

Clean Energy Leadership

TVA Progress
and Impact



TVA is what an American-made energy future looks like.

More than 91 years ago, the Tennessee Valley Authority was created on a clear mission to benefit the public good. While the challenges are different today, they are no less critical to the lives of the communities and people we serve.

TVA is focused on delivering the energy needed to grow the seven-state region. And we are working every day to ensure the energy we provide is affordable, reliable, resilient, and clean.

Already a national leader in carbon reductions, TVA has reduced mass carbon emissions 58% since the baseline year of 2005. In the first nine months of FY 2024, 57% of TVA's power supply was carbon-free — coming from nuclear, hydroelectric, solar and wind. However, we know there is more to do.

The evolution and acceleration of clean energy programs has been identified by the TVA Leadership Team and Board of Directors as a critical strategic initiative. We recognize TVA's unique position to lead the region and nation in delivering a clean energy future.

TVA is pursuing a clean energy strategy that maintains affordability, adds capacity to the grid, and supports energy security. That includes:

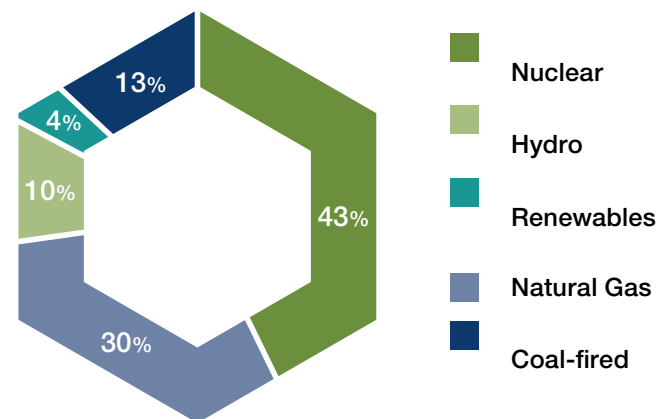
- Maintaining an affordable, reliable, diverse, and clean energy portfolio
- Driving towards up to 10,000 megawatts of solar supplying the system by 2035. Today, TVA has around 4,000 megawatts in commercial operation or under development
- Offsetting 30% of future load growth and lowering energy bills through the launch of industry-leading \$1.5 billion energy efficiency and demand response programs

TVA Was Created to Help the Tennessee Valley Prosper

In recent years, the seven-state region has grown faster than the national average, resulting in an increase in forecasted demand for electricity.

To meet that growing demand, TVA has one of the nation's largest, most diverse, and cleanest generation portfolios. A diverse energy portfolio is the foundation for energy security. As we look to power growth and build on our clean energy progress, this strong foundation becomes even more important.

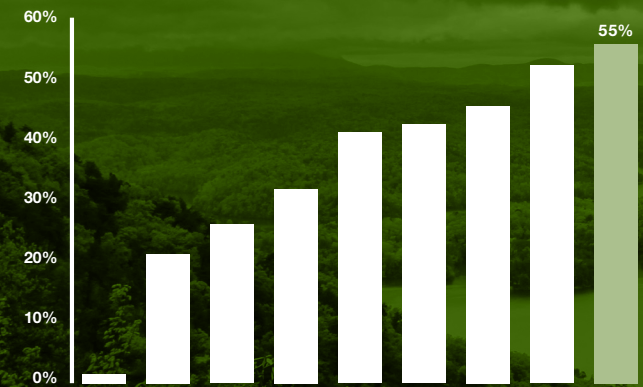
TVA's Power Supply



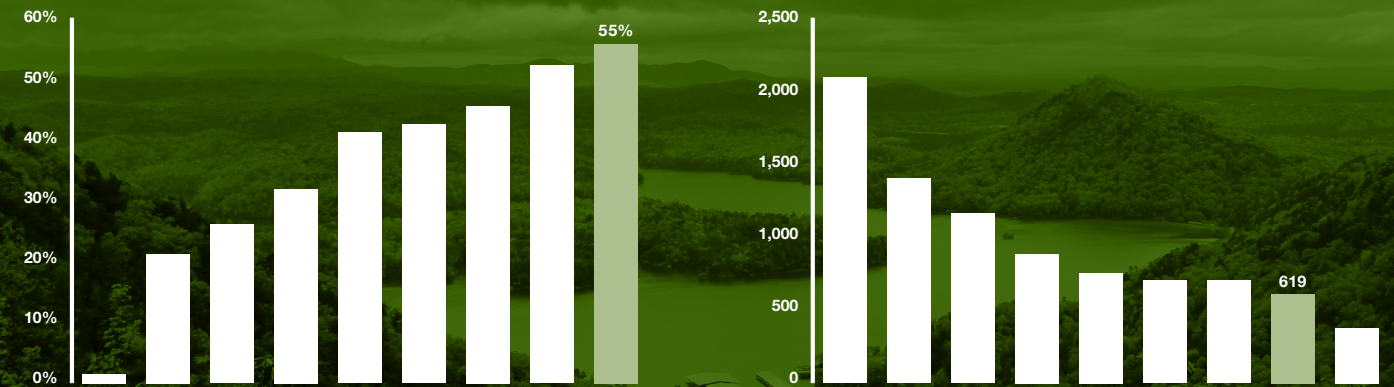
Regional Peer Comparisons

Net Generation Including Purchased Power

Clean Energy Generation (% of Total Generation)
Regional Peer Holding Companies
3-Year Average, 2020-2022



CO2 Emissions Rate (Lbs/MWh)
Regional Peer Holding Companies
3-Year Average, 2020-2022



Source: EEI Electric Company Carbon Emissions and Electricity Mix Reporting Database for Corporate Customers

Industry Leader in Decarbonization

How we measure:

Rate (lbs/MWh)

Pounds of carbon dioxide emitted per megawatt-hour of electricity delivered from TVA generation and purchased power

53% reduction from 2005 in system emission intensity (CY2023)

33% lower than regional average
24% lower than national average

Mass (tons)

Total amount of carbon emitted from TVA generation and purchased power in a calendar year

58% reduction from 2005 in mass carbon emissions (CY2023)

Clean Energy (%)

Percentage of TVA generation and purchased power from carbon-free sources: hydro, wind, solar and nuclear in a calendar year

57% carbon-free generation (first nine months of FY 2024)

Driving Down Carbon Emissions

As of April 2024, TVA has retired or announced retirement of 86% of our coal fleet, a total of 12,297 megawatts. To continue to provide reliable and resilient power, TVA has replaced some coal units with lower emission natural gas. Natural gas has several advantages including providing dispatchable, fast-start generation to help us meet growing peak demands for energy.

At this time, natural gas helps balance an affordable, reliable, resilient, and cleaner system. It is a low-cost, highly efficient, and proven technology that enables TVA to reduce carbon emissions and maintain affordability. As the system evolves, natural gas becomes an important backstop — the capacity, the reliability insurance, and the resiliency contribution. Natural gas is not in competition with renewables — it accelerates the expansion of renewables on the system.



Growth In Renewables

Renewables, including solar, are a growing part of TVA's diverse energy portfolio. TVA is driving towards an aspiration of up to 10,000 megawatts of solar supplying the system by 2035, with around 4,000 megawatts of solar operating or committed for development. TVA's solar portfolio is valued at \$5 billion and represents our commitment to purchasing renewable energy over the next 20 years. TVA is bringing renewables onto the system directly and through programs that enable local power company ownership and partnership with solar developers.

In Kentucky, TVA is pursuing a first-of-its-kind, 100-megawatt solar generation pilot project on a closed coal ash site at the Shawnee Fossil Plant. Using a patented closure cap system called ClosureTurf®, this technology provides the capability for an innovative approach to building solar generation on closed landfills and impoundments. Solar panels can be directly attached to the engineered turf foundation using a system called PowerCap™ that maintains the integrity of the closed site.

Nuclear Leadership

TVA has the nation's third-largest nuclear fleet. Nuclear energy is carbon-free and can run all day, every day. Currently, TVA is planning to extend and optimize approximately 8,200 megawatts of reliable nuclear generation across three sites and seven operating units for 80+ total years of life. Over a 20-year timeframe, TVA is planning investments in the nuclear fleet to ensure safe, reliable operation of this important generation source. This project will replace or upgrade major components and systems with state-of-the-art materials and technologies. Once complete, the efficiencies gained will increase output capability of those units.

The Original Clean Energy

Hydroelectric power is one of the cleanest, most reliable, most efficient, and most economical renewable energy sources. Today, TVA has 29 power-generating dams. TVA has a pumped-storage plant, Raccoon Mountain, that has a summer net capacity of 1,700 megawatts. In addition, TVA also purchases power from eight dams on the Cumberland River operated by the Army Corp's of Engineers.

Since 2021, TVA has undertaken a large-scale hydro modernization effort to extend the life of this carbon-free power source. The hydro life extension program includes allowing TVA to get more power from the same amount of water. The electricity TVA produces with our hydro fleet helps avoid higher fuel costs and supports TVA's mission to keep energy costs low.

Running a State-of-the-Art, Efficient System

TVA has invested \$300 million in a state-of-the-art System Operations Center (SOC) in Meigs County, Tennessee. The new SOC will provide more real-time information on renewables, improved security features and resiliency to meet current and anticipated regulatory requirements, better protect the grid and ensure the ability to rebound more quickly or avoid disruption from adverse incidents such as weather events or cybersecurity threats. By running a more efficient system, the new SOC is expected to result in significant fuel savings annually.

Solar and Storage Expansion

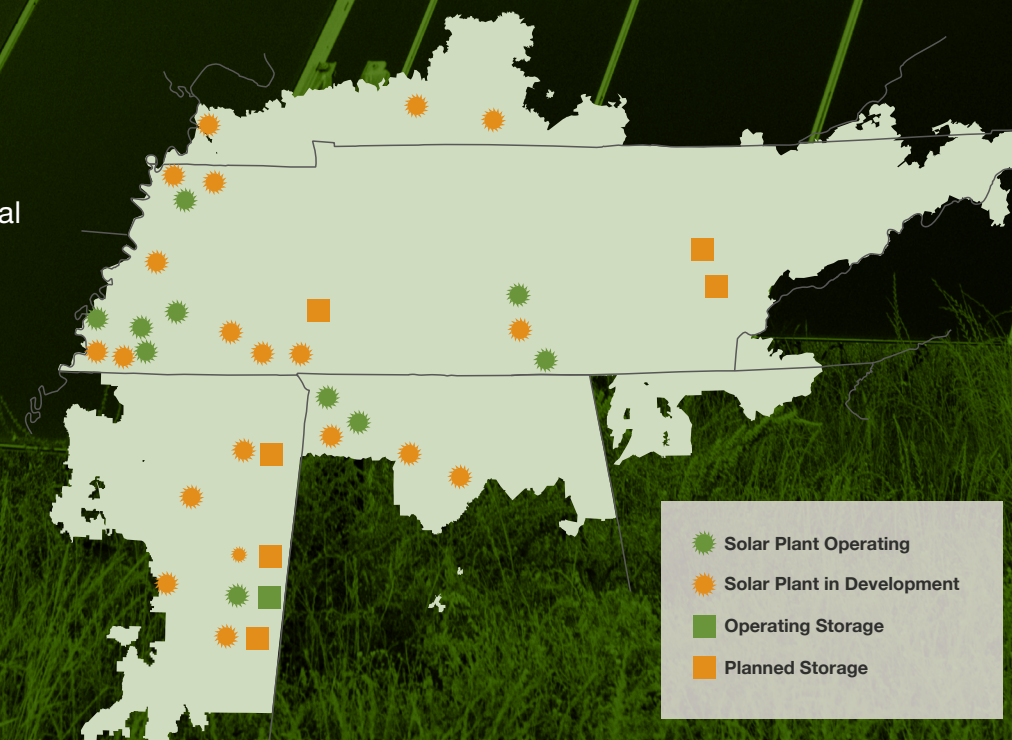
Aspiring to add up to 10,000 Megawatts of Solar by 2035 to meet customer demands and TVA system needs

Solar

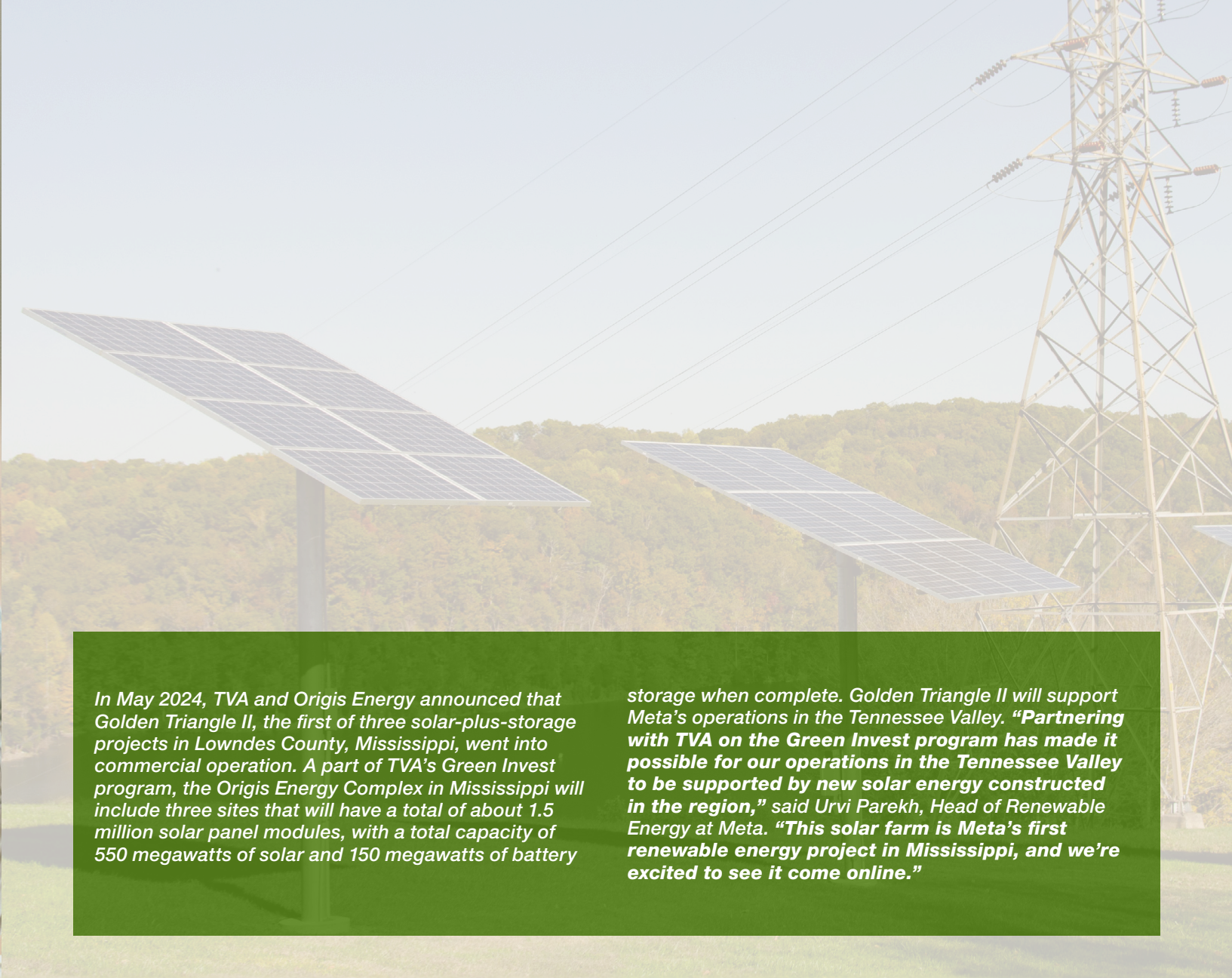
- ~1,200 MW operating
- ~2,800 MW in developmental construction

Storage

- 50 MW operating
- 255 MW planned



	Solar Plant Operating
	Solar Plant in Development
	Operating Storage
	Planned Storage



Adding Renewables Through Partnership

Increasingly, TVA is working with partners – industry, businesses, and residents – to bring more solar on to the system. Today, there are significant incentives and tax credits available for different entities to build and operate solar generation. Looking ahead, we believe these Power Purchase Agreements (PPAs) will be the quickest and most cost-effective way to bring solar to the Valley.

TVA has a portfolio of renewable programs that enable businesses and local power companies (LPCs) to meet their sustainability goals while promoting economic development and clean energy sources in the Valley.

Today, about half of our solar capacity comes from our award-winning Green Invest program. The nation's first renewable energy program that creates public-private partnerships, TVA connects large customers looking for clean energy with

developers building large-scale solar projects. As of July 2024, more than 2,000 megawatts of renewable PPAs have been matched to customers through the Green Invest Program.

Recognizing LPCs were looking to generate their own renewable energy, TVA started its Generation Flexibility program in 2020. Under the program, LPCs who have a Long-Term Partnership Agreement with TVA can generate a portion of their total energy needs themselves. To date, most Flexibility projects under development have been solar, though the program also allows for wind, natural gas, batteries, and other carbon-free generation sources. In 2023, TVA expanded this program to allow LPCs to generate up to 5% of their energy needs from distributed energy solutions built outside their service territory. At a maximum, the program could result in 2,000 megawatts of capacity.

In May 2024, TVA and Origis Energy announced that Golden Triangle II, the first of three solar-plus-storage projects in Lowndes County, Mississippi, went into commercial operation. A part of TVA's Green Invest program, the Origis Energy Complex in Mississippi will include three sites that will have a total of about 1.5 million solar panel modules, with a total capacity of 550 megawatts of solar and 150 megawatts of battery

storage when complete. Golden Triangle II will support Meta's operations in the Tennessee Valley. "Partnering with TVA on the Green Invest program has made it possible for our operations in the Tennessee Valley to be supported by new solar energy constructed in the region," said Urvi Parekh, Head of Renewable Energy at Meta. "This solar farm is Meta's first renewable energy project in Mississippi, and we're excited to see it come online."

In May 2024, Middle Tennessee Electric (MTE), the largest electric cooperative in the TVA region, announced a new 110-megawatt (MWAC) solar project under TVA's newly expanded Generation Flexibility Program in collaboration with Silicon Ranch, the nation's largest independent power producer, and a community-focused renewable energy company.

for decades to come, generating millions of dollars in new tax revenue to support local infrastructure, schools, and community priorities.

The Copeland Solar Farm, to be in Cumberland County, will be the largest solar facility to serve an LPC directly in the Tennessee Valley. Once construction is completed in late 2027, MTE will receive the power and environmental attributes generated by the facility—realizing savings on day one of operation—to benefit the more than 750,000 Tennesseans the cooperative serves across 11 counties. The Copeland Farm project is expected to contribute to the economic viability of Cumberland County and the surrounding community

"Because we are owned by the members we serve, MTE is constantly seeking new ways to deliver value and to meet their evolving needs and expectations," said Chris Jones, President and CEO of MTE. "As part of this effort, our team worked closely with TVA to update the Generation Flexibility Program, and we thank TVA for its collaborative spirit to make this project and this partnership with Silicon Ranch a reality. MTE is pleased and grateful to partner with Silicon Ranch, a trusted local provider that is the recognized leader in providing solar power to electric cooperatives not just for the Tennessee Valley, but across this country."

Powering Clean Jobs

America's clean energy future is being built in the Tennessee Valley region.

TVA was created to help the Tennessee Valley region prosper. When companies are looking for a skilled workforce, a great place to live, and reliable, affordable, clean energy, it's no coincidence that they choose to set up shop in the Valley.

Today, the seven-state region is growing faster than the national average. Over the past five years, TVA has helped bring capital investments to the region that total a projected \$46 billion. That means thousands of good-paying jobs in communities from Lawrence County, Alabama, to Marshall County, Mississippi, Bowling Green, Kentucky and West Tennessee.

Our reliable, diverse, affordable, and clean energy portfolio is a selling point when companies are deciding where to open a plant or office. Many of these businesses want to be powered by clean energy. Many are manufacturers of electric vehicles, solar panels, or other aspects of the clean energy transition. This growth is providing a competitive and national security advantage for our region.

"By helping companies meet their renewable goals, it becomes very attractive to locate or expand in Mississippi. We are pleased to partner with the TVA to use sustainability as an economic development tool, and what's good for the environment is also good for business."

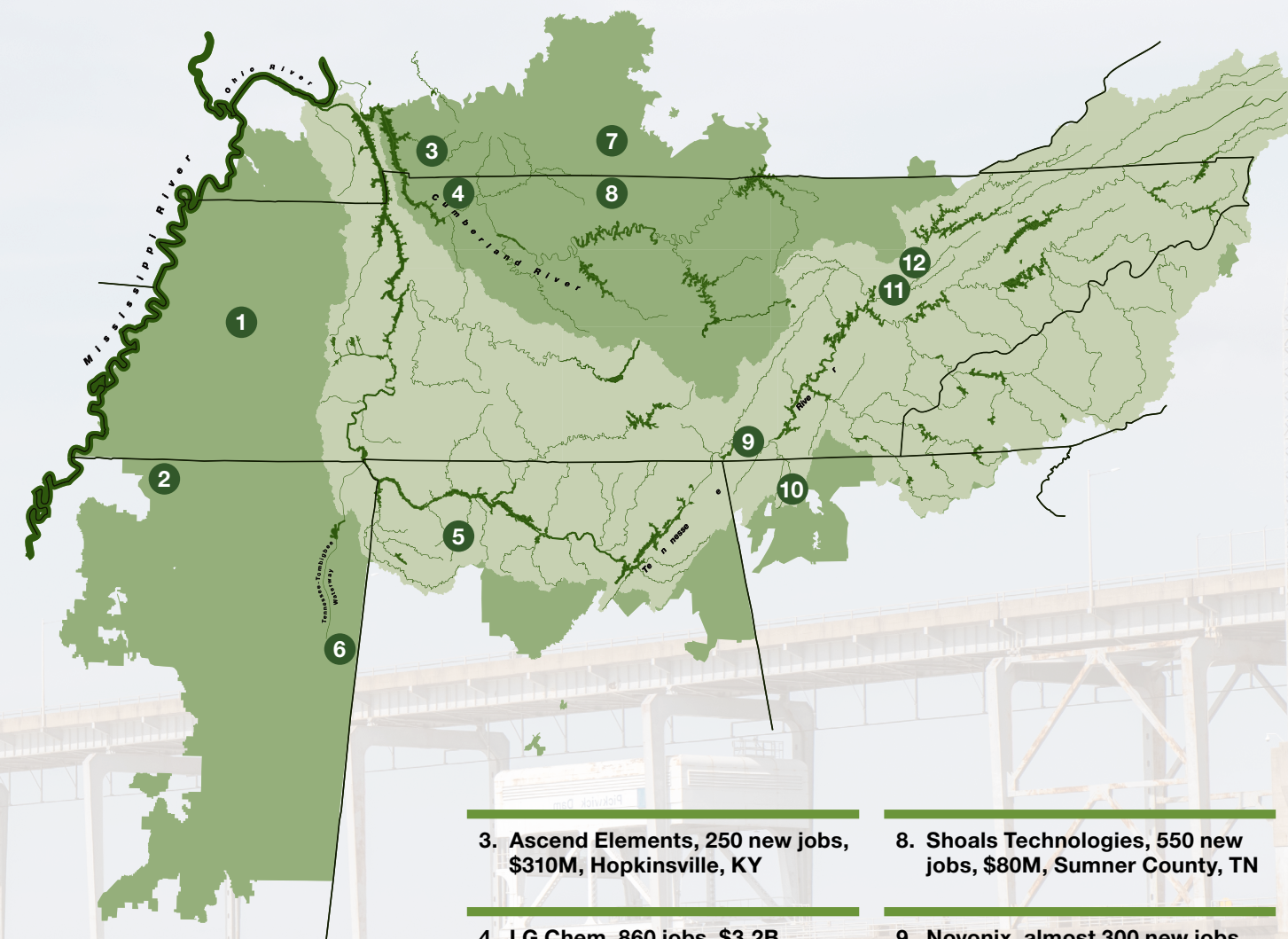
- Johan Vanhee, Chief Commercial and Procurement Officer at Origis Energy

"These jobs and this payroll commitment will have a generational impact on the people of Marshall County, and it's going to have a generational impact on literally thousands of families."

- Mississippi Gov. Tate Reeves

"Ford Chief Jim Farley said one of the reasons the automaker based its manufacturing campus in Tennessee is because the Tennessee Valley Authority, an electricity company, is one of the largest clean-energy providers in the U.S. The state's lower energy costs also attracted Ford there, he has said."

- Wall Street Journal



3. Ascend Elements, 250 new jobs, \$310M, Hopkinsville, KY

8. Shoals Technologies, 550 new jobs, \$80M, Sumner County, TN

4. LG Chem, 860 jobs, \$3.2B, Clarksville, TN

9. Novonix, almost 300 new jobs, Chattanooga, TN

1. Ford Motor Company, nearly 6,000 direct jobs, \$5.6B, West Tennessee

5. First Solar, 700 jobs, \$1.1B, Lawrence County, AL

10. Hanwha Q Cells, 985 new jobs; \$383M, Dalton, GA

6. Steel Dynamics, 1,000 jobs, \$2.5B, Lowndes County, MS

11. Kairos Power, 55 jobs, \$100M, Oak Ridge, TN

7. Envision AESC, 2,000 new jobs, \$2B, Bowling Green, KY

12. Type One Energy, 330 new jobs, \$223.5M, Clinton, TN

The Cleanest Megawatt



The maker of MoonPies, Chattanooga Bakery, took advantage of Electric Power Board (EPB) of Chattanooga and TVA's energy efficiency programs to reduce their energy bill by 20%. In 2018, Chattanooga Bakery began a five-year energy efficiency partnership through TVA and EPB that included replacing incandescent lightbulbs with energy efficient LED bulbs and installing solar panels as

part of a power buy-back program. The lighting updates alone allowed the bakery to reduce power consumption for its lighting by 75%. "Using solar panels to help fuel the production of MoonPies is pretty out of this world," said Tory Johnston, vice president of sales and marketing at Chattanooga Bakery.

The cleanest megawatt is the one that isn't generated. With that in mind, TVA developed one of the industry's largest programs to improve the energy efficiency of homes, schools, and small businesses and incentivize lower usage for larger customers.

TVA plans to invest \$1.5 billion in energy efficiency and demand management programs through FY 2028, which is estimated to offset 30% of TVA's new load growth over the next decade. In the first 10 months of the program, TVA has helped businesses and residents reduce their energy use, resulting in over 320,910 tons of CO2 avoided, which is equivalent to the carbon emissions of 35,072 homes powered for a year.

Energy Efficiency

Through TVA's EnergyRight, TVA partners with local power companies to offer homeowners, small businesses, large industrial customers, and schools to provide rebates for energy efficiency updates. For businesses, this includes rebates on electric forklifts, new heating and air-conditioning installations, heat pumps, and LED lighting.

Since 2018, EnergyRight has helped income-eligible homeowners make updates through the Home Uplift program. Home Uplift provides homeowners with an average of \$10,000 in free home energy upgrades, including HVAC units, attic and wall insulation, duct sealing, electric water heaters and more. The upgrades save homeowners an average of \$500 per year and reduce home energy use by 25%. As of August

2024, TVA has provided 6,000 homes across the Valley with free energy efficiency updates through the program. TVA runs similar programs that help schools and small businesses in economically challenged areas.

Through the Uplift program, TVA and partners have helped:

6,328
homes



223
schools



188
small businesses



*as of August 2024

Demand Response

There are a few days each year when temperatures are very hot or very cold, causing a high demand on the system. Rather than build and maintain generation to those levels, demand response is a mechanism that allows TVA to partner with LPCs and large customers to offer financial incentives in exchange for reducing electricity use when called upon. This helps maintain reliability in our region during extreme weather or other events that put pressure on the system. Additionally, demand response reduces the amount of power TVA may need to purchase, keeping money in the Valley and rates low. More than 4,500 tons of carbon have been avoided through TVA's demand response programs in FY 2024 alone. As of August 2024, TVA's demand response portfolio has a summer capacity of nearly 1,500 megawatts and continues to grow.

Developing Emerging Technologies



For 91 years, innovation has been part of TVA's DNA. Research and development are a key part of building the foundation for a cleaner energy system. TVA has seven Innovation & Research Strategic Initiatives as we seek to reduce carbon emissions across the system and the service territory.

TVA has partnered with the University of Tennessee (UT) to support promising cleantech startups that align with TVA's innovation and research initiatives. UT's Spark Cleantech Accelerator provides mentorship, technical assistance, and access to resources to help East Tennessee companies advance their technologies. TVA will create opportunities for pilot projects and commercialization of innovative cleantech solutions, as well as support cleantech leaders.

Decarbonization

A challenge faced across the industry is a technology gap. The technologies needed to achieve net-zero carbon emissions, like carbon capture, advanced nuclear and alternative fuels, have not been developed to commercial economic scale. This initiative is focused on evaluating the development of new low-and no-carbon technologies and how they might reduce carbon emissions at existing and new assets.

For example, alternative fuels, such as hydrogen, renewable diesel, and others, either have no carbon or utilize existing carbon in a way that no new carbon is released into the atmosphere. This is one technology being monitored until a viable demonstration can be recommended.

Advanced Nuclear Solutions

Launched in February 2022, TVA's New Nuclear Program is a significant component of TVA's clean energy efforts. Advanced nuclear technology has the versatility to serve as baseload power or a complement to renewables. The TVA Board of Directors has approved a total of \$350 million for the development of small modular reactors (SMRs) at the Clinch River Site, in Oak Ridge, Tennessee.

A cornerstone of the program, TVA has the nation's first early site permit for an SMR from the U.S. Nuclear Regulatory



For illustrative purposes only

Commission for the Clinch River Nuclear Site. Some SMR designs, including the GEH BWRX-300 TVA is considering for Clinch River, use elements of proven technology and new innovations that simplify construction, maintenance, and operations to achieve a cost efficient and reliable design.

TVA has joined with GE Hitachi Nuclear Energy (GEH), Ontario Power Generation (OPG) and Orlen Synthos Green Energy (OSGE) to advance the development of the GEH BWRX-300 SMR standard design, which could have global implications. Each contributor has agreed to fund a portion of GEH's overall costs and collectively utilize a Design Center Working Group for the purpose of ensuring the standard design is deployable in multiple jurisdictions. The long-term goal is for the BWRX-300 design to be licensed and deployed in Canada, the U.S., Poland and beyond.

Storage Integration

Batteries store energy from TVA's transmission system during low energy demand, then re-deploy it during peak demand. Battery storage provides system reliability and resiliency, improved transmission capabilities, and can provide backup to renewables on the system.

TVA's first owned and operated battery storage facility is under development just outside of Vonore, Tennessee, about 35 miles southwest of Knoxville. The Vonore facility uses lithium-ion batteries to store 40 megawatt-hours of energy on about 3 1/2 acres of TVA-owned land near an industrial area of Monroe County. TVA is pursuing additional sites to build a battery that will support grid reliability, defer the costs of building new transmission lines, and receive IRA tax credits.

Carbon Capture

TVA is currently evaluating the feasibility of carbon capture. This is an emerging technology that would capture carbon dioxide formed during power generation and store it, rather than releasing it into the atmosphere. TVA has projects at natural gas plants in Ackerman, Mississippi, and Drakesboro, Kentucky. In 2023, TVA entered a memorandum of understanding with TC Energy Development Holdings Inc. to study the development, construction, and operation of carbon capture, utilization, transportation, and sequestration infrastructure. In the future, proven carbon capture technology could be applied to any of TVA's natural gas combined cycle units.



“We are building the future right here in West Tennessee. This facility is the blueprint for Ford’s future manufacturing facilities and will enable Ford to help lead America’s shift to electric vehicles.” - Eric Grubb, Ford’s director of new footprint construction



Driving Electric Vehicle Growth

EVs not only reduce carbon emissions, but they can save drivers \$1,000 a year on refueling and maintenance costs. TVA is building the infrastructure to make it easier for consumers to consider purchasing EVs, with a goal of 200,000 EVs in the Valley by 2028.

To reduce range anxiety, TVA is partnering to develop a Fast Charge network to connect the Valley. Working with local power companies and state and local governments, TVA has supported the deployment of 78 Fast Chargers at 35 sites, with a goal of 80 sites by 2026. So far, 299 tons of carbon have been avoided from EVs using TVA’s Fast Charge Network.

In the Valley, the people manufacturing EVs increasingly are our friends and neighbors. Since 2013, TVA has helped bring \$22 billion in EV and EV battery manufacturing to the region, creating 21,800 jobs.

This includes Ford Motor Company’s investment of \$5.6 billion to build electric pickup trucks in West Tennessee. This is expected to create almost 6,000 direct jobs – the largest economic development announcement in Tennessee history.

Enabling Electric School Bus Adoption

TVA supports school districts, bus dealers, and LPCs in applying for clean school bus rebates through the Environmental Protection Agency (EPA). Today, there are 104 electric school buses operating across the Tennessee Valley. Rebates for an additional 49 electric buses were announced in May 2024. In total, districts across the Valley have won \$80 million for electric school buses.

This milestone shows that the support provided to school districts from LPCs and TVA is working well. To date across the country, over 10% of applicants from year one have given money back to the EPA, citing challenges with utilities and charging. That hasn’t been the case in our region. The applications and adoption process has been supported by the Electric School Bus cohort, which provides technical support including charging infrastructure and help navigating tax credits for buses.

Regional Grid Transformation

Regional Grid Transformation (RGT) is part of the larger Valley Vision initiative - a collaboration between LPCs and TVA to transform the Valley’s existing power grid into a more resilient, flexible, and integrated system to meet customer expectations and changing Tennessee Valley conditions.

A future RGT scenario could look like TVA and LPCs sharing energy storage assets on the transmission and distribution systems to accommodate the short-, medium- and long-duration demand needs by shifting, storing, and strategically discharging energy generated by low- or no-carbon generation resources. This can be achieved through the deployment of advanced grid modernization capabilities along with new communication channels and policies between TVA and the LPCs to allow the shared use of grid assets.

Future Grid Performance

As TVA’s resource mix changes, the planning and operation of the electric grid will need to evolve with it. TVA’s Future Grid Performance (FGP) initiative will determine the processes, tools and grid-supporting technologies needed to operate a grid with inherently different characteristics than the grid has operated for almost a century. At scale, TVA will be able to manage a grid with up to 50% inverter-based and variable energy resources by 2038 with the same level of reliability, stability, and resiliency that TVA has had for the past 90 years.

Connected Communities

TVA’s success in decarbonizing its system may require the communities we serve to make technological and workforce advancements. The Connected Communities initiative is designed to prepare communities to be part of a future energy system that includes distributed energy resources, energy storage, and smart grid management. These projects fund broadband expansion, workforce development programs, and economic development efforts. Since 2022, TVA has provided or committed a total \$7.9 million for 21 pilot projects aimed at increasing connectedness, lowering energy costs, delivering environmental benefits and increasing community resiliency. Many projects have the added benefit of promoting access to healthy and natural environments.

The Energy To Lead

**TVA is uniquely positioned to lead
the way to a clean energy future**



By any measure, TVA is a national clean energy leader – both in carbon reduction and in pursuing clean energy technologies. I am extremely proud of the work the organization has done so far to achieve one of the nation's largest reductions in mass carbon emissions.

TVA's objective is energy security and low or zero carbon, and we are using every tool at our disposal to get us there. Not only do we have to keep energy security and decarbonization in balance, they really complement each other. A diverse energy portfolio helps us go farther, faster in our decarbonization journey and – most importantly – ensures we continue to provide affordable, reliable, clean energy to the 10 million residents in the seven-state region we are privileged to serve.

We are building as many renewables as we can, but we are also aggressively pursuing innovative technologies like carbon capture, low-carbon fuels, large-scale long-duration energy storage and new nuclear.

Public-private partnerships will be important as we work to make this goal a reality. These partnerships provide TVA with a path to complete projects as soon as possible at the least cost. This includes accelerated innovation that requires partnership and support from federal and state governments, peer utilities and others.

Continuing to build out clean energy in our diverse portfolio is a focus for TVA and a focus for our Board. I am excited about the path ahead as TVA continues to accelerate in the development and deployment of clean energy and new, innovative technologies.

- Jeff Lyash, TVA President and CEO