

Welcome!

The Meeting will
begin at
9:00 AM Eastern



Regional Energy Resource Council

October 3-4, 2022

3rd Meeting – Term 5

Welcome

RERC Live and Virtual Meeting

- **This is the third meeting of the 5th term of the RERC.**
- **This meeting is being recorded.** A link will be provided on the TVA RERC Website (tva.com/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 name plate vertically 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 speak loudly 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 doors you entered at the back of the room. Exit the building via the front doors. Turn right and gather outside at Assembly Area 1.
- **In case of severe weather**, exit the doors you entered in the back of the room. You will be guided to the stairs where we will go down to the sublevel.

Introductions

Name

Position, Organization, Location

What are you looking forward to this Fall

RERC Term 5* Members

Introductions:

Name

Position, Organization, Location

Looking Forward to this Fall

Mike Butler

Tennessee Wildlife Federation

Jonathan Levenshus

Sierra Club

Patrice Robinson

Memphis City Council

Erin Gill**

City of Knoxville

Sen. Steve Livingston

State of Alabama

Alexa Voytek

State of Tennessee

Rebecca Goodman

Commonwealth of Kentucky

Pete Mattheis

Tennessee Valley Industrial Committee

Clay Walker

NETWORKS Sullivan Partnership

Rodney Goodman

Habitat for Humanity

Dan Miller

Oak Ridge National Laboratory

John Warren

Commonwealth of Virginia

Chrissy Heard

State of Mississippi

Doug Peters

Tennessee Valley
Public Power Association

Lloyd Webb

Olin Chlor Alkali

Dana Jeanes

Memphis Light, Gas, and Water

Bailey Recktenwald

State of North Carolina

To Be Appointed

State of Georgia

Candy Johnson

Urban League of
Greater Chattanooga

Dr. Kari Babski-Reeves

Mississippi State University

*August 1, 2021 – July 31, 2023

** Council Chair

FAC Meeting Requirements

Jennifer Brundige – Attorney, TVA General Counsel Office
May 23, 2022

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

Agenda

RERC Meeting – Day 1

October 3, 2022

All times are ET

9:00 am	Welcome – Designated Federal Officer Melanie Farrell & Chair Erin Gill Safety, Introductions, Meeting Protocols Agenda
9:30	DFO Briefing
9:45	Valley Vision 2035
10:45	Break
11:00	TVA Systems Operations Center
12:30	Adjourn for Lunch
1:45 pm	Welcome Back
2:00	Public Comment
3:00	Summary
3:15	Adjourn Day 1 RERC Meeting

Agenda

RERC Meeting – Day 2

October 4, 2022

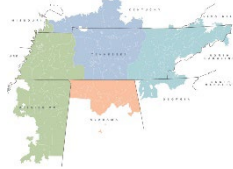
All times are ET

9:15 am	Welcome Speaker – David Wade, President & CEO, EPB
10:00	Day 1 Review
10:15	Break
10:30	TVA Nuclear Update
11:30	Q&A
11:45	Summary
11:55	Adjourn Day 2 RERC Meeting

TVA Update

Melanie Farrell, Designated Federal Officer

- TVA's Regional Model



- Building the Energy System of the Future
 - Coal Asset Transition
 - Carbon-Free RFP



- Expected IRP Kickoff - Late 2023



- Memphis Update
- Status update on TVA Board Nominees

Regional Relations Leadership Team



Dan Pratt
*Senior Vice President,
Regional Relations*



Erin Henderson
*Rotational Mgmt. Dev.
Regional Relations*



Hunter Hydas
*Rotational Management Development
Regional Relations*

NORTH REGION

Justin Maierhofer
Regional Vice President

Ernie Peterson
Director, Customer Relations

Gary Harris
Director, Government & Community Relations

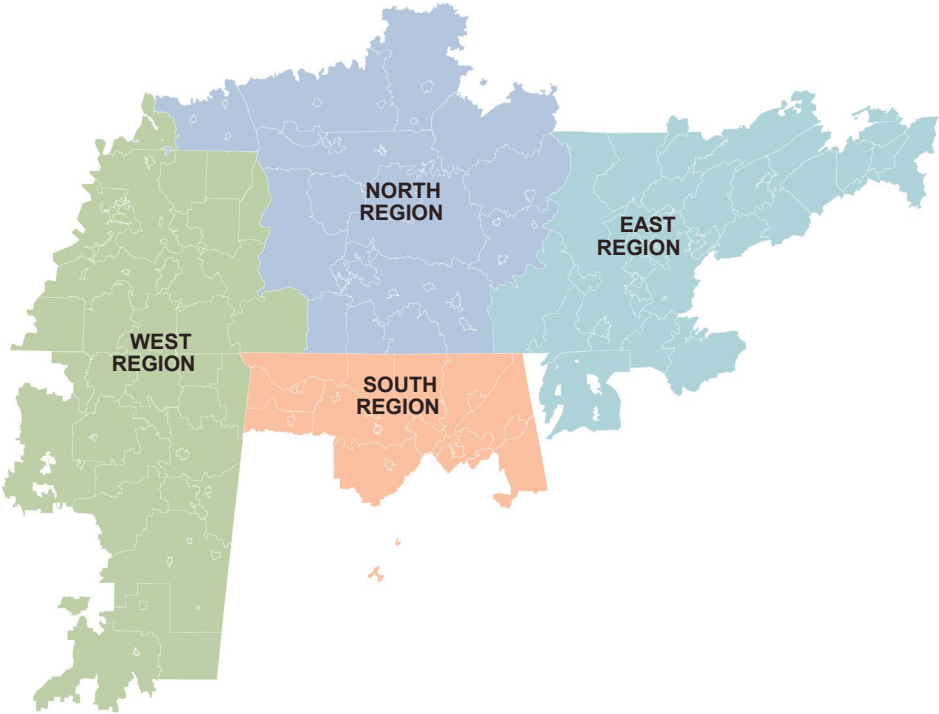
WEST REGION

Mark Yates
Regional Vice President

John Malone
*Director, Customer Relations
Mississippi*

Ryan Leister
*Director, Customer Relations
West Tennessee*

Gabe Franceschi
Director, Government & Community Relations



EAST REGION

Carol Eimers
Regional Vice President

Amy Edge
Director, Customer Relations

Bert Robinson
Director, Government & Community Relations, Northeast

Matt Sawhill
Director, Government & Community Relations, Southeast

SOUTH REGION

Jared Mitchem
Regional Vice President

Kevin Chandler
Director, Customer Relations

Lauren Pelto
Director, Government & Community Relations

Valley Vision 2035:

Developing the Vision for the Valley Public Power Model

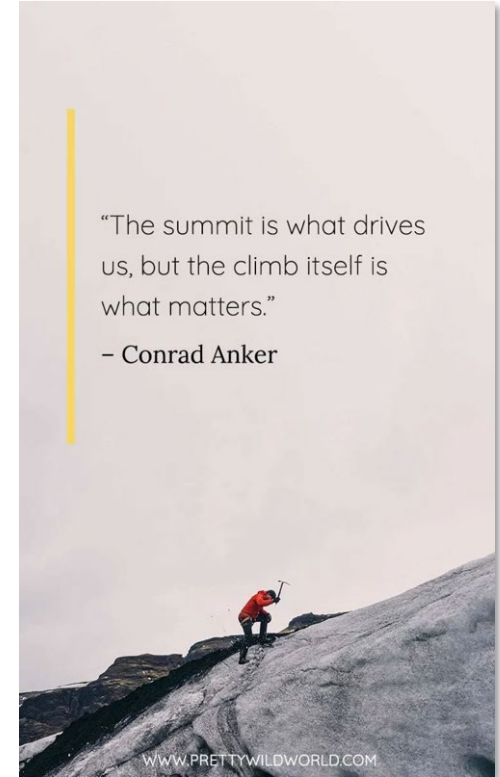
RERC Update

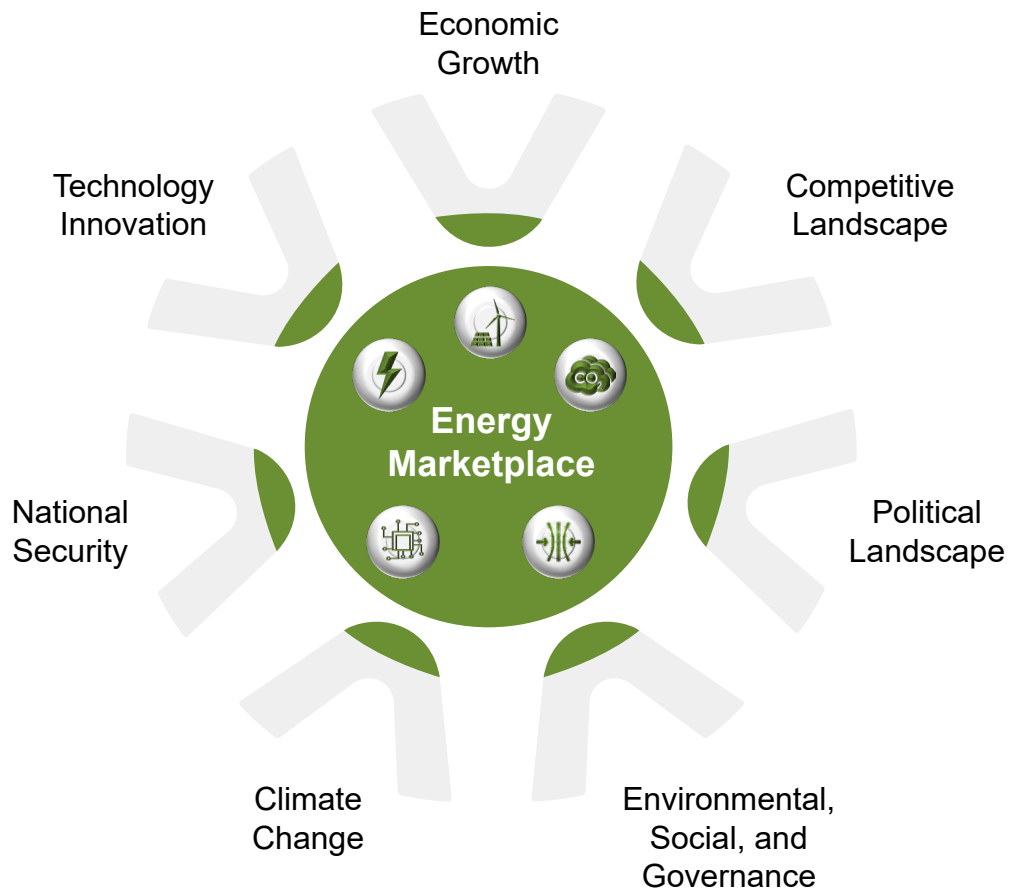
Hunter Hydas

October 3, 2022

Today's Meeting

- Create an understanding of the need for Valley Vision 2035
- Provide an overview of the approach, schedule, and process
- Discuss current progress and the path ahead
- Align on RERC roles in relation to Valley Vision 2035
- Discuss how Valley Vision 2035 fits together with the Integrated Resource Plan





Why Valley Vision 2035?

Market forces are reshaping and evolving the **energy marketplace at rapid speeds:**

- Decentralization
- Electrification
- Decarbonization
- Digitization
- Resiliency

Goal of Valley Vision 2035

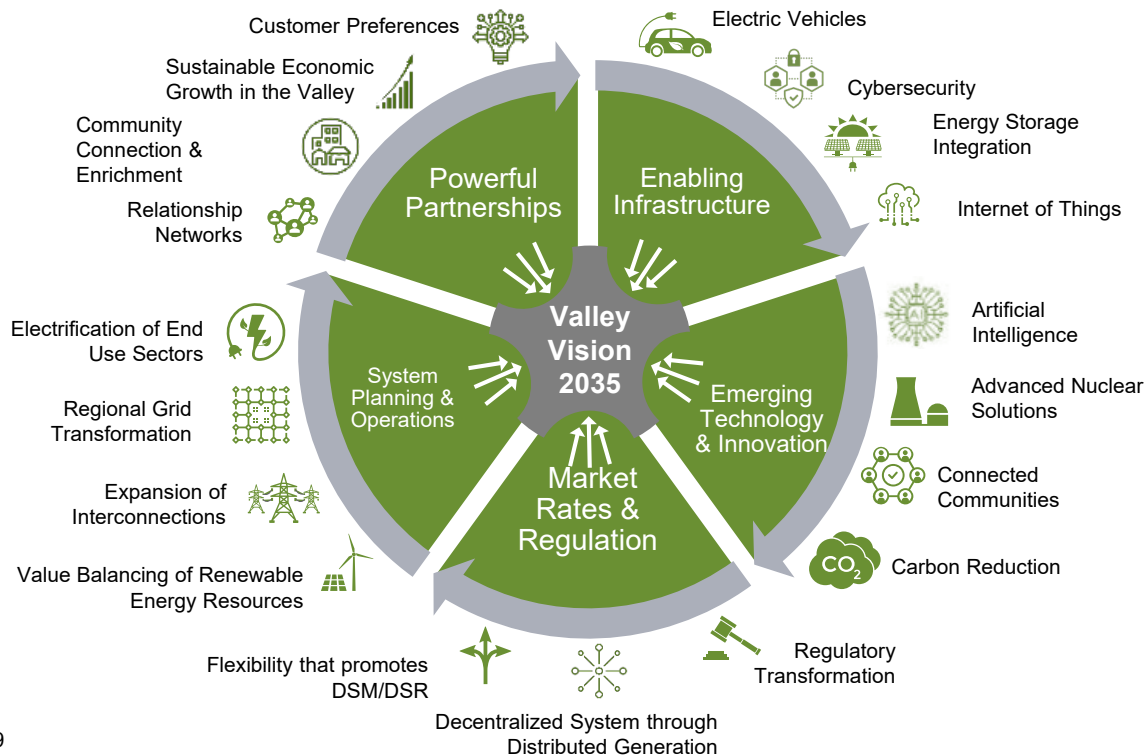


The energy industry is ever-changing, and the customer marketplace is experiencing unprecedented and ongoing transformation.

To ensure that we best meet customer needs in the future, we need a collective vision to evolve public power in the region we serve.

Valley Vision 2035 Overview

Valley Vision 2035 is designed to explore the emerging energy industry and community trends and uncertainties and establish a foundation for creating value for the Valley.



Innovation Trends / Uncertainties for the Future Valley Business Model

Decentralization

Electrification

Decarbonization

Resiliency

Digitization

Valley Vision 2035 Participants

Collaboration Group

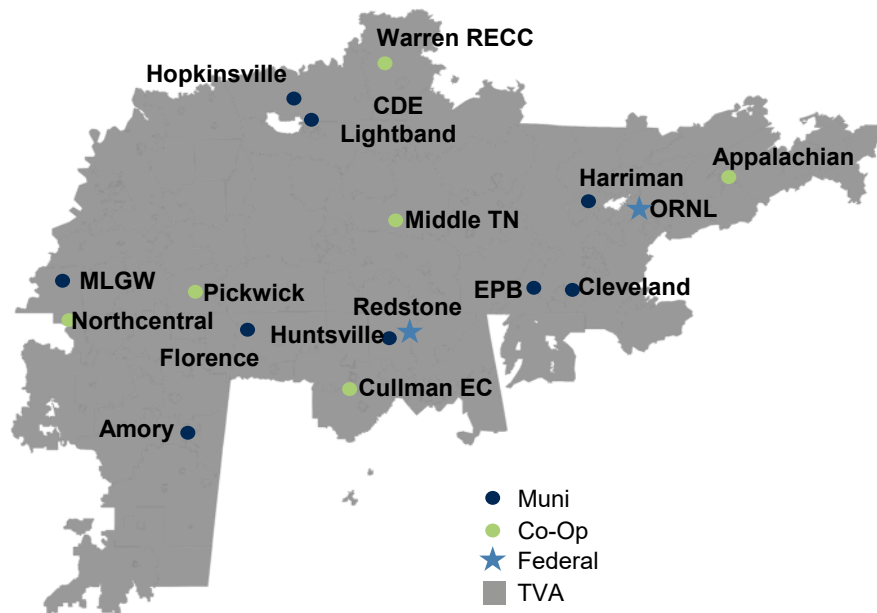
- LPCs
- Large Federal
- Customer Associations
- TVA

Content Partners

- Select energy organizations, e.g., R&D, Consulting, Services, Government, and Associations, etc.
- Valley inflight initiatives

Regional Energy Resource Council (RERC)

- Comprising members of regional government, customers, academia, and advocacy groups



The Collaboration Group codified the following success criteria for Valley Vision 2035

Align on the Future



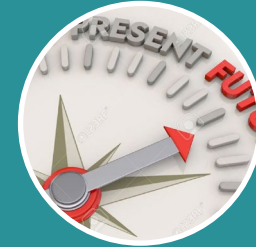
- Creates Valley alignment on future industry and marketplace trends that will impact TVA, its Partners, and Customers in 15 years
- Allows us to understand our customers' future needs and expectations and adapt our value proposition to meet them

Align Valley Participants



- Creates a mutual understanding of the differences, opportunities, and potential future disruptions across the entire system (generation through distribution to customer)
- Defines roles and responsibilities to efficiently plan for the future of the Valley

Align on Direction



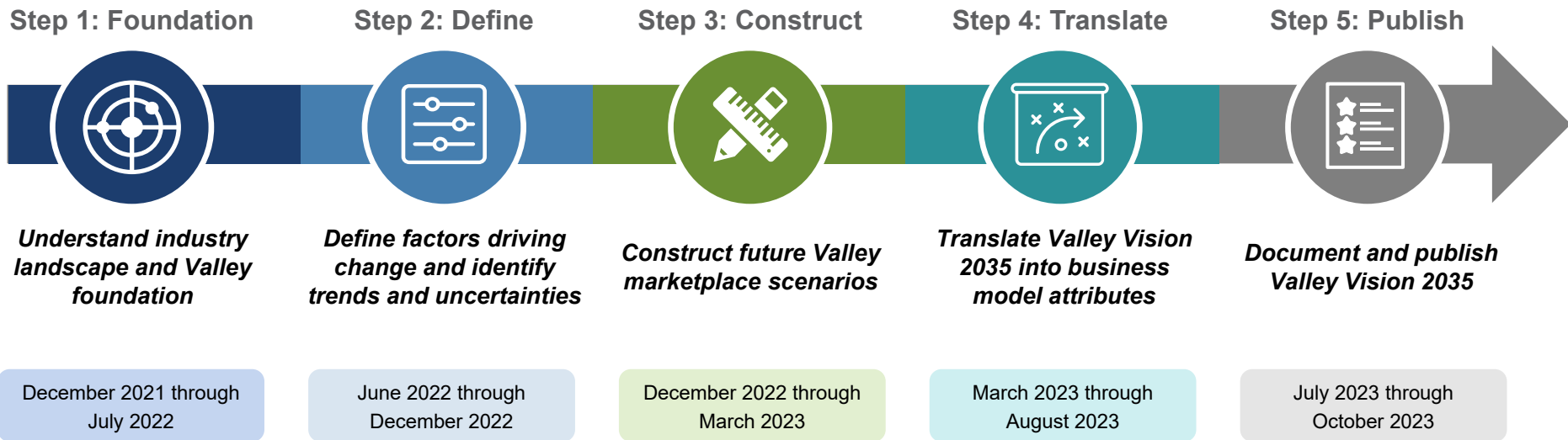
- Provides direction (accounting for local differences) that is actionable and nimble to prepare for anticipated Valley energy marketplace changes
- Strengthens and optimizes the Valley Public Power Model as a whole

Valley Vision 2035 Approach Key Features



*PECTEL: Political/Regulatory, Economic, Customer/Cultural, Technological, Environmental, and Legal

Valley Vision 2035 Approach and Timeline



Progress to Date and Path Forward

Key Accomplishments by the Numbers



20

Confirmed Content Partners



3

Components of the Valley Public Power Model defined



9

Collaboration Group meetings conducted (12 remaining)



58

PECTEL drivers defined, discussed, and vetted



20

Presentations covering "Big Picture", Valley Foundation, and New Technology/Grid Integration topics completed



21

Most impactful drivers on the Valley energy marketplace identified (only Legal remain)

Confirmed Content Partners

R&D/Consulting/Energy Services



Associations/Customer



Government/Academia



DOE



Valley Vision 2035 Topic Categories



Electricity/Financial Markets

Topics focused on methods to increase customer/consumer access to new technologies and explore energy market and financial options and how others are preparing



New Technology Deployment and Grid Integration

Exploration of emerging, future, and disruptive technologies and how they can be optimally deployed and integrated into grid operations



Metering, Communications and Data

Issues related to the current state and future impacts to metering, data collection and frequency, and the communication networks used to support the reliable delivery of energy services



Reliability, Resiliency and Security

Issues exploring the ability to provide continuous and trustworthy levels of RR&S, notwithstanding the many obstacles and challenges presented with grid modernization



Customer and Community Participation

Topics focused on the different ways that groups of customers and communities may participate in the evolving energy marketplace



Regulatory, Environmental and Policy Issues (includes ESG)

Exploration of opportunities and challenges relating to technological advances and environmental impacts and identified regulatory and policy approaches to grid modernization with the desired environmental objectives attained



Ratemaking

Exploration of rate alternatives to support the future electricity grid



Future Business Model

Exploration of potential ways the utility business and operating model will change to adapt to innovation across the grid

Collaboration Group Meeting Common Themes



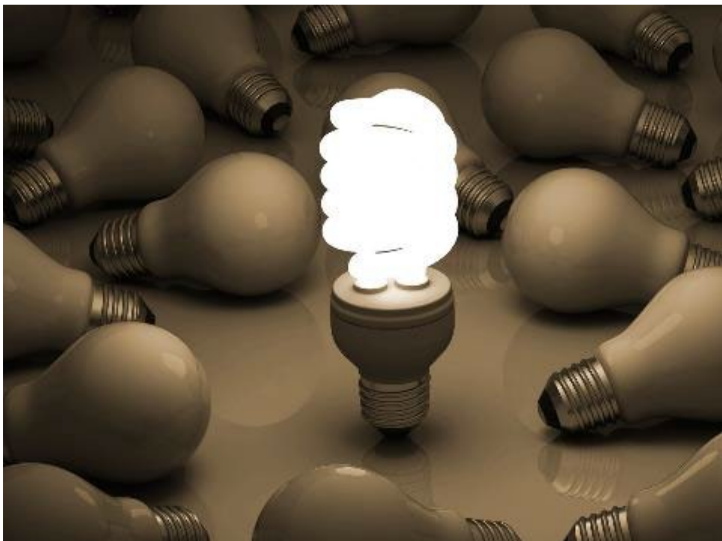
Progress

- All Collaboration Group members feel the initiative is progressing well and have enjoyed the meetings, especially in-person
- LPCs will move at different paces when transitioning to meet the future marketplace
- Differences between Co-Ops and Munis are important factors for addressing future marketplace changes
- In the end, we will need to create alignment across all LPCs

"We've created a good foundation but are ready to dive in deeper"

"One size won't fit all"

Collaboration Group Meeting Common Themes (Cont'd)



Key Takeaways

- Electrification, especially EVs and industrial, could present a big challenge for the Valley in a very short time frame
- The future marketplace will require us to be more integrated in our planning processes across the Valley
- The Valley cannot sacrifice reliability and resiliency in pursuit of grid modernization and decarbonization – both are foundational to customer satisfaction and national security
- Flexibility options, in their current form, may hinder the transition to the future energy marketplace
- We'll need to educate end-use customers on the outcomes of Valley Vision 2035 e.g., the value of the Public Power Model and DER deployment policy, benefits, what makes sense for them, etc.

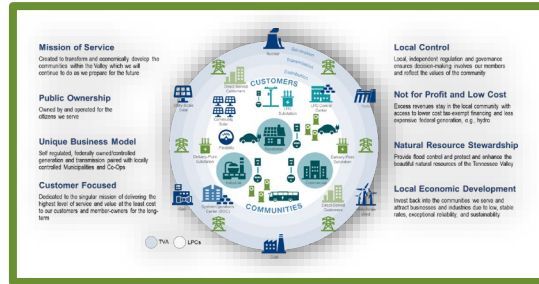
"Electrification is coming and we can't control the timing"

"Most of the future pressure will be on the distribution system"

"We need to prepare our system now to handle the changing marketplace"

Valley Public Power Model Components

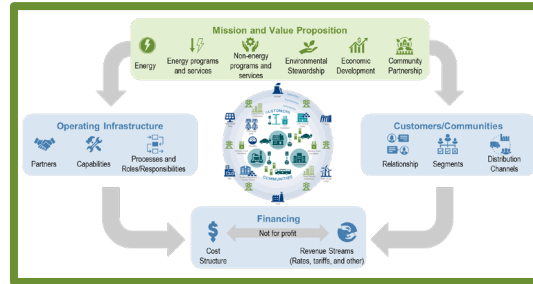
Foundational and Unique Attributes



Articulates the foundational and unique features of the Valley Public Power Model that has delivered significant benefit to the Valley for over 85 years

Will not likely change in the future

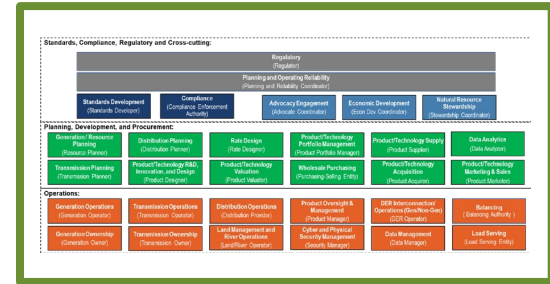
Valley Business Model



Describes how the Valley Public Power Model creates and delivers value, in economic, environmental, social, or other contexts

Will most likely change in the future as the marketplace evolves

Functional Roles and Responsibilities



Defines roles and responsibilities to efficiently plan, manage, and operate in the future Valley marketplace

Foundational and Unique Valley Public Power Attributes

Mission of Service

Created to transform and economically develop the communities within the Valley which we will continue to do as we prepare for the future

Public Ownership

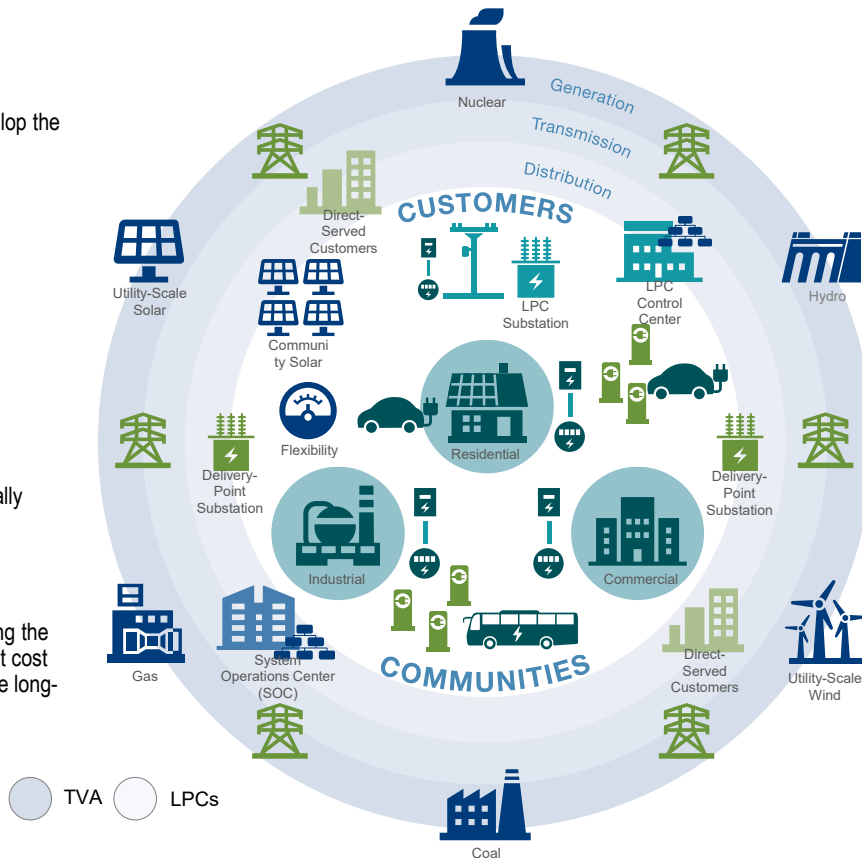
Owned by and operated for the citizens we serve

Unique Business Model

Self regulated, federally owned/controlled generation and transmission paired with locally controlled Municipalities and Co-Ops

Customer Focused

Dedicated to the singular mission of delivering the highest level of service and value at the least cost to our customers and member-owners for the long-term



Local Control

Local, independent regulation and governance ensures decision-making involves our members and reflect the values of the community

Not for Profit and Low Cost

Excess revenues stay in the local community with access to lower cost tax-exempt financing and less expensive federal generation, e.g., hydro

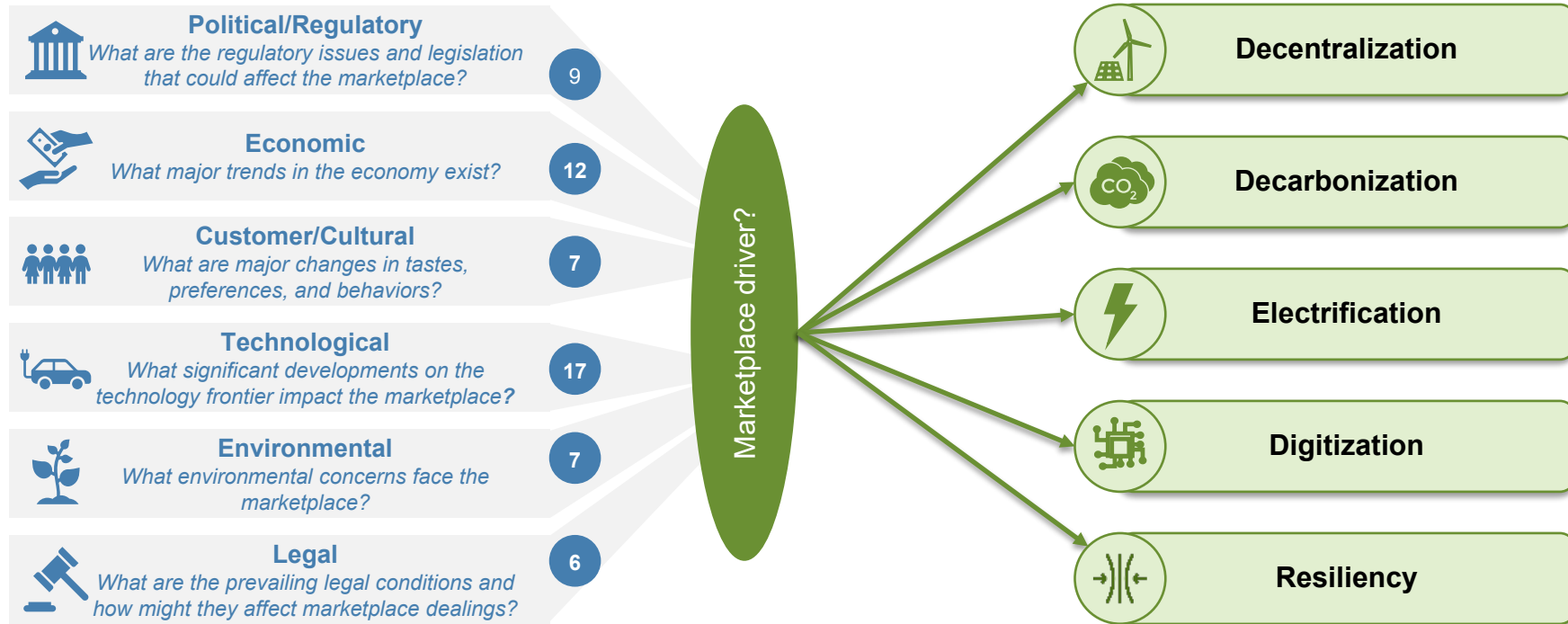
Natural Resource Stewardship

Provide flood control and protect and enhance the beautiful natural resources of the Tennessee Valley

Local Economic Development

Invest back into the communities we serve and attract businesses and industries due to low, stable rates, exceptional reliability, and sustainability

Fifty-eight drivers vetted that will influence one or more of these marketplace categories



Most Impactful Valley Vision 2035 Energy Marketplace Drivers

Legal

- TBD
-
-

Political/Regulatory

- Environmental legislation and regulations
- Energy market regulations
- Grid (T&D) reliability requirements
- TVA and LPC Board composition/policies

Economic

- Natural gas prices
- Storage prices
- Supply chain sourcing and efficiency
- Workforce availability

Environmental

- Clean tech. waste disposal requirements
- Public or special interest group challenges
- Natural gas opposition, e.g., bans for new hook-ups
- Requirements for permitting and siting

Technological

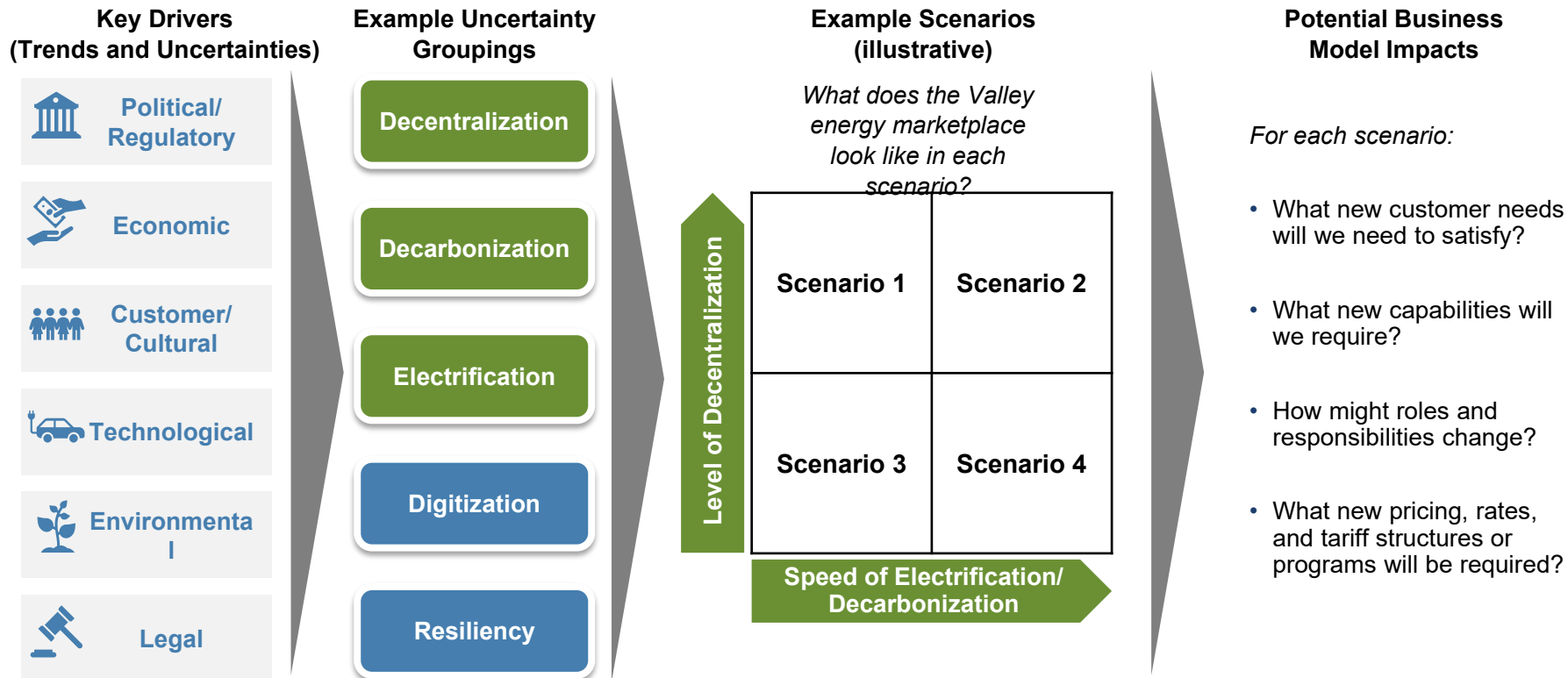
- DER and utility-scale generation technology
- Fuel technology
- Transportation technology
- Storage technology
- Load mgmt./grid enabling technology

Customer/Cultural

- Valley customer perception related to clean energy
- Consumer expectations regarding data availability, information, insights, and convenience
- Demand for a "trusted energy advisor" and competitor penetration
- Industrial ESG and resiliency decisions



Valley Vision 2035 – The Path Ahead



RERC roles in relation to Valley Vision 2035



Keep updated on progress and results

Provide feedback on insights and findings

Represent the views and interests of your respective stakeholders

Solicit an advice statement to the TVA Board

Relationship to the Integrated Resource Plan

Comparison of Valley Vision 2035 to the IRP

Valley Vision 2035

Demand, Customer Marketplace

Explores emerging issues and uncertainties that have the potential to significantly impact our energy marketplace and the operation of the holistic system

TVA, Valley Partners (LPCs), Customer Associations, and large Federal customers

No direct involvement; conversation between TVA, Valley customers, and Customer Associations

Considers plausible future Valley energy marketplace scenarios and translates them to potential Valley Public Power business model attribute changes and needs



Focus



Goal



Working Group



Public Participation



Process

TVA Integrated Resource Plan

Supply Portfolio

Identifies an optimal energy resource plan that performs well under a variety of future conditions

TVA, LPCs, Customer Associations, industrial customers, non-governmental (energy and environ.), state government/agencies, Research, Academia, Economic Development organizations, and others

Direct involvement through public outreach webinars and briefings and open comment periods

Utilizes a least-cost analytical framework and multiple scenarios of the future to determine how potential power generation resource portfolios could perform in different market and external conditions

Valley Vision 2035

Questions?

Hunter Hydas

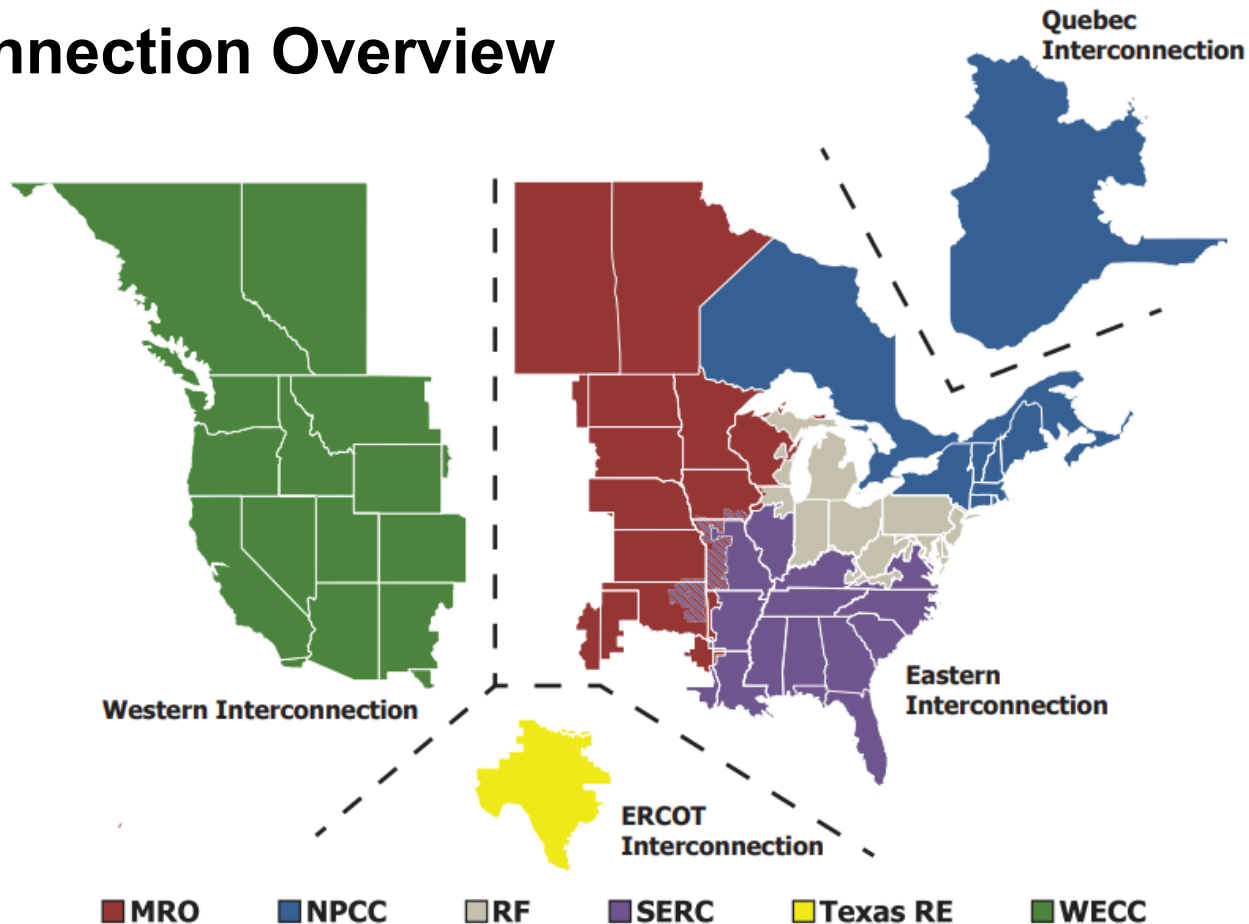
TVA System Operations

RERC

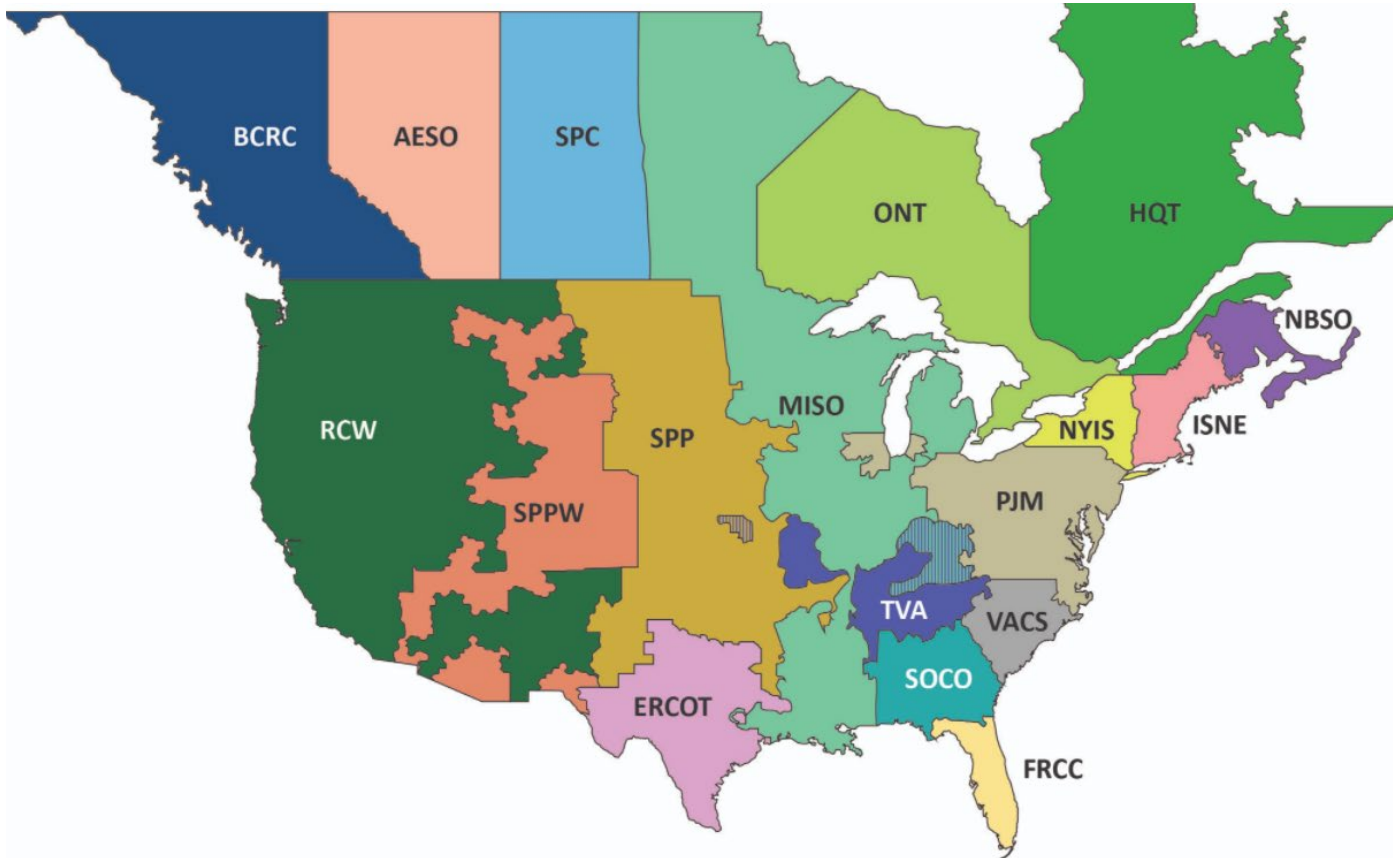
Greg Henrich

October 2022

Interconnection Overview

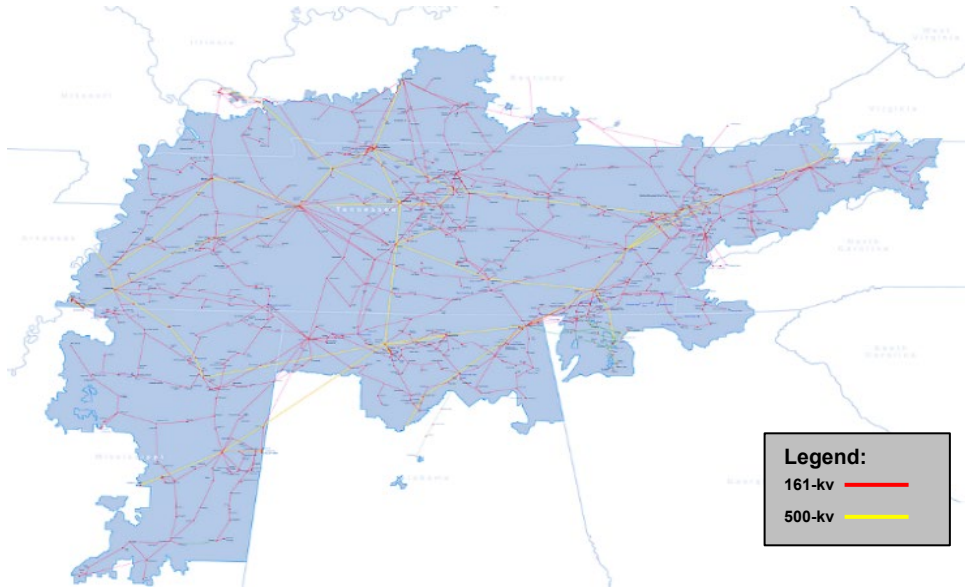


Reliability Coordinator



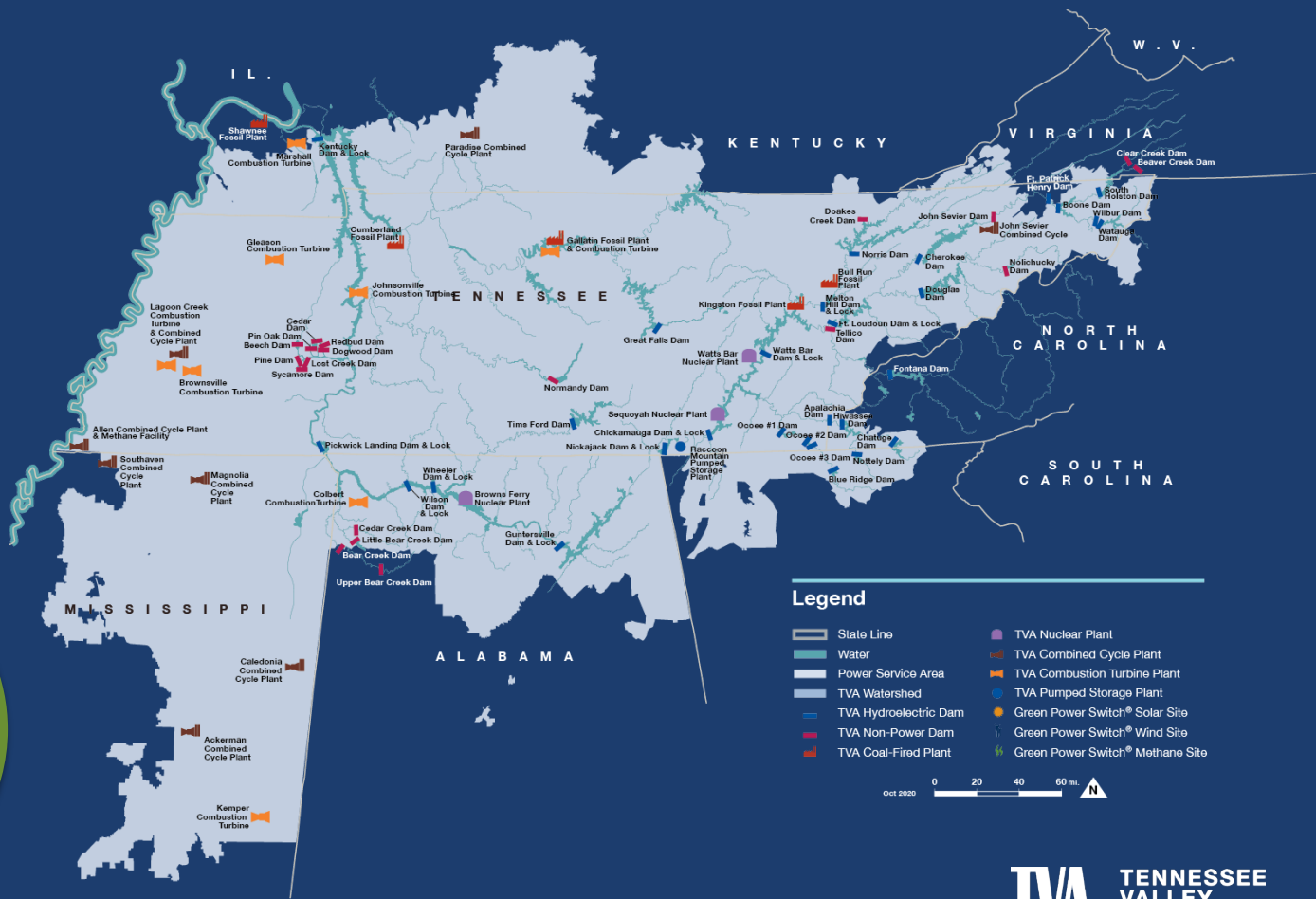
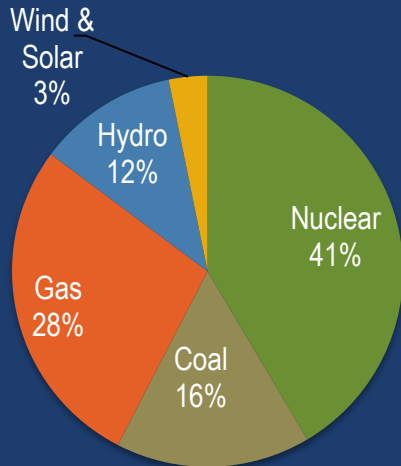
TVA Transmission Overview

Bulk System Capacity | Generation | Regulation | Asset Performance | Customer Delivery | Economic Development | Interregional Impacts
16,265 Circuit Miles | 104,865 Structures | 522 Substations | 1,325 Customer Connection Points | 239,439 Acres ROW | 4,300+ miles Backbone Telecom Fiber



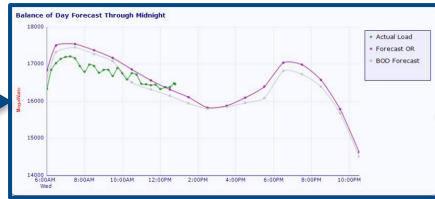
The TVA Power System

FY21 Energy



Balancing Authority & Resource Operation

Resource Operations & Analysis



Participant Scheduling

Power Supply Update 11/10/2017 5:46									
TVA RESTRICTED INFORMATION									
Resource	Unit	11/10/2017	11/11/2017	11/12/2017	11/13/2017	11/14/2017	11/15/2017	11/16/2017	11/17/2017
Coal	1	1000	1000	1000	1000	1000	1000	1000	1000
Coal	2	1000	1000	1000	1000	1000	1000	1000	1000
Coal	3	1000	1000	1000	1000	1000	1000	1000	1000
Coal	4	1000	1000	1000	1000	1000	1000	1000	1000
Coal	5	1000	1000	1000	1000	1000	1000	1000	1000
Coal	6	1000	1000	1000	1000	1000	1000	1000	1000
Coal	7	1000	1000	1000	1000	1000	1000	1000	1000
Coal	8	1000	1000	1000	1000	1000	1000	1000	1000
Coal	9	1000	1000	1000	1000	1000	1000	1000	1000
Coal	10	1000	1000	1000	1000	1000	1000	1000	1000
Coal	11	1000	1000	1000	1000	1000	1000	1000	1000
Coal	12	1000	1000	1000	1000	1000	1000	1000	1000
Coal	13	1000	1000	1000	1000	1000	1000	1000	1000
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Coal	20	1000	1000	1000	1000	1000	1000	1000	1000
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Coal	64	1000	1000	1000	1000	1000	1000	1000	1000
Coal	65	1000	1000	1000	1000	1000	1000	1000	1000
Coal	66	1000	1000	1000	1000	1000	1000	1000	1000
Coal	67	1000	1000	1000	1000	1000	1000	1000	1000
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Coal	70	1000	1000	1000	1000	1000	1000	1000	1000
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Coal	75	1000	1000	1000	1000	1000	1000	1000	1000
Coal	76	1000	1000	1000	1000	1000	1000	1000	1000
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Coal	84	1000	1000	1000	1000	1000	1000	1000	1000
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Coal	86	1000	1000	1000	1000	1000	1000	1000	1000
Coal	87	1000	1000	1000	1000	1000	1000	1000	1000
Coal	88	1000	1000	1000	1000	1000	1000	1000	1000
Coal	89	1000	1000	1000	1000	1000	1000	1000	1000
Coal	90	1000	1000	1000	1000	1000	1000	1000	1000
Coal	91	1000	1000	1000	1000	1000	1000	1000	1000
Coal	92	1000	1000	1000	1000	1000	1000	1000	1000
Coal	93	1000	1000	1000	1000	1000	1000	1000	1000
Coal	94	1000	1000	1000	1000	1000	1000	1000	1000
Coal	95	1000	1000	1000	1000	1000	1000	1000	1000
Coal	96	1000	1000	1000	1000	1000	1000	1000	1000
Coal	97	1000	1000	1000	1000	1000	1000	1000	1000
Coal	98	1000	1000	1000	1000	1000	1000	1000	1000
Coal	99	1000	1000	1000	1000	1000	1000	1000	1000
Coal	100	1000	1000	1000	1000	1000	1000	1000	1000

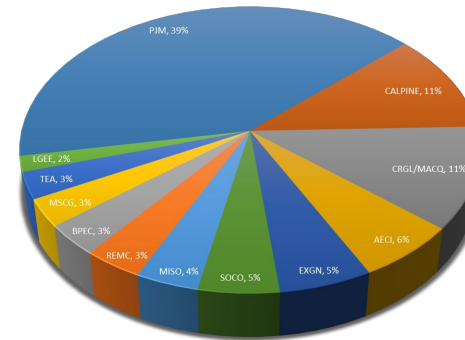
Balancing Authority



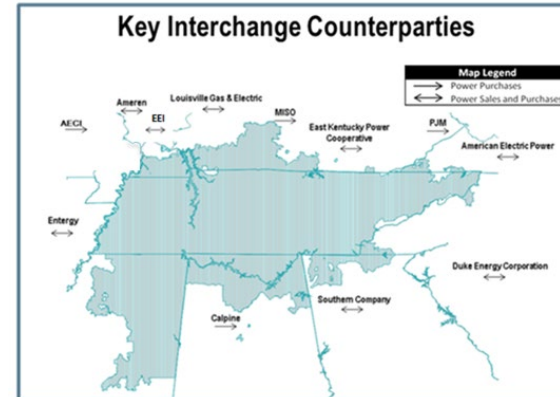
Power Trading

- Purchase for economics to displace higher-cost units
- Purchase for reliability as directed by the Balancing Authority
- Sell excess generation off-system within the restrictions of the TVA fence
- Execute Economic Demand Response

FY17 - FY20 Purchased Power Suppliers (% of GWh)



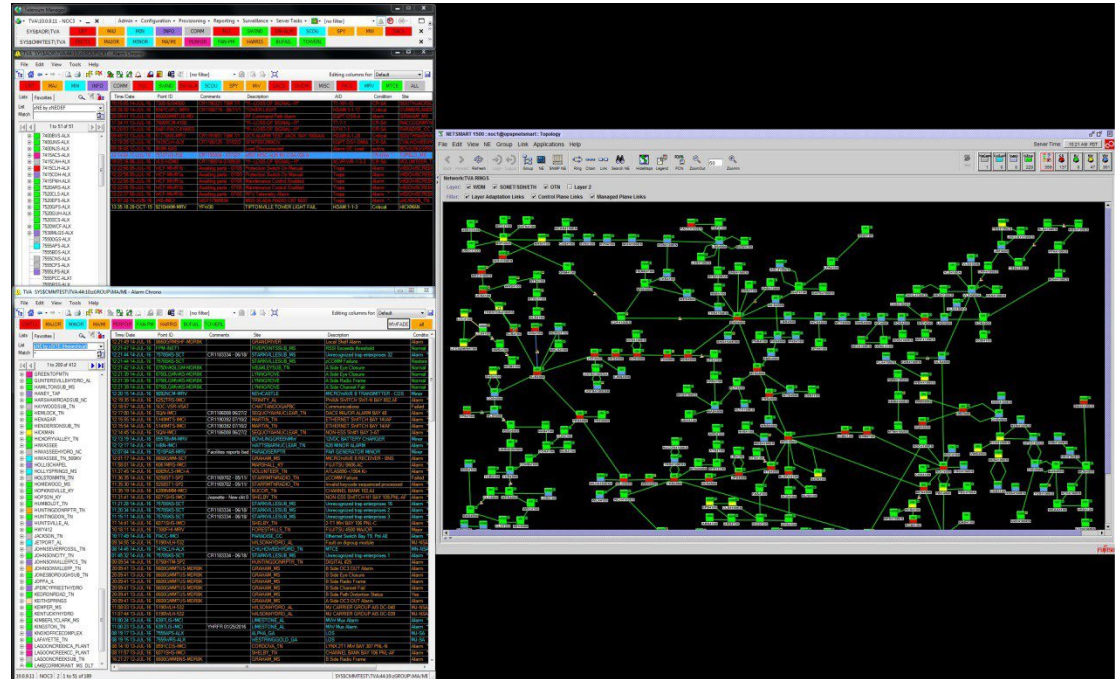
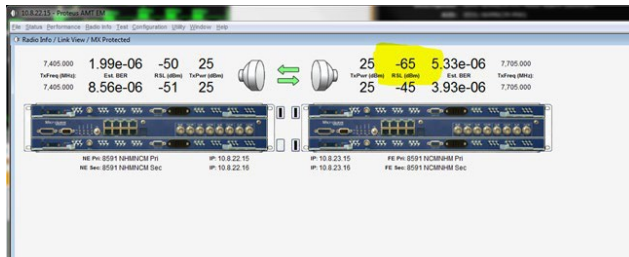
Key Interchange Counterparties



Telecommunication System

Network Operations Center

- Transport(Fiber/MW)
- SCADA
- Metering
- System protection
- Voice
- IT



Control Centers

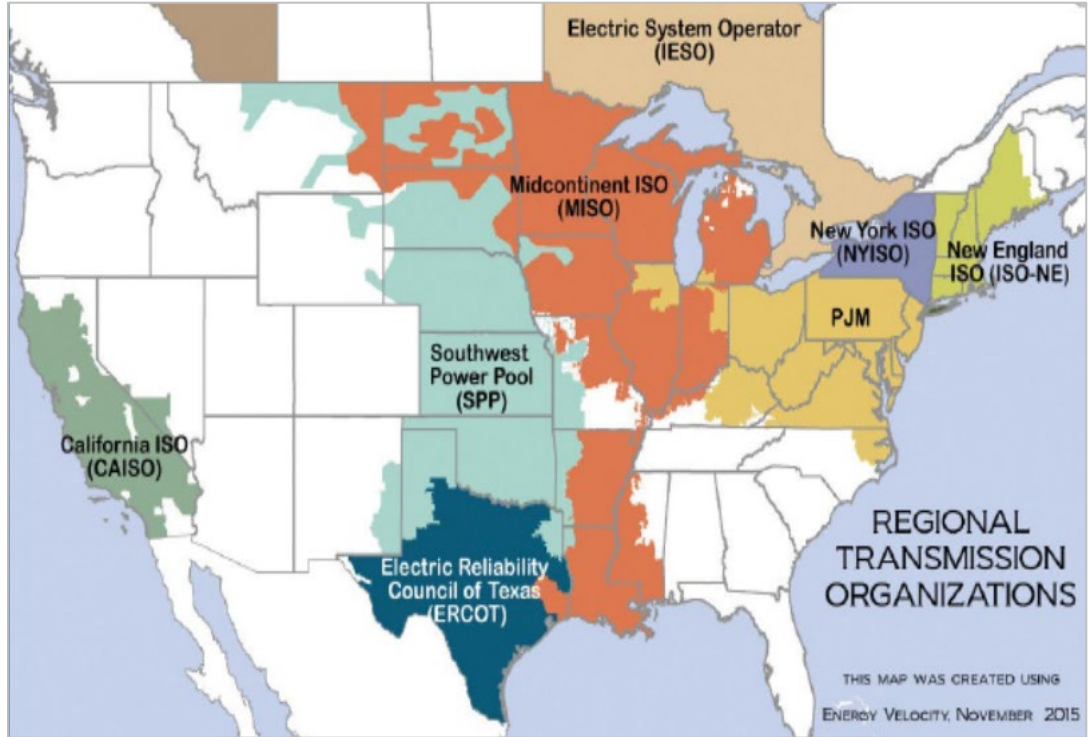
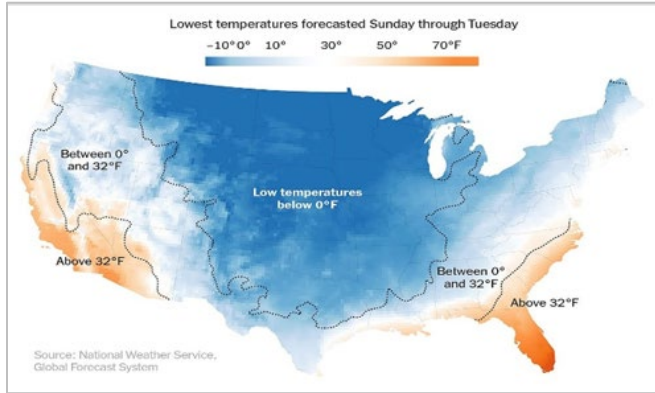
- Two fully-operational control centers
 - System Operations Center (SOC)
 - Regional Operations Center (ROC)
- Hydro Dispatch Control Center (HDCC)
- Staffed 24x7
- Data is mirrored at both in real-time



System Performance

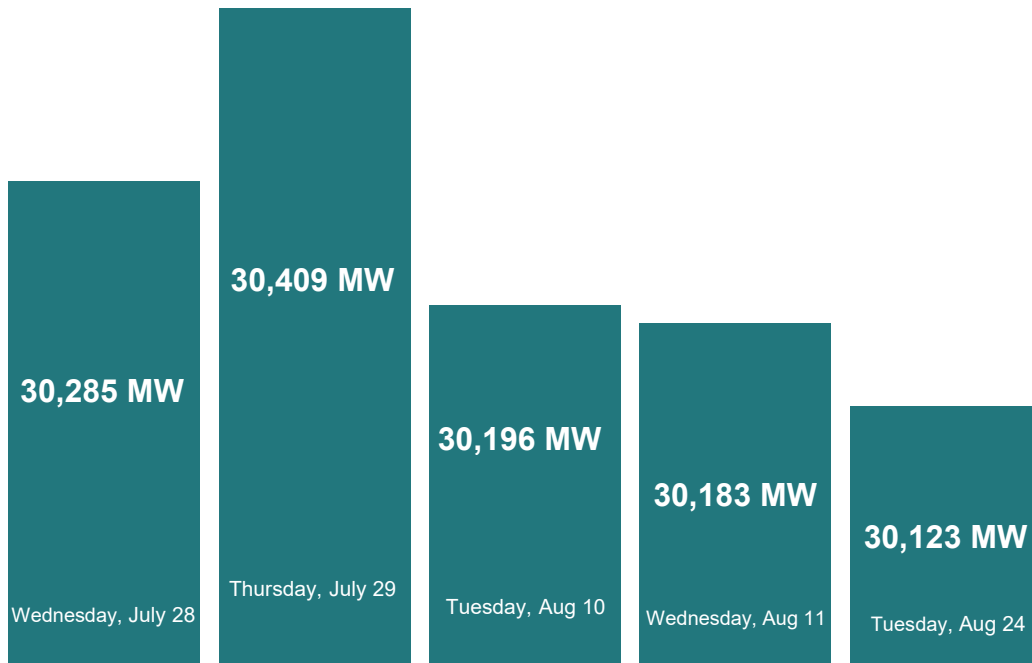


Winter 2021



2021 Summer Peak Overview

- Highest summer peak since 2012.
- First time since 2018 that loads were greater than 30,000 megawatts (MW).
- First time since 2017 that loads were greater than 29,000 MW for four consecutive days.



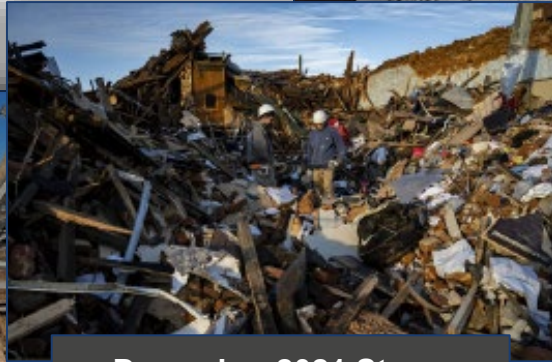
TVA Reliability – 99.999%



February 2021 Winter Weather Event



December 2021 Storm Response

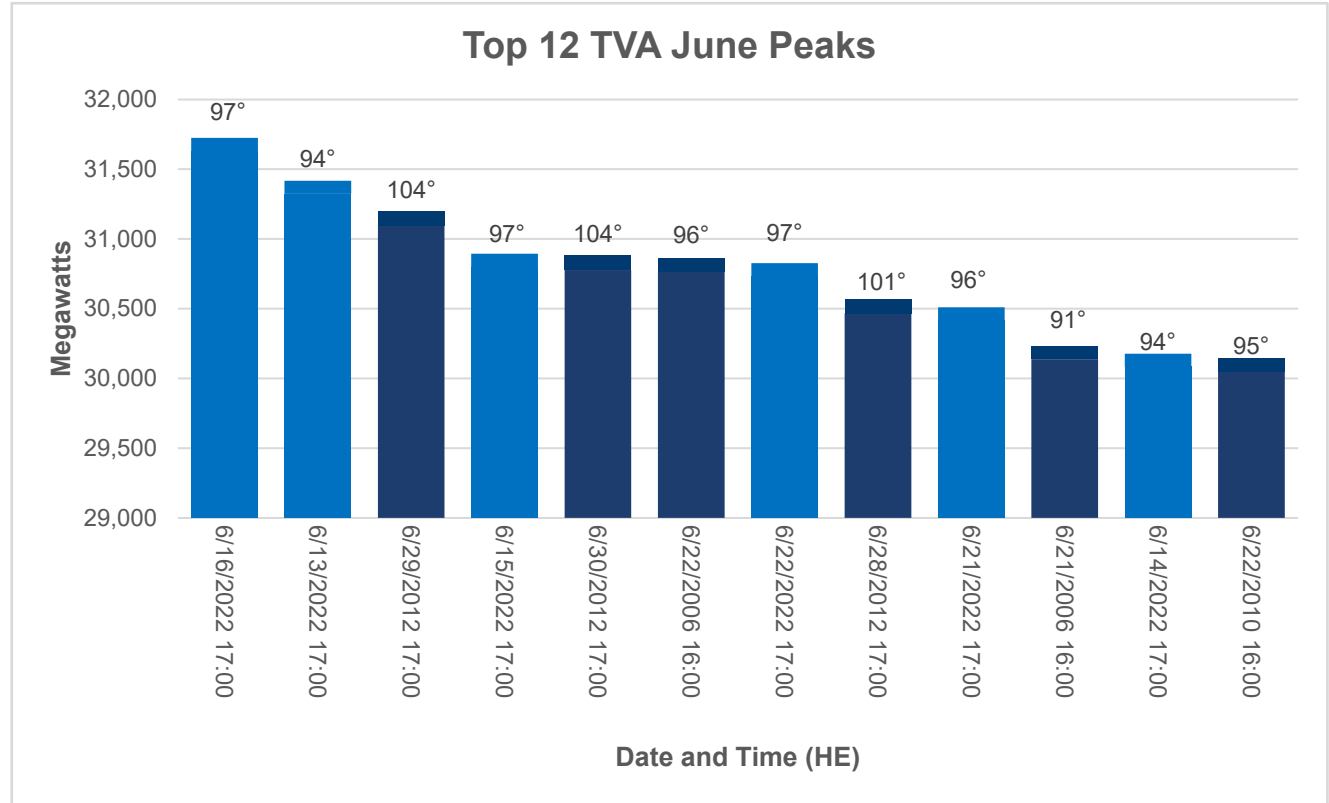






June 2022

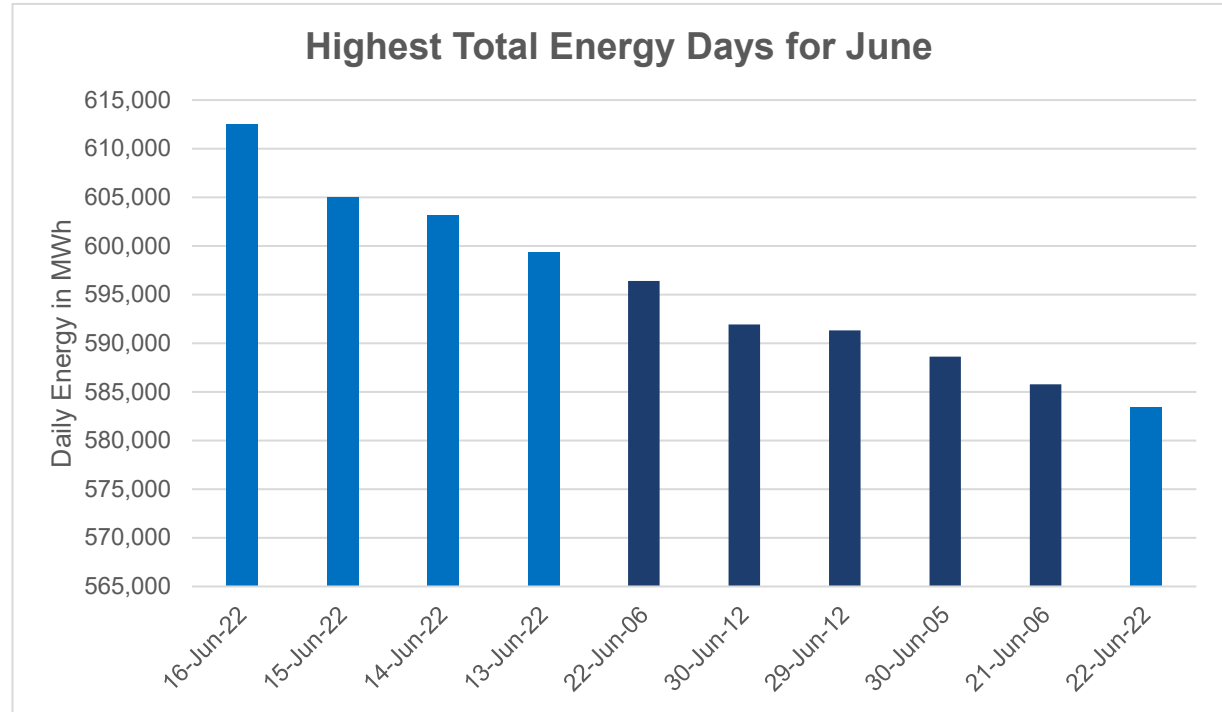
- In TVA history, there have been 12 peaks above 30,000 in the month of June
- Six of those peaks occurred in 2022 including the top two in TVA June history



June 2022

- June 2022 had the four highest June total energy days in TVA history (and they were consecutive!)

The System Average temperature hit 99 degrees at 1600 CDT on June 21, 2022. This was the highest system average temperature since July 1, 2012 (101F).

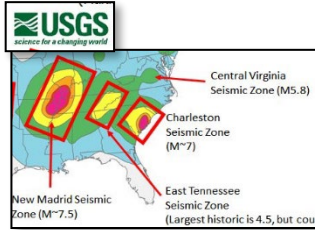


Grid Resiliency



Resilience – Recent Advances

TVA continually works at improving resilience. Below are a few recent developments:



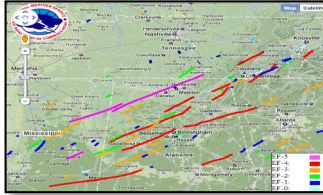
Seismic events

- Improved construction
- Hardened equipment
- Supply redundancy



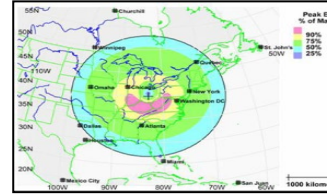
Community Resiliency

- Survey of all LPCs for critical loads
- Review of gas-electric interaction



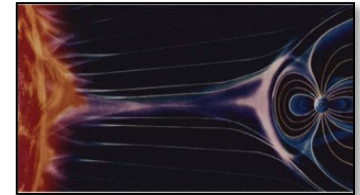
Severe Weather

- Standardization
- Increased number of spares
- Higher quality spares
- Better communications



EMP

- New operating center
- Expanded fiber network
- EPRI/NERC/DOE/EISC studies
- Core grid restoration plan
- Developing standard to harden Core Grid (50 substations)
- Planning for 10-year project to implement



Geomagnetic Storms

- Best in class system of detectors
- Best in class models of grid and transformers
- Studies of extreme events
- Real-time data models



New Primary System Operations Center Highlights

Primary System Operating Center - Overview

The Primary System Operating Center (PSOC) is being constructed on a 166-acre parcel located in Georgetown, Meigs County, Tennessee.

The secure campus will include:

- 175,000 sq ft two-story System Operation Center and Technical Service Building
- Receiving / Maintenance Building, Entrance Guard House and Heli-Pad
- Fire Water Supply Tank, Wastewater Plant and Electrical Substation

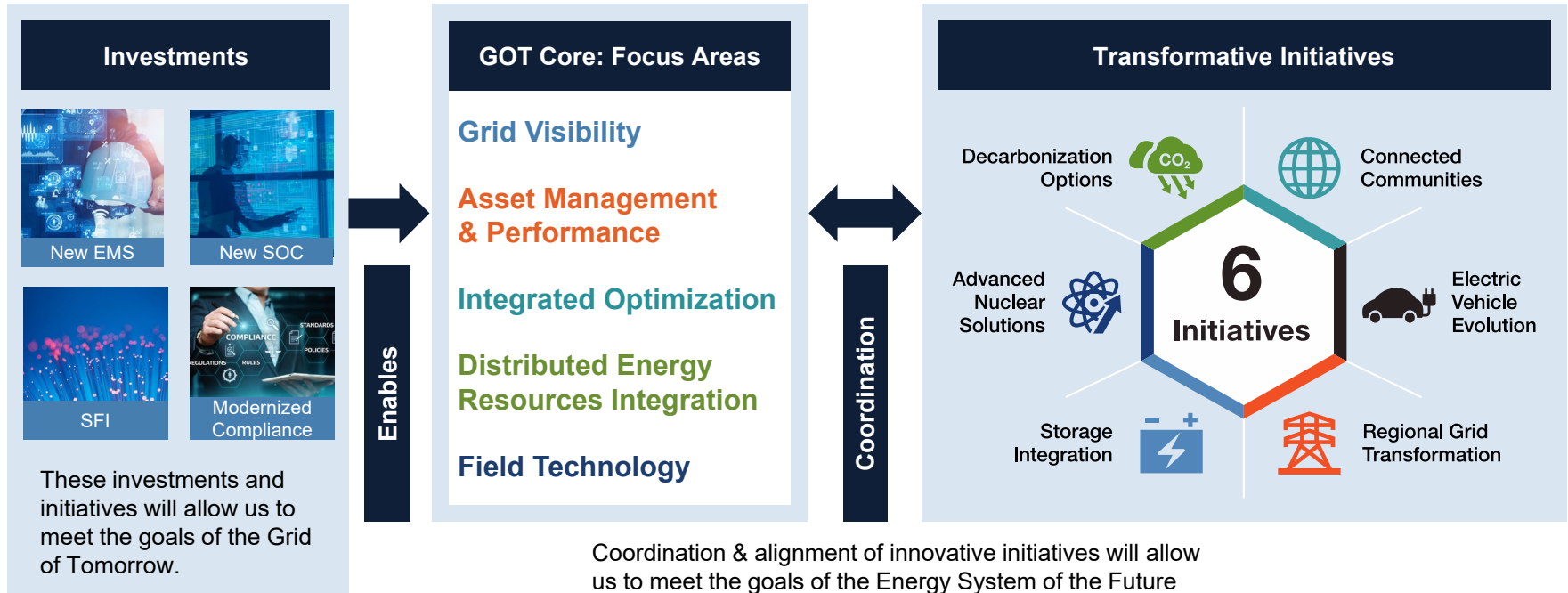
Key Attributes:

- Seismic, extreme weather events (F5 tornados), ballistics and electromagnetic pulse protection.
- Security improvements - relocation away from urban area, perimeter setbacks and fencing, etc.
- Designed with full redundancy of mechanical, electrical and communication systems.
- Site location is 30 miles of the Back-up System Operations Center.

PSOC Milestones:

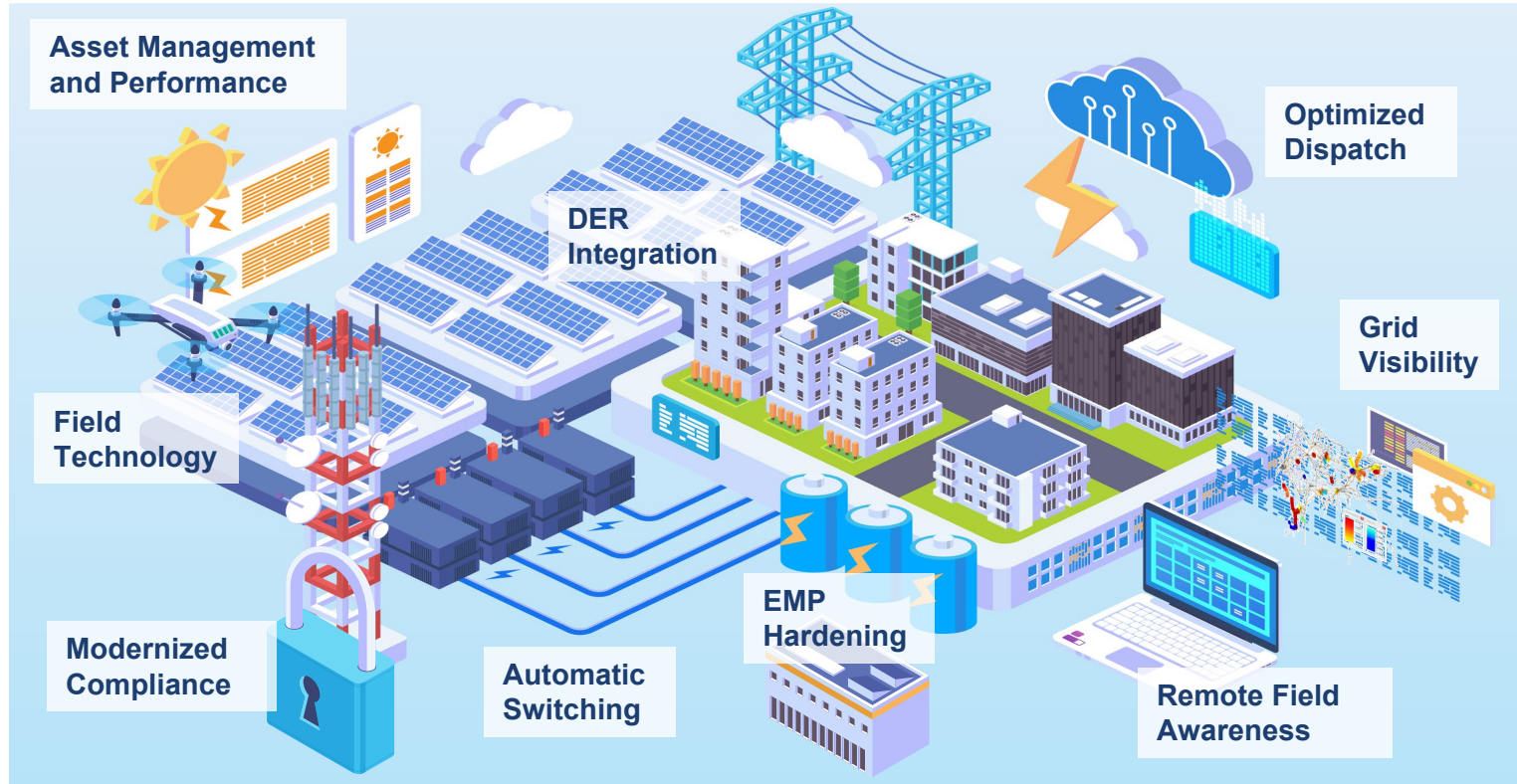
- Construction Commenced – March 2020
- Turnover, Ready for Occupancy – June 2023
- Commence SCADA/EMS Parallel Operations – Feb 2024
- Fully Operational includes SCADA/EMS – Jan 2025

Grid of Tomorrow



FOUNDATIONAL: COMMUNICATIONS, ANALYTICS, & CYBERSECURITY

Delivering the Energy System of the Future





New Primary System Operations Center Video



Questions?

Greg Henrich



BREAK

**Meeting resumes at
1:45 PM**

Welcome

Public Comment

**This is a listening
session; responses
are typically not
provided**



Summary

Agenda

RERC Meeting – Day 2

October 4, 2022

All times are ET

9:15 am	Welcome Speaker – David Wade, President & CEO, EPB
10:00	Day 1 Review
10:15	Break
10:30	TVA Nuclear Update
11:30	Q&A
11:45	Summary
11:55	Adjourn Day 2 RERC Meeting

**Meeting begins
at 9:15 am tomorrow**

Welcome!

The Meeting will
begin at
9:15 AM Eastern



Regional Energy Resource Council

October 3-4, 2022

3rd Meeting – Term 5

Welcome

Agenda

RERC Meeting – Day 2

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DAVID WADE

PRESIDENT & CEO, EPB

BREAK

Day 1 Review

TVA Nuclear Overview: New Nuclear Program & Clinch River Nuclear Project

*Presented by Scott Hunnewell, Vice President,
TVA New Nuclear Program*



Briefing Agenda

- TVA Mission and Generation History
- NetZero Aspiration & Potential Role For SMR Fleet
- TVA's SMR Journey
 - Site Development
 - Technology Evaluation
 - Detailed Planning
 - Workforce Planning
 - Initial Unit

Tennessee Valley Authority

- TVA is a federal corporation
- Largest public utility in the US.
- TVA currently receives **NO** funding from the US Government.
- TVA created in 1933 by Congress as part of President Franklin D. Roosevelt's New Deal



TVA's nuclear power and construction experience



- TVA operates the third largest nuclear reactor fleet in the U.S.
- TVA's Watts Bar Unit 2, the nation's first new nuclear generation in 20 years, entered commercial operation in 2016
- At any given time, TVA has around 900 active projects totaling \$12 Billion in approved funding for construction and refurbishment projects for coal and gas plants, hydro-electric dams, and transmission infrastructure across the Tennessee Valley.

TVA Mission

BUILT FOR THE PEOPLE OF THE VALLEY

ENERGY

Electricity at the lowest feasible rate and highest feasible reliability

ENVIRONMENT

Stewardship of the natural resources for best use by the public

ECONOMIC DEVELOPMENT

To attract and retain good jobs and capital investment in the Valley



1933

TVA ACT
SIGNED

Innovating out of
economic depression



1940s
HYDRO

Largest hydropower
construction programs
ever undertaken in the
US to support power
needs during WWII.



1950s
FOSSIL

Rise of inexpensive
coal power to meet
Valley demands.
Innovations in fertilizer
and land management
techniques established
model for modern
agriculture extension
services.



1960s
NUCLEAR

To address challenges
with burning coal and
increasing energy
demand, TVA
constructs the nation's
first GE BWR-4 nuclear
plant at Browns Ferry.



1970s

PUMPED
STORAGE &
GAS

TVA continues to
innovate to meet peak
daytime demands through
pumped storage at
Raccoon Mountain. TVA
also begins producing
power by simple cycle
combustion turbines
(gas).



2020+

TVA'S ENERGY
SYSTEM OF THE
FUTURE

To reduce carbon emissions
and support increasing
electricity demands, TVA
pioneering emerging
technologies in advanced
nuclear, solar, pumped
storage, and battery storage
to create the Energy System
of the Future.

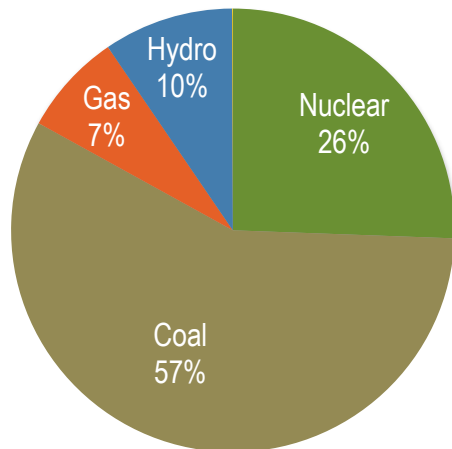
INNOVATING FOR
THE PEOPLE OF
THE VALLEY

NetZero Aspiration & Potential Role For SMR Fleet

Diverse and Cleaner Energy Mix

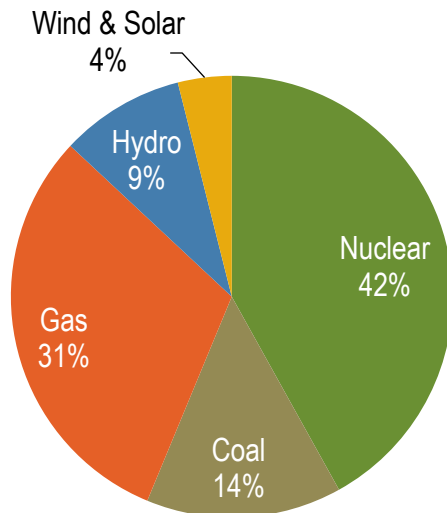
FY 2005

177 TWh



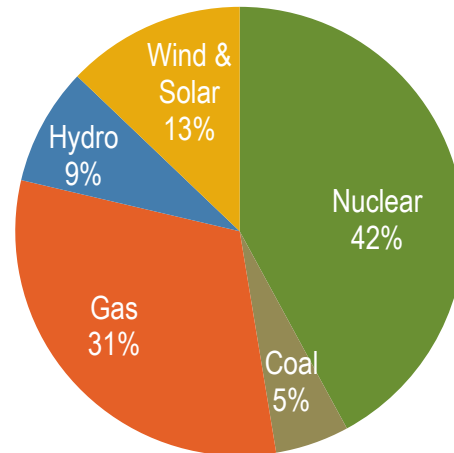
FY 2022

159 TWh

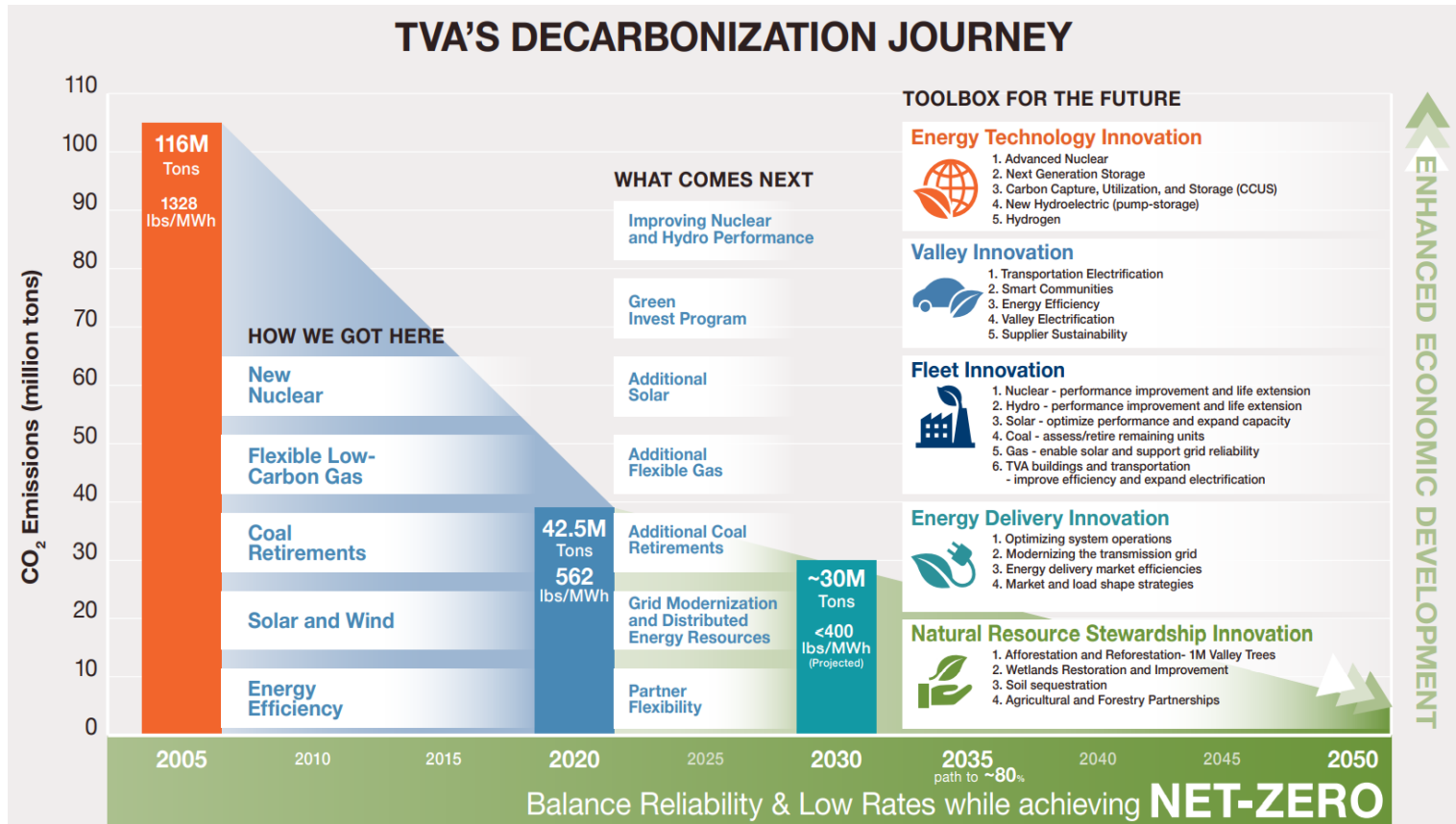


FY 2030

165 TWh

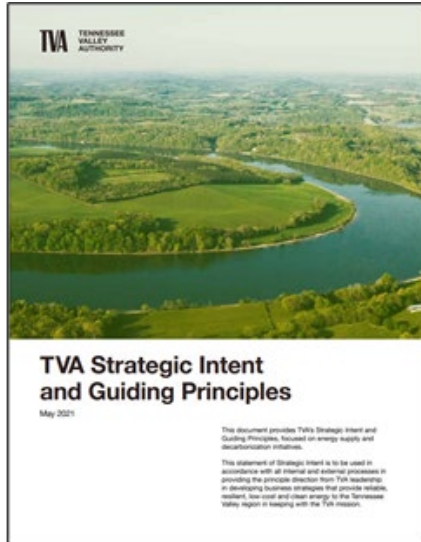


FY22 & FY30 forecasts based on the FY22 Budget Power Supply Plan and are subject to change. Please refer to TVA's most recent annual report on Form 10-K and quarterly report on Form 10-Q for a discussion of factors that could cause actual results to differ from these forecasts. TVA Energy Efficiency Program impacts are estimated to reduce total energy needs by about 1.6% in FY22 on a Net Cumulative Realized at System basis, 2007 base year. TVA sells the renewable energy certificates associated with some of its renewable energy to certain customers.



Source: TVA's Carbon Report – May 2021

Company Direction and Authorization



TVA Board Authorizes New Nuclear Program to Explore Innovative Technology

Feb 10, 2022

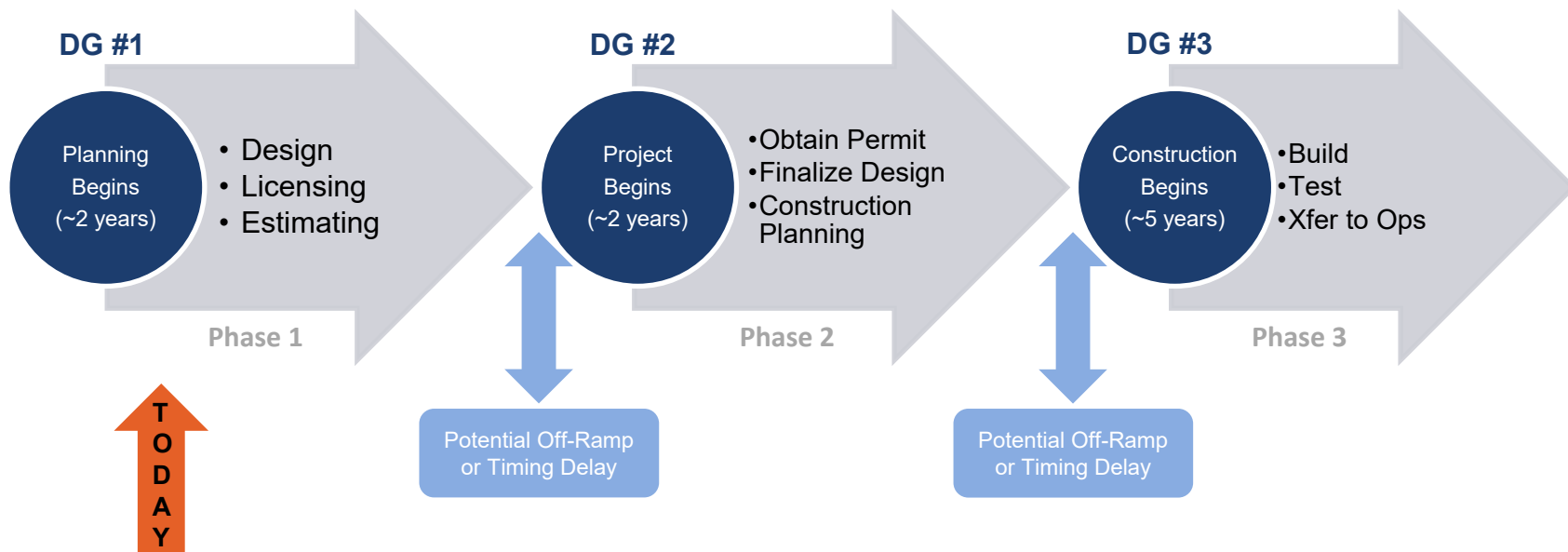
Key Points –

- TVA will lead the way for advanced nuclear technology, applying a systematic approach to exploring technologies and potential locations for advanced nuclear reactors to support TVA's decarbonization goal as outlined in its Strategic Intent and Guiding Principles.
- TVA will partner with other utilities, government agencies and research institutes to mitigate costs and risks associated with advancing this new technology.
- The New Nuclear Program would also oversee a project to prepare an NRC construction license application for a light-water, small modular reactor at the Clinch River site, subject to required environmental reviews and Board approval.
- Key national, regional and industry leaders are supportive of TVA's plans for advanced nuclear technology.

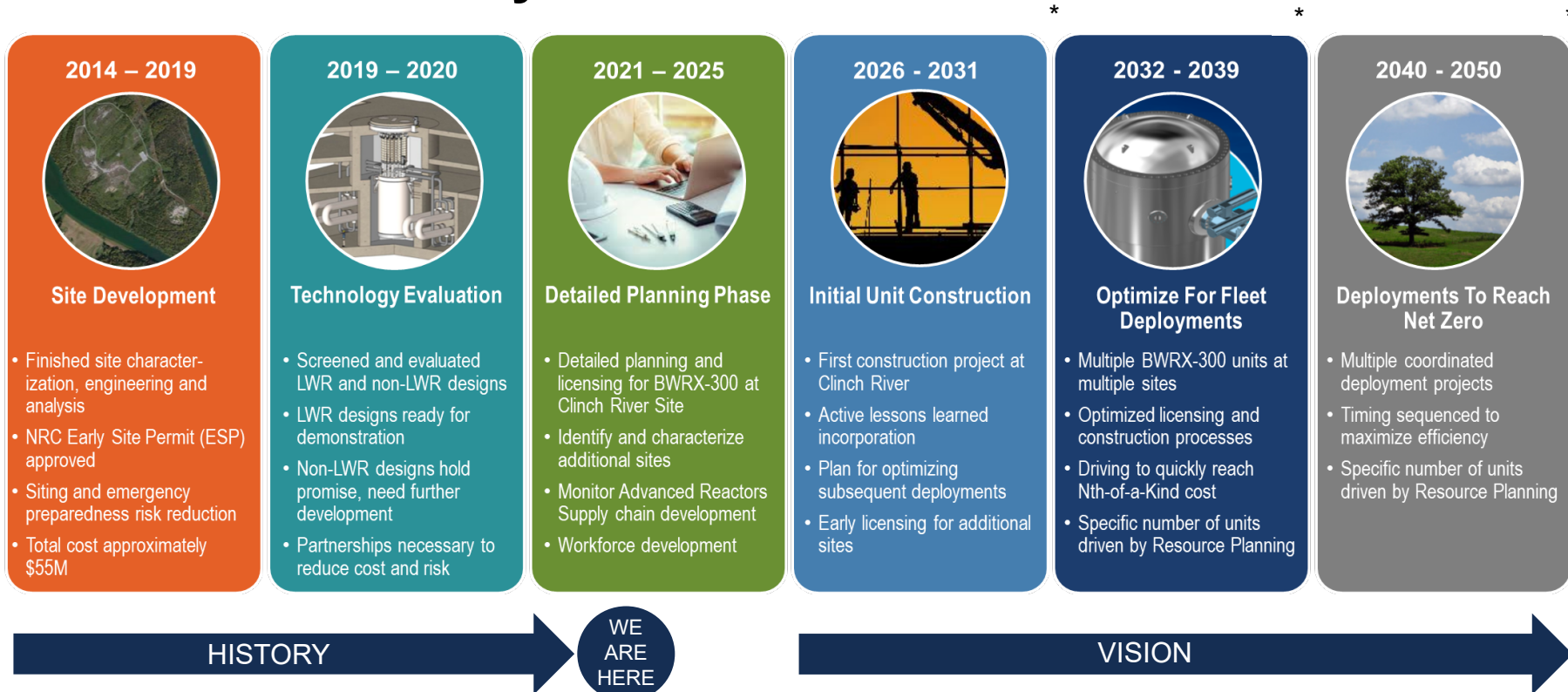
BOWLING GREEN, Ky. — The Tennessee Valley Authority Board of Directors ratified approval of a programmatic approach to exploring advanced nuclear technology as a component of its decarbonization goals as discussed at its meeting on the campus of Western Kentucky University on Feb. 10, the board's first in-person meeting since the COVID-19 pandemic began.

As part of the development of innovative, cost-effective technologies that will achieve TVA's aspiration of a net-zero carbon energy future, as outlined in its [Strategic Intent and Guiding](#)

- Board Authorization required to proceed beyond Decision Gate (DG) for each phase.
Enterprise evaluation criteria to support recommendation to the CEO and Board.**



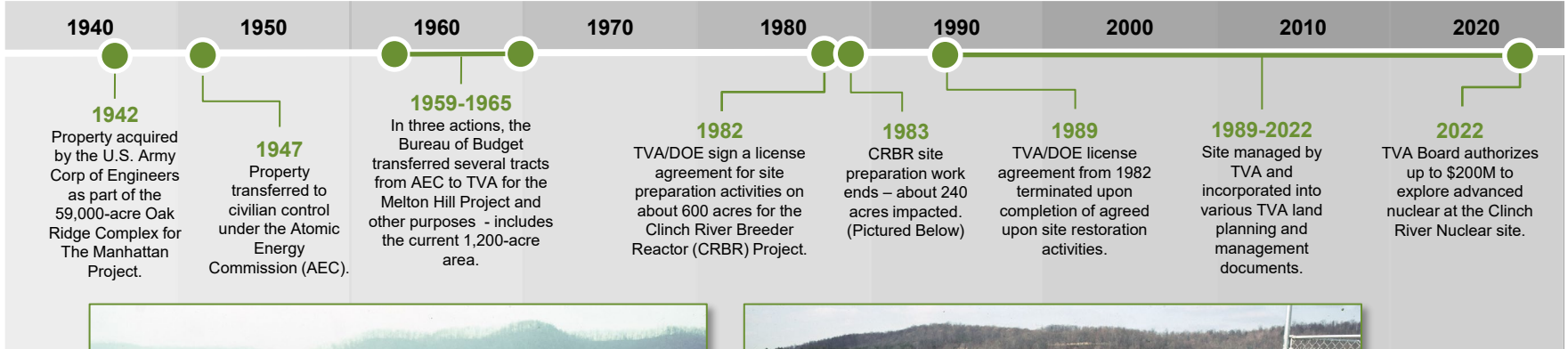
TVA's SMR Journey



Site Development

Clinch River Nuclear Site History

MANHATTAN PROJECT TO TVA'S FIRST SMALL MODULAR REACTOR*



CLINCH RIVER BREEDER REACTOR PROJECT, 1983



* Subject to support, risk sharing, required internal and external approvals, and completion of all necessary environmental and permitting reviews

NRC Early Site Permit



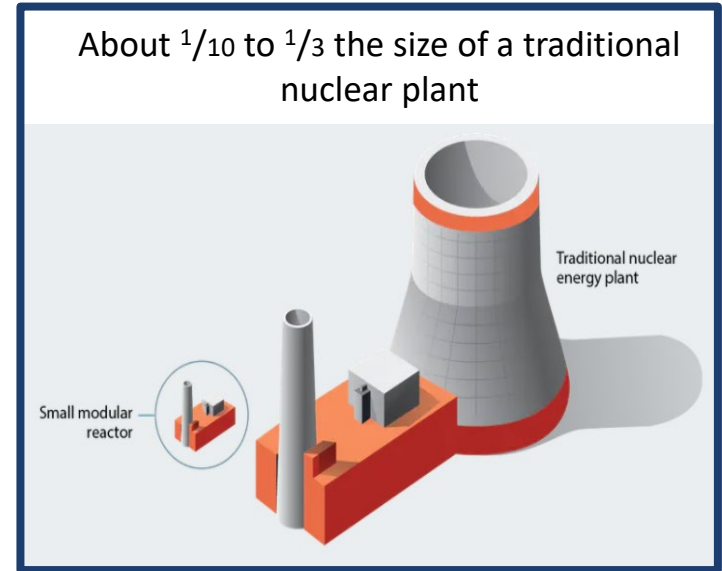
Nation's First
Small Modular Reactor
Early Site Permit
Clinch River Site



Technology Evaluation

Advanced Nuclear Technology

- Power Output ~300 MWe or less, in contrast to the >1,000 MWe reactors operating today
- Two general categories of Advanced Reactors of interest for commercial power use:
 - Light water-cooled reactors, or small modular reactors (SMRs), are most like current operating reactors but simplified.
 - Nonlight water-cooled reactors, sometimes called Generation 4 reactors, use alternative reactor coolants such as gas (helium), metal (sodium), or molten salt.



Source: Idaho National Laboratory Website

Advanced Nuclear Technology Evaluation

	Light Water SMRs	Non-Light Water Reactors (sodium, gas, salt coolants)
Nuclear Fuel	Same as operating nuclear fleet	Need enrichment, supply chain, testing, and licensing
Supply Chain	Ready; quickly scalable	Need suppliers and component testing
Operational Characteristics	High availability; compatible with renewables	Unproven availability; compatible with renewables; industrial process heat capable
Timeframes	Ready now; first deployments by 2030	Initial testing by 2030; first deployments by 2040

Technologies and their potential for commercial scale deployment

- were assessed:**
- ✓ The right product (size, electricity production, economics)
 - ✓ The right amount of risk (technology, availability, project size)
 - ✓ The right team (team strength and vision alignment)
 - ✓ The right risk allocation (team roles, contracts, partnerships)

Ongoing Planning for New Nuclear

Ongoing Planning for New Nuclear

PLANNING FOR A POTENTIAL NEARER-TERM DEPLOYMENT AT CLINCH RIVER AND
PLANNING FOR THE POTENTIAL ROLE OF NEW NUCLEAR IN DECARBONIZATION

- **Clinch River Project activities**

- Perform design, scoping, estimating, and planning associated with the potential first deployment at the CRN site
- Negotiating a contract with OPG, Synthos and GEH to jointly fund and develop the standard design of the GEH BWRX-300

- **New Nuclear Program activities**

- Develop an NRC Construction Permit Application and Environmental Report for a first SMR at the CRN Site
- Planning for potential future SMR projects
- Preliminary planning for a potential fleet of SMRs, activities such as workforce development, supply chain development, fleet integration
- Continued evaluation of advanced reactor designs

Planning/Construction Phase Workforce

- Planning Phase Workforce
 - Project Management Professionals
 - Engineers
 - Licensing Specialists
- Construction Phase Workforce (adds ~2000 craft) (notional examples only)
 - Carpenters
 - Boilermakers
 - Electricians
 - Pipefitters

TIMEFRAMES

~ 2 years to develop an NRC Construction Permit Application (CPA) and to identify / evaluate risks of deciding to proceed to a Project

~ 2 years for NRC review of the CPA and to develop plans for construction readiness

~ 5 years of construction and testing, prior to commercial operation

A first-of-a-kind reactor project, incorporating new technologies and techniques, will require an integrated team approach across all disciplines and organizations.

How is TVA Helping?

- TVA has developed a 10-year labor strategy
- Partnered with the North America's Building Trades Unions to complete a labor supply survey
- Created a 10-year labor forecast for 32 NABTU T&L categories
- Half of the categories have forecasted labor shortfalls
- TVA is partnering with the Unions to identify a diverse talent pipeline through apprenticeship volume and curriculum
- TVA is working with local universities to identify areas of need that require specialty training such as RP Techs, Chem Techs

Goal is to have a diverse, talented workforce that can support the needs of the Valley for the foreseeable future!

Approach for First Deployment

OUR GOAL IS TO HAVE A RELIABLE, AFFORDABLE, FLEXIBLE AND CLEAN ADVANCED REACTOR OPTION AVAILABLE BY 2032, WITHOUT ADVERSELY AFFECTING OUR CUSTOMERS.

- Use a disciplined approach for decision making
- Apply Project Management best practices and innovations ready for commercial use
- Incorporate lessons learned from TVA experience and other major projects
- Partner with utilities and government agencies to mitigate costs and risks associated with a first-of-a-kind deployment
- Work with universities and research institutions to leverage select technology innovations



Risk Mitigation - Critical Lessons Learned

- Vogtle AP1000 construction
 - Extreme ownership needed
 - Design readiness for construction is essential to project execution
 - Need regulatory certainty and ability to adjust design during construction
- Watts Bar Unit 2 construction
 - Project management and oversight are critical



Graphic Source: Georgia Power Vogtle Website

Technology Beyond the Plant

- Technology In Flight
 - Smart Procedures
 - 4D Modeling
 - Interconnected Electronic Design Basis Documents
 - Wifi/BlueTooth Connectivity Throughout Plant
 - Integrated Camera Capabilities



Graphic Source: Georgia Power Vogtle Website

TVA Partnerships

- TVA has entered into a consulting and licensing support agreement with **Kairos Power** as part of Kairos Power's HERMES test reactor project, near Oak Ridge, TN
- TVA has entered into a consulting and licensing support agreement with **Synthos Green Energy**, an energy company in Poland, to advise it regarding potential, future SMR projects in Poland
- TVA has partnered with **Oak Ridge National Lab**
- TVA has partnered with **University of TN Knoxville**
- TVA and **OPG** have executed a collaboration agreement that facilitates exchanges of information about the respective projects at Clinch River and Darlington, Ontario
- TVA has entered into a two-party agreement with **GE Hitachi** to support the development of a Construction Permit Application for Clinch River-1
- TVA, OPG and Synthos are negotiating a contract to jointly fund and develop the standard design of the GEH BWRX-300



TVA Moving Forward With Clarity On What's Needed For New Nuclear

- ✓ TVA's Pathway to Net Zero requires technology innovation
- ✓ TVA's Clinch River Site is NRC approved for SMRs
- ✓ TVA's New Nuclear Program will inform future SMR decisions
- ✓ TVA's Decision Gates will ensure the timing is right
- ✓ TVA has the construction experience and talent when it's time

TVA Nuclear Overview: New Nuclear Program & Clinch River Nuclear Project

Questions?

*Scott Hunnewell, Vice President,
TVA New Nuclear Program*



Summary

Next RERC Meeting

November 2 - 3 Nashville

Joint Meeting with Regional Resource Stewardship Council (RRSC)

Thank You



TENNESSEE
VALLEY
AUTHORITY