

Tennessee Valley Authority

2018 Sustainability Report and Implementation Plan

Executive Summary

Overview

TVA submitted its first Sustainability Plan to the White House in June 2010. On May 17, 2018 President Trump issued Executive Order (EO) 13834 on Efficient Federal Operations. This Executive Order establishes a Sustainability Report and Implementation Plan.

The new EO instructs agencies to cut waste and costs to "enhance the resilience" of federal facilities, and to lower the energy use of the buildings they oversee. The EO emphasizes meeting statutory requirements, and gives greater flexibility and discretion to agencies to decide how to best improve operations and meet goals.

The new EO states that OMB and CEQ will coordinate scorecard metrics and reporting instructions to measure agency progress in implementing and achieving EO 13834 goals. TVA continues with sustainable performance planning to ensure continuity of federal data, and because it aligns with our mission, aligns with our customer-focused approach to business, and supports the development of TVA's Corporate Social Responsibility Report.

Mission

The TVA Mission includes serving the Tennessee Valley through providing affordable and reliable energy, environmental stewardship, and economic development. Achieving the EO 13834, EPAAct05, and EISA 2007 goals directly supports the broader TVA Mission.

Sustainability focuses on environmental, economic and social criteria, aspects that are integral to TVA and its mission:

- ❖ The TVA Environmental Policy and commitment to cleaner energy correlates with the environmental aspect of sustainability. TVA efforts to manage natural resources responsibly, reduce emissions, increase use of renewable energy, all while providing affordable and reliable power, are central to this commitment.
- ❖ TVA's economic development commitment mirrors the economic aspect of sustainability through goals of increasing capital investment and attracting and retaining quality jobs for the people and businesses served by TVA.
- ❖ The TVA mission is supported by its values, all of which reflect sustainability's social aspect: safety, diversity, integrity and respect, honest communication, accountability, teamwork, flexibility, and continuous improvement.

Leadership

TVA's implementation of the Sustainability Plan will be directed by the following key staff:

- Brenda E. Brickhouse – TVA Vice-President of Environment & Energy Policy and TVA Chief Sustainability Officer
- Monte L. Matthews – TVA Senior Manager, Sustainability & Climate and TVA Deputy Chief Sustainability Officer
- Chris A. Azar – TVA Senior Program Manager, Internal Energy Management Program, EnergyRight® Solutions

TVA's Environment & Energy Policy group is the point of contact with the Office of Management and Budget, and the Council on Environmental Quality for sustainability reporting. TVA's Environment &

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Energy Policy group also leads TVA's Sustainability Program and governance structure, which includes subject matter experts (SMEs) and representatives from multiple business units working together and with TVA's Sustainability Program to provide leadership and focus for TVA's efforts. These staff comprise the TVA Sustainability Working Group.

The objective of TVA's Federal Sustainability Program is to reduce the non-power block component of the TVA environmental footprint as a federal agency. The program achieves this objective by issuing and maintaining the TVA Sustainability Report, increasing awareness and engaging employees on sustainability, and implementing actions to reduce TVA's internal environmental footprint through cross-organizational collaboration.

Agency Priorities

- **EISA 2007 Energy and Water Surveys/Projects**
TVA plans to continue to evaluate facilities to identify potential energy and water conservation measures. In addition, TVA plans to continue implementation of cost-effective energy and water saving projects in both goal subject and excluded buildings based on funding availability.
- **Electric and Zero Emission Vehicles**
TVA continues to follow progress in EV technology and is exploring the establishment of a cross-functional team to develop a best case recommendation for the deployment of ZEV/PHEV vehicles and the associated charging infrastructure. Any recommendations will be presented to TVA management for guidance and funding.
- **Resilience and Preparedness**
TVA will continue to update its *Statement on Climate Change, Adaptation Plan* and *High Level Vulnerability Assessment* consistent with the Third National Climate Assessment and EO 13783 related guidance.

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Implementation Summary

1. Facility Management:

FACILITY ENERGY EFFICIENCY

FY 2017 Status: 7% reduction (Btu/GSF) (Compared to a FY 2015 baseline)

Implementation Status	Operational Context	Priority Strategies & Planned Actions
<p>TVA finished FY 2017 with a 7% reduction in energy intensity. TVA continues to evaluate facilities to identify potential energy and water conservation measures as required by EPCAct05 and EISA 2007. During FY 2017, TVA surveyed 6 covered facilities accounting for ~4.9 million square feet. TVA’s covered facilities are mostly excluded buildings under EPCAct05 and TVA continues to survey and make energy/water improvements at goal subject buildings. In FY 2017, TVA invested \$3.98M on improvements resulting in \$511,700 in annual savings, 5,849 MWh in energy consumption savings and 2.8 million gallons of water savings at both covered and non-covered facilities.</p>	<p>TVA continues to be challenged by efforts to contain costs as TVA is self-funded receiving no appropriated dollars.</p>	<p>TVA plans to continue to evaluate facilities to identify potential energy and water conservation measures as required by EPCAct05 and EISA 2007. In order to meet the energy intensity reduction TVA plans to continue implementation of cost-effective energy saving projects in both goal subject and excluded buildings based on funding availability. TVA plans to continue to install and monitor energy meters per latest metering plan. Lastly, TVA plans to continue to track and monitor building energy usage to identify buildings that may have high energy usage as compared to year over year and month over month.</p> <p>Projected Progress for FY 2018: 9 – 9.5% reduction compared to a FY 2015 baseline</p> <p>Projected Progress for FY 2019: 11 – 12% reduction compared to a FY 2015 baseline</p>

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EFFICIENCY MEASURES, INVESTMENT, AND PERFORMANCE CONTRACTING

ESPC and UESC investment / number of projects FY 2017: \$3.98M / 56 Projects (self-funded projects)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
TVA has self-funded projects totaling \$3.98M in FY 2017 which has exceeded the commitment of \$2.5M. TVA met its commitment through the implementation of projects identified by its energy, water and sustainability surveys.	TVA, as an energy provider, has its own Federal Energy Services Program that provides Utility Energy Service Contracts (UESC) to Federal direct serve and Federal non-direct serve customers in its region at special request by the local power distributor. TVA can most cost effectively implement these services by acting as its own UESC.	TVA is setting a target to implement projects totaling \$2.5M for FY 2018 and \$2.5M for FY 2019 for a total investment of \$5.0M. TVA as a provider of utility based ESPCs will continue to self-fund its own energy, water and sustainability projects. - Planned investment / number of projects FY 2018: \$2.5M / 20 – 40 projects (self-funded projects) - Planned investment / number of projects FY 2019: \$2.5M / 20 – 40 projects (self-funded projects)

RENEWABLE ENERGY

FY 2017 Status: 13.1% renewable electricity (Total RE% of TVA Buildings)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
TVA renewable energy use was at 13.1% for FY 2017. TVA utilized hydroelectric modifications (HMODs) at its hydroelectric plants to meet the renewable energy goal. TVA also purchased renewable energy certificates (RECs) totaling 8,874 MWh for its two large office buildings through local power companies, which participate in TVA's Green Power Switch and Southeastern RECs program.		TVA plans to maintain its current progress by continuing to utilize HMODs at its hydroelectric plants. HMODs increase the amount of energy generated by the turbine, by increasing the turbine's efficiency. For this goal the additional energy is considered to be renewable energy that is generated and used onsite by TVA buildings. TVA also plans to maintain the purchase of RECs at its two large office buildings. Projected Progress for FY 2018: 13 – 13.5% renewable electricity (Total RE% of TVA Buildings) Projected Progress for FY 2019: - 13.5 – 14.5% renewable electricity (Total RE% of TVA Buildings)

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WATER EFFICIENCY

FY 2017 Status: 28% reduction in potable water (Gal/GSF)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>TVA finished FY 2017 with a 28.2% reduction in Gal/GSF compared to its FY 2007 base year. Water surveys were conducted at multiple TVA sites covering ~4.9 million square feet. Continued to complete retirement of coal-fired plants, which has reduced non-potable water usage.</p>	<p>In FY 2017, TVA experienced an increase in Gal/GSF compared to FY 2016 that was driven by the reduction in square footage associated with plant closings and building inventory accuracy improvements. TVA continues to reconcile our office space square footage and that may potentially have a future impact on our Gal/GSF results. As a result, TVA is looking at projects that will further reduce its water usage. In addition, TVA's water use could fluctuate due to its aging water infrastructure that is prone to leaking.</p>	<p>TVA plans to continue to identify and repair water leaks through visual identification and through water bill analysis. TVA plans to continue EISA surveys to identify and implement cost effective building improvements that will reduce facility water usage. TVA plans to reduce non-potable water use through conversion of wet fly ash storage to dry storage. Lastly, areas where potable water use can be diverted to non-potable water sources will continue to be identified.</p> <p>Projected Progress for FY 2018: 28 – 29% reduction in potable water (Gal/GSF) Projected Progress for FY 2019: 29 – 30% reduction in potable water (Gal/GSF)</p>

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HIGH PERFORMANCE SUSTAINABLE BUILDINGS

FY 2017 Status: 9% buildings and 5% by GSF

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>TVA finished FY 2017 at 5% based on gross square feet for building meeting the Guiding Principles for Sustainable Federal Buildings (GP). TVA continues to apply the GPs to its two largest office complexes and to date, 85% of the GPs have been completed at both complexes.</p>	<p>TVA continues to apply the GPs to its two largest office complexes, which are the Knoxville Office Complex and the Chattanooga Office Complex. TVA is currently anticipating parts of the Knoxville Office Complex to be renovated and it will be a multi-year effort. TVA continues to be challenged by cost-reduction efforts as TVA is self-funded receiving no appropriated dollars.</p>	<p>TVA plans to continue completing GP projects that were previously underway. TVA plans to continue using the Energy Star Portfolio Manager Sustainable Checklist to track GPs progress for existing buildings and its own internal database (Tririga) to track building energy/water use. TVA will continue to review all new building designs and major renovations for incorporation of the new GPs of its greater than 5,000 square feet buildings by FY 2025. TVA is planning on implementing the GPs at new buildings through new construction budgets and at existing buildings through project review during business planning.</p> <ul style="list-style-type: none"> - Projected Progress for FY 2018: Maintain existing status - Projected Progress for FY 2019: 10 – 10.4% buildings and 19 – 20% by GSF

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WASTE MANAGEMENT AND DIVERSION

FY 2017 Status: 7.0% total waste diverted (Solid Non-Hazardous Waste and C&D Waste)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
In FY 2017, TVA reported 15,194 tons of non-hazardous MSW of which 1,139 tons were recycled for a total waste diversion rate of 7%. TVA has continued to maintain its recycling at its facilities through working with its contracted waste management company.	Implementing recycling at many smaller buildings at remote locations has been challenging due to the lack of local recycling infrastructure and available markets. TVA has worked with facility maintenance personnel and even employees at each location to find ways to collect and transport recyclables to other locations.	TVA plans to work with Supply Chain to encourage source reduction and recycling in contracts and develop employee focused messaging on benefits of recycling and reduction. TVA will continue to implement HFC management training as part of its Technical Training Programs. Measures will be taken to ensure recycling equipment/contracted services are available at appropriate locations. - Projected Progress for FY 2018: 7% total waste diverted - Projected Progress for FY 2019: 7% total waste diverted

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2. Fleet Management:

TRANSPORTATION / FLEET MANAGEMENT

FY 2017 Status: 68.3% reduction in petroleum & 4.6% alt fuel use as a % of total covered fleet

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>In FY 2017, TVA had a 68.3% reduction in petroleum fuel use for covered fleet compared to FY 2005. In addition, total petroleum fuel use in covered fleet decreased by 8.2% year over year. TVA has been in the process of implementing several strategies to help reduce petroleum usage and increase alternative fuel usage. Two strategies that have helped include the following: the use of our Fleet Management Information System (FMIS) to report our Vehicle line level data (VLD) for FAST reporting, and the use of FleetDASH.</p>	<p>TVA’s service territory requires employees to travel to urban and very rural areas on average 2,000 miles more annually than utility industry peers. The availability of GHG compliant vehicles to support TVA’s mission and the geographic coverage area impacts TVA’s opportunity to improve performance in this area. Fueling options in rural areas are limited. Miscoded E85 fuel transactions by retail suppliers continue to impact the accuracy of reporting. TVA will continue to purchase alternative fuel vehicles that meet core mission requirements. The most cost-effective and fuel-efficient options will influence the vehicle types purchased. The fulfillment of the Fleet Alternative Fuel Consumption Goal is dependent upon the availability of product and funding.</p>	<p>TVA plans to do the following: Increase acquisitions of zero emission and plug-in hybrid vehicles. Zero emission vehicles will be purchased if commercially available and meets the intended mission. Issue agency policy and a plan to install appropriate charging or refueling infrastructure for zero emission or plug-in hybrid vehicles and opportunities for ancillary services to support vehicle-to-grid technology. Increase utilization of alternative fuel in dual-fuel vehicles. Use a FMIS to track real-time fuel consumption throughout the year for agency-owned, GSA-leased, and commercially-leased vehicles. Minimize use of law enforcement exemptions by implementing GSA Bulletin FMR B-33, <i>Motor Vehicle Management, Alternative Fuel Vehicle Guidance for Law Enforcement and Emergency Vehicle Fleets</i>. - Projected Progress for FY 2018: 70.7% reduction in petroleum & 5.5% alt fuel use as a % of total covered fleet - Projected Progress for FY 2019: 70.7% reduction in petroleum & 5.5% alt fuel use as a % of total covered fleet</p>

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3. Cross-Cutting:

SUSTAINABLE ACQUISITION / PROCUREMENT

FY 2017 Status: 86% contracts & 95% contract dollars with environmental clauses

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>The percentage of Sustainable Acquisition achieved for the First Quarter FY 2017 was 86% and for the Second Quarter was 81%, as calculated by TVA's methodology. Bio-based purchases were at 61% for each quarter, which surpasses established target of 50% of contracts in products to be delivered. TVA has reviewed and update agency procurement policies, programs, and standard terms and conditions to ensure designated federally mandated sustainable products are included in all relevant procurements and services.</p>	<p>Providing continuing education to our buyers and ensuring that all assigned green codes are accurate is a challenge. Barriers to increased adoption of Bio-based Cleaning products were identified as reducing effectiveness of products, higher cost of Bio-based alternatives, and lack of knowledge concerning Bio-based attributes and certifications by vendor sales staff.</p>	<p>TVA will continue to review and provide necessary updates to procurement policies, programs, and standard terms and conditions to ensure purchases provide for federally mandated sustainable products in all relevant contracts where appropriate and practical. TVA will continue to promote the inclusion of Bio-based, other designated green products, and sustainability clauses where appropriate and practical in Request for Proposals and Request for Quotes. TVA will leverage partnerships with internal business partners to create awareness and identify ways to increase use of office products and printer cartridges that are sustainable products, including Bio-based products and other designated green products. TVA will conduct performance reviews for key suppliers where appropriate and practical. TVA intends to continue both its paper acquisition program and reduction pilot project to also support Bio-based purchases and recycling goals.</p> <p>- Projected Progress for FY 2018: 1% increase in contracts & contract dollars w/environmental clauses from prior year & target 400 bio-based contract actions</p> <p>- Projected Progress for FY 2019: 1% increase in contracts & contract dollars w/environmental clauses from prior year & target 400 bio-based contract actions</p>

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ELECTRONICS STEWARDSHIP

FY 2017 Status: 95 % equipment acquisition meeting EPEAT requirements, 100% equipment with power management (32% of equipment was exempted based on business needs), & 100% compliance with disposal guidelines

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>TVA has been able to maintain >95% compliance with the goal of acquiring EPEAT registered electronics. TVA has shifted primarily to Solid State storage in laptops purchased and is transitioning to Solid State storage for desktops. All eligible display devices are currently being managed for power settings through Microsoft Group Policy Objects and those that must be exempted have unique policies applied. TVA’s primary data centers in Chattanooga and Knoxville have achieved <1.5 PUE. Smaller site data centers are being evaluated for improvements.</p>	<p>Currently, TVA’s greatest EPEAT hard spot is large panel displays. TVA has a centralized investment recovery organization that disposes of surplus electronic equipment. This function was recently transferred from the IT organization which resulted in the discontinuing of the use of certified recyclers. Resource limitations prevent implementing power management solutions that provide more detailed reporting of results. Efforts for cost control and also site specific limitations will affect how many data center locations can achieve the <1.5 PUE. Operational requirements will continue to override other considerations.</p>	<p>TVA has shifted primarily to Solid State storage in laptops and we are transitioning to Solid State storage for desktops. This shift is resulting in reduced energy consumption. TVA is also re-establishing disposal of surplus electronics with certified recyclers, and we continue to monitor electronic equipment surplus process to look for additional opportunities for process improvement. TVA is also currently evaluating site data centers for opportunities to improve energy efficiency goals and seeking a more aggressive PC Power Management solution, which will allow us to manage more PC's in a strategic fashion.</p> <ul style="list-style-type: none"> - Projected Progress for FY 2018: Maintain existing status - Projected Progress for FY 2019: Maintain existing status

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GREENHOUSE GAS EMISSIONS

FY 2017 Status: 36.1% reduction in Scope 1 & 2 emissions

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>TVA finished FY 2017 at a 36.1% reduction in GHG Scope 1 & 2 emissions. TVA scope 1 & 2 emissions showed a large reduction due to the retirement and de-energizing of two fossil plants. In addition, TVA has been reviewing its building inventory and has improved the accuracy of the inventory.</p>		<p>For Scope 1 and 2 greenhouse gas emissions related to buildings, TVA plans to continue EISA 2007 and goal-subject energy/water surveys and project upgrades to help meet greenhouse gas reduction targets. For Scope 1 greenhouse gas emissions related to vehicles, TVA will continue to reduce petroleum use in fleet vehicles by reducing employee travel, increasing utilization of alternative fuel, and optimizing its vehicle fleet size.</p>