TENNESSEE VALLEY AUTHORITY

Regional Energy Resource Council

Nov 7, 2023

1st Meeting – Term 6


TVA
TENNESSEE
VALLEY
AUTHORITY
NORRIS
Welcome!
The Meeting will
begin at
8:00 AM Central

Welcome

TENNESSEE VALLEY AUTHORITY

RERC Live and Virtual Meeting

- **This is the first meeting of the 6th term of the RERC.**
- **We welcome members of the public attending virtually and who are in listen only mode**. For those that pre-registered to make public comments, the meeting host will give you instructions for speaking to the Council at that time. Written comments are always welcomed (tva.com/rerc).
- **RERC Members who are attending virtually are able to mute and unmute their own line.** RERC Members who are attending virtually may use the raise hand function to be recognized for questions or comments.
- **RERC Members attending in person**, please turn your light bulb on and I will call on you. I will identify the person I call on so that those attending virtually will be able to identify the speaker. Please use your microphone so that those in the room and those attending virtually can hear your comments.

Safety First!

- **In case of fire or other building emergency,** exit the conference room doors you entered. Exit the building via the front doors. Gather outside in the parking lot.

- **In case of severe weather**, exit the doors you entered in the back of the room. You will be guided to an interior room.

TVA TENNESSEE VALLEY AUTHORITY

Introductions

Name

Position, Organization, Location

Something you do for fun

TVA TENNESSEE VALLEY AUTHORITY

Introductions:
Name
Position, Organization, Location
Fun

RERC Term 6* Members

Adam Benshoff
Ford Motor Company

Jan Berry
Citizens Climate Education

Marquita Bradshaw
Sowing Justice

Ron Bunch
Bowling Green Chamber of Commerce

Monte Cooper
Jackson Energy Authority

Erin Gill, RERC Chair
Knoxville Utilities Board

Rebecca Goodman
Commonwealth of Kentucky

Rodney Goodman
Habitat for Humanity

Chrissy Heard
State of Mississippi

Chelsea Jenkins
Commonwealth of Virginia

Candy Johnson
Urban League of Greater Chattanooga

Sen. Steve Livingston
State of Alabama

Pete Mattheis
Tennessee Valley Industrial Committee

Dan Miller
Oak Ridge National Laboratory

Doug Peters
Tennessee Valley Public Power Association

Boyd Pettit
State of Georgia

Erik Schmidt
City of Chattanooga

Patricia Sims
Drake State Community & Technical College

Alexa Voytek
State of Tennessee

Julie Woosley
State of North Carolina

*Aug1, 2023 – July 31, 2025

TVA TENNESSEE VALLEY AUTHORITY

Agenda

RERC Meeting
Nov 7, 2023

8:00 am CST	**Welcome – Designated Federal Officer Melanie Farrell & Chair Erin Gill** **Introductions, Agenda**
8:30	**Federal Advisory Committee Act Briefing**
8:45	**DFO Briefing**
9:00	**Introduction to TVA**
10:00	Break
10:15	**Stakeholder Engagements Updates** **Valley Pathways Study** **Utility of the Future Information Exchange**
11:30	Break for lunch
12:10 pm	**IRP Overview – Process, Plan, Role of RERC**
1:45	Break
2:00	**Public Listening Session**
3:00-5:00	**RERC Member Discussion for the Benefit of TVA Board Members** **TVA's Energy System of the Future** **Key Question: What is important to each stakeholder?**
5:00	**Adjourn RERC Meeting**

The Federal Advisory Committee Act (FACA)

FACA Briefing, First Meeting of the 6th term of the RERC

Jennifer Brundige, Attorney, Office of the General Counsel

November 7, 2023

TVA TENNESSEE VALLEY AUTHORITY

Federal Advisory Committee Act of 1972

Congress formally recognized the merits of seeking advice and assistance

- President Washington sought advice during the Whiskey Rebellion in 1794.
- Growth in advisory committees after World War II.
- Through the Act, Congress addressed concerns about transparency, accountability, and use of federal funds.

The Act assures that advisory committees provide advice that is relevant, objective, and open to the public and comply with the record keeping requirements

Regional Energy Resource Council

Created by TVA in 2013 “to provide advice on its energy resources and the priorities among competing objectives and values”

- Construction and operation of various supply-side resources, including fossil-fueled power plants, nuclear plants, hydroelectric dams, and renewable resources
- Development and management of demand-side resources, including energy efficiency
- Design, construction, and operation of power delivery systems
- The integration of these energy resources into plans for meeting future demands for electricity in the TVA region

Key Elements of the Act

Public access

- Meetings (reasonably accessible and timely notice required—generally open to the public)
- Records (available for public inspection, subject to the Freedom of Information Act, etc.)

Structured management

- Filed charters
- Expiration after two years
- Attendance of a designated federal officer (DFO) or employee

Balanced Membership

Key Provisions of RERC Charter

Council Provides Advice

- On TVA's energy resources and the priorities among competing objectives and values
- Advice reported to TVA Board's External Stakeholders and Regulation Committee
- Term of Council is two years with two meetings per year typically

Balanced Membership

Members include:

- Nominations from the Governors within the Tennessee Valley states
- One representative each: TVPPA, LPCs, TVIC, Direct-served customers
- Two representatives each: Environment/Energy NGOs; chamber of commerce/economic and community development; academic or research center
- Up to three additional members to ensure a broad range of views

TVA TENNESSEE VALLEY AUTHORITY

Federal Advisory Committee Act Meeting Requirements

Agenda

- Prepared and approved by the DFO, or alternate DFO, in consultation with Council Chair
- Distributed to Council and an outline is published in the Federal Register prior to each meeting
- Topics may be submitted for consideration to the DFO by any member of the Council, or non-members, including members of the public

Meeting Minutes

- DFO will ensure that minutes are prepared for each meeting, approved by the Chair, and made available to Council members and the public

Voting

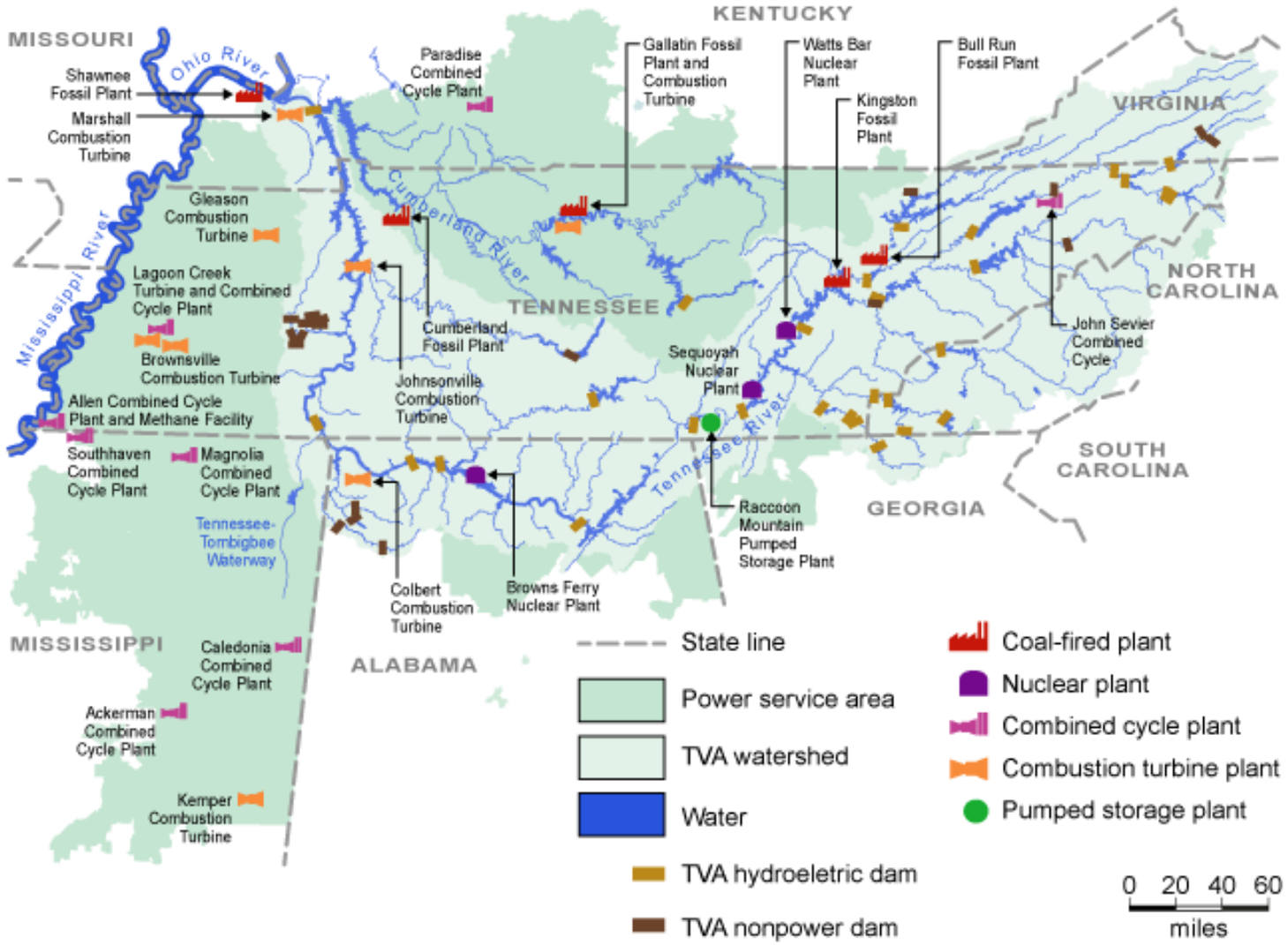
- Any member of the Council may make a motion for a vote
- Quorum is a majority of the seated members of the Council as defined in the bylaws
- Advice requires an affirmative vote of majority of Council members present
- Advice may include minority or dissenting views

Membership

- Balanced Membership
- Professional or personal qualifications to achieve the mission of the Committee
- Broad range of diverse views and interests

RERC Advice

Your advice is important to TVA and for the ten million people of the Tennessee Valley service territory and beyond.



Source: Tennessee Valley Authority (TVA). | GAO-23-105375

TVA Update

Melanie Farrell, Designated Federal Officer

TENNESSEE VALLEY AUTHORITY

Introduction to TVA

Brian Child, Vice President, Enterprise Planning
Regional Energy Resource Council Meeting
November 7, 2023

TVA TENNESSEE VALLEY AUTHORITY

Agenda

TVA's Mission

TVA's Finances

TVA's Asset Portfolio

TVA's Innovation and Research Initiatives

TVA's Mission

TVA Created to Make Life Better

May 18, 1933, the TVA Act was signed.

TENNESSEE VALLEY AUTHORITY ACT

AN ACT

To improve the navigability and to provide for the flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; to provide for the agricultural and industrial development of said valley; to provide for the national defense by the creation of a corporation for the operation of Government properties at and near Muscle Shoals in the State of Alabama, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of maintaining and operating the properties now owned by the United States in the vicinity of Muscle Shoals, Alabama, in the interest of the national defense and for agricultural and industrial development, and to improve navigation in the Tennessee River and to control the destructive flood water in the Tennessee River and Mississippi River Basins, there is hereby created a body corporate by the name of the "Tennessee Valley Authority" (hereinafter referred to as the "Corporation"). The Board of Directors first appointed shall be deemed the incorporator, and the incorporation shall be held to have been effected from the date of the first meeting of the Board. This Act may be cited as the "Tennessee Valley Authority Act of 1933." [48 Stat. 58-59, 16 U.S.C. sec. 831][1]

Sec. 2. MEMBERSHIP, OPERATION, AND DUTIES OF THE BOARD OF DIRECTORS.

(a) MEMBERSHIP.--

(1) APPOINTMENT.--The Board of Directors of the Corporation (referred to in this Act as the "Board") shall be composed of 9 members appointed by the President by and with the advice and consent of the Senate, at least 7 of whom shall be a legal resident of the service area of the Corporation.

(2) CHAIRMAN.--The members of the Board shall select 1 of the members to act as chairman of the Board.

(b) QUALIFICATIONS.--To be eligible to be appointed as a member of the Board, an individual--

(1) shall be a citizen of the United States;

(2) shall have management expertise relative to a large for-profit or nonprofit corporate, government, or academic structure;

(3) shall not be an employee of the Corporation;

(4) shall make full disclosure to Congress of any investment or other financial interest that the individual holds in the energy industry; and

(5) shall affirm support for the objectives and missions, of the Corporation, including being a national leader in technological innovation, low-cost power, and environmental stewardship.

[1] For the purpose of identifying the sections that appeared in the original Act of 1933 and those that have been brought into the Act by amendment, references have been placed at the end of the sections. For example, the reference at the end of section 1, 48 Stat. 58-59, indicates that this section will be found in volume 48 of the Statutes at Large on pages 58 and 59.

1

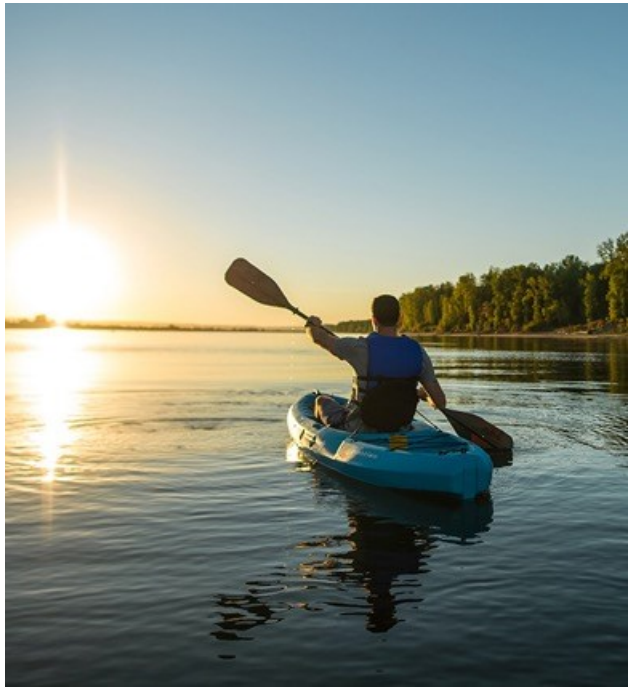
Our Mission

To serve the people of the Tennessee Valley to make life better.

Delivering on Our Mission to You

Energy | Environment | Economic Development

Provide affordable, reliable power.



Steward the Valley's natural resources.

Partner for economic growth.

Partnering to Serve You & Your Community

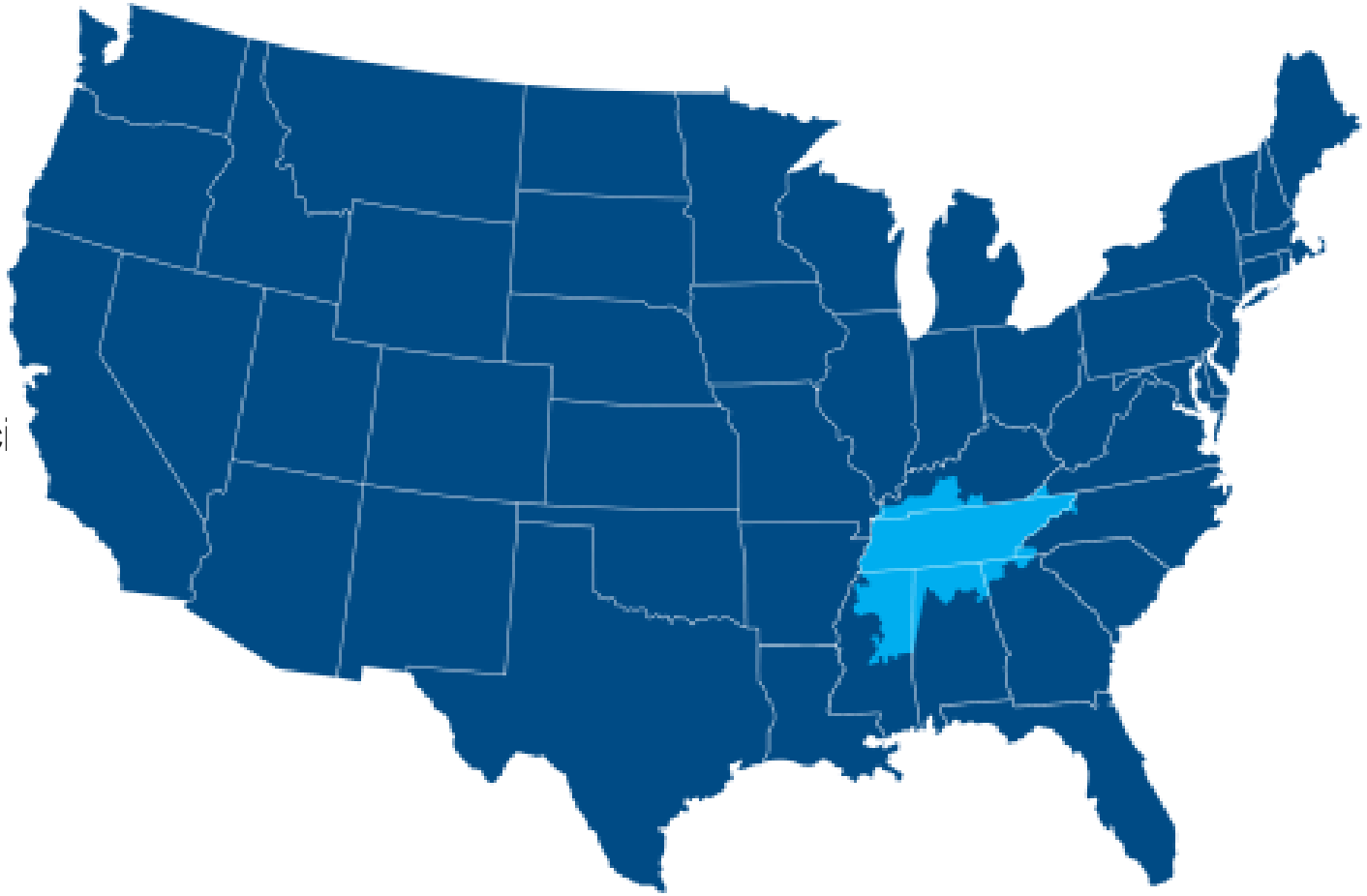
Partnering with
153 Local Power Companies

To serve
10 Million People
700,000 Businesses in Parts of 7 States
58 Large Industries & Federal Installations

TVA TENNESSEE VALLEY AUTHORITY

Profile: America's Largest Public Power Company

- Among the largest utilities in the U.S.
- 3rd largest nuclear owner in the U.S.
- 90 years in operation (1933-2023)
- 80,000 square miles service area
- 10 million service area population
- 39,553 MW* diverse power system capaci
- 16,000 miles+ transmission system
- $12.5 billion annual revenues
- $51.2 billion total assets
- Entirely self-funded



*Capacity aligns to FY22 10-K Net Summer Capability, adjusted to include demand response programs. Planning capacity is lower, as it accounts for Hydro and Renewable expected generation at peak, fuel blend derates, and other factors.

TVA TENNESSEE VALLEY AUTHORITY

24

The Value of Public Power

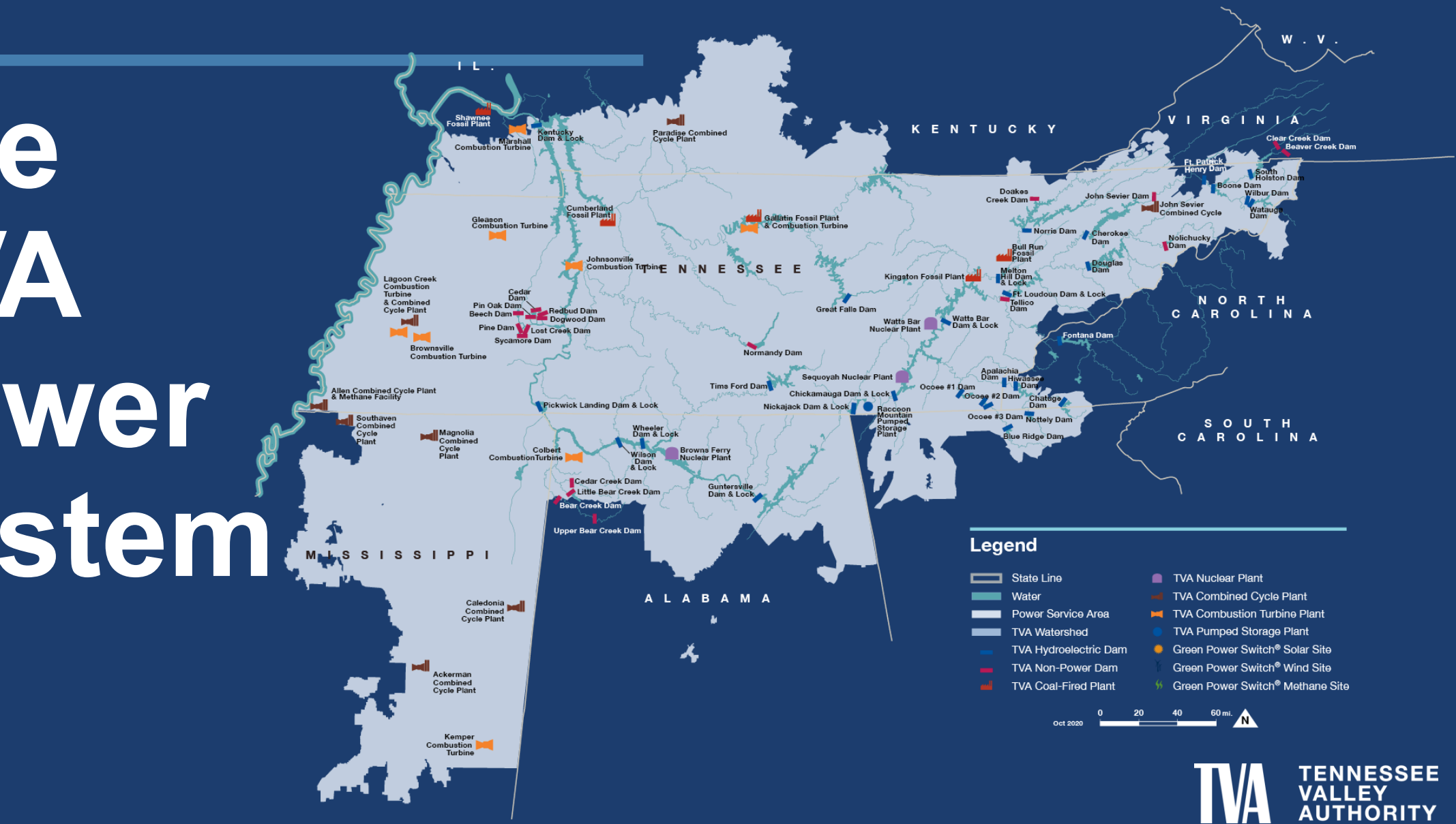
- People are first – Accountable to stakeholders, not stockholders
- Rates are set to recover costs and reinvest in facilities – Not maximize profits
- Low-cost, reliable service are the focus – Not shareholders
- Collaborative regulatory process with a clear focus on serving energy consumers

TVA TENNESSEE VALLEY AUTHORITY

TVA Governance

- Corporate Agency of the United States, receives no tax dollars and is self financing
- Nine-member, part-time Board of Directors, nominated by the President, confirmed by the Senate
- CEO, appointed by the TVA Board
- Regional Energy Resource Council (RERC) provides advice to the TVA Board

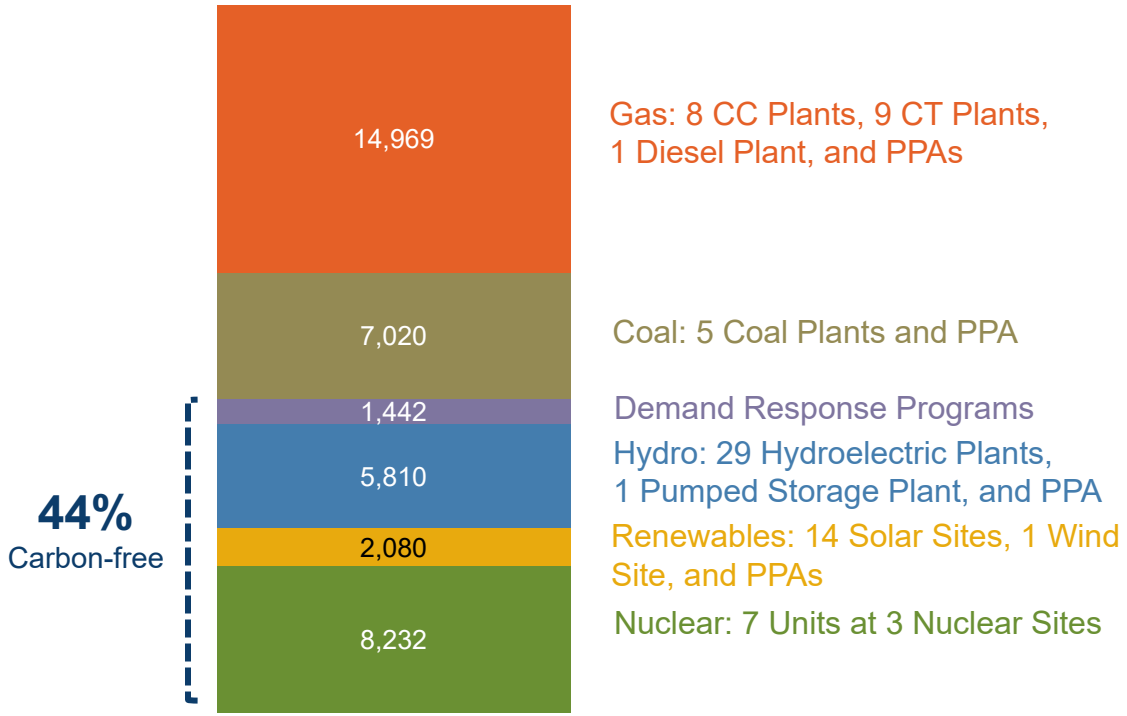
The TVA Power System



TVA TENNESSEE VALLEY AUTHORITY

Today's Resource Portfolio

FY22 Capacity
39,553 MW



Gas: 8 CC Plants, 9 CT Plants, 1 Diesel Plant, and PPAs

Coal: 5 Coal Plants and PPA

Demand Response Programs

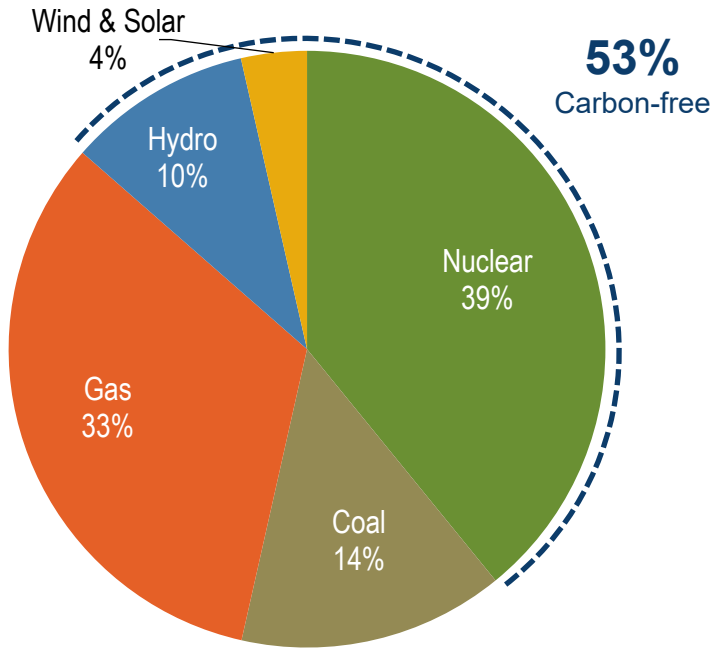
Hydro: 29 Hydroelectric Plants, 1 Pumped Storage Plant, and PPA

Renewables: 14 Solar Sites, 1 Wind Site, and PPAs

Nuclear: 7 Units at 3 Nuclear Sites

Capacity aligns to FY22 10-K Net Summer Capability, adjusted to include demand response programs. Planning capacity is lower, as it accounts for Hydro and Renewable expected generation at peak, fuel blend derates, and other factors.

FY22 Energy
165 TWh



In addition to power supply sources included here, TVA offers energy efficiency programs that effectively reduced 2022 energy needs by about 2,200 GWh or 1.3% (Net Cumulative Realized at System basis, 2007 base year).

TVA TENNESSEE VALLEY AUTHORITY

Partnering to Manage Our Resources

Water source for over

5 Million People

10 Billion Gallons of Water

are used in the valley every day

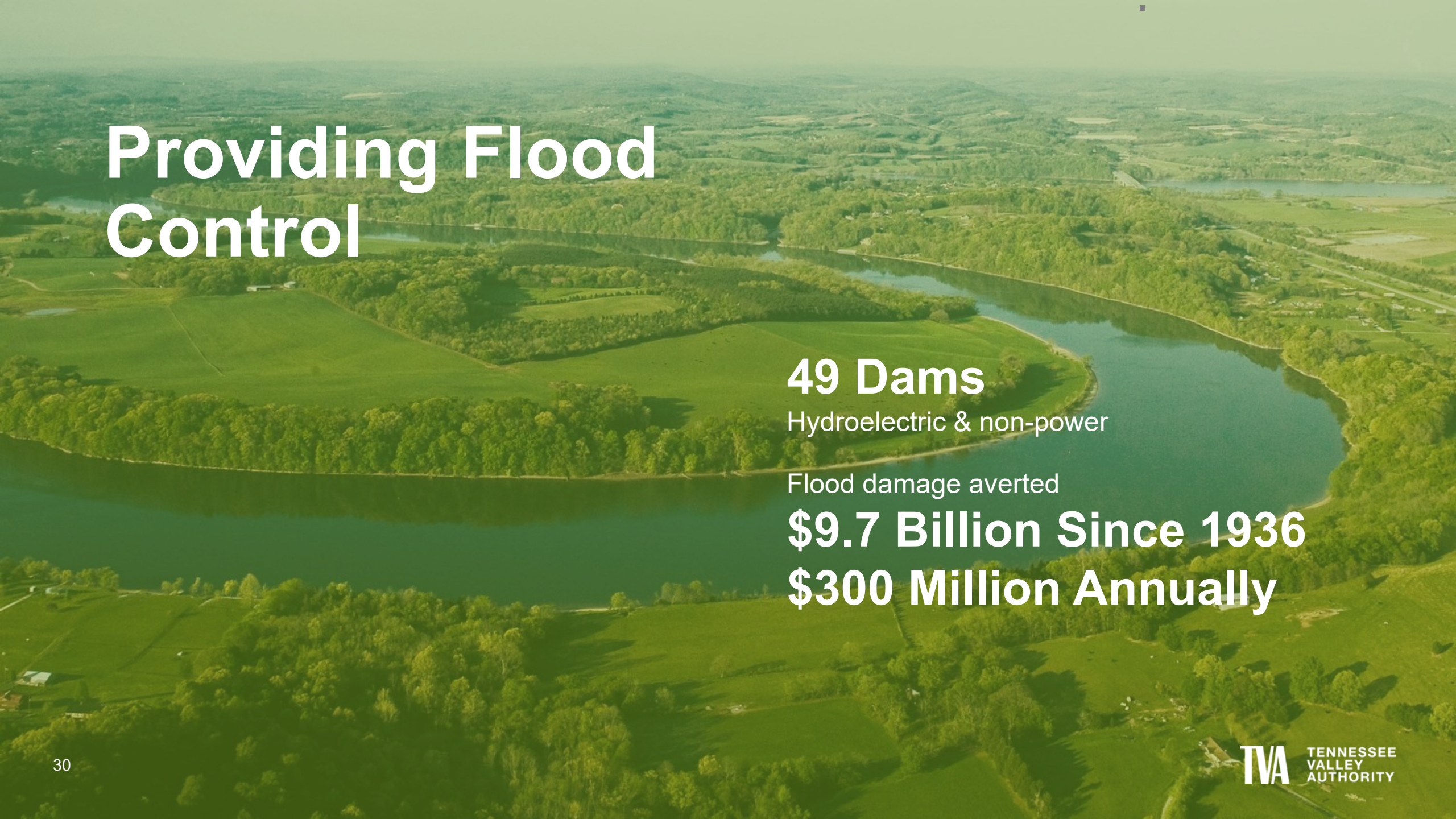
95.6% is Recycled

and returned to the river

Our 14 locks move 50 million tons

Saving $500 Million Per Year

in shipping costs



Providing Flood Control

49 Dams

Hydroelectric & non-power

Flood damage averted

$9.7 Billion Since 1936

$300 Million Annually

TVA TENNESSEE VALLEY AUTHORITY

Bringing Businesses & Jobs to the Valley

Fiscal year 2022

Attracted | Retained 66,500 Jobs

$10.2 Billion Invested

17th year

Top 10 Utility

Attract

Engage

Serve

TVA TENNESSEE VALLEY AUTHORITY

Investing in the Valley

Entirely self-funded since 1999

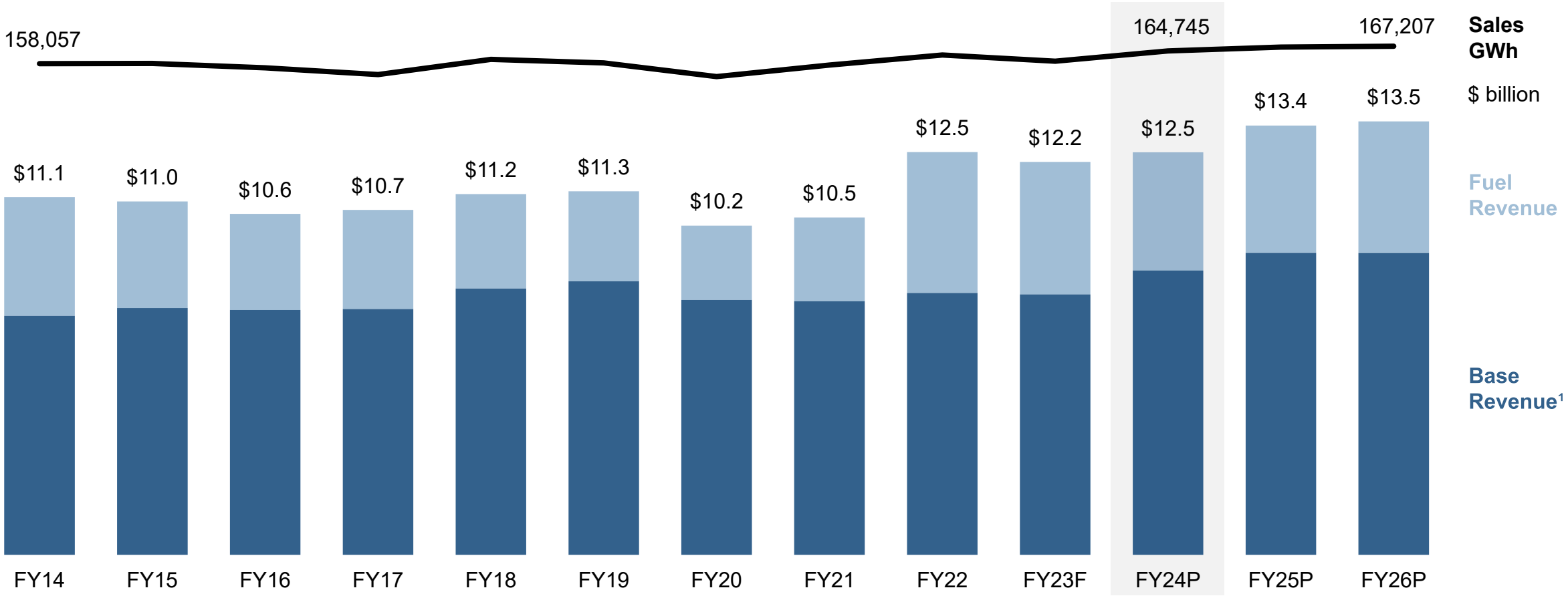
Tax-equivalent payments
$500 Million

Integrated Management of Natural Resources
Partner for Economic Growth

TVA TENNESSEE VALLEY AUTHORITY

TVA's Finances

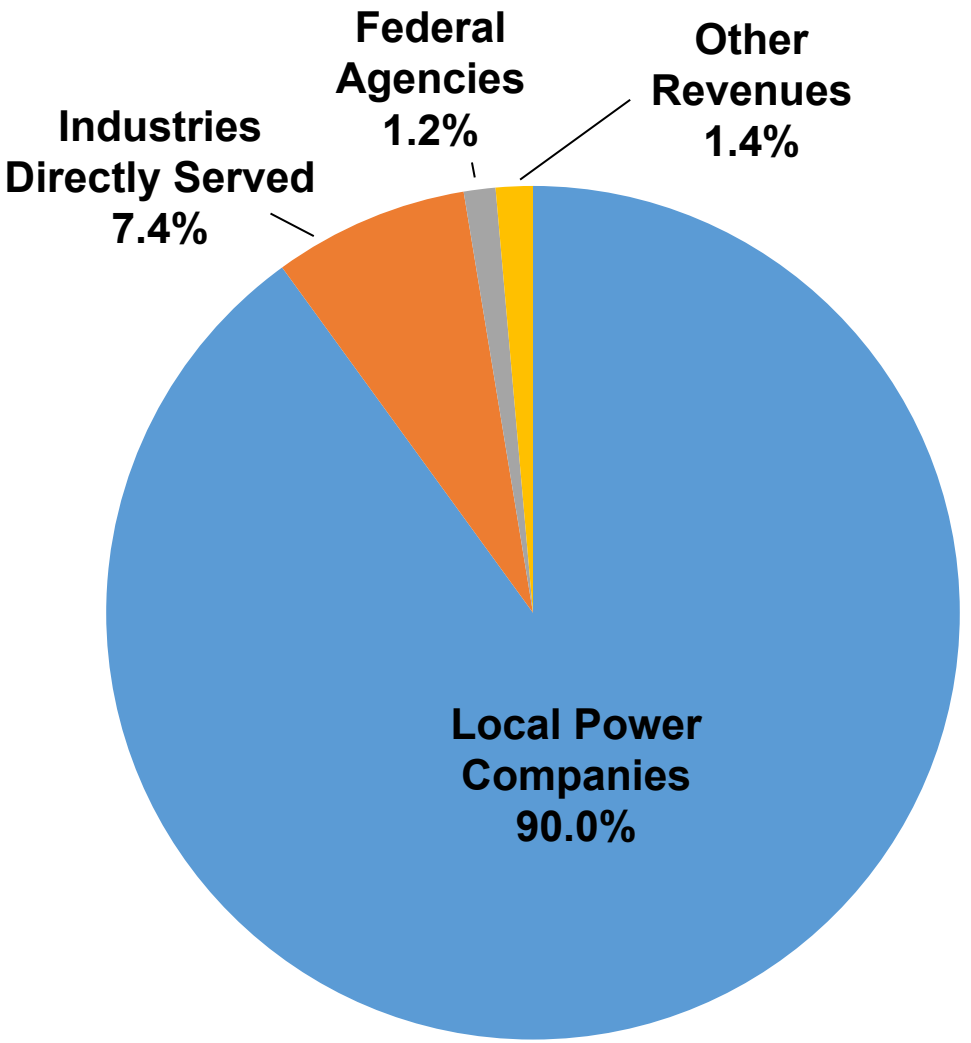
Operating Revenue



[1]Base Revenue includes “Other” revenue

TENNESSEE VALLEY AUTHORITY

Sources of TVA Revenues



Based on FY22 total operating revenues

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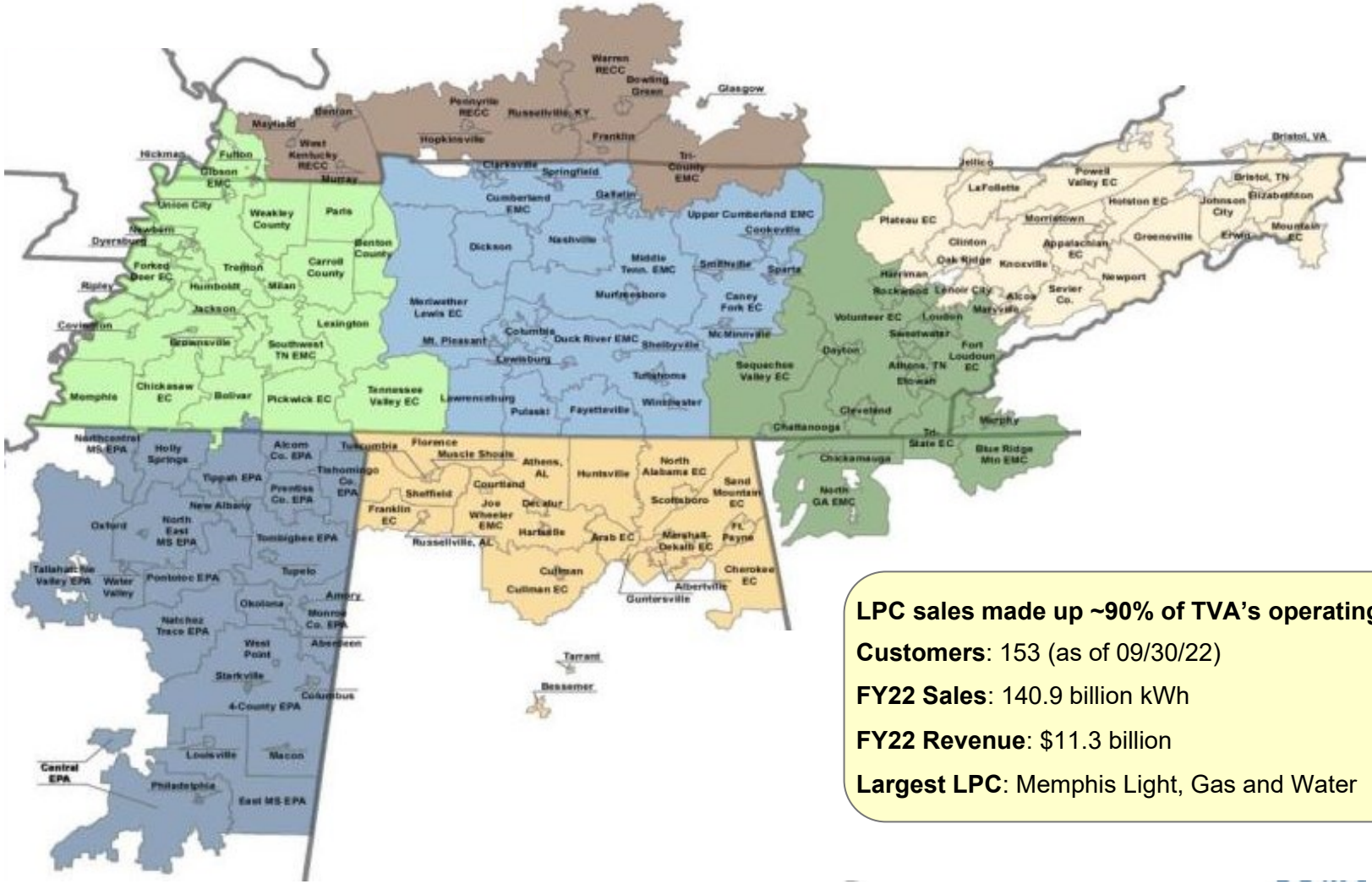
35

Local Power Company (LPC) Customers



LPC sales made up ~90% of TVA's operating revenue in FY22

Customers: 153 (as of 09/30/22)

FY22 Sales: 140.9 billion kWh

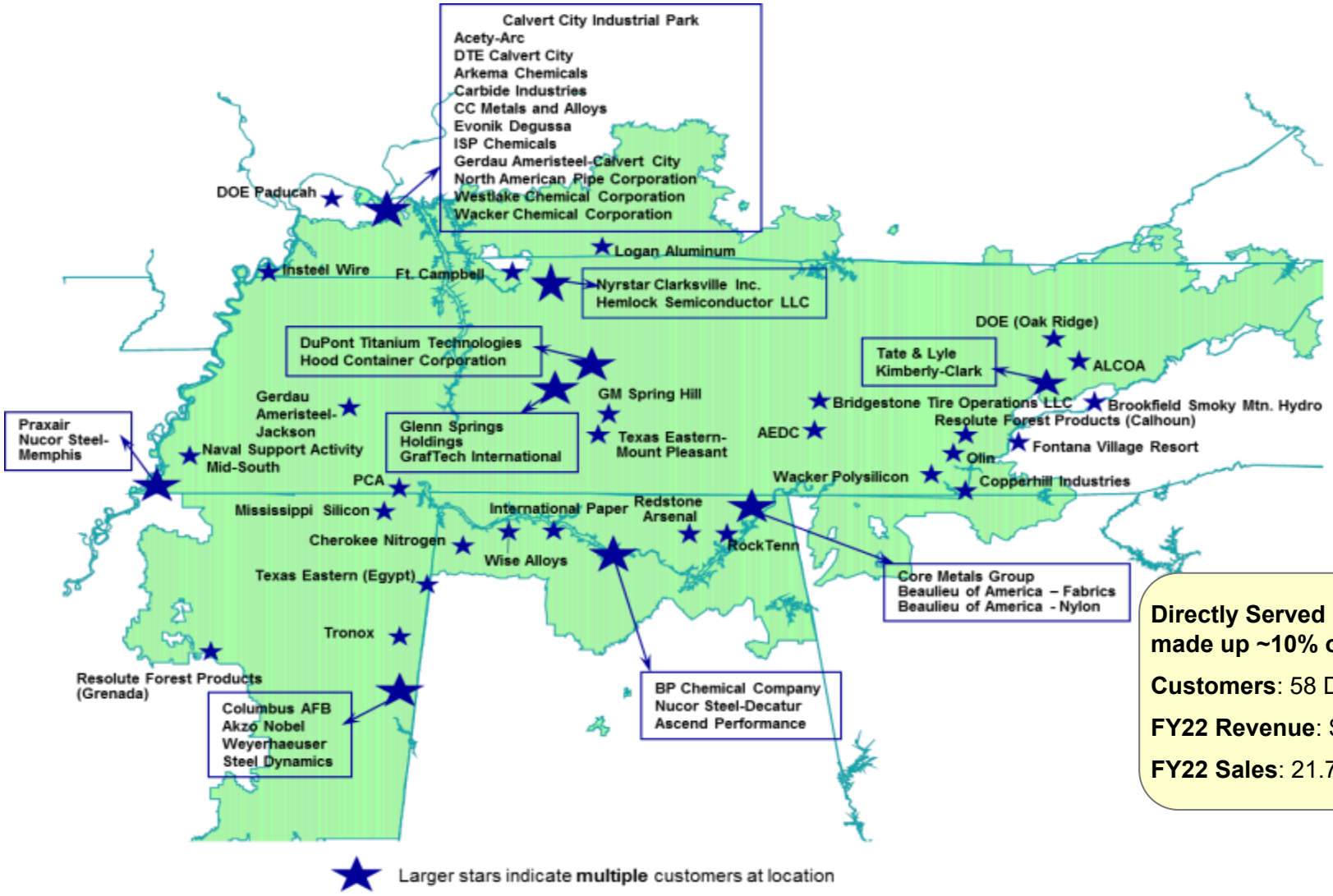
FY22 Revenue: $11.3 billion

Largest LPC: Memphis Light, Gas and Water

TVA TENNESSEE VALLEY AUTHORITY

36

Directly Served, Federal, and Other Customers



Directly Served Industrial, Federal Agencies, and other revenues made up ~10% of TVA's operating revenues in FY22

Customers: 58 Directly Served Industrial and 7 Federal (as of 09/30/22)

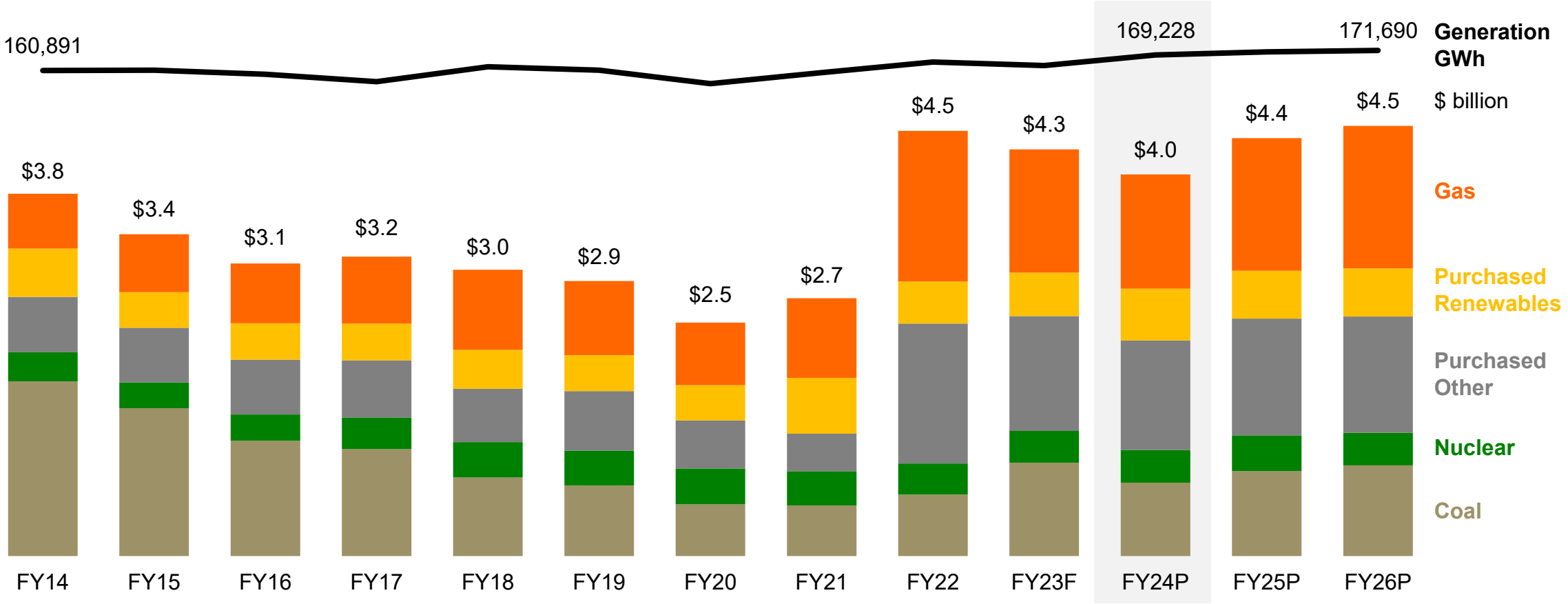
FY22 Revenue: $1.2 billion

FY22 Sales: 21.7 billion kWh

TVA TENNESSEE VALLEY AUTHORITY

37

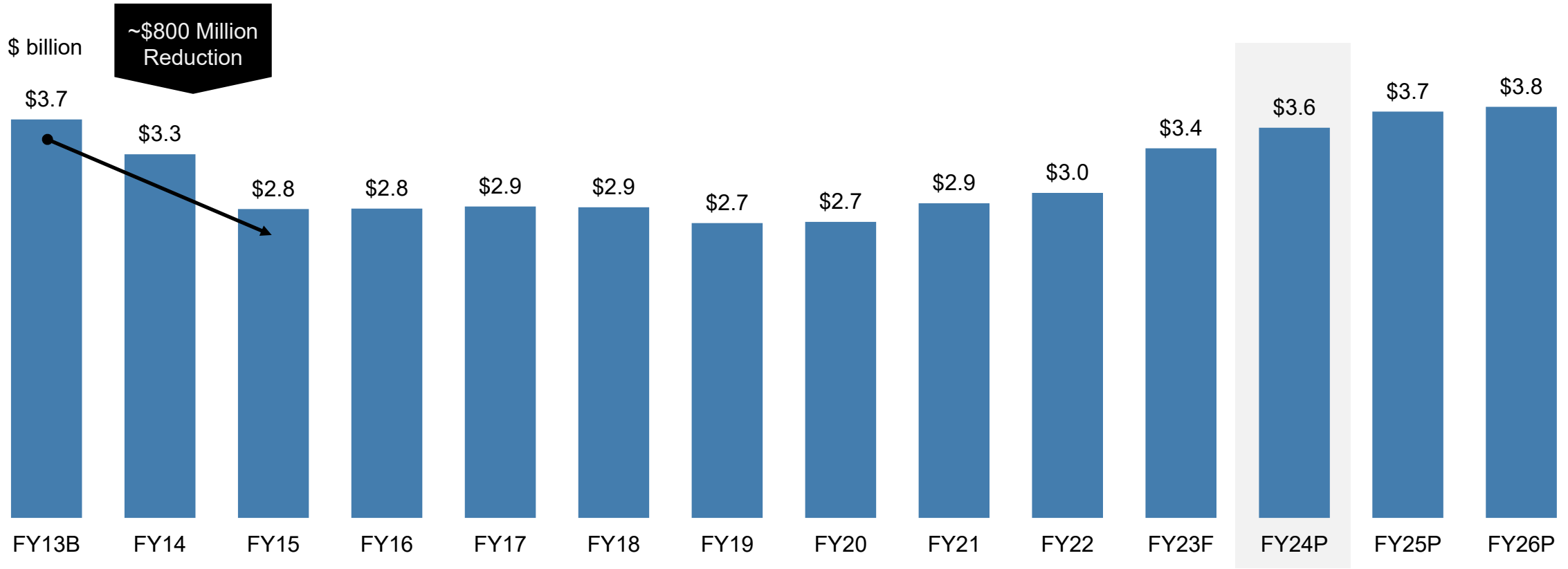
Fuel and Purchased Power



Totals include fuel cost adjustment (FCA) deferrals and fuel handling costs but exclude reagents
FY23F-FY26P represent FY23 July FCA

TVA TENNESSEE VALLEY AUTHORITY

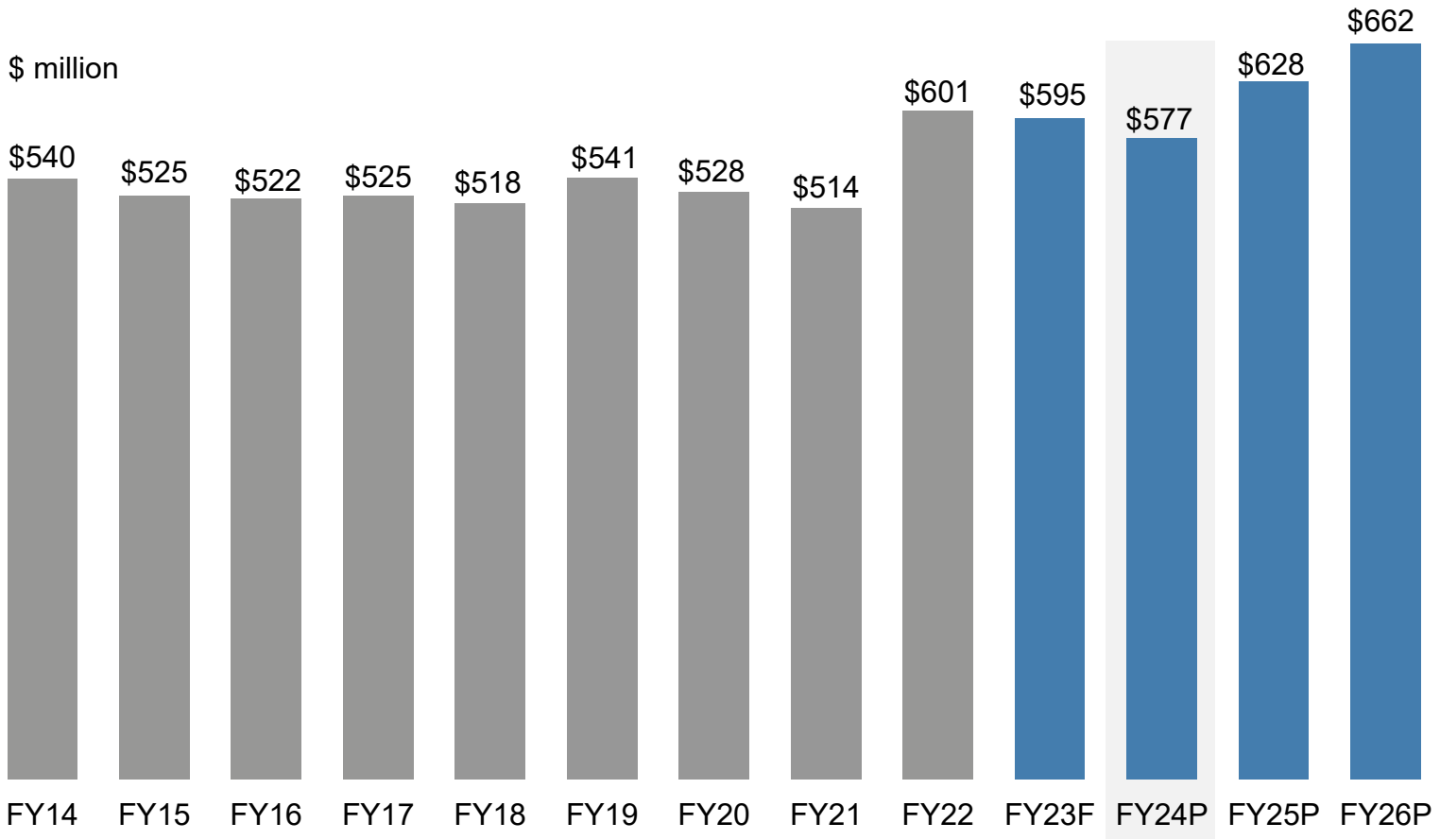
O&M Expense



Excludes FY17 and FY19 unusual items – Discretionary pension contribution, Bull Run and Paradise write-offs, and Kingston Regulatory Asset amortization

TVA TENNESSEE VALLEY AUTHORITY

Tax Equivalents



Tax Equivalent – Final Payments by State

$ million	FY22	FY23	Delta
Tennessee	$345	$410	$ 65
Alabama	83	98	15
Mississippi	39	47	8
Kentucky	32	40	8
Georgia	8	10	2
North Carolina	3	4	1
Virginia	1	1	-
Illinois	1	1	-
Final Payments	$512	$611	$ 99
Fuel Cost Adjustment	89	(16)	(105)
Total Expense	**$601**	**$595**	**$ (6)**

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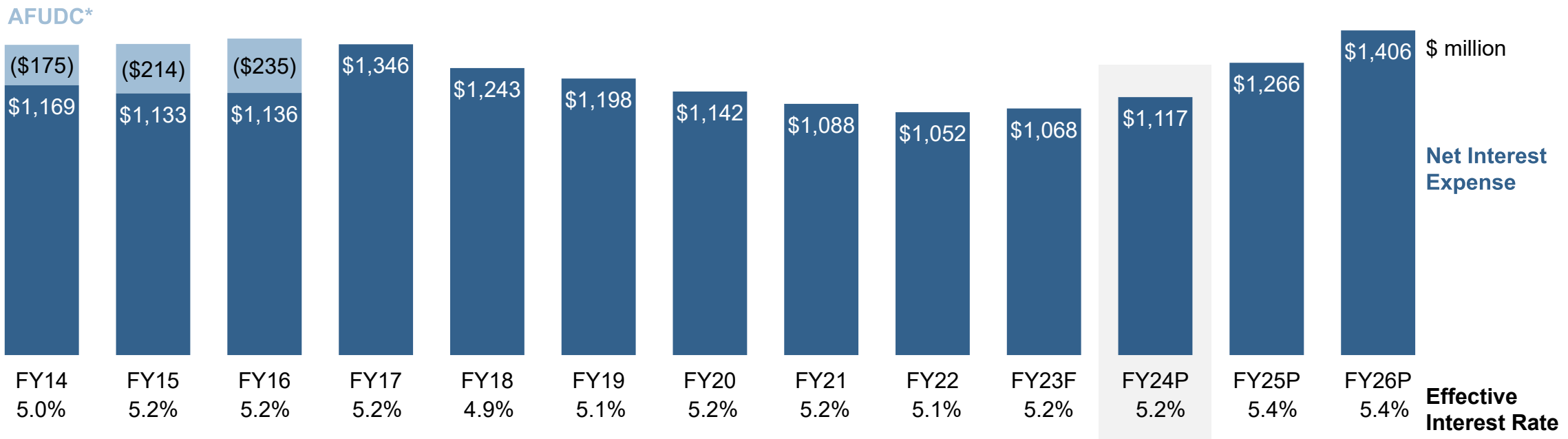
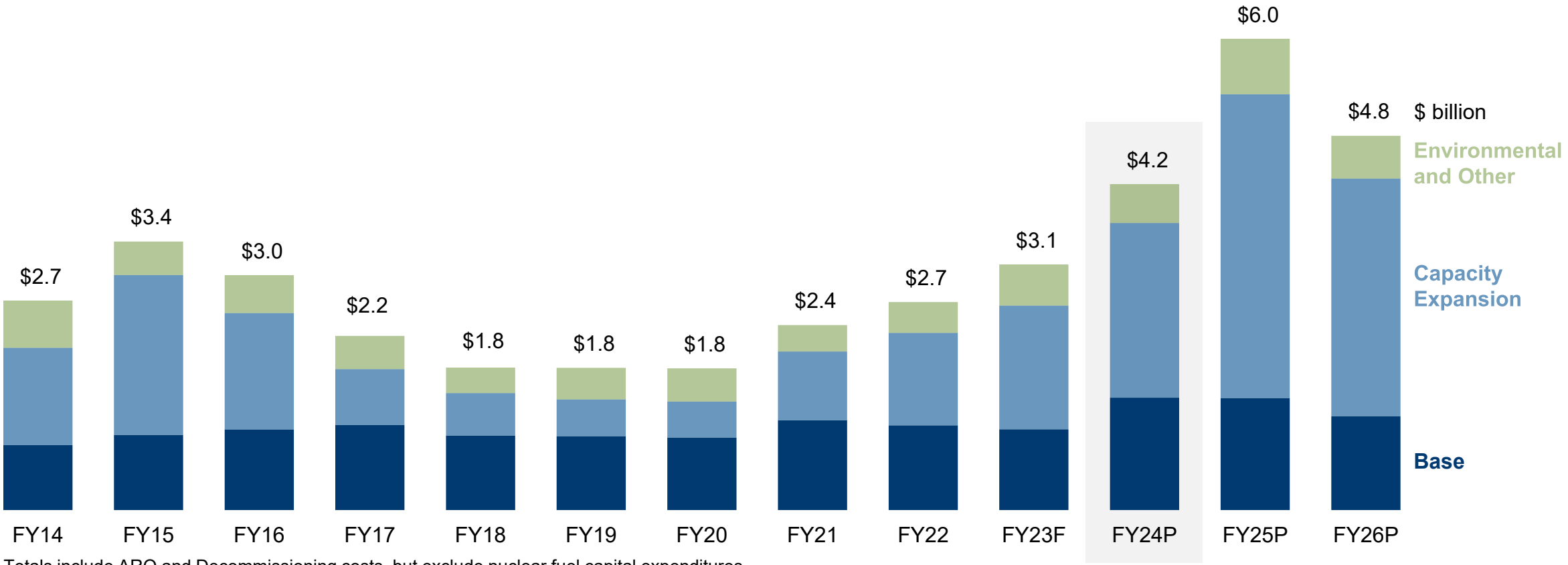
Interest Expense



*AFUDC: Allowance for Funds Used During Construction - related to the cost of borrowed funds for new builds that is capitalized

TVA TENNESSEE VALLEY AUTHORITY

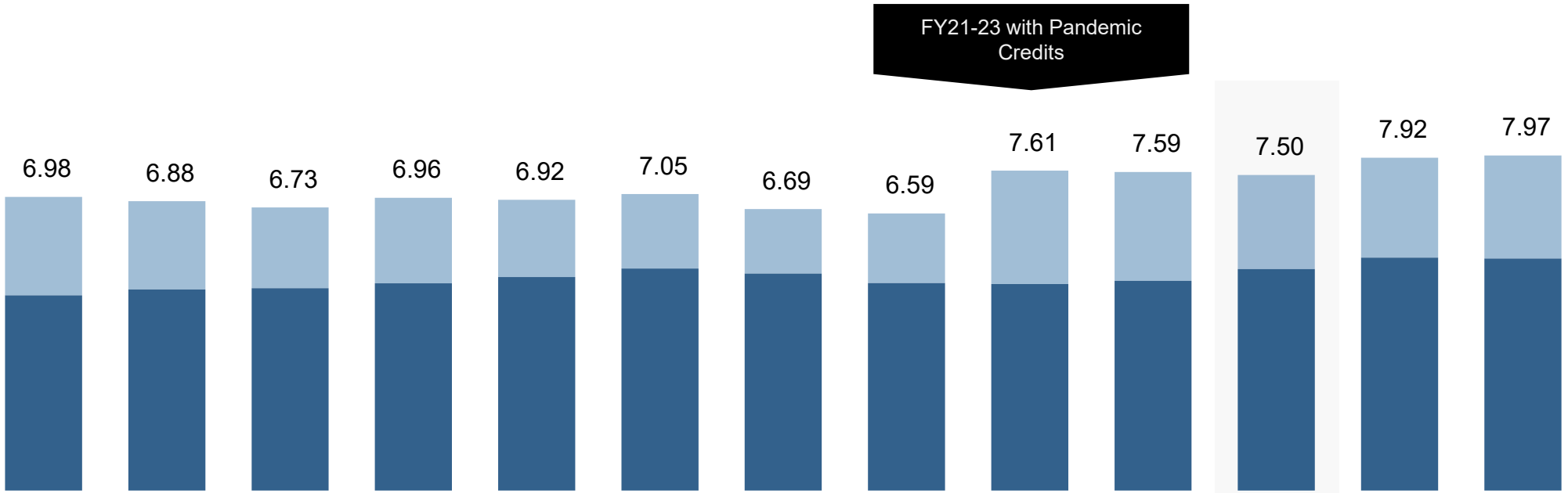
Capital Expenditures



Totals include ARO and Decommissioning costs, but exclude nuclear fuel capital expenditures

TVA TENNESSEE VALLEY AUTHORITY

Base and Fuel Rate

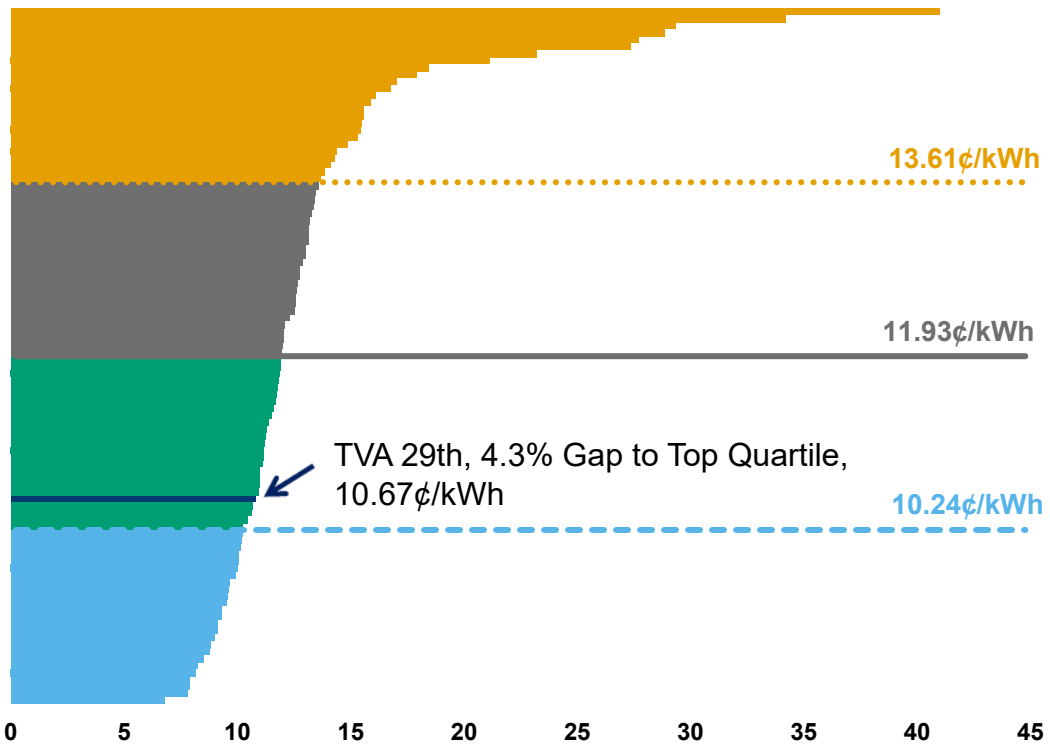


	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23F	FY24P	FY25P	FY26P	
	4.64	4.78	4.81	4.93	5.08	5.28	5.16	4.93	4.91	5.00	5.27	5.54	5.52	Base Rate
	2.34	2.10	1.92	2.03	1.84	1.77	1.53	1.66	2.70	2.59	2.23	2.38	2.45	Fuel Rate
	6.98	**6.88**	**6.73**	**6.96**	**6.92**	**7.05**	**6.69**	**6.59**	**7.61**	**7.59**	**7.50**	**7.92**	**7.97**	**Wholesale Rate**

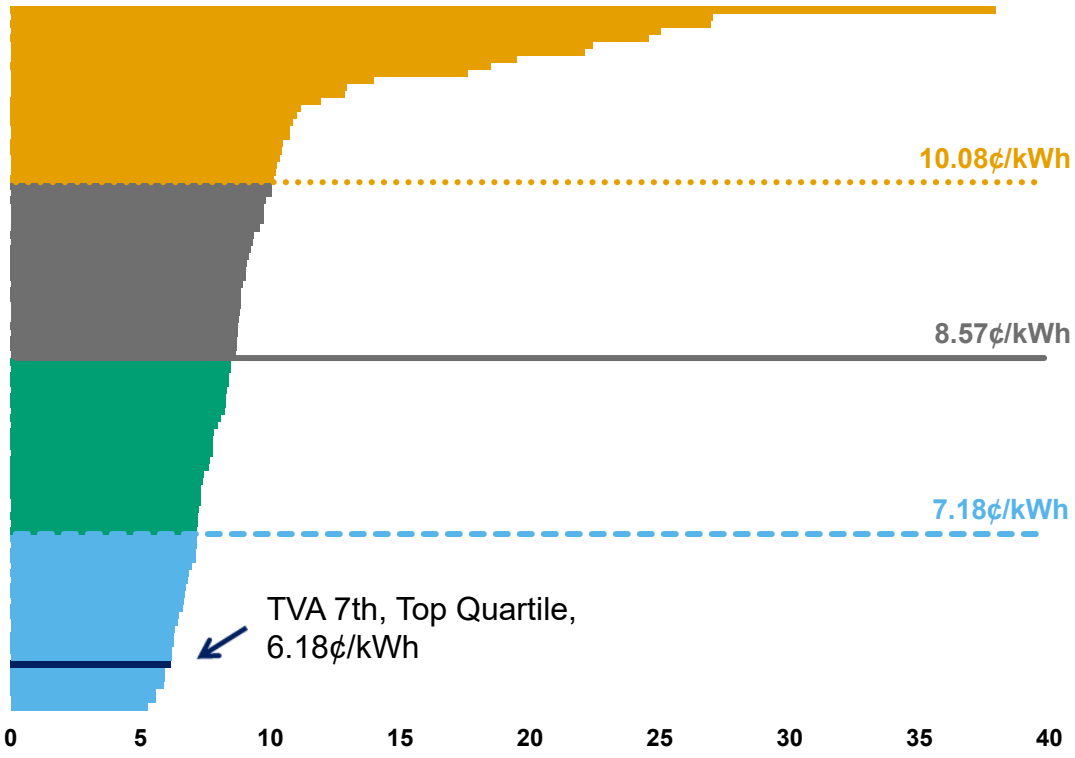
TVA TENNESSEE VALLEY AUTHORITY

Power Rates Among the Lowest in the U.S.

Average Retail Rate (¢/kWh)
Among Top 100 U.S. Utilities



Average Industrial Rate (¢/kWh)
Among Top 100 U.S. Utilities



12-Month Rolling Average (¢/kWh) – Sources: U.S. Energy Information Administration-861M and Electricity Sales Statistics- April 2022 – April 2023

TVA TENNESSEE VALLEY AUTHORITY

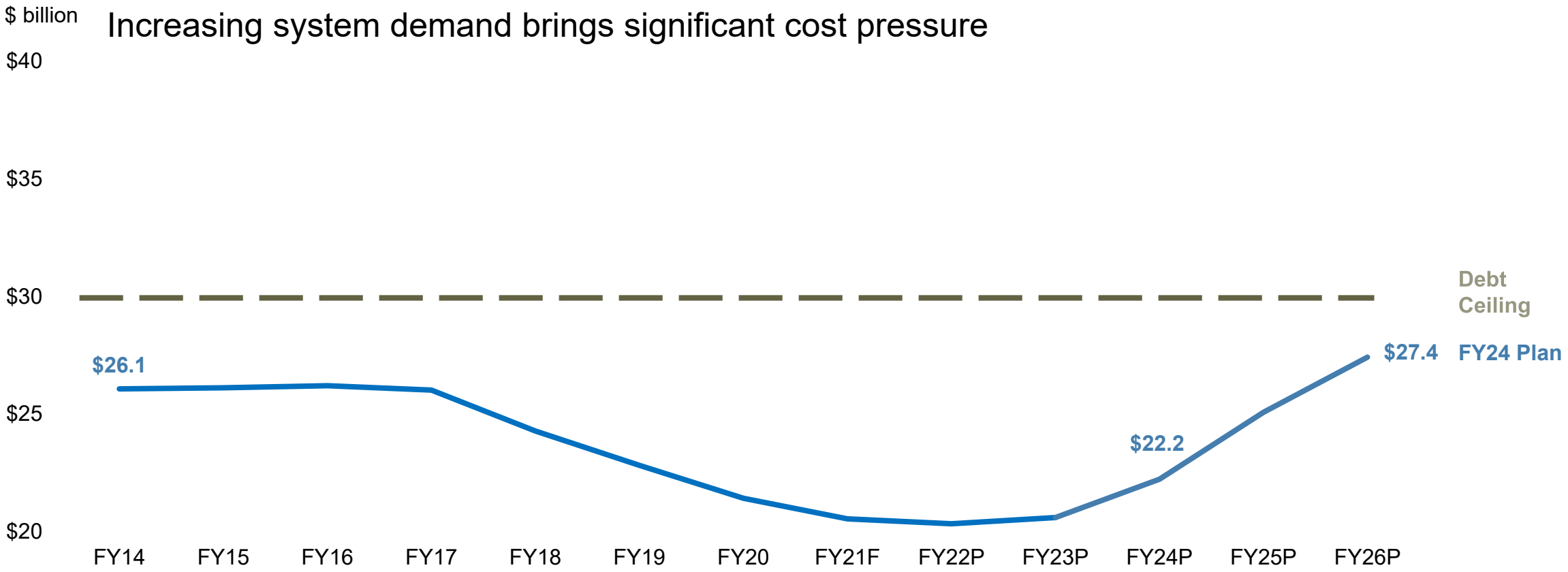
Financial Guiding Principles

In addition to setting rates in accordance with the TVA Act, TVA also adopted Financial Guiding Principles (FGP) in 2010 to establish principles to follow in setting rates:

- Retire debt over the useful life of assets
- Issue new debt for new assets
- Use regulatory treatment for asset-related, specific and unusual events
- Rate actions as necessary to fund operating expenses
- Evaluate rate actions to avoid significant rate volatility
- Implement rate actions to maintain financial flexibility

45

Total Financing Obligations (TFO)

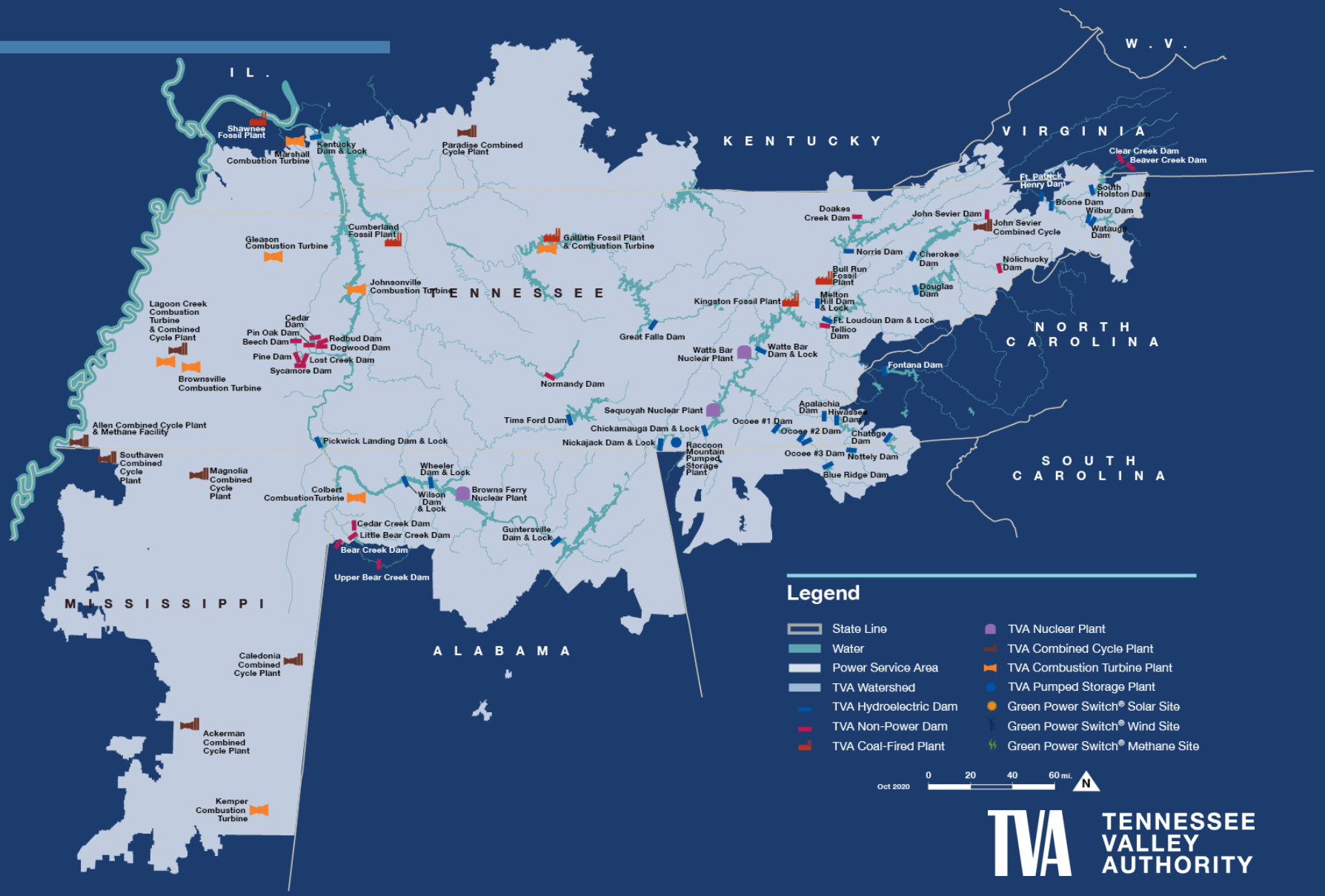


TFO includes statutory and other debt issuances

TENNESSEE VALLEY AUTHORITY

TVA's Asset Portfolio

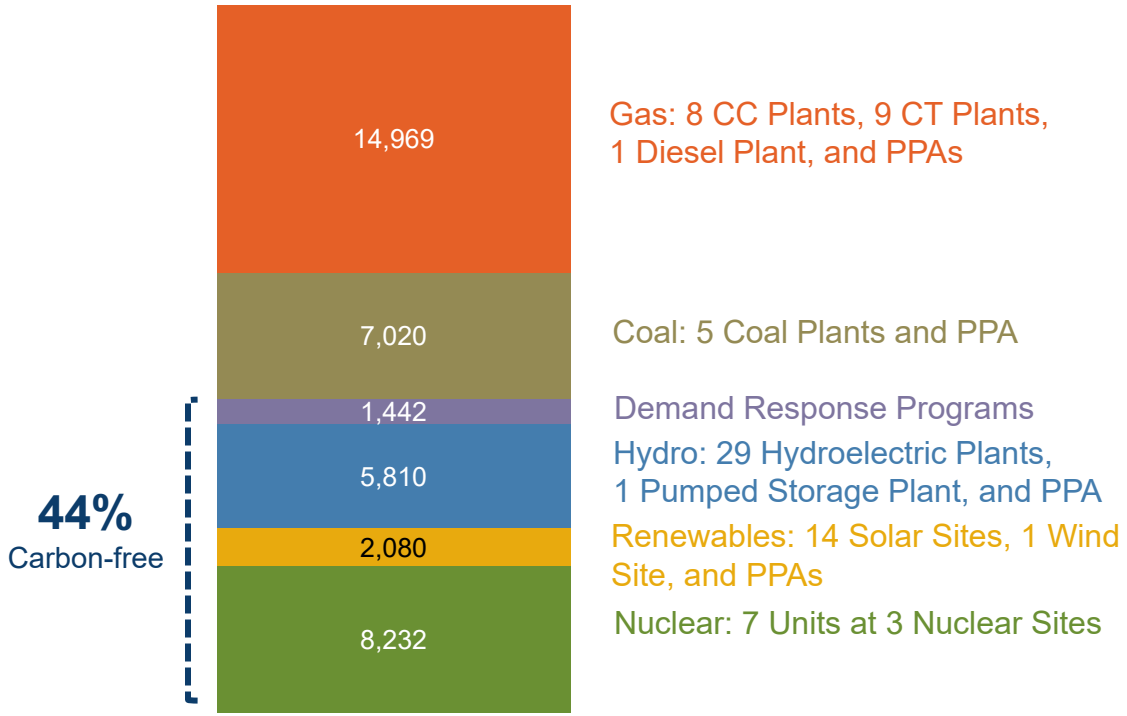
The TVA Power System



TVA TENNESSEE VALLEY AUTHORITY

Today's Resource Portfolio

FY22 Capacity
39,553 MW



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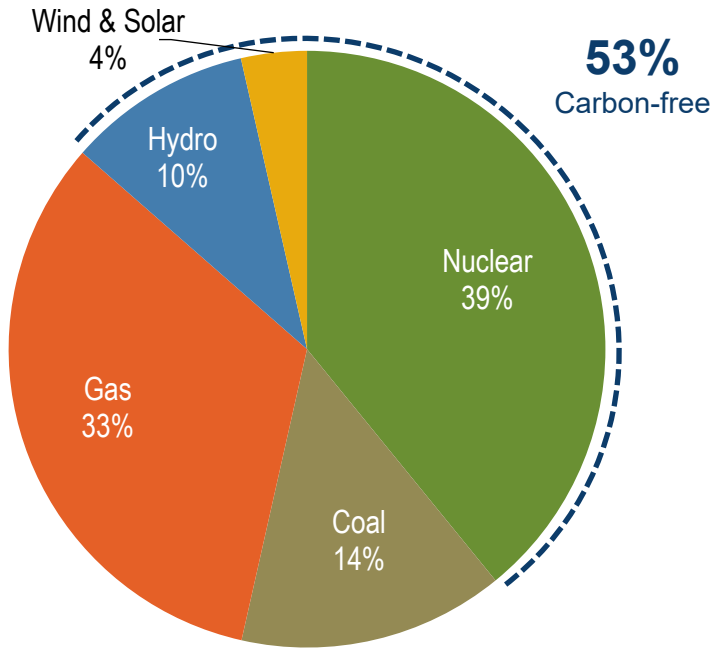
FY22 Energy
165 TWh



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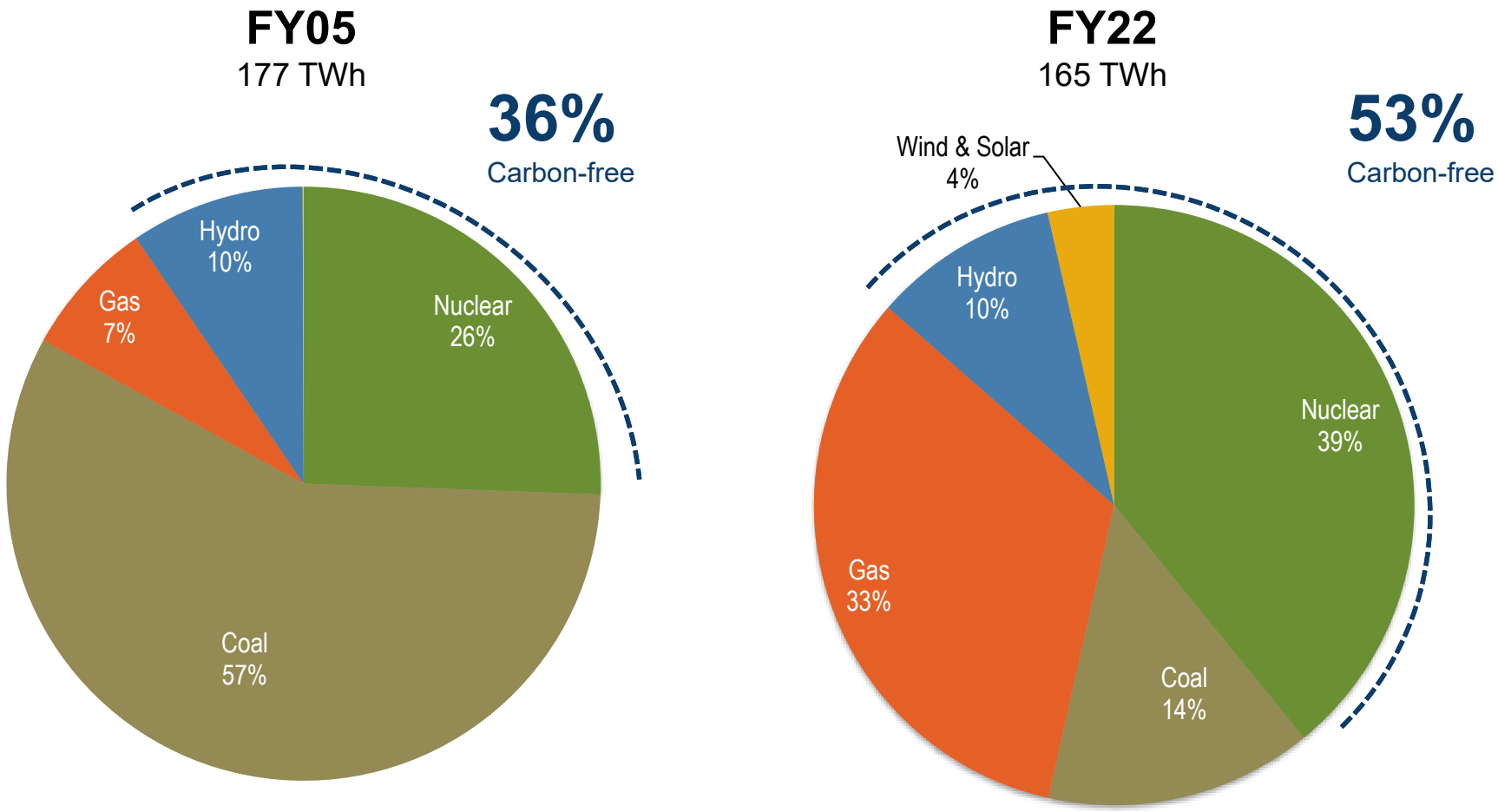
TVA TENNESSEE VALLEY AUTHORITY

Diverse and Cleaner Energy Mix



TVA TENNESSEE VALLEY AUTHORITY

Building the Energy System of the Future

Reliable

Investment in Existing Fleets
Increasing reliability and resiliency to TVA's system

Resilient

New System Operations Center
Keeping reliability high, costs low, and improving resiliency and flexibility

Responsible

Portfolio Diversity
Expanding clean energy generation while maintaining flexibility and reliability

TVA TENNESSEE VALLEY AUTHORITY

TVA's Innovation and Research Initiatives

Innovation and Research

TENNESSEE VALLEY AUTHORITY

BREAK

TENNESSEE VALLEY AUTHORITY

Valley Pathways Study:

Building a Competitive, Clean Economy

Laura Duncan, Senior Project Manager, Environment & Energy Policy

November 7th, 2023

THE UNIVERSITY OF TENNESSEE KNOXVILLE
BAKER SCHOOL OF PUBLIC POLICY & PUBLIC AFFAIRS

TVA TENNESSEE VALLEY AUTHORITY

Study Partnership & Support

THE UNIVERSITY OF TENNESSEE KNOXVILLE
BAKER SCHOOL OF PUBLIC POLICY & PUBLIC AFFAIRS

Mission is to address *critical energy and environmental challenges* by creating policy-relevant research and educational opportunities that integrate natural, physical, and social science.

TVA

Mission is to serve the people of the Tennessee Valley to make life better, with a focus on Energy, Environment, and Economic Development.

Guidehouse

veic

Significant, ongoing TVA experience working on major initiatives & engaging stakeholders

Experience conducting economy-wide decarbonization pathways modeling

Guidehouse and VEIC are uniquely positioned to understand decarbonization pathways for the Valley and drive stakeholder alignment.

- **Massachusetts 2050 Decarbonization Roadmap**
- **Duke Energy Carolinas Carbon Plan**

What is a Pathways Study?

A Pathways Study uses scenario-based analysis to compare several possible visions of the future to help determine the timing, scale, and effects of achieving greenhouse gas targets.

What paths are most feasible for the Valley to get to net zero by 2050?

What impacts will these paths have on the Valley as a whole?

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Valley Pathways Study

A study to understand what economic sectors, such as transportation, industry, agriculture and buildings, might do throughout the Valley in the coming years to reduce carbon emissions and grow the economy.

Community

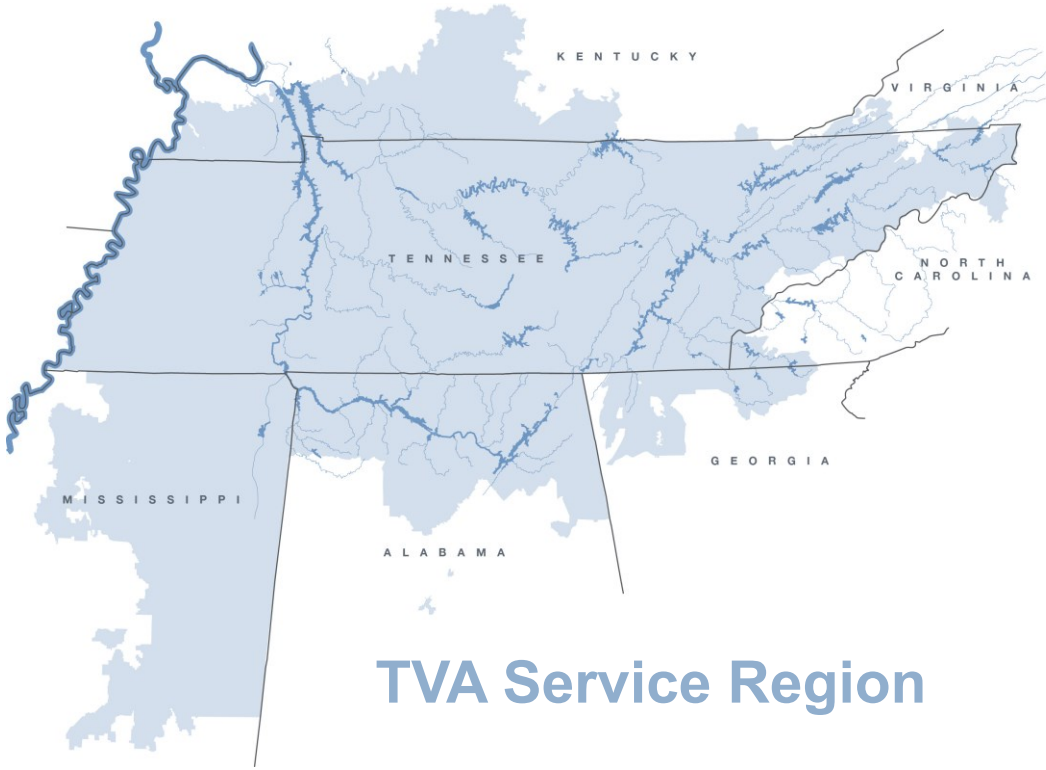
Residential

Commercial

Industrial

Agricultural

Transportation



TVA Service Region

TVA's Integrated Resource Plan

Sets strategic direction for how TVA will meet the electricity load needed in the future in a least cost, reliable and responsible manner.

Gas

Carbon Capture

Hydrogen

Hydro

Utility-Scale Solar

Energy Storage

Utility-Scale Wind

Nuclear/SMRs

Energy Efficiency

Demand Response

Economy-Wide Study, Economy-Wide Stakeholders

1. Ford Motor Company
2. City of Knoxville
3. Oak Ridge National Laboratory
4. Southeast Energy Efficiency Alliance
5. WestRock
6. BrightRidge
7. Tennessee State University
8. University of Tennessee Chattanooga
9. The Nature Conservancy
10. Redstone Arsenal
11. Tennessee Farm Bureau Federation
12. Tennessee Interfaith Power and Light
13. Tennessee Advanced Energy Business Council
14. Tennessee Department of Economic Development
15. Nashville Electric Service
16. City of Chattanooga
17. Tennessee Valley Public Power Association
18. Middle Tennessee Natural Gas Utility District
19. City of Florence Electricity
20. UT Center for Transportation Research
21. Tennessee Valley Industrial Committee
22. Tennessee Department of Environment and Conservation
23. Commonwealth of Kentucky Energy and Environment Cabinet
24. Memphis and Shelby County Division of Planning and Development

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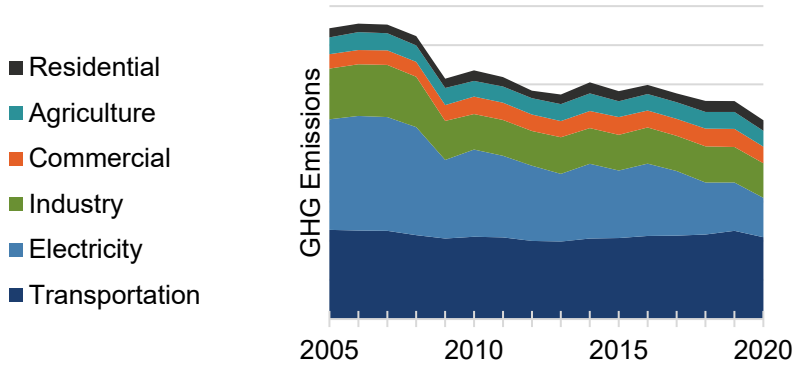
Key Components

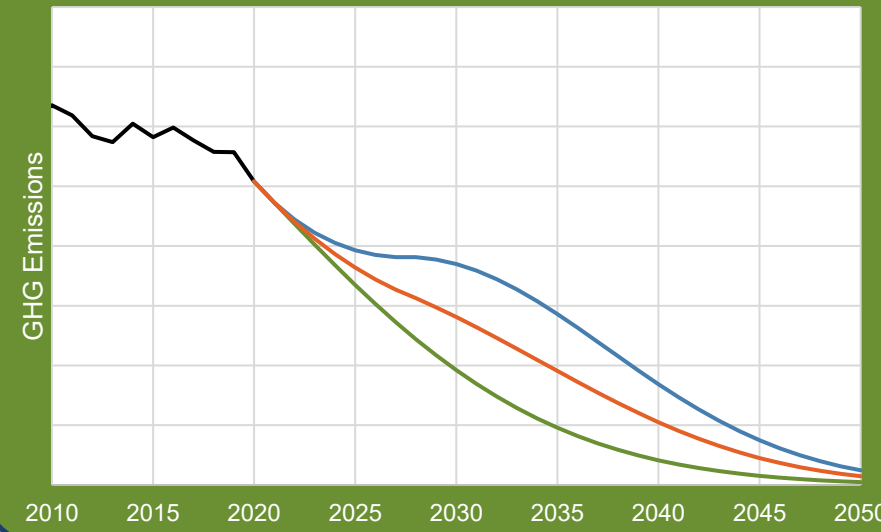
Valley Stakeholders

- Geographic & economic sector reps
- Key issue advocates
- State, municipal, and local power company officials

Valley Baseline GHG Footprint



Pathways to Net Zero



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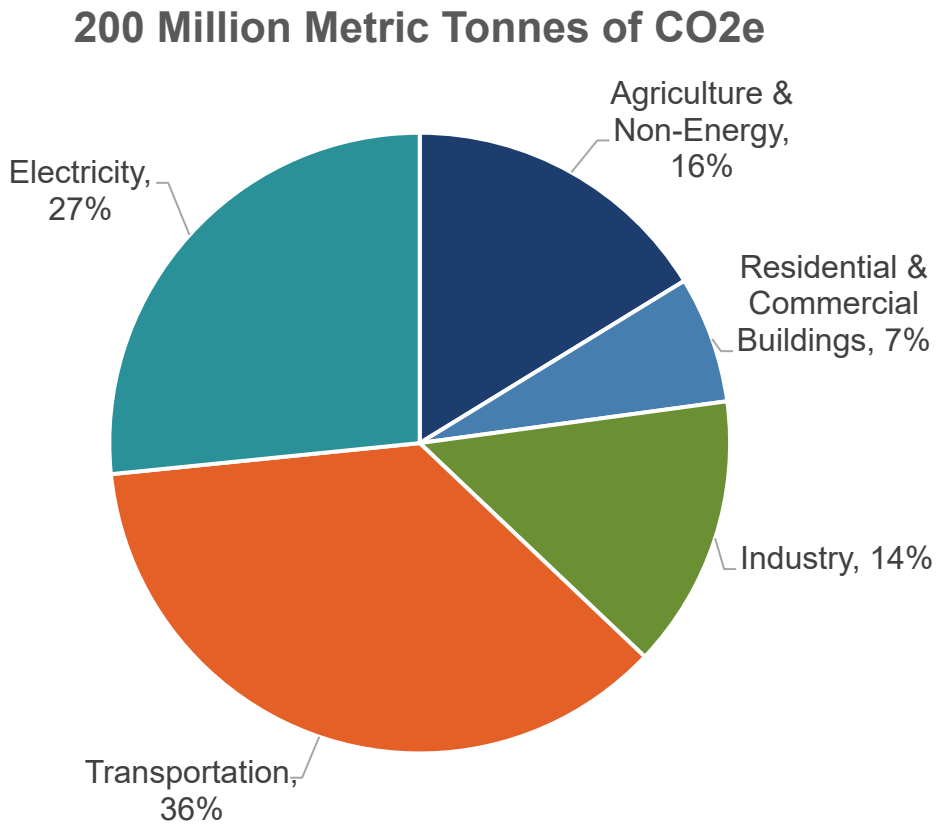
GHG Baseline for the Valley



Tennessee Valley 2019 Greenhouse Gas Emissions (estimated). Commissioned by TVA and UTK Baker Center. Prepared by Guidehouse and VEIC. Draft, Nov. 2023.

Key Insights

- 200 MMTCO2e is ~3% of US GHG emissions – the Tennessee Valley is home to about 10 million people, or about 3% of US population.
- Transportation is, by far, the largest source of greenhouse gas emissions in the Valley.
- Emissions from Buildings and Industry look small, but these sectors demand nearly 100% of the electricity that is generated for the Valley.
- Agriculture represents only energy consumed; methane emissions related to agriculture are in Non-Energy alongside refrigerants and flame retardants.

Pathways to Net Zero – Scenarios

Scenarios align to “Pillars of Decarbonization”

Initial pathways scenarios focused on three critical strategies, often referred to as “pillars of decarbonization” – **efficiency, electrification**, and **low-carbon fuels.** A fourth pathway tests the synergies of combining those levers.

Community Resiliency

A future where more demands – for energy, goods, and services – throughout the economy are met and funded locally. Denser communities, both urban and rural, allow for less driving.

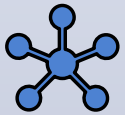
Accelerated Electrification

A future where almost everything in the Valley is electrified. This scenario explores the upper bound of how much electricity demand growth might be expected in a Net Zero economy.

Low-Carbon Breakthrough

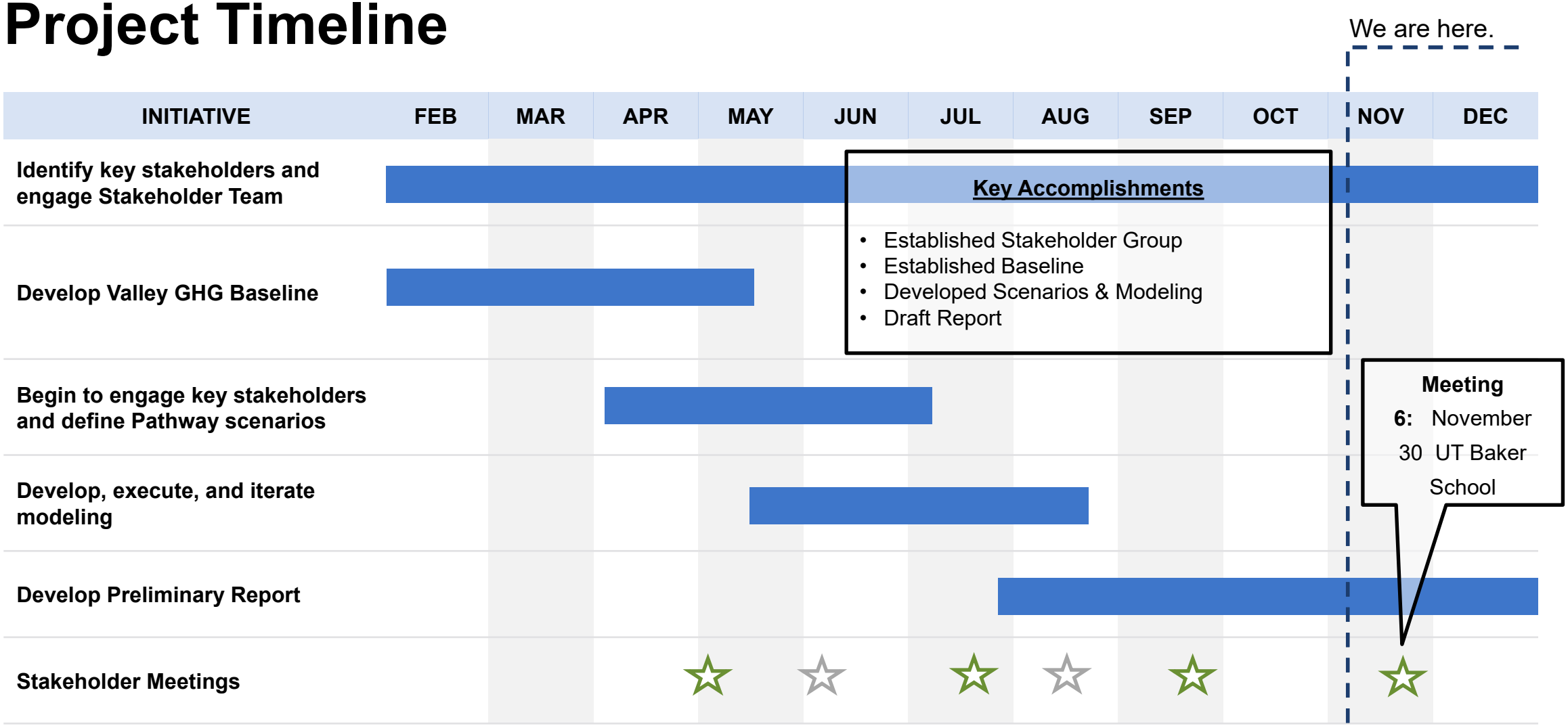
A future in which the pace and l magnitude of electrification is more limited. Instead, innovation allows new low-carbon fuel alternatives to be deployed beyond just niche applications.

Combined Scenario



A future where the Valley strives for a combination of the three strategies. This scenario takes an “all of the above” approach matching decarbonization strategies to their most impactful sectors.

Project Timeline



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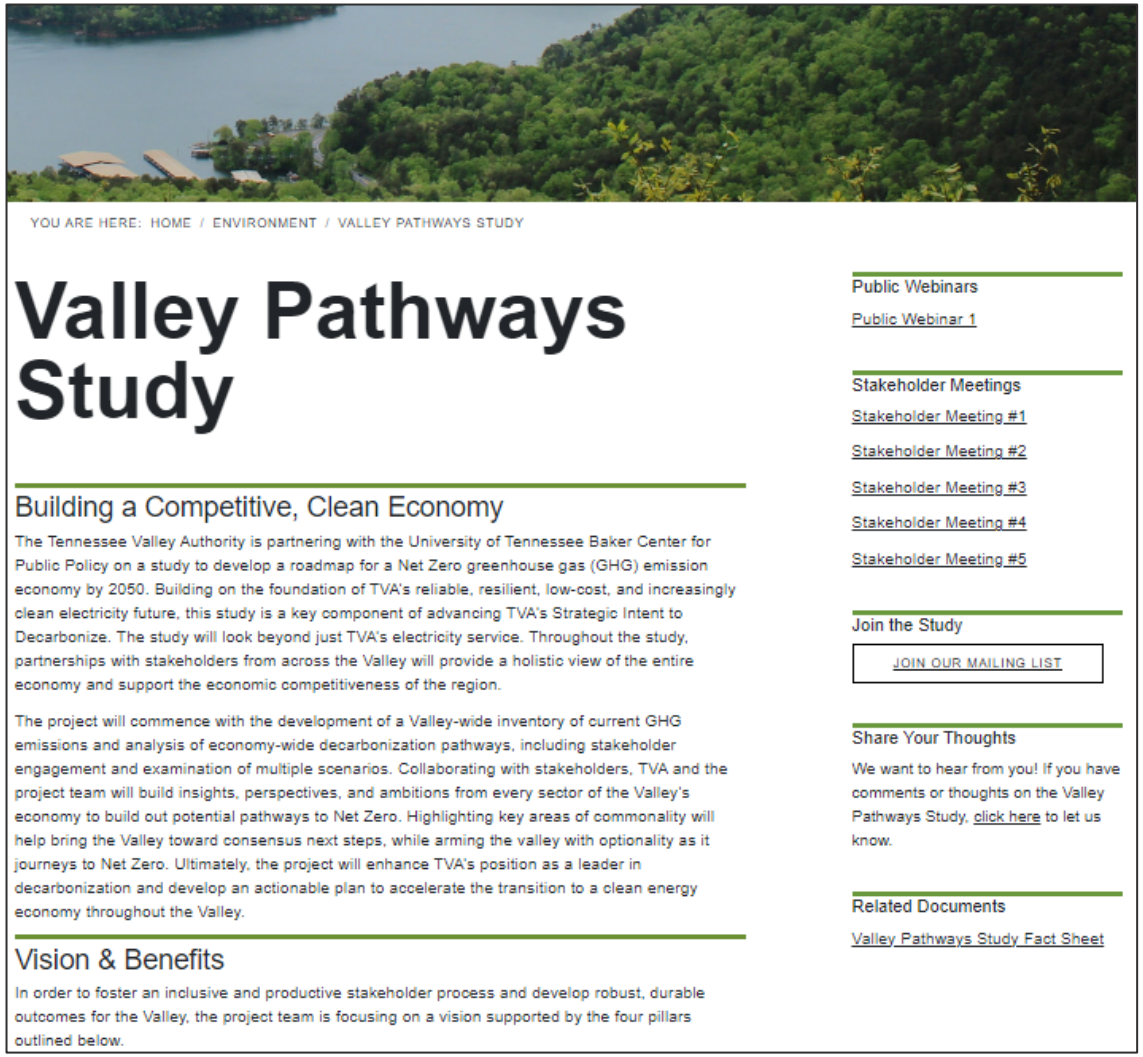
What's next?



YOU ARE HERE: HOME / ENVIRONMENT / VALLEY PATHWAYS STUDY

Valley Pathways Study

Building a Competitive, Clean Economy

The Tennessee Valley Authority is partnering with the University of Tennessee Baker Center for Public Policy on a study to develop a roadmap for a Net Zero greenhouse gas (GHG) emission economy by 2050. Building on the foundation of TVA's reliable, resilient, low-cost, and increasingly clean electricity future, this study is a key component of advancing TVA's Strategic Intent to Decarbonize. The study will look beyond just TVA's electricity service. Throughout the study, partnerships with stakeholders from across the Valley will provide a holistic view of the entire economy and support the economic competitiveness of the region.

The project will commence with the development of a Valley-wide inventory of current GHG emissions and analysis of economy-wide decarbonization pathways, including stakeholder engagement and examination of multiple scenarios. Collaborating with stakeholders, TVA and the project team will build insights, perspectives, and ambitions from every sector of the Valley's economy to build out potential pathways to Net Zero. Highlighting key areas of commonality will help bring the Valley toward consensus next steps, while arming the valley with optionality as it journeys to Net Zero. Ultimately, the project will enhance TVA's position as a leader in decarbonization and develop an actionable plan to accelerate the transition to a clean energy economy throughout the Valley.

Vision & Benefits

In order to foster an inclusive and productive stakeholder process and develop robust, durable outcomes for the Valley, the project team is focusing on a vision supported by the four pillars outlined below.

Public Webinars

Public Webinar 1

Stakeholder Meetings

Stakeholder Meeting #1

Stakeholder Meeting #2

Stakeholder Meeting #3

Stakeholder Meeting #4

Stakeholder Meeting #5

Join the Study

JOIN OUR MAILING LIST

Share Your Thoughts

We want to hear from you! If you have comments or thoughts on the Valley Pathways Study, click here to let us know.

Related Documents

Valley Pathways Study Fact Sheet

- Present Preliminary Report Findings
  - Joint RERC & RRSC Meeting
- Publish Preliminary Report 2024
- Public Webinar
- Information Sharing
- Support Initiatives and Plans

View notes & submit comments at:

tva.com/valleypathways

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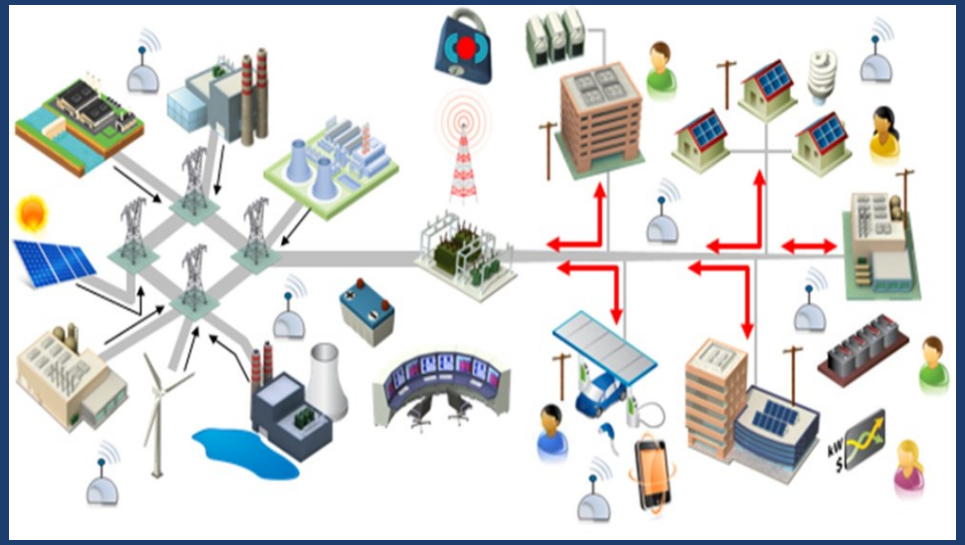
Utility of the Future Information Exchange

Althea Jones, Senior Manager, Public and Community Engagement

Regional Energy Resource Council Meeting

November 7, 2023



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Gaining Insight

Objective

- Provide a forum for a diverse set of stakeholders to discuss the IRP process and broad issues they believe should be considered as we plan for the 2024 Integrated Resource Plan (IRP).

Goal

- Build trust; greater understanding of issues, technologies and challenges/opportunities in the evolving marketplace; facilitate mutual understanding among diverse interests; hear ideas; and present options and considerations to TVA and each other.

Discussion Topics

- IRP process, DER & Distribution, Generation & Transmission, Community Issues and Modeling & Assumptions.

Outputs

- Will be used by TVA staff to inform the scenarios and strategies of the upcoming IRP and provided to the 2024 IRP Working Group.

Scope

- The group consists of 19 members and their alternates -- Drawn from local power company and direct serve partners, environmental NGOs, academia, community influencers, a think tank and social justice advocates.
- A third-party facilitator, Future 500, managed the process.

Process

- First meeting established ground rules – Chatham House Rule
  - No attribution of comments to outsiders
  - Be curious and listen to understand
  - Show respect and suspend judgment
  - Be authentic and note common ground, etc.
- Determined topics for next four meetings and sought presenters for each topic
- Notes were taken and approved by everyone in the group
- Quickly learned that some of our recommended considerations didn't relate to an IRP but to an effective new style utility… so we created a two-pronged report

Utility of the Future Information Exchange (UF-IX) Meeting Outcomes

UF-IX Deliverable:
Written document that takes the four meeting topics and answers several key questions that will provide data and insights to inform TVA's next Integrated Resource Plan Working Group (IRPWG)

Guiding Questions:
- What would enhance TVA's IRP process?
- Are there new and novel approaches to planning for evolving technologies?
- How can TVA best engage stakeholders throughout the process?

January - Nashville	March - Memphis	May - Bowling Green	July - Knoxville
DER/Distribution	**Generation & Transmission**	**Community Impact**	**Modeling & Assumptions**
• What does DER and Distribution technology look like in the Valley? • What is proven technology vs technologies that are evolving?	• What planning assumption should be considered when creating IRP scenarios? • How can TVA ensure balance of reliability, resiliency, affordability and sustainability in its resource mix? • What technologies should TVA consider in planning?	• How can TVA best foster engagement with diverse stakeholder groups during the IRP process? • What locations/types of venues should be considered? • How can TVA evaluate Environmental Justice impacts in the IRP?	• What modeling and assumptions are other utilities using? • What technologies are off the shelf/ready now? • How does TVA reach net zero carbon while balancing reliability, resiliency, affordability and sustainability ? • What are the scenarios and strategies we should consider?

UF-IX Members

Kendra Abkowitz
Southeast Sustainability Directors Network

Pearl Walker
Southern Alliance for Clean Energy

Tom Suggs
Middle Tennessee Electric Membership Cooperative

Wes Kelly
Huntsville Utilities

Greg Fay
Clinton Utilities Board

Monte Cooper
Jackson Energy Authority

Melanie Farrell
TVA

Cortney Piper
TN Advanced Energy Business Council (TAEBC)

Kenya Stump
Kentucky, Office of Energy Policy

Michael Vandenburg
Vanderbilt

Charles Sims
UTK-Baker Center

Spencer Nelson
ClearPath

Daniel Tait
Energy Alabama

Joe Hoagland
TVA

Molly Cripps
Tennessee, Dept of Environment and Conservation (TDEC)

Ernest Strickland
Black Business Association

Pete Mattheis
TVIC

Patrick Sullivan
Mississippi Energy Institute

Jan Berry
Citizens' Climate Education

Ervan Henderson
Meta

Rebecca Tolene
TVA

Outcome and a Look Ahead

- TVA learned a lot by listening, relationships were built, and broader understanding was achieved.
- A report was approved by the UF-IX and shared as a tool with the 2024 IRP Working Group.
- TVA committed to meet with UF-IX team members to apprise them of the IRP progress and how their suggested considerations are being used in the process.
- Coordinating updates with broader key Stakeholder Briefings throughout 2024.

BREAK

TENNESSEE VALLEY AUTHORITY

Integrated Resource Plan (IRP) Overview

Brian Child, Vice President, Enterprise Planning

Melanie Farrell, Vice President, External Strategy and Regulatory Oversight

November 7, 2023

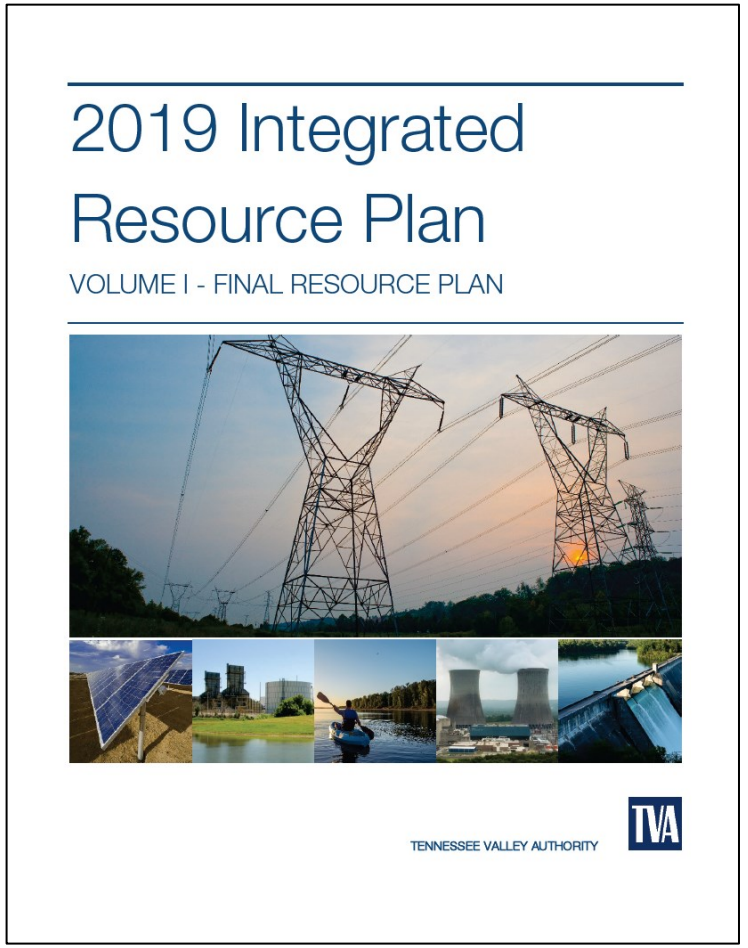
TVA TENNESSEE VALLEY AUTHORITY

IRP and Resource Planning Overview

Brian Child, Vice President, Enterprise Planning

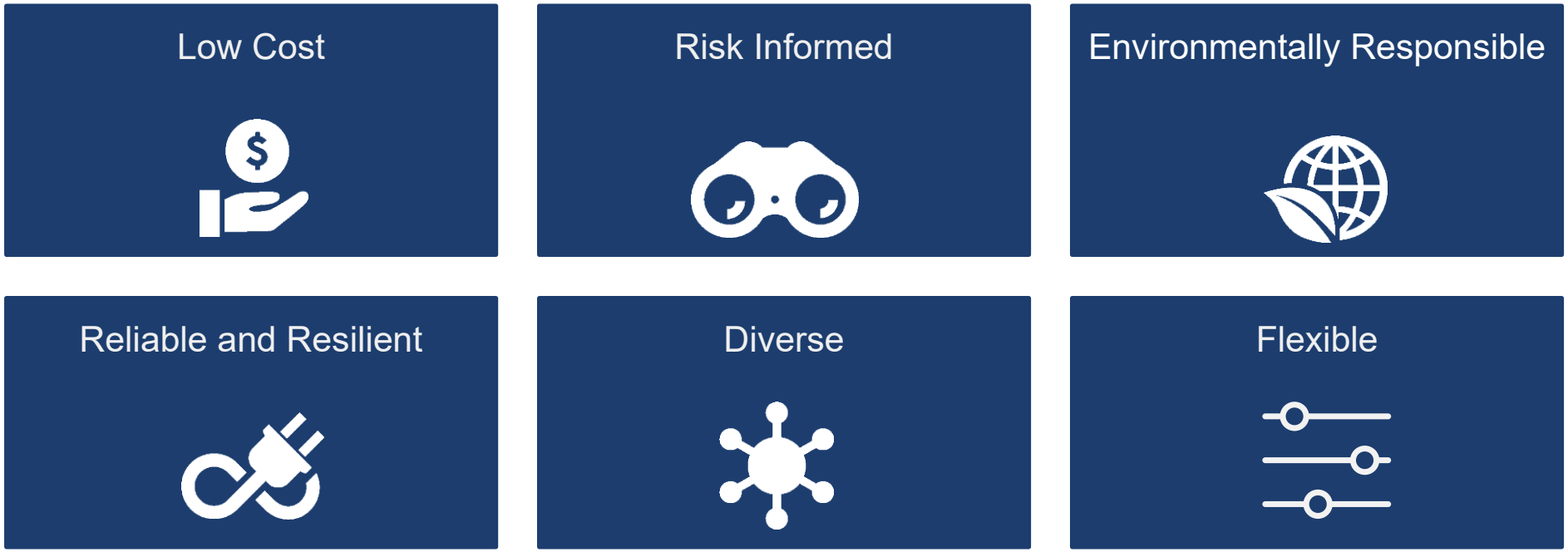
TVA's Integrated Resource Plan

- The IRP is a study of how TVA could meet customer demand for electricity between now and 2050 across a variety of future worlds.
- A programmatic Environmental Impact Statement (EIS) accompanies the IRP to analyze the impacts to the Valley.
- An updated IRP is needed to:
  - Establish a strong planning foundation for the 2030s and beyond
  - Inform TVA's next long-range financial plan
- The IRP provides strategic direction on how TVA will continue to provide low-cost, reliable, and increasingly cleaner electricity to the 10 million residents of the Tennessee Valley.



Planning is Grounded in Least-Cost Principles

In resource planning, TVA applies fundamental least-cost planning principles*:



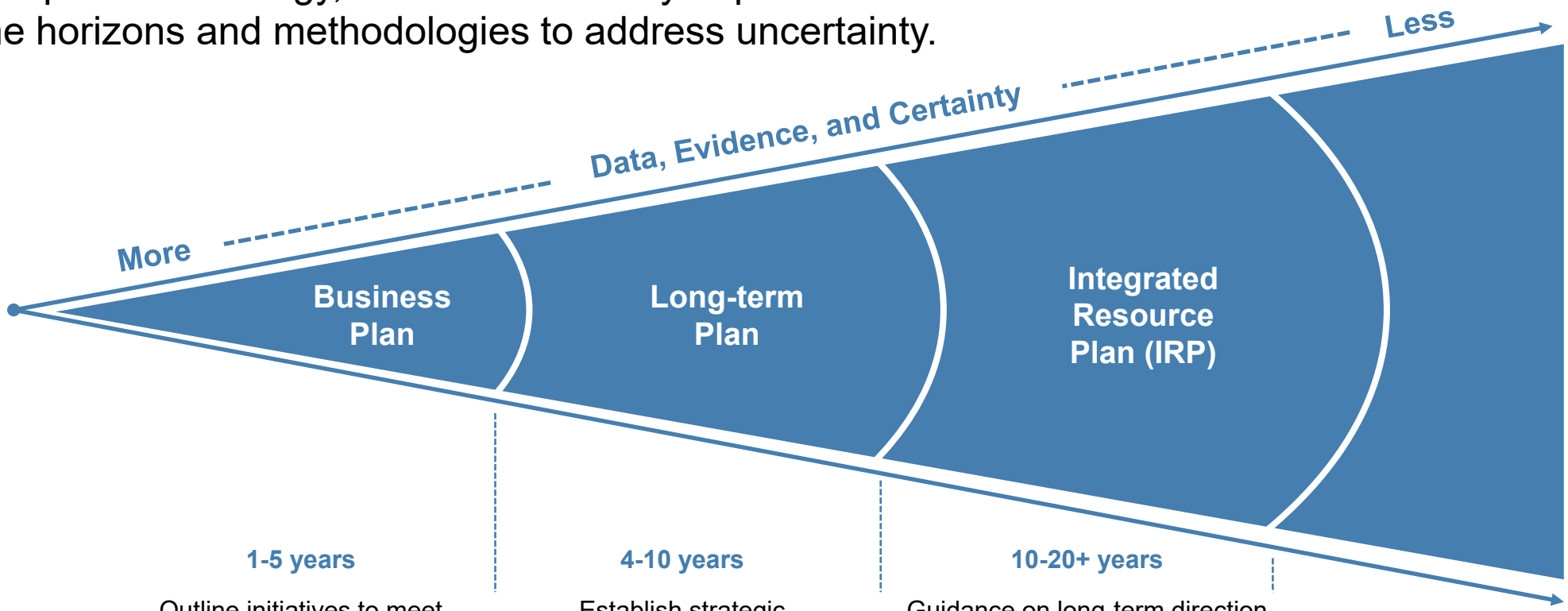
*In alignment with the Energy Policy Act of 1992

TVA Least-cost Planning Requirements

- Section 113 of the Energy Policy Act of 1992 requires TVA to employ and implement a “least-cost planning program” for its electrical system to provide “adequate and reliable service at the lowest system cost.”
- Under this program, TVA is directed to:
  - Evaluate all demand and supply side resources, including energy conservation, efficiency, and renewable energy
  - Take into account a variety of factors related to system operations, including diversity of resources to meet operating conditions, reliability, compliance costs, and other relevant risk factors
- Key takeaways for resource planning:
  - TVA is not permitted to direct a specific resource mix or adopt firm policy decisions regarding what resources are to be included in or excluded from that mix.
  - TVA must strive for a balance of providing electrical service that it determines is “adequate” and “reliable,” consistent with the needs of the system, with the obligation to provide that service at the lowest system cost.

Planning Horizons and Uncertainty

To test and implement strategy, TVA uses a variety of plans with different time horizons and methodologies to address uncertainty.



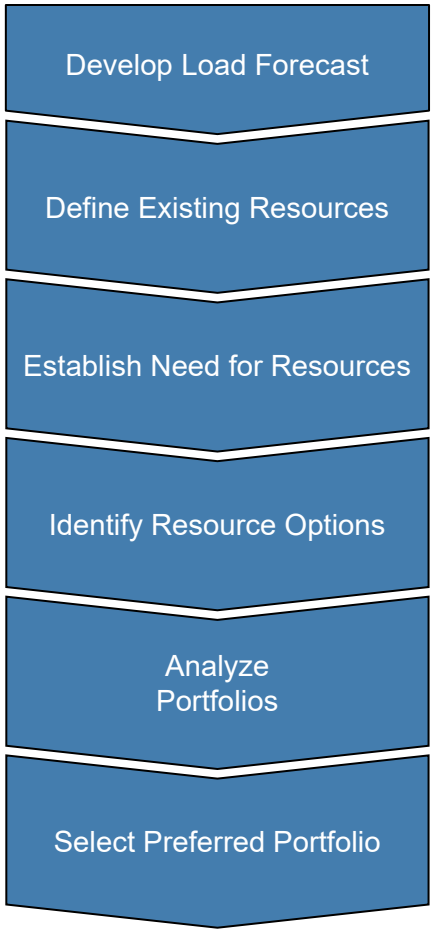
Timeframe	1-5 years	4-10 years	10-20+ years
Purpose	Outline initiatives to meet near-term targets	Establish strategic objectives	Guidance on long-term direction and no-regrets near/mid-term actions
Uncertainty	Conservatism, contingencies and reserves	Stochastics and planning confidence analysis	Scenarios and strategies

Resource Planning Is About Solving Puzzles

- By asking a lot of questions, like …
- How much energy will our customers use in the future?
- What alternatives do we have to meet our resource needs?
- Are there strategic considerations that will limit the alternatives we can consider?
- How do we properly evaluate these resource alternatives?
- How do we find the best solution?
- Which plan (portfolio) do we select?

The TVA Resource Planning Process

Resource Planning is a common practice in the utility industry to identify the least cost solution to meet customer demand and system operational requirements over a long horizon (typically 20-30 years)



Project customer demand for electricity in the future

Define the resources currently available to meet customer demand and how that will change in the future

Compare future customer demand with existing resources and system operational requirements

Identify all resources (supply- and demand-side) that will be considered to meet future need and system operational requirements

Test different resource combinations (portfolios) to evaluate performance

Select the preferred combination of resources

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2019 IRP

Brian Child, Vice President, Enterprise Planning

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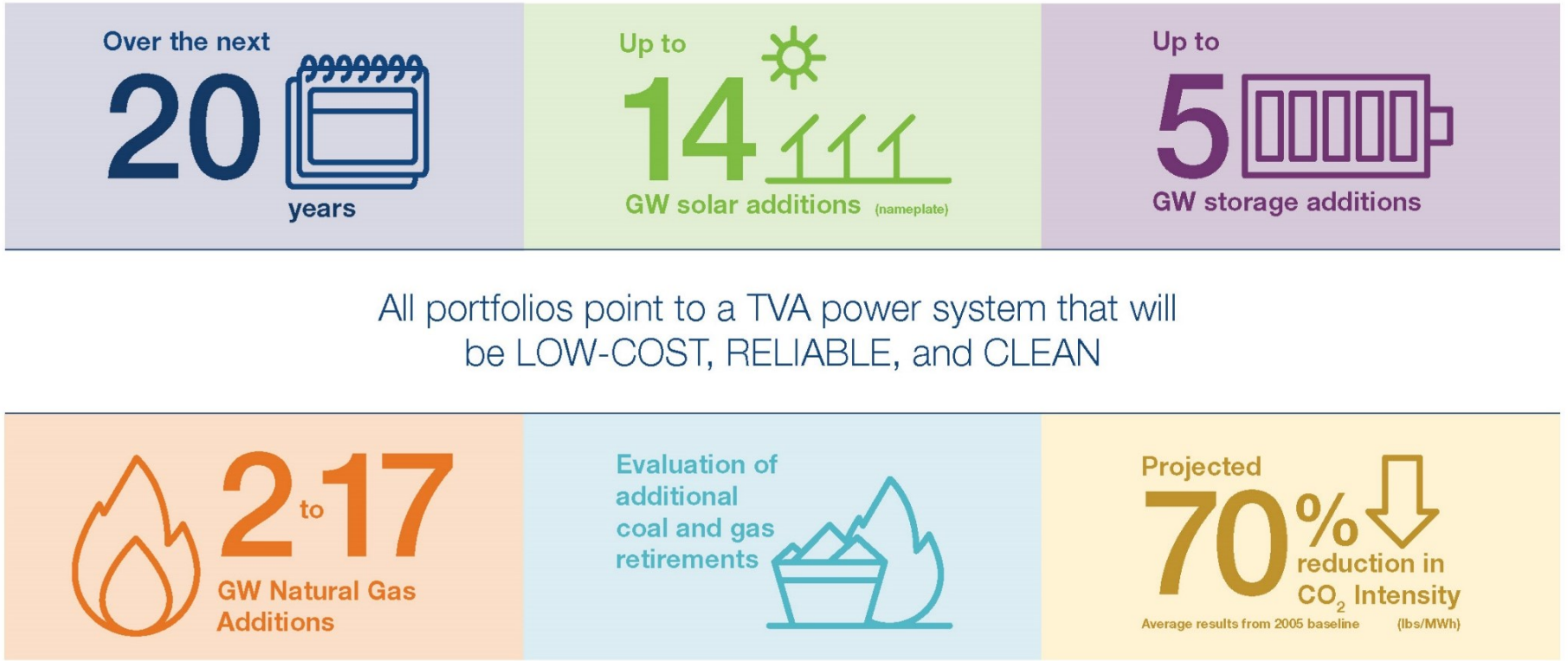
2019 IRP Results



- In addition to providing the strategic direction for TVA's future energy supply, the 2019 IRP recommended near-term actions that have been integrated into TVA's asset strategy.

Asset Strategy

TVA's asset strategy was developed based on 2019 IRP strategic direction, near-term actions, and key signposts, grounded in least-cost planning, and includes the following initiatives:

Coal

- Retire Bull Run in 2023 and Cumberland in 2026/2028
- Retire remaining coal units as they reach the end of life, expected by 2035

Natural Gas

- Modernize the combustion turbine fleet
- Enable coal retirements and solar integration

Nuclear

- Invest to improve and sustain fleet performance
- Renew nuclear fleet licenses
- Explore advanced technologies

Hydro

- Invest to sustain fleet performance
- Optimize flexibility
- Continue evaluation of market options
- Evaluate pump-storage options

Solar/Wind

- Add 10 GW of solar by 2035 to meet customer and system needs
- Optimize location and procurement
- Continue to enable partner flexibility to add renewables

Storage

- Demonstrate use cases to support system needs and solar integration
- Explore emerging technologies

EE & DR

- Continue to invest in low-income programs
- Expand economic EE programs to offset system costs
- Support integrated planning efforts

Transmission

Reliable and Integrated Grid | Expansion for Economic Development and Local Load Growth | Regulatory Compliance

2019 IRP - TVA Board Action and Direction*

- Approved the planning direction in the 2019 IRP.
- Directed TVA staff to monitor signposts to appropriately consider possible adjustments to the planning direction:
  - Changing market conditions
  - More stringent regulations
  - Technology advancements
- Directed TVA staff to initiate the next IRP no later than 2024.

*August 22, 2019, TVA Board Meeting

2019 IRP Key Signposts

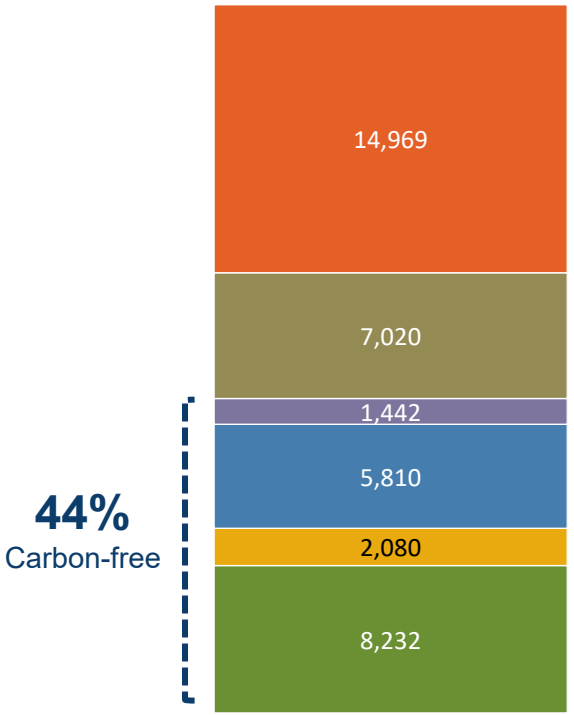
- Demand for Electricity
- Natural Gas Prices
- Stakeholder Expectations
- Regulatory Requirements
- Operating Costs for Existing Units
- Solar and Wind Costs
- Emerging and Developmental Technologies

IRP Process

Brian Child; Vice President, Enterprise Planning

Today's Resource Portfolio

FY22 Capacity
39,553 MW



Gas: 8 CC Plants, 9 CT Plants, 1 Diesel Plant, and PPAs

Coal: 5 Coal Plants and PPA

Demand Response Programs

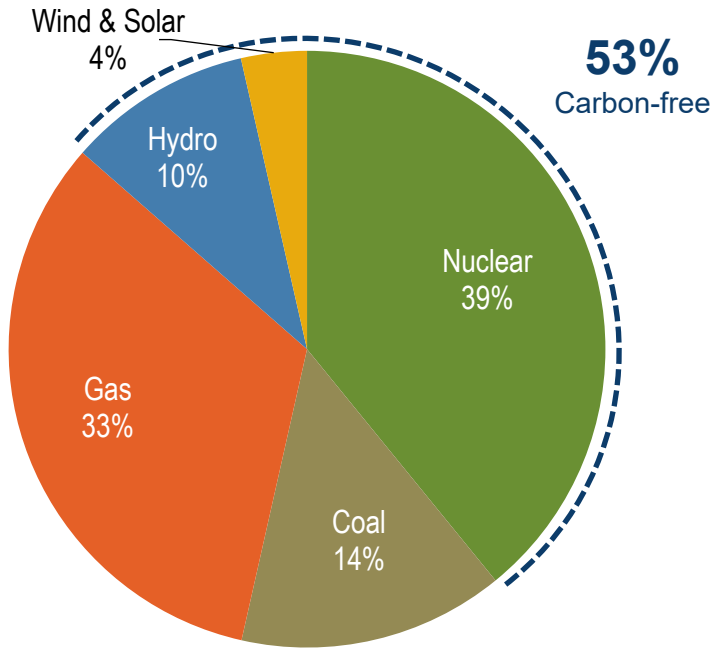
Hydro: 29 Hydroelectric Plants, 1 Pumped Storage Plant, and PPA

Renewables: 14 Solar Sites, 1 Wind Site, and PPAs

Nuclear: 7 Units at 3 Nuclear Sites

Capacity aligns to FY22 10-K Net Summer Capability, adjusted to include demand response programs. Planning capacity is lower, as it accounts for Hydro and Renewable expected generation at peak, fuel blend derates, and other factors.

FY22 Energy
165 TWh



In addition to power supply sources included here, TVA offers energy efficiency programs that effectively reduced 2022 energy needs by about 2,200 GWh or 1.3% (Net Cumulative Realized at System basis, 2007 base year).

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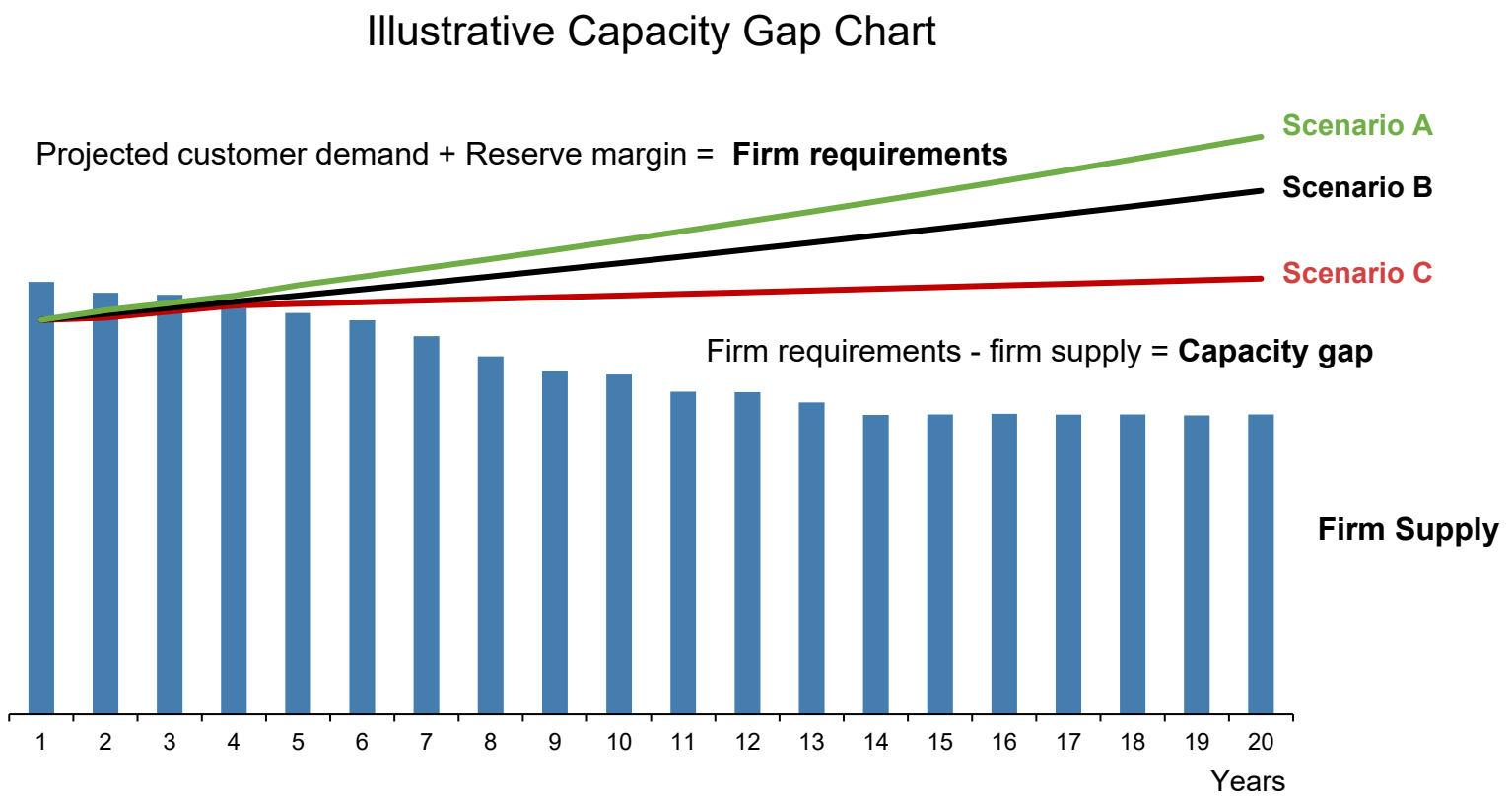
Resource Planning for Future Capacity Needs

- Resource planning is about optimizing the mix of future capacity.
- Projections of capacity needed are filled by the most cost-effective resources.
- Multiple scenarios will be explored, reflecting different levels of forecasted demand or firm requirements.



Recommended path provides low cost, reliability, diversity and flexibility

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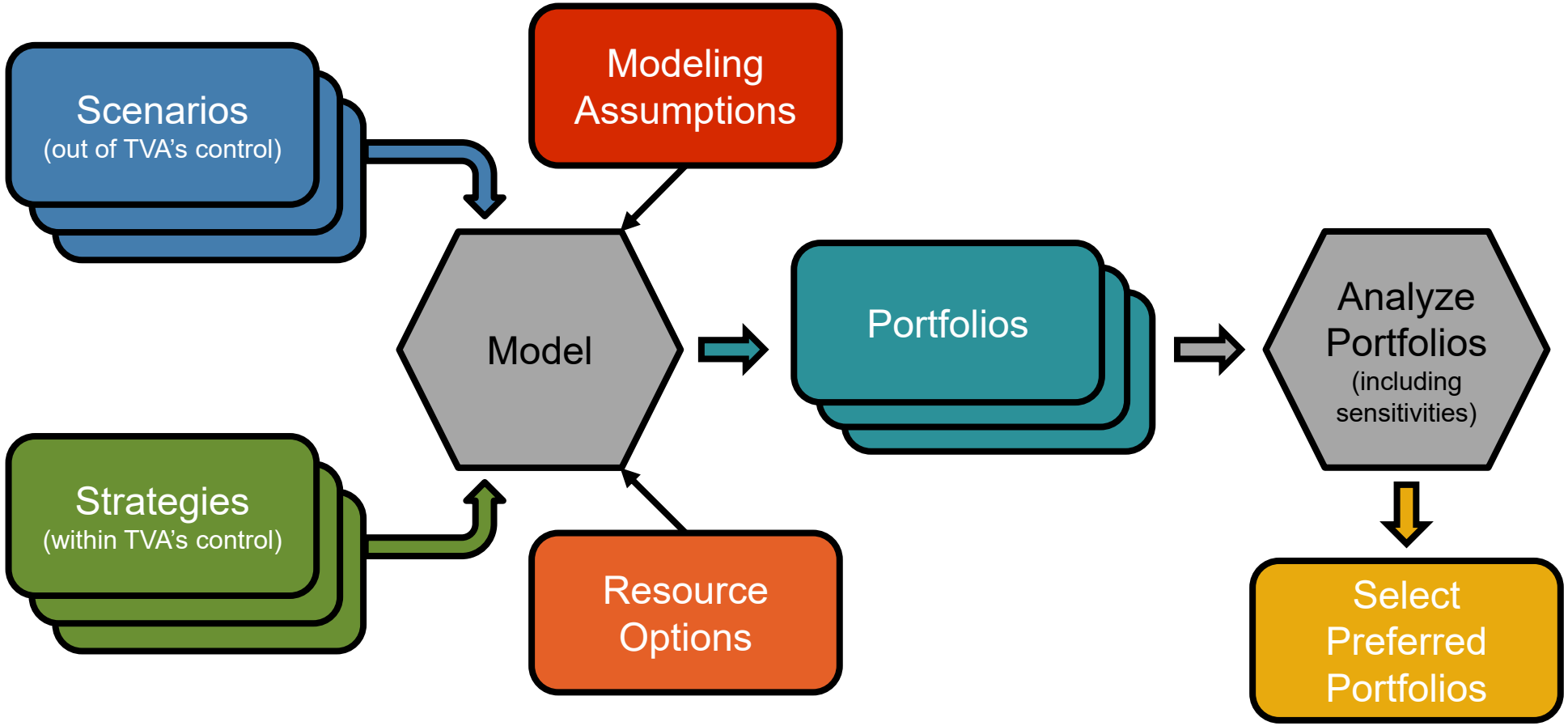
How the Integrated Resource Planning Process Works

Stakeholder feedback is a key component in the development of all model inputs



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Scenarios and Strategies Establish a Framework

Scenarios
Outside TVA's Control

- Describe potential outcomes of factors (uncertainties) outside of TVA's control
- Represent possible conditions and are not predictions of the future
- Include uncertainties that could significantly impact operations, such as:
  - Load forecasts
  - Commodity prices
  - Environmental regulations
- Lends insight to riskiness of portfolio choices

Strategies
Within TVA's Control

- Test various business options within TVA's control
- Defined by a combination of resource assumptions, such as:
  - DER portfolio
  - Nuclear expansion
  - Energy storage
- Consider multiple viewpoints
  - Public scoping period comments
  - Assumptions that would have the greatest impact on TVA long-term

A well-designed strategy will perform well in many possible scenarios

2024 IRP - Key Considerations

- Reliability, affordability, and resiliency
- Dispatchability
- Electrification and load growth
- Carbon reductions and net zero
- Renewables and storage
- Climate impacts
- Environmental justice
- Other risks

IRP Timeline and Updates

Brian Child; Vice President, Enterprise Planning

Key IRP Dates

- The 2024 IRP study approach is intended to enable stakeholder involvement and ensure transparency

- Spring 2023: Publication of Notice of Intent (NOI) and public scoping initiation
- Summer 2023: IRP Working Group commences
- Fall 2023: Public scoping report published
- Fall/Winter 2023: Power system modeling and environmental study
- Spring 2024: Publish Draft documents, public comment period begins
- Spring/Summer 2024: Respond to Draft comments and develop Final documents
- Summer 2024: Publication and TVA Board adoption of Final IRP and EIS

IRP Updates and Upcoming Activities

- Engaging the IRP working group
- Finalized scenarios and strategies and reviewing/refining assumptions
- Consulting industry experts, e.g., National Renewable Energy Laboratory (NREL)
- Performing power system modeling
- Next public webinar planned for December 2023

NEPA Process Overview

Melanie Farrell; Vice President, External Strategy and Regulatory Oversight

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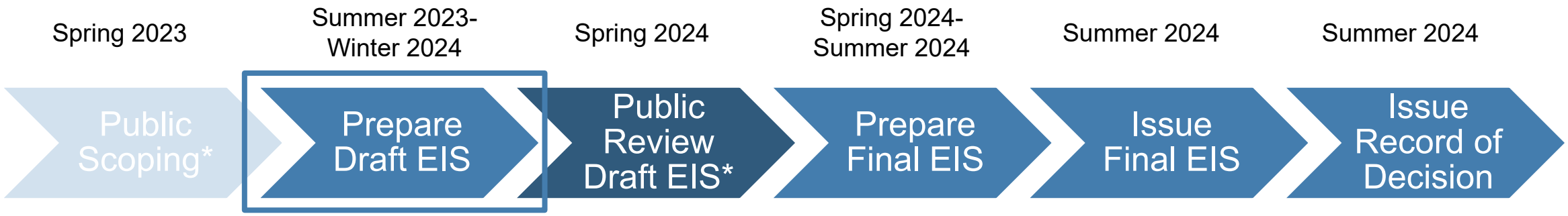
IRP Environmental Impact Statement (EIS) - Purpose and Approach

- To comply with the National Environmental Policy Act (NEPA)
- Ensures TVA decision-makers are informed of environmental impacts
- Provide public involvement
- Determine the environmental impacts system-wide
- Programmatic EIS

EIS Analyzes Key Environmental Factors

- The EIS will assess broad region-wide impacts of the next IRP on environmental factors such as:
  - Air quality and climate impacts
  - Water resources
  - Fuel requirements
  - Waste production
  - Land requirements
  - Socioeconomics and environmental justice

EIS Process and Milestones



*Opportunity for public feedback

2024 IRP SCOPING REPORT AVAILABLE AT www.tva.com/irp

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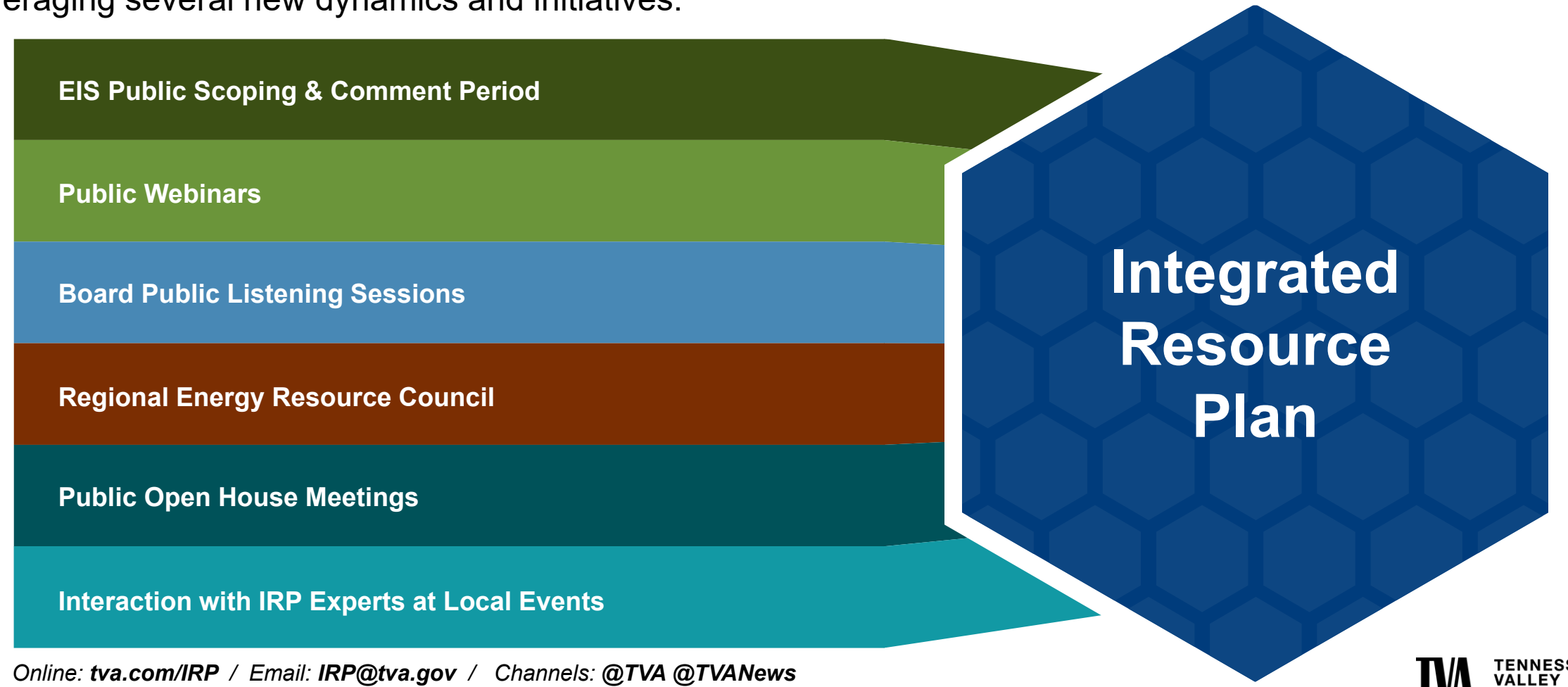
Stakeholder Engagement Opportunities

Melanie Farrell; Vice President, External Strategy and Regulatory Oversight

IRP Public Engagement Opportunities

A key element of TVA's IRP process is to ensure public involvement and direct engagement with a diverse group of stakeholders. The 2024 IRP process is utilizing past effective engagement venues as well as leveraging several new dynamics and initiatives.



Online: ***tva.com/IRP*** */* *Email:* ***IRP@tva.gov*** */* *Channels:* ***@TVA @TVANews***

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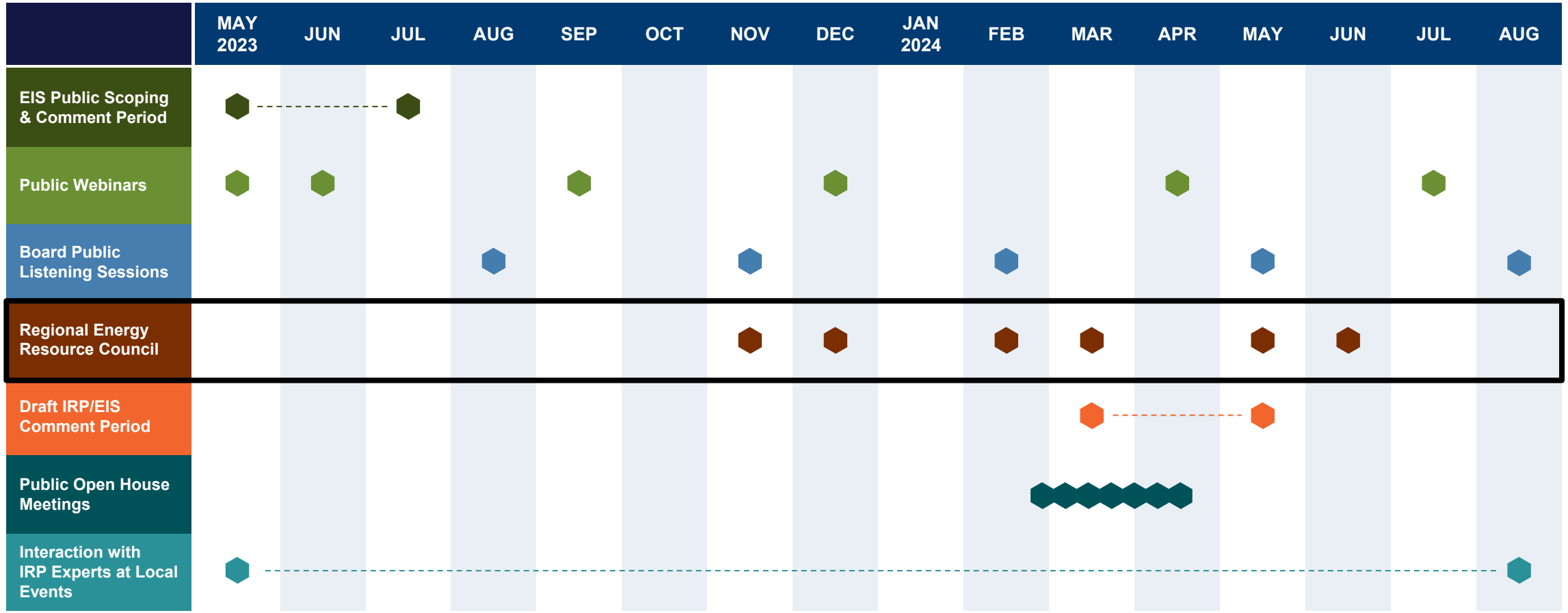
IRP Stakeholder Input Opportunities / Public Outreach Tools



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Opportunities for the Public to Stay Involved

- TVA Website www.tva.gov/IRP.
- Attend future periodic public educational webinars.
- Add email to the IRP mailing list at www.tva.gov/IRP to be notified when documents are released.
- Submit comments on the Draft IRP/EIS Report, expected to be available in spring 2024.

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Role of the RERC

Melanie Farrell; Vice President, External Strategy and Regulatory Oversight

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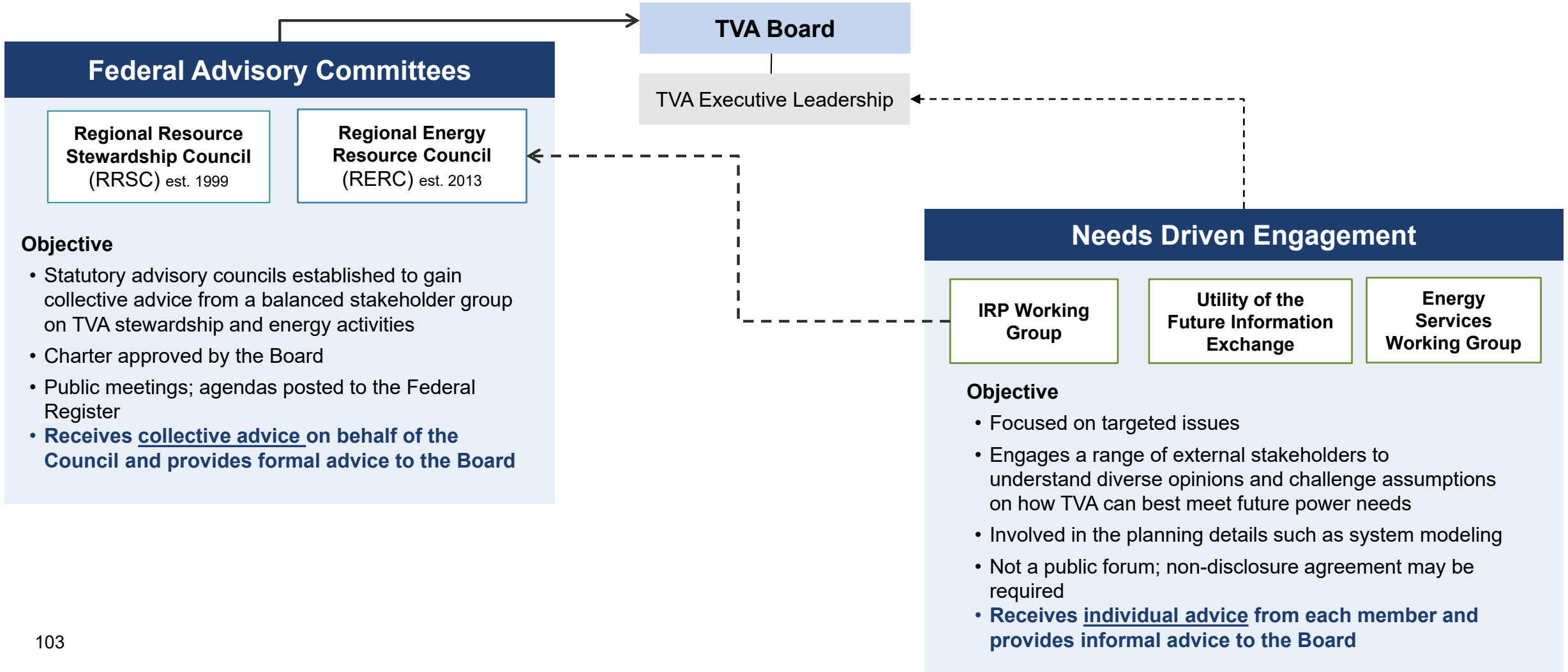
Structured TVA Stakeholder Engagements

The following describes the objectives of TVA's Federal Advisory Committees versus other needs driven stakeholder engagements and the respective differences in advisement to TVA Executive Leadership and the TVA Board of Directors.



2024 IRP Working Group

Diverse representation creates support and credibility for TVA's long-term resource plans

Eight customer representatives, including:

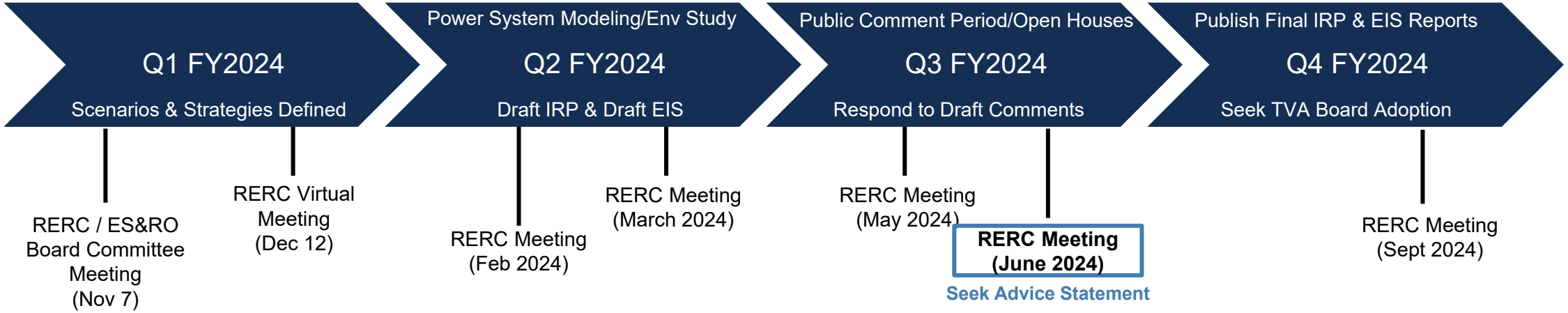
- Three Local Power Companies (LPCs)
- Five customer associations

16 stakeholder representatives, including:

- Three research and/or academic institutions
- Three energy and/or environmental non-governmental organizations
- Four state and/or federal government
- Six representing community, sustainability, and/or other special interests

Role of RERC in TVA's Integrated Resource Plan

- Objective of RERC - Provide TVA advice on its energy resource activities and the priorities among competing objectives and values. The advice of the Council is reported to TVA Board's External Stakeholders and Regulation Committee.
- TVA staff will provide updates to the RERC throughout the development of the IRP.
- The RERC will be asked to provide a consensus advice statement on the final version of the IRP.



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Wrap Up

Brian Child; Vice President, Enterprise Planning

2024 Integrated Resource Plan

- Collaboration with stakeholders to envision the generation needs of the future.
- Based on a least-cost planning framework.
- Provides foundation for developing long-range financial plans.
- Considers a number of potential futures to help predict changes in the marketplace.

The IRP functions like a compass, not a GPS

What TVA's IRP Does

The IRP will:

- Use least-cost planning criteria
- Incorporate resource capital, operating, fuel, and environmental compliance costs
- Include Valley economics as key criteria to evaluate strategies
- Evaluate socioeconomic and climate impacts of alternative strategies in the associated EIS

The IRP will not:

- Establish wholesale or retail electricity rates
- Identify specific sites for new resources
- Be a Distribution Integrated Resource Plan (DIRP)

Questions?

BREAK

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Public Comment

This is a listening session; responses are typically not provided

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Thank You

TVA's Energy System of the Future:

What is important to each stakeholder?

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Thank You

Next RERC Meetings

December 12, 2023 Virtual 2:00 – 3:30 pm Eastern

IRP Scenarios and Modeling

Jan 17-18, 2024 Joint Meeting RERC and RRSC

Advice on Valley Pathways Study

Knoxville

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Adjourn

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