



# TVA Strategic Intent and Guiding Principles

May 2021

This document provides TVA's Strategic Intent and Guiding Principles, focused on energy supply and decarbonization initiatives.

This statement of Strategic Intent is to be used in accordance with all internal and external processes in providing the principle direction from TVA leadership in developing business strategies that provide reliable, resilient, low-cost and clean energy to the Tennessee Valley region in keeping with the TVA mission.

# Part One

TVA Mission  
and Leadership





## Built for the People

**TVA is the largest public power provider in the United States and the third-largest electricity generator in the nation. We supply the energy that approximately 10 million people and over 750,000 businesses across the seven states of the Tennessee Valley region depend on each and every day.**

TVA was established by Congress in 1933 and charged with carrying out its mission of service to the people of the Tennessee Valley and to the nation. Our unique, long-standing mission drives and inspires us daily to pursue new ideas and innovative solutions that enrich and improve the quality of life for the communities and people we are privileged to serve.

TVA delivers on this unique mission through three key areas: Energy that is reliable, resilient and low-cost; Economic Development that brings jobs and capital investment to the region; and Environmental Stewardship of public lands, water and air. TVA was created and has continued to build on its clear mission to serve the public good.

As a corporation of the federal government, TVA has responsibilities not only for service to the Tennessee Valley but also to support our national defense. TVA helped to power the nation to win World War II, and our responsibilities today include supplying critical materials to support nuclear deterrence and supplying energy to federal installations in Oak Ridge, Tennessee, and to military bases across the seven-state region.

## A Passion to Serve

The strength of TVA is its people. Our experienced and talented employees have a passion for service, and they are committed to TVA's unique mission. Each and every day, the women and men of TVA and our contract partners are dedicated to improving the quality of life for the people of the Tennessee Valley. Around the clock, our people deliver energy and other critical services, and they lay the groundwork for continuing progress.

TVA's mission is as relevant today as it was nearly nine decades ago when TVA was founded. The challenges are different but no less critical to the lives of those we serve. It is a mission that stands the test of time.

## Rising to the Challenges of Our Day

TVA's long history of leadership in developing and delivering new ideas and innovative solutions has helped transform the Tennessee Valley region. Today, the 10,000 women and men of TVA, as well as almost 14,000 contractors, continue to build on that track record of excellence, pursuing new solutions for our nation's sustainable success. Now, our drive to find innovative solutions to meet future energy challenges is inspiring us to build the energy system of the future.

TVA was established to bring innovative solutions to the seven-state Tennessee Valley region, helping to lift it from the depths of the Great Depression. TVA was tasked with addressing a wide range of challenges, and its strategy focused on the innovative concept of managing the vast resources of the Tennessee Valley as an integrated system, across jurisdictional boundaries, to benefit the communities and people of the region as a whole.

Today, we are delivering vital services and support during the unprecedented COVID-19 pandemic that continues to impact families, communities, businesses and industries. And we maintain 99.999% system reliability for our customers, ensuring that our power system is resilient in the face of extreme weather conditions like the winter storm in February 2021 and the tornadoes and floods that affected large areas of our region in 2020.

As we look to the future, the alignment and interdependency of the three elements of TVA's mission will grow stronger. Our clean Energy future, the innovative Economic Development and jobs of tomorrow, and Environmental Stewardship must move forward in balanced lockstep.

Those three elements complement and amplify one another as TVA provides low-cost, reliable energy; brings good jobs and investments to the region; and serves as steward of the region's natural resources, including operating the 652-mile Tennessee River system.

## Rates and Reliability

### Powerful Economic Advantages

TVA, in partnership with local power companies, delivers unmatched value with low, stable rates and reliability of 99.999% since 2000. TVA's competitive service is sustained through disciplined financial management, reduced fuel and operating costs, and an increasingly clean energy supply, attracting and retaining new economic opportunities to the region.

We believe that maintaining balance between price, reliability, carbon reduction efforts and economy-wide electrification will deliver a sustainable economic advantage. Across the region, the availability of reliable, low-cost energy not only makes homes and businesses more comfortable and safe, it also powers economic development in the region.

### TVA Cost of Energy

Lower effective rates than a decade ago

Lower rates than 70% of top utilities

Lower industrial rates than 90% of top utilities

Plan to keep rates stable through the decade

(Based on latest available 2019 EIA data)

During the past five years, TVA has helped the region attract or retain 341,000 jobs and more than \$45.4 billion in capital investment. Even during COVID-19 in 2020, TVA helped to attract or retain 67,000 jobs and \$8.6 billion in capital investment.

For a growing number of these businesses and industries, having a supply of carbon-free energy has joined cost and reliability as a key factor in determining where they locate or expand their operations.

TVA's ability to provide low-cost, increasingly clean, highly reliable energy is essential for powering the ambitious strategies and climate goals of these businesses. This ability creates a competitive advantage for our region in attracting innovative industries, jobs and investments and continuing to power the Valley's economic success.

Energy costs and reliability matter to our customers. Our delivered cost of energy is lower today than it was a decade ago, and we intend to keep rates stable through this decade. TVA rates are lower than rates at 70% of the top 100 U.S. utilities, and our industrial rates are lower than rates at 90% of the top utilities, based on available data.



### Over Past Five Years

Attracted or retained

**341,000 Jobs**

and over

**\$45.4 Billion**

in capital investment

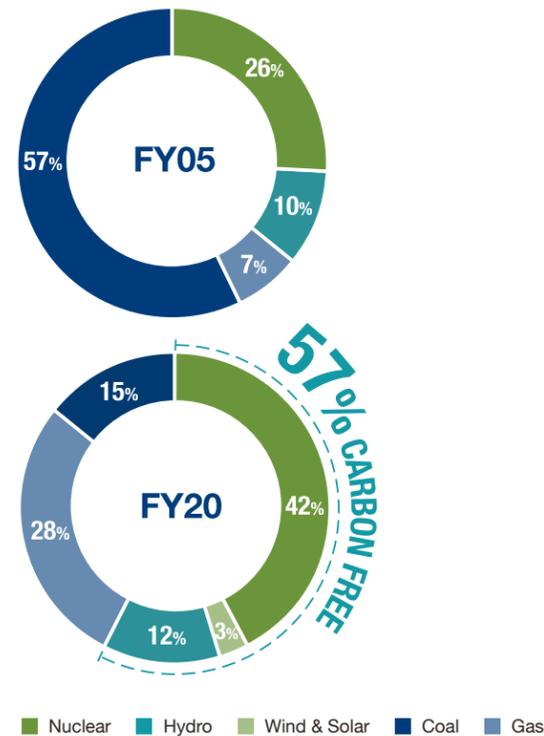


## Track Record of Industry Leadership

Our aspiration is to achieve net-zero carbon emissions and to support broader national efforts to decarbonize the economy through technology advancements. As the largest clean-energy producing utility in the Southeast, we are committed to maximizing our carbon-free generation and reaching our aspiration while maintaining our focus on delivering the reliable, low-cost energy our customers expect and deserve.

A core TVA strength is our diverse and increasingly clean generation portfolio—one of the largest in the industry, including hydroelectric power, renewable energy, natural gas, a lessening contribution from coal and the nation's third-largest nuclear fleet.

We are adding significant renewable energy to our system. TVA has solar commitments to date of over 2,300 megawatts of solar capacity expected to come online by the end of 2023. Including these projects, we expect to add 10,000 megawatts of solar by 2035, which is primarily based on customer demand and represents a 24-fold increase from today. Additionally, TVA is also supporting our many long-term local power company partners in the deployment of up to 2,000 megawatts of distributed solar to provide increasingly clean, local, renewable energy generation as a fully integrated part of the larger power system. These projects have the potential to add as much as 12,000 additional megawatts of solar in TVA's future.



\*Chart depicts both generated and purchased power within respective resource types. In addition to power supply sources included here, TVA offers energy efficiency programs that effectively reduced FY20 energy needs by about 2,300 GWh or 1.5%.

Today, our system is one of the nation's cleanest with almost 60% of our energy supply coming from carbon-free sources. Over the past two decades, we have diversified our generating assets, modernized the system, lowered fuel costs and significantly reduced emissions. We accomplished this by incorporating renewable energy assets, replacing aging plants with new high-efficiency natural gas capacity and expanding our nuclear power program.

Our efforts to build a resilient, diverse power generation mix have led to a 63% reduction in mass carbon emissions since 2005 in the total energy we supply to the region. This is one of the largest decreases in the industry. With the investment of \$6.8 billion in environmental controls at our coal plants, reduced sulfur dioxide emissions are 99% below 1977 levels. Nitrogen oxide emissions have been reduced 97% below 1995 levels.

In our fossil-fueled generation, TVA's coal-burning units are among the nation's oldest. They have served the power system well for decades. In FY05, coal supplied 57% of our total generation, compared with only 15% in FY20. TVA has retired or announced retirements for 8,600 megawatts of coal generation. We will continue to evaluate the impact of retiring the balance of the coal fleet by 2035; our evaluation includes environmental review, public input and Board approval.

We have also added capacity to our system through nuclear, solar, hydro modifications and flexible low-carbon gas plants, including our newest additions—the Allen and Paradise Combined Cycle plants. These plants not only reduce emissions; just as important, they increase TVA's ability to provide reliable, affordable power during spikes in peak demand throughout the year. Moreover, they are an integral part of our long-term, bridging strategy to increase generation from renewable energy sources.

The value of these plants is clear: With renewable sources, energy generation can shift as the wind starts and stops and the available sunlight is affected by the time of day and cloud cover. Gas generation can be turned on when renewable resources are not generating energy, enabling more renewable energy to be added to the system while keeping the energy supply reliable.

Our nuclear fleet—the nation's third-largest—has a generating capacity of approximately 8,000 megawatts and is the backbone of our clean generation portfolio. In FY20, our nuclear fleet is supplied 42% of the region's energy supply. TVA is an industry leader in expanding nuclear generation.

In 2016, TVA brought online the first new nuclear generation of the 21st Century, achieving commercial operation of the second unit at our Watts Bar Nuclear Plant and adding about 1,150 megawatts of carbon-free energy for our system.

We have uprated our existing Browns Ferry Nuclear Plant units to generate additional low-cost, reliable and carbon-free energy; and we are investing in maintaining and upgrading our plants to extend their operations by decades. TVA is also engaged in developing new nuclear technology, and our Clinch River site in East Tennessee is the nation's only site with an Nuclear Regulatory Commission approved early site permit for small modular reactors.

As we progress on our path to deep carbon reductions, we have identified the most viable technologies needed for decarbonization. To develop those technologies, support from the federal government is needed.

### Climate Change Adaptation and Resiliency

TVA maintains a Climate Change Adaptation Plan that was last updated in July 2020, and we are currently developing our Climate Action Plan for completion in the coming months. The goal of the adaptation planning process is to ensure TVA continues to achieve its mission and program goals and operate in a secure, effective and efficient manner in a changing utility landscape. We do this by coordinating our efforts with state and local partners, tribal governments and private stakeholders. TVA manages the potential effects of climate change on its mission, programs and operations within its environmental management processes.

### Energy Efficiency

Additionally, TVA has increased the energy efficiency in its operations. Since their inception more than 40 years ago, TVA's energy efficiency efforts have adapted to the changing needs of TVA, local power companies and the Valley. TVA brings the benefits of energy efficiency to the communities and people who need it most but have been the least able to take advantage of past programs or broader societal advancements in energy efficiency.

TVA has also ramped up efforts to promote efficient electric technologies in place of technologies that rely on carbon-intensive fossil fuels—an effort that maximizes the environmental benefits of our improved generation portfolio for the entire Valley.

TVA's Energy Programs Potential Study in FY21 and FY22 will help inform TVA's path forward for the next decade as the energy landscape continues to evolve. The study is intended to offer a detailed look at regional opportunities for influencing electric load through various programs, such as energy efficiency, electrification and demand response. It will help inform TVA's next Integrated Resource Plan, support least-cost planning in TVA's asset strategy, help align energy programs to TVA's mission and evolving energy strategy, and capture the impact of social, economic and policy changes on markets.

# Part Two

**TVA Values,  
Strategic Priorities  
and Commitments**





## Living Our Values

The strength of TVA is its people. We have an experienced and talented workforce committed—each and every day—to improving the quality of life for the 10 million people we serve.

Our actions are guided by four core values that form our institutional guideposts and help us sustain success. First among these values is Safety; we are uncompromising in our commitment to the safety of our employees and the public. Next is Integrity—we are straightforward and transparent in all that we do. Through Inclusion, we treat one another with dignity and respect so that we attract, retain and leverage the talents of a diverse team, and so that all members of the TVA team feel valued and can reach their full potential. Fourth is Service. It reflects our long-standing mission and is central to all that we do.



Safety



Integrity



Inclusion



Service

## Strategic Priorities

TVA's strategic priorities provide a framework for our service to the region and the nation:

### People Advantage

All that TVA accomplishes comes through the efforts and energies of 10,000 TVA employees and our 14,000 contractors. Through the efforts of the women and men of TVA, we provide low-cost, reliable, and increasingly clean energy; foster economic development that brings businesses and jobs to the region; and protect the Valley's natural resources through environmental stewardship.

### Operational Excellence

Our strategic priority of Operational Excellence builds on TVA's best-in-class reputation and performance as we supply reliable low-cost energy for the communities and people of the Tennessee Valley.

### Financial Strength

Our financial strength and stability are advantages and ensure our ability to continue to carry out our mission of service. TVA's financial position has strengthened over the past decade, and we are continuing our disciplined financial approach as we invest in the future and keep energy rates as low as feasible.

TVA conducts its operations with no federal appropriations of tax dollars. While TVA is a corporation of the federal government, TVA funds its power system and virtually all other operations entirely with revenues from energy sales and proceeds from debt issuances.

### Powerful Partnerships

TVA's opportunity to serve the people of the Tennessee Valley and the nation comes to life through our Powerful Partnerships with customers, the communities we serve and other stakeholders.

First and foremost among these partnerships is TVA's historic relationship with local power companies. Through these partnerships, TVA and local power companies work together to deliver public power at the lowest feasible rate for people throughout the region, from the largest cities to the most remote farms, with an obligation to serve the people and their communities, not shareholders.

Together, TVA and local power companies ensure a reliable, increasingly clean and low-cost energy supply; a local presence and local voice; and the reinvestment of revenues into the energy, economic development and environmental services that benefit the region. In this public power model, TVA now has new and stronger partnerships in place with 142 of the 153 local power companies we serve—93% of them—and we are aligned around a 20-year commitment to plan and work together.

### Igniting Innovation

Igniting Innovation is an increasingly critical priority as we address energy system and climate challenges while maintaining low energy costs and high reliability. Innovation is in TVA's DNA, and innovation is essential as today's energy system evolves into the energy system of the future.



People Advantage



Operational Excellence



Financial Strength



Powerful Partnerships



Igniting Innovation

## Our Guiding Principles for Carbon Reduction

TVA's mission is the foundation of all that we do in service to the people of the Tennessee Valley, and we act in accordance with our values and priorities. Our region's continuing success requires an increasingly clean energy supply, and we are building on TVA's accomplishments to move toward decarbonization. Our actions will be guided by the following principles and our commitment to serving the people of the Tennessee Valley:

### 01

Prioritize the needs of Valley stakeholders as we work to achieve our goals by maintaining low rates and high reliability, and attracting new jobs in the Valley.

### 02

Use best-available science and support research and policies that further carbon-free dispatchable technologies.

### 03

Partner with our long-term local power company customers and other customers and communities to support economy-wide decarbonization efforts and the strategic electrification of other sectors, such as transportation.

### 04

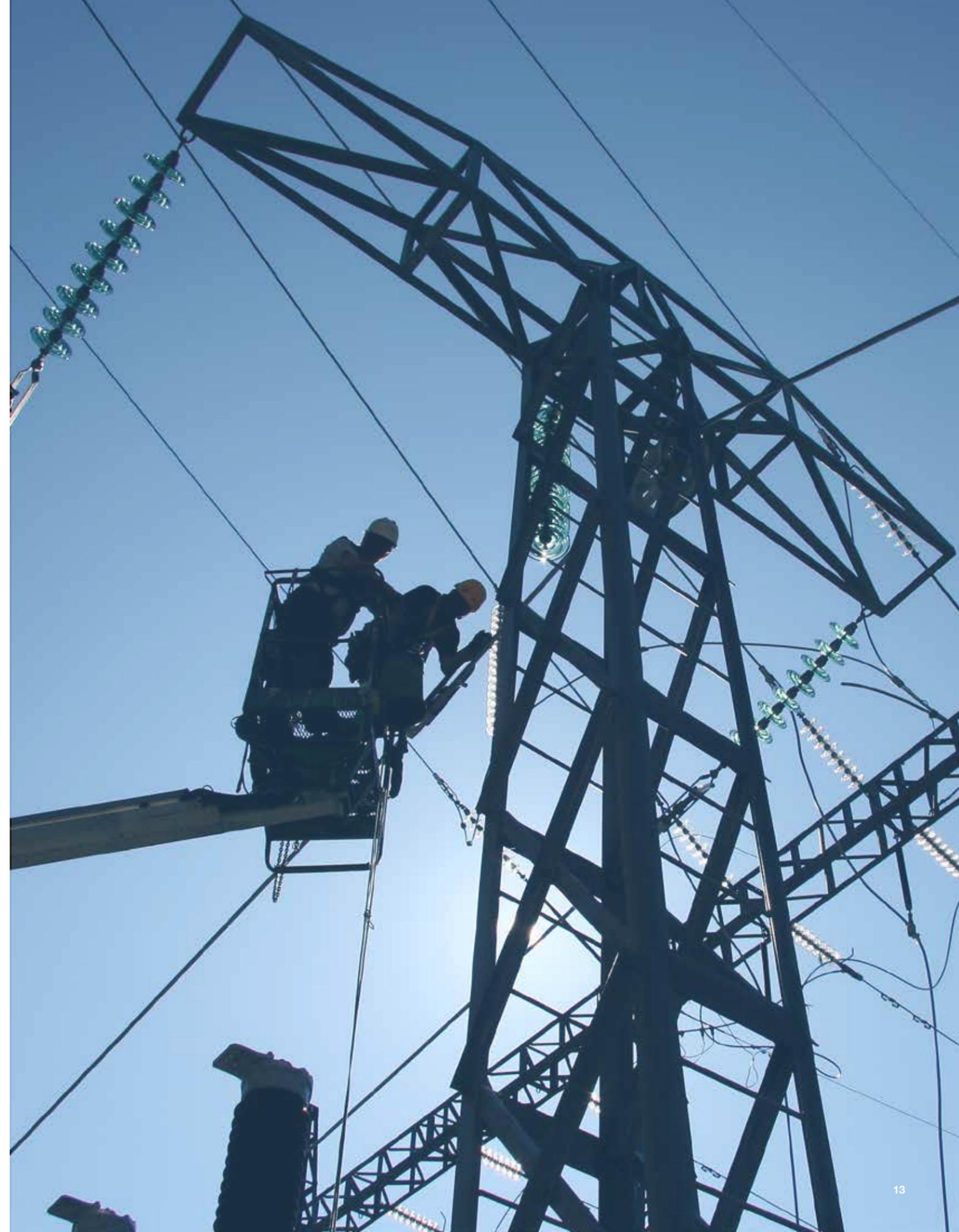
Maintain nuclear generation, hydro generation and a strong transmission grid as key enabling assets.

### 05

Be transparent with stakeholders in measuring and sharing our progress, and listen and work effectively with all our stakeholders to understand their priorities and needs.

### 06

Adapt to new technologies and changing policies, and be willing and open to changing our plans and projects to achieve deep carbon reduction.



## Our Ongoing Commitments

### We are committed to serving Valley communities

TVA is focused on supporting progress in the region through the shared successes of our customers, stakeholders and communities. We serve the region with 153 local power companies, and a central tenet of the public power model is local control. We are working to enhance our role as a community leader and trusted partner in order to meet our resource and environmental stewardship commitments and to help the region remain a top choice for business and industry.

In a region where some residents are still among the nation's poorest, we will continue to work with community leaders, businesses and our customers to reduce energy burden. While TVA's energy costs are among the nation's lowest, we continue our commitment to help people use energy more efficiently, directly benefiting those we serve.

In addition to reducing the energy burden, we will focus TVA's community outreach activities on improving employability and fostering quality economic development. These actions align well with TVA's new, comprehensive regional focus: The critical priorities of each community vary, and TVA's shift to a regional model will best identify local community needs and align priorities and resources to match those needs.

### We are committed to continued investments in our increasingly clean, diverse generation portfolio

TVA has made significant investments modernizing its diverse generating fleet. Actions include retiring aging coal units, adding modern gas generation and investing in TVA's industry-leading transmission system. The results are one of the nation's most reliable energy systems, a \$1 billion reduction in fuel and purchased power costs and our 63% reduction in mass carbon emissions.

As we move forward, the next phase of our asset strategy is planning for emerging issues with asset performance, technology developments and environmental risks. After the scheduled retirement of Bull Run Fossil Plant by December 2023, approximately 6,000 megawatts of coal capacity will still be part of the TVA system; these remaining coal plants are approaching the end of their cost-effective service to the power system.



As coal plants are retired, TVA's commitment to serving the Valley includes the safe, responsible management of coal combustion residuals (CCR). These are commonly referred to as coal ash and are a byproduct of burning coal for electricity.

TVA is an industry leader in the safe, secure management of CCR. At each fossil site, we develop science-based monitoring and management plans that meet or exceed regulatory requirements by the Environmental Protection Agency and state regulators. Plans for the closure and long-term storage and management of coal combustion residuals for each site are based on the unique characteristics of that site. With oversight from state regulators, we use science, data and analysis to develop plans and close each CCR site in an environmentally safe manner.

In addition, we work closely with community members, public officials, economic development leaders and other stakeholders on any plans to potentially repurpose sites for the benefit of communities after closure. We remain committed to the safe, secure management of coal combustion residuals.

Our nuclear fleet is the nation's third largest, and it will continue to serve as our largest source of carbon-free energy. In addition to our growing portfolio of solar power, natural gas will most likely serve as an important bridge until new cost-effective and carbon-free technologies are available.

Natural gas is a lower-emission dispatchable generation source and will allow TVA to integrate significant amounts of solar generation into the system, further demonstrating TVA's success as one of the nation's leaders in carbon-free generation.

By the mid-2030s, TVA believes carbon capture technology may be available to be added to gas plants, making them more cost-effective, zero-carbon resources for their full useful life and helping us to meet peak demand spikes with reliable, affordable energy.

Progress toward net-zero emissions will require continued investment in new technologies in addition to nuclear, solar, wind and hydro. We see gas as a bridging strategy—a way to continue to add renewables and support the needs of the system while new technologies are developed.

Energy storage capability is essential for integrating solar power into the TVA system. Changes in weather and limited hours of daylight reduce the reliability of solar power, but battery storage can enable solar power to meet the reliability demands of our customers. TVA has contracted about 180 megawatts of utility-scale battery storage through the second quarter of FY21, and we are piloting broader efforts to create utility-scale energy storage.



**We are committed to being a leader in innovation and decarbonization solutions**

TVA was founded on the principle that it would be an innovator for the nation, developing and demonstrating technical solutions to a wide range of economic, environmental and societal challenges. Now, our nation is at the point where new low-cost and carbon-free technologies can become available only if they are supported by the right investments in research and development.

**We are committed to inclusion**

We are committed to inclusion at TVA. We believe that success over the long-term requires the full and active participation of the Board of Directors, senior leadership and employees, whose diverse perspectives will generate creative solutions to the challenges we face.

Our commitment includes hiring employees at all levels who embrace inclusion as a core value. A top priority is to create an inclusive and diverse workforce focused on TVA's outreach to our customers, stakeholders and business partners. Finally, we will eliminate barriers that hinder our expansion and use of diverse suppliers and contract partners.

**We are committed to being a leader in low-carbon energy**

We believe that how quickly the nation can achieve carbon-free electric generation will be determined by the federal government's urgency in funding technology development and demonstration. We believe this development cannot rely on traditional market-based methods, including production and investment tax credits and loan guarantees. The development that is needed on an accelerated basis will require direct, financial support for entities that have demonstrated the ability to achieve significant carbon reduction, who integrate new technologies in a cost-effective manner, and drive economic development to ensure a strong national economy. As a part of the federal government, TVA stands ready to lead.

**We are committed to financial strength and stability**

TVA is mandated by the TVA Act to keep rates as low as feasible. Over the past decade, TVA has kept its effective rate flat while at the same time investing over \$15 billion to balance and modernize its generation portfolio. As TVA further modernizes its asset portfolio and reduces emissions, we are committed to maintaining flat base rates through the decade.

In recent years, while making record investments in the power system and maintaining effective wholesale rates, TVA has also steadily reduced debt, which is now at its lowest point in more than 30 years. We remain committed to keeping debt stable at or below \$24 billion. Over the coming decade, debt may increase modestly as we make continued investments in power system assets. We are comfortable with slightly higher debt levels (less than \$24 billion) given the large number of local power companies that have committed to 20-year partnerships and long-term incentives with TVA.

**TVA's Carbon Reduction Leadership**

**63%**  
*Results Accomplished*

**70%**  
*Plan by 2030*

**~80%**  
*Path by 2035*

**Net-Zero**  
*Aspiration by 2050*

# Part Three

Leading in Innovation,  
Decarbonization





## Building the Energy System of the Future

Decades ago, TVA's innovative integrated resource management brought the first electric lights to rural communities and remote farms.

Today our customers and communities are counting on us to deliver the increasingly clean, low-cost and reliable electricity they expect and deserve. This energy powers high-tech industries, integrates distributed resources and empowers customer choice and local control.

On the generation side of TVA's work and in partnership with our local power companies, clean energy sources and decarbonization are key. In delivering that energy across the region, state-of-the-art technologies that keep energy reliable and low-cost are critical.

**Solar Energy Expansion**  
**Targeting**  
**10,000 MW**  
**by 2035**

TVA is investing more than \$2 billion in transmission system improvements over five years to ensure that we continue to provide increasingly clean, low-cost, reliable power. We are working to find ways to ensure our grids work together seamlessly as local power companies bring their own solar and other renewable resources onto the system.

The heart of the energy system of the future will be TVA's new System Operations Center and Energy Management System, a \$300 million investment employing smart technologies to manage power grid operations more reliably, efficiently and securely.

The center's Energy Management System will increase system flexibility by integrating and monitoring distributed energy resources and demand response, helping to keep costs low and reliability high as energy sources and customers' energy use continue to evolve.

The energy system of the future will support a diverse portfolio of clean energy sources, advanced technologies, and broad electrification in the transportation sector and elsewhere. We are investing in the future today as we set our plans and aspirations for years to come.

## TVA Leadership in Decarbonization

TVA is an industry leader in developing innovative and cost-effective technologies that will decarbonize our economy and achieve our aspiration of a net-zero carbon energy future.

We measure and benchmark our carbon emissions in two ways, each for important reasons. Carbon intensity, or the rate of emissions, measures the amount of carbon released per unit of electricity produced and is typically reported as lbs/MWh. This measure allows customers to easily compare electric utilities in an equivalent manner. The other measure is mass, which measures the total tons of carbon emitted. This metric is also helpful because it gives a whole-picture view of the carbon in an electric utility's footprint. For 2020, TVA's carbon intensity was 562 lbs/MWh and mass emissions were 42.5 million tons.

Based on our progress in diversifying the power system and the status of our existing power system assets, we are working to achieve significant carbon reductions in the decades to come without compromising the low rates and high reliability that sustain the customers and communities we serve.

We intend to follow this trajectory as we aspire to achieve net-zero carbon emissions by 2050:

### Results Delivered

We have achieved a 63% reduction in mass carbon emissions in our energy supply from calendar year 2005 to 2020, primarily by diversifying our generation portfolio we have :

- Added about 1,600 megawatts of new, carbon-free nuclear generation with the commercial operation of Watts Bar Nuclear Plant Unit 2 and extended power uprates at all three units at Browns Ferry Nuclear Plant
- Added renewable energy, with over 400 megawatts of solar and 1,200 megawatts of wind
- Retired approximately 8,600 megawatts of coal generation in recent years, including Bull Run Fossil Plant's announced retirement of 865 megawatts by December 2023. This amounts to about 60% of our coal generation, and we are evaluating the impact of retiring the balance of the coal-fired fleet by 2035
- Added about 5,200 megawatts of new flexible and efficient gas generation
- Invested over \$400 million in energy efficiency programs since 2011

### Executing a plan to 70% carbon reduction by 2030

- Bringing additional solar capacity online as part of TVA's total projected solar capacity of about 10,000 megawatts by 2035, including solar commitments to date of over 2,300 megawatts expected to come online by 2023, pending environmental reviews, largely driven by customer demand
- Further reducing our reliance on coal as additional plants approach end of life
- Modernizing our gas fleet to support year-round reliability and integration of intermittent renewable generation
- Expanding our storage portfolio by adding lithium-ion batteries as costs decline
- Working with local power companies on customer-centric options
- Investing in our existing carbon-free nuclear and hydroelectric fleets
- Investing in our transmission system to enable the integrated grid of the future

**Developing a path to approximately 80% carbon reduction by 2035**

- We see a path to an approximate 80% carbon reduction by 2035, primarily leveraging existing, cost-effective technologies and using innovations and federal support for early steps toward small modular reactors and longer-duration storage to allow us to maintain low-cost and reliable power
- This includes continuing to invest to extend the life of our current nuclear and hydro fleets, further expanding our renewable portfolio to include a total of 10,000 megawatts of solar power by 2035, evaluating coal plants as they reach end of life, and collaborating with our local power company partners to further integrate our planning and leverage demand-side solutions. Evaluation of the coal plants includes environmental review, public input, and Board approval.
- We are investing in research and development of new carbon-free technologies, such as small modular reactors, long-duration storage, and carbon capture, to enable their potential deployment in 2030 to 2040 and beyond

**Aspiration to achieve net-zero carbon emissions by 2050**

- TVA's approach to climate change and managing our carbon footprint is grounded in our statutory mission of service
- TVA believes that moving toward a net-zero carbon future is in the best interest of public well-being and the continued economic expansion of the Tennessee Valley, but must be balanced by TVA's statutory mission to provide electricity at rates as low as feasible
- Low rates and reliability are critical to achieving economy-wide deep decarbonization, because they enable and encourage the massive electrification required for net-zero carbon
- Federal support to incentivize the development of clean energy technologies will be crucial to finding a pathway to net-zero that is economical and reliable
- As we seek to go beyond 80% carbon reduction, new, cost-effective technologies must be developed. We are a founding member of the Electric Power Research Institute's (EPRI) Low Carbon Research Initiative and participating with the National Carbon Capture Center. The availability of viable, affordable, scalable new technology earlier can accelerate the transition

TVA's mission of service is a constant, our North Star by which we develop and implement projects and programs that benefit the region and nation in Energy, Economic Development and the Environment. TVA's early engineering projects were hydro-electric dams to control flooding, enable commercial navigation and bring the first electricity to many parts of the region.

Over time, TVA has adapted to meet a wide range of customer and consumer needs, and we continue to meet new challenges today. Our focus on and investments in diversifying the power system to reduce costs and carbon emissions have made TVA a national leader in producing clean energy.

We are developing plans to continue diversifying the system that already produces about 60% of its generation from carbon-free sources, and we are on a path to bring significant, additional amounts of renewable energy online. We are also carefully evaluating the status of our remaining coal-fired units as they near the end of their years of service to the power system.

We are committed to working with our partners in the Tennessee Valley and elsewhere to accelerate the clean energy economy in keeping with TVA's mission of service. This commitment will strengthen our ability to attract major businesses that create jobs and support economic growth in the Valley, and it will enhance partnerships with businesses seeking to meet their own ambitious

**Natural Gas as a Bridge**

**Supports coal retirements**

**Enables solar energy expansion**

**Maintains system reliability and resiliency**

**Enhances decarbonization strategy**

sustainability goals. It will help protect the Valley's natural resources, the Tennessee River system and our public lands for future generations. As a federal agency, we also are committed to supporting broader national efforts to decarbonize the economy.

As we continue lowering the carbon intensity of electricity without sacrificing reliability or low cost, electricity will be one of the keys to decarbonizing large sectors of the economy. Studies such as the EPRI's U.S. National Electrification Assessment predict that with efficient electrification, the contribution of electricity could rise to over 40% of total energy use by 2050.

**Coal Fleet End of Life**

**Evaluating the impact of retiring the balance of the coal fleet by 2035**



## Developing Emerging Technologies

Elements critical to our success on a path to decarbonization include investments in these technologies:

### Energy Storage Integration

Implement a long-term strategy to integrate energy storage for system flexibility and maximizing renewables

### Electric Vehicle Evolution

Enable the adoption of electric vehicles in the Valley to create load growth and benefits for citizens

### Decarbonization Options

Develop feasible technology pathways to achieve the next phases of carbon reductions and offsets

### Connected Communities

Expand smart technologies including broadband with communities to manage energy and services

### Regional Grid Transformation

Enable an interconnected, intelligent grid to reliably deliver power as customer values evolve, investing in a state-of-the-art System Operations Center and Energy Management System that enhance security, resiliency and reliability and enable innovation

### Advanced Nuclear Solutions

Develop a reliable, affordable, flexible and clean generation option with cost and risk shared

The continued development of cost-effective energy storage is critically needed to support a carbon-free generation fleet as energy storage is essential for fully integrating solar power into the TVA system. Changes in weather and limited hours of daylight reduce the reliability of solar power, but battery storage can enable solar power to meet the reliability demands of our customers.

In addition to the actions TVA has taken in its generation fleet, we are also committed to advancing the decarbonization of the economy overall. Gasoline and diesel vehicles are the largest sources of CO<sub>2</sub> emissions, and a major initiative by TVA focuses on electrification of the transportation sector.

TVA's electric vehicle initiative will also support economic development in the TVA region by attracting significant jobs and capital investment to the area. Many new clean-generation projects are located in areas where coal plants now operate, and new jobs would help offset local economic impacts. Several major auto makers have already invested in major electric vehicle manufacturing operations in the region; and TVA is partnering with the industry, the State of Tennessee and our local power company partners and customers to advance electric vehicles. We have plans for fast charging stations every 50 miles along Tennessee interstates and major highways with the intent of helping to put more than 200,000 electric vehicles on Valley roads by 2028.



Another emerging technology is the availability of carbon capture to extend the life of existing natural gas plants in a carbon-free environment. Carbon capture will likely be key to achieving deep carbon reduction, because it can serve as a backstop for removing carbon that cannot be displaced by other means. This is the fastest and most direct method of ensuring low-cost, reliable, dispatchable generation to fuel the next phase of carbon reduction in the 2030s.

This technology will also ensure that natural gas generation can support the adoption of renewable energy over the long term. TVA is engaged in technology development, understanding its capabilities and potential equipment deployment for post-combustion carbon capture. Additionally, TVA is investigating and monitoring the development of direct air capture.

Another important factor in economic development today is the availability of fiber and broadband services so communities and people are connected and have access to 21st century services. The expansion of broadband, specifically rural broadband, is essential to building communities with equal opportunities for

growth and jobs for the future. Broadband is also a “must have” for businesses and industries that are considering locating in a Valley community to be competitive; and broadband availability improves education and healthcare opportunities that are vital for community sustainability. The combination of these societal benefits and the critical link to efficient, clean distributed generation makes broadband accessibility a priority. TVA has developed a regulatory framework to enable qualifying local power companies to make investments in broadband internet services for their customers with appropriate oversight and controls to protect ratepayers.

Additionally, TVA is expanding its fiber network that supports communications between generating plants, substations and office facilities to maintain a reliable, resilient power grid. The network will continue to provide local power companies an opportunity to lease surplus TVA fiber for their own business needs and may provide opportunities for economic development in direct support of TVA's mission of service to the people of the Valley.



Expanding the accessibility of broadband requires the involvement of many stakeholders, and TVA is uniquely positioned to bring stakeholders together and facilitate effective solutions, especially in rural communities. We have demonstrated through our nationally recognized initiative on electric vehicles the ability to create partnerships with stakeholders to effectively advance new technologies for the betterment of all.

In regional grid transformation, TVA is working with our local power company partners to develop a shared vision and roadmap for transforming the Valley's transmission and distribution systems into an integrated regional grid. The goal is to enhance reliability and resiliency and manage cyber threats while supporting growing solar and new technologies such as battery storage. This partnership will enable local power companies to bring their own solar and other renewable resources onto the grid. TVA will work in partnership with local power companies to test and develop technologies to support the roadmap and provide examples for implementation to all the local power companies so that everyone can transform the grid to benefit all the Valley.

Investments we are making in our transmission system include expanding our strategic fiber network and constructing a new state-of-the-art System Operations Center and Energy Management System. These represent significant advancements in security, reliability and cost. Expected to be operational in 2024, the System Operations Center incorporates industry-leading protective features to mitigate cyber events, electromagnetic pulse threats, and geomagnetic disturbances, as well as natural disasters. It will be one of the most secure facilities in the country. Completion of the new Energy Management System, coupled with additional strategic fiber, will transition the core operations of the TVA system from analogue to high-speed digital. This transition will greatly enhance operational capability, ensuring 99.999% reliability and improving on some of the lowest power rates in the country. Most important, these enhancements will further differentiate the Valley as the premier location globally for advanced manufacturing and load-intensive big industry.

### TVA's Leadership in Advanced Nuclear Solutions

Another technology essential to decarbonization is small modular nuclear reactors—flexible, carbon-free, baseload generation. The availability of cost-effective, small modular nuclear reactors (SMRs) in the mid-2030s would help secure a carbon-free generation fleet for the next 100 years. The critical path for SMR adoption is the ability to ensure a fully developed design and the necessary modularization, manufacturing capability, construction scale and expertise.

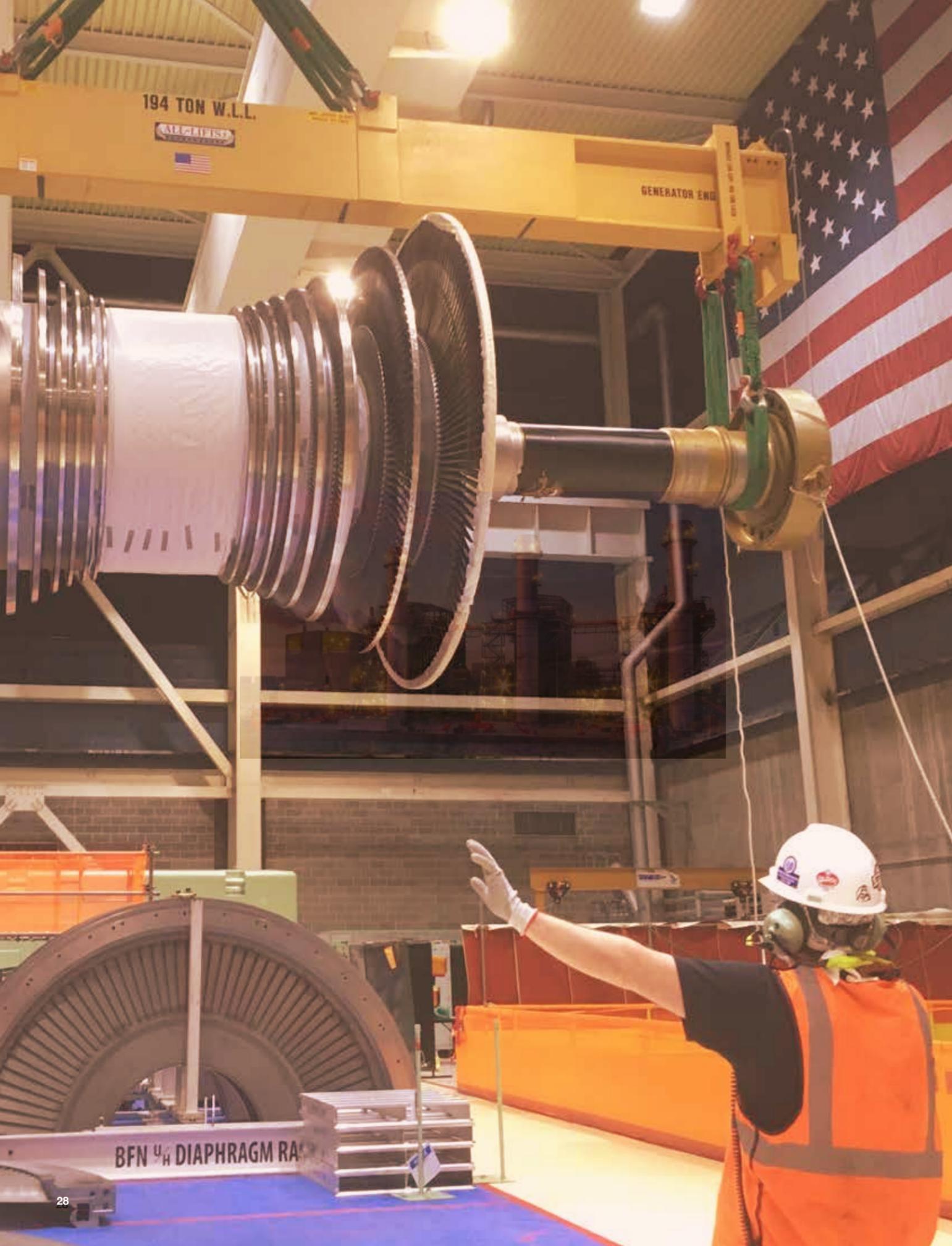
The level of SMR deployment our nation needs is significant, and development of the technology must fully address all aspects of the technology during the next 10 years. TVA—as a part of the federal government and with a fully licensed early site permit—is a clear choice for meeting this critical need and leading this initiative with the U.S. Department of Energy.

In December 2019, TVA received the nation's first Early Site Permit for a small modular reactor from the U.S. Nuclear Regulatory Commission for two or more small modular reactors at our Clinch River Site in Oak Ridge, Tennessee, the only site in the nation with an NRC-approved early site permit for small modular reactors. In the second quarter of 2021, TVA initiated a programmatic Environmental Impact Statement to address the potential environmental effects associated with the construction, operation, and decommissioning of an advanced nuclear

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

reactor technology park at the Clinch River site. We already have a partnership to explore the economic feasibility of SMR technology with the University of Tennessee and Oak Ridge National Laboratory, among others.

Successful partnerships are particularly important in the development of advanced nuclear designs. In the Tennessee Valley and elsewhere, nuclear technology plays a critical role in meeting electricity generation needs and carbon reduction goals in a manner that maintains reliability and keeps rates affordable. As one of the nation's largest electricity providers, TVA is committed to being part of the solution and to working with others to meet this important challenge.



### Nuclear Leadership as Part of Our Path Forward

Across our industry and the nation, our goal should be to decarbonize the generation of electricity and then use our clean energy supply to reduce emissions, drive innovation and grow our economy. That goal can be achieved through the development and use of carbon-free nuclear energy. Carbon-free nuclear is essential to our energy supply as we work to electrify the economy, drive down customer costs and eliminate emissions.

As a national leader in nuclear energy, TVA is engaged today in developing new nuclear technology because it is essential to TVA's and the nation's decarbonization efforts. Light-water small modular reactors are the specific advanced nuclear technology we believe to be most ready for deployment near-term—with the first commercial operation by 2030 possible, and multiple deployments possible during the 2030s. This would enable advanced nuclear to make a meaningful contribution to carbon reduction within the next two decades.

We are following the process related to evaluating the potential environmental impacts associated with deployment of more than one reactor and more than one design at our Clinch River site to preserve our future options. Our team is actively engaged in technology assessment, working with developers to understand the costs and risks associated with construction and operation of various designs. When we select technology and begin site-specific engineering, it will be after extensive and careful planning and preparation.

TVA's goal is to have a reliable, affordable, flexible and clean advanced reactor option available by 2032. Our path to this goal will be to make incremental investment decisions informed by continuous monitoring and analysis of our options. This effectively eliminates a number of risks that have previously stopped or delayed many nuclear projects.

We are applying TVA's experience as a leader in technology innovation and deployment in the industry to the new challenge of identifying the best options for the next generation of advanced nuclear.

This is not a path that TVA can take alone, however. We are committed to partnering and collaborating with the many players who must be involved in this effort; the support of the federal government is essential. With federal financial support, we can break through risks associated with developing first-of-kind technology and deploying it throughout the United States and internationally. TVA is poised with a site, expertise, nuclear construction know-how, and mission to lead in this technology to achieve the nation's carbon-free goals.

Our commitment is that we will work to preserve and enhance the value of our Clinch River Site as a location to test and deploy new nuclear technologies. We will work with others in our industry to support policies, regulations and research that would further new nuclear development. We will also continue to monitor and support alternative technologies.

This comprehensive approach will increase the probability that TVA will have a healthy array of options to meet our long-term decarbonization goals and help move our nation closer to net-zero emissions at a cost everyone can afford.

TVA's first commitment is to the safe and efficient maintenance and operation of our existing nuclear fleet and other generating assets. Then, as we explore new nuclear technologies, we have the opportunity to demonstrate their worth. Together, TVA, the Department of Energy, and others can move toward an energy supply that is reliable and safe and supports long-term decarbonization goals for our region and the nation.

# Part Four

Delivering the Energy  
Economy of the Future



## Energy Opportunities

By the nature of its statutory mission, TVA fills a unique role as a living laboratory, sharing solutions across the nation and the world. TVA is charged with supplying Energy at the lowest feasible cost, fostering Economic Development, and delivering on its commitment to Environmental Stewardship, while maintaining financial strength and stability.

Today, TVA is taking a leadership role in establishing the energy system of the future and furthering its legislatively mandated mission to make life better for the 10 million people of the seven-state region.

### Creating the Clean Energy Jobs of Tomorrow, Today

TVA's mission is the motivation for our commitment to a clean energy future and clean energy economy for the region. As a public power provider, TVA serves the people rather than shareholders, and the energy it supplies to the region fosters quality economic growth. Inherent to TVA's business model is our Strategic Priority of Powerful Partnerships. TVA works hand-in-hand with local power companies to supply energy throughout the region, and it partners with local, state, and regional leaders to foster quality growth in the region.

During the past five years, TVA has worked with stakeholders to help attract or retain approximately 341,000 jobs and more than \$45.4 billion in direct investment in the region. Even in 2020 during pandemic conditions, TVA helped to attract or retain approximately 67,000 jobs and \$8.6 billion in capital investment. Our continuing success in decreasing carbon emissions is helping our customers and communities compete in the marketplace for businesses, jobs and investment.

We can see TVA's clean energy strategy come to life in jobs and investments across the Valley, including global tech companies that require vast data centers and computing power. Amazon, Facebook and Google have built major operations across our seven-state region as we have helped them meet their ambitious environmental goals. We are working with our local power company partners to build a thriving regional economy where increasingly clean energy and green jobs make life better.

TVA's electric vehicle initiative is a 21<sup>st</sup> century embodiment of our historic work in Energy, Economic Development, and the Environment, and the initiative demonstrates how those three elements combine for optimal results. The electric vehicle initiative aims to increase the number of electric vehicles across the seven-state area from approximately 16,000 today to over 200,000 by 2028. The average EV driver is expected to save up to \$1,000 a year in fuel costs—totaling an estimated \$200 million a year in consumer savings and \$120 million in refueling dollars that go back into the region's economy. The locally produced, clean energy fueling these vehicles will save almost a million metric tons of CO<sub>2</sub> a year. And in terms of economic development, the initiative grows jobs as it complements the region's robust auto manufacturing industry and related businesses.

The TVA region is already number one in the Southeast and number three in the nation for electric vehicle production. General Motors, Nissan and Volkswagen are putting electric vehicles and net-zero emissions commitments at the core of their strategies. They are building the next generation of electric vehicles and electric vehicle batteries here in the Valley and attracting auto industry suppliers and related business, making our area the Southeast leader in electric vehicle production.

### Industry-Leading Green Invest Program

Similarly, our award-winning utility-scale solar program, Green Invest, is setting a standard for the industry. The program is based on a unique public/private partnership structure and competitive bid process that enable the growth of affordable solar without shifting costs to non-participants. Additionally, Green Invest leverages the demand for utility-scale solar from business and industry for economic development in our communities.

The result is that this award-winning model offers business and industry an effective, timely, and cost-competitive solution to aggressively meet their aggressive sustainability goals by matching their need for renewable energy with new renewable projects in the Valley. Through a competitive procurement process, businesses that partner with TVA benefit from TVA's scale and negotiating expertise in attracting a wide variety of potential renewable projects at economical prices.

Since 2018, Green Invest has attracted nearly \$2.7 billion in solar investment and procured more than 2,000 megawatts of solar on behalf of its customers—maintaining TVA's green energy leadership as the energy provider with the greatest amount of renewable generation in the Southeast. In November 2020, the Knoxville Utilities Board announced that 20% of its load would be generated from renewable resources to help Knoxville, Tennessee, meet its goal of reducing greenhouse gas emissions by 80% over 2005 levels by 2050. Knoxville is now the number one city in the Southeast and one of the top cities in the nation for solar power investment. In total, KUB will secure enough energy to power about 83,000 homes—a commitment that stands out on a national scale.



**200,000**  
**Electric Vehicles**  
**in the Valley**

Estimated by 2028

### Workforce Development

The energy industry offers economic opportunity for workers with a wide variety of skills, and TVA workforce development programs are helping people develop those skills. TVA and the Tennessee Urban League Affiliates have conducted a training pilot program this year to provide technical and soft skills training to increase minority participation in TVA EnergyRight's Quality Contractor Network certification.

This certification enables contractors to work in TVA's Residential Services programs, which offer energy efficiency services to homeowners. The Urban League Affiliates in the pilot include the Urban League of Greater Chattanooga Inc., Memphis Urban League, Knoxville Area Urban League and Urban League of Middle Tennessee. As of June 2020, 42 minority contracting businesses achieved QCN membership through the program. The contractor training program is opening doors and creating opportunities for minority contractors. In fact, these recently certified QCN members are now performing work for our Home Uplift program in several communities.

TVA also supports educational programs that are helping build the workforce of tomorrow for the Tennessee Valley. TVA contributes to educational programs and competitions in the fields of science, technology, engineering and math (STEM) and robotics, in both primary and secondary schools. By concentrating on STEM and robotics for school-related assistance, we are helping to educate the future workforce and build a pipeline of prospective employees for TVA and other businesses in the Valley. Last year, we invested more than \$1.1 million in grants for STEM and robotics programs and sponsored more than 200 student robotics competitions.

For high school and college students looking for STEM-related career paths, our CADNet School-to-Work Program provides a pathway. CADNet students work with TVA staff to do computer-aided design (CAD) drawings for engineering organizations across TVA. The program started with one school in 1995 and today partners with 42 high schools, community colleges and universities across the Valley. Despite the challenges of reduced staffing and telework, CADNet was able to complete over 4,500 engineering drawings for various customers in TVA in FY20, breaking their previous fiscal-year record.

### Supplier Diversity

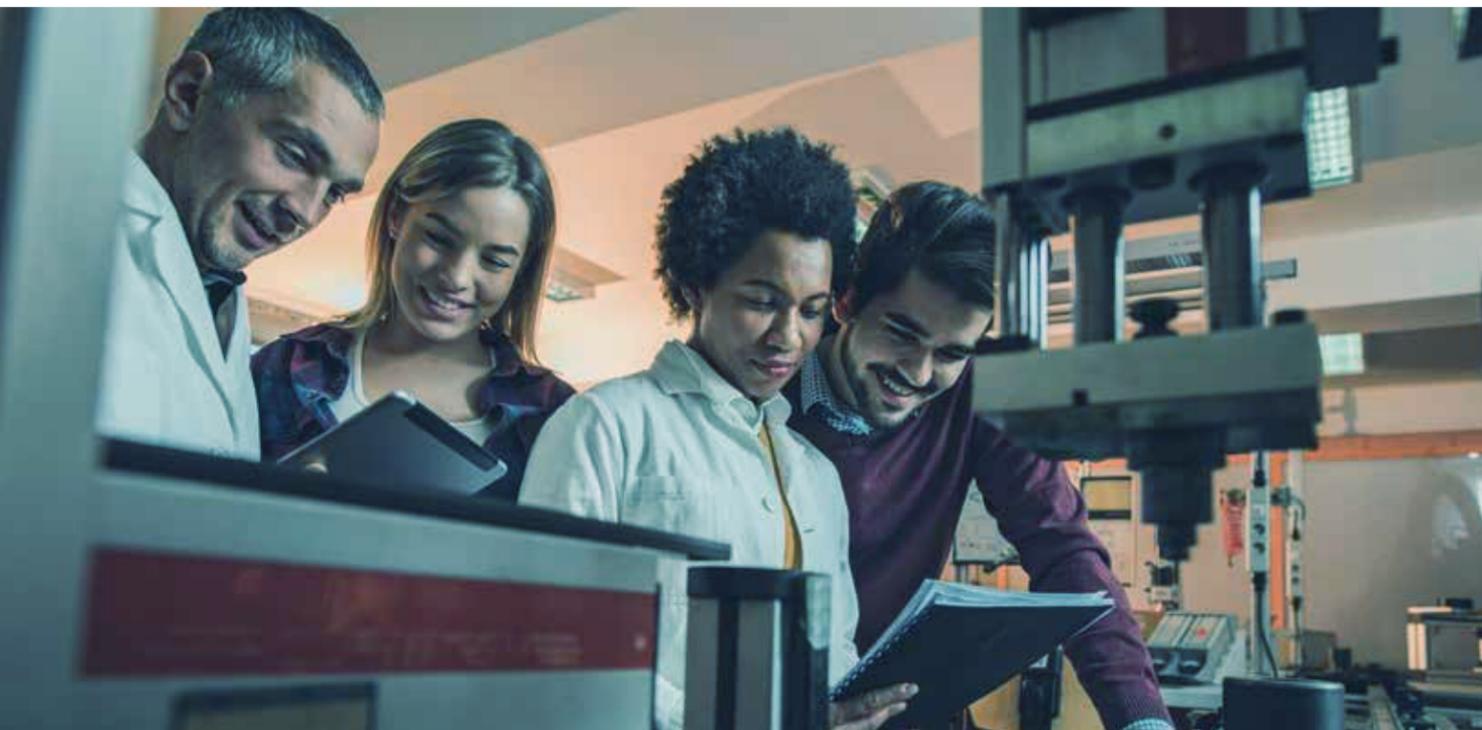
A big part of TVA's mission of service is maintaining a competitive, diverse supplier base that is reflective of the demographics of our region. TVA is committed to its mission of serving the people of the Tennessee Valley, and supporting small, diverse and local businesses is part of that commitment. In FY20, TVA spent more than 46% of its supplier spend with small and diverse businesses—a total of more than \$1.2 billion.

By welcoming businesses of all types—small, minority-owned, woman-owned, veteran-owned, service-disabled veteran-owned and those located in historically underutilized business (HUB) zones, among others—TVA promotes economic prosperity in local communities and across its service territory. Traditional supply chains have been strained by the challenges of COVID-19, and this has provided an opportunity for small, diverse and local suppliers to shine. These companies have demonstrated over and over the flexibility and value that they provide to their communities.



Fulfilling TVA's commitment to Supplier Diversity also includes joining with community, state and regional partners who share the same goals. Last year, TVA awarded funds to 13 nonprofit organizations that work to assist small or diverse businesses in the Tennessee Valley region.

Through TVA's Diversity Alliance Program, we partner with advocacy organizations focused on supporting and growing qualified small and diverse businesses within TVA's seven-state service area. The partnership includes funds from TVA to help provide training, consulting and other development support services to business owners. TVA actively assists small, diverse suppliers in qualifying for contract opportunities and encourages joint ventures, partnerships and subcontracting relationships to aid in business development and growth. These efforts recently earned TVA the "Regional Corporation of the Year" award from the Southern Region Minority Supplier Development Council and recognition in Minority Business News MBN USA magazine as a "Supplier Diversity All-Star for 2020."



**Home Energy Uplift Program**

Powerful partnerships between TVA and local power companies are helping to ease the energy burden for Valley residents most in need. While the median energy burden in our region is 4.4%, disadvantaged households typically spend 10% of their disposable income on energy.

Even with TVA's low energy costs, that burden can be heavy for many households in the Valley region, where 67% of the communities are classified as disadvantaged. Of the 185 counties in the TVA area, 124 are designated this year as economically distressed Special Opportunity Counties.

Nearly 50 local power companies now partner with TVA to provide the Home Uplift program to qualified low-income homeowners in their areas with houses in need of energy upgrades. Across the Valley, more than 1,700 homes have been upgraded so far—with 1,000 more planned by the end of this fiscal year.

Since 2018, TVA matching funds and donations from community partners and local power companies have invested or pledged over \$27 million in Home Uplift. Improvements made through the program save homeowners an average of more than \$500 per year with such upgrades as, air sealing, high-efficiency heat pumps and air conditioners, duct replacement/repairs, ENERGY STAR windows and appliances, insulation, high-efficiency lighting, heat pump water heaters, and/or whole-house ventilation.

Beyond the energy savings, the upgrades help to improve the air quality, health and safety of those living in the renovated homes. In recognizing the Home Uplift for its work with underserved markets, the Smart Energy Consumer Collaborative credited TVA with “tapping into the power of partnerships to reshape the energy assistance paradigm in the Southeast, an area where the energy burden ranks among the highest, and health and wellness indicators rank among the lowest in the country.”

**School Uplift**

The spirit of Home Uplift is now coming to local schools across the Valley to help them reduce energy costs and improve the quality of the learning environment. Our public schools are asked to do an outsized task—educating and nurturing our children, keeping them safe and preparing them for the economy of the future. And many schools do this while facing constant budget shortfalls and aging infrastructure. Through School Uplift, we offer support to help schools save so they can invest their limited resources where it matters most: educating children.

This year, TVA is partnering with the state of Tennessee's Energy Efficient Schools Initiative to provide training on Strategic Energy Management to facilities and staff from 13 schools in economically distressed areas. We plan to award three participating schools with up to \$400,000 each to fund desperately needed building energy upgrades. Seven additional schools will receive grants to install solar pavillions that can function as outdoor classrooms while demonstrating solar power. These schools have collectively saved approximately \$166,000 in energy cost through behavior changes, and we expect that annual savings to continue. This represents an average savings of nearly 18% and will equate to \$1 million in cost savings over the next 6 years. An additional 50 schools have been recruited to participate in the program next year.



## TVA's People Advantage

A member of TVA's first Board of Directors, David Lilienthal, observed that the "greatest of all resources, the indispensable ones, are the energies of individuals." All that TVA does is accomplished through the 10,000 individuals in the TVA workforce, women and men working across the region alongside employees of our contract partners.

As we develop our workforce, we are committed to creating a diverse employee population that mirrors the Valley population we serve. We intend to lead in our hiring practices.

TVA's Employee Resource Groups promote cultural awareness and build quality relationships across TVA as part of our commitment to a sustainable, diverse and inclusive workforce. In 2020, TVA and the Employee Resource Groups were recognized with a Diversity Impact Award from the Association of ERGs and Councils, for efforts to promote diversity and inclusion across TVA and throughout the community.

**10,000 Employees and almost 14,000 Contractors**

**Nearly 20% of Workforce are Veterans**

**60% Represented by 17 Unions**

Even during the trying conditions of the COVID-19 pandemic, when TVA employees are recognized as essential workers, they carried out their responsibilities efficiently and safely and achieved top-decile performance in their rates of recordable and serious injuries. Collaboration with our union partners was key in producing this milestone result. Sixty percent of TVA employees are represented by labor unions, and a total of 17 unions represent our employees and contractors.

Employees and contractors are represented largely by our nation's trade unions, and the strength of TVA's partnerships with those unions is evident in the Code of Excellence program. Modeled after a program by the International Brotherhood of Electrical Workers, the Code of Excellence is a union-led and TVA-empowered initiative based on a strong set of core values and behaviors. Through the program, TVA and union leaders work together to empower teams of employees to serve as ambassadors in TVA business units. The ambassadors work across boundaries and focus together on communications, problem-solving, and empowering others. The results can be seen not only in our safety record but also in better relationships and outstanding performance.

In recent months, we have signed two historic, 10-year agreement extensions with unions: the first-ever 10-year agreement between TVA and the North America's Building Trades Unions, extending our joint commitment into 2031, and a 10-year recognition agreement with the Trades and Labor Council for Annual Employees, extending into 2032 our strong partnership with the council representing TVA's craft employees. We value the long-standing, constructive relationships we share with the trade unions and all of our union partners.

Our employees have a wide range of expertise and experience, serving in roles that range from engineers to archaeologists, from accountants to transmission line crews. They include almost 400 licensed Professional Engineers, more than 2,700 employees with undergraduate degrees, and more than a thousand with master's degrees. Almost a hundred have law degrees or PhDs; and about 270 employees participate in the rigorous, ongoing training required for them to maintain certifications as reactor operators at our nuclear plants.

Almost 20% of our employees are veterans; and they bring outstanding skills to the workforce, along with a deep commitment to service. TVA is honored to be recognized as a Top 10 Employer of U.S. veterans for five consecutive years, as well as a "Military Spouse Friendly Employer." TVA was also recognized in 2020 as a "Leading Disability Employer" for the second year in a row. We also have approximately 24,000 retirees and beneficiaries, with many serving as TVA ambassadors and volunteers in their communities.



# Built for the People

Our national charter is engraved in stone at many of our facilities: “Built for the People of the United States.” Our mission is to serve the people of the Tennessee Valley and the nation through leadership and innovation in Energy, the Environment and Economic Development. We are here to serve, and we are proud to continue to carry out TVA’s mission today and in our nation’s clean energy future.



