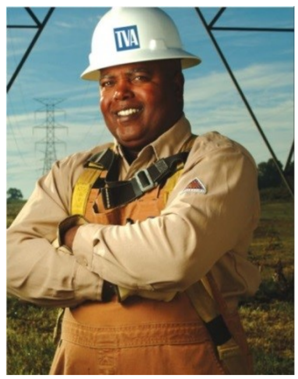
Tennessee Valley Authority

FY 2021 Budget Proposal & Management Agenda and FY 2019 Performance Report



For the Fiscal Year Ending
September 30, 2021

Submitted to Congress
February 10, 2020

TVA

Table of Contents

Introduction

TVA's Mission

TVA was built for the people, created by Congress in 1933 and charged with a unique mission of service – to improve the quality of life in a seven-state region through the integrated management of the region's resources. As it helped lift the Tennessee Valley out of the Great Depression, TVA built dams for flood control, provided low-cost power and navigation for commercial shipping, restored depleted lands, and raised the standard of living across the region. As times have changed, TVA has changed with them by updating and refining its work to accomplish its mission of providing affordable energy, economic development, environmental stewardship, integrated river system management, and technological innovation. While TVA's mission has remained constant since its inception, the environment in which TVA operates continues to evolve. The business and economic environment has become more challenging while the demand for power has remained effectively flat due to reduced customer usage and increased energy efficiency and demand response.

Strategic Imperatives

In order to continue its mission of service, TVA must continue to address four strategic imperatives: (1) rates: maintain rates as low as feasible, (2) debt: live within its means, (3) assets: manage its assets to meet reliability expectations and provide a balanced portfolio, and (4) stewardship: be responsible stewards of the region's natural resources. Through people performance excellence, TVA intends to continuously improve in these areas.

Rates

TVA is committed to providing energy at the lowest feasible cost, as specified in the Tennessee Valley Authority Act of 1933, as amended (the "TVA Act"). This customer focus requires scrutiny of all projects and use of resources so that the organization operates efficiently and responsibly.

Debt

TVA is committed to long-term debt management through a conservative approach to capital projects. While financing continues to be an important tool for funding TVA's long-term power system investments, the organization is committed to managing its debt under the ceiling established by Congress.

Asset Portfolio

Balancing TVA's assets with a diverse portfolio is vital to serving TVA's customers reliably and at the lowest cost. In 2019, the TVA Board of Directors ("Board" or "TVA Board") approved an updated Integrated Resource Plan ("IRP"), which provides strategic guidance on the resource mix to respond to changing market conditions while maintaining a reliable, low-cost, and clean supply of electricity for customers. The 2019 IRP demonstrates that TVA will continue to provide low-cost, reliable, and clean electricity into the future and that resource additions will build on TVA's existing diverse asset portfolio.

Stewardship

TVA's responsibility for stewardship of the waters and public lands of the Tennessee Valley was established in the TVA Act. These responsibilities include flood control, improved navigation of the Tennessee River, land and shoreline management, agricultural and industrial development, and employing environmentally responsible practices in its own operations. TVA is committed to its role in these areas as activities are planned for dam safety and reservoir operation enhancements, stabilization of eroding shorelines, and the redevelopment of surplus properties.

Power Program

TVA operates the nation's largest public power system and supplies power in most of Tennessee, northern Alabama, northeastern Mississippi, and southwestern Kentucky and in portions of northern Georgia, western North Carolina, and southwestern Virginia to a population of nearly 10 million people. In 1959, Congress passed an amendment to the TVA Act that required TVA's power program to be self-financing from power revenues and proceeds from power program financings. While TVA's power program did not directly receive appropriated funds after it became self-financing, TVA continued to receive appropriations for certain multipurpose and other non-power, mission-related activities as well as for its stewardship activities through 1999. TVA has not received any appropriations from Congress for any activities since that time, and now funds stewardship program activities primarily with power revenues, with the remainder funded with user fees and other forms of revenues derived in connection with those activities.

TVA received total power system appropriations of approximately $1.4 billion ("Power Program Appropriation Investment"). The 1959 amendment to the TVA Act also required TVA, beginning in 1961, to make annual payments to the U.S. Treasury from net power proceeds as a repayment of and as a return on the Power Program Appropriation Investment. With the 2014 payment, TVA fulfilled its requirement under the 1959 amendment to repay $1.0 billion of the Power Program Appropriation Investment. TVA has repaid $1.2 billion, including repayments made prior to 1959, along with interest of $2.6 billion, for total payments of $3.8 billion through September 30, 2019. The TVA Act requires TVA to continue making payments to the U.S. Treasury as a return on the remaining $258 million of the Power Program Appropriation Investment. The amount of the return on the Power Program Appropriation Investment is based on the Power Program Appropriation Investment balance at the beginning of each fiscal year and the computed average interest rate payable by the U.S. Treasury on its total marketable public obligations at the same date.

TVA now funds all its operations primarily from the sale of electricity and power system financings. TVA's power system financings consist primarily of the sale of debt securities and secondarily of alternative forms of financing, such as lease arrangements.

TVA is primarily a wholesaler of energy. It sells electricity to local power company customers ("LPCs") which then resell power to their customers at retail rates. TVA's LPCs consist of (1) municipalities and other local government entities ("municipalities") and (2) customer-owned entities ("cooperatives"). These municipalities and cooperatives operate public power electric systems whose primary purpose is not to make a profit but to supply electricity to the general public or the cooperative's members. TVA also sells power directly to certain end-use customers, primarily large commercial and industrial loads and federal agencies, including military installations, with loads larger than 5,000 kilowatts ("kW"). In addition, power in excess of the needs of the TVA system may, where consistent with the provisions of the TVA Act, be sold under exchange power arrangements with certain electric systems. In fiscal year ("FY") 2021, TVA expects sales of approximately 158 billion kilowatt-hours ("kWh") of electricity.

Power generating facilities operated by TVA at September 30, 2019 included 29 conventional hydroelectric sites, one pumped-storage hydroelectric site, six coal-fired sites, three nuclear sites, 17 natural gas and/or oil-fired sites, one diesel generator site, and 14 solar energy sites, although certain of these facilities were out of service as of September 30, 2019.

As of September 30, 2019, TVA's coal-fired units accounted for 7,886 megawatts ("MW") of summer net capability. The six coal-fired sites generated about 20 percent of the power from TVA-operated facilities, which excludes purchased power, during FY 2019. TVA's system also includes 101 generators powered by natural gas and/or oil with a total summer net capability of 12,509 MW. These generators can be quickly started and are vital for meeting peak electricity demands. These generators provided 23 percent of the power from TVA-operated facilities in FY 2019.

TVA's nuclear units had a combined summer net capability of 7,922 MW at September 30, 2019, and generated 46 percent of the power from TVA-operated facilities in FY 2019. TVA-owned hydroelectric units had a combined summer net capability of 5,400 MW at September 30, 2019, and generated about 12 percent of the power from TVA-operated facilities in FY 2019.

Integrated Resource Plan

TVA's Integrated Resource Plan is a long-term plan that provides direction on how TVA can best meet future demand for power. It shapes how TVA will provide low-cost, clean, reliable electricity; support environmental stewardship; and foster economic development in the Tennessee Valley for the next 20 years.

TVA's 2015 IRP identified distributed energy resources ("DER") as a growing trend in the utility industry and designed a mechanism where energy efficiency could be chosen as a resource. In order to maintain a focus on low-cost, clean, and reliable electricity, TVA updated its IRP in 2019 to adapt to changing market conditions. Completion of this process was collaborative with customers while including opportunities for stakeholder engagement through public meetings, webinars, the IRP working group, and work with the Regional Energy Resource Council ("RERC"). The IRP working group and RERC consist of representatives from LPCs, direct-served customers, non-governmental organizations, state and local governments, and academia. Stakeholders and the public provided invaluable input that helped shape the 2019 IRP.

The 2019 IRP demonstrates that TVA will continue to provide low-cost, reliable, and clean electricity into the future and that resource additions will build on TVA's existing diverse asset portfolio. The 2019 IRP provides guideline ranges for potential resource additions or retirements over the next 20 years, with results indicating the following:

- There is a need for new capacity in all scenarios to replace expiring or retiring capacity.
- Solar expansion plays a substantial role in all future scenarios.
- Gas, storage, and demand response additions provide reliability and/or flexibility to TVA's system.
- No baseload resources (designed to operate around the clock) are added, highlighting the need for operational flexibility in the resource portfolio.
- Coal retirements may occur in certain futures.
- Energy efficiency levels depend on market depth and cost-competitiveness.
- Wind could play a role if it becomes cost-competitive.
- In all cases, TVA will continue to provide for economic growth in the Tennessee Valley.

Recognizing that a variety of future scenarios are possible and each strategy has positive aspects, all IRP results were included in the recommended power supply mix to ensure flexibility to respond as the future unfolds. Per the National Environmental Policy Act ("NEPA"), TVA also prepared an Environmental Impact Statement ("EIS") to analyze potential impacts on the environment, economy, and population in the Tennessee Valley.

Results of the 2019 IRP indicate that the following near-term actions would provide benefits across multiple futures:

- Add solar based on economics and to meet customer demand.
- Enhance system flexibility to integrate renewables and distributed resources.
- Evaluate demonstration battery storage projects to gain operational experience.
- Pursue option for license renewal for TVA's nuclear fleet.
- Evaluate engineering end-of-life dates for aging fossil units to inform long-term planning.
- Conduct market potential study for energy efficiency and demand response.
- Collaborate with states and local stakeholders to address low-income energy efficiency across the Valley.
- Collaboratively deploy initiatives to stimulate the local electric vehicle market.
- Support development of Distribution Resource Planning for integration into TVA's planning process.

The 2019 IRP, EIS, and recommended power supply mix were approved by the Board in August 2019. TVA will monitor key signposts that will guide decisions in the longer term. Portfolio shifts will be driven by changing market conditions, evolving regulations, and technology advancements.

In an ever-changing world, TVA will continue to serve the people of the Tennessee Valley by providing low cost, reliable, and clean power in an environmentally responsible manner while promoting economic development across the region.

Transmission System

TVA's transmission system is a critical link in moving electricity throughout the eastern United States. In carrying out its responsibility for grid reliability in the TVA service area, TVA has operated with 99.999 percent reliability over the past 20 years in delivering electricity to customers. The TVA transmission system is one of the largest in North America. TVA's transmission system has 69 interconnections with 13 neighboring electric systems and delivered nearly 158 billion kWh of electricity to TVA customers in FY 2019. TVA continues to invest in transmission assets to strengthen system reliability and incorporate new technology that provides a clearer picture of grid conditions over a wider area at any given time.

TVA's transmission system interconnects with systems of surrounding utilities and consisted primarily of the following assets as of September 30, 2019:

- Approximately 2,500 circuit miles of 500 kilovolt, 11,700 circuit miles of 161 kilovolt, 2,000 circuit miles of other voltage transmission lines, and 3,500 miles of fiber;
- 510 transmission substations, power switchyards, and switching stations; and
- 1,314 customer connection points (customer, generation, and interconnection).

In May 2017, the TVA Board authorized up to $300 million to be spent over the next 10 years, subject to annual budget availability and necessary environmental reviews, to build an enhanced fiber network that will better connect TVA's operational assets. Fiber is a vital part of TVA's modern communication infrastructure. The new fiber optic lines will improve the reliability and resiliency of the generation and transmission system, improve TVA's communications with LPCs and other entities, and enable the system to better accommodate DER as they enter the market.

The Administration proposes to sell the electricity transmission assets of TVA. The vast majority of the Nation's electricity infrastructure is owned and operated by for-profit investor owned utilities. The Administration believes that eliminating the Federal government's role in owning and operating transmission assets encourages a more efficient allocation of economic resources and mitigates unnecessary risk to taxpayers.

Natural Resource Stewardship

TVA's natural resource stewardship work makes life in the Valley better, and it is a key part of TVA's mission of service. TVA serves the people of the TVA region through the integrated management of the Tennessee River System and public lands, including approximately 11,000 miles of shoreline, 650,000 surface acres of reservoir water, and 293,000 acres of reservoir lands. In addition, TVA manages over 170 agreements with private entities for commercial recreation (such as commercial campgrounds and marinas), manages 130 agreements with public agencies for public recreation (such as public parks, day use areas, boat launches, and swimming areas), and is directly responsible for over 80 public recreation areas throughout the Tennessee Valley. TVA accomplishes its mission and supports the objectives of the TVA Environmental Policy through implementation of its natural resource stewardship strategy. Within this strategy, TVA confirms a desire to remain agile, balance competing demands, and be a catalyst for collaboration in order to protect and enhance biological, cultural, and water resources, as well as create and sustain destinations for recreation and opportunities for learning and research. TVA assists water-based community development with technical support, land agreements, and permitting, using planning, clear regulations, meaningful guidelines, and consistent enforcement. Additional guidance for carrying out many of TVA's essential stewardship responsibilities is provided in TVA's Natural Resource Plan ("NRP"). Building on the natural resources stewardship strategy and a comprehensive review of the 2011 NRP conducted in 2016, TVA is updating the NRP to improve its efficacy and continue to provide a sound framework for balancing land use, human activity and conservation to achieve the greatest public benefit from our natural resources. TVA completed an environmental review of the proposed changes, which include changes to the NRP's structure and a more comprehensive approach to TVA's work in natural resource stewardship. As proposed, the 2020 NRP will provide a flexible approach for long-term planning that will help TVA be better equipped to prioritize funding plans, create efficiencies in business planning and stewardship project implementation, and align with TVA's mission. TVA plans to issue the NRP and associated Final Supplemental Environmental Impact Statement in early 2020.

Tennessee River System

Approximately 42,000 miles of rivers, streams, and tributaries, including the 652-mile-long Tennessee River, and 49 dams and 14 navigation locks constitute the Tennessee River System. It is a vital part of the nation's inland waterway system, transporting more than 50 million tons of cargo annually. In addition to supporting commercial navigation, TVA's integrated management of the river system supports recreation, public and industrial water supply needs, aquatic habitat protection, flood risk reduction, hydroelectric power production, and cooling water for TVA's generation units. The watersheds of the Tennessee River and its 16 tributaries encompass more than 41,000 square miles across 125 counties in portions of seven states.

Economic Development

Since its creation in 1933, TVA has promoted the development of the Tennessee Valley region. Economic development is a core component of the mission of TVA, along with energy production and environmental stewardship. TVA works with LPCs, regional, state and local agencies, and communities to showcase the advantages available to businesses locating or expanding in TVA's service area. TVA's primary economic development goals are to recruit major business operations to the Tennessee Valley, encourage the location and expansion of companies that provide quality jobs, and prepare communities in the Tennessee Valley for economic growth. TVA seeks to meet these goals through a combination of initiatives and partnerships designed to provide program support, technical services, industry expertise, financial assistance, and site-selection assistance to new and existing businesses. TVA's economic development efforts helped recruit or expand over 215 companies into the TVA service area during FY 2019. These companies announced capital investments of over $8.9 billion and the expected creation and/or retention of approximately 66,500 jobs.

Technology Innovation

TVA makes annual investments in science and technology innovation, assisting the agency in meeting business and operational challenges. TVA supports the optimization of its generation and delivery assets by focusing on emerging technological advances, grid modernization, electrification, grid edge technologies, and DER. TVA’s goal is to determine how technologies can be used to improve/sustain reliability, reduce costs, lower emissions to the environment, and position TVA for a sustainable future.

TVA seeks to leverage research and development activities and investments through partnerships with LPCs, the Electric Power Research Institute ("EPRI"), the Department of Energy, the Oak Ridge National Laboratory (“ORNL”) and other national labs, research consortiums, peer utilities, universities, vendors, and through participation in professional societies.

Commitment to the Future

TVA is a leader in public power, a model built on trust and partnerships with the people TVA serves. This model continues to deliver reliable electricity for nearly 10 million people and 700,000 businesses at the lowest feasible cost. It enables effective, integrated resource management and environmental stewardship in parts of seven southeastern states. TVA promotes alliances with others that help attract and retain jobs and investments that support economic development in the Tennessee Valley. TVA recognizes that the environment in which TVA does business continues to evolve. TVA is more flexible in its planning and more nimble in its execution and is also working to respond more quickly than ever to continually changing market conditions.

TVA continues to improve its operating and financial performance, including controlling O&M costs and adjusting capital spending based on market and regulatory conditions. One thing will not change – TVA’s commitment to providing safe, clean, reliable energy at rates as low as feasible. TVA is proud to honor this commitment.

Budget Overview

Asset Portfolio

TVA, like the rest of the electric utility industry, is challenged to meet customer demand with cleaner, reliable energy resources while maintaining rates as low as feasible, per the TVA Act. This can require the continuous review of capital investments in order to meet necessary operational needs. TVA funds asset investments through power revenues, the issuance of bonds up to a limit set by Congress, and alternative financings including lease financings.

TVA faces significant uncertainty from external factors such as weather, the economy, and decreased demand from energy efficiency and demand response initiatives. TVA's financial information includes estimates, which are affected by these and other changing conditions. TVA projects total revenue to be $10.7 billion in FY 2021, which includes revenues related to fuel cost recovery. The fuel cost recovery mechanism adjusts power rates monthly to reflect the changing costs of fuel, purchased power, and emission allowances.

In November 2013, the TVA Board approved the completion of a natural gas-fired facility at the Paradise Fossil Plant ("Paradise") site. Construction of the natural gas-fired facility has been completed, and the facility began commercial operations in April of 2017. After completion of the natural gas-fired units, TVA retired Paradise coal-fired Units 1 and 2 effective April 15, 2017. Paradise Unit 3 continues to operate; however, the Board voted at its February 2019 meeting to retire Paradise Unit 3 by December 2020, and to retire Bull Run Fossil Plant ("Bull Run") by December 2023 in order to maintain a low-cost and efficient generating fleet. Subsequent to the Board approval, TVA determined that Paradise would not be restarted after January 2020 due to the plant's material condition. Paradise Fossil Plant Unit 3 was taken offline on February 1, 2020, effectively retiring the plant.

TVA is also converting its wet ash and gypsum facilities to dry collection facilities. The estimated cost of its coal combustion residual ("CCR") conversion program is $3.0 billion through 2024. This program includes costs associated with pond closures, conversion of wet to dry handling, and landfill activities. TVA will continue to undertake CCR projects past 2024, including building new landfill sections under existing permits and closing existing sections once they reach capacity. As environmental studies are performed and closure methodologies are determined, detailed project schedules and estimates will be finalized.

TVA's nuclear fleet is an important element in a diversified portfolio for the future. On October 22, 2015, the Nuclear Regulatory Commission ("NRC") issued a forty-year operating license for Watts Bar Unit 2. Watts Bar Unit 2 officially became commercially operational on October 19, 2016, after completing the final phase of testing with a total completed cost within the $4.7 billion limit approved by the TVA Board. Also, as part of its efforts to maintain a well-balanced nuclear portfolio, TVA recently implemented an extended power uprate project at all three units of the Browns Ferry Nuclear Plant. As of September 30, 2019, physical work on all units was complete and the generation capacity is expected to increase 465 MW after sufficient run time to validate the new capacity.

In FY 2021, TVA estimates that it will invest about $2.4 billion in capital projects for the power system. These investments are subject to approval in the FY 2021 budgeting process.

Stewardship Funding

In the 1998 Energy and Water Development Appropriations Act, Congress directed TVA to fund essential stewardship activities related to its management of the Tennessee River system and nonpower or stewardship properties with power revenues. Congress has not provided any appropriations to TVA to fund such activities since 1999. Consequently, during 2000, TVA began paying for essential stewardship activities primarily with power revenues, and the remainder is funded with user fees and other forms of revenues derived in connection with those activities. TVA has not received federal appropriations for stewardship activities since 1999, and none are requested for FY 2021.

TVA Operating Budget

(Millions of dollars)

	2019 Actual	2020 Estimate	2021 Estimate
Revenue	$ 11,318	$ 10,751	$ 10,708
Operating Expenses			
Fuel & Purchased Power	(2,903)	(2,733)	(2,713)
Operating, Maintenance, & Other	(3,090)	(2,756)	(2,865)
Depreciation & Amortization	(1,973)	(1,890)	(1,645)
Tax Equivalents	(541)	(538)	(526)
Total Operating Expenses	(8,507)	(7,917)	(7,749)
Operating Income	2,811	2,834	2,959
Other Income	(196)	(220)	(207)
Interest Expense, net	(1,198)	(1,218)	(1,183)
Net Income	$ 1,417	$ 1,396	$ 1,569

Capital Budget & Cash Flow

(Millions of dollars)

	2019 Actuals	2020 Estimate	2021 Estimate
Cash flows from operating activities			
Net income	$ 1,417	$ 1,396	$ 1,569
Items affecting operating activities*	2,303	2,118	1,795
Net cash provided by operating activities	**3,720**	**3,514**	**3,364**
Cash Used in Capital Budget			
Capital Projects			
Nuclear	(282)	(299)	(308)
Power Operations	(215)	(192)	(187)
River Operations	(107)	(140)	(155)
Transmission	(181)	(182)	(173)
Other Base Capital	(158)	(242)	(258)
Total Base Capital	(943)	(1,055)	(1,081)
Ash Remediation	(212)	(170)	(133)
Water Remediation	(77)	(83)	(73)
Total Environmental Costs	(289)	(253)	(206)
CT Expansion Builds	-	(14)	(546)
Hydro	(112)	(170)	(74)
Other Capacity Expansion	(356)	(491)	(484)
Total Capacity Expansion	(468)	(675)	(1,104)
Nuclear Fuel Capital	(474)	(358)	(427)
Other Investing Activities	(69)	(66)	(65)
Net cash used in investing activities	**(2,243)**	**(2,407)**	**(2,883)**
Borrowings (net of redemptions)	(1,292)	(973)	(209)
Other financing activities	(185)	(134)	(272)
Net cash provided by financing activities	**(1,477)**	**(1,107)**	**(481)**
Net change in cash and cash equivalents	-	-	-
Cash and cash equivalents at beginning of year**	299	299	299
Cash and cash equivalents at end of year**	299	299	299
Cash Payments to U.S. Treasury***	(6)	(7)	(7)
Increase/(Reduction) in Total Debt and Debt-Like Obligations	$ (1,463)	$ (1,077)	$ (451)

* Kingston Ash Spill, Bellefonte, and Ash ARO expenses are included in Operating Activities

** Beginning and ending cash equivalents exclude restricted cash

*** For federal reporting purposes Payments to U.S. Treasury are not considered

Note: Included budget estimates are subject to change by TVA management and the TVA Board.

Business Plan

TVA is governed by the nine-member TVA Board of Directors, which is responsible for approving an annual budget. The information in this document is based on the FY 2020 annual budget, which was approved by the TVA Board in August 2019. The following were considered in preparing the budget.

Borrowing Limit

TVA works to fulfill its mission of supplying low cost and reliable energy, providing environmental stewardship, and stimulating economic development while effectively managing debt and living within its means. In achieving its mission while following sound financial principles, TVA generally uses financing to fund capital investments for new generation capacity and environmental controls.

TVA has the authority per the TVA Act to issue bonds, notes, and other evidence of indebtedness subject to a $30 billion limit, sometimes referred to as TVA's statutory debt limit. TVA bonds are not backed by the full faith and credit of the federal government and do not count against the United States federal debt limit. Congress last raised TVA's borrowing authority in 1979. As of September 30, 2019, TVA had $ 21.4 billion of bonds and notes outstanding. Bonds and notes are generally the lowest-cost form of financing available to TVA.

While the $30 billion limit on bonds and notes has not been raised since 1979, TVA's business and operations have continued to grow along with the power needs of the Tennessee Valley. Since 1979, TVA has increased its total assets from $13 billion to $50 billion as of September 30, 2019. TVA's balance of total financing obligations ("TFOs"), which includes statutory debt and other financing obligations, is projected to decrease by $1.1 billion in FY 2020. This reduction, which follows an FY 2019 reduction of $1.5 billion, is consistent with TVA's FY 2014 plan and initiative to reduce debt levels to $21.8 billion by FY 2023. TVA will continue to effectively manage its debt in a responsible manner and remain below the statutory debt limit.

TVA Retirement System

The TVA Retirement System ("TVARS") was established by the TVA Board in 1939 to provide retirement benefits for TVA employees. TVARS is a separate legal entity from TVA and is governed by its own board of directors consisting of seven members ("TVARS Board"): three elected by and from active employees who are members of TVARS, three appointed by TVA, and a seventh selected by the other six who is a TVA retiree. TVARS administers a defined benefit (pension) plan and a 401(k) plan, both of which are tax-qualified retirement plans under section 401(a) of the Internal Revenue Code.

As of September 30, 2019, the pension plan had assets of $8.0 billion compared with liabilities of $13.3 billion and currently pays out approximately $715 million per year in retirement benefits to approximately 23,000 retirees and beneficiaries. The 401(k) plan currently has $2.8 billion in assets.

TVA is committed to funding the retirement benefits for current and future retirees and beneficiaries under the pension plan, and as evidence of this commitment, has worked with the TVARS Board in recent years to implement several significant changes to improve the long-term health of the plan. The first change closed the pension plan to new employees – employees who were hired on or after July 1, 2014 receive retirement benefits under the 401(k) plan only.

In 2016, additional amendments were approved by the TVARS Board and TVA that shifted future benefit accruals for current employees from the pension plan to the 401(k) plan based on the employees' hire date and years of service. For approximately 7,700 employees, TVA increased non-elective and matching contributions to the 401(k) plan to offset reduced accruals in the pension plan.

As part of these amendments, TVA also committed to increased annual contributions to the pension plan of at least $300 million for a period of 20 years (from FY 2017 through FY 2036) or until the plan is fully funded, whichever occurs first. As further demonstration of TVA's commitment to fund retirement benefits, TVA made a discretionary contribution of $500 million in FY 2017 to the pension plan, for a total contribution amount of $800 million for the fiscal year.

In May 2018, the TVARS Board and TVA approved additional amendments to the pension plan and 401(k) plan that allowed employees who are continuing to accrue cash balance pension benefits in the pension plan to voluntarily elect to switch future participation to the 401(k) plan only. It also allowed employees with cash balance accounts in the pension plan who have a 401(k) only benefit the additional option to waive their rights to benefits under the pension plan and transfer their cash balance accounts to the 401(k) plan. Under the plan amendments, the voluntary election options were offered to eligible TVA employees during a two-month window from July 2018 to August 2018, with changes and transfers becoming effective on October 1, 2018. As a result, there were $23 million of one-time transfers to the 401(k) plan based upon employee elections.

All retirement benefit payments continue to be made by TVARS to retirees and beneficiaries, and with the recent amendments to the plans, along with TVA's increased contributions to fund benefits, the pension plan remains on-track to achieve 100% funded status by FY 2036.

Coal-Fired Fleet Evaluation

TVA began constructing its coal-fired plants in the 1940s, and its coal-fired units were placed in service between 1951 and 1973. Coal-fired units are in either active or retired status. TVA considers a unit to be in an active state when the unit is generating, available for service, or temporarily unavailable due to equipment failures, inspections, or repairs. All other coal-fired units are considered retired. As of September 30, 2019, TVA had six coal-fired plants consisting of 26 active units. These active units accounted for 7,886 MW of summer net capability at September 30, 2019.

Coal-fired plants have been subject to increasingly stringent regulatory requirements over the last few decades, including those under the Clean Air Act ("CAA"), the Environmental Protection Agency's ("EPA") Coal Combustion Residuals Rule, and the associated regulations. TVA has committed to a programmatic approach for the evaluation of its sites where CCR is stored to meet all applicable state and federal regulations. Increased regulatory costs have caused TVA to consider whether to make the required capital investments to continue operating its coal-fired facilities.

TVA is moving toward a more balanced generation plan with greater reliance on lower-cost and cleaner energy generation technologies. Since September 30, 2010, TVA has reduced its summer net capability of coal-fired units by 6,682 MW. The 2019 IRP indicated evaluation of additional coal unit retirements if cost effective. Most of TVA's coal-fired plants are among the oldest in the nation still in operation, and with increasing amounts of solar generation expected to be utilized by TVA in the future, TVA's long-range plans will continue to consider the costs and benefits of significant environmental and other major capital investments at its coal-fired plants.

Coal Combustion Residuals Facilities

TVA has committed to a programmatic approach to the elimination of wet storage of CCRs within the TVA service area. Under this program (the "CCR Conversion Program"), TVA is converting all operational coal-fired plants to dry CCR storage and closing all wet storage facilities. To carry out its CCR Conversion Program, TVA is undertaking the following actions:

- Dry generation and dewatering projects: Conversion of coal plant CCR wet processes to dry generation or dewatering is complete at Bull Run, Shawnee Fossil Plant ("Shawnee"), Kingston Fossil Plant ("Kingston"), and Gallatin Fossil Plant ("Gallatin"). Construction is also underway at Cumberland Fossil Plant ("Cumberland") and is scheduled for completion in late 2020. Fly ash and gypsum conversion projects at Paradise were complete during the third quarter of 2019.

- Landfills: TVA has made strategic decisions to build and maintain lined and permitted dry storage facilities on TVA-owned property at several TVA locations, allowing these facilities to operate beyond existing dry storage capacity. Currently, lined and permitted dry storage facilities are completed and operational at Bull Run, Kingston, and Gallatin, and a lined dry storage facility at Paradise has been constructed but is not yet operational. A lined dry storage facility at Shawnee is currently under construction with completion scheduled for September 2020. Construction of a lined dry storage facility at Cumberland is expected to start in 2021. Kingston's permitted lined dry storage expansion is scheduled for completion in 2021. TVA is designing and permitting a lateral expansion of the existing landfill at Gallatin. Additionally, TVA is initiating the design and permitting process for a new lined landfill at Bull Run, but no decision to construct the facility has been made at this time. Construction of additional lined facilities may occur to support future business requirements.

- Wet CCR impoundment closure: TVA is working to close wet CCR impoundments in accordance with federal and state requirements. Closure project schedules and costs are driven by the selected closure methodology (such as closure-in-place or closure-by-removal). Closure initiation dates are driven by environmental regulations. TVA's predominant closure methodology is closure-in-place, with exceptions at certain facilities. TVA issued an EIS in June 2016 that addresses the closure of CCR impoundments at TVA's coal-fired plants. TVA issued its associated Record of Decision in July 2016. Although the EIS was designed to be programmatic in order to address the mode of impoundment closures, it specifically addressed closure methods at 10 impoundments. TVA subsequently decided to close those impoundments.

The method of final closure for each of these facilities will depend on various factors, including the results of studies conducted pursuant to NEPA and approval by appropriate state regulators. Additional NEPA studies will be conducted as other facilities are designated for closure.

- Groundwater monitoring: Compliance with the EPA's CCR rule (the "CCR Rule") as well as other requirements will require additional engineering and analysis as well as implementation of a comprehensive groundwater monitoring program. As further analyses are performed, including evaluation of monitoring results, there is the potential for additional costs for investigation and/or remediation. TVA expects to continue to evaluate and update these cost estimates.

In compliance with the CCR Rule, TVA published the results of additional groundwater testing at TVA's CCR facilities on March 1, 2019. The results included values above groundwater protection standards for some constituents at several CCR units. Accordingly, TVA will have to cease sending CCR and non-CCR waste streams to any impacted unlined CCR surface impoundments no later than October 31, 2020 (and potentially earlier due to location demonstration results) and initiate additional corrective actions for groundwater. TVA is developing these corrective actions and published Assessment of Corrective Measures reports to its CCR website in August 2019. Due to location demonstration results, TVA has already ceased sending waste streams to one impoundment at Allen and three impoundments at Gallatin. As required by the CCR Rule, TVA will continue to publish reports in the second quarter of each year on annual groundwater monitoring and corrective actions at its active CCR facilities.

TVA has been involved in two lawsuits concerning the CCR facilities at Gallatin. One of these cases was resolved by the entry of a consent order that became effective July 31, 2019. TVA agreed to close the existing wet ash impoundments by removal, either to an onsite landfill or to an offsite facility. TVA may also submit a plan that allows for beneficial reuse. TVA is currently conducting additional studies and environmental reviews to support its determination of the specific removal plans. The other case was decided in TVA’s favor.

In October 2019, the Tennessee Department of Environment and Conservation ("TDEC") released amendments to its regulations which govern solid waste disposal facilities, including TVA's active CCR facilities covered by a solid waste disposal permit and those which closed pursuant to a TDEC approved closure plan. Such facilities are generally subject to a 30-year post-closure care period during which the owner or operator must undertake certain activities, including monitoring and maintaining the facility. The amendments will, among other things, add an additional 50-year period after the end of the post-closure care period, require TVA to submit recommendations as to what activities must be performed during this 50-year period to protect human health and the environment, and require TVA to submit revised closure plans every 10 years. TVA is currently evaluating the amendments to determine their potential impact on TVA and anticipates that the costs of complying with the amendments could be material.

As of September 30, 2019, TVA had spent approximately $1.8 billion on its CCR Conversion Program. TVA expects to spend an additional $1.2 billion on the CCR Conversion Program through 2024. These estimates may change depending on the final closure method selected for each facility. Once the CCR Conversion Program is completed, TVA will continue to undertake certain CCR projects, including building new landfill cells under existing permits and closing existing cells once they reach capacity.

Variable Interest Entities

On August 9, 2013, TVA entered into a lease financing arrangement with Southaven Combined Cycle Generation LLC ("SCCG") for the lease by TVA of the Southaven Combined Cycle Facility ("Southaven CCF"). SCCG is a special single-purpose limited liability company formed in June 2013 to finance the Southaven CCF through a $360 million secured notes issuance and the issuance of $40 million of membership interests subject to mandatory redemption. The membership interests were purchased by Southaven Holdco LLC (“SHLLC”). SHLLC is a special single-purpose entity, also formed in June 2013, established to acquire and hold the membership interests of SCCG. A non-controlling interest in SHLLC is held by a third-party through nominal membership interests, to which none of the income, expenses, and cash flows of SHLLC are allocated. The membership interests held by SHLLC were purchased with proceeds from the issuance of $40 million of secured notes and are subject to mandatory redemption pursuant to scheduled amortizing, semi-annual payments due each August 15 and February 15, with a final payment due on August 15, 2033.

On January 17, 2012, TVA entered into a $1.0 billion construction management agreement and lease financing arrangement with John Sevier Combined Cycle Generation LLC ("JSCCG") for the completion and lease by TVA of the John Sevier Combined Cycle Facility ("John Sevier CCF"). JSCCG is a special single-purpose limited liability company formed in January 2012 to finance the John Sevier CCF through a $900 million secured notes issuance and the issuance of $100 million of membership interests subject to mandatory redemption. The membership interests were purchased by John Sevier Holdco LLC ("Holdco"). Holdco is a special single-purpose entity, also formed in January 2012, established to acquire and hold the membership interests in JSCCG. A non-controlling interest in

Holdco is held by a third-party through nominal membership interests, to which none of the income, expenses, and cash flows of Holdco are allocated. The membership interests held by Holdco in JSCCG were purchased with proceeds from the issuance of $100 million of secured notes and are subject to mandatory redemption pursuant to scheduled amortizing, semi-annual payments due each January 15 and July 15, with a final payment due on January 15, 2042.

Wholesale Rate Structure Changes

Since the fall of 2013, TVA, LPCs, and directly served industries have worked collaboratively to develop changes to TVA's rates that focus on TVA's long-term pricing efforts. A comprehensive rate restructuring was implemented in October 2015 to improve pricing by better aligning rates with underlying cost drivers and to send improved pricing signals while maintaining competitive industrial rates and keeping residential rates affordable.

Consistent with the pricing goals and changes implemented through the 2015 rate restructuring, TVA staff recommended and the TVA Board approved the proposed 2018 rate change on May 10, 2018. This change reduced wholesale energy rates for standard service customers and introduced a Grid Access Charge ("GAC") at an offsetting rate to better recover fixed costs. The net impact to TVA, as a result of this change, was designed to be revenue neutral. The 2018 rate change better reflects the wholesale cost of energy and recognizes the value of the grid's reliability and associated fixed costs. This modernized approach to pricing provides bill stability while maintaining reliability and fairness for all TVA customers. Concurrent with this process, an Environmental Assessment was completed on May 4, 2018, resulting in a finding of no significant impact.

Recognizing the need for flexibility, all LPCs were presented with the option to implement the wholesale changes in October 2018 or defer the implementation of the GAC until October 2019. Seventy-nine LPCs implemented the GAC in October 2018, while the remaining 75 LPCs implemented the wholesale changes in October 2019. In May of 2019, the TVA Board approved a change to the wholesale power rate schedules providing a mechanism to adjust the GAC for large changes in LPC load. This change helps ensure the equitable administration of the GAC.

Additionally, at its August 22, 2019 meeting, the TVA Board approved a 20-year Partnership Agreement option that better aligns the length of LPC contracts with TVA's long-term commitments. These agreements are automatically extended for an additional year each year after their initial effective date. Participating LPCs will receive benefits including a 3.1 percent wholesale bill credit in exchange for their long-term contractual commitment, which enables TVA to recover its long-term financial obligations over a commensurate period. As of December 2019, 134 LPCs had signed the 20-year Partnership Agreement with TVA.

Renewable Energy and Emerging Technologies

TVA's renewable energy portfolio includes both TVA-owned assets and renewable energy purchases. TVA owns 14 solar sites with a total net summer capability of approximately 1 MW. Certain coal-fired units have the capability for digester gas and biomass co-firing, which is accounted for as coal-fired generation summer net capability.

TVA tracks its renewable energy commitments and claims through the management of renewable energy certificates ("RECs"). The RECs, which each represent 1 megawatt hour ("MWh") of renewable energy generation, are principally associated with wind, solar, biomass, and low-impact hydroelectric. TVA also acquires RECs from renewable purchased power.

Consumer desire for energy choice is, among other things, driving the expectation for flexible options in the electric industry. TVA and LPCs are working together to leverage the strengths of the Tennessee Valley public power model to provide distributed energy solutions that are economic, sustainable, and flexible. TVA will focus on the safety and reliability impacts of these resources as they are interconnected to the grid and will ensure that the pricing of electricity remains as low as feasible. Additional regulatory considerations and analysis may be required as the DER market, technologies, and programs evolve. TVA will work to develop pricing and regulatory structures with a deliberate and thoughtful analysis of each current and future program offering. This requires strong partnerships with LPCs to reinforce local control, provide customers choices, and provide end-use consumers the flexibility they desire.

TVA has encouraged the development of solar, wind, biomass, and low-impact hydroelectric generation systems across the Tennessee Valley through various current and former offerings. As of September 30, 2019, the combined participation for all such renewable solutions is 415 MW of installed operating capacity with nearly 685 MW of additional approved capacity. Additionally, TVA contracts for approximately 1,215 MW of operating wind capacity from outside the Tennessee Valley via power purchase agreements.

New energy management systems and energy storage technologies present opportunities for more sophisticated and integrated operation of the entire grid. The advent of electric vehicles and small-scale renewable generation has hastened the development of battery technologies that have the potential to mitigate the intermittent supply issues associated with many renewable generation options. Implementation of these technologies, in conjunction with two-way communication to the site, creates the potential for more efficient usage of other DER on the grid.

Onsite energy management technologies and the proliferation of companies interested in providing services to support and aggregate the impacts of such systems provide another DER opportunity. Such systems can afford the consumer benefits through reduced consumption, increased comfort, detailed energy use data, and savings from time-sensitive rate structures. TVA and LPCs must consider the integration of the impacts from changes in energy usage patterns resulting from the operation of such systems.

Demand response systems that take advantage of the increasing sophistication in communication to homes, businesses, and distribution system assets also afford the opportunity for more granular control of system demand.

Payments in Lieu of Taxes

TVA provided over $547 million in tax equivalent payments in FY 2019 to state and local governments where it sells electricity or has power properties. TVA pays tax equivalent payments annually to the eight states where it sells electricity or owns generating plants, transmission lines, substations or other power assets, and directly to 147 county governments where TVA owns power properties that were previously privately owned and operated and subject to ad valorem taxes.

The TVA Act requires TVA to return five percent of its gross proceeds from the sale of power during the previous fiscal year (excluding sales or deliveries to other federal agencies, off-system sales with other utilities, and power used by TVA, with a provision for minimum payments under certain circumstances) in the form of tax equivalent payments. The payments compensate state and local governments that cannot levy property or sales tax on TVA as a federal entity and make TVA one of the largest “taxpayers” in Tennessee and Alabama.

State and local governments distribute the funds according to their own formulas and discretion to support a variety of initiatives, including schools, fire departments and other emergency response agencies, tourism and recreation, and human service organizations.

Since 1941, TVA has paid more than $14 billion in tax equivalent payments, with payments in the past 10 years totaling more than $5 billion.

Management Initiatives

Financial Plan

In August 2019, the TVA Board approved an annual budget that reflects the first year of a new Strategic Financial Plan. The Strategic Financial Plan, which extends from FY 2020 through FY 2030, is flexible in aligning customer preferences and TVA's mission while at the same time establishing a long-term forecast of financial results. Key focus areas of the Strategic Financial Plan include (1) establishing better alignment between the length of LPC contracts and TVA's long-term commitments, (2) stabilizing debt in an $18-$20 billion range, (3) maintaining rates as low as feasible, (4) maintaining current levels of cash, and (5) pursuing operational efficiencies.

Establish Better Alignment between LPC Contracts and TVA's Long-Term Commitments
Long-term power planning requires TVA to make long-term financial commitments. As of October 1, 2018, the weighted average length of the notice period under TVA's wholesale power contracts with LPCs was less than 7 years. TVA measures the alignment between its committed revenues and total obligations through a measure known as Net Portfolio Position. In order to better align customer contractual commitments with TVA's overall financial obligations, a long-term partnership proposal was made available to TVA's 154 LPCs on August 22, 2019, after Board approval. Under this long-term partnership proposal, LPCs that agree to contractual changes, which include a rolling 20-year term and a termination notice period of 20 years, will receive a long-term partner credit. That credit is currently 3.1% of wholesale standard service demand, energy, and grid access charges. TVA's effective wholesale rate and annual revenues will decline as LPCs commit to becoming long-term partners, but TVA's overall financial health will improve through better alignment of customer contract terms with TVA's overall financial obligations. As part of the agreement, TVA has also committed to collaborating with LPCs who execute the long-term agreement to develop and provide enhanced power supply flexibility for 3-5% of LPC energy, by October 1, 2021, with pricing and planning considerations mutually agreeable between the LPC and TVA. As of December 31, 2019, 134 of the 154 LPCs served by TVA have signed the long-term partnership proposal, thus closing the gap between TVA's committed revenues and long-term obligations.

Stabilize Debt at $18-$20 Billion
Under TVA's previous financial plan, which was adopted in the FY 2014 planning cycle, the TVA Board approved a strategic debt reduction goal to reduce TFOs to $21.8 billion by FY 2023. TVA remains committed to achieving this goal and is well positioned to do so given the strong financial and operational performance achieved to date. Beyond FY 2023, TVA is committed to further debt reduction with a goal of stabilizing debt at $18-$20 billion based on long-term partner participation and achieving a 50/50 or better capitalization structure.

Maintain Rates as Low as Feasible
Rates as low as feasible are part of TVA's mission, and TVA remains committed to serving its customers at the lowest feasible rate. The strategic debt goal adopted in the previous financial plan was predicated on TVA's Board approving modest annual base rate actions of 1.5 percent of the retail rate, as long as rates remained competitive. Those rate actions were approved from FY 2014 through FY 2019 (six years), but TVA's strong financial and operational performance in recent years allowed TVA to forego the FY 2020 rate action, and TVA does not anticipate any near-term rate actions as being needed. TVA remains committed to providing all customers with stable wholesale rates while also offering long-term partners the opportunity for wholesale credits via the long-term partner proposal.

Maintain Current Levels of Cash
TVA is committed to maintaining its current cash target of $300 million. TVA has maintained a cash balance of approximately $300 million since the end of FY 2015. Maintaining a higher level of cash requires a higher level of both debt and annual interest expense, so TVA is committed to continue to focus on treasury management and maintaining the necessary liquidity to support maintaining a cash balance of $300 million.

Pursue Operational Efficiencies
As part of its previous financial plan, TVA embarked upon an aggressive initiative in FY 2013 to align O&M spending with revenues by reducing its non-fuel O&M expenses by $500 million by FY 2015 compared with the FY 2013 budget. TVA exceeded this goal with an actual reduction of over $800 million. Similarly, TVA's efforts to further modernize and diversify its portfolio of generating assets have allowed TVA to reduce its annual fuel and purchased power expense by over $1 billion. TVA remains committed to holding cost escalation below inflation levels while also maintaining the fuel cost benefits of a diverse portfolio and improving the performance of its nuclear fleet to further reduce fuel costs.

Designing and Implementing Energy Programs and Services

TVA is working with customers to develop and execute energy programs and services that make life better for the people of the Valley. These products and services are typically offered to consumers in partnership with LPCs, and are generally designed to provide energy efficiency, demand response, or electrification objectives. These offerings also help TVA and the LPCs position themselves as the trusted energy advisors, innovators, and energy providers of choice as the utility industry enters an era of greater competition.

The EnergyRight® offerings continue to engage customers through services promoting the wise use of energy including residential, commercial, industrial, and power systems initiatives. Current EnergyRight® resources that are being implemented include the following:

- **Energy Efficiency** – Offer services that make TVA's customers more productive and comfortable, lower customer costs, and position LPCs and TVA as trusted energy providers.
- **Smart Electric Technologies (Electrification)** – Promote smart electric technologies, like electric vehicles, space heating, and industrial processes, to make TVA's customers more productive and sustainable while generating efficient load and revenue for LPCs and TVA.
- **Demand Response** – Provide more than 1,600 MW of economical capacity while lowering rates for participating customers. This resource lowers TVA's peak demand and offsets the need for additional generation.

TVA continues to research and support products and services that benefit TVA's customers in the wise use of energy, increase efficient load, and manage peaks, as each of these efforts is consistent with TVA's mission of service and keeping rates as low as feasible.

Cybersecurity

TVA has an established risk-based Cybersecurity Program designed to ensure alignment with applicable regulations, industry requirements, and best practices. The program includes multi-layer security standards, training, and metrics that assign clear accountability for all cybersecurity activities throughout TVA. Security controls are integrated into business processes, enabling timely, coordinated, effective, and efficient execution of the program across TVA. Cybersecurity management processes are implemented agency-wide with the goal of being systematic, repeatable, and effective in achieving the strategic security goals of the program.

The budget of the Cybersecurity Program is allocated to responsible organizations to improve accountability and provide transparency. Budgeting and planning for the program's components are integrated into the business planning process and are maintained in a three-year cybersecurity strategic plan. The plan will be modified to upgrade TVA's capabilities as technology, threat vectors, and business requirements change.

Securing timely, accurate, and reliable information is critical to the success of the TVA mission and the role it plays as a National Critical Infrastructure Key Resource and Bulk Electric System provider. The Cybersecurity Program objectives are aligned with TVA's business strategy and support the goals of the enterprise. TVA uses a full spectrum defense security model to identify, protect, detect, respond, and recover from threats against its systems. TVA plans to invest approximately $60 million to $80 million in its Cybersecurity Program between FY 2020 and FY 2022 to ensure it meets its mission objectives.

People/Stewardship

TVA's mission includes managing the Tennessee River, its tributaries, and federal lands along the shoreline to provide year-round navigation, flood damage reduction, affordable and reliable electricity, and, consistent with these primary purposes, recreational opportunities, adequate water supply, improved water quality, and natural resource protection. TVA's integrated reservoir system is composed of 49 dams, and each may have ancillary structures to support or assist the main dam's function. The reservoir system provides approximately 800 miles of commercially navigable waterways and also provides significant flood reduction benefits throughout the Tennessee River system and further downstream on the lower Ohio and Mississippi Rivers. The reservoir system also provides water supply for residential and industrial customers, as well as cooling water for TVA's coal-fired, combined cycle, and nuclear power plants.

Flood control is an important outcome of TVA's mission of environmental stewardship. Over the years, TVA personnel have worked to avert billions of dollars of damage in the Tennessee Valley. As of September 30, 2019, TVA had spent $153 million on modifications and improvements related to extreme flooding preparedness and expects to spend up to an additional $27 million to complete the modifications. TVA continues its flood resilience and dam safety initiatives, including remediation efforts at Boone Dam.

Navigation on the Tennessee River is made possible by a system of dams and locks and contributes to the regional economy. TVA owns 14 lock chambers at 10 dam sites on the Tennessee River and one tributary. The U.S. Army Corps of Engineers operates and maintains these locks for navigation. This provides an alternative mode of transportation for businesses in the region to ship their products. Barges can move bulk cargo on 652 miles of the Tennessee River, which ends where it flows into the Ohio River near Paducah, Kentucky. Secondary channels provide approximately 150 miles of additional commercially navigable waterways.

TVA's Environmental Policy provides objectives for an integrated approach related to providing cleaner, reliable, and low-cost energy, supporting sustainable economic growth, and engaging in proactive environmental stewardship in a balanced and ecologically sound manner. The Environmental Policy provides additional direction in several environmental stewardship areas, including water resource protection and improvements, sustainable land use, and natural resource management.

TVA's NRP, issued in August 2011, serves as a 20-year guide for TVA's essential stewardship efforts for managing biological resources (plants, animals, and aquatic species), cultural resources (archaeological sites, historical sites, and artifacts), recreation, water resources, reservoir land planning, and public engagement within its seven-state service area. The NRP also guides TVA in achieving the objectives of its Environmental Policy for a more systematic and integrated approach to fulfilling its essential stewardship responsibilities. The NRP was developed with public input including participation from federal and state resource management agencies and the Regional Resource Stewardship Council ("RRSC"). Members of the RRSC, established in March 2000, represent public and private stakeholders affected by TVA's management of the river system. The RRSC provides recommendations on TVA's stewardship activities.

TVA remains committed to a balanced management approach and is considering changes to the NRP that include objectives and programs for each focus area and a flexible approach for long-term planning. These changes align with TVA's mission and will help TVA be better equipped to prioritize funding plans and create efficiencies in business planning and stewardship project implementation. In FY 2018, TVA initiated a multi-year effort to update the NRP and released a draft Supplemental Environmental Impact Statement ("SEIS") in May 2019 to supplement the 2011 environmental review and examine the potential impacts associated with these changes. The draft NRP and SEIS were made available for public review and comment until July 8, 2019. During the public review period, TVA held meetings around the Tennessee Valley and hosted a webinar. TVA is currently drafting the final SEIS and 2020 NRP, which are expected to be published in the second quarter of 2020.

In managing the watershed, TVA balances water quality protection with other demands for water use. TVA has installed and is maintaining equipment at several dams to help provide the flows and oxygen levels needed for a healthy aquatic community in tailwaters (the areas immediately downstream from dams). As part of the NRP, TVA has implemented several programs to improve water resources including Tennessee Valley Clean Marinas, Sentinel Monitoring, Aquatic Ecological Management, and a Strategic Partnership Initiative. Under the Stream and Tailwater Monitoring Program in the NRP, TVA performs annual monitoring and analysis of streams and rivers within the Tennessee River Watershed. Upon request, TVA provides the monitoring data to other agencies, educational institutions, non-government organizations, and stakeholders.

Air Quality in the Tennessee Valley

The CAA establishes a comprehensive program to protect and improve the nation's air quality and control sources of air pollution. The major CAA programs that affect TVA's power generation activities are described as follows.

Mercury and Air Toxics Standards for Electric Utility Units. The U.S. Court of Appeals for the District of Columbia Circuit ("D.C. Circuit") upheld the Mercury and Air Toxics Standards ("MATS") rule on April 15, 2014. In June 2015, however, the U.S. Supreme Court left the rule in place but remanded it back to the D.C. Circuit, finding that the EPA was required to consider cost before deciding whether the regulation of hazardous air pollutants ("HAP") emitted from steam electric utilities was appropriate and necessary. In response to the Supreme Court's remand, the EPA published the final *Supplemental Finding That It is Appropriate and Necessary to Regulate Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units* (the "Supplemental Finding") in April 2016. Several groups filed petitions with the D.C. Circuit challenging the supplemental finding. On December 27, 2018, the EPA released a proposed rule to replace the Supplemental Finding with a new finding that it is not appropriate and necessary to regulate HAP emissions from steam electric utilities. However, the EPA also proposed that notwithstanding this new finding, it would not remove electric generating units from the source categories listed under Section 112 of the CAA and it would not rescind the MATS requirements. Additionally, the EPA proposed to find that further restrictions on HAP emissions are not warranted upon conducting a residual risk and technology review for this source category. Until a final rule is issued, specific impacts to TVA cannot be determined; however, as proposed, the rule would not change TVA's MATS compliance requirements or strategy.

Affordable Clean Energy Rule. On June 19, 2019, the EPA finalized the final Affordable Clean Energy ("ACE") rule and repealed the Clean Power Plan. The ACE rule establishes guidelines for greenhouse gas ("GHG") emissions from existing coal-fired units based on efficiency improvements that can be achieved at those units at reasonable cost. States are required to apply the emission guidelines to coal-fired units within their respective jurisdictions and take into account the remaining useful life of those units. The impact of the ACE rule on TVA's coal-fired units cannot be determined until Tennessee and Kentucky submit to the EPA their state implementation plans ("SIPs") implementing guidelines in the ACE rule and the EPA approves these SIPs. The ACE rule allows states three years to submit their SIPs and allows the EPA 18 months for approval.

New Source Performance Standards. On December 6, 2018, the EPA proposed revisions to the GHG emission standards for new, modified, and reconstructed electric utility generating units that were finalized by the EPA in October 2015. For coal-fired units, the EPA proposes to revise the current new source standards such that carbon capture and sequestration technology are no longer necessary to meet the standards of performance that reflect the best system of emission reduction. The resulting limits are less stringent than limits under the current rule and can be met by modern coal-fired units (e.g., supercritical steam generators) in combination with best operating practices, but without carbon capture and sequestration. The EPA is not proposing to revise the new source performance standard for GHG emission from gas-fired units. If finalized as proposed, the revisions are not expected to significantly impact TVA since TVA does not currently plan to construct, modify, or reconstruct any coal-fired units.

New York Petition to Address Impacts from Upwind High Emitting Sources. In March 2018, the State of New York filed a petition with the EPA under Section 126(b) of the CAA to address ozone impacts on New York from the nitrogen oxide (“NO_x”) emissions from sources emitting at least 400 tons of NO_x in calendar year (“CY”) 2017 from nine states including Kentucky. The New York petition requests that the EPA require daily NO_x limits for utility units with selective catalytic reduction systems (“SCRs”) such as Paradise Unit 3 and emission reductions from utility units without SCRs such as Shawnee Units 2, 3, and 5-9. On April 12, 2019, the State of New York filed a lawsuit against the EPA asking the U.S. District Court for the Southern District of New York to set a deadline for the EPA to make the requested finding on New York’s Section 126(b) petition or deny it. Kentucky utility unit NO_x emissions are already limited by the Cross-State Air Pollution Update Rule and are declining, and current EPA modeling projects no additional requirements to reduce Kentucky NO_x emissions are necessary. On May 20, 2019, the EPA proposed to deny the State of New York’s petition because the state did not meet its burden to demonstrate, and the EPA could not independently establish, that sources in the states listed in the petition contribute to exceedances of the 2008 and 2015 ozone National Ambient Air Quality Standards (“NAAQS”) in New York. On September 20, 2019, the EPA finalized its denial of New York's petition because the state did not demonstrate, and the EPA could not independently establish, that sources in the states listed in the petition contribute to exceedances of the 2008 and 2015 ozone NAAQS in New York. On October 29, 2019, the State of New York filed a petition in the D.C. Circuit for judicial review of the EPA's denial of the petition. Specific impacts to TVA as a result of the filing of the petition for judicial review cannot be determined at this time.

Petition to Expand the Ozone Transport Region. In December 2013, eight of the twelve states that make up the Ozone Transport Region ("OTR") submitted a petition requesting the EPA to add nine states, including Kentucky and Tennessee, to the OTR. If states within TVA's service territory were included in the OTR, TVA would be required to further reduce NO_x emissions. Six of the states filed suit when the EPA failed to act on the petition. In January 2017, the EPA subsequently published a notice in the Federal Register proposing to deny the petition on the basis that the CAA provides other options. The EPA then denied the petition in October 2017. In December 2017, the eight petitioning states filed in the D.C. Circuit a petition for judicial review of the EPA's denial of the petition to add states to the OTR. On April 23, 2019, the D.C. Circuit denied the petition for judicial review of the EPA's refusal to expand the OTR to include nine additional states.

Maryland Petition to Address Impacts from Upwind Electric Generating Units. In September 2017, the State of Maryland filed a lawsuit against the EPA for failing to act within 60 days on Maryland's petition under Section 126 of the CAA to address ozone impacts on Maryland from the NO_x emissions of 36 electric generating units, including TVA's Paradise coal-fired Unit 3. Paradise coal-fired Unit 3 is equipped with an SCR that TVA continuously operates to the greatest extent technically practicable in order to minimize NO_x emissions. The EPA has denied the petition because existing regulations already address emissions from the generating units at issue. On October 15, 2018, the State of Maryland filed a petition for judicial review with the D.C. Circuit asking the court to review the EPA's decision.

From FY 1970 to FY 2019, TVA spent approximately $6.8 billion on clean air controls to reduce emissions from its power plants. TVA estimates that compliance with existing and future CAA requirements (excluding GHG requirements) could lead to costs of $142 million from FY 2020 to FY 2024, which include existing controls on capital projects and air operations and maintenance projects.

Emissions from all TVA-owned and operated units (including small combustion turbine units of less than 25 MWs) have been reduced from historic peaks. Emissions of NO_x have been reduced by 96 percent below peak 1995 levels and emissions of sulfur dioxide ("SO_2") have been reduced by 99 percent below CY 1977 levels through CY 2018. For CY 2018, TVA's emission of carbon dioxide ("CO_2") from its sources was 52.3 million tons, a 51 percent reduction from CY 2005 levels. This includes 5,037 tons from units rated at less than 25 MWs.

Economic Development

TVA's partnerships with its customers and communities have helped create quality jobs and attract significant capital investments from new and existing companies. TVA conducts these economic development efforts in partnership with private and public organizations, including local, regional, and state agencies. This serves the needs of TVA stakeholders through regional economic development, which contributes to a better quality of life for Tennessee Valley residents. TVA's innovative programs and services combine to create effective tools for sustainable economic development. These programs and services include, but are not limited to, the following:

- **Recruiting Services** - TVA works with LPCs and their customers and local, state, and regional economic development organizations to recruit companies through an integrated package of economic development resources.
- **Regional Development** - TVA assigns a regional development specialist with economic development expertise to serve counties in a specific area to help create and sustain job growth.
- **Community Preparedness** - TVA helps communities increase their competitiveness in attracting investment and creating jobs by delivering resources and training to local community leaders.
- **Rural Initiative Strategy** - TVA helps rural communities develop and better market their sites and buildings to prospective companies. TVA also offers leadership development, planning, and project assistance.
- **Research** - TVA provides economic and market research to help build the business case for the location and expansion of companies and prepare communities for future growth opportunities.
- **Business Development Support** - An array of products and services is designed to meet the needs of prospective or existing industries. These include financial support and industry consulting services. This work provides vision to businesses for locating and being successful in the Tennessee Valley.
- **Technical Services** - TVA offers general engineering design services to help industrial prospects make sound location decisions and to help communities market themselves for prospects and growth.

The results of some of TVA's innovative economic development programs and offerings are described below.

- For the fourteenth consecutive year, TVA made Site Selection magazine's list of the top utilities in North America for economic development activity, one of only three utilities to earn this distinction.
- TVA Economic Development recruits new companies and investments to the region in these targeted industry sectors: Transportation-Related Manufacturing, Consumer and Industrial Products, Aerospace and Defense, Advanced Manufacturing, and Power Intensive Industries.
- TVA staff provides ongoing economic development assistance through technical services, economic research, proposal writing, training, and other services.
- Financial support, offered by TVA and LPCs, continues to be successful in helping new and existing companies locate or expand and make a commitment to enhance economic development in the region.
- The Valley Sustainable Communities Program was launched in 2013. This community preparedness program assists communities in cataloging their sustainable assets and improving their competitiveness when companies are considering locating or expanding in the Valley. To date, more than 30 communities have completed this program to highlight and increase their sustainability efforts and differentiate their communities.
- TVA's Rural Development strategy supports economic development efforts in rural and economically distressed areas.
- FY 2019 announcements of jobs created and/or retained and capital investment include:
  - Alabama: 12,300 jobs and $1.7 billion
  - Kentucky: 6,200 jobs and $1.3 billion
  - Middle Tennessee: 16,600 jobs and $1.8 billion
  - Mississippi: 6,800 jobs and $1.1 billion
  - Northeast Tennessee and Virginia: 8,500 jobs and $598 million

- Southeast Tennessee, Georgia and North Carolina: 6,700 jobs and $792 million
- West Tennessee: 9,400 jobs and $1.5 billion

Technological Innovation

The TVA Act specifies that members of the TVA Board shall affirm support for the objectives and missions of TVA, including being a national leader in technological innovation. A key element in achieving this vision is an annual investment in science and technology, positioning TVA to meet future business and operational challenges. TVA's goal is to demonstrate how technologies can be used to improve/sustain reliability, reduce costs, and lower emissions for a sustainable future.

Each year, TVA's research portfolio is updated based on a broad range of operational and industry drivers assessing key technology gaps, performance issues, or other significant challenges addressed through research and development. Core research activities support modernization and optimization of TVA's generation and transmission assets, air and water quality, and distributed/clean energy integration. The current research strategy focuses on components of the power system, including sustainability, generating fleet optimization, grid modernization, cyber security, data analytics, and grid edge engagement. TVA's distributed/clean energy research effort explores the scope and impact of integrating DER, solar photovoltaics, electric vehicles ("EV"), and battery storage on operations, business economics, and strategies for the Tennessee Valley.

Additional research is placed on grid modernization for distribution systems, electrification, grid edge technologies, and evolving DER applications. TVA's efforts are directed towards demonstrating and validating the performance, reliability, consumer acceptance, and implementation of new technologies in the Tennessee Valley. TVA coordinates activities with EPRI and industry stakeholders on transportation electrification in order to support operational fleet requirements and plug-in EV grid integration and readiness.

Technology evaluations are accomplished through studies and field scale demonstrations to document performance and requirements. TVA delivers or transfers results to the operating organizations and other stakeholders through reporting, technology transfer events, and educational outreach. TVA also serves as a technology advisor for LPCs and directly served customers. Investments in TVA's research portfolio are highly leveraged through partnership and collaboration with LPCs, EPRI and other stakeholders throughout the Tennessee Valley.

Sustainability

Sustainability for TVA means ensuring its ability to provide the people of the Tennessee Valley with low-cost and reliable electricity, a healthy environment, and a prosperous economy – without compromising the ability of future generations to do the same. The three Es – energy, environmental stewardship and economic development – continue to drive everything TVA does to sustain the Tennessee Valley Region. TVA's mission to "serve the people to make life better" is as relevant today as it was when President Roosevelt signed the TVA Act in 1933.

Since its inception, TVA has maintained a proud history of leadership in sustainability. In fact, sustainability is incorporated into the work performed at TVA to protect the miles of reservoir shoreline, to keep electricity rates as low as feasible, to reinforce TVA's commitment to a safe employee workplace and public safety, to support TVA's economic development efforts throughout the region, and to pursue continuous improvement in environmental performance. TVA also manages many environmental sustainability programs, including technology innovation, environmental stewardship and compliance, and a growing renewable energy portfolio.

Because the TVA mission includes serving the Tennessee Valley by providing affordable and reliable energy, environmental stewardship, and economic development, achieving sustainability goals directly supports this mission. TVA works to integrate these goals into existing and new innovative programs. These goals are an integral part of TVA's business practices and are tracked along with other business objectives.

Oversight and Governance

In December 2004, Congress passed legislation to make TVA's governance structure more like that of other large corporations. The TVA Board changed from three full-time members to nine part-time members who are responsible for providing strategic direction, governance, and oversight. In addition, a full-time Chief Executive Officer ("CEO") position was established to supervise day-to-day activities. The CEO is appointed by and reports directly to the TVA Board. The December 2004 legislation also amended the Securities Exchange Act of 1934 by adding Section 37. This section requires TVA, as a non-accelerated filer under Securities and Exchange Commission ("SEC") rules, to file financial reports with the SEC. In December 2006, TVA filed its first Annual Report on Form 10-K with the SEC and now files Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, and Current Reports on Form 8-K with the SEC. As an SEC filer:

- The management reporting requirements of Section 404(a) of the Sarbanes-Oxley Act became effective for TVA for FY 2008.
- As a non-accelerated filer, the external auditor attestation requirements of Section 404(b) of the Sarbanes-Oxley Act are not applicable. However, TVA implemented the auditor attestation requirements of Section 404(b) in FY 2009 and continues to do so on a voluntary basis.
- The Dodd-Frank Act deferred indefinitely the auditor attestation requirements of Section 404(b) for non-accelerated filers; however, management has chosen to continue to have external auditor attestations.

TVA Oversight

TVA is a government-owned corporation, and its mission of service is fundamentally different from that of publicly traded companies. TVA has oversight similar to other utilities, such as a board of directors, SEC requirements, credit rating agencies, and Sarbanes-Oxley requirements. In addition, TVA has oversight from Congress, the Government Accountability Office ("GAO"), OMB, the U.S. Treasury, and an independent Office of the Inspector General ("OIG").

Board of Directors

TVA is governed by the TVA Board. The TVA Board has nine part-time members, at least seven of whom must be legal residents of the TVA service area. The TVA Board members are appointed by the President of the United States with the advice and consent of the U.S. Senate. The TVA Board's responsibilities include formulating broad goals, objectives, and policies for TVA, approving plans for their implementation, reviewing and approving annual budgets, setting and overseeing rates, and establishing a compensation plan for employees.

Audit Committee

The TVA Board established the Audit, Risk, and Regulation Committee. The committee is responsible for, among other things, recommending an external auditor to the TVA Board, overseeing the auditor's work, and reviewing reports of the auditor and the OIG.

Independent Inspector General

The OIG conducts ongoing audits of TVA's operational and financial matters in accordance with Government Auditing Standards, which incorporate the American Institute of Certified Public Accountants Generally Accepted Auditing Standards. The OIG had 108 employees as of September 30, 2019, including more than 50 auditors. TVA's Inspector General is appointed by the President of the United States and confirmed by the U.S. Senate. The OIG provides semi-annual reports to Congress on the results of its audit and investigative work.

As required by the Inspector General Reform Act of 2008 (Pub. L. No. 110-409), the TVA OIG made an aggregate budget request of $26 million for FY 2021, which includes amounts for OIG training and support of the Council of the Inspectors General on Integrity and Efficiency. TVA's FY 2021 budget assumes OIG activities at the level requested. TVA received no additional comments from the OIG with respect to the budget proposal.

$ million	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 OIG Proposed	2021 OIG Proposed
OIG Spend	$22	$23	$24	$24	$24	$25	$26	$26

Independent Auditor

An independent auditor audits TVA's annual financial statements in accordance with standards of the Public Company Accounting Oversight Board and with Government Auditing Standards issued by the Comptroller General of the U.S. The auditor also provides an opinion as to whether those statements are presented in conformity with Generally Accepted Accounting Principles ("GAAP").

Congressional Oversight

Congress provides formal oversight of TVA through two committees, the U.S. House of Representatives Transportation and Infrastructure Committee and the U.S. Senate Environment and Public Works Committee. The audit arm of Congress, the GAO, also conducts audits of various TVA activities and programs, generally at the request of members of Congress.

Executive Branch

TVA routinely submits budget information to OMB, and TVA's budget is included in the consolidated budget of the U.S. Government. TVA's financial results also are included in the federal government's financial statements, which are coordinated with the U.S. Treasury and are subject to audit by GAO.

The TVA Act

TVA's congressional charter, the TVA Act of 1933, as amended, defines the range of TVA's business activities. TVA is also subject to the Government Performance and Results Act, which requires that a strategic plan and an annual performance report be submitted to Congress.

Other Regulatory Oversight

In aspects of its operations, TVA is subject to regulations issued by other governmental agencies, including the EPA, state environmental agencies, the SEC, and the NRC. While TVA is generally not subject to regulations issued by the Federal Energy Regulatory Commission ("FERC"), this commission has some regulatory authority over TVA activities. Other organizations with major influence on TVA and others in the electric utility industry include the North American Electric Reliability Corporation and the industry-based Institute of Nuclear Power Operations.

Auditor Independence – Providing Assurance to Stakeholders

The TVA OIG conducts an annual audit of the work of TVA's independent auditor to help ensure compliance with generally accepted Government Auditing Standards. Additionally, a peer review audit of the OIG is conducted every three years by another federal Inspector General's office.

Accounting and Financial Reporting

On an annual basis, TVA submits a closing package, which is a set of special purpose financial statements and notes that represent TVA's comparative, consolidated, department-level financial statements, to the U.S. Treasury to comply with the requirements of the U.S. Treasury Financial Manual. This provides financial information to the U.S. Treasury and the GAO to use in preparing the Financial Report of the U.S. Government. TVA's independent auditor also provides an opinion on whether the closing package is prepared in accordance with accounting standards and other pronouncements issued by the Federal Accounting Standards Advisory Board. TVA's financial transactions are subject to audit by the Comptroller General under various statutes.

TVA also submits financial information to the OMB, SEC, NRC, U.S. Treasury, Energy Information Administration, and others, in accordance with applicable regulatory and statutory requirements. As required by the TVA Act, TVA maintains its accounting records in accordance with the FERC's Uniform System of Accounts for Public Utilities. In addition, TVA presents its financial statements and related disclosures in conformity with GAAP promulgated by the Financial Accounting Standards Board. These financial statements are annually audited by an independent financial auditor.

Consistent with the Improper Payments Information Act of 2002, as amended, TVA has determined that none of its programs or activities are susceptible to significant improper payments.

Monthly Reporting Process

Internal financial performance reporting is done on a monthly basis at all levels within the enterprise. The monthly financial performance reports contain analysis for the income statement, cash flow statement, and statement of capital expenditures. The reports also include a balance sheet analysis detailing significant changes during the reporting period. TVA also performs agency-wide financial forecasts on a monthly basis in order to anticipate and respond to events that may have a significant impact on financial performance during the year.

Enterprise Risk Management

Enterprise Risk Management ("ERM") is a strategic business function that provides TVA with a comprehensive risk perspective to more effectively identify and manage risks, capitalize on opportunities, and improve risk management behaviors. ERM is specifically responsible for TVA's risk governance structure, performing risk assessments and analysis, and facilitating enterprise risk discussions to evaluate risk profiles as an interrelated portfolio in order to support risk-informed decisions for achieving TVA's strategic and operational objectives. The TVA Board has established an Enterprise Risk Council ("ERC") to oversee TVA's management of enterprise risks and establish an appropriate tone for a risk management culture throughout TVA, and the ERM organization, along with other designated subcommittees, carries out the ERC mission at the direction of the ERC and TVA's Chief Risk Officer.

Fraud Disclosure

The Fraud Reduction and Data Analytics Act of 2015 (the "Fraud Act") was signed into law on June 30, 2016. The law is intended to improve federal agency financial and administrative controls and procedures to assess and mitigate fraud risks and to improve federal agencies' development and use of data analytics for the purpose of identifying, preventing, and responding to fraud, including improper payments.

To oversee compliance with the Fraud Act, TVA established a Fraud Risk Management program (the "Fraud Program") led by the ERM organization. In accordance with the guidelines of the Fraud Act, TVA has adopted the GAO's Framework for Managing Fraud Risks in Federal Programs to document its Fraud Program. Additionally, TVA has considered both the fraud risk principles in the Standards for Internal Control in the Federal Government and the OMB Circular A–123 with respect to the leading practices for managing fraud risk in the development of the Fraud Program.

To establish a commitment to combating fraud, TVA issued an executive policy regarding fraud risk management, establishing TVA's approach, designating the guiding principles, and outlining the governance structure. Additionally, TVA implemented supporting processes and procedures to define roles and responsibilities within the Fraud Program.

To determine TVA's fraud risk profile, TVA has included the identification and assessment of fraud risks as a component of its annual risk assessment process. Among other areas, TVA will continue to assess fraud risk related to payroll, beneficiary payments, grants, large contracts, purchase and travel cards, physical asset misappropriation, and information technology and security.

To help mitigate assessed fraud risks, TVA will evaluate our current control activities and consider the need for additional financial and administrative controls based on the fraud risk profile.

In order to improve the Fraud Risk Management program, TVA has developed a strategy for monitoring and evaluating its fraud risk management activities. The results of the monitoring activities and evaluations will be utilized to adapt the Fraud Program's activities and communicate

Pending GAO and OIG Recommendations

Periodically, the GAO and OIG may offer recommendations to TVA as part of their standard review process of the organization. TVA actively works with GAO and OIG to review any potential recommendations in order to better serve the Valley.

The table on the following page lists recommendations that have been outstanding for at least one year as of September 30, 2019.

Source	Report Number	Report Title	Report Date	Recommendation Status	Estimated Date of Completion
GAO	GAO-17-726	Investment Management: Key Practices Could Provide More Options for Federal Entities and Opportunities for Minority- and Women-Owned Asset Managers	9/13/2017	Accepted / Implementing	Ongoing
GAO	GAO-17-343	Tennessee Valley Authority: Actions Needed to Better Communicate Debt Reduction Plans and Address Billions in Unfunded Pension Liabilities	3/23/2017	Accepted / Implementing	Ongoing
OIG	2013-14959	TVA Environmental Risk Management	8/7/2014	Accepted / Implementing	4/30/2020
OIG	2016-15445-01	Organizational Effectiveness - Human Resources: Bus Office	5/18/2017	Accepted / Implementing	12/31/2019 *
OIG	2017-15453	TVA's Privacy Program	6/13/2018	Accepted / Implementing	7/31/2020
OIG	2017-15516	Heat Rate Input Calculations	7/30/2018	Accepted / Implementing	2/28/2020
OIG	2017-15451	Key Sarbanes-Oxley Financial Spreadsheets	9/13/2018	Accepted / Implementing	3/31/2020

* Indicates closure is pending OIG review

For additional information regarding the recommendations listed above, and TVA's actions taken to date, please see Appendix A.

Strategic Imperatives, Strategic Objectives, and Performance Goals

Strategic Imperatives

As discussed previously, TVA has established four strategic imperatives: (1) rates: maintain rates as low as feasible, (2) debt: live within its means, (3) assets: manage its assets to meet reliability expectations and provide a balanced portfolio, and (4) stewardship: be responsible stewards of the region's natural resources. Through people performance excellence, TVA intends to bring these goals to life and become safer, better, faster, and leaner.

Strategic Objectives

In order to help ensure that TVA accomplishes its strategic goals, TVA is focusing on the following strategic objectives:

- Maintain low rates and align O&M spending with revenues
- Effectively manage debt to ensure long-term financial health
- Work safely and effectively
- Live our values and competencies
- Pursue operational excellence
- Balance the portfolio to provide cleaner, efficient, and affordable energy
- Stimulate economic development and investment in the Tennessee Valley
- Protect and improve the environment, natural resources, and the use and enjoyment of public lands

Performance Goals

To help measure how effectively TVA is achieving its strategic objectives, TVA has several performance goals. These performance goals include the following:

- Rates/Debt
  - Retail Rates
  - Wholesale Rate, excluding Fuel / Non-Fuel Delivered Cost of Power
  - Operating Cash Flow
  - Net Income
  - Total Financing Obligations
- Asset Portfolio
  - Load Not Served
  - Coal Seasonal Equivalent Forced Outage Rate ("EFOR") / Coal Equivalent Availability Factor ("EAF")
  - Nuclear Performance Index
  - Combined Cycle Seasonal EFOR / Combined Cycle EAF
  - Nuclear Unit Capability Factor
- People/Stewardship
  - Recordable Incident Rate / Serious Injury Incident Rate
  - CO_2 Emissions Rate
  - Reportable Environmental Events / Environmental Violations of Significance
  - Jobs Created and Retained

A summary of changes, or updated goals, effective beginning FY 2019 are noted as follows:

Previous Performance Goal	Updated Performance Goal
Wholesale Rate, excluding Fuel	Non-Fuel Delivered Cost of Power
Reportable Environmental Events	Environmental Violations of Significance

The Non-Fuel Delivered Cost of Power metric has been implemented to replace the Wholesale Rate, excluding Fuel goal as it more closely reflects TVA's ability to manage annual operating costs collected through rates. Additionally, the Reportable Environmental Events metric has been replaced with the Environmental Violations of Significance goal in order to more accurately evaluate TVA's ability to operate in a safe and environmentally conscious manner without impact of a significant environmental violation.

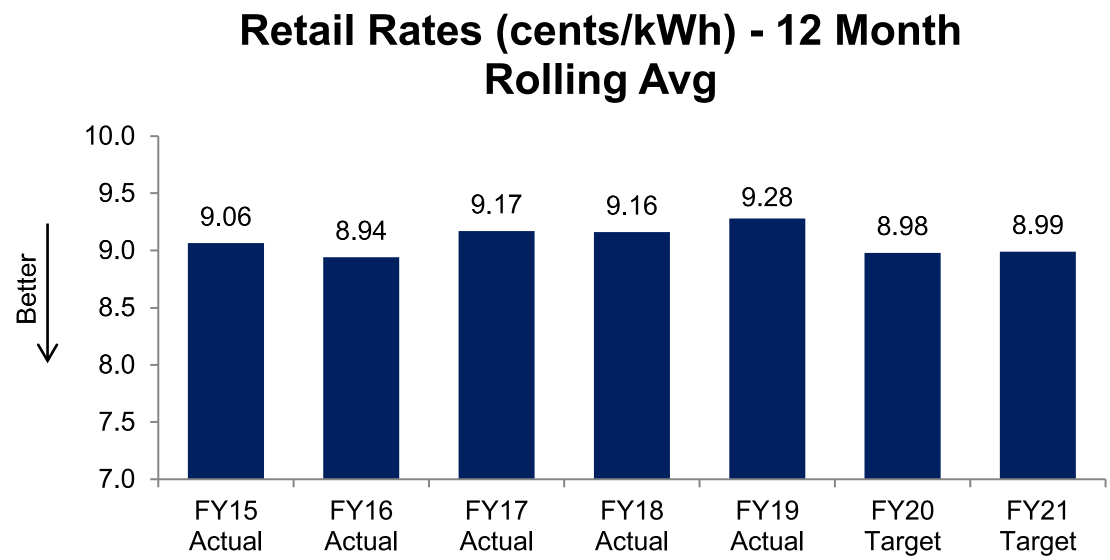
Additional changes expected to take effect beginning in FY 2020 regarding TVA's performance goals are summarized as follows:

Current Performance Goal	Proposed Performance Goal
Coal Seasonal EFOR	Coal EAF
Combined Cycle Seasonal EFOR	Combined Cycle EAF
Recordable Incident Rate	Serious Injury Incident Rate

The Coal and Combined Cycle Seasonal EFOR performance goals will be replaced with the Coal and Combined Cycle EAF goals, respectively, beginning in FY 2020. The proposed metrics are designed to better reflect the corresponding fleet's ability to consistently generate power for the Valley. Furthermore, the Recordable Incident Rate will be replaced with the Serious Injury Incident Rate in order to more accurately gauge and project serious injury incidents impacting TVA employees.

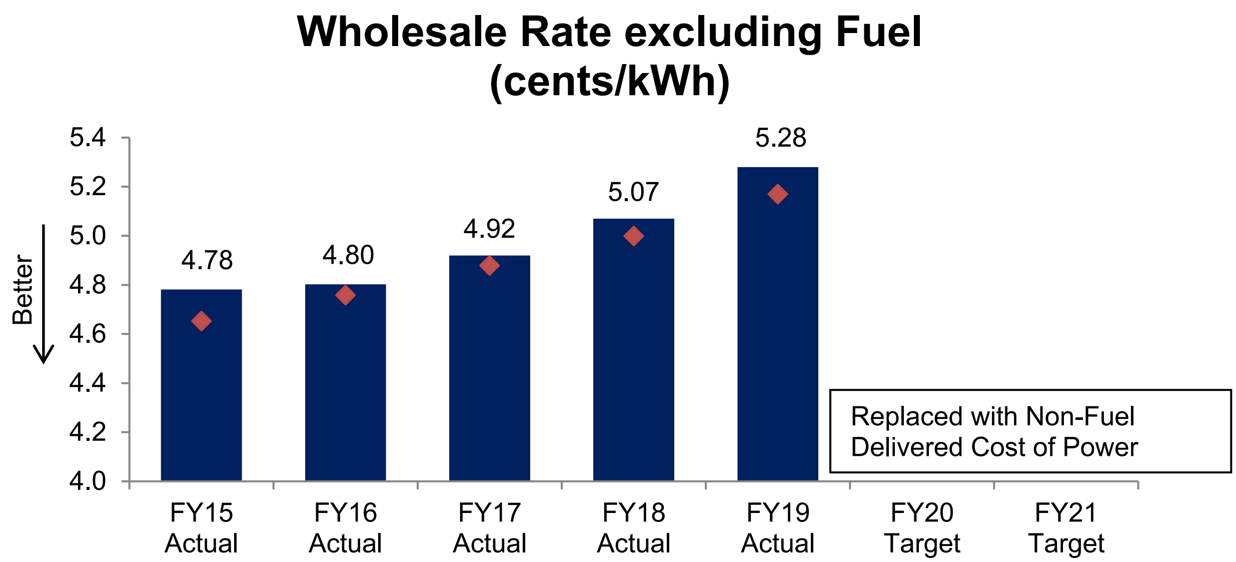
Each of TVA's performance goals is described in more detail on the following pages.

Rates/Debt



* Actual Results Exclude USEC and Off-System Revenue

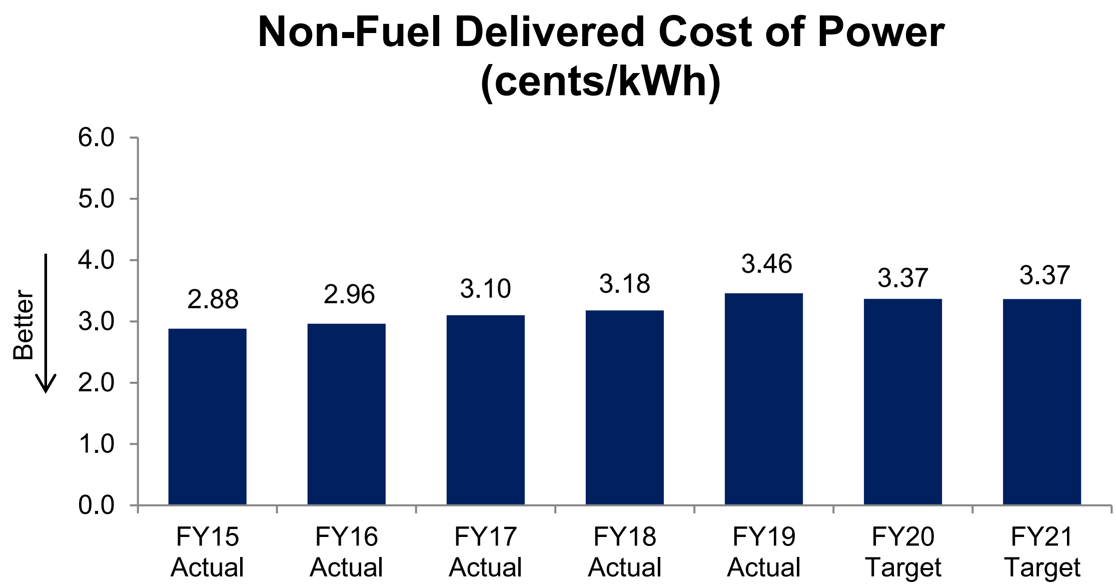
Definition	Average of the previous twelve months' LPC reported retail power revenue and directly served power revenue divided by LPC reported retail power sales and directly served power sales.
Calculation	(LPC reported retail power revenue + Directly served power revenue) / (LPC reported retail power sales + Directly served power sales)



* Actual Results Exclude Off-System Revenue

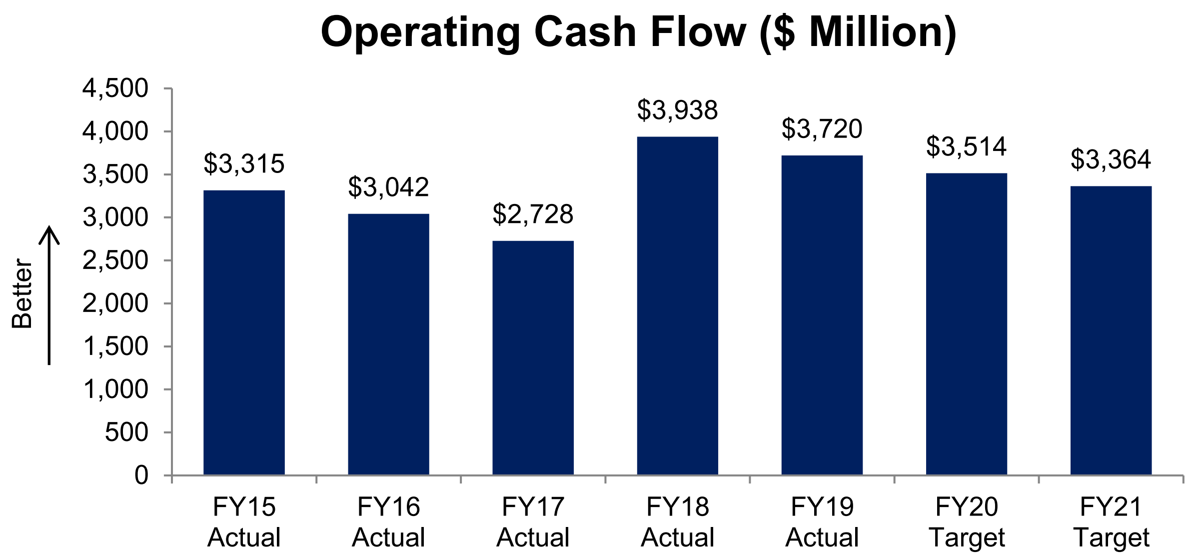
◆ Indicates results projected (cents/kWh) within the FY14 Long-Range Financial Plan

Definition	The Wholesale Rate excluding Fuel measure represents TVA's electric sales revenue excluding fuel divided by electric power sales.
Calculation	TVA's electric sales revenue excluding fuel / TVA's electric power sales

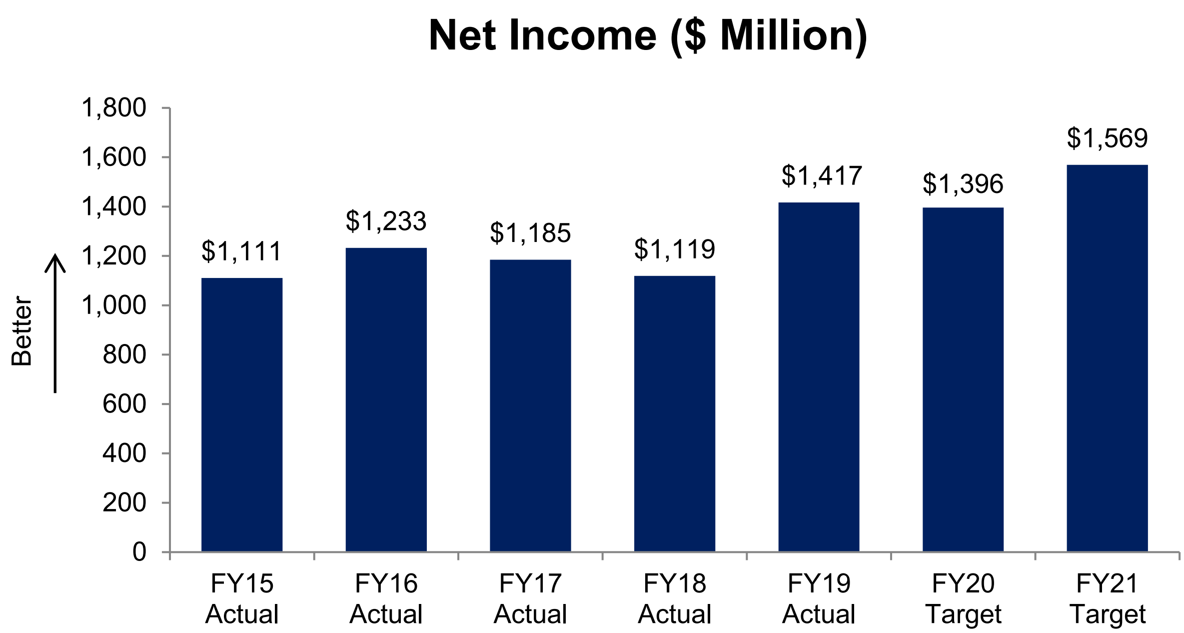


* "Actual" results prior to FY19 reflect 3-year averages
* "Target" figures reflect out-year averages

Definition	TVA's Non-Fuel Delivered Cost of Power represents TVA's non-fuel O&M, base capital, interest, and other cash needs divided by budgeted electric sales.
Calculation	(Non-Fuel O&M + Base Capital + Interest + Other Cash Needs) / Budgeted Electric Power Sales Additional incremental contributions to liabilities approved by the Board of Directors are excluded from the measure.

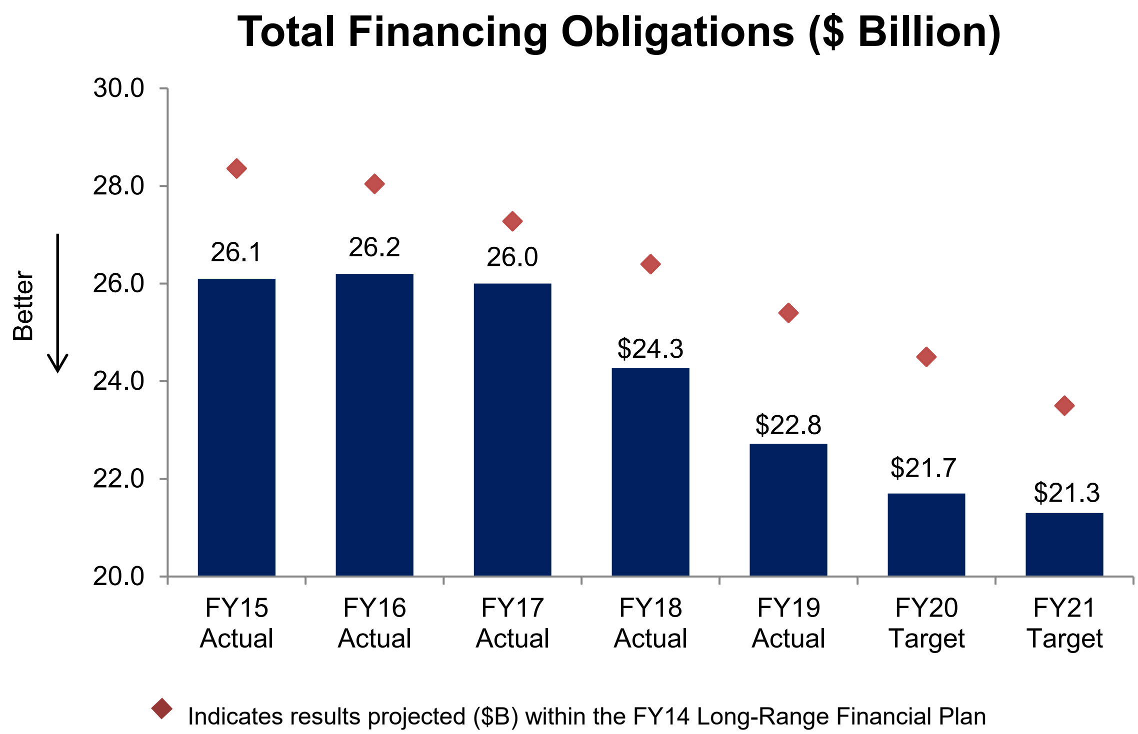


Definition	Operating Cash Flow refers to the amount of cash generated from power production and other mission-related activities and is generally defined as Operating Revenues received less cash payments made for Operating Expenses. This amount can be found on the Consolidated Statement of Cash Flows under Cash Flows from Operating Activities.
Calculation	Net income + Non-cash expenses + Impact of changes in working capital and other deferred operating items



* FY17 Actual Results Exclude $500M Incremental Pension Contribution

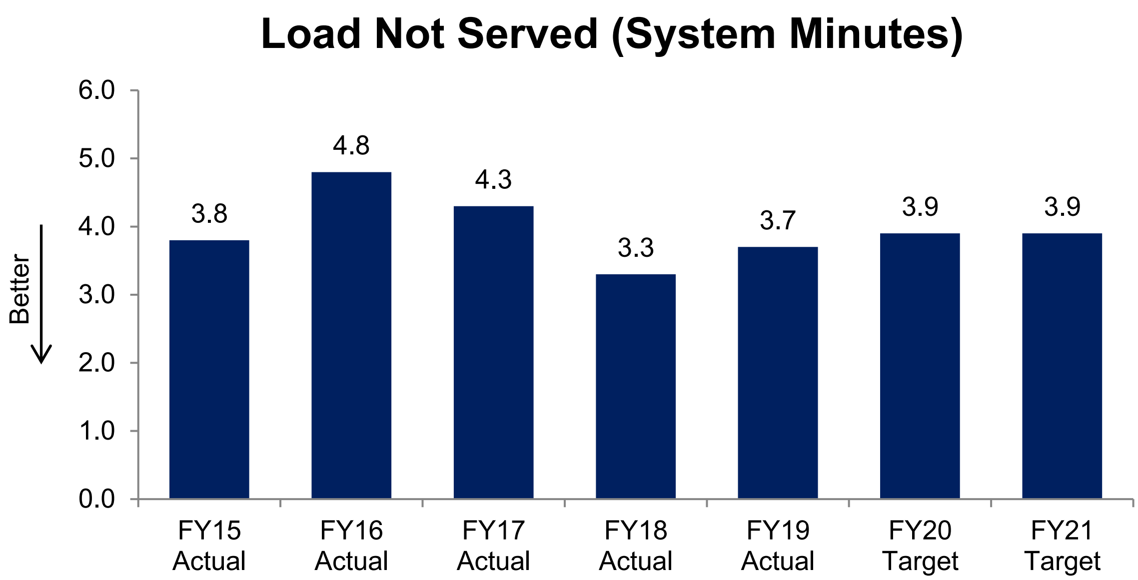
Definition	Net Income is an entity's net earnings derived by adjusting revenues for the cost of doing business, including cost of sales, depreciation, interest, taxes, and other expenses. This amount is shown on the bottom line of the Consolidated Statement of Operations.
Calculation	Operating Revenues - Operating Expenses + Other Income/(Expense) - Net Interest Expense



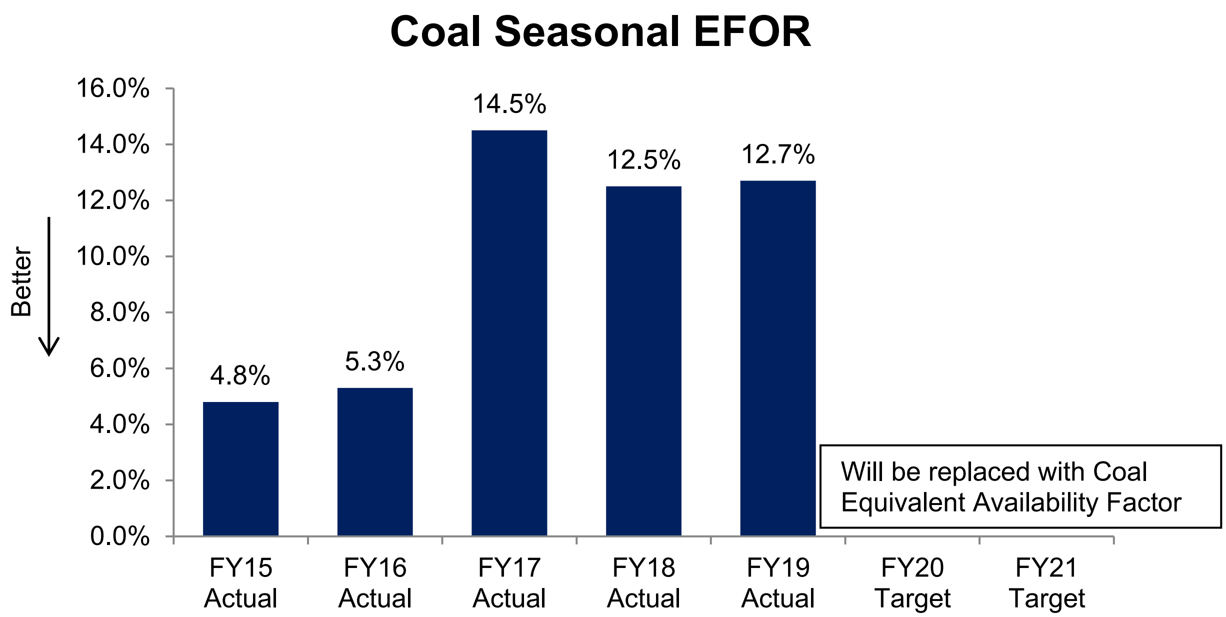
Definition	TFOs include all statutory debt and other financing obligations, as shown on TVA's balance sheet.
Calculation	Long-term Power Bonds + Short-Term Debt + Leaseback Obligations + Energy Prepayment Obligations + Debt of Variable Interest Entities ("VIE") + Membership Interests of VIE Subject to Mandatory Redemption + Notes Payable

* See Appendix B for a calculation of TFOs utilizing financial statement line items reported in accordance with Generally Accepted Accounting Principles.

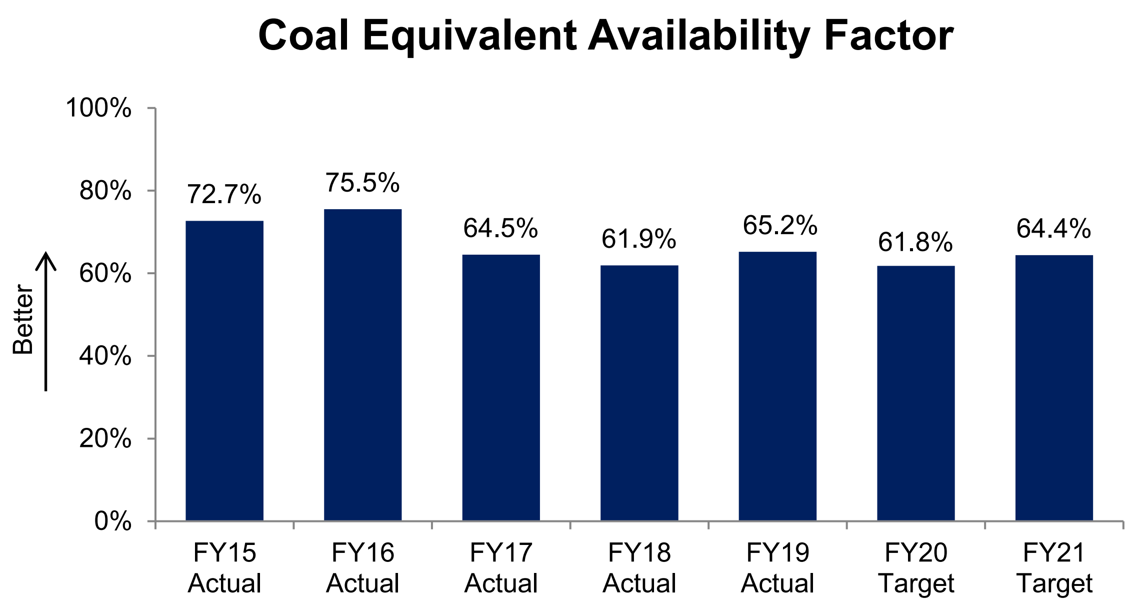
Asset Portfolio



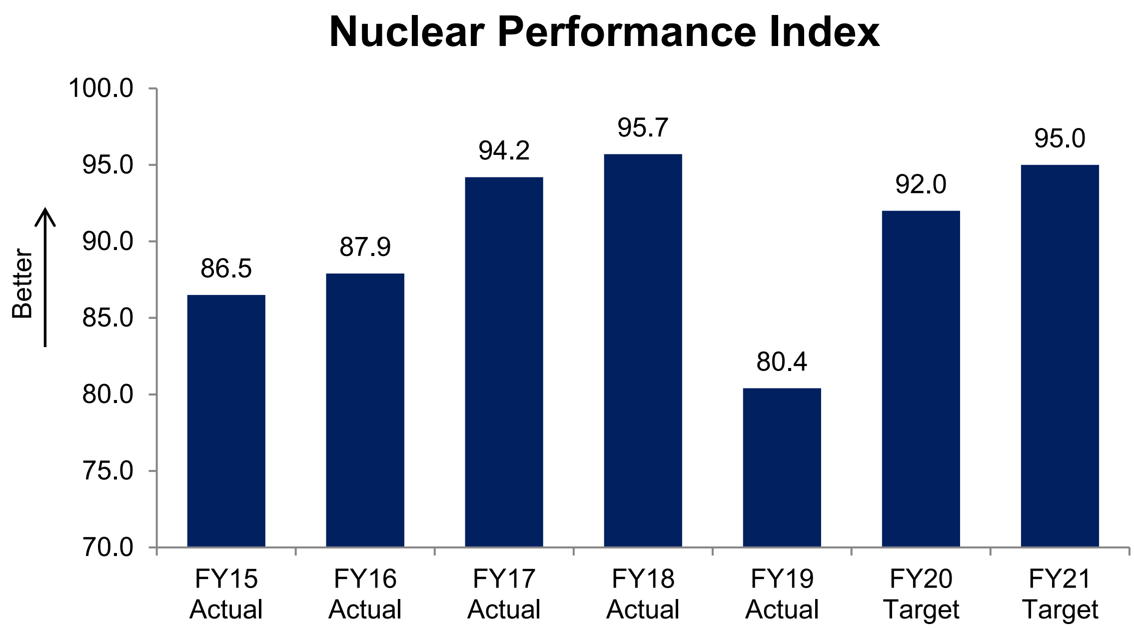
Definition	Load Not Served measures the magnitude and duration of transmission system outages that affect TVA customers. This measure is expressed in system minutes and excludes events during declared major storms.
Calculation	Percent of total load not served x Number of minutes in period



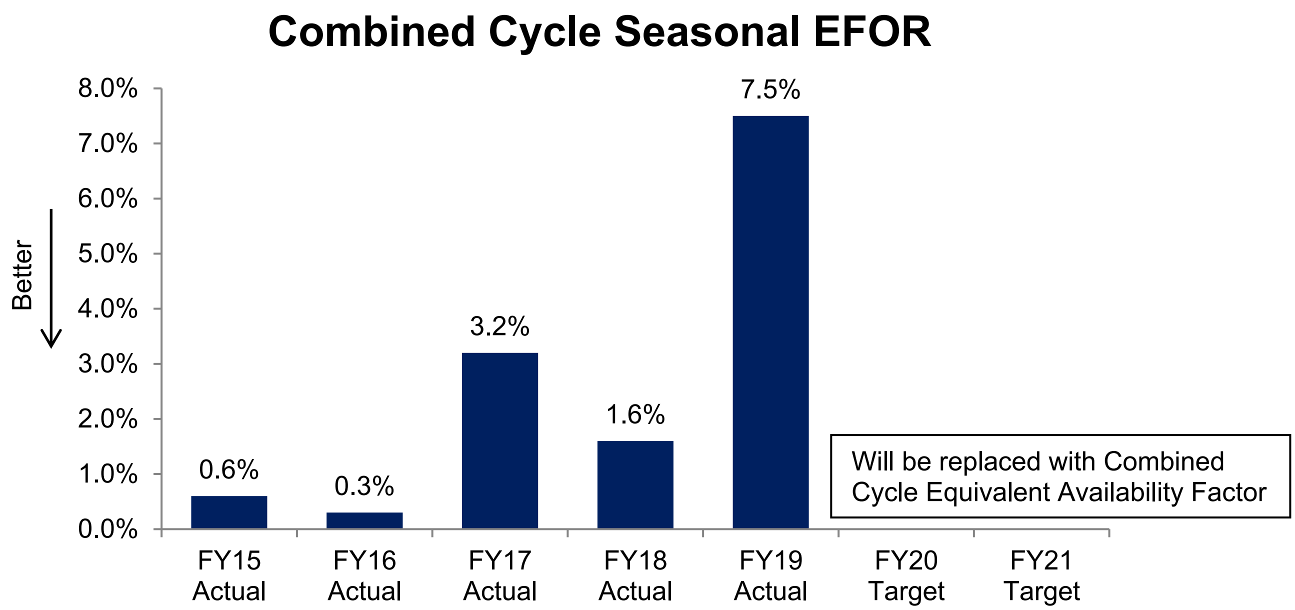
Definition	Coal Seasonal EFOR measures the generation lost due to forced events as a percentage of time the unit would have been scheduled to run. This measure runs from December through March and June through September and includes the Allen, Cumberland, Gallatin, Kingston, Paradise, and Shawnee coal plants. This measure excludes events that are classified as “Outside Management Control.”
Calculation	((FOH X WNDC) + Forced MWhL) / ((FOH + SH) X WNDC) X 100 FOH = Forced Outage Hours SH = Service Hours WNDC = Winter Net Dependable Capacity Forced MWhL = MWh Losses Due to Forced Derating



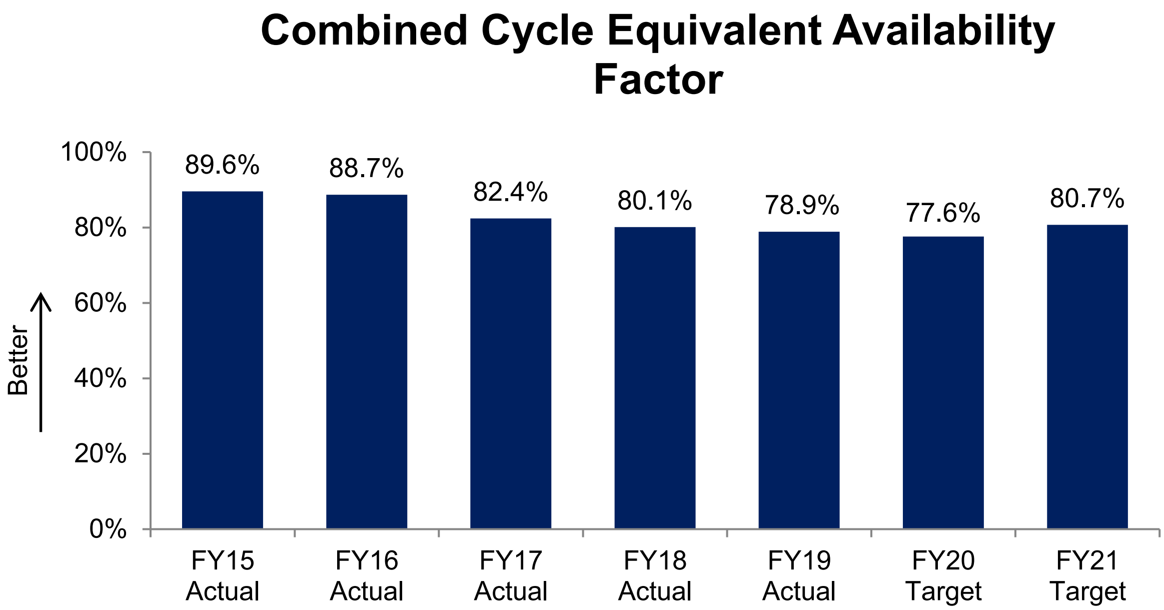
Definition	The Coal Equivalent Availability Factor reflects the percentage of time over a given period that a coal-fired unit was available to generate electricity for TVA. This measure excludes any newly commissioned units until after the first full fiscal year of operation.
Calculation	Weighted Capacity Based Equation: WEAF = {Σ [(AH –EFDH –EMDH –EPDH –ESEDH) x NMC] / Σ (PH x NMC)} x 100 Where: NMC = Net Maximum Capacity AH = Available Hours PH = Period Hours ESEDH = Equivalent Seasonal Derated Hours EPDH = Equivalent Planned Derated Hours EFDH = Equivalent Forced Derated Hours EMDH = Equivalent Maintenance Derated Hours



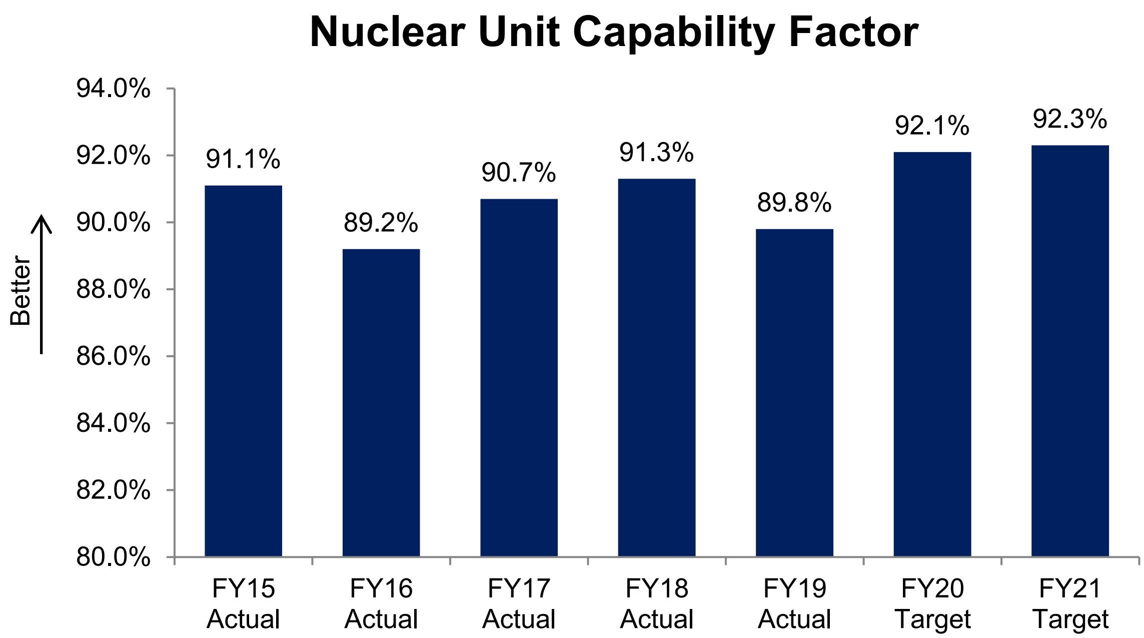
Definition	The Nuclear Performance Index is a weighted combination of the key performance indicators based on standard nuclear industry definitions for station performance.
Calculation	The Nuclear Performance Index for each unit is calculated using a weighted combination of key performance indicators based on standard nuclear industry definitions, with the maximum obtainable being 100 points. TVA's fleet-level Nuclear Performance Index is a simple average of the performance of each unit.



Definition	Combined Cycle Seasonal EFOR measures the generation lost due to forced events as a percentage of time the unit would have been scheduled to run. This measure runs from December to March and June to September and includes Caledonia, John Sevier, Lagoon Creek, Magnolia, and Southaven combined cycle plants. This measure excludes events that are classified as “Outside Management Control.”
Calculation	((FOH X NDC) + Forced MWhL) / ((FOH + SH) X NDC) X 100 FOH = Forced Outage Hours SH = Service Hours NDC = Net Dependable Capacity Forced MWhL = MWh Losses Due to Forced Derating

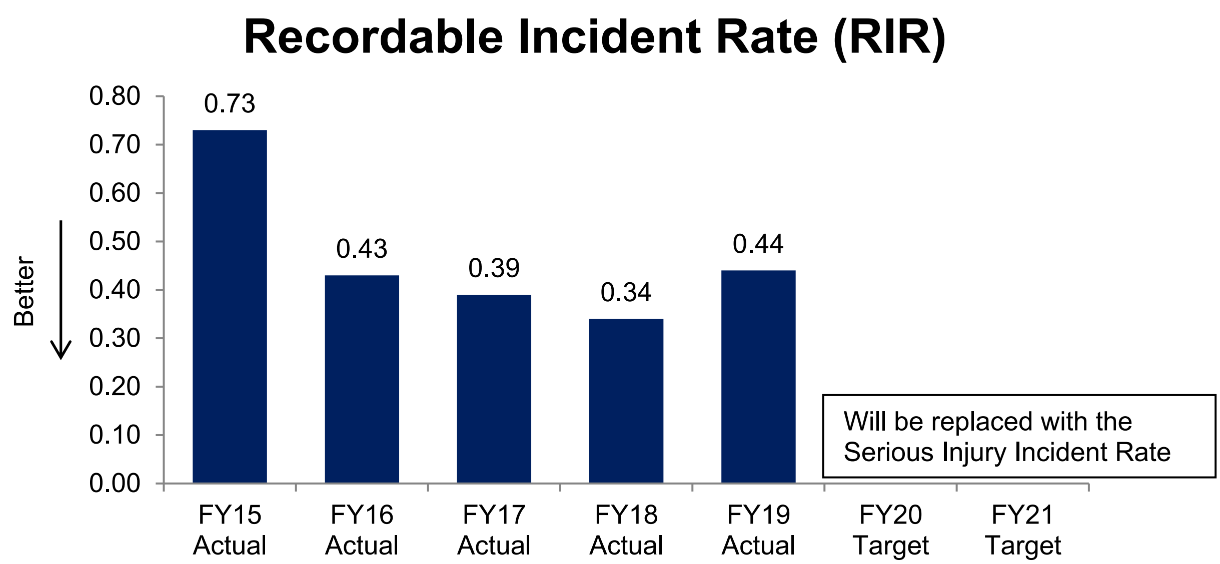


Definition	The Combined Cycle Equivalent Availability Factor reflects the percentage of time over a given period that a natural gas-fired unit was available to generate electricity for TVA-operated combined cycle generating assets. This measure excludes any newly commissioned units until after the first full fiscal year of operation.
Calculation	Weighted Capacity Based Equation: WEAF = {Σ [(AH –EFDH –EMDH –EPDH –ESEDH) x NMC] / Σ (PH x NMC)} x 100 Where: NMC = Net Maximum Capacity AH = Available Hours PH = Period Hours ESEDH = Equivalent Seasonal Derated Hours EPDH = Equivalent Planned Derated Hours EFDH = Equivalent Forced Derated Hours EMDH = Equivalent Maintenance Derated Hours

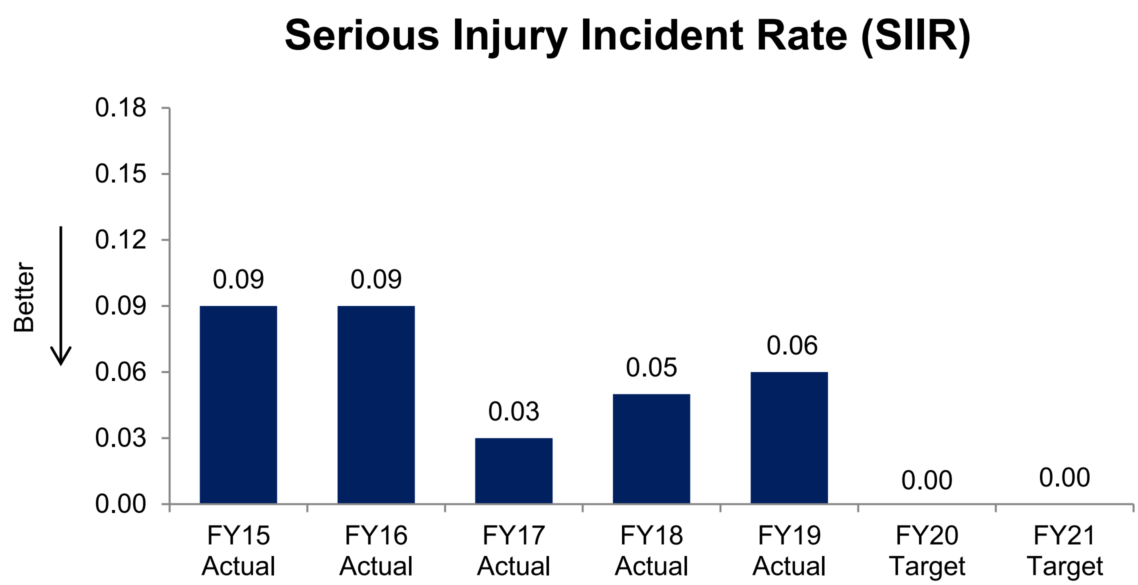


Definition	Nuclear Unit Capability Factor is the ratio of available energy generation over a given period of time to the reference energy generation over the same time period, expressed as a percentage.
Calculation	[(REG - PEL - UEL - OEL) / REG] X 100 REG = Reference Energy Generation PEL = Planned Losses UEL = Unplanned Losses OEL = Outage Extension Losses

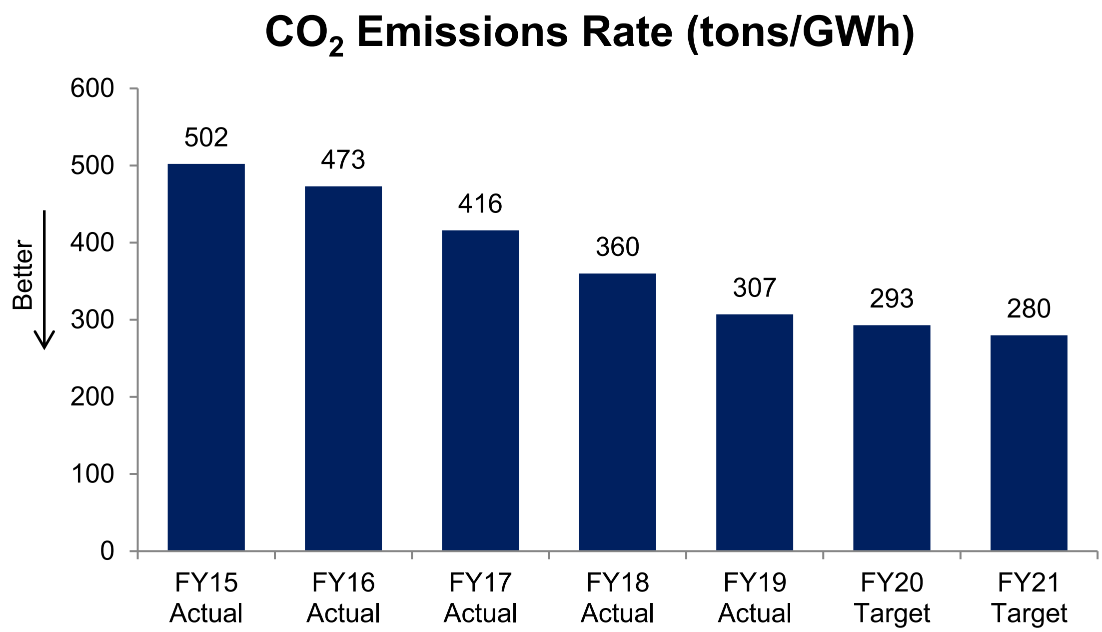
People/Stewardship



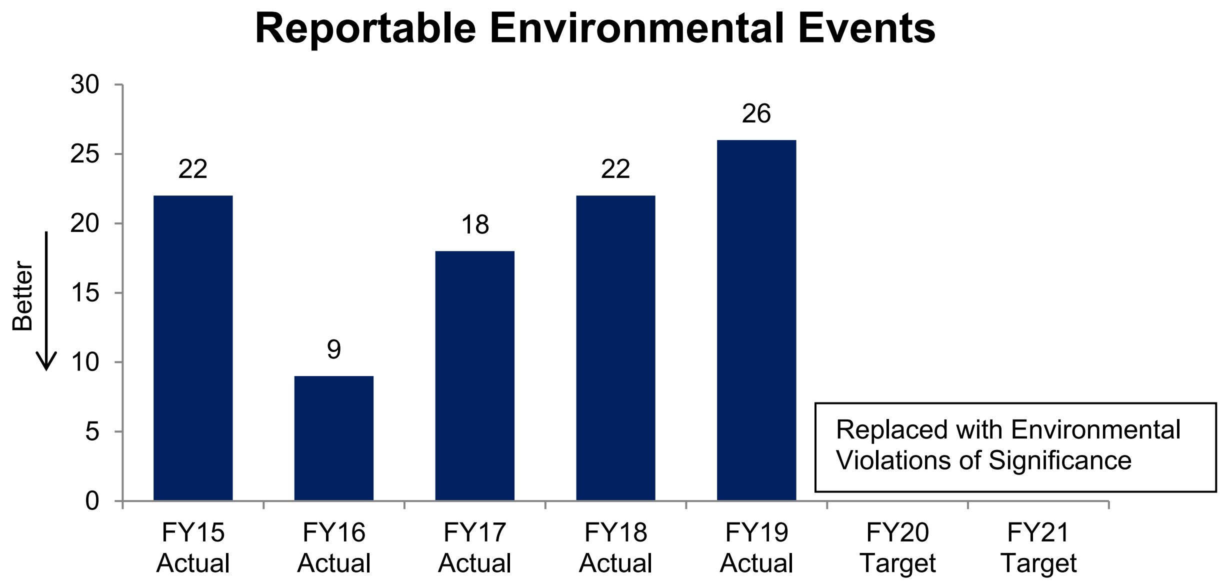
Definition	The number of recordable injuries (as defined by TVA's safety program) per 200,000 employee-hours worked by TVA employees and staff augmentation contractors.
Calculation	(Number of recordable injuries x 200,000) / (Number of employee-hours worked)



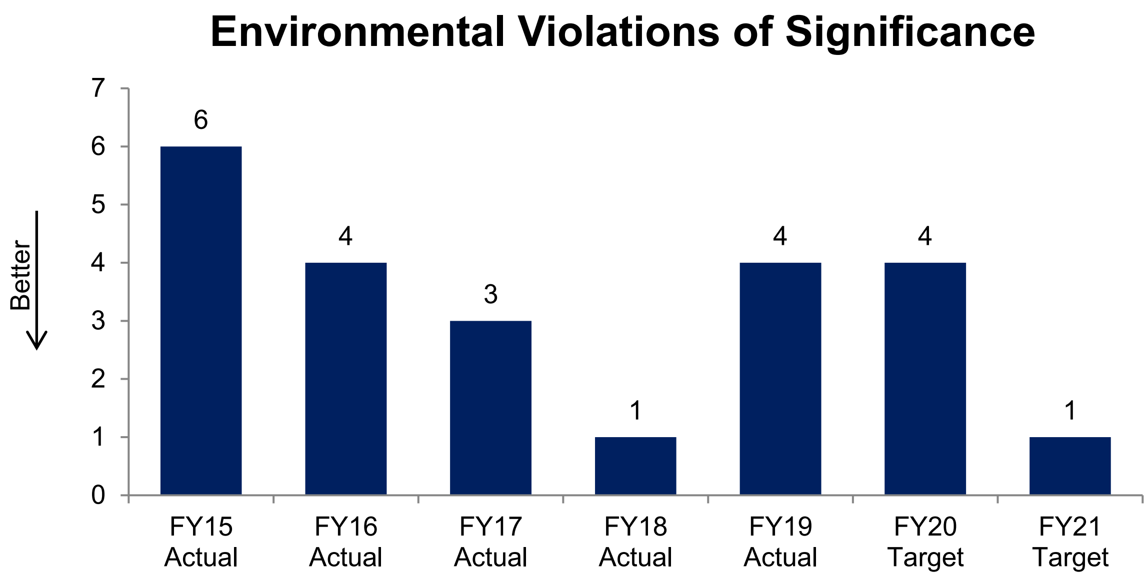
Definition	The SIIR is a mathematical calculation used by Edison Electric Institute that quantifies the extent of injury for serious injuries and fatalities from events within the control of the employee and/or the employer.
Calculation	(Number of cases x 200,000) / (number of hours worked during the time period) Metric applies to TVA employees and staff augmentation contractors.



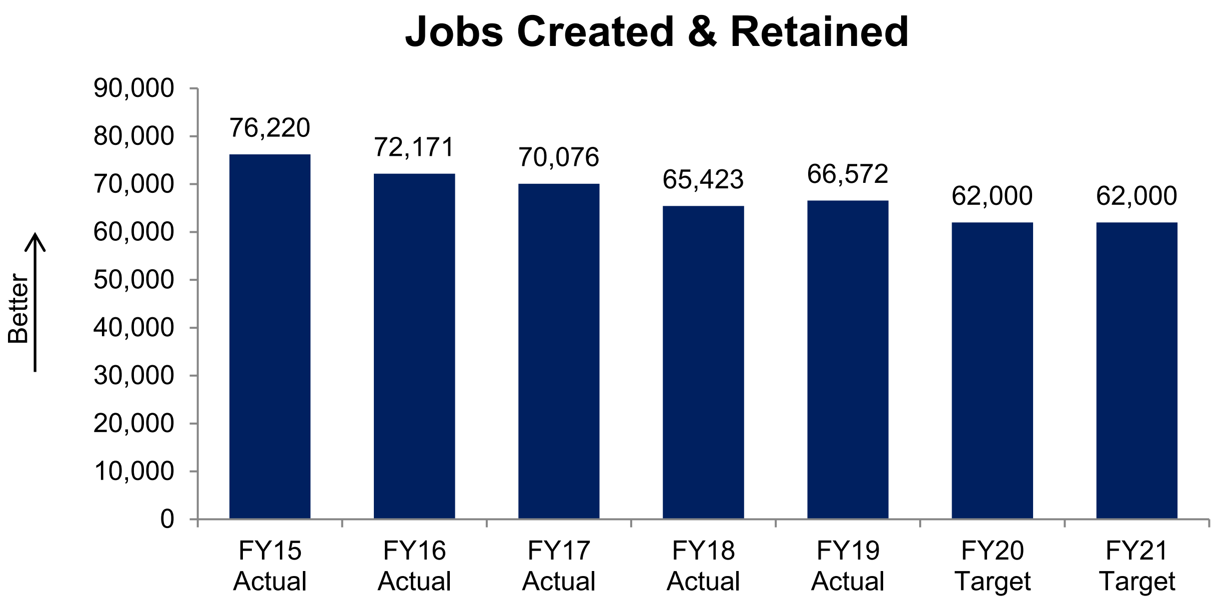
Definition	This measure reflects TVA's commitment to manage greenhouse gas emissions through efficient operation of its diverse generation mix.
Calculation	Tons of CO_2 emissions / GWh of generation



Definition	An environmental event at a TVA facility or elsewhere caused by TVA or TVA contractors that violates permit conditions or other regulatory requirements and triggers regulatory required oral or written notification to or enforcement action by a regulatory agency. Multiple parameters or multiple media/regulatory violations that result from the same root cause/event are counted as one reportable environmental event ("REE"). However, repeat occurrences count as separate REEs if they occur in a different reporting period. In cases where there is lag time between the event and receipt of a Notice of Violation ("NOV"), the receipt date for the NOV will be used as the date of the REE if the NOV has not previously been counted as a REE, and if the fiscal year reporting deadline for TVA-level environmental metrics has passed.
Calculation	Number of Reportable Environmental Events



Definition	Environmental Violations of Significance is defined as a notice of violation or enforcement order issued by a regulatory agency for any non-compliance, or any non-compliance resulting in a fine or penalty.
Calculation	Number of EVOS (an occurrence will be recorded for each event) - Multiple parameters or multiple regulatory violations that result from the same root cause/event are counted once. - Repeat occurrences will always count as separate events where cause evaluations are complete but actions to address have not been completed.



Definition	Jobs Created and Retained measures the annual number of new or retained jobs in the Tennessee Valley for which TVA has played a role in the recruitment or retention of the economic development project.
Calculation	Number of annual Jobs Created and Retained as reported through TVA channels

Other Information

Data Validation and Verification

Much of the data contained in this document was derived from TVA's Annual Report on SEC Form 10-K for the year ended September 30, 2019 (the "Annual Report"). TVA filed the Annual Report with the SEC, and TVA's Chief Executive Officer and Chief Financial Officer certified the Annual Report in accordance with the requirements of the Sarbanes-Oxley Act. In addition, TVA's independent auditor, Ernst & Young LLP, audited the financial statements contained in the Annual Report.

TVA's management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rule 13a-15(f) under the Securities Exchange Act of 1934 and required by Section 404 of the Sarbanes-Oxley Act. TVA's internal control over financial reporting is designed to provide reasonable, but not absolute, assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with GAAP. Because of the inherent limitations in all control systems, internal controls over financial reporting and systems may not prevent or detect misstatements.

TVA's management, including the Chief Executive Officer, the Chief Financial Officer, and the Controller, evaluated the design and effectiveness of TVA's internal control over financial reporting as of September 30, 2019, based on the framework in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, TVA's management concluded that TVA's internal control over financial reporting was effective as of September 30, 2019.

Although management's report on the effectiveness of internal control over financial reporting was not required to be subject to attestation by TVA's registered public accounting firm, TVA has chosen to obtain such a report. Ernst & Young LLP issued an attestation report on TVA's internal control over financial reporting as of September 30, 2019.

Lower-Priority Program Activities

TVA has determined that it does not have any lower-priority program activities for purposes of 31 U.S.C. § 1115(b)(10).

Hyperlinks

Hyperlinks to documents discussed in this Performance Plan are set forth below:

Document	Hyperlink
Integrated Resource Plan	https://www.tva.gov/Environment/Environmental-Stewardship/Integrated-Resource-Plan
Natural Resource Plan	https://www.tva.gov/Environment/Environmental-Stewardship/Environmental-Reviews/Natural-Resource-Plan
Annual/Quarterly Report	http://www.snl.com/IRWebLinkX/docs.aspx?iid=4063363
Annual Performance Report	https://www.tva.gov/About-TVA/Guidelines-and-Reports
TVA Environmental Sustainability News Release	https://www.tva.gov/Newsroom/Press-Releases/New-Report-Highlights-TVAs-Environmental-Sustainability-Information

Appendix A

Report Number	GAO Recommendation	TVA Response
GAO-17-726	The Chief Investment Officer of the Tennessee Valley Authority Retirement System should fully implement key practices to increase opportunities for minority and women-owned ("MWO") asset managers as part of its selection processes. Specifically, the Chief Investment Officer should take actions to demonstrate top leadership commitment, and to the extent that staff and resources are a constraint, should direct its consultant to conduct outreach to MWO firms and communicate its priorities and expectations for an inclusive selection process by requesting its consultant conduct more inclusive asset manager searches specifically for TVARS.	TVARS committed to the following: - Document within TVARS policy a commitment to equal opportunity for all asset managers, including MWO firms; - Work with its consultant to establish a process for providing information on potential MWO asset managers researched and evaluated by the consultant; and - After identifying a short list of top, qualified firms for a particular investment strategy or mandate, request that at least one MWO asset manager be included in the list for further evaluation and consideration. TVARS has followed through on each of these commitments. The inclusion of MWO asset managers in TVARS' searches has become a standard practice, and TVARS has hired an additional MWO firm that will manage TVARS assets in a private real estate fund. Additionally, TVARS has been communicating its commitment to MWO opportunities by including a question asking for information on the number and percentage of employees and partners who are women and minorities in Requests for Information, along with requesting a description of the firm's efforts and policies to promote diversity among employees and partners of the firm.
GAO-17-343	The Board of Directors should ensure that TVA better document and communicate its goals to reduce its debt and unfunded pension liabilities in its performance plans and reports, including detailed strategies for achieving these goals.	TVA has added language to its annual performance plan and annual performance report to better document and communicate its goal to reduce its debt (see page 15) and its commitment to fully fund the qualified pension plan (see page 10). The additional language provides enhanced transparency about TVA's goals and commitments for these focus areas, the accomplishments to date, and future plans for achieving the debt goal and fully-funding the pension. In addition to the annual performance plan and annual performance report, TVA continues to utilize other forums to ensure transparency with its stakeholders on its financial and operational performance. This includes TVA's public Board meetings and regular meetings with customers and public officials.
GAO-17-343	The Board of Directors should ensure that TVA propose, and work with the TVARS Board to adopt, funding rules designed to ensure the plan's full funding.	TVA remains committed to working with the TVARS Board, a separate legal entity from TVA, to ensure a fully-funded retirement system. In addition to the 2016 plan amendments that were approved by the TVARS Board and accepted by TVA that put in place a plan to close the gap between TVARS' assets and obligations over a 20-year period, other recent developments include: - In FY 2017, TVA made an additional one-time pension contribution of $500 million to TVARS. This brought the total FY 2017 contribution to $800 million versus the required contribution of $300 million. This additional contribution coupled with strong investment returns to date has improved the confidence of being fully-funded over the original 20-year period. - As of September 30, 2018, TVARS reported a funded ratio of approximately 84%, the highest funded ratio in roughly a decade. - In June 2018, the TVARS Board approved, and TVA accepted, rule changes that allowed employees with a Cash Balance pension account to stop receiving Cash Balance pension benefits and instead shift their retirement benefits to the 401(k) Plan effective October 1, 2018. This choice provided employees with greater flexibility in future financial planning and the option to choose the retirement benefits that are best for them.

Report Number	OIG Recommendation	TVA Response
2013-14959	Revise TVA environmental procedures to better describe responsibilities for NEPA reviews and address the specific concerns identified in the OIG report. Update TVA NEPA procedures and guidance to reflect current TVA structure and procedures, reduce repetition, and improve ease of use. Work with TVA Projects to better describe requirements in project management procedures for initiating, documenting, and completing environmental reviews. Include processes for identifying planned projects and significant work that require but have not initiated a NEPA review.	TVA accepted the recommendation and is actively working to implement the updates. Updated TVA NEPA procedures have been drafted. Per TVA's Rulemaking process, the procedures are required to be published for public comment, and comments must be addressed. The draft was submitted to the Council on Environmental Quality ("CEQ") in October 2018. CEQ provided many comments, all of which were reviewed and addressed in 2019. TVA submitted the final version to CEQ on 11/20/19 and is currently awaiting response. TVA expects the rule to be finalized by the end of CY 2019, after which there will be an implementation period. TVA currently expects closure of the recommendation by the end of April 2020.
2016-15445-01	In conjunction with the Chief Executive Officer, the Senior Vice President, and the Chief Human Resources Officer ("CHRO"), identify and implement the changes needed to obtain compliance with the regulations regarding the placement and reporting structure of the Equal Opportunity Compliance ("EOC") department.	TVA has accepted the recommendation and implemented suggested resolutions. Currently, TVA is on track to complete the request and is awaiting validation by the OIG to close the recommendation.
2017-15453	Recommend that the Director, TVA Cybersecurity, implement a process to prevent and/or detect unsecured RPII on shared network drives, specifically GFP servers.	TVA has implemented routine scanning of server storage for RPII. TVA also has a planned FY 2019 project to encrypt all storage arrays in the Chattanooga and Knoxville data centers. Documentation of these activities have been provided to the OIG. Progress to Date: All storage arrays containing home drives have been encrypted, as well as share drives located in TVA's cloud solution. Additionally, routine RPII scanning has been implemented. A project is underway to replace the current environment with encrypted storage and all recommendations are on track to be closed by July 2020.
2017-15516	Automate or identify methods to reduce inaccurate calculations in the Combined Cycle hourly heat rate calculation process.	TVA has made significant progress toward implementing physics based thermal performance models for the combined cycle gas fleet. Once implemented in production, these models will replace the previous method which used regression analysis techniques to estimate combined cycle plant power and heat rate. Currently, all recommendations are on track to be completed by February 2020.
2017-15451	Enforce compliance with the specified naming convention for critical spreadsheets.	TVA is in the process of implementing a SharePoint site for critical spreadsheet storage. TVA plans to use inherent functionality in SharePoint for versioning control to ensure consistent naming convention. Progress to date: The SharePoint site is complete and TVA is in the process of moving critical spreadsheets to the new repository. TVA currently expects closure of the recommendation by the end of March 2020.
2017-15451	Consider adding the following controls to the critical spreadsheet policy: 1) A training program for critical spreadsheet owners and reviewers. 2) Baseline each spreadsheet to develop a basis for understanding future changes. 3) Create templates for future critical spreadsheets where possible. 4) Add functional testing controls where determined appropriate.	TVA is developing a training for critical spreadsheet owners. TVA is also evaluating the use of templates and baselining based on risk. Progress to date: The training has been developed and will be offered beginning in calendar 2020. Currently, TVA expects closure of the recommendation by the end of March 2020.

2017-15451	Coordinate with the critical spreadsheet owners to ensure the inventory information is complete, consistently formatted, and properly classified.	TVA utilizes quarterly certifications to facilitate completeness for critical spreadsheets. Additionally, the SharePoint repository will enable central management and monitoring of the inventory. TVA is on track to close the recommendation by the end of March 2020.
2017-15451	Define a process for managing critical spreadsheet passwords that is consistent with TVA-SPP-12.003, IT Account Management.	TVA is implementing a SharePoint site for critical spreadsheet storage. SharePoint uses a single sign-on authentication process that allows a user to access multiple applications with one set of login credentials. TVA will utilize user accounts that already conform to the password requirements included in TVA-SPP-12.003. Progress to date: The SharePoint site is complete and TVA is in the process of moving critical spreadsheets to the new repository. TVA expects closure of the recommendation by the end of March 2020.
2017-15451	Coordinate with the Director of IT Planning and Operations to determine (a) the number of critical spreadsheets accessible by shared accounts either directly or via groups and (b) if that access is appropriate.	TVA plans to use inherent functionality in SharePoint to limit access to specific users and logging all changes. Progress to date: The SharePoint site is complete and TVA is in the process of moving critical spreadsheets to the new repository. TVA expects closure of the recommendation by the end of March 2020.

Appendix B

TFOs are a financial measure that is not calculated and presented in accordance with GAAP. TFOs are measured by summing bonds and notes, gross, debt related to variable interest entities ("VIE"), leaseback obligations, energy prepayment obligations, the membership interests of VIE subject to mandatory redemption, and notes payable. A calculation of TFOs utilizing financial statement line items reported in accordance with GAAP follows:

TENNESSEE VALLEY AUTHORITY
Unaudited Reconciliation of Total Financing Obligations
(in millions)

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 Projected	FY 2021 Projected
Total Financing Obligations	**$ 26,120**	**$ 26,207**	**$ 26,022**	**$ 24,281**	**$ 22,818**	**$ 21,741**	**$ 21,290**
Energy prepayment obligations	(310)	(210)	(110)	(10)	-	-	-
Notes payable	-	(75)	(122)	(69)	(23)	-	-
Leaseback obligations	(616)	(467)	(339)	(301)	(263)	(223)	(25)
Membership interests of VIE subject to mandatory redemption	(37)	(35)	(32)	(30)	(28)	(25)	(23)
Debt of VIE	(1,279)	(1,245)	(1,211)	(1,175)	(1,137)	(1,098)	(1,056)
Bonds and Notes, gross	**23,878**	**24,175**	**24,208**	**22,696**	**21,367**	**20,395**	**20,186**
Exchange loss (gain)	(21)	(150)	(125)	(147)	(191)	-	-
Unamortized discounts, premiums, issue costs and other	(107)	(173)	(163)	(154)	(139)	(298)	(305)
Notes payable	-	75	122	69	23	-	-
Debt of variable interest entities	1,279	1,245	1,211	1,175	1,137	1,098	1,056
Total outstanding debt	$ 25,029	$ 25,172	$ 25,253	$ 23,639	$ 22,197	$ 21,194	$ 20,937

TVA