, Washington, DC, 4, 47, 60, 77, 81, 93, 95, 105, 198, 243, 245, 251, 252, 254, 256, 258, 263
Gem, Alice, Wallington, Surrey, England, 193
Gholz, Barbara D., Falls Church, VA, 147
Gibbons-Benton, Jessica, Elevate Consulting, Nashville, TN, 155, 185
Gilliland, Jay, 4-County Electric Power Association, Columbus, MS, 138, 184
Ginn, Dana, Temecula, CA, 151
Gloria, Key, Shell Knob, MO, 323
Goeke, John, Citizen and MTE customer, Franklin, TN, 1, 155
Goldberg, Michael, Ocean Park Food Bank, Ocean Park, WA, 151
Goldfarb, Carole, San Diego, CA, 186
Gomes, Gabriel J, Fishkill, NY, 186
Goodmacher, Charles Dana, Do Good LLC, Rio Rancho, NM
Goodman Theurer, Mary, Minneapolis, MN
Gore, Duane, Trinity, FL, 186
Gregg, Paul, Electrical Engineer, IEEE member - Retired, Holmen, WI, 147
Groshardt, Joanne, Richardson, TX, 265
Grout, Jim and Paula, United Methodist Church, Brentwood, TN, 117, 150, 323
Grower, Julie, Hermitage, TN, 5
Guzdial, Tony, Shelby Township, MI, 150
H, Lee, Chattanooga, TN, 150
Hamilton, Christopher, Berkeley, CA, 150
Hamilton, Jon, Solar Alliance Southeast, Knoxville, TN, 267, 280
Hanna, Lindsay, The Nature Conservancy, Brentwood, TN, 21, 23, 26, 27, 35, 44, 46, 48, 53, 57, 59, 72, 82, 84, 101, 104, 106, 107, 117, 118, 119, 127, 155, 156, 189, 203, 204, 223, 233, 305, 307, 314, 345, 354
Hardin, Nancy, Oak Ridge, TN, 39, 172, 267
Harmon, Mary Ann, Garden Plain, KS, 151
Harris, Melissa, Telecom Training Corporation, Nashville, TN, 117, 150, 323
Harrison, Harry, Warwick, RI, 185
Hart, Sharon, Butler, TN, 150
Hartnagel, Mark, Saint Louis, MO, 273
Hassinger, Richard, Newton, MA, 151
Hatcher, Justin, KY, 138, 184
Haynes, Caleb, Church of the Nazarene, Nashville, TN, 151
Hays, Helen, Self, Walnut Creek, CA, 323
Haywood, Cheryl, Athens, TN, 137, 156, 168, 212
Heggison, Marge, Bradford, VT, 150, 177
Heinlein, Phil, Summerville, SC, 186
Heinz, Rita, Durham, NC, 150
Henderson, Donald W, PhD, Ithaca, NY, 150
Hendrix, Scott R, Tombigee Electric Power Association, Tupelo, MS, 38, 129, 178, 330

Henighan, Richard, Seymour, TN, 4, 48, 84, 176, 220, 257
 Henning, Susan, Self, Pittsboro, NC, 151, 282, 283
 Henry, Wendy, Manchester, NH, 185
 Hensley, Gary H, Private citizen, Maryville, TN, 178
 Herr-Rains, Cheryl, Vienna, ME, 298
 Herther, James N, Saint Paul, MN, 188
 Hild, Harvey, Marion, TX, 155
 Hill, Kathryn, Maryville, TN, 186
 Hindle, Pamela F, Tennessee Interfaith Power and Light, Knoxville, TN, 147
 Hirstein, Lee, Schaumburg, IL, 144
 Hodgkiss, Warren Clay, Harrisburg, PA, 150
 Hoffman, Thomas E, Watervliet, NY, 151
 Holder, Raymond, R.J.H. & A.I., Cedar Rapids, IA, 284
 Holdread, Joyce, Pagosa Springs, CO, 151
 Holland, Gabriele, Strafford, NH, 186
 Holtslag, James, Our Lady of Fatima Church, Maryville, TN, 155
 Hoos, Anne, Nashville, TN, 151
 Hough, Gil, TennesSEIA, Knoxville, TN, 6, 10, 23, 53, 59, 72, 73, 81, 84, 119, 208, 245, 337
 Howard, Lorella, Ooltewah, TN, 192
 Howell, Wesley, Dickson, TN, 130
 Hudson, Adrienne, Fort White, FL, 151
 Huff, Thad, Cleveland, TN, 178, 192
 Huffman, Leigh, Shelby County Government, Memphis, TN, 4, 35, 94, 104, 125, 204, 230
 Huffman, Leigh, City of Memphis, Memphis, TN, 4, 35, 37, 46, 94, 125, 204
 Hughes, Mark, Shoreline, WA, 186
 Hughes, Gary, Retired, Trinity, AL, 116
 Hunley, Elizabeth C, Alliance for Community Transformation East TN, Knoxville, TN, 150
 Isaacs, David L, New Albany, IN, 147
 Isaacs, Susan, Nashville, TN, 151, 169
 Jackson, Aimee, Aimee Jackson Design, St. Petersburg, FL, 146
 Jackson, Rebecca, Maryville, TN, 147, 151
 Jackson, Thomas, Maryville, TN, 150
 Jain, Katherine, Elders Climate Action, San Rafael, CA, 151
 Jamieson, Sita, Santa Fe Discovery Walking tours, Santa Fe, NM, 151
 Janeway, Nathan, Chattanooga, TN, 138
 Jaques, Karen, Sacramento, CA, 151, 176, 177
 Jennings, Jan, Ocoee, FL, 151
 Jins, R, Collierville, TN, 161
 Joanne, Sacramento, CA, 323
 Jobe, Kenneth, United Methodist Church, Nashville, TN, 146
 Johanson, Greg, Go Green Solar Solutions, Thousand Oaks, CA, 132, 236, 237
 Johnson, Philip, Retired, Durham, NC, 193
 Johnson, Maureen C., St. Louis, MO, 137
 Johnson, Johnny, 4-County Electric Power Association, Columbus, MS, 138, 184
 Johnston, Philip, Scotts Valley, CA, 137
 Jonas, Alfred, MD, MGM Behavioral, Miami, FL, 151
 Jones, Diane, Hillsborough, NJ, 193
 Jones, Jan, El Cerrito, CA, 147
 Jones, Virginia M, Oak Ridge, TN, 185
 Jones, Pam, Old Hickory, TN, 4, 44, 72, 95, 97, 117
 Jones, Ken, 4

Joranko, Daniel, Tennessee Interfaith Power and Light, Nashville, TN, 4, 70, 117, 126, 147
Kadish, William, Worcester, MA, 151
Kajumba, Ntale, Environmental Protection Agency Region 4, Atlanta, GA, 2, 4, 7, 19, 21, 22, 24, 39, 45, 46, 47, 81, 106, 107, 108, 119, 125, 149, 223, 253, 257, 259, 275, 290, 293, 294, 295, 306, 308, 318, 322, 332, 333, 334, 342, 352
Kantola, Angela T, Littleton, CO, 150
Kantor, James Stuart, ASDOTA, Raleigh, NC, 196
Kaplan, Ira, Oak Ridge, TN, 169
Kathryn, Huntsville, AL, 4, 146, 211, 271
Kay, Gray, Nashville, TN, 186
Keeling, Jack, Self, Chattanooga, TN, 83
Kelley, Don, Deadwood, SD, 150
Kingston, Bill, Self, New Castle, NH, 146
Kirberg, Emil, Plano, TX, 185
Kirshe, Mark, Self, Knoxville, TN, 179, 180, 182
Knaack, Dennis, Bronx, NY, 186
Knable, Jacqueline, Hendersonville, NC, 323
Knight, Dean, KY, 174
Knox Bagwell, Wilson, Crawfordville, FL, 186
Korn, Meryle A, Bellingham, WA, 162
Kurtz, Michelle, Scottville, KY, 177
Kurtz, Roger, Anacortes, WA, 137
Lachman, Margie, Beaverton, OR, 151
Lackey, Mercedes, Claremore, OK, 186
Lamberts, Francis, Ratepayer, Jonesboro, TN, 121, 150, 176, 177, 186, 208, 220, 228, 282, 283, 310
Lamborn, Suzanne P, Nottingham, PA, 143
Lance, Angelica, Self, Whitwell, TN, 117
Landry Baysinger, Curtis, Citizens' Climate Education, Nashville, TN, 81, 318
LaPlaca, Nancy, LaPlaca and Associates LLC, Boone, NC, 192
Larrabee, Mary, West Bath, England, 127, 178, 192
Laxier, Scott, Del Rey Oaks, CA, 358
Lefcourt, Philip A, Pasadena, CA, 151
LeinbachL, Barbara, Retired, Reading, PA, 323
Leiserson, Alan, Nashville, TN, 151, 170
Lemay, Cecile, Surrey, England, 323
Levesque, Paul, San Diego, CA, 186
Levin, Art, Pawtucket, RI, 135
Levin, Grace, City of Knoxville, TN, Knoxville, TN, 4, 35, 70, 204, 226, 230
Linakis, Michelle, Tampa, FL, 192
Linn, ML, Nashville, TN, 147
Little, Larry, Fairfax, VA, 185
Livingston, Ann, Southeast Sustainability Directors Network, Sarasota, FL, 3, 4, 35, 46, 70, 77, 80, 84, 93, 94, 101, 102, 118, 125, 137, 205, 221, 318
Logan, Joanne, Sierra Club, Third Act, Climate Reality Project, Hermitage, TN, 4, 84
Long, Marilyn, Knoxville, TN, 152, 155
Long, John E, Jr, Knoxville, TN, 38, 129
Long, G nol, TN, 174, 191
Look, Linda, Houston, TX, 151
Lovely, Rosanne, Nashville, TN, 186, 217, 323
Lynch, Dennis, Self, Memphis, TN, 95, 96, 151, 214, 220, 238, 240, 267, 274
MacNeil, d'Anne Y, Mesa, AZ, 150

Madison, TN, 181
Maffei, Kathleen, Aston, PA, 150
Mahan, Simon, Southern Renewable Energy Association, AR, 101
Mahathey, Bill, TN, 184
Main, Edward, Self, Houston, TX, 224
Maitland, Rachael, Tennessee Department of Environment and Conservation, Nashville, TN, 5, 30, 36, 38, 51, 76, 89, 178, 179, 208, 218, 227, 232, 233, 255, 278, 329, 347, 349
Mandich, Farah, US General Services Administration, Washington, DC, 10, 23, 43, 52, 53, 81, 84, 94, 95, 96, 97, 113, 119
Markey and Cohen, Congress of the United States, 31, 35, 46, 48, 53, 65, 70, 72, 82, 84, 119, 152, 168, 169, 208, 222, 245, 256, 264, 283
Marquardt, Michael R, Whitewater, CO, 150
Martin, Wendy, Belington, WV, 146
Martinez, Priscilla, Snoqualmie, WA, 323
Marx Woodward, Joan, Marana, AZ, 146
Mason, Karen L, Care for Creation Ministry at Our Lady of Fatima Church in Alcoa, TN, Maryville, TN, 117
May, Maureen Linda, Second Sunday Gardeners, Nashville, TN, 150
Mazzaferro, Deborah, Bradenton, FL, 186
McCann, Annie, Vote Solar, Venice, FL, 193
McCarthy, Pete, Midnight Auto Inc, Newton, NJ, 137
McCarthy, Shirley, Branford Clean Energy Committee, Branford, CT, 297
McClanahan, Jamie, Nashville, TN, 24, 44, 70, 119, 146, 210
McCloy, Marjorie, Salt Lake City, UT, 151, 158
McColgan, Jane, San Clemente, CA, 185
McConnell, Lawrence, Self, Pleasant View, TN, 169, 171, 188
McCord, Leah, CleanUpTVA Coalition, Knoxville, TN, 4, 5, 82, 84, 95, 169, 283
McDaniel-Gilman, Stephanie, Missoula, MT, 271
McDougall, Alec and Sandy, McDougall, Mount Vernon, WA, 186
McGay, John, Retired, Fyffe, AL, 180
McGlumphy, David, Toccoa, GA, 178
McGrath, Sean M, Alcorn County Electric Power Association, Corinth, MS, 39, 65, 138, 235, 239, 243, 244, 245, 252
McGrew, Rebecca, NACCO Natural Resources, Plano, TX, 19, 25, 26, 28, 32, 42, 46, 59, 67, 83, 129, 130, 131, 138, 139, 156, 159, 166, 235, 253, 257, 281
Mcintyre, Karen, Sierra Club MTG, Nashville, TN, 151, 152
McLaughlin, Barry, Hobe Sound, FL, 210
McLean, Michael, Chicago, IL, 182
Mejia, Marianna, Soquel, CA, 186
Melton, Stella, Rogersville, TN, 147, 179
Mercedes Verdugo, Rachel, Cosa Mesa, CA, 323
Merendino, Caleb, 186
Miller, Richard, Washington, DC, 185
Miller, Brant, Climate Reality Project, Nashville Chapter, Antioch, TN, 4, 84, 95, 97, 104, 150, 210
Miller, Patricia, Climate Reality Project, Nashville Chapter, Antioch, TN, 4, 84, 95, 97, 104, 150, 210
Miller, Floyd, AL, 174
Mimms, Miriam, Nashville, TN, 151
Minault, Kent, Sierra Club, Knoxville, TN, 4, 39, 84, 119, 134
Minerovic, Constance, Northfield, OH, 146
Mitchel, Magdalen, Tennessee Interfaith Power and Light, Nashville, TN, 151
Mitchell, James, Farragut, TN, 183, 243
Mitchell, Nancy, Hilton Head Island, SC, 271

Mody, Shalin, Across Alabama.org; Energy Alabama, Huntsville, AL, 9, 101, 103, 123, 210
Montemayor-Thomas, Sofia, Acton, MA, 155
Mooney, Elizabeth, Portsmouth, NH, 147
Moore, Ruth, Huntington Woods, MI, 147
Moore, Robert, Wake Forest, NC, 186
Moorman, Frankie L, Pontotoc Electric Power Association, Pontotoc, MS, 235, 281
Morelock, Audra, CleanUpTVA, Knoxville, TN, 4, 84, 95, 97
Morrow, Thomas, Finleyville, PA, 155, 181
Mosse, Claudio, Nashville, TN, 147
Moulton, Shirley, PCC, TEC, Ashland City, TN, 82, 104
Munro, Nancy, Oak Ridge, TN, 147
Murphy, Linda, Jackson, TN, 174, 191
Murray, Gia, Rancho Mirage, CA, 185, 252
Musser, Ellyn Z, Sandy Springs, GA, 155
Nadler, Richard S, Boynton Beach, FL, 151
Nadler, Carole, Nashville, TN, 146
Naylor, Milton, Ratepayer, Chattanooga, TN, 186, 197
Neal, Jim, Nacogdoches, TX, 185
Needleman, David Berney, San Francisco, CA, 151
Nelson, Pam, Individual, Warner Springs, CA, 186, 248
Nelson, David, Concerned Citizen, Huntsville, AL, 365
Nevin, Carolyn, Third Act TN, Powell, TN, 150, 155
New, Robert, Rutland, VT, 186
Niccum, Charles F, Upland, IN, 142
Nicholes, KGH, Martinsdale, MT, 185, 323
Nicoson, Mark Jorgen, Cleveland, TN, 4, 35, 46, 271
Nieland, Carolyn, UUFHCT, Alamo, TX, 323
Nieland, Thomas, UUFHCT, Alamo, TX, 323
Noethen, Scott, TenneSEIA – Distributed Committee, Knoxville, TN, 36, 118, 209, 210, 243, 244, 245
Novkov, Russell, Madison, WI, 150
Nygard, Kendall, Go Green Energy LLC, Bokeelia, FL, 186
O'Guin, Roxanne, Centerville, TN, 186, 147
O'Kennon, Martha R, Albion College Emerita, Albion, MI, 193
Oliveira, Tyler, Huntsville, AL, 271
O'Malley, Polly, Los Angeles, CA
O'Neill, Tracy, Preserve Cheatham County, TN, 36, 81, 100, 125, 171, 210, 228, 246, 252, 257, 271, 274, 275
Ordway, John, Aurora, CO, 186
Orton Hodges, Karen, Charlotte, NC, 151
Overby, Gary, Sister Bay, WI, 147
Owens, Emma, Knoxville, TN, 150, 156, 168
Owens, Debra, Franklin, TN, 147
Paine, Ophelia, Nashville, TN, 151, 202
Palla, Paul J, Greencastle, PA, 323
Paltin, Sharon, Laytonville, CA, 323
Pantano, Cristian, Sora, Italy, 185
Panucci, Michele, Nashville, TN, 150, 152
Parenti, Noel, Clemmons, NC, 323
Parker, Jennifer, Los Angeles, CA, 151
Pasqua, John, Escondido, CA, 185
Patel, Bhasker, Afro-Asian Energy Development Consortium Inc, Sunnyvale, CA, 185
Paul, Knoxville, TN, 147, 176, 177

Pedersen, Sven Erik, Alamosa, CO, 362
Peek, Mike, 161, 178, 192
Pendergrass, Michael, TN, 159
Petty, Maddie, Emeren US, Norwalk, CT, 119
Phelps, Peggy, Clarendale, Nashville, TN, 155
Phillips, Joyce Elaine, Tazewell, TN, 159
Phillips, Matilda, Democratic Party, Winston Salem, NC, 186
Phypers, Mindy, Tucson, AZ, 151
Pielach's, Tom, Mesa, AZ, 193
Pierucci, Shelley, Arleta, CA, 193
Pike, John, Prairie Village, KS, 151, 206
Piper, Courtney, Tennessee Advanced Energy Business Council, Knoxville, TN, 4, 31, 39, 53, 56, 65, 93, 117, 148, 173, 179, 197, 210, 217, 229, 248, 252, 261, 263, 267, 275
Pire, Pa, Wauwatosa, WI, 185
Poggioli, Nicholas, 4
Pope, Holly, Austin, TX, 192
Popiel, Sandie, Newport, TN, 186
Power, Nancy, Rockingham, NC, 150
Powers, James S, Pleasant View, TN, 151
Price, Don C, Davis, CA, 299
Prince, Anthony, Community Foundation of Greater Chattanooga, Chattanooga, TN, 151
Pujals, Joaquim M, Reading, NJ, 151
Queener, Elizabeth, Nashville, TN, 193
Rainey, David and Tish, Nashville, TN, 117, 150, 323
Rawn, Ken, Self, Ashland City, TN, 199, 268
Ray, Gayle, TIPL, Nashville, TN, 185
Reichert, Robyn, School, Lake Worth, FL, 193
Riall, David, Sierra Club TN, Chattanooga, TN, 170
Richards, James, Nuclear Innovation Alliance, Washington, DC, 31, 42, 52, 54, 57, 66, 110
Rigers, Dus, Former Jackson Co Econ Dev and Former Chair of TVA RERC, Jackson, TN, 178, 180
Roberts, James S, Dallas, TX, 193
Roberts, Holley E, SAGE-TN, Johnson City, TN, 152, 155, 169, 317
Robinson, Robby, Olympia, WA, 323
Rocco, Chuck, Simi, CA, 146
Roles, Patricia, Louisville, KY, 381
Rollings, Madison, City of Chattanooga, Office of Sustainability, Chattanooga, TN, 4, 37, 46, 66, 70, 80, 230, 271, 318
Rosebaugh, D.J., Eagleville, TN, 155, 156
Roser, Elena, Self, Ashland City, TN, 171
Rouse, David, Self, Bristol, VA, 151
Roush, Jeffry Graham, Yucca Valley, CA, 185
Rovetti, Corinne, Knoxville, TN, 56, 58, 147, 149, 151
Rowell, Patricia, Alexandria, VA, 323
Rowland, Elizabeth, Knoxville Beloved Community Circle, Knoxville, TN, 147, 149, 151
Roy, William, TN, 130, 183
Rueth, William, Blue Ridge, GA, 152, 248
Rushlow, Claudia, Sisters of Charity of Seton Hill, Tucson, AZ, 380
Rushton, Emma, Climate Nashville, Nashville, TN, 117, 150
Russell, Rev. Aline Gaston, D.Min., PCUSA and Sierra Club, Alton, IL, 127, 151, 323, 375
Salone, Margo, Shubuta, MS, 150
Sandstrom, Deirdre, Retired, Portland, OR, 323

Sarri-Tobar, Gabriela, Center for Biological Diversity, Washington, DC, 4, 5, 6, 17, 24, 35, 36, 37, 48, 59, 64, 72, 82, 84, 85, 95, 96, 104, 119, 125, 126, 134, 136, 146, 149, 150, 152, 155, 156, 164, 168, 170, 177, 202, 208, 210, 214, 222, 223, 228, 233, 248, 249, 252, 257, 264, 271, 274, 276, 282, 283, 287, 288, 296, 301, 303, 318, 320, 350, 351, 353

Scaff, Michael, Retired-TVA, Johnson City, TN, 263

Scharin, Lisa, Vote Solar/Taxpayer/Voter/Citizen, Fountain Inn, SC, 151, 185, 186, 323

Scheel, Tom, Flagstaff, AZ, 150, 271

Schieferecke, Angela, Prairie Village, KS, 185

Schiller, Drs. Joe and Sarah, Clarksville, TN, 24, 40, 44, 53, 61, 70, 86, 104, 106, 119, 120, 124, 316

Schmidt, William, Turn of the Century, Mansfield, OH, 146

Schmidt, Connie, Sierra Club IL, Warrenville, IL, 150

Schneider, Sari Rose, Retired, Mercer Island, WA, 186

Schultz, Jennifer T, Buffalo, NY, 186

Schwartz, Daniel, Chattanooga, TN, 186

Schwartz, Jason A, Institute for Policy Integrity at NYU School of Law, New York, NY, 291

Scott, Memphis, TN, 210, 271

Scott, Peter, Impromptu Action, Salt Lake City, UT, 323

Sen, L, Durham, NC, 150

Serafino, Stephen, Self, Camarillo, CA, 186

Serody, Lucille, Melbourne, FL, 151

Seymour, Valetta, Nashville, TN, 150, 151, 171, 186, 220, 323

Shea, Courtney, Tennessee Interfaith Power and Light, Knoxville, TN, 147

Shirey, William, Decatur, AL, 186

Shober, Maggie, Southern Alliance for Clean Energy, Knoxville, TN, 12, 24, 35, 44, 45, 46, 52, 53, 69, 72, 74, 75, 77, 78, 81, 82, 84, 93, 98, 99, 100, 101, 104, 115, 119, 125, 126, 157, 164, 190, 203, 208, 209, 210, 214, 219, 229, 245, 250, 252, 318

Shoun, Claire, Johnson City, TN, 150

Silver, Dan, Endangered Habitats League, Los Angeles, CA, 185, 284

Singh Parhar, Pawiter, DNC/DCCC, Sammamish, WA, 323

Skarada, Darcy, Kelseyville, CA, 147

Skvir, Connie, Delran, NJ, 186

Slentz, Paul, Nashville, TN, 117, 150, 323

Sliwka, Piotr, Private Resident of Virginia, Manassas Park, VA, 151

Sloane, Gaylene, Lakewood, OH, 6

Smart, Amy, Bethpage, TN, 150, 221

Smith, Hoyt, Citizen, Lebanon, TN, 174

Smith, Mark, Oconto Falls, WI, 186

Smith, Julie, Los Osos, CA, 193

Smith, Vicki, Blairsville, GA, 323

Smith, Carol F, Nashville, TN, 151

Smith, Sandra, Self, Nashville, TN, 117

Sonin, John S, Civilized Humanity, Douglas, AK, 155

Speck, Janice, Self, TN, 151

Speer Goodwin, Margaret, Green Sanctuary of USNH, West Haven, CT, 150

Spencer, Clifford, MA, MS, Portland, OR, 150

Spinner, Mark, Leland, NC, 185

Spradlin, Karen, Jacksonville, AL, 186

Spray, Eric, Lafayette, CO, 187

Stack, Jim, Phoenix EAA, Chandler, AZ, 186

Stafford, Fred, Public Power Review, 57

Stanko, Janet, Tampa, FL, 151

Staples, Joseph M, Lunenburg, MA, 151
 Stavis, Alex, New York, NY, 186
 Stehn, Lorraine, McAllen, TX, 151
 Stephenson, Jill, Flagstaff, AZ, 151
 Stetten, Nancy, Nashville, TN, 155
 Stiles, David, Centerline Communications, Chattanooga, TN, 329
 Stine, Robert, San Francisco, CA, 151
 Stines, Zachary, New Leaf Energy, 11, 53, 59, 71, 84, 119, 208, 245
 Stoia, Karyl, Friends of Belle Isle Salt Marsh, Lynn, MA, 135
 Stoker, Eugenia, Private Citizen; Retired MD, Tucson, AZ, 323
 Stone, MaryBeth, Tennessee Interfaith Power and Light, Nashville, TN, 117, 150
 Stoney, Shannon, Third Act TN, Cookeville, TN, 137, 207, 210
 Stout, Roger, Unicoi, TN, 53, 165, 169, 221, 266, 267, 269, 272, 279
 Strasburg, Jack E, WE, the World, Tucson, AZ, 450
 Straus, Hillary, Maitland, FL, 186
 Stroessner, Wayne, Retired High School Science Teacher, Random Lake, WI, 165, 186
 Strom, Mary, Greenville, SC, 262
 Stuart, Robert, Lincoln County Historical Association, Richmond, ME, 150, 177, 228, 347
 Sullivan, Linda, Self, Lombard, IL, 150
 Sullivan, Jared, Franklin, TN, 147
 Swafford, Carlson, Eco Demo Law PLLC, Chapmansboro, TN, 1, 36, 201, 203, 215, 249, 267, 270, 271, 292, 309
 Swartzfager, Helen, Ridgeland, MS, 193
 Swenson, Ruth, Individual, Helena, MT, 186
 Swinford, Bonnie, Sierra Club, 5, 88, 117, 137, 145, 146, 147, 150, 151, 152, 155, 167, 175, 186, 187, 189, 192, 197, 220, 234, 264, 274, 366
 Szabo, Anthony, Harrison, TN, 184
 Tahhan, Albert T, Quincy, MA, 147
 Tankersley, Mary, Individual/Family, Alcoa, TN, 117, 151, 154
 Taylor, Nicole, Las Vegas, NV, 150
 Teed, Cornelia, Bellingham, WA, 147
 Thomas, Charles, Duck Trails Farm, Luka, MS, 179
 Thomas, Dwayne R, Knowledgepanel, Merrillville, IN, 151
 Tidwell, Miranda, Climate Reality Project, College Grove, TN, 169
 Tiffany, Nashville, TN, 4
 Tomlinson, Dale, Phoenix, NY, 185, 378
 Tomlinson, Joan, Knoxville, TN, 151, 185
 Traina, Margaret, Charton, MA, 147
 Troy, Gail, Shipman, VA, 151
 Turner, Julie, Mobridge, SD, 151
 Twine, Jeff, Synerjy, New York, NY, 185
 Tzankova, Zdravka, PhD, Vanderbilt University, Nashville, TN, 126, 164, 168, 169, 170, 186, 275
 Ueleke, Brian, City of Germantown, Germantown, TN, 178
 Valente, Tom, Chicago, IL, 160, 186
 Valerie, Ontario, CA, 186, 284, 355
 Valzania, Elaina, Greenland, NH, 323
 Van Praag, Jane Leatherman, Bartlett, TX, 193
 Vanderveer, William, Appalachian Voices, Bristol, VA, 150
 Voehringer, John T, Jamestown, VA, 186, 197
 Wallace, Wayne David, Solar Source, Dunedin, FL, 248
 Wallace, Donald, Citizen, Lewisburg, TN, 235

Ward, Martha, Gatlinburg, TN, 53, 165, 169, 221, 266, 267, 269, 272, 279
 Waterman, John Todd, 4, 313
 Waybright, George, Carmel, IN, 185
 Weatherford, Kurtis, The Institute for Policy Integrity at NYU School of Law, New York, NY, 19
 Weaver, Brian, Public, Knoxville, TN, 140
 Weber, Mary A, Scottsville, NY, 146
 Weber, Stephen Gustav, Citizen, Knoxville, TN, 109, 138, 184, 195
 Wedekind, Suzanne, Knoxville, TN, 150
 Weinberg, Leslie, Stamford, CT, 186
 Weiner, Mary Ellen, Sandy Hook, CT, 147
 Weissman, Stephen, Asheville, NC, 151
 Wells, Jim, Medford Pears, Medford, OR, 147
 Welsford, Susan, Norton Shores, MI, 193
 Wetteman, Dr. Marhta, Pleasant View, TN, 137, 186, 190, 220, 311
 Whitfield, Shane, Blue Springs, MS, 377
 Whitten, Michael, UMWH, Peytona, WV, 297
 Wibe, Lauren, Huntsville, AL, 39, 41, 70
 Willett, Cynthia, Smyrna, TN, 138, 186
 Williams, Jordan, Knoxville, TN, 151, 211, 282
 Williams, Taffy, NY4Whales, Yonkers, NY, 137, 210, 284
 Williams, Diana M, Lacey, WA, 92
 Willis, Nashville, TN, 147, 178
 Wilson, Jeffrey V, Matthews, NC, 150
 Winland, Robert, Lebanon, TN, 174, 178
 Wiser, Thomas, Home, Rainsville, AL, 180
 Woodcock, Charlene M, Berkeley, CA, 150
 Wren, Memphis, TN, 228
 Wright, Ellen T, South Atlanta Progress, Grantville, GA, 150
 Wright, John, 167, 180
 Wyse, Margo, Mimbres, NM, 323
 Yoder, David, Valley Head, AL, 127
 Zimmerman, Pam, Santa Rosa, CA, 192
 Zinkiewicz, Crys, West End United Methodist Church, Nashville, TN, 146, 150

H.3.2 Form Commenters

H.3.2.1 Evergreen Form Letter, 5, 147, 151, 156, 168, 264, 282, 283, 323

Abrams, Christopher, TN	Atkinson, Reese, TN	Beck, Deborah, KY
Adams, Robert, NC	Atlakson, Carli, TN	Beder, Andrej, TN
Adams, Sharon C, TN	Atwater, Dianne, TN	Bentley, Marianne, TN
Adams, Shirley, TN	Baggett, Ruth, KY	Berge, Sheryl, TN
Adams, Wayne, TN	Bahlinger, Cliff, TN	Bespalec, Kris, TN
Allen, Patricia, TN	Bailey, Steven, TN	Beverly, Jequise, TN
Alsup, William, TN	Bailey, Tonda, TN	Bevis, Stacey, AL
Ameen, Arshad, TN	Baine, Brenda, TN	Birdsong, Sonja, KY
Andied, Rita, TN	Baker, Mallory, AL	Black, Jason, TN
Andrews, Joy, TN	Baker, Peggy, TN	Black, Rhonda, GA
Andujo, Cesar, TN	Barnes, Deborah, TN	Blake, Billy, KY
Anhalt, Matt, TN	Batchelor, M, TN	Blankenship, Jim, TN
Anyy, Ralph, TN	Bean, Joan, AL	Blanks, Erserline, TN
Arcangeli, Kathy, TN	Beard, Joanne, TN	Bohrman, Heather, TN
Arnold, Ardarian, KY	Beaton, Kathleen, TN	Boren, Ronald, TN
Arredondo, Dee, TN	Beavers, Billy, TN	Borreson, Brent, TN

Bower, Stacy, TN
 Bowers, Corinna, TN
 Bowman, Sandra, TN
 Braconnier, Benoit, AL
 Brady, Michael, AL
 Branham, Olivia, TN
 Braswell, Randy, TN
 Brawner, Deborah, TN
 Brazell, Linda, TN
 Brisolara, William, TN
 Brooks, Debra, TN
 Broussard, Phillip, GA
 Brown, Dafreda, TN
 Brown, David, TN
 Brown, Joyce, TN
 Brown, Joyce, TN
 Brown, Judy, TN
 Brown, Lorraine, TN
 Brown, Monica, TN
 Brownlee, Kaye, TN
 Bruce, GD, TN
 Bruner, Anthony, TN
 Bryan, Stacey, AL
 Bryant, Patrice, TN
 Buck, Dana, TN
 Bullock, Brandi, TN
 Burgess, Lauren, TN
 Burgin, John, TN
 Burks, Jan, TN
 Burston, Alda, TN
 Burton, B.A., TN
 Busby, Chris, TN
 Butler, Elizabeth, KY
 Butler, Sharon, TN
 Byram, Beverly, TN
 Byrd, Lauren, TN
 Byrd, Zeldia, TN
 C, Jen, TN
 C, W, KY
 Cacioppo, Judy, AL
 Caldwell, Jason, TN
 Caldwell, Zandre, TN
 Calhoun, Jeffrey, TN
 Cannon, Kenneth, TN
 Cannon, Pam, TN
 Carey, Jami, TN
 Carlson, Keith, TN
 Carp, Janie, TN
 Carter, Sheri R, TN
 Carvel, Richard, TN
 Cashman, Deldrie, TN
 Caso, Mark, MS
 Castleberry, Mary L, AL
 Chambers, Charles, AL
 Chase, John, TN
 Cherry, Shanitta, TN
 Clark, Bill, TN
 Claybrooks, Brittany, TN
 ClaytonClayton, JohnathanD, TN

Cloud, Caroline, AL
 Cobb, Robert, TN
 Cole, Deborah, TN
 Coleman, Anne, TN
 Coleman, Margaret, TN
 Collins, Wendy, TN
 Comstock, Tracy, AL
 Conley, Regina, AL
 Connor, Riley O, AL
 Cooper, Barbara, TN
 Cooper, Charlene, TN
 Cox, James, GA
 Crawford, David, KY
 Crawford, Jerry, KY
 Cress, Benita, TN
 Cricksmith, Amber, TN
 Cross, Jimmy, TN
 Crouch, Phyllis, TN
 Crowley, Mark, KY
 Csrbaugh, Joyce, TN
 Culver, Emily, TN
 Culwell, Jan, KY
 D, Tara, TN
 Daigle, Kayla, TN
 Dalton, Stefanie, TN
 Daniels, Jodi, AL
 Darby, Lynetta, TN
 Darby, Marsha, AL
 Dare, Cheryl, TN
 Dart, Jenny, TN
 Darwin, Marilan, TN
 Davis, Barbara A, TN
 Davis, Brenda, TN
 Davis, Laurie, TN
 Davis, Priscilla, TN
 Dawson, Cheryl, TN
 Deamues, William, TN
 DeGrie, Nancy, TN
 DeLay, Sam, TN
 Deming-Plunk, Jackie, TN
 Diersing, Eli, TN
 Dobbs, Rachel, TN
 Dohrmann, Ella, TN
 Dowell, James G, TN
 Drake, Frederick, AL
 Drexler, MaryEvelyn, TN
 Drumright, Chris, TN
 Dullea, Lindsay, AL
 Dunn, Mike, AL
 Dunn, Ron, TN
 Duplessis, Katherine, TN
 Duplissis, Eve, TN
 Dycus, William, TN
 Dymond, Dighan, AL
 Dyson, Ada Sue, TN
 Eaton, Rochelle, VA
 Eberhardt, India, TN
 Edwards, Madeleine, TN
 Eladma, Ibrahim, GA

Elkin, Nora, GA
 Elliot, Dottia, TN
 Elrod, Virginia, GA
 Etters, Samantha, TN
 Everton, Walter, TN
 Fancher, Beth, TN
 Farmer, Myra, TN
 Ferguson, Crystal, TN
 Fingerman, Robert, TN
 Finley, Beverly, TN
 Flaishans, Jackie, MS
 Fleisher, Tim, KY
 Fletcher, Marshall, TN
 Flottman, Spencer, TN
 Ford, Devonne, AL
 Ford, Jessica, TN
 Ford, Lillian, TN
 Fortner, Pastor, Mary, AL
 Franklin, Jennifer, TN
 Fred, Wright, AL
 Fredrickson, Barb, TN
 Freire, Helena, TN
 Frost, Mary Ellen, TN
 Fullenwider, G, NC
 Fuller, Michael, TN
 Gaddes, Sharon, TN
 Gaddy, Jr, James, TN
 Gaitor, Brandon, TN
 Gallamore, Lucy, TN
 Gardner, Jacob, TN
 Gardner, Jarred, TN
 Gardner, Michael, TN
 Gardner, Susan, TN
 Gardner, Tye, TN
 Garner, Larry, TN
 Gerlich, Marissa, TN
 Gibson, Jonathan, TN
 Gilbert, Sherie, TN
 Gill, Patricia, TN
 Gillaspie, Richard, TN
 Gilreath, Chris, TN
 Gladden, Michelle, TN
 Glenn, Andree, TN
 Golden, Patricia, AL
 Gordon, Alesia, TN
 Gordon, Lisa, TN
 Gover, Gary, AL
 Gray, Cortoria, TN
 Greathouse, Jerel, AL
 Green, Inger, TN
 Green, Inger, TN
 Groves, Keith, TN
 Guaitoli, Gianluca, KY
 Guinn, Krusten, TN
 Guthery, Dale, TN
 H, Shelby, TN
 Hailey, Heather, TN
 Haley, Rita, TN
 Hall, David, TN

Hall, III, Harold, TN
Hall, Jennifer, TN
Hall, Johnny, KY
Hall, Mary Ellen, TN
Hall, Matthew, KY
Hamilton, David, TN
Hancock, Ruby, TN
Handley, Edward, KY
Haney, Tim, AL
Hanserd, Gregory, TN
Hardesty, Marita, TN
Harding, Ashley, AL
Harper, Rhonda, TN
Harper, William, TN
Harrison, Norma A, TN
Harrison, Randy, TN
Hatcher, Cindy, TN
Haug, III, Fredric, TN
Haverland, Michelle, TN
Hayden, Catherine, TN
Hayes, Peggy, AL
Headrick, Angela, TN
Heard, Xavier, TN
Heidel, Kamie, TN
Helland, Edward, TN
Helmholtz, Leila, TN
Henley, Amelia, TN
Henry, Valerie, TN
Henson, Juanita, TN
Hernandez, Vicente, AL
Herricott, Katie, AL
Herring, Allison, TN
Hill, Kathryn, TN
Hill, Kimberly, TN
Hill, Lowanda, TN
Hines, Carolyn, TN
Hockley, Bruce, AL
Hoehne, Angela, AL
Hoffman, Rachel, NC
Holland, Patricia, TN
Holland, Yvette, TN
Hollingsworth, Amanda, TN
Holman, David, TN
Holtslag, James, TN
Hopkins, Michael, TN
Horne, Margaret, TN
Horton, Leslie, TN
Horton, Rebecca, KY
Horton, Rebecca-Ann, KY
House, Rhonda, TN
Howell, William, TN
Hulet, Laura, TN
Hunt, Chet, TN
Hunt, Leanna, TN
Hunt, Stephen, AL
Hunter, John, GA
Hutsell, Hardin, TN
Hyde, Kenneth, AL
Hyde-Berkan, Lisa, TN

Iles, Paul, MS
Inaba, Aria, TN
Ippolito, Benito, TN
Irvin, Robert, TN
Jackson, Grace, TN
Jackson, Juliette, AL
Jackson, Kelvin, TN
Jackson, Mary, TN
Jacobs, L, TN
Janda, Amanda, TN
Jeck, Leona, TN
Jimmy, Jimmy, AL
Johnson, Andy, TN
Johnson, Elizabeth R, TN
Johnson, James, TN
Johnson, Tammy, AL
Jones, Barbara, TN
Jones, Charmaine, TN
Jones, Danielle, VA
Jones, Pat, TN
Jones, Ruby, TN
Joshi, Vijay, TN
Joyner, TaWanda, TN
Judge, Patricia, TN
Karr, Diane, TN
Karuch, Brad, TN
Kazy, Crystal, TN
Kelley, Suzanne, TN
Kellogg, Cara, TN
Kendall, Abby, TN
Kennedy, Brenton, TN
Kerr, Darren, KY
Kerr, Kelsy, TN
Kess, Lauren, TN
Key, Shaina, AL
King, Charles, TN
King, Deanna, TN
King, Karen, TN
Kirkpatrick, Jack, TN
Klein, Susan, AL
Kneeland, Paula, TN
Konjicija, Susana, TN
Kreager, Charissa, KY
Kuehn, Shelley, TN
Kyle, Velda, TN
Lajoie, Lance, TN
Large, Herbert, TN
Lattimore, Carlous, TN
Lawrence, James, TN
Lawson, Retha, TN
Lee, Catherine, TN
Lee, Jerry, AL
Lefler, Susan, TN
Leonard, Ruth, TN
Leonardo, Sharon, TN
Lester, Troy, TN
Lewis, Clarise, TN
Lewis, Gloria, TN
Lindahl, Steve, TN

Lloyd, Colly, TN
Lopez, Tracy, TN
Lorraine, Mira, TN
Lovreta, Barabara, TN
Loyleless, Betsy, TN
Ludwig, Chase, AL
Lyford, Frank, TN
Lynch, Eric, KY
Lynn, Kelly, TN
Lyu, Karen, TN
M, Amy, TN
M, Frances, TN
Mackey, Carol, TN
Mackey, Gerald, TN
Maner, Lex, AL
Markushewski, Edward, AL
Marshall, Flecia, TN
Marshall, Leona, TN
Martin, Andrew, TN
Martin, George, TN
Martin, Susan, TN
Martinez Martinez, Rudy Tomas, TN
Mashbir, Katherine, TN
Massey, Laura, TN
Matthews, Chaniese, TN
May, Chuck, AL
McAllister, Myra, AL
McAvoy, Karen, TN
McCann, Barbara, TN
McClure, Jess, TN
McCollough, Amanda, TN
McCool, Rebecca, TN
McCoy, Kathy, TN
Mcdaniel, William, AL
Mcdonald, Deniese, AL
McGee, Belinda, AL
McIntosh, JoAnn, TN
McMurphy, Lydia, AL
McNatt, Gary, TN
Medlin, Nellie, MS
Menechella, Tony, KY
Miess, Shira, MS
Miller, Wayne, AL
Mills, Talitha, TN
Millwood, Don, TN
Milton, Ginger, TN
Minault, Kent, TN
Ming, Deanna, TN
Mink, Franklin, VA
Mitchell, Chekia, TN
Montgomery, Michael, AL
Moore, Carie, TN
Moore, Mariah, TN
Moore, Rodney, TN
Moorer, Silk, TN
Morgan, Glend, AL
Morris, Gary, TN
Morris, Pamela, AL
Morrison, Regina, TN

Morrissey, Ellen, TN
 Morrow, Taylor, TN
 Moseley, Sally, TN
 Mullins, Kate, TN
 Mulvey, Patricia, TN
 Murphree, Mike, AL
 Murphy, Deborah, TN
 Murr, Teresa, TN
 Murrell, Dennis, TN
 Myers, Candace, AL
 Neal, Dawn, TN
 Neville, Cynthia, TN
 Newell, Emily, TN
 Newsome, Tony, TN
 Newson, Raymond, TN
 Niceley, Carrie, TN
 O'Dell, Debbie, TN
 Oetjen, Christine, TN
 Ogle, Philip, TN
 O'Kelley, Celia, AL
 Oliver, Sabrina, AL
 Ooten, Viveca, TN
 Outten, Erica, AL
 Paine, Jacob, TN
 Papin, Loretta, TN
 Paris, Douglas, TN
 Parkans, Stephanie, TN
 Parks, Misty, TN
 Parrish, Anthony, TN
 Pasquale, Jaclyn, TN
 Patel, Samar, TN
 Pearce, Amanda, TN
 Pearce, Jessica, TN
 Pearce, Margaret, KY
 Pearson, April, TN
 Pennington, Anessa, TN
 Phillips, Donna, TN
 Pickett, Ann, AL
 Pierson, Marilyn, KY
 Pilcher, Tonya, AL
 Piper, David, AL
 Pollard, Catherine, TN
 Poole, Gregory, TN
 Pope, Sutton, TN
 Porrott, Patricia, TN
 Porter, Cindy, TN
 Powell, Jane, TN
 Pratt, Vernis, TN
 Price, Diane, TN
 Rachels, Eddie, TN
 Ramsey, Corinne, AL
 Reddick, Leslie, TN
 Reece, AD, TN
 Reed, Janice, TN
 Reed, Penny, TN
 Reed, Zachery, GA
 Reyes, Victoria, TN
 Reynolds, Matt, TN
 Reynolds, Teresa, TN
 Rice, Marquita, AL
 Rice, Mary, TN
 Richard, Deborah, TN
 Richey, Tuesday, AL
 Richmond, Cecilia, TN
 Richter, Wes, AL
 Ridings, Terri, TN
 Rivers, Carolyn, TN
 Rivers, Tayannah, GA
 Robbins, Thomas, TN
 Rockwell, Sylvia, TN
 Rodgers, Kenneth, TN
 Rodriguez, Carlos, TN
 Rogers, Leslie, TN
 Rooks-Clark, Angela, TN
 Roop, Stephen, TN
 Roper, Brends, TN
 Rosken, Esther, TN
 Rossiter, Lucas, AL
 Russell, Patty, TN
 Russell, Shirley, TN
 Sabel, Leah, TN
 Sanders, Patrice, TN
 Schrock, Pam, TN
 Scott, Don, TN
 Scott, Gary, TN
 Scott, Sean, AL
 Scruggs, Kristina, TN
 Scruggs, Pamela, TN
 Seff, Joshua, KY
 Sellers, Joshua, TN
 Sellers, Karyn, TN
 Selvey, Mary Anne, KY
 Shadwell, Jane, TN
 Shainberg, Cindy, TN
 Sheridan, Megan, TN
 Sherrod, Lucy, TN
 Shields, Donna, TN
 Shirey, William, AL
 Shorter, Joann, MS
 Simmons, Yolanda M, TN
 Singer, Linda, AL
 Skipworth, Orndell, AL
 Slay-Butler, Stephany, TN
 Sloan, Harry, AL
 Smith, Angela, TN
 Smith, David, TN
 Smith, Felicia, TN
 Smith, Gary, TN
 Smith, Justin, TN
 Smith, Kendra, TN
 Smith, Ray, KY
 Smith, Suzannah, TN
 Smith, Tim, AL
 Smith, William, GA
 Sneed, Christie, TN
 Snider, Janice, TN
 Snider, Marika, TN
 Snyder, Alan, TN
 Snyder, Marcy, TN
 Sockwell, Phyllis, AL
 Southard, Tom, TN
 Spradlin, Karen, AL
 St. Hilaire, Cynthia, TN
 Stack, Sheryl, KY
 Stanley, Matt, TN
 Stephan, Carole, TN
 Stewart, Tinsley, TN
 Stocks, James, TN
 Stone, Mary, TN
 Summers, Katherine, TN
 Swindell, Kacey, TN
 Sy, Selly, TN
 Taggart, Jeff, TN
 Taylor, Nidia, TN
 Taylor, W James, TN
 Teague, Amy, TN
 Thiemann, Jeff, KY
 Thoman, James, TN
 Thomas, Jewell, TN
 Thomas, Micah, AL
 Thomas, Phillip, TN
 Thomas, Susan, TN
 Thompson, Bethany, TN
 Thompson, Carol, AL
 Thompson, Terri, TN
 Thompson, Thomas, KY
 Tibbs, Swresa, AL
 Tidwell, Montel, TN
 Tiefenbrunn, Jaie, TN
 Tiller, Tonia, TNTomlin, Curtis, TN
 Townsend, Sajhana, TN
 Travise, Doreen, TN
 Troth, Tracy S, MS
 Tucker, Haajar, TN
 Tucker, James, AL
 Turner, Charlie, GA
 Tylor, Ruth, TN
 Underwood, Sonya, AL
 Vago, Grady, TN
 Vanvalkenburgh, Wilfred, AL
 Vaughn, Georgia, TN
 Vaughn, Victoria, TN
 Vaught, Kevin, TN
 Vedder, Harry, TN
 Vines, Clara, AL
 Vinson, Dale, AL
 vonHerrmann, Amanda, AL
 Vorpahl, Rita, TN
 W, Michael, TN
 Waldo, Jason, TN
 Walker, Kelly, TN
 Walker, Kenna, KY
 Walker, Melba, TN
 Walker, Tammie, TN
 Wallace, Jackie, TN
 Wallace, Pam, TN
 Wallace, Patricia, TN

Wampler, Nicholas, TN
 Warner, Lynette, KY
 Warnotte, Brigitte, AL
 Washington, Dasia, TN
 Waters, Elaine, TN
 Watson, Patricia, TN
 Weathers, Randall, TN
 Weaver, Susan, TN
 Wells, Cynthia, TN
 West, Jolen, TN
 West, Joyce, TN
 Whatley, Matthew, AL
 White, Latonia, TN
 White, Tyson, AL
 Whitehead, Carole, TN

Whitehead, Jamal, TN
 Whjtaker, Tyrone, TN
 Wilbar, Kerry, TN
 Wilder, Regina, TN
 Williams, Lonnie, TN
 Williams, William, TN
 Williamson, Eugenia, AL
 Williamson, Eugenia, TN
 Willis, Daniel, TN
 Wilson, Carmen, TN
 Wilson, Darryl, TN
 Wingo, Simona, AL
 Winston, Joelle, TN
 Witherow, Reginald, TN
 Wood, Victor, TN

Woodruff, Robin, TN
 Woods, Alma, TN
 Woods, James, TN
 Woods, Kaitlyn, AL
 Woods, Lerissa, TN
 Wooldridge, Lelia, TN
 Worley, Lisa, TN
 Wright, Ashley, TN
 Wright, Blake, TN
 YaholaSmall, Kristy, TN
 Yates, Judy, TN
 Yeates, Jenny, TN
 Zaidman, Charity, TN
 Zaragoza, Christina, TN

H.3.2.2 Clean Energy Form Letter, 5, 137, 146, 147, 150, 155

Abramson, Billie, Charlotte, NC
 Ahn, Dennis, Unknown
 Albury, Kathryn, Forestville, CA
 Allegoren, Mary, Davis, CA
 Allison, Jetana, Tucson, AZ
 Avendano, Madeleine, Brewster, NY
 Awtry, Jessica, Middleburg, FL
 Barnard, Leslie, Arlington, MA
 Basierbe, Deborah, Southfield, MI
 Berman, Jody, Pompano Beach, FL
 Bliss, Nishanga, Berkeley, CA
 Bobilin, Noel, Mountain View, HI
 Bouville, Jef, Los Angeles, CA
 Braun-Greiner, Kolya, Takoma Park, MD
 Brehme, Ellie, Ann Arbor, MI
 Bull, Ashley, Dallas, TX
 Burgess, John, Pittstown, NJ
 Burnett, Brian, Berkley, MI
 Cameron, Casey, San Jose, CA
 Cameron, Alexis, Delmar, NY
 Carlson, Doug, Chattanooga, TN
 Carney, Cheryl, San Antonio, TX
 Casanova, James, North Las Vegas, NV
 Claunch, Emma, Columbia, MO
 Cocchiario, Gerald, Lansdale, PA
 Couture, Shelley, Syracuse, NY
 Cottle, Elaine, Hopewell Junction, NY
 Cowen, Macenna, , Unknown
 Cray, Nick, Mequon, WI
 Dack, Michael, Sacramento, CA
 Davis, Shawn, Phoenix, AZ
 DiSalvo, Chuck, Rochester, NY
 Dittman, David, Elkridge, MD
 Dunham, Elenna, New York, NY
 Edstrom, Heather, Oak Park, MI
 Fanelli, William, St Louis, MO
 Farone, Aurora, Willowick, OH
 Feder, Patrick, Belvedere, CA
 Fernández Rodríguez, Amelia, Denver, CO

Fleischman, Christopher, Houston, TX
 Fletcher, Barbara, Farmington Hills, MI
 Floyd, Melissa, University Park, MD
 Fredericks, Misha, Poughkeepsie, NY
 Gentzler, Sara, Brooklyn, NY
 Gray, Kaitlyn, Raleigh, NC
 Hakiel, Annette, Brooklyn, NY
 Hammann, Mary, New York, NY
 Hart, Doug, Lake Orion, MI
 Hartzell, Sandra, Orrtanna, PA
 Hook, Jenny, Hingham, MA
 Howe, Dana, West Bloomfield, MI
 Howell, Jess, Southfield, MI
 Huddleston, Frank, San Antonio, TX
 Hyde, Pat, Sanibel, FL
 Hyne, Joyce, Portland, OR
 Ingerson, Tonya, Bellingham, WA
 Irwin, Rebecca, Carmel, CA
 Jacobs, Robert, Troy, NY
 Johnson, Jeffrey, Phoenix, AZ
 Kaskowitz, David, San Francisco, CA
 Keller, Christina, San Antonio, TX
 Ketchaver, James, Lakewood, OH
 King, David, Bronx, NY
 Krakauer, Wendy, Seattle, WA
 Kuehn, Margie, Annapolis, MD
 Kurth, Krista, Potomac, MD
 LaBelle, Donna, Bloomfield Hills, MI
 Laird, Amy, New Waverly, TX
 Landry, Hayley, Houston, TX
 Lathrop, Rick, Portland, OR
 Lockwood, Sarah, Minneapolis, MN
 Logan, Joanne, Hermitage, TN
 Lowry, MaryEllen, Greensboro, NC
 Martin, Kai, Pacifica, CA
 Mason, David, Fayetteville, NY
 Meyerson, Julie, Sunnyvale, CA
 Mog, Gloria, Arlington, VA
 Moody, Harry, San Mateo, CA
 Moran, Thomas, Minnetonka, MN
 Munn, Barb, Meadow Vista, CA
 Neves, Deb, Lansdale, PA

Nordrum, Susann, Box Elder, SD
 Olmsted Silverstein, Dara, Hillsborough, CA
 Oscarlece, Lisa, Valley Cottage, NY
 Paulson, Barbara, Troy, MI
 Peregrine, Erik, Providence, RI
 Peterson, Sandra, Palm Desert, CA
 Porter, Shirley, Grass Valley, CA
 Rice, Dave, Saint Charles, IL
 Roberts, Robby, Annapolis, MD
 Rockley, Joshua, West Allis, WI
 Rodrigues, Maryann, North Attleboro, MA
 Rogers, Coleman, Lowell, MA
 Romesburg, Denise, Phoenix, AZ
 Ronson, Ian, Jacksonville, FL
 Root, Bob, Reston, VA
 Roquet, Lauren, Mahtomedi, MN
 Rubinton, David, Long Beach, NY
 Schmidt, Ken, Lombard, IL
 Schroeder, Karen, Neptune City, NJ
 Seelke, Cindy, Cleburne, TX
 Skardarasy, Doreen, Belleville, MI
 Snyder, Debbie & Bob, Livonia, MI
 Sorrell, Reverand Lyle, Fairmont, WV
 Stewart, Frances, Bethesda, MD
 Sticha, Lily, Saint Paul, MN
 Stonge, Emily, Verona, WI
 Sullivan-Peters, Taylor, Indianapolis, IN
 Sutter, Tom, New Lenox, IL
 Sutter, Tom, New Lenox, IL
 Targos, Andrea, Folsom, CA
 Tarr, Sue, Edmond, OK
 Thomas, Rebecca, Santa Rosa, CA
 Triana, Mary, San Antonio, TX
 Tullos, Margie, Decatur, GA
 Tyson, Julianne, Wilton, NH
 Van Kirk, Carol, Red Bank, NJ
 Vital, Artèm, Cambridge, MA
 Walker, Jasen, Malvern, PA
 Wanees, Kyro, Fresh Meadows, NY
 Wharton, Leslie, Bethesda, MD

Wilson, Lisa, Royal Oak, MI
 Withrow, Mindy, Perrysburg, OH
 Woodland, Marcia, Fort Collins, CO
 Yenchick, Suze, Bellingham, WA
 Zingher, Judith, Elmsford, NY
 Zurcher, Christoph, Beaverton, OR
 Ashti, Christa, Belmont, CA
 Atkinson, Vickie, Chappel Hill, NC
 Augustine, Victoria, Astoria, NY
 B, R, Palm Bay, FL
 Bader, Jessica, New York, NY
 Benim, Marilyn, Hasbrouck Heights, NJ
 Bennett, Nancy, Oak Park, MI
 Bible, Eugene, Honolulu, HI
 Bobola, Greycin, , Unknown
 Bandom, MD, Barbara, Rockwood, PA
 Brooker, James, Onalaska, WI
 Buchan, Bob, Chula Vista, CA
 Bunin, Greta, Elkins Park, PA
 Burns, Daniel, Spring, TX
 Butt, Glenn, Picayune, MS
 Calame, Beatrice, Redmond, WA
 Campbell, Liz, Seattle, WA
 ChenAllen, Doreen, Pasadena, CA
 Constant, Hugh, La Jolla, CA
 D'Arcy, John, Holmdel, NJ
 Davis, Alexis, Fort Myers, FL
 delaTorre, Alejandro, Webster, TX
 DeManuel, Paula, Torrance, CA
 DiMaria, Peter, Berkeley, CA
 Duda, Timothy, San Antonio, TX
 Dunham, Elenna, New York, NY
 Dygert-Gearheart, Anita, Spokane, WA
 Elliot, Kristen, St Paul, MN
 Ferrante, Michael, East Norwich, NY
 Ford, Sam, San Jose, CA
 Fuqua, Claire, Hastings, NE
 Giampe, Lelia, Monroe, CT
 Greene, Avi, Indio, CA
 Gupta, Anshul, Vallhalla, NY
 Hamlin, Heather, Royal Oak, MI

Hannon, Alexandra, Bainbridge Island, WA
 Hardy, Elisabeth, Beaverton, OR
 Hargrove, Molora, Louisville, KY
 Harrison, Liz, San Diego, CA
 Hayward, Linda, Sacramento, CA
 Hindes, Miri, Los Angeles, CA
 Hinkel, Austin, Cold Spring, KY
 Jaggi, Preeti, Decatur, GA
 Janowitz-Price, Beverly, Phoenix, AZ
 Jansen, Tiffany, Johns Creek, GA
 Johnson, Eric, , CO
 Johnson, Megan, St Paul, MN
 Junco, Shauna, Orlando, FL
 Keeth, Trey, Franklin, TN
 Komie, Adrian, Austin, TX
 Kuenker, Amy, Millersville, MD
 Lehman, Nanette, Berkley, MI
 Levan, Christina, Lancaster, PA
 Lloyd, Gary, New Orleans, LA
 Macfie, Rebekah, Corning, NY
 Majestic, Kate, , Unknown
 Majewski, Gene, Addison, IL
 Man, Will, Stockholm, NJ
 Mandella, Gail, Berkeley, CA
 Marquardt, Jeana, Commerce Township, MI
 Martinez, Nevaeh, Jarrell, TX
 McDonnell-Forney, Catherine, Minneapolis, MN
 Mercado, Joyce, Alameda, CA
 Meseguer, Alejandro, Little Egg Harbor, NJ
 Moore, Carolyn, Wake Forest, NC
 Moreau, Lynn, San Leandro, CA
 Munie, Kenneth, Princeton, NJ
 Musgrove, Donna, Lake Tapps, WA
 Myasishchev, Denis, Chandler, AZ
 Nierenberg, Al, Boxford, MA
 Parker, Teadra, White Center, WA
 Pegg, John, Minneapolis, MN
 Pendorf, Laura, South Pasadena, CA

Penner, Susan, Emeryville, CA
 Percy, Valerie, Kingston, NY
 Pinch, Tracy, Royal Oak, MI
 Pontecorvo, Jenna, Flemington, NJ
 Powers, Alexis, Delmar, NY
 Prina, David, Salinas, CA
 Q-Shafer, Stephen, Saugerties, NY
 Randall, Scott, Copenhagen, NY
 Rapoport, Liz, , Unknown
 Rhyne, George, Wilkesboro, NC
 Richards, Eryn, Davison, MI
 Rotondo, Vincent, Jackson Heights, NY
 Russell, Cat, Jamestown, CO
 Sabol, Jae, Hermosa Beach, CA
 Schirm, Alyssa, Kearny, NJ
 Schmitt, Alex, Cincinnati, OH
 Schwartz, Amy, Prairie Du Sac, WI
 SinghRawat, Shishpal, Folsom, CA
 Stark, Sherie, West Hollywood, CA
 Stephens, Lori, Waynesville, NC
 Sutherland, MD, Katherine, Winter Haven, FL
 Tharp, Julianne, Vestavia Hills, AL
 Thomas, Ari, Santa Rosa, CA
 Thompson, Gretchen, Williamstown, MA
 Tombaugh, Katherine, New Haven, CT
 Twarek, Drew, Berkley, MI
 Unell, Alan, Vancouver, WA
 Vanderlee, Heidi, Brooklyn, NY
 Voget, Richard, Seattle, WA
 Walter, Nancy, Schererville, IN
 Washburn, Constance, Lagunitas, CA
 Whitt, Charles, Dardenne Prairie, MO
 Wittig, Michael, San Jose, CA
 Woodruff, Margaret, Charlotte, VT
 Wright, Marilyn, Sacramento, CA
 York, Traci, Erath, LA
 Z, Anthony,
 Jones, Rebekah, Akron, OH

H.3.2.3 Coal Form Letter, 128, 185, 376

A, Madeleine
 Abramson, Billie
 Ahn, Dennis
 Albury, Kathryn
 Ali, Maggie
 Allegoren, Mary
 Allison, Jetana
 Anderson, Florence
 Anderson, Nancy
 Antonik, Marilyn
 Augustine, Victoria
 B, R
 Barndt, Deborah
 Bartolomeo, Kathleen
 Basierbe, Deborah

Baughn, Autumn
 Benim, Marilyn
 Bennett, Nancy
 berman, Jody
 Bernstein, Susan
 Bettig, Allen
 Beuttenmueller, Nathan
 Blake, Ann
 Bliss, Nishanga
 Booth, Jimmy
 Bouville, Jef
 Bradford, James
 Bandom, Barbara
 Brasseale, Elizabeth

Braun-Greiner, Kolya, Takoma Park, MD
 Brehme, Ellie
 Brooker, Barbara
 Brown, Mitchell
 Buchan, Bob
 Bull, Ashley
 Burnett, Brian, Berkley, MI
 Burns, Daniel
 Calame, Beatrice
 Campbell, Kay
 Campbell, Liz
 Carlson, Doug
 Carny, Cheryl
 Casanova, James

Chakrabarty, Neil	Hinkel, Austin	Moma, Luke
Chamberlin, Amy	Hirsch, Laurenace	Moody, Harry, San Mateo, CA
Chang, Dar-Lon	Howe, Dana	Moore, Carolyn
Chatsey, Stephanie	Howell, Jess	Moran, Tom
Chaves, Chris	Hyne, Joyce	Morgan, Kat
chu, Paula	Hyre, Noreen	Morgan, Mary
chu, Paula	Ignatoff, Rachael	Morton, Cheryl
Cocchiario, Gerald	Ingerson, Tonya	Munie, Kenneth
Collier, Duane	Irwin, Rebecca	Murray, Julia
Constant, Hugh	Jacobs, Bob	Musgrove, Donna
Couture, Shelley	Janowitz-Price, Beverly, Phoenix, AZ	Myasishchev, Denis
Cooper, James	Johnson, Emanuel, Chicago, IL	Nakamura, Ellen
Cooper, Ruth	Johnson, Eric	Nankivell, Sue
Copple, Frank	Johnson, Megan	Narr, Valerie
Costelle, Autumn	Johnson, Treve	Nicholas, Ann
Cox, Remi	Johnston, Catherine	Nierenberg, Al
Cozens, Brians	Jones, Brian	Pagan, Kathleen W.
Cragg, Dianne	Jones, Mikaela	Paine, Lesley Blair
Cray, Nick	Junco, Shauna	Palmer, Jeanne
Cuneo, Sherrell	Kahn, Rob	Parker, Teadra
Dack, Michael, Sacramento, CA	Kana, Catherine	parson, Kim
Dahill, Judith	Kathy and Dave	Pearce, Liz
Dahl, Jessica	Keeth, Trey	Pegg, John
D'Arcy, John	Keleher, Richard	Pellman, Julie
Davidson, Linda	King, David	Pendorf, Laura
De Manuel, Paula	Kofler, Marilyn	Penner, Susan
DeBolt, Angela, Oswego, IL	Kofler, Marilyn	Pepe, Joseph
DeMarta, Sonia	Kohlmeyer, Sandy	Pinch, Tracey
Dittman, Dave	Kovacs, Dakota	Porter, Joshua
Dorries, Bruce	Krakauer, Wendy	Porter, Keith
Dow, Ryan	Kubiac, Jan	Powell, Lauren
Durocher, Laurie	Kuehn, Case	Prina, David
Dygert-Gearheart, anita	Kuehn, Margie	Ramirez, Yenesey
Edstrom, Heather	Kuehn, Ashtom, Maryville, IL	Randall, Hope
Ellish, Melissa	LaRochelle, Sophie	Rapoport, Liz
Fanelli, Lynn	LeBaron, Mary Rose	Reh, Toni
Farone, Aurora	LePage, Abby	Rennie, Alice
Fec, Jeanne	Lloyd, Deborah K.	Rhyne, George
Feder, Patrick	Lloyd, Gary	Rice, Mary
Fernandez, Luci	Lord, Danielle	Richards, Eryn
Fletcher, Barbara	Lott, Catie	Robinson, Paula
Ford, Sam	Lowery, Scott	Rockley, Joshua
Fosshage, Mark	Lyon, Kathleen	Rodrigues, Maryann
Freiermuth, Donna	Macfie, Rebekah	Rollow, Mardi
Gajewski, Kathryn	Majewski, Gene	Roquet, Lauren
Garrett, Dennis	Mammarella, Mary	Roquet, Lauren
Gehl, Carol	Man, William	Rorke-Davis, Shawn
Gerhauser, Donna	Manza, Dana	Rosenweig, Lester
Glenn, Suki	Marquardt, Jeana	Roskos, Nicole
Goetz, Issabella	Martin, Kai	Rotondo, Vincent
Gonzalez, Alexistori	Maupin, Cami	Sableman, Lynn
Goulart, Joshua	Maxwell-Glenn, Caitlin	Sabol, Jae
GrantWingate, Aurora	McAdam, Kyle	Salinger, Elaine, San Mateo, CA
Greene, Avi	McCormick, Martha	Schirm, Alyssa
Guillen, Heather	McDonald, Catherine	Schley, Marta, Bethesda, MD
Hakiel, Annette	McDowell, Leslie	Schultz, Sara
Harris, Judy	Mercado, Joyce	Schweitzer, Jillian
Hart, Doug	Meredith, Linda	Seelke, Cindy
Hayden, Monica	Miller, Elaine	Shafer, Stephen Q.

Sherman, Mike
 Short, David
 Siegel, Ellen
 Singh Rawat, Shishpal
 Snodgrass, Paul
 Solazzo, Alyssa
 Solazzo, Alyssa
 St Onge, Emily
 Stark, Sherie
 Stauffer-Dunham, Elenna
 Stevens, Brynne
 Stewart, Frances
 Stratton, Sherry, Warrenville, IL
 Suagee-Beauduy, Mary
 Sutherland, Katherine
 Sutter, Tom
 Sutton, Brian K.
 Swetman, Bonnie

Targos, Andrea
 Tharp, Julianne
 Thomas, Chris
 Tomyris, Scout
 Trudeau, Ned
 Truong, Justin
 Twarek, Drew
 Unell, Alan
 Van Kirk, Carol
 Villegas, Teresa
 Voget, Richard
 Walker, Gary, Youngstown, OH
 Walker, Jasen
 Walter, Cooper A.
 Walter, Nancy
 Washle, Kiersten
 Ways, Heather
 Wendell, Diana

Wentz, Dylan
 Wharton, Leslie
 White, Jane, Berkeley, CA
 Williams, Briana
 Wilson, Lisa
 Wittig, Mike
 Woolf, Amanda
 Wozniak, John
 Wright, Marilyn
 Yanez, Laura
 Ybarra, Cindy
 Yencich, Jay
 York, Traci
 Z, Anthony
 Zingher, Judith
 Zurcher, Christoph

H.3.2.4 Illinois Coal Form Letter, 150, 340, 375

Abella, Olga, IL
 Abraham, Clark, IL
 Adkisson, Derek, IL
 Aguilar, Margaret, IL
 Aguirre, James, IL
 Amling, Michael, IL
 Amling, Peter, IL
 Amundsen-Kuester, Connor, IL
 Applegate, Jim, IL
 Atkinson, Nancy, IL
 Atwood, John, IL
 Aud, Kenneth, IL
 Ayres, Peter, IL
 B, B, IL
 Babler, Pam, IL
 Baits, Paul, IL
 Baker, Greg, IL
 Balaban, Susan, IL
 Bannerman, Brittany, IL
 Banning, Robert, IL
 Barbezat, Mary, IL
 Bargiel, Paula, IL
 Barker, Mary, IL
 Barrett, Donna, IL
 Bauer, Nancy, IL
 Beck, Robert, IL
 Beck, Tammy, IL
 Benson, Eric, IL
 Bergstrom, Gail, IL
 Biondo, Ron, IL
 Blackwell, Curtis, IL
 Blanchard, Ann, IL
 Blumenshine, Joyce, IL
 Boland, Maura, IL
 Boling, Thomas, IL
 Borkowski, Tom, IL
 Bortoluzzo, Virginia, IL
 Bortoluzzo, Virginia, IL
 Bowsher, Pam, IL

Bozzetti, Paula, IL
 Bradley, Sue, IL
 Bravo, Karen, IL
 Brewster, Deborah, IL
 Brooker, Mark, IL
 Brown, Jean, IL
 Brown, Laurie, IL
 Brown, Nancy, IL
 Brunner, Meredith, IL
 Buckler, Daniel, IL
 Buehler, Sara, IL
 Bullard, Clark, IL
 Bullard, Clark, IL
 Bunkers, Laurie, IL
 Burke, Dana, IL
 Butler, Melanie, IL
 Callaci, Gloria, IL
 Camp, Kristin, IL
 Carey, Peter, IL
 Castelluccio, K, IL
 Chorn, Donly, IL
 Christensen, Deb, IL
 Clarkin, Catherine, IL
 Clendenen, Cindy, IL
 Clinch, Paul, IL
 Cline, Austin, IL
 Coleman, Carol, IL
 Coles, Megan, IL
 Cook, Stefanie, IL
 Cornelius, Stacy, IL
 Cornwell, Ed, IL
 Cowger, Nancy, IL
 Crouse, George, IL
 Daglas, Andie, IL
 Dale, Foster, IL
 DannerLentz, Eve, IL
 Dappen, Mary, IL
 Davis, Laura, IL
 DeBolt, Angela, IL

Dempsey, Peter, IL
 Deoss, Carol, IL
 DePriest, Bridget, IL
 Derks, Laura, IL
 Dibenedetto, Nicholas, IL
 Dickerson, Paul, IL
 Dilger, Val, IL
 Dively, John, IL
 Doherty, Brigitte, IL
 Dohrmann, Paul, IL
 Domke, Ellen, IL
 Dosch, Mary, IL
 Dostalek, Patricia, IL
 Drake, Tracy, IL
 Drake, Tracy, IL
 Dressen, Karyl, IL
 Dulcan, Kristin, IL
 Duy, Bob, IL
 Eckberg, Brenda, IL
 Edwards, Eric, IL
 Englebresten, Alice, IL
 Englund, LindaS, IL
 Englund-Kenealy, Kate, IL
 Enstrom, Paula, IL
 Evans, Larry, IL
 Feda, Nicholas, IL
 Finkel, David, IL
 Finn, Robert, IL
 Firestone, Anne, IL
 Fischer, Tessa, IL
 Flanagan, Marianne, IL
 Ford, Mary, IL
 Forsythe, Nathaniel, IL
 Frankel, Janice, IL
 Fredericks, Rachel, IL
 Freese, Lisanne, IL
 Friz, Lee, IL
 Frost, Tom, IL
 Fruin, Emmett, IL

Fry, Barbara, IL
 Fujihara, Tracy, IL
 Fuller, Victoria, IL
 Gahris, Jeff, IL
 Gallagher, Karen, IL
 GawneJr, Bill, IL
 Gebhardt, Sarah, IL
 Gendron, Bob, IL
 George, Meredith, IL
 Georgia, Nikki, IL
 Glass, Jacqueline, IL
 Glennemeier, Karen, IL
 Gottlieb, MaryAnn, IL
 Graham, Geoffrey, IL
 Grant, William, IL
 Gray, Karen, IL
 Greco, Rose, IL
 Greenberg, Jill, IL
 Greer, Geoffrey, IL
 Griffith, Julie, IL
 Grigorian, Renee, IL
 Groch, Clare, IL
 Gysler, Kathleen, IL
 Hall, Steven, IL
 Halloran, Monica, IL
 Halloway, Cynthia, IL
 Hanahan, Brad, IL
 Hancock, Jonathan, IL
 Handelsman, Robert, IL
 Hansen, Brenda, IL
 Hansen, Kai, IL
 Hawk, Gary, IL
 Heidenfelder, Randy, IL
 Henderson, Henry, IL
 Henderson, Jim, IL
 Hensley, Jen, IL
 Hinkle, Harry, IL
 Hippensteel, Donna, IL
 Hoban, Eileen, IL
 Hoffman, Andrew, IL
 Holowczak, Barbara, IL
 Holt, Randi, IL
 Hossli, Jerome, IL
 Hudak, Lindsey, IL
 Huffman, Melodie, IL
 Huggins, Joyce, IL
 Hussein, Sharif, IL
 Jacobson, Roberta, IL
 Jesse, Chuck, IL
 Johnson, Emanuel, IL
 Johnson, Sue, IL
 Jones, Alexander, IL
 Julien, Beverly, IL
 Juliusson, Marguerite, IL
 K, Ed, IL
 Kearney, Laura, IL
 Keating, Joanne, IL
 Kegley, Jillian, IL
 Keistler, Robert, IL
 Kessler, Roberta, IL
 Kett, Nancy, IL
 Killeen, Robert, IL
 King, Catherine, IL
 Kitchen, Linda, IL
 Kite, Anna, IL
 Kittlaus, Janet, IL
 Klubek, Brian, IL
 Knol, Patricia, IL
 Kochman, Ron, IL
 Kohli, Manvika, IL
 Komisarz, Marion, IL
 Koss, Mary, IL
 Kraemer, Mark, IL
 Krause, Christine, IL
 Kreger, Laurie, IL
 Kreymer, Jeanne, IL
 Krucoff, Rachel, IL
 Krusa, Christopher, IL
 Krusa, Christopher, IL
 Kuehnle, Ashton, IL
 Kuffner, MaryJo, IL
 LaBarge, Alison, IL
 LaBuda, L, IL
 LaGessee, Rebecca, IL
 Langer, Eric, IL
 Lantow, Susan, IL
 Lauder, David, IL
 LeBihan, Marie, IL
 Lee, Robert, IL
 Levitan, Grant, IL
 Lindsay, Carla, IL
 Lindsay, Susan, IL
 Llewellyn, David, IL
 Lobonc, Susan, IL
 Logerquist, Kristin, IL
 Lombardi, Dan, IL
 Lundholm, Mark, IL
 Luner, Julie, IL
 Luther, June, IL
 Manobianco, Daniel, IL
 Marcus, Syd&Diane, IL
 Marquis, Wendy, IL
 Marro, John, IL
 Marsh, Jeanette, IL
 Martinez, Patricia, IL
 Marzano, Gina, IL
 Mast, Joyce, IL
 Mathews, Deni, IL
 Mauloff, Dolores, IL
 May, Lana, IL
 Maziarz, Rosemary, IL
 McCabe, Ann, IL
 McCullough, Debra, IL
 McDonald, Catherine, IL
 McDonnell, Janet, IL
 McGee, Dennis, IL
 McGee, Dennis, IL
 McGowan, Janis, IL
 McKasson, Barbara, IL
 McKee, Kevin, IL
 McShane, Julie, IL
 Meeker, Robert, IL
 Merrill, Lawrence, IL
 Merritt, Frank, IL
 Milkowski, George, IL
 Miller, Krista, IL
 Miller, Mary, IL
 Minyo, Tiffany, IL
 Mitchell, Brian, IL
 Montalto, Tina, IL
 Morgan, Beverly, IL
 MorrisDownie, Elizabeth, IL
 Morrison, Larry, IL
 Mortimer, Rudolf, IL
 Mosby, Lisa, IL
 Murphy,MD, Eileen, IL
 Nagendran, Divya, IL
 Negele, Linda, IL
 Noel, Letitia, IL
 Nommensen, Mary, IL
 Noworyta, Tim, IL
 Nuccio, Pat, IL
 Nuenthel, Don, IL
 Nusekabel, Kent, IL
 O'Connell, Chris, IL
 O'Donoghue, James, IL
 Oestry, Linda, IL
 Ogorzaly, David, IL
 O'Kiersey, MaryE., IL
 Okroi, Robert, IL
 Olson, David, IL
 Ondek, Michael, IL
 Orlik, David, IL
 Osowski, Maryjo, IL
 Ozik, Sam, IL
 Packheiser, Jen, IL
 Parks, Jim, IL
 Pawlisz, Linda, IL
 Pearson, Suzanne, IL
 Pellegrino, Samantha, IL
 Pervenecki, Shelly, IL
 Peterson, Karen, IL
 Petrakis, Carolyn, IL
 Pfeifer, Wallace, IL
 Philipp, Sara, IL
 Picchetti, Gloria, IL
 Pierri, Frank, IL
 Piersialla, Leonard, IL
 Piniotes, Betty, IL
 Podewell, Roger, IL
 Pohlman, Maxine, IL
 Polite, Michael, IL
 Pope, Jacquelyn, IL
 Poteraske, John, IL
 Proffitt, Susan, IL
 Pruitt, Patricia, IL
 Pszanka, James, IL

R, Le, IL
 Raatz, Annette, IL
 Randle, Stephanie, IL
 Rausa, Krysten, IL
 Real, Amanda, IL
 Reid, William, IL
 Reifman, Jamie, IL
 Reimer, Karen, IL
 Reingruber, Gregory, IL
 Rejebian, Sona, IL
 Rendulich, Ellen, IL
 Ricketts, Christie, IL
 Ricobene, Tom, IL
 Roberts, Nathan, IL
 Robertson, Anne, IL
 Robertson, Julie, IL
 Robertson, Linda, IL
 Roman, Michael, IL
 Rossman, Jeremy, IL
 Rubin, David, IL
 Rudo, Behn, IL
 Rutschman, Richard, IL
 Sallee, Barbara, IL
 Sanes, Janice, IL
 Sarelas, Thomas, IL
 Saur, Terri, IL
 Schacht, Lenore, IL
 Schaefer, David, IL
 Scheiber, Linda, IL
 Schietzelt, Randall and Nancy, IL
 Schillaci, MaryJo, IL
 Schleman, Joshua, IL
 Schlender, Greg, IL
 Schmeck, Melanie, IL
 Schmidt, Connie, IL
 Schmidt, Ulrich, IL
 Schmitt, Darlene, IL
 Schnur, Kathy, IL
 Schueth, Steve, IL
 Schultz, Kristin, IL
 Schutzius, Catharine, IL
 Scovill, Richard, IL

Seidenfeld, Jerome, IL
 Self, Rob, IL
 Shapiro, Ellene, IL
 Sizemore, Linda, IL
 Smith, Curt, IL
 Smith, Fran, IL
 Smith, Lora, IL
 Smith, Newland, IL
 Snawadzki, Mark, IL
 Sondheim, Steven, IL
 Sparks, Connor, IL
 Stacey, Karen, IL
 Stanley, Robert, IL
 Starr, Sharon, IL
 Stelzer, Sarah, IL
 Stevens, Vicky, IL
 Stoll, Marcia, IL
 Stouder, Ariel, IL
 Strimbu, MJ, IL
 Strong, Laura, IL
 Stuckey, Richard, IL
 Stuhlmacher, James, IL
 SueNoe, Sr. Linda, IL
 Sullivan, Eric, IL
 Sutton, Katherine, IL
 Swarzman, Gerald, IL
 Szot, Thomas, IL
 T, S, IL
 Tafel, Carol, IL
 Tait, Barbara, IL
 Templeton, Mark, IL
 Tharp, Reynold, IL
 Thompson, Wanda, IL
 Thoresen, Ruthann, IL
 Tieman, Amedee, IL
 Toigo, Joe, IL
 Trimble, Carolyn, IL
 Turney, Andrew, IL
 Twery, Jill, IL
 Udel, L, IL
 Unverfehrt, Karen, IL
 Valsecchi, Sergio, IL

Vandewalker, Jean, IL
 Vernon, Wendy, IL
 Verziel, Maureen, IL
 Vogel, Denise, IL
 W, I, IL
 Wagner, Jessica, IL
 Walker, Brad, IL
 Walsh, Sarah, IL
 Walter, Laurie, IL
 Walton-Winnie, Jayne, IL
 Ward Jr., Tedd, IL
 Webb, Randall, IL
 Webster, Ken, IL
 Weinert, Mark, IL
 Weiss, Jeffrey, IL
 Whelan, Maria, IL
 Whelan, Maria, IL
 Willenborg, Susan, IL
 Williams, Dawn, IL
 Williamson, Lauren, IL
 Winn, Linda, IL
 Winter, Joan, IL
 Wiseman, Ann, IL
 Witkowski, Allyson, IL
 Wolcott, Ellen, IL
 Wolcott, Keith, IL
 Wolfe, Amy, IL
 Woodford, Hannah, IL
 Woodman, Bradley, IL
 Woods, Chris, IL
 Wooten, Caroline, IL
 Workman, David, IL
 Wright, Kimball, IL
 Wyant, Dianne, IL
 Yanda, Jack, IL
 Youse, Robin, IL
 Zare, Debra, IL
 Ziegler, Russ, IL
 Ziegler, Russ, IL
 Zurakov, Michael, IL

H.3.2.5 Millington, TN Form Letter, 331

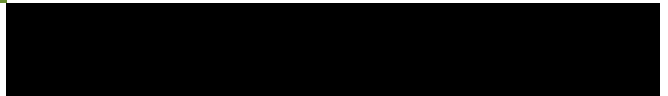
Allen, Michele, Millington, TN
 Allred, Katie, Millington, TN
 Asemota, Barbara & Emmanuel,
 Millington, TN
 Baskin, Skip, Millington, TN
 Bell, Johnnie, Millington, TN
 Biscoe, Chris, Millington, TN
 Brady, Susan, Millington, TN
 Church, David, Millington, TN
 Clance, Leslie, Millington, TN
 Dacus, Tim, Millington, TN
 Espinoza, Gina, Millington, TN
 Espinoza, Georgina, Millington, TN
 Estupinan, Georgina, Millington, TN

Everingham, N. Mark, Millington, TN
 Fly, Danny, Millington, TN
 Godwin, Tracie, Millington, TN
 Grabowski, Craig, Millington, TN
 Green, Susan, Millington, TN
 Hayden, Karon, Millington, TN
 Jeffcoat, James, Millington, TN
 Johnson, Michael & Jo-Annette,
 Millington, TN
 Kawaii, Neko, Millington, TN
 Landau, Denise, Millington, TN
 Maclin, Leroy, Millington, TN
 Moorlach, Kent, Millington, TN
 Moorlach, Faith, Millington, TN

Moorlach, Stephanie, Millington, TN
 Morton, Dean, Millington, TN
 Myers, Jody, Millington, TN
 Myers, Jody, Millington, TN
 Neff, John & Peg, Millington, TN
 Owen, Carrol, Millington, TN
 Patterson, Donna, Millington, TN
 Sarinoglu, Linda, Millington, TN
 Schmidt, Susan, Millington, TN
 Schnell, Randy, Millington, TN
 Schnell, Gabriel, Millington, TN
 Taylor, AJ & Katherine, Millington,
 TN
 Walker, Rona, Millington, TN



Appendix I – Index



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PRELIMINARY

Appendix I - Index

Air Quality, 1-6, 3-17, 4-1, 4-2, 4-3, 4-9, 5-1, 5-3, 5-29, 5-30, 5-32, 5-38, 5-76

Alternative, 1-2, 1-4, 1-5, 1-8, 2-15, 3-2, 3-3, 3-7, 3-10, 3-12, 3-13, 3-14, 3-16, 4-1, 4-22, 4-39, 4-52, 4-57, 4-61, 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-26, 5-27, 5-29, 5-30, 5-31, 5-32, 5-33, 5-34, 5-35, 5-36, 5-37, 5-38, 5-39, 5-40, 5-41, 5-42, 5-43, 5-44, 5-51, 5-52, 5-57, 5-58, 5-59, 5-60, 5-61, 5-62, 5-63, 5-66, 5-67, 5-68, 5-69, 5-70, 5-71, 5-72, 5-73, 5-74, 5-76, 5-77, 5-78, 5-79

Aquatic, 4-12, 4-22, 4-25, 4-26, 4-27, 4-28, 4-30, 4-31, 4-32, 4-33, 4-38, 4-39, 4-44, 4-48, 4-49, 4-50, 4-51, 5-4, 5-11, 5-15, 5-21, 5-30, 5-43, 5-55, 5-57, 5-60

Aquifer, 4-22, 4-23, 4-24

Biomass, 2-1, 2-10, 2-13, 2-14, 4-18, 4-55, 4-61, 5-4, 5-15, 5-19, 5-23, 5-46, 5-49, 5-50

Carbon Dioxide (CO₂), 3-10, 4-18, 4-19, 4-20, 4-41, 4-42, 5-3, 5-7, 5-8, 5-9, 5-13, 5-24, 5-30, 5-38, 5-39, 5-40, 5-41, 5-42, 5-43, 5-44, 5-45, 5-47, 5-48, 5-51, 5-52, 5-53

Clean Air Act, 1-6, 1-7, 4-1

Clean Water Act (CWA), 1-6, 4-25, 4-26, 4-31, 4-32, 4-38, 4-50, 4-51, 5-57

Climate, 1-5, 3-17, 4-1, 4-14, 4-17, 4-18, 4-20, 4-21, 4-43, 4-46, 4-51, 4-71, 4-74, 5-29, 5-30, 5-43, 5-54, 5-55, 5-56, 5-57, 5-79

Climate Change, 1-5, 4-1, 4-14, 4-18, 4-20, 4-21, 4-43, 4-46, 4-51, 5-30, 5-43, 5-54, 5-55, 5-56, 5-79

Coal, 1-1, 1-6, 1-7, 1-8, 1-9, 1-10, 1-11, 1-12, 2-1, 2-3, 2-4, 2-5, 2-6, 2-7, 2-8, 2-12, 3-3, 3-7, 3-8, 3-9, 3-13, 3-14, 4-1, 4-7, 4-6, 4-8, 4-9, 4-19, 4-20, 4-22, 4-24, 4-28, 4-31, 4-32, 4-33, 4-37, 4-41, 4-48, 4-64, 4-65, 4-66, 4-67, 4-76, 4-82, 5-1, 5-3, 5-5, 5-7, 5-8, 5-9, 5-30, 5-31, 5-32, 5-33, 5-38, 5-45, 5-48, 5-49, 5-50, 5-43, 5-55, 5-56, 5-57, 5-58, 5-64, 5-67, 5-68, 5-71, 5-72, 5-73, 5-77, 5-78, 5-79

Cogeneration, 1-10, 2-6, 2-7, 2-8, 2-10

Combined Cycle, 2-7, 2-8, 2-12, 3-15, 4-38, 4-42, 5-7, 5-9, 5-10, 5-45, 5-48, 5-49, 5-50

Combined Heat and Power, 1-12, 2-10

Combustion Turbine, 1-8, 1-10, 1-11, 2-3, 2-6, 2-7, 2-8, 3-11, 3-15, 5-7, 5-9, 5-10, 5-46, 5-49, 5-50

Compressed Air Energy Storage, 5-24

Cultural Resources, 1-6, 4-39, 4-56, 4-57, 4-58, 5-4, 5-77

Diesel, 1-1, 1-7, 2-9, 2-12, 4-9, 5-46, 5-49, 5-50, 5-79

Employment, 1-2, 4-71, 4-80, 4-83, 4-84, 5-6, 5-26, 5-32, 5-75, 5-76

Endangered and Threatened Species, 1-6, 4-39, 4-48, 4-49, 4-50, 5-2, 5-4, 5-12, 5-22, 5-29, 5-55

Energy Efficiency, 1-5, 3-3, 3-11, 3-15, 5-1, 5-26, 5-64, 5-74, 5-77

Farmland, 1-6, 4-54, 4-55, 4-56, 4-76, 5-4, 5-11, 5-12, 5-19, 5-21, 5-22, 5-23, 5-28, 5-63, 5-78

Forest, 4-6, 4-12, 4-31, 4-43, 4-44, 4-45, 4-46, 4-47, 4-51, 4-53, 4-54, 4-55, 4-56, 5-11, 5-12, 5-21, 5-22, 5-28, 5-55, 5-67

Geology, 4-39, 4-41, 5-1

Greenhouse Gas (GHG), 1-7, 4-14, 4-18, 4-19, 4-21, 4-41, 5-3, 5-8, 5-9, 5-10, 5-13, 5-15, 5-18, 5-19, 5-20, 5-23, 5-24, 5-25, 5-26, 5-30, 5-38, 5-43, 5-44, 5-45, 5-46, 5-47, 5-48, 5-49, 5-50, 5-51, 5-52

Green Power Providers, 1-7, 2-13

Groundwater, ii, vi, 1-6, 4-22, 4-23, 4-24, 4-25, 4-33, 4-34, 4-35, 4-36, 4-37, 5-4, 5-9, 5-60, 5-63, 5-73

Hazardous Waste, 3-8, 3-9, 4-64, 4-65, 5-29, 5-31, 5-71, 5-73

Hydroelectric, 1-1, 1-8, 2-1, 2-9, 2-10, 2-13, 2-14, 4-1, 4-54, 4-59, 4-60, 4-61, 4-64, 4-82, 5-1, 5-4, 5-5, 5-7, 5-14, 5-15, 5-16, 5-24, 5-57, 5-60, 5-63

Integrated Resource Plan (IRP), 1-1, 1-2, 1-4, 1-5, 1-7, 1-12, 2-3, 3-1, 3-2, 3-7, 3-9, 3-10, 3-12, 3-13, 3-14, 3-15, 3-16, 3-17, 4-15, 4-49, 5-1, 5-3, 5-5, 5-8, 5-9, 5-10, 5-13, 5-15, 5-19, 5-24, 5-25, 5-44, 5-45, 5-47, 5-48, 5-75, 5-76, 5-77

Land Requirement, 5-4, 5-5, 5-7, 5-11, 5-12, 5-20, 5-22, 5-28, 5-64, 5-65, 5-66, 5-67

Land Resource, 4-39, 5-4, 5-5, 5-29, 5-31, 5-63, 5-78

Landfill Gas, 2-13, 2-14, 5-23, 5-46, 5-49, 5-50

Lead (Pb), 4-2

Life Cycle Analysis (LCA), 5-3, 5-5, 5-8, 5-10, 5-44, 5-45, 5-46, 5-47, 5-48, 5-49, 5-50, 5-51

Lignite, 2-12, 4-24, 4-76, 5-8, 5-56

Limestone, 2-5, 4-23, 4-24, 4-41, 4-45, 4-61, 4-66, 5-5, 5-9

Low-Income, 4-79, 4-80, 4-85, 4-86, 5-2, 5-26, 5-76, 5-77

Mercury, 4-5, 4-6, 4-7, 4-8, 4-25, 4-28, 4-29, 4-30, 4-31, 4-65, 5-3, 5-9, 5-30, 5-32, 5-33, 5-34, 5-37, 5-38, 5-73

Minority, 4-72, 4-73, 4-74, 4-76, 4-79, 4-80, 5-76

National Register of Historic Places (NRHP), 4-56, 4-59, 4-60, 4-61

Natural Gas, 1-1, 1-8, 1-10, 2-1, 2-2, 2-3, 2-4, 2-6, 2-7, 2-8, 2-12, 3-7, 3-8, 3-10, 3-11, 3-13, 4-8, 4-19, 4-20, 4-28, 4-31, 4-33, 4-41, 4-42, 4-52, 4-64, 5-1, 5-2, 5-3, 5-5, 5-7, 5-9, 5-10, 5-11, 5-12, 5-13, 5-27, 5-31, 5-32, 5-33, 5-43, 5-44, 5-48, 5-52, 5-56, 5-57, 5-65, 5-67, 5-69, 5-70, 5-71, 5-73, 5-77, 5-78, 5-79

Nitrogen Oxides (NOx), 2-4, 4-2, 4-4, 4-5, 4-6, 4-7, 4-12, 5-3, 5-7, 5-9, 5-30, 5-32, 5-34, 5-36, 5-38

Nonattainment Area, 4-2

Nuclear, 1-1, 1-2, 1-7, 1-11, 1-12, 2-1, 2-5, 2-6, 3-3, 3-4, 3-10, 3-11, 3-13, 3-14, 3-16, 4-1, 4-20, 4-28, 4-32, 4-33, 4-37, 4-59, 4-64, 4-65, 4-67, 4-68, 4-79, 4-80, 4-82, 4-84, 5-1, 5-4, 5-5, 5-7, 5-13, 5-14, 5-15, 5-27, 5-30, 5-31, 5-46, 5-49, 5-50, 5-55, 5-56, 5-57, 5-58, 5-60, 5-69, 5-74, 5-79

Ozone, 4-2, 4-3, 4-4, 4-12, 4-18, 4-46, 5-38, 5-74

Park, 1-11, 1-13, 4-8, 4-9, 4-10, 4-12, 4-39, 4-53, 4-54, 4-56, 5-2, 5-11, 5-13, 5-22, 5-29

Per Capita Income, 4-84, 4-85, 4-86, 5-31

Photovoltaic (PV), 1-8, 2-10, 2-11, 2-13, 2-14, 4-1, 4-62, 4-63, 4-65, 5-5, 5-19, 5-20, 5-21, 5-31, 5-64, 5-74, 5-79

Power Purchase Agreement (PPA), 2-8, 2-10, 2-12, 2-13, 5-2, 5-8, 5-19, 5-48

Recreation, 4-25, 4-26, 4-53, 4-59, 4-60, 5-2, 5-4, 5-57

Renewable Energy, 1-8, 2-1, 2-11, 2-13, 2-14, 4-1, 4-61, 4-62, 5-14, 5-19, 5-31, 5-44

Resiliency, 1-8, 2-4, 3-2, 3-12, 3-15, 5-16, 5-57

Risk, 3-4, 3-8, 3-9, 3-10, 3-11, 3-12, 3-13, 3-14, 3-16, 4-16, 4-18, 4-21, 4-22, 5-27, 5-43, 5-54, 5-55, 5-56, 5-57

Scenario, 1-1, 1-5, 1-7, 3-1, 3-3, 3-4, 3-5, 3-12, 3-16, 4-15, 4-20, 4-21, 5-29, 5-30, 5-31, 5-32, 5-33, 5-34, 5-35, 5-36, 5-37, 5-38, 5-39, 5-40, 5-41, 5-42, 5-43, 5-51, 5-52, 5-58, 5-59, 5-60, 5-61, 5-62, 5-64, 5-66, 5-68, 5-69, 5-70, 5-71, 5-73, 5-74, 5-75

Scoping, 1-4, 1-5

Socioeconomics, 4-1, 4-69, 5-6, 5-29, 5-31, 5-75, 5-76

Storage, ix, 1-1, 1-2, 1-5, 1-7, 1-8, 1-9, 1-12, 1-13, 2-1, 2-8, 2-9, 2-13, 3-3, 3-7, 3-11, 3-12, 3-13, 3-15, 3-16, 4-24, 4-25, 4-26, 4-41, 4-42, 4-47, 4-51, 4-61, 4-62, 4-63, 4-67, 5-1, 5-4, 5-5, 5-7, 5-14, 5-16, 5-23, 5-24, 5-25, 5-27, 5-31, 5-64, 5-67, 5-74, 5-79

Strategy, 1-11, 3-1, 3-2, 3-3, 3-4, 3-5, 3-9, 3-10, 3-11, 3-12, 3-17, 5-4, 5-14, 5-27, 5-29, 5-30, 5-31, 5-32, 5-33, 5-34, 5-35, 5-36, 5-37, 5-38, 5-39, 5-40, 5-41, 5-42, 5-43, 5-51, 5-58, 5-59, 5-60, 5-61, 5-62, 5-63, 5-64, 5-66, 5-68, 5-69, 5-70, 5-71, 5-73, 5-74, 5-75, 5-78

Sulfur Dioxide (SO₂), 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-9, 4-12, 5-3, 5-5, 5-7, 5-9, 5-30, 5-32, 5-33, 5-35, 5-38

Surface Mining, 1-6

Surface Water, 4-22, 4-25, 4-26, 4-31, 4-33, 4-34, 4-35, 4-36, 4-37, 5-55, 5-63

Temperature, 4-14, 4-15, 4-16, 4-18, 4-20, 4-21, 4-31, 4-55, 5-54, 5-55, 5-56

Transmission System, 2-2, 2-3, 2-15, 2-16, 3-16, 4-60, 5-1, 5-27, 5-28

Uranium, 2-6, 4-33, 4-67, 5-67, 5-69, 5-79

Vegetation, 4-14, 4-18, 4-39, 4-43, 4-44, 4-50, 4-51, 4-64, 5-4, 5-21

Visibility, 4-8, 4-9, 4-10, 4-11, 4-12

Water Quality, 1-6, 4-23, 4-25, 4-26, 4-27, 4-28, 4-31, 4-32, 4-33, 4-38, 4-50, 5-57

Water Supply, 4-22, 4-23, 4-25, 4-26, 4-33, 4-35, 4-36, 5-15, 5-54, 5-76

Wildlife, 1-6, 4-7, 4-25, 4-38, 4-39, 4-43, 4-44, 4-47, 4-50, 4-51, 4-53, 4-54, 4-61, 5-2, 5-4, 5-17, 5-21, 5-55, 5-78