



March 2017

# TENNESSEE VALLEY AUTHORITY

## Actions Needed to Better Communicate Debt Reduction Plans and Address Billions in Unfunded Pension Liabilities

Accessible Version

# GAO Highlights

Highlights of [GAO-17-343](#), a report to congressional requesters

## Why GAO Did This Study

TVA, the nation's largest public power provider, is a federal electric utility with revenues of about \$10.6 billion in fiscal year 2016. TVA's mission is to provide affordable electricity, manage river systems, and promote economic development. TVA provides electricity to more than 9 million customers in the southeastern United States. TVA must finance its assets with debt and operating revenues. TVA primarily finances large capital investments by issuing bonds but is subject to a statutorily imposed \$30 billion debt limit. In fiscal year 2014, TVA established a debt reduction goal.

GAO was asked to review TVA's plans for debt reduction. This report examines (1) TVA's debt reduction goal, plans for meeting its goal, and key assumptions; (2) the extent to which TVA reports required performance information; and (3) factors that have been reported that could affect TVA's ability to meet its goal. GAO analyzed TVA financial data and documents and interviewed TVA and federal officials and representatives of stakeholder and industry groups.

## What GAO Recommends

GAO recommends that TVA (1) better communicate its plans and goals for debt reduction and reducing unfunded pension liabilities in its annual performance plan and report and (2) take steps to have its retirement system adopt funding rules designed to ensure the pension plan's full funding. TVA agreed with the first recommendation and neither agreed nor disagreed with the second. GAO believes that action is needed as discussed in the report.

View [GAO-17-343](#). For more information, contact Frank Rusco at (202) 512-3841 or [ruscof@gao.gov](mailto:ruscof@gao.gov).

March 2017

## TENNESSEE VALLEY AUTHORITY

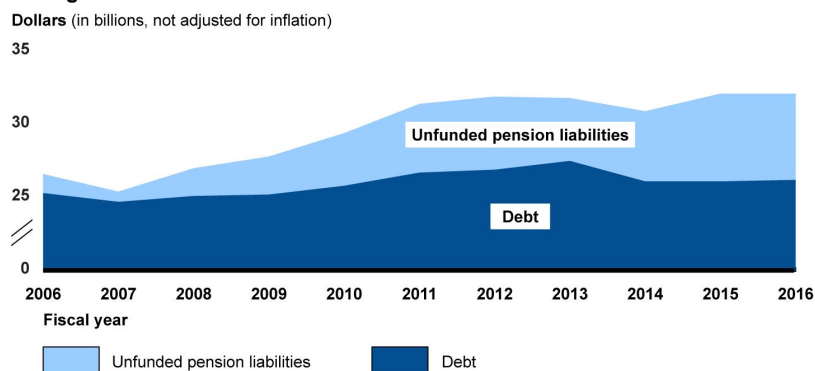
### Actions Needed to Better Communicate Debt Reduction Plans and Address Billions in Unfunded Pension Liabilities

#### What GAO Found

To meet its goal to reduce debt by about \$4 billion—from about \$26 billion in fiscal year 2016 to about \$22 billion by fiscal year 2023—the Tennessee Valley Authority (TVA) plans to increase rates, limit the growth of operating expenses, and reduce capital expenditures. For example, TVA increased rates each fiscal year from 2014 through 2017 and was able to reduce operating and maintenance costs by about 18 percent from fiscal year 2013 to 2016. TVA's plans depend on assumptions that future capital projects will be completed on time and within budget, but TVA's estimated capital costs may be optimistic and could increase.

TVA's debt reduction plans and performance information are not reported in a manner consistent with the GPRA Modernization Act of 2010. Specifically, TVA identifies managing its debt and its unfunded pension liabilities as major management challenges but has not reported required performance information in its performance plans or reports on these challenges, thereby reducing transparency and raising questions about how it will meet its goal. As of September 30, 2016, TVA's pension plan was about 54 percent funded (plan assets totaled about \$7.1 billion and liabilities \$13.1 billion). While TVA's debt has remained relatively flat, its unfunded pension liabilities have steadily increased over the past 10 years, as shown below.

Tennessee Valley Authority's Debt and Unfunded Pension Liabilities, Fiscal Years 2006 through 2016



Source: GAO analysis of Tennessee Valley Authority financial statements and documents. | GAO-17-343

Several factors could affect TVA's ability to meet its debt reduction goal, including regulatory pressures, changes in demand for electricity, technological innovations, or unforeseen events. Also, TVA aims to eliminate its unfunded pension liabilities within 20 years, according to TVA officials. However, factors such as market conditions could affect TVA's progress, and no mechanism is in place to ensure it fully funds the pension liabilities if, for example, plan assets do not achieve expected returns. The TVA retirement system rules that determine TVA's required annual pension contributions do not adjust TVA's contributions to ensure full funding and TVA does not plan to contribute more than the rules require. Without a mechanism that ensures TVA's contributions will adequately adjust for actual plan experience, unfunded liabilities could remain and future ratepayers may have to fund the pension plan even further to pay for services provided to prior generations of ratepayers.

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**Abbreviations**

CBO	Congressional Budget Office
CEO	Chief Executive Officer
DOE	Department of Energy
EIA	Energy Information Administration
EPA	Environmental Protection Agency
EPU	extended power uprate
ERISA	Employee Retirement Income Security Act of 1974
GPRA	Government Performance and Results Act of 1993
GPRAMA	GPRA Modernization Act of 2010
IRP	integrated resource plan
NRC	Nuclear Regulatory Commission

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O&M	operating and maintenance
OIG	Office of Inspector General
OMB	Office of Management and Budget
SMR	small modular reactors
TVA	Tennessee Valley Authority
TVARs	TVA Retirement System
TVARs Rules System	Rules and Regulations of the TVA Retirement System

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March 23, 2017

The Honorable Bill Shuster  
Chairman  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable John J. Duncan  
House of Representatives

The Tennessee Valley Authority (TVA)—the nation’s largest public power provider—is a federal electric utility with revenues of about \$10.6 billion in fiscal year 2016.<sup>1</sup> TVA’s mission is to provide affordable electricity, manage river systems, and promote economic development in the Tennessee Valley. TVA provides electricity to more than 9 million customers, and its service area covers about 80,000 square miles across seven states in the southeastern United States.<sup>2</sup> TVA must finance its assets with debt and operating revenues—primarily from selling power. TVA is a wholesaler of power to 154 local power companies that resell electricity to consumers. TVA also sells electricity directly to industrial customers and federal entities. Unlike many utilities, state public utility commissions do not review or approve TVA’s rates, but its Board of Directors must comply with the requirements of the TVA Act, including the sale of power at the lowest feasible rates. In addition to providing electricity, TVA engages in flood control and environmental stewardship activities that include managing the Tennessee River and federal lands along the shoreline to provide navigation, flood damage reduction, recreational opportunities, adequate water supply, improved water quality, and natural resource protection.

TVA primarily finances large capital investments, such as the construction of nuclear power plants, by issuing bonds, and it also enters into

<sup>1</sup>The TVA Act of 1933 established TVA as a federal corporation. Pub. L. No. 73-17, 48 Stat. 58 (codified as amended at 16 U.S.C. §§ 831 – 831ee (2017)).

<sup>2</sup>TVA’s service territory includes most of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia.

alternative financial arrangements.<sup>3</sup> TVA has a statutorily-imposed \$30 billion debt limit on bonds and notes and “other evidences [*sic*] of indebtedness.”<sup>4</sup> As of September 30, 2016, TVA’s debt totaled about \$26 billion—about \$24 billion in bonds and notes (debt TVA considers subject to the debt limit and refers to as statutory debt) and about \$2 billion in other financing obligations, such as lease-leasebacks and energy prepayments. We have previously reported on TVA’s management of its high levels of debt.<sup>5</sup> In October 2011, we found that TVA may face challenges making planned large capital investments because of existing debt and statutory requirements to keep its rates as low as feasible.<sup>6</sup> In April 2015, at a hearing before the Subcommittee on Water Resources and Environment of the House Transportation and Infrastructure Committee, TVA’s Chief Executive Officer (CEO) said that TVA had a 10-year plan to reduce its debt to about \$21 billion by about 2023—the fourth debt reduction plan in 2 decades. Prior plans did not meet their goals.

TVA’s activities, particularly its power generation activities, are subject to Environmental Protection Agency (EPA) regulations in a variety of areas, including air and water quality control and management and disposal of solid and hazardous wastes. TVA is also subject to certain aspects of

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<sup>3</sup>Alternative financial arrangements include lease-leasebacks, energy prepayments, debt related to variable interest entities, and membership interests issued in connection with variable interest entities subject to mandatory redemption. Lease-leasebacks involve long-term leasing of power generators to private investors, and TVA retains legal title to the assets. Energy prepayments allow customers to prepay for power in exchange for discounted rates in advance of the period in which it is provided. Debt related to variable interest entities includes certain leasing transactions TVA has entered into with special purpose entities to obtain third-party financing for its facilities.

<sup>4</sup>In 2003, we concluded that the TVA Act does not clearly and unambiguously address whether certain financing arrangements should be counted against the debt limit. We suggested that Congress may want to consider amending the TVA Act to clarify whether certain financing arrangements should count toward the debt limit, since they have the same impact on TVA’s financial condition and competitive position as traditional debt financing, but no such amendment was made. GAO, *Tennessee Valley Authority: Information on Lease-Leaseback and Other Financing Arrangements*, [GAO-03-784](#) (Washington, D.C.: June 30, 2003).

<sup>5</sup>GAO, *Tennessee Valley Authority: Full Consideration of Energy Efficiency and Better Capital Expenditures Planning Are Needed*, [GAO-12-107](#) (Washington, D.C.: Oct. 31, 2011); *Tennessee Valley Authority: Plans to Reduce Debt While Meeting Demand for Power*, [GAO-06-810](#) (Washington, D.C.: Aug. 31, 2006); [GAO-03-784](#); and *Tennessee Valley Authority: Debt Reduction Efforts and Potential Stranded Costs*, [GAO-01-327](#) (Washington, D.C.: Feb. 28, 2001).

<sup>6</sup>[GAO-12-107](#).

Federal Energy Regulatory Commission jurisdiction that affect TVA's generation and transmission system and Nuclear Regulatory Commission (NRC) requirements for licensing, operation, and decommissioning of its nuclear generating facilities. NRC also has authority to impose fines, shut down units, or modify, suspend, or revoke operating licenses.

You asked us to review TVA's plans for debt reduction. This report examines (1) TVA's debt reduction goal, plans for meeting its goal, and key assumptions; (2) the extent to which TVA reports required performance information; and (3) factors that have been reported that could affect TVA's ability to meet its debt reduction goal. To address all of our objectives, we reviewed TVA documentation including its long range financial plan, strategic plan, annual reports, and budget submissions. We also reviewed financial data from TVA's annual reports (audited financial information reported on the Securities and Exchange Commission Form 10-K) including revenues; debt; pension and other liabilities; and expenditures such as operating and maintenance (O&M), interest, and capital.<sup>7</sup> In this report, unless otherwise indicated, when we refer to TVA's pension funding—unfunded liabilities and funded ratios—we are referring to the Projected Benefit Obligations TVA discloses in its financial statements.<sup>8</sup> We also obtained data from TVA on historical and projected revenue, debt, capital expenditures, and O&M expenses. To assess the reliability of these data, we reviewed documentation, corroborated the data with TVA's audited financial statements and other published sources of the data, and consulted with knowledgeable officials. We compared TVA's projections with historical data and information from TVA's capital expenditure, resource, and other business plans to determine how they compared with these sources and whether relevant costs and revenue

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<sup>7</sup>TVA reports on debt using a measure of total financing obligations that includes bonds and notes, which TVA considers "statutory debt," and other financing obligations, which include lease-leaseback obligations, energy prepayment obligations, debt related to variable interest entities, and membership interests issued in connection with a lease financing transaction.

<sup>8</sup>TVA's Projected Benefit Obligations are calculated in accordance with Accounting Standards Codification 715. Other measures of pension funding such as those used to determine contribution requirements per the TVA Retirement System rules, may use different assumptions that result in different views of the plan's funding. For an examination of different interest rate and other measurement standards used in the determination of pension liabilities, see GAO, *Pension Plan Valuation: Views on Using Multiple Measures to Offer a More Complete Financial Picture*, [GAO-14-264](#) (Washington, D.C.: Sept. 30, 2014).



sources were considered. We determined that the data were sufficiently reliable for the purposes of our review.

We also reviewed legislation and other sources of TVA's financial, planning, and reporting requirements and policy including the TVA Act, the GPRAMA Modernization Act of 2010 (GPRAMA),<sup>9</sup> the Office of Management and Budget (OMB) Circular A-11 and Circular A-136, and TVA board and other policies and compared these sources with TVA's debt reduction plans. We reviewed our prior reports and those of the Congressional Budget Office (CBO), TVA Office of Inspector General (OIG), and others to identify key issues TVA faces and factors that could affect TVA's ability to meet its goals. We identified these reports based on discussions with CBO and TVA OIG officials, searches of their websites, and recommendations of federal officials and representatives of stakeholder groups. We interviewed TVA and TVA OIG officials and others knowledgeable about TVA, its goals and assumptions, issues facing the utility and the industry, and TVA's service area. We identified and selected a nongeneralizable sample of federal officials and representatives of industry and stakeholder groups to interview by reviewing TVA documents; reviewing our prior reports and those of CBO and OIG; and obtaining recommendations during our interviews about others we could interview who were knowledgeable about TVA. We interviewed federal officials from the Department of Energy's (DOE) Energy Information Administration (EIA), EPA, NRC, the Federal Energy Regulatory Commission, CBO, OMB, and the Department of the Treasury.<sup>10</sup> We interviewed representatives of industry and stakeholder groups including the American Public Power Association, Edison Electric Institute, North American Electric Reliability Corporation, Nuclear Energy Institute, SERC Reliability Corporation, TVA Retirement System (TVARS) Board, Tennessee Valley Public Power Association, Tennessee Valley Industrial Committee, Southern Alliance for Clean Energy, and Southern Environmental Law Center. We also interviewed officials with credit rating institutions including Moody's, Standard & Poor's, and Fitch. Information obtained from our interviews cannot be generalized to those officials or representatives we did not interview.

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<sup>9</sup>Pub. L. No. 111-352, 124 Stat. 3866 (2011). GPRAMA updated the Government Performance and Results Act of 1993 (GPRAMA), Pub. L. No. 103-62, 107 Stat. 285 (1993).

<sup>10</sup>EIA is the statistical agency within DOE that collects, analyzes, and disseminates independent information on energy issues.

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We conducted this performance audit from August 2015 to March 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

#### Background

This section describes TVA's (1) legislation and governance, (2) operations and planning, (3) debt ceiling, and (4) retirement system.

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### Legislation and Governance

TVA is an independent federal corporation established by the TVA Act. The act established TVA to improve the quality of life in the Tennessee River Valley by improving navigation, promoting regional agricultural and economic development, and controlling the floodwaters of the Tennessee River. To those ends, TVA built dams and hydropower facilities on the Tennessee River and its tributaries. From its inception in 1933 through fiscal year 1959, TVA received annual appropriations to finance its cash and capital requirements. In 1959, however, Congress amended the TVA Act and provided TVA with the authority to finance its power program through revenue from electricity sales and borrowing and required it to repay a substantial portion of the annual appropriations it had received to pay for its power facilities. Under the TVA Act, TVA must design its rates to cover all costs but also keep rates as low as feasible. TVA must charge rates for power that will produce gross revenues sufficient to provide funds for its costs including operating, administrative and maintenance costs. TVA can borrow by issuing bonds and notes, an authority set by Congress that cannot exceed \$30 billion outstanding at any given time.<sup>11</sup>

Legislation also limits competition between TVA and other utilities. When the TVA Act was amended in 1959, it prohibited TVA, with some exceptions, from entering into contracts to sell power outside the area where it or its distributors were the primary source of power supply on July 1, 1957. This is commonly referred to as the "fence," because it limits

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<sup>11</sup>If adjusted for inflation, the \$30 billion limit last changed in 1979 would be about \$83 billion in 2016 dollars. In this report, all data are fiscal year data and historic dollar values are not adjusted for inflation unless otherwise indicated.

TVA's ability to expand substantially outside its service area. In addition, the Federal Power Act includes a provision that helps protect TVA's ability to sell power within its service area. This provision, called the "anti-cherry-picking" provision, exempts TVA from being required to allow other utilities to use its transmission lines to deliver power to customers within its service area.<sup>12</sup> The anti-cherry-picking provision reduces TVA's exposure to loss of customers and competition from other utilities.<sup>13</sup>

A nine-member Board of Directors nominated by the President and confirmed by the U.S. Senate administers TVA. The board sets TVA's goals and policies, appoints the CEO, develops long-range plans, seeks to ensure those plans are carried out, and approves TVA's budget. The board also approves rate changes and has the sole authority to set wholesale electric power rates and approve the retail rates charged by TVA's distributors. TVA's board approves the agency's strategic plan which outlines TVA's broad goals, priorities, and performance measures. TVA's most recent strategic plan covers fiscal years 2014 through 2018 and outlines its "strategic imperatives"—namely, to "maintain low rates, live within our means, manage our assets to meet reliability expectations and provide a balanced portfolio, and be responsible stewards of the region's natural resources."<sup>14</sup>

In August 2013, TVA's board approved the goal to reduce TVA's debt to about \$22 billion by fiscal year 2023. TVA developed this goal during its fiscal year 2014 long-term financial planning process, but TVA updates its long range financial plan each year. The TVA board approves the budget each fiscal year, and the board is updated at least semi-annually on the long-range financial plan. TVA uses a 10-year long-range financial plan to determine the amount of funds that will be available for capital investment. Operating priorities are detailed in business unit plans, such as the power supply plan, the transmission assessment plan, and the coal and gas operations asset plan. In addition, TVA files publicly available quarterly and annual financial reports with the Securities and Exchange

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<sup>12</sup>16 U.S.C. § 824k(h)(2) (2016).

<sup>13</sup>TVA faces some competitive pressure common to all utilities. For example, the cost of power could affect decisions by TVA's customers to move or expand outside TVA's service area or by businesses to move into its service area. In addition, customers can decide to generate their own power for on-site use. However, as long as the legislative framework continues to insulate TVA from direct competition for its wholesale customers, it will remain in a position similar to that of a regulated utility monopoly.

<sup>14</sup>Tennessee Valley Authority, *Strategic Plan: Fiscal Years 2014-2018* (March 2014).

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Commission. TVA also submits a budget proposal and management agenda (performance report) to Congress and a performance budget (performance plan) to OMB.

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## Operations and Planning

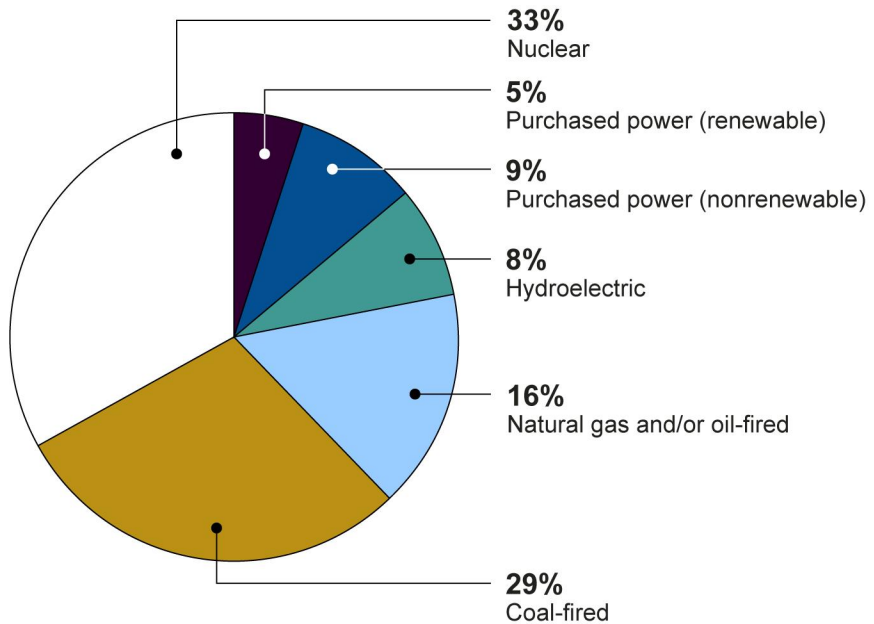
To meet demand for electricity, utilities can construct new plants, upgrade existing plants, purchase power from others, and provide incentives to customers to reduce and shift their demand for electricity through energy efficiency or demand-response programs.<sup>15</sup> Since its establishment, to meet the subsequent need for more electric power, TVA has expanded beyond hydropower to other types of power generation such as natural gas, coal, and nuclear plants. In fiscal year 2016, TVA provided nearly 159 billion kilowatt-hours to customers from its power generating facilities and purchased power, as shown in figure 1.<sup>16</sup>

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<sup>15</sup>By helping to reduce demand for electricity, energy efficiency programs can reduce the need for either new generating capacity or power purchases. Demand-response programs provide customers with financial incentives to reduce their electricity use during periods of peak demand.

<sup>16</sup>A kilowatt-hour is a measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour.

**Figure 1: Percentage of Tennessee Valley Authority's Power Provided to Customers by Source (based on kilowatt hours), Fiscal Year 2016**



Source: GAO analysis of Tennessee Valley Authority financial statements. | GAO-17-343

Note: Renewable resources (nonhydroelectric) from TVA facilities total less than 1 percent and therefore are not represented. Purchased power contains the majority of nonhydroelectric renewable energy supply.

To guide TVA decisions about the resources needed to meet future demand for electricity and determine the most cost-effective ways to prepare for the future power needs of its customers, TVA periodically develops an integrated resource plan (IRP).<sup>17</sup> TVA's 2015 IRP found no immediate needs for new baseload plants—plants that generally have been the most costly to build but have had the lowest hourly operating costs—beyond the completion of the Watts Bar Unit 2 nuclear plant in Tennessee and the expansion of capacity at the Browns Ferry nuclear plant in Alabama.<sup>18</sup> In October 2016, TVA completed Watts Bar Unit 2—

<sup>17</sup>As required by law, TVA conducts least-cost planning through an integrated resource planning process. TVA completed an IRP in 2015, updating its 2011 IRP.

<sup>18</sup>Electricity demand can vary throughout a day, as well as seasonally, so utilities use baseload plants and peaker plants. A baseload plant is operated close to its maximum output all the time it is available for service and generally includes the units whose energy costs are among the lowest on the system. Peaker plants generally operate at a higher hourly cost and can rapidly be brought online or offline in response to changes in electricity demand.

the first nuclear unit to enter commercial operation in 20 years. Beyond those projects, the 2015 IRP found that TVA could rely on additional natural gas generation, greater levels of cost-effective energy efficiency, and increased contributions from competitively priced renewable power.

TVA develops forecasts of demand for electricity that help it make resource planning decisions, such as how much and what kind of capacity to build, how much power to buy from other sources, or how much to invest in energy efficiency. To forecast the demand for electricity in its service area for the next 20 or more years, TVA employs a set of models but forecasting beyond a few years into the future involves great uncertainty. Utilities deal with uncertainty partly by producing a range of forecasts based on demographic and economic factors, and by maintaining excess generating capacity, known as reserves. Models help utilities choose the least-cost combination of generating resources to meet demand. If demand forecasts are unreasonably high or low, a utility could end up with more or less generating capacity than it needs to serve its customers reliably, or it could end up with a mix of generating capacity that is not cost effective. These outcomes can affect electricity rates as well as the utility's financial situation. TVA experienced less than anticipated electricity demand growth over the past 20 years and now forecasts little, if any, growth in demand for electricity in the upcoming years.

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## Debt Ceiling

Congress increased TVA's debt ceiling four times from 1966 to 1979, from \$750 million to \$30 billion. In the years following these increases, TVA's financial condition worsened, largely as the result of construction delays, cost overruns, and operational shutdowns in its nuclear program. In the late 1960s and 1970s, TVA started construction on 17 nuclear units but completed only 7 because of lower-than-anticipated demand for electricity, resulting in billions of dollars of debt. In February 2001, we reported that TVA had about \$6.3 billion in unrecovered capital costs associated with uncompleted and nonproducing nuclear units.<sup>19</sup> In fiscal year 2016, TVA had about \$1.1 billion in unrecovered costs associated with uncompleted nuclear units.

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<sup>19</sup>[GAO-01-327](#).

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While the debt ceiling has not been changed since 1979, TVA's business and operations have grown along with the power needs of the Tennessee Valley. TVA has continued to add generating capacity to the system, as its customer base has increased, and environmental spending requirements have increased. TVA generally uses debt financing for capital investments in new generation capacity and environmental controls and uses revenues for operation and maintenance of the power system. TVA can borrow funds at competitive interest rates as a result of its triple-A credit rating which is based, in part, on its ownership by the federal government. Appendix I includes historical data on TVA's debt and other selected financial data.

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## Retirement System

TVA's board established TVARS in 1939. TVARS is a separate legal entity from TVA and is administered by a seven-member Board of Directors.<sup>20</sup> The TVARS board manages the retirement system, including decision-making on investment portfolios, the interest rate or rates used in actuarial and other calculations, and benefits. The Rules and Regulations of the TVA Retirement System (TVARS Rules) establish how the retirement system is administered and what benefits are payable to participants.<sup>21</sup> The TVARS Rules establish the minimum amount TVA must contribute to the system each year. The TVARS board can amend the TVARS Rules, but TVA has veto power and amendments proposed by the TVARS board become effective only if TVA does not exercise its veto within 30 days. As a governmental plan, TVA's plan is not subject to the Employee Retirement Income Security Act of 1974 (ERISA), which

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<sup>20</sup>Three of the directors are appointed by TVA and three are elected by and from the participants in the system. A seventh director is selected by the other six.

<sup>21</sup>TVARS administers three different benefit structures for members of the system: employees hired prior to January 1, 1996 (and who did not elect to switch pension structures) participate in a defined benefit plan. Employees hired on or after January 1, 1996 (or who elected to switch pension structures) are eligible to participate in a defined benefit (converted to a cash balance formula) and a defined contribution 401(k) plan. Employees hired on or after July 1, 2014 are generally eligible for a retirement benefit in the 401(k) plan only. Changes made to the system in fiscal year 2014 closed the defined benefit plan to new entrants. In addition, TVARS provides a supplemental medical benefit to eligible retirees. TVA administers a Supplemental Executive Retirement Plan for certain executives in critical positions.

sets minimum standards for pension plans in the private sector.<sup>22</sup> As of September 30, 2016, the defined benefit pension plan (which we refer to as the pension plan in this report) had about 34,000 participants, of whom about 24,000 were retirees; it is a “mature” plan, in that there are more than twice as many retirees and beneficiaries as employees participating in the plan.

TVA Plans to Reduce about \$4 Billion in Debt by Raising Rates, Limiting the Growth of Operating Expenses, and Reducing Capital Expenditures To meet its goal to reduce its debt from about \$26 billion in fiscal year 2016 to about \$22 billion by fiscal year 2023, TVA plans to increase revenue through rate increases, limit the growth of operating expenses, and reduce capital expenditures. TVA’s plans assume the completion of capital projects will occur on time and within budget. TVA’s plans also include costs for investigating the development of new nuclear technology but do not include capital costs for construction.

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### TVA Plans to Increase Rates, Limit the Growth of Operating Expenses, and Reduce Capital Expenditures

According to TVA officials, TVA aims to increase its overall financial flexibility over the long term to ensure sufficient room under the debt ceiling so it can access capital for future investments to meet its mission. TVA plans to gradually decrease debt through 2023 (see fig. 2).

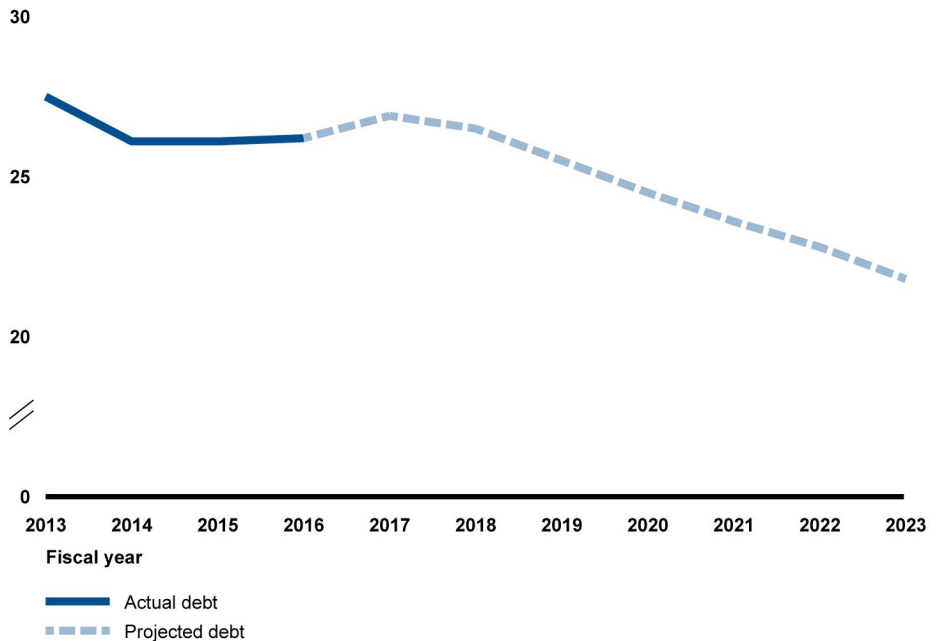
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<sup>22</sup>The pension benefits are not insured by the Pension Benefit Guaranty Corporation which is a federal agency established under ERISA to insure pension benefits in certain private-sector defined benefit plans. ERISA also includes requirements for benefit accrual and minimum standards for vesting and plan funding.



**Figure 2: Tennessee Valley Authority’s Actual Debt and Projected Debt, Fiscal Years 2013 through 2023**

Dollars (in billions, not adjusted for inflation)



Source: GAO analysis of Tennessee Valley Authority financial data and documents. | GAO-17-343

Note: TVA reports on debt using a measure of total financing obligations that includes bonds and notes, which TVA considers “statutory debt,” and other financing obligations, which include lease-leaseback obligations, energy prepayment obligations, debt related to variable interest entities, and membership interests issued in connection with a lease financing transaction. As of September 30, 2016, TVA’s debt totaled about \$26 billion, which included about \$24 billion in bonds and notes and about \$2 billion in other financing obligations.

To meet its goal to reduce its debt to about \$22 billion by fiscal year 2023, TVA’s plans include the following.

**Rate increases.** TVA’s plans include annual rate increases not to exceed 1.5 percent of the retail rate as needed to maintain its debt reduction trajectory. According to TVA officials and documents, TVA’s plans included rate increases of 1.5 percent for about \$200 million in annual revenue. TVA can use increased revenue to refinance existing debt or to fund certain expenditures rather than taking on new debt, but TVA’s board must approve rate increases. TVA increased rates each fiscal year from 2014 through 2017. According to TVA officials, annual rate increases through 2023 could result in the reduction of debt to about \$19.8 billion by fiscal year 2023, which would exceed the agency’s debt reduction goal.

**Limits in the growth of operating expenses.** TVA plans to continue evaluating its operations and to limit the growth of its operating expenses. Having fewer operating expenses frees up revenue from rates that TVA can use to repay outstanding debt or fund certain expenditures without taking on new debt. In fiscal year 2016, TVA's O&M expenses totaled about \$2.8 billion—a reduction of about 18 percent from \$3.4 billion in fiscal year 2013.<sup>23</sup> As part of its cost-reduction initiatives, TVA eliminated 2,200 positions through attrition and elimination of vacant positions. TVA plans to pursue additional workforce reductions to offset increases in retirement benefit and labor costs.<sup>24</sup> According to TVA documents, reductions in expenses associated with coal plant closures will offset some of the increase in labor-related costs but other reductions will be required. TVA officials said that additional reductions could involve contract labor in its nuclear group. In July 2016, TVA offered a voluntary reduction-in-force program to all 3,500 employees in its nuclear group, providing an opportunity to retire or depart; as of January 2017, TVA officials had not provided information on the number of employees participating in this program. In fiscal year 2016, TVA's workforce included 10,691 employees and 12,729 contractors. According to TVA documentation, as a major component of its O&M costs, TVA continuously evaluates its staffing levels, both employees and contractors. TVA plans are being finalized, over the next several years, to decrease the overall workforce through various mechanisms as TVA aligns its workforce with changes to its generating assets; these mechanisms may include reductions-in-force, attrition, and elimination of vacant positions. However, early retirements and severance associated with workforce reductions could also pose additional expenses.

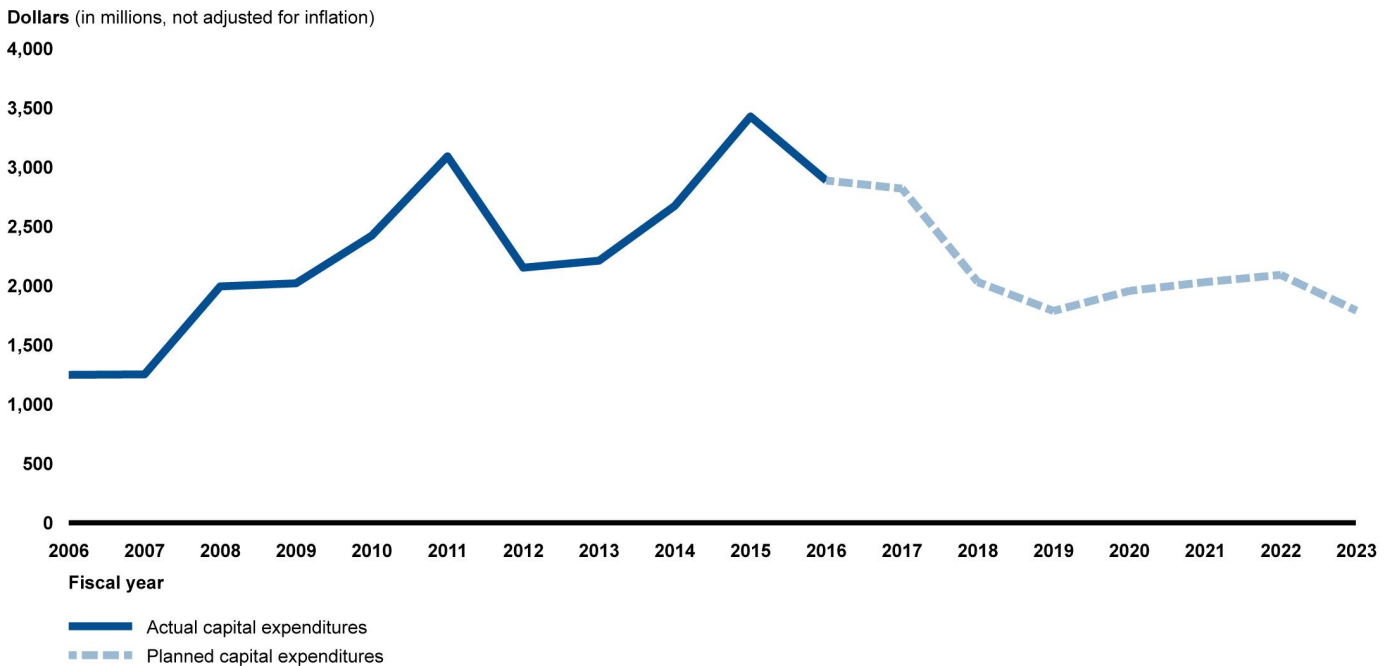
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<sup>23</sup>Routine O&M expenses include labor, benefits and materials for the general maintenance and operation of TVA's generating facilities and corporate functions. TVA's other O&M expenses include outage expenses (work completed during outages of nuclear, coal, gas and hydro generating facilities); expenses for strategic projects at generating facilities and programs, such as energy efficiency and demand response; and other expenses (fuel-related O&M, portions of retirement benefits, and the amortization of costs associated with the cleanup of a large coal combustion residual (coal ash) spill that occurred in December 2008 at TVA's Kingston, Tennessee, coal-fired unit).

<sup>24</sup>These costs include employee salary growth, retirement benefit changes, and labor for new gas plants. Amendments to the TVARS Rules that reduced future pension benefit accruals and increased 401(k) contributions became effective on October 1, 2016. These changes reduced TVA's pension liabilities by about \$960 million, but TVA anticipates an increase of about \$63 million in retirement expenses consisting of \$25 million in additional contributions (\$300 million up from \$275 million) to fund the pension plan, including benefits that have already accrued, and about \$38 million in contributions to the 401(k).

**Reductions in capital expenditures.** TVA plans to reduce its capital expenditures through fiscal year 2023. Over the past decade, TVA’s capital expenditures increased by over 180 percent—from about \$1.2 billion in fiscal year 2006 to about \$3.4 billion in fiscal year 2015.<sup>25</sup> TVA aims to decrease capital expenditures to about \$1.8 billion by fiscal year 2023 (see fig. 3).

**Figure 3: Tennessee Valley Authority’s Actual and Planned Capital Expenditures, Fiscal Years 2006 through 2023**



Source: GAO analysis of Tennessee Valley Authority financial data and documents. | GAO-17-343

Based on its electricity demand forecast, TVA does not anticipate the need for additional baseload capacity until the 2030s beyond completion of Watts Bar Unit 2—which cost about \$4.7 billion—and capacity expansion at three nuclear units. TVA’s capital expenditure plan from fiscal years 2016 through 2023 includes a total of about \$17.4 billion; about \$8.3 billion for base capital projects to maintain the current operational state, about \$5.2 billion for capacity expansion projects, and

<sup>25</sup>If adjusted for inflation, TVA’s capital expenditures increased by about 133 percent, from about \$1.5 billion to about \$3.5 billion, from fiscal years 2006 to 2015 (in 2016 dollars).

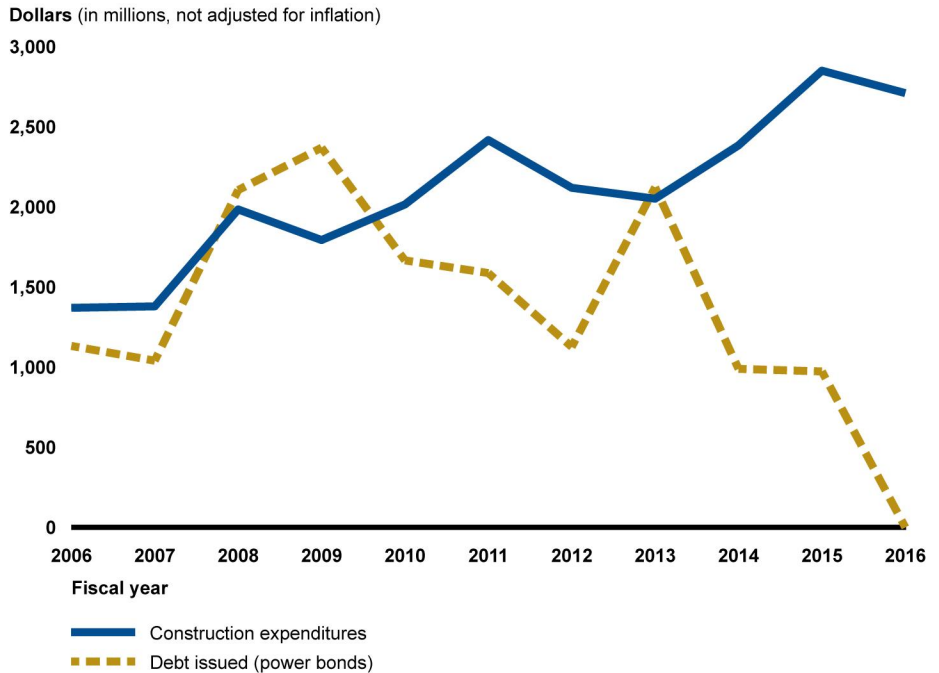
about \$3.9 billion for environmental and other projects.<sup>26</sup> Under TVA's financial guiding principles, TVA may issue debt for new assets, including capacity expansion and installation of environmental controls, but, according to TVA officials, TVA plans to primarily fund capital expenditures with revenue, as opposed to issuing new debt, to reach its debt goal. TVA increased construction expenditures from fiscal years 2006 through 2016 from about \$1.4 billion (\$1.6 billion in 2016 dollars) to about \$2.7 billion while reducing the amount of new debt issued (see fig. 4).<sup>27</sup>

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<sup>26</sup>Base capital includes projects aimed at maintaining the current operational state—for example, replacing parts and systems based on requirements of maintenance agreements, assessing age and condition, and addressing operating problems.

<sup>27</sup>Construction expenditures include expenditures for property, plant, and equipment additions, including clean air projects and new generation but do not include expenditures for certain costs associated with TVA facilities (including costs associated with the Kingston coal ash spill, deferred costs for construction activities at nonproducing units, and settlement of asset retirement obligations associated with the future retirement of TVA's generating facilities). Capital expenditures include construction expenditures and costs associated with the aforementioned facilities.

**Figure 4: Tennessee Valley Authority’s Construction Expenditures and Debt Issued, Fiscal Years 2006 through 2016**



Source: GAO analysis of Tennessee Valley Authority financial statements. | GAO-17-343

Note: TVA did not issue any power bonds in fiscal year 2016.

## TVA’s Plans Assume Completion of Capital Projects on Time and within Budget

According to TVA officials, TVA’s plans assume that the completion of capital projects will occur on time and within budget. TVA’s plans included the assumption that it would complete construction of a new nuclear unit—Watts Bar Unit 2—in 2016. Watts Bar Unit 2 began commercial operation in October 2016. By completing construction of this unit in 2016, a key assumption underlying TVA’s debt reduction plans was met. However, TVA’s plans include other key capital projects such as the construction of two natural gas plants, modification of a coal plant to install clean air controls, and two smaller nuclear projects. Information about these two nuclear projects follow.

**Browns Ferry extended power uprate (EPU).** TVA’s capital plans include a project that aims to increase generation capacity at the Browns Ferry nuclear plant’s three existing units. TVA began the project in 2001

and anticipated completion within 2 to 4 years but the project remains incomplete.<sup>28</sup> As of September 30, 2016, TVA reported that it anticipates completion of the project by 2024 at a total estimated cost of about \$475 million—an increase of 25 percent from an estimated \$380 million in fiscal year 2014. According to TVA documentation, the agency spent about \$191 million on the project through fiscal year 2016. The project involves engineering analyses and modification and replacement of certain existing plant components to enable the units to produce additional power. To allow operation at the higher power level, the license for each unit requires modification that would occur in parallel with the NRC license amendment review process. TVA originally submitted the licensing amendment requests to NRC in June 2004. However, TVA withdrew these requests in September 2014 and submitted a new request in September 2015. According to NRC, it is planning to complete its review by fall 2017.

**Watts Bar Unit 2 steam generator replacement.** TVA's capital plans include about \$438 million to replace steam generators at the newly operational unit. The existing generators prematurely developed leaks and other problems occurred at nuclear plants, including Watts Bar Unit 1 which required replacement of the generators 9 years into operation. According to TVA officials, TVA has completed steam generator replacements at other nuclear units without significant cost overruns or schedule delays.

Given historical trends in nuclear construction, TVA's estimated capital costs may be optimistic and could increase. Any cost overruns or delays on its nuclear or other capital projects could require adjustments to its future financial plans. TVA's history of cost overruns and schedule delays includes the construction of Watts Bar Unit 2 which began commercial operation in October 2016 after decades of construction (see table 1).

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<sup>28</sup>At the request of TVA management, the OIG reviewed the causes of the delays in the Browns Ferry EPU project and concluded that TVA senior management's decisions early in the EPU project were the most significant factor in the lack of progress in the project. Specifically, the TVA OIG found that senior management directed staff to keep the EPU proposal within a certain cost, requiring the staff to report an artificially optimistic scope and ultimately, leading a contractor to propose use of a methodology that was not approved by NRC.

**Table 1: Tennessee Valley Authority's Watts Bar Unit 2 Construction History**

Date	Activity
1973	TVA received a construction permit for Watts Bar Units 1 and 2. TVA's original cost estimate for units 1 and 2 totaled about \$500 million, with estimated completion dates in 1976 and 1977, respectively.
1985	Construction proceeded on unit 2 until TVA halted construction in 1985 after more than a decade of construction. The reactor was approximately 60 percent complete.
November 2006	TVA informed the Nuclear Regulatory Commission of its intent to perform a study of the feasibility of completing Watts Bar Unit 2, with the goal of producing power from the reactor in 2013.
August 2007	TVA revived the project and the TVA board approved the completion of the unit, at a cost of \$2.5 billion to be completed in 60 months (i.e., by August 2012).
April 2012	The TVA Office of Inspector General determined TVA's construction was significantly behind schedule and grossly over budget, despite information released by TVA senior management to the contrary. TVA's board approved a revised cost estimate of between \$4.0 billion and \$4.5 billion, up from \$2.5 billion, and the unit was forecasted to come on line by December 2015.
January 2016	TVA's board approved additional funding, up to a total estimated cost of \$4.7 billion with completion of the unit anticipated in June 2016.
October 2016	Watts Bar Unit 2 entered commercial operation.

Source: GAO analysis of TVA documents. | GAO-17-343

Note: Dollar values are not adjusted for inflation.

TVA did not complete another nuclear project. TVA auctioned off the 1,400 acre site of the Bellefonte nuclear plant in Alabama, including two unfinished nuclear units, in November 2016 for \$111 million—a fraction of the approximately \$5 billion TVA had spent on the plant.<sup>29</sup> TVA began building the plant in 1974, but several stops and starts in construction occurred primarily as a result of lower-than-anticipated growth in electricity demand. According to TVA officials, TVA decided again to complete unit 1 in 2011 but stopped work in 2013 because of reduced electricity demand, Watts Bar Unit 2 concerns, and anticipated increases in construction costs. In 2013, TVA estimated that the cost to complete the unit had grown from its prior approved cost of \$4.9 billion to at least \$7.5 billion or more. TVA stated that it wanted to complete Watts Bar Unit 2 and await the results of its IRP process. Based on the 2015 IRP, TVA

<sup>29</sup>These capital expenditures data do not include the effect of inflation over the years during which the expenditures occurred. Nuclear Development LLC purchased the Bellefonte site in November 2016 and plans to complete construction of the plant. The company has up to 2 years from the purchase date to close on the site, which TVA will maintain in the meantime. TVA constructed various facilities on the site, including two partially completed pressurized light-water reactors, reactor containment buildings, a control building, cooling towers, warehouses, office buildings, railroad spurs, and a training center. When TVA first halted construction in 1988, Bellefonte Unit 1 was about 90 percent complete, and unit 2 was about 58 percent complete. TVA did not begin construction on the other two units that were initially planned at the site.

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decided not to complete construction of Bellefonte. According to TVA documentation, TVA spent about \$10 million to \$12 million annually maintaining the Bellefonte site. TVA's plans do not anticipate any such events occurring with its current projects that would interfere with timely completion within budget.

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### TVA's Plans Include Costs for Investigating New Nuclear Technology Although Its Study Concluded the Technology Is Cost-Prohibitive

TVA's plans include costs for investigating the development of new nuclear technology but do not include capital costs for construction of the technology. Specifically, TVA is assessing the potential of its Clinch River site in Tennessee for the construction of small modular reactors (SMR).<sup>30</sup> According to TVA documentation, these efforts include research and development activities that support its technology innovation mission. In 2016, TVA submitted an early site permit application to NRC to assess the suitability of the site for construction and operation of SMRs at its 1,200-acre Clinch River site. An early site permit is valid for up to 20 years and would address site safety, environmental protection, and emergency preparedness associated with any of the light-water reactor SMR designs under development in the United States. According to TVA documentation, TVA has not selected a technology and has not entered into any contracts for design work.

If TVA decides to construct SMRs, its costs are uncertain but could total about \$3 billion after cost sharing through public-private partnerships but expenditures prior to a construction decision would be a very small portion of this cost, according to TVA documentation. The total estimated

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<sup>30</sup>SMRs are nuclear power reactors with a generating capacity of less than 300 megawatts of electricity generally, while TVA's existing nuclear units generate about 1,190 to 1,270 megawatts. As we reported in July 2015, light-water SMRs are a new reactor concept that may provide some benefits but that also face some development challenges even though they are similar to existing large light-water reactors, such as at TVA's Sequoyah, Browns Ferry, and Watts Bar plants. We reported that common challenges include long time frames and high costs associated with the shift from development to deployment—that is, the construction of the first commercial reactors of a particular type. GAO, *Nuclear Reactors: Status and Challenges in Development and Deployment of New Commercial Concepts*, [GAO-15-652](#) (Washington, D.C.: July 28, 2015). According to TVA, the smaller size enables components to be shipped to the site by rail or truck, allowing more of the construction to take place in factories which increases standardization, improves quality and shortens construction durations.



costs for TVA to develop, submit, and support the NRC application and review include about \$72 million, according to an interagency agreement with DOE, and TVA is responsible for half of these costs. According to TVA documentation, the agency spent about \$23 million on SMR activities through fiscal year 2015 and estimates spending about \$5 million in fiscal year 2016.<sup>31</sup> According to TVA, it spends about \$10 million to \$15 million on research and development activities each year as part of its technology innovation organization (not including spending on SMRs). TVA officials said that the agency will not decide whether or not to construct SMRs for at least 5 years. However, TVA is investigating SMRs even though its 2015 IRP found that TVA does not need additional baseload power plants beyond the projects currently under way and that SMRs are cost-prohibitive.

#### TVA Has Not Reported Required Performance Information on Its Debt Reduction Plans and Its Performance Goals Do Not Address Billions in Unfunded Pension Liabilities

TVA's debt reduction plans and performance information are not reported in a manner consistent with GPRAMA requirements. GPRAMA requires agencies, including TVA, to report major management challenges that they face, and for each major management challenge that agencies develop and report performance information—including performance goals, measures, milestones, and planned actions to resolve the challenge.<sup>32</sup> TVA identifies managing debt and its unfunded pension liabilities as major management challenges but TVA has not reported required performance information in its annual performance plan or report on these challenges.<sup>33</sup>

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<sup>31</sup>Dollar figures are not adjusted for inflation.

<sup>32</sup>The GPRA Modernization Act of 2010, Pub. L. No. 111-352, § 3, 124 Stat. 3866, 3867 (2011). GPRAMA establishes a framework aimed at taking a crosscutting and integrated approach to focusing on results and improving government performance. In addition, OMB guidance on implementing GPRAMA instructs agencies to highlight management issues and risks and how the agency will address major management challenges; in the performance plan agencies are to describe progress made on management priorities and challenges. Office of Management and Budget, Circular A-11, *Preparation, Submission and Execution of the Budget*, Part 6, § 210 (November 2014).

<sup>33</sup>For a discussion of its major management challenges, TVA's strategic plan refers readers to other documents, including its performance report, which discusses "managing debt," "debt reduction," and "pension fund."

For managing debt, TVA's CEO stated a goal for debt reduction by 2023 during a congressional hearing in April 2015 and the goal is reported in internal documents and Board presentation slides available on TVA's website. In addition, according to TVA's 2016 performance report, its strategic objectives include "effectively manage debt to ensure long-term financial health."<sup>34</sup> TVA's 2016 performance report includes a goal related to total financing obligations for fiscal years 2016 and 2017, but the goal shows these obligations increasing, and the report does not include information on planned actions to resolve the challenge. Although TVA established a goal to reduce its debt, it has not documented in its annual performance plan or report strategies for how it will meet its goal, as required by GPRAMA, thereby reducing transparency and raising questions about how the agency will meet its goal.<sup>35</sup>

For TVA's unfunded pension liabilities, TVA officials have stated a goal to eliminate the pension funding shortfall (about \$6 billion at the end of fiscal year 2016) by 2036, but TVA has not identified such a goal or milestones in its performance plan or report. As of September 30, 2016, TVA's pension plan was about 54 percent funded with a funding shortfall of about \$6 billion (plan assets totaled \$7.1 billion and liabilities \$13.1 billion).<sup>36</sup> While TVA's debt has remained relatively flat, its unfunded pension liabilities have steadily increased over the past 10 years (see fig. 5).

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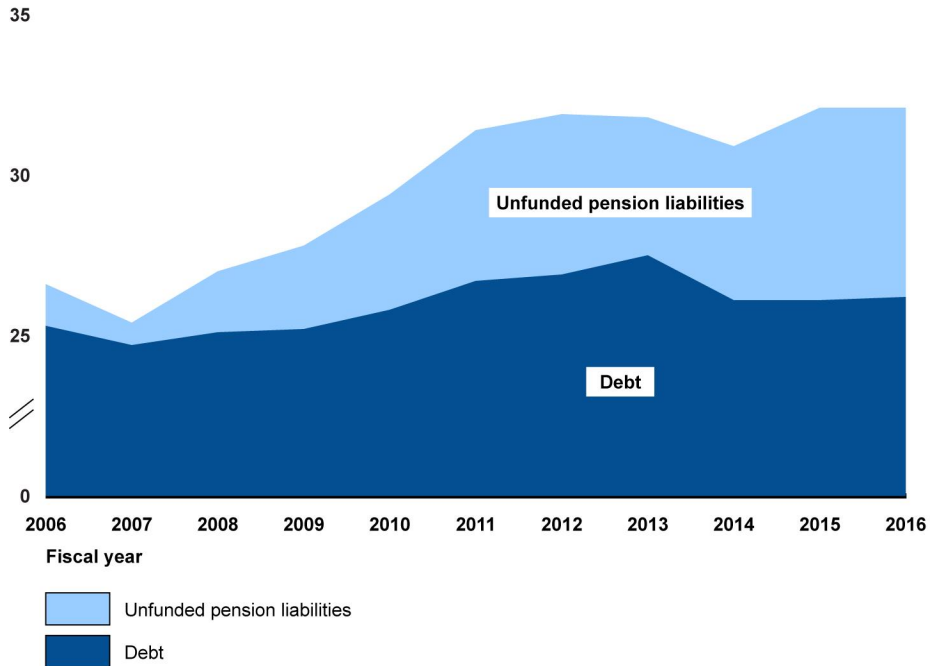
<sup>34</sup>Tennessee Valley Authority, *Budget Proposal and Management Agenda (Performance Report) for the Fiscal Year Ending September 30, 2017* (February 2016). TVA has not published a separate performance plan since 2014. *Performance Budget for the Fiscal Year Ending September 30, 2016* (September 2014).

<sup>35</sup>In June 2016, we found that 22 of the 24 agencies we reviewed did not report complete performance information for each of their major management challenges. GAO, *Managing for Results: Agencies Need to Fully Identify and Report Major Management Challenges and Actions to Resolve them in their Agency Performance Plans*, [GAO-16-510](#) (Washington, D.C.: June 15, 2016).

<sup>36</sup>The \$13.1 billion in pension liabilities does not include TVA's other post-retirement benefit obligations which totaled about \$571 million as of September 30, 2016. In addition, TVA administers a Supplemental Executive Retirement Plan for certain executives in critical positions and TVA has historically funded the annual calculated expense. In fiscal year 2016, TVA made contributions of about \$6 million to the Supplemental Executive Retirement Plan and \$47 million to the other post-retirement benefit plans.

**Figure 5: Tennessee Valley Authority’s Debt and Unfunded Pension Liabilities, Fiscal Years 2006 through 2016**

Dollars (in billions, not adjusted for inflation)



Source: GAO analysis of Tennessee Valley Authority financial statements and documents. | GAO-17-343

Note: TVA reports on debt using a measure of total financing obligations that includes bonds and notes, which TVA considers “statutory debt,” and other financing obligations, which include lease-leaseback obligations, energy prepayment obligations, debt related to variable interest entities, and membership interests issued in connection with a lease financing transaction. As of September 30, 2016, TVA’s debt totaled about \$26 billion, which included about \$24 billion in bonds and notes and about \$2 billion in other financing obligations.

Unfunded pension liabilities are similar to other kinds of debt because they constitute a promise to make a future payment or provide a benefit.<sup>37</sup> According to a joint American Academy of Actuaries and Society of Actuaries task force, a pension plan needs to be evaluated as part of a plan sponsor’s overall enterprise; an analysis that looks at the pension plan as a self-standing entity is incomplete and too narrow.<sup>38</sup> However,

<sup>37</sup>Financial economic theory informs the premise that a promise to make a future payment of benefits is similar to a promise to pay off any other kind of debt (such as a bond) and should be valued in a similar way.

<sup>38</sup>Joint American Academy of Actuaries and the Society of Actuaries Task Force on Financial Economics and the Actuarial Model, *Pension Actuary’s Guide to Financial Economics* (2006).

TVA officials told us that because TVA uses revenue from the rates it charges customers to fund the pension, and not debt in the form of bonds, unfunded pension liabilities would not affect TVA's debt reduction plan. In addition, TVA defers pension costs as "regulatory assets"—incurred costs deferred for recovery through rates in the future—in accordance with accounting standards and with TVA board approval.<sup>39</sup> However, because TVA will need to recover these costs through rates in the future, this affects its financial health and operations. If TVA uses revenue from rate increases to close the pension shortfall, this could decrease its ability to fund other activities such as capital projects with revenue from rates. This could, in turn, require TVA to rely on debt to fund certain capital projects and interfere with efforts to meet overall debt reduction goals. Alternatively, further rate increases could interfere with TVA's objective of keeping rates as low as feasible. Without the Board of Directors ensuring that TVA better document and communicate information about its goals to reduce debt and unfunded pension liabilities in its performance plan and report, including strategies for achieving its goals, congressional and other stakeholders will not have a complete picture of TVA's progress toward managing its debt or its overall financial health.

#### Several Factors Could Affect TVA's Ability to Meet Its Debt Reduction Goal, and No Mechanism Is in Place to Ensure TVA Addresses Unfunded Pension Liabilities

Several factors could affect TVA's ability to meet its debt reduction goal, including regulatory pressures, changes in demand for electricity,

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<sup>39</sup>As a rate-regulated entity, TVA can defer recognition of certain costs or revenues (by capitalizing them as assets or liabilities, respectively) that normally would be charged to the statement of operations as costs or revenues, with approval from the TVA board. In order to defer recognition of incurred costs, a regulated entity must have the statutory authority to establish rates that recover all costs, and those rates must be charged to and collected from customers. The TVA Board is authorized by the TVA Act to set rates for power sold to customers. Additionally, TVA's regulated rates are designed to recover its costs of providing electricity. In view of demand for electricity and the level of competition, TVA has assumed that rates, set at levels that will recover TVA's costs, can be charged and collected. Regulatory assets generally represent incurred costs that have been deferred because such costs are probable of future recovery in customer rates. If future recovery of regulatory assets ceases to be probable, TVA would be required to write off these deferred costs and recognize them as a charge against net income or other comprehensive income. Appendix I, table 6 includes historical data on TVA's regulatory assets.

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technological innovations, or unforeseen events.<sup>40</sup> In addition, TVA aims to eliminate its \$6 billion in unfunded pension liabilities within 20 years, according to TVA officials, but no mechanism is in place to ensure TVA fully funds the liabilities if, for example, plan assets do not achieve expected returns.

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## Factors That Could Affect TVA's Ability to Meet Its Debt Reduction Goals

Several factors could affect TVA's ability to meet its debt reduction goals, including regulatory pressures that could require additional capital investment, changes in demand for electricity, technological innovations, or unforeseen events that could affect revenues or require additional investments.

### Regulatory Pressures Could Require Additional Capital Investment

TVA's fossil fuel and nuclear power plants are, or potentially will be, affected by existing and proposed environmental and other regulations, and the implementation of these regulations may require TVA to make additional capital investments. For example, TVA estimates it will spend about \$2 billion on environmental expenditures and compliance with regulations from 2017 through 2023 but, according to a TVA document, this estimate could change as additional information becomes available and regulations change. TVA spent about \$977 million to eliminate the wet storage of coal combustion residual, commonly called coal ash, to assist in meeting EPA and Tennessee Department of Environment and Conservation environmental requirements.<sup>41</sup> As part of these efforts, TVA prepared a June 2016 environmental impact statement on the approach it planned to take for closing coal ash impoundments at its coal plants,

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<sup>40</sup>Other factors could affect TVA's ability to meet its debt reduction goal, but the factors we identified include those mentioned in the documents we reviewed and by TVA officials and the representatives we interviewed from industry and stakeholder groups.

<sup>41</sup>Coal combustion residuals are produced from burning coal in coal-fired power plants and include a number of by-products, such as boiler slag (molten bottom ash from certain furnace types) and scrubber residues. In April 2015, EPA published its final rule on disposal of coal combustion residuals, which regulates, among other things, design, operations, groundwater monitoring, and closure and postclosure standards.

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which involved converting all its wet storage to dry storage.<sup>42</sup> According to a TVA document, the agency anticipates spending about an additional \$1.2 billion in related coal ash costs through 2022.

While the status of the Clean Power Plan that EPA issued in 2015 is unclear, TVA continues to assess the plan and its status.<sup>43</sup> According to TVA documentation, TVA is well positioned to meet carbon emission guidelines for existing fossil fuel plants under the plan. Specifically, in April 2011, TVA agreed to retire 18 of its 59 fossil fuel units by the end of 2017 for several reasons, including the cost of adding emission control equipment and other environmental improvements to the units.<sup>44</sup> As of September 2016, TVA had retired 14 of the 18 units and reported that it would continue to evaluate the appropriate asset mix, given the costs of continuing to operate its coal plants, including adhering to environmental regulations.<sup>45</sup>

With regard to TVA's nuclear power plants, TVA also faces potential costs related to proposed regulations. For example, in May 2014, NRC notified certain nuclear power plant licensees of the results of seismic hazard screening evaluations performed following the Fukushima nuclear

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<sup>42</sup>Two lawsuits were filed against TVA in 2015 alleging waste materials were released from the Gallatin Fossil Plant's coal ash facilities into waters around the plant in violation of Tennessee state law and the Clean Water Act, respectively. According to TVA documents, both lawsuits are scheduled for trial in 2017.

<sup>43</sup>The U.S. Supreme Court stayed implementation of the Clean Power Plan in February 2016 pending judicial review. In addition, the plan is subject to review by the new presidential administration.

<sup>44</sup>TVA entered into two similar agreements in April 2011—one with EPA and one with four states (Alabama, Kentucky, North Carolina, and Tennessee) and three environmental groups (Sierra Club, National Parks Conservation Association, and Our Children's Earth Foundation). TVA refers to these agreements collectively as the "environmental agreements." Under the agreements, TVA committed, among other things, to retire on a phased schedule 18 fossil fuel units, invest \$290 million in certain TVA environmental projects, and pay civil penalties of \$10 million.

<sup>45</sup>TVA reported in September 2016 that it planned on retiring the remaining four units by December 2017. In addition, TVA has also retired 10 additional coal-fired units that were not part of the environmental agreements.

accident.<sup>46</sup> Based on the screening results, TVA must conduct additional seismic risk evaluations of all three of its nuclear plants—Browns Ferry, Sequoyah, and Watts Bar—by 2019.<sup>47</sup> According to TVA, NRC is developing a rule anticipated in mid-2017 for nuclear plants to mitigate the effects of events, such as seismic events, that exceed plant design standards that could require TVA to modify one or more of its nuclear plants. According to TVA documents, plant modification costs will be unknown until the rule is finalized, but they could be substantial.

### Changes in Electricity Demand, Technological Innovation, or Unforeseen Events Could Affect Revenues or Require Additional Investments

Reductions in demand for electricity could affect TVA's revenues; alternatively, increases in demand could generate additional revenue but require investment in additional capacity or purchased power. The expanded use of distributed generation and increased energy efficiency and conservation could reduce demand for electricity in TVA's service area and affect its revenues.<sup>48</sup> As the amount of distributed generation grows and renewable generation and energy efficiency technologies improve and become more cost-effective, TVA projects sales of electricity will see little, if any, growth in upcoming years. According to several representatives from industry and stakeholder groups, distributed generation could increase competition from end-use customers—consumers who typically buy power from the local power companies that obtain power from TVA—if they adopt on-site power generation.

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<sup>46</sup>In March 2011, a 9.0-magnitude earthquake and subsequent tsunami hit northeast Japan. The Fukushima Daiichi nuclear power plant suffered extensive damage when a tsunami wave exceeded the plant's seawall, flooded the site, and caused a prolonged power loss. As a result of the power loss, plant operators were unable to keep three of the reactors cool, which led to fuel melting, hydrogen explosions, and the release of radioactive material into the environment. The disaster displaced tens of thousands of residents and contaminated the surrounding area.

<sup>47</sup>TVA must complete the seismic risk evaluation for Browns Ferry and Sequoyah by December 31, 2019, and complete the evaluation for Watts Bar by June 30, 2017. According to TVA, these seismic risk evaluations were required by NRC because TVA's three nuclear plants had increases in seismic parameters beyond the technical information available when the plants were designed and licensed.

<sup>48</sup>Distributed generation refers to a variety of technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power. Distributed generation may serve a single consumer, such as a home or business, or it may be part of a small grid that is also tied into a larger electricity delivery system, such as an industrial facility, military base, or college campus.

According to EIA's Annual Energy Outlook 2016, annual electricity demand for the average household will decline by 11 percent from 2015 to 2040.<sup>49</sup> EIA reported that factors contributing to a decline in household demand include efficient lighting technologies and increased distributed generation, particularly rooftop solar. According to TVA documents, the agency cannot predict the financial impact from future growth of distributed generation but TVA has taken steps to anticipate the changes in the electricity market that distributed generation could bring. For example, in 2016, TVA announced a new business unit focused on distributed energy resources and the energy delivery marketplace, and according to a TVA official, it also formed information exchanges to provide forums to discuss implementation issues related to distributed generation and energy efficiency.

Other technological developments in the electric utility industry could change TVA's operating costs or requirements. For example, several representatives we interviewed from industry and stakeholder groups said that energy storage technology could become more cost-effective and change the way utilities operate.<sup>50</sup> While the added capacity provided by energy storage could delay or alleviate the need for TVA to build additional power plants, TVA officials said that there are still several unknowns about the technology though they do not believe integration of battery storage into the system would be problematic. Finally, unforeseen events could also affect TVA's ability to meet debt reduction goals. For example, the 2008 Kingston coal ash spill cost about \$1.2 billion to remediate—costs TVA is still recovering.

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### Market Conditions and Other Factors Could Affect TVA's Unfunded Pension Liabilities, and No Mechanism Is in Place to Ensure Full Funding of These Liabilities

TVA plans to make annual contributions of \$300 million to the pension plan, or more if required by the TVARS Rules, for up to 20 years.

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<sup>49</sup>Energy Information Administration, *Annual Energy Outlook 2016*, DOE/EIA-0383 (Washington, D.C.: August 2016).

<sup>50</sup>Energy can be stored for later use in a variety of ways including pumped hydroelectric, batteries, and thermal storage. Energy storage can help balance fluctuations in electricity supply and demand by storing electricity during periods of relatively high production and low demand, then releasing the stored energy back to the electric power grid during periods of lower production or higher demand.



According to TVA's analysis, there is a 50 percent chance that annual contributions of \$300 million could eliminate the \$6 billion funding shortfall at the end of 20 years and a 50 percent chance that a funding shortfall would remain. TVA's analysis assumes an annual return of 7 percent on pension plan assets, but depending on market conditions, assets could yield higher or lower than expected returns.<sup>51</sup> According to TVA officials, the pension plan asset performance is critical to TVA's ability to close the pension funding shortfall. TVA officials have stated a goal to fully fund the pension plan within 20 years. However, if market conditions over the next 20 years are not favorable enough to fully fund the pension liabilities, which TVA's analysis assigns a 50 percent chance, TVA would need to contribute more than \$300 million per year to make up the difference if it aims to eliminate the funding shortfall. Other factors that could affect TVA's pension liabilities include greater than expected increases in retiree lifespans and declining bond yields.<sup>52</sup>

In a 2010 report, the TVA OIG found that a combination of factors—including market conditions and TVA actions—resulted in a significant shortfall between pension plan assets and projected liabilities.<sup>53</sup> These factors included: (1) TVA not making contributions to TVARS for 6 years, (2) the addition of significant retirement benefits to the plan when the funded status was better, (3) the establishment of TVARS Rules that had the effect of enticing employees to retire, and (4) the economic downturn in 2008 and 2009.<sup>54</sup> The TVARS pension plan's funded status decreased from about 92 percent in 2007 to about 55 percent in 2016 (see fig. 6).

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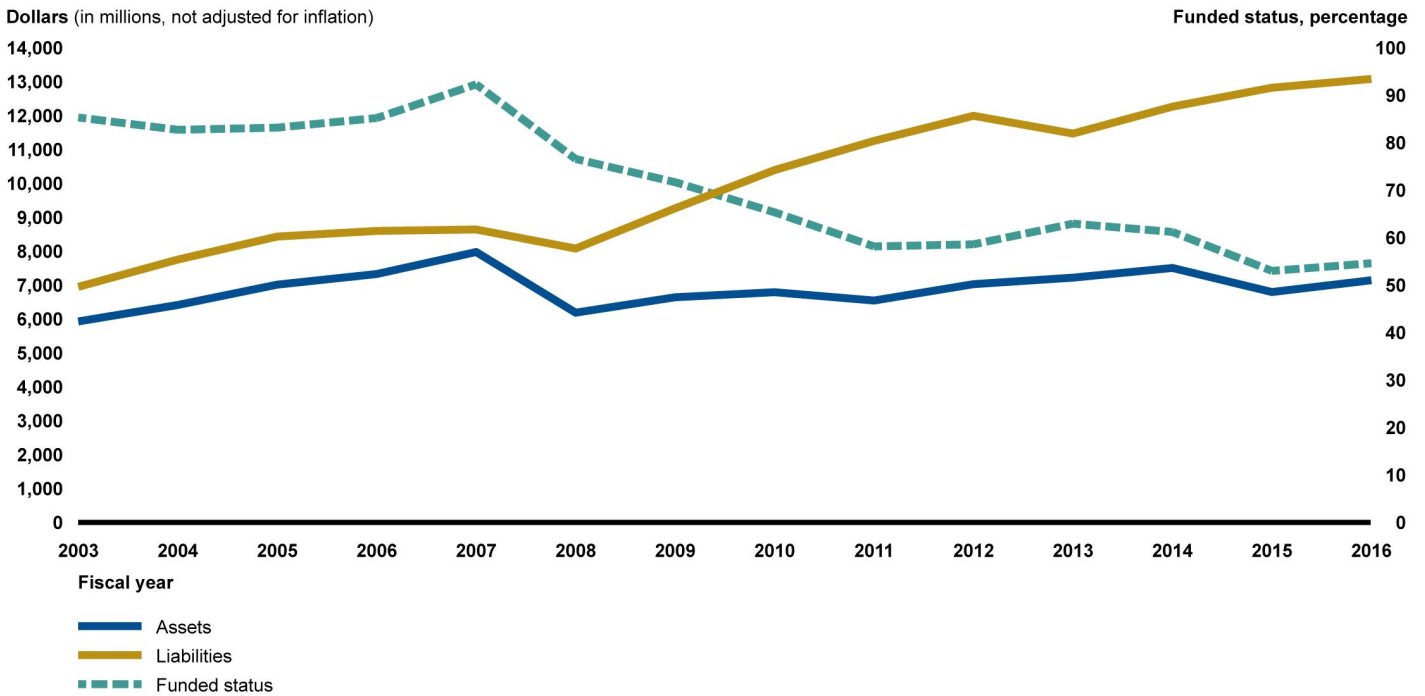
<sup>51</sup>The TVARS board plans to reduce the risk of its asset allocation as the plan's funded status improves but does not plan to begin the reductions until the plan is about 70 to 75 percent funded. Reducing investment risk could reduce the expected return on investments. Changes to the TVARS asset allocation policy that change the assumed rate of return on the investment of system assets are subject to TVA review and veto. TVARS Rules §§ 1(33), 4(7).

<sup>52</sup>Lower bond yields result in less discounting of future benefits payments, increasing the present value of future benefit payments and, therefore, pension liabilities. For example, the interest rate used to determine TVA's pension liability decreased from 4.50 percent as of September 30, 2015 to 3.65 percent as of September 30, 2016 which increased TVA's pension liabilities by \$1.4 billion. Bond yields may also increase in the future, lowering the present value of future benefit payments.

<sup>53</sup>Tennessee Valley Authority Office of Inspector General, *Final Report—Audit 2009-12326—Review of TVA's Pension Risk* (February 2010).

<sup>54</sup>According to the TVA OIG report, TVARS as well as other pension funds invested about 60 percent of plan assets in stocks during the economic downturn when stock markets experienced significant declines that negatively impacted the value of the plan assets.

**Figure 6: Tennessee Valley Authority Retirement System Pension Plan Assets, Liabilities, and Funded Status, Fiscal Years 2003 through 2016**



Source: GAO analysis of Tennessee Valley Authority financial statements. | GAO-17-343

Note: Funded status is the ratio of plan assets to liabilities.

In December 2015, TVA proposed changes to the TVARS Rules to reduce the obligations of the pension plan and commit to making consistent contributions. The TVARS board approved amendments that reduced TVA’s pension liabilities by about \$960 million, reduced future benefit accruals, and added a minimum contribution requirement of \$300 million to the existing requirement for a period of 20 years. However, the amended TVARS Rules do not adjust TVA’s annual contribution requirement to ensure TVA will fully fund its pension liabilities. The TVARS Rules require that for a period of 20 years, or until the plan is deemed fully funded, TVA’s annual contribution equal the greater of (1) a

formula-based contribution or (2) \$300 million.<sup>55</sup> To the extent that a \$300 million contribution proves inadequate because of plan experience, the formula-based contribution would determine the amount TVA must contribute each year. The formula uses a 30-year “open amortization method,” meaning that the amortization period is reset to 30 years each fiscal year, so the end of the amortization period (i.e., paying off the unfunded liability) may never be achieved. A Blue Ribbon Panel commissioned by the Society of Actuaries believes that plans’ risk management practices and their ability to respond to changing economic and market conditions would be enhanced through the use of amortization periods shorter than the 30-year period commonly used today.<sup>56</sup> The panel recommended amortization periods of no more than 15 to 20 years for gains and losses. According to the panel’s 2014 report, the panel believes that fully funding pension benefits of public employees over their average future service reasonably aligns the cost of today’s public services with the taxpayers who benefit from those services. In addition, according to the American Academy of Actuaries, funding rules should include targets based on accumulating the present value of benefits for employees by the time they retire, and a plan to make up for any variations in actual assets from the funding target within a defined and reasonable time period.<sup>57</sup> In the private sector, ERISA generally requires a 7-year amortization of shortfalls for private sector single-employer pension plans.

Unlike an open amortization period, a closed, or fixed, amortization period is generally maintained until the original unfunded liability amount is fully repaid. Thus, a closed amortization period would be a better practice if

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<sup>55</sup>TVARS Rules and Regulations, §§ 9(B)(3) - 9(B)(4). The formula contribution equals the sum of the “normal contribution” (representing the cost of benefits accrued during the current year), plus the “accrued liability contribution” (an amortization of the unfunded benefit liability). The liability used to determine TVA’s minimum contribution requirement is generally less than the pension liability that TVA reports in its financial statements, to which we refer throughout this report. To the extent that the liability used to determine TVA’s contribution requirement is less than the pension liability TVA reports in its financial statements, TVA’s financial statements could show a shortfall in funding when the TVARS Rules would deem the plan to be fully funded.

<sup>56</sup>In April 2013, the Society of Actuaries chartered the Blue Ribbon Panel on Public Pension Plan Funding, which consisted of actuaries, economists, former plan trustees, and government and financial experts. *Report of the Blue Ribbon Panel on Public Pension Plan Funding* (February 2014).

<sup>57</sup>American Academy of Actuaries, *Issue Brief: Objectives and Principles for Funding Public Sector Pension Plans* (Washington, D.C.: February 2014).

the goal is to fully fund pension liabilities. Table 2 compares the amortization of \$6 billion in unfunded liabilities using open and closed amortization methods, assuming assets return 7 percent, as TVA expects. The closed amortization method would extinguish the unfunded liability in 30 years, whereas more than \$4 billion in unfunded liability would remain under the open amortization method (see table 2).

**Table 2: Comparison of Open and Closed Amortization Methods Applied to a Balance of \$6 Billion in Unfunded Liabilities over 30 Years**

Dollars in millions

Year	Open amortization			Closed amortization		
	Balance	Payment	Interest	Balance	Payment	Interest
1	6,000	(452)	388	6,000	(452)	388
2	5,936	(447)	384	5,936	(452)	384
3	5,874	(442)	380	5,869	(452)	379
4	5,811	(438)	376	5,796	(452)	374
5	5,750	(433)	372	5,718	(452)	369
6	5,689	(428)	368	5,635	(452)	363
7	5,629	(424)	364	5,546	(452)	357
8	5,569	(419)	360	5,450	(452)	350
9	5,510	(415)	357	5,348	(452)	343
10	5,452	(411)	353	5,239	(452)	335
11	5,394	(406)	349	5,122	(452)	327
12	5,337	(402)	345	4,997	(452)	318
13	5,281	(398)	342	4,864	(452)	309
14	5,225	(393)	338	4,721	(452)	299
15	5,169	(389)	335	4,568	(452)	288
16	5,115	(385)	331	4,404	(452)	277
17	5,061	(381)	328	4,229	(452)	264
18	5,007	(377)	324	4,041	(452)	251
19	4,954	(373)	321	3,840	(452)	237
20	4,902	(369)	317	3,626	(452)	222
21	4,850	(365)	314	3,396	(452)	206
22	4,798	(361)	311	3,150	(452)	189
23	4,747	(358)	307	2,887	(452)	170
24	4,697	(354)	304	2,606	(452)	151
25	4,648	(350)	301	2,305	(452)	130
Year	Balance	Payment	Interest	Balance	Payment	Interest

Year	Open amortization		Closed amortization			
26	4,598	(346)	298	1,983	(452)	107
27	4,550	(343)	294	1,638	(452)	83
28	4,501	(339)	291	1,269	(452)	57
29	4,454	(335)	288	874	(452)	30
30	4,407	(332)	285	452	(452)	0
31	4,360			0		

Source: GAO analysis. | GAO-17-343

Note(s): The balance in each year is reduced by the payment (an amount calculated to pay off the balance with interest over the specified period of time, 30 years in this case) and increased by interest on the balance (assumed to be 7 percent each year). The open amortization method recalculates the payment each year, based on the balance at the beginning of that year. The closed amortization calculates the payment once, at the beginning of the 30-year period, and holds the payment constant thereafter. The figures in the table are rounded.

As we mentioned earlier, TVA assumes an annual return of 7 percent on pension plan assets, but depending on market conditions, assets could yield higher or lower than expected returns. If the return on investment was lower than expected, the unfunded liabilities would be greater, and TVA would need to contribute more than \$300 million per year to make up the difference. The open amortization period utilized by the TVARS formula-based contribution requirement does not ensure TVA's contributions will adequately adjust for plan experience and does not ensure full funding of the pension liabilities. Without a mechanism that ensures TVA's contributions will adequately adjust for actual plan experience, unfunded liabilities could remain, and future ratepayers may have to fund the pension plan even further to pay for services provided to prior generations of ratepayers.

TVA officials told us that the agency does not plan to contribute more than the TVARS Rules require and that it plans to continue to treat its unfunded pension liabilities as regulatory assets, deferring pension costs for recovery through rates in the future. However, the TVARS Rules do not provide for fully funding pension benefits over the service of TVA employees covered by the plan, which would align the cost of services provided by covered employees with the rates paid by customers who benefit from the services of covered employees. The deferral of contributions necessary to close the funding shortfall reduces future financial flexibility and may result in the need for rate increases during a period of declining demand for electricity. If TVA needs to use revenue originally targeted for debt reduction to pay for greater than estimated pension expenses, this could interfere with TVA's debt reduction goal and additional rate increases may be required which could interfere with

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TVA's ability to keep rates low. Alternatively, less flexibility could lead to pressure to reduce the pay or benefits of future TVA employees.

#### Conclusions

Since fiscal year 2013, TVA reduced its O&M costs by about 18 percent while completing construction of the first nuclear unit to enter commercial operation in 20 years. However, since the late 1970s, TVA's financial condition worsened largely as a result of delays, cost overruns, and operational shutdowns in its nuclear program, and the agency continues to invest in nuclear projects while deferring full recognition and funding of pension liabilities. TVA generally aims to reduce its debt to increase its financial flexibility over the long term to ensure sufficient room under its debt ceiling so it can access capital for future investments to meet its mission. However, retirement benefit and labor costs and cost overruns or delays on nuclear capital projects could put pressure on TVA's plan, along with other factors including future demand for electricity or unforeseen events.

GPRAMA requires agencies to report major management challenges that they face and report performance information—including performance goals, measures, milestones, and planned actions needed to resolve them. However, TVA is not fully meeting this requirement, thereby reducing transparency and raising questions about how it will meet its goals of managing debt and reducing its unfunded pension liabilities. TVA's unfunded pension liabilities affect TVA's financial health and operations especially if TVA will need to fund them through rate increases in the future. Without better documentation and communication of TVA's goals to reduce debt and unfunded pension liabilities in its performance plan and report, including the strategies for achieving these goals, congressional and other stakeholders will not have a complete picture of TVA's progress toward managing its debt or its overall financial health.

TVA aims to eliminate \$6 billion in unfunded pension liabilities within 20 years, according to TVA officials, but factors such as market conditions could affect TVA's progress and no mechanism is in place to ensure the pension plan is fully funded. The TVARS Rules do not adjust TVA's required contributions to ensure pension liabilities will be fully funded and TVA plans to contribute no more than the rules require and to defer the remaining pension liability. Without a mechanism that ensures TVA's contributions will adequately adjust for actual plan experience, unfunded liabilities could remain, and future ratepayers may have to fund the pension plan even further to pay for services provided to prior generations of ratepayers.

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#### Recommendations for Executive Action

We recommend that the Board of Directors ensure that TVA take the following two actions:

- 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.
- propose, and work with the TVARS board to adopt, funding rules designed to ensure the plan's full funding.

#### Agency Comments and Our Evaluation

We provided a draft of this product to TVA for comment. In its comments, reproduced in appendix II, TVA agreed with our first recommendation and stated that it will incorporate additional details in the next iteration of its performance plan and report to enhance transparency. TVA neither agreed nor disagreed with our second recommendation. However, TVA said that it is committed to working with the TVARS Board to ensure a fully funded system. It did not specifically state whether it would consider proposing, and working with the TVARS Board to adopt, funding rules designed to ensure the pension plan's full funding. As TVA states in its comments, it worked with the TVARS Board to implement plan amendments that were effective October 1, 2016. TVA states that those amendments have placed the retirement system on a path toward achieving full funding in 20 years. We continue to believe that the action we recommended is needed and, as discussed in the report, that the open amortization period used in the TVARS Rules to determine TVA's minimum contribution requirement does not ensure TVA's contributions will adequately adjust for plan experience and, therefore, does not ensure full funding of the pension liabilities. In addition, we received technical comments, which we have incorporated as appropriate.

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As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees, TVA's board of directors, and other interested parties. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff members have any questions about this report, please contact me at (202) 512-3841 or [ruscof@gao.gov](mailto:ruscof@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff members who made major contributions to this report are listed in appendix III.



Frank Rusco  
Director, Natural Resources and Environment



## Appendix I: Tennessee Valley Authority's Debt and Other Selected Financial Data, Fiscal Years 2006 through 2016

The Tennessee Valley Authority (TVA) reports on debt using a measure of total financing obligations that includes bonds and notes, which TVA considers “statutory debt,” and other financing obligations which include lease-leaseback obligations, energy prepayment obligations, debt related to variable interest entities, and membership interests issued in connection with a lease financing transaction. As table 3 shows, in fiscal year 2016, TVA’s \$26 billion in debt included about \$24 billion in bonds and notes and \$2 billion in other financing obligations. Table 4 shows selected data from TVA’s financial statements including revenues, expenses, and other data. Table 5 shows TVA’s pension liabilities, assets and funded status. Table 6 shows TVA’s regulatory assets—incurred costs deferred for recovery through rates in the future—by major category.

**Table 3: Tennessee Valley Authority Debt, Fiscal Years 2006 through 2016**

Dollars in millions

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bond and notes, gross <sup>a</sup>	22,899	22,506	22,68	22,834	23,627	24,660	24,103	24,821	23,620	23,878	24,175
Other financing obligations											
Energy prepayments	1,244	1,138	1,033	927	822	717	611	510	410	310	210
Lease-leasebacks	1,108	1,072	1,354	1,404	1,354	1,282	1,204	761	691	616	537
Membership interests of variable interest entities subject to mandatory redemption	-	-	-	-	-	-	-	40	39	37	35
Debt of variable interest entities	-	-	-	-	-	-	994	1,341	1,311	1,279	1,245
<b>Total other financing obligations</b>	<b>2,352</b>	<b>2,210</b>	<b>2,386</b>	<b>2,332</b>	<b>2,176</b>	<b>1,999</b>	<b>2,809</b>	<b>2,652</b>	<b>2,451</b>	<b>2,242</b>	<b>2,027</b>
<b>Total financing obligations<sup>b</sup></b>	<b>25,251</b>	<b>24,716</b>	<b>25,066</b>	<b>25,166</b>	<b>25,803</b>	<b>26,659</b>	<b>26,912</b>	<b>27,473</b>	<b>26,071</b>	<b>26,120</b>	<b>26,202</b>

Source: GAO analysis of TVA data. | GAO-17-343

Note: Totals may not add due to rounding. Dollar values are not adjusted for inflation. Energy prepayments allow customers to prepay for power in exchange for discounted rates in advance of the period in which it is provided. Lease-leasebacks involve long-term leasing of power generators to private investors, and TVA retains legal title to the assets. Debt related to variable interest entities

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**Appendix I: Tennessee Valley Authority's Debt  
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includes certain leasing transactions TVA has entered into with special purpose entities to obtain third-party financing for its facilities.

<sup>a</sup>Bonds and notes, gross do not include unamortized discounts, premiums and issue costs, and net exchange losses from foreign currency transactions.

<sup>b</sup>According to TVA, it reports on total financing obligations using a financial measure that, although commonly used, is not calculated and presented in accordance with generally accepted accounting principles.

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**Table 4: Tennessee Valley Authority Selected Financial Data, Fiscal Years 2006 through 2016**

Dollars in millions

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Operating revenues	8,983	9,326	10,382	11,255	10,874	11,841	11,220	10,956	11,137	11,003	10,616
Operating expenses											
Fuel and purchased power	3,342	3,449	4,176	4,745	3,219	4,353	3,869	3,847	3,824	3,394	3,090
Operating and maintenance	2,328	2,353	2,307	2,395	3,232	3,617	3,510	3,428	3,341	2,838	2,842
Depreciation and amortization	1,500	1,473	1,224	1,598	1,724	1,772	1,919	1,680	1,843	2,031	1,836
Tax equivalents	376	451	491	544	457	662	622	548	540	525	522
<b>Total operating expenses</b>	<b>7,560<sup>a</sup></b>	<b>7,726</b>	<b>8,198</b>	<b>9,282</b>	<b>8,632</b>	<b>10,404</b>	<b>9,920</b>	<b>9,503</b>	<b>9,548</b>	<b>8,788</b>	<b>8,290</b>
Net interest expense	1,264	1,232	1,376	1,272	1,294	1,305	1,273	1,226	1,169	1,133	1,136
Net income <sup>b</sup>	113	423	817	726	972	162	60	271	469	1,111	1,233
Construction expenditures	1,370	1,379	1,984	1,793	2,015	2,417	2,119	2,051	2,384	2,850	2,710
<b>Total assets</b>	<b>34,308</b>	<b>33,732</b>	<b>37,137</b>	<b>40,017</b>	<b>42,753</b>	<b>46,393</b>	<b>47,257</b>	<b>46,105</b>	<b>45,514</b>	<b>48,745</b>	<b>50,494</b>

Source: GAO analysis of TVA financial statements. | GAO-17-343

Note: Dollar values are not adjusted for inflation.

<sup>a</sup>In fiscal year 2006, operating expenses do not add to total because \$14 million in loss on asset impairment is not included in the other operating expense categories.

<sup>b</sup>Net income includes revenues from activities unrelated to TVA's overall mission that are not recorded as operating revenue; this income is recorded as other income and totaled about \$43 million in fiscal year 2016.

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**Table 5: Tennessee Valley Authority Pension Liabilities, Assets, and Funded Status, Fiscal Years 2006 through 2016**

Dollars in millions

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Liabilities	8,600	8,642	8,080	9,266	10,394	11,255	11,995	11,471	12,265	12,824	13,083
Assets	7,328	7,977	6,188	6,643	6,792	6,546	7,029	7,221	7,507	6,797	7,145
Funded status	85%	92%	77%	72%	65%	58%	59%	63%	61%	53%	55%

Source: GAO analysis of TVA financial statements. | GAO-17-343

Note: Dollar values are not adjusted for inflation. Funded status is the ratio of plan assets to liabilities.

**Table 6: Tennessee Valley Authority's Regulatory Assets by Major Category, Fiscal Years 2006 through 2016**

Dollars in millions

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Deferred nuclear generating units <sup>a</sup>	3,521	3,130	2,738	2,347	1,956	945	710	1,675	1,492	1,279	1,087
Deferred pension costs and other postretirement benefit costs	914	973	2,277	4,063	4,711	5,807	5,517	4,076	4,297	5,565	5,385
Unrealized losses on interest rate derivatives <sup>b</sup>	-	-	-	-	797	1,164	1,332	808	957	1,236	1,547
Nuclear decommissioning costs <sup>c</sup>	474	419	764	909	898	1,012	914	893	931	1,003	938
Non-nuclear decommissioning costs	-	-	349	351	410	519	550	571	645	828	819
Other <sup>d</sup>	421	530	800	2,008	1,775	2,601	2,878	1,669	1,153	1,013	924
<b>Total regulatory assets</b>	<b>5,330</b>	<b>5,052</b>	<b>6,928</b>	<b>9,678</b>	<b>10,547</b>	<b>12,048</b>	<b>11,901</b>	<b>9,692</b>	<b>9,475</b>	<b>10,924</b>	<b>10,700</b>

Source: GAO analysis of TVA financial statements. | GAO-17-343

Note: Dollar values are not adjusted for inflation.

<sup>a</sup>Deferred costs related to the Bellefonte nuclear plant totaled about \$1.1 billion as of September 30, 2016. In November 2013, the TVA board approved the treatment of all amounts at the time included in the "construction in progress" category that were related to the Bellefonte nuclear plant (Bellefonte) as a regulatory asset. Additionally, the TVA board approved combining (1) the amounts related to Bellefonte previously included in "construction in progress," (2) the \$619 million in "regulatory asset-construction costs," and (3) the remaining amounts included in "regulatory asset-deferred nuclear generating units" into a single regulatory asset titled "deferred nuclear generating units." In August 2016, the TVA Board approved the recognition of a regulatory asset for (1) all costs attributable to (a) the expected disposition of Bellefonte assets, including preparing or preserving the Bellefonte site, and (b) associated liabilities directly related to those assets; (2) any related future operating and project costs until the assets are sold; (3) the amount by which the book value of Bellefonte exceeds its fair market value less cost to sell, if any; (4) any subsequent gains and losses resulting from the disposition or impairment of Bellefonte; and (5) any costs attributable to the steam generators for Bellefonte until TVA disposes of the generators.

<sup>b</sup>Unrealized losses on interest rate derivative contracts reflect losses on TVA's interest rate swaps which TVA uses to fix variable short-term debt to a fixed rate.

<sup>c</sup>TVA maintains trusts for the purpose of providing funds to decommission its nuclear and other facilities. TVA's nuclear decommissioning trust holds funds for the decommissioning of TVA's nuclear power plants and its asset retirement trust holds funds primarily for the costs related to the future

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closure and retirement of TVA's other long-lived assets. The balances in these trusts were \$1.6 billion and \$519 million, respectively, as of September 30, 2016.

<sup>d</sup>Other includes costs for environmental cleanup of the Kingston coal ash spill, environmental agreements, unrealized losses on commodity derivatives, and fuel cost adjustment receivable.

## Appendix II: Comments from the Tennessee Valley Authority



Tennessee Valley Authority, 400 W. Summit Hill Drive, Knoxville, Tennessee 37902

March 2, 2017

Mr. Franklin W. Rusco  
Director, Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

GAO DRAFT REPORT – ACTIONS NEEDED TO BETTER COMMUNICATE DEBT  
REDUCTION PLANS AND ADDRESS BILLIONS IN UNFUNDED PENSION LIABILITIES

Dear Mr. Rusco:

Thank you for the opportunity to provide the Tennessee Valley Authority's (TVA) comments on the subject report. TVA appreciates the U.S. Government Accountability Office's (GAO) professionalism in conducting its review and issuing this report.

We appreciate GAO's recognition of the strategic debt goal adopted by the TVA Board in August 2013 and the actions TVA has taken in support of that goal. TVA's strategic debt goal is to reduce its debt to approximately \$22 billion by fiscal year 2023, a reduction of approximately \$6 billion over a 10-year period. In addition to being approved by the TVA Board, our strategic debt goal was endorsed by our customers and the Office of Management and Budget.

Approximately four years have passed since the TVA Board established the strategic debt goal, and through strong financial and operational performance achieved to date, TVA is well positioned to meet and potentially exceed the debt goal on a consistent rate trajectory to the TVA Board-approved plan. As part of TVA's normal business planning cycle, assumptions will be reviewed and are subject to change, yet even as assumptions change, TVA remains committed to maintaining competitive rates and to reducing its debt to approximately \$22 billion by FY23.

This report contains two recommendations, and both of these have been shared with TVA's Board of Directors. First, the report recommends that TVA better communicate its plans and goals for debt reduction and reducing unfunded pension liabilities in its annual performance plan and report. TVA agrees to include additional details on these matters in future performance plans and reports.

TVA is committed to transparency with its stakeholders on its financial and operational performance and demonstrates this commitment in numerous ways, including public Board meetings, regular meetings with customers and public officials, and financial reports filed with the Securities and Exchange Commission. TVA believes that its annual performance plan and annual performance report comply with the applicable reporting requirements, but we recognize

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Mr. Franklin W. Rusco  
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that they provide another available vehicle to communicate with our stakeholders. Accordingly, we will incorporate GAO's recommendation for additional transparency in these reports with the next iteration (FY19) of these documents.

Second, the report recommends that TVA take steps to have its retirement system adopt funding rules designed to ensure the pension plan's full funding. TVA is committed to working with the TVA Retirement System Board of Directors (TVARS Board) to ensure a fully-funded retirement system.

Established in 1939, the TVA Retirement System (TVARS) is a separate legal entity from TVA. The TVARS Rules and Regulations are administered by the seven-member TVARS Board with three of the directors elected by and from the membership, three appointed by TVA, and a seventh director selected by the other six. Amendments to the TVARS Rules and Regulations must be approved by the TVARS Board and become effective 30-days after approval unless vetoed by TVA.

TVA recently worked with the TVARS Board to implement plan amendments that were effective October 1, 2016. Those amendments, which include a change in funding rules to increase the annual funding from TVA, have placed the retirement system on a path toward achieving fully-funded status in 20-years. As noted in GAO's report, there are assumptions such as asset returns and discount rates that will impact the funding level, and actual results in that regard may cause fully-funded status to be achieved earlier or later than the planned 20-years. What will not change, however, is TVA's commitment to work with the TVARS Board to ensure that the system remains on a viable path to fully-funded status.

Thank you again for the opportunity to review this report and provide these comments. We appreciate GAO's recommendations on these important matters.

Sincerely,



William D. Johnson  
President and Chief Executive Officer

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## Appendix III: GAO Contact and Staff Acknowledgments

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### GAO Contact

Frank Rusco, (202) 512-3841 or [ruscof@gao.gov](mailto:ruscof@gao.gov).

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### Staff Acknowledgments

In addition to the contact named above, Michael Hix (Assistant Director), Janice Ceperich, Philip Farah, Kirk Menard, and Joseph Silvestri made key contributions to this report. Also contributing to this report were Antoinette Capaccio, Cindy Gilbert, Steve Lowrey, Alison O'Neill, Karissa Robie, Dan C. Royer, Barbara Timmerman, and Jacqueline Wade.



# Appendix IV: Accessible Data

## Data Tables

**Data Table for Highlights figure: Tennessee Valley Authority's Debt and Unfunded Pension Liabilities, Fiscal Years 2006 through 2016**

Fiscal year	Debt	Unfunded pension liabilities
2006	25.3	1.3
2007	24.7	0.7
2008	25.1	1.9
2009	25.2	2.6
2010	25.8	3.6
2011	26.7	4.7
2012	26.9	5.0
2013	27.5	4.3
2014	26.1	4.8
2015	26.1	6.0
2016	26.2	5.9

**Data Table Figure 1: Percentage of Tennessee Valley Authority's Power Provided to Customers by Source (based on kilowatt hours), Fiscal Year 2016**

Percentage	Source
5%	Purchased power (renewable)
8%	Hydroelectric
9%	Purchased power (nonrenewable)
16%	Natural gas and/or oil-fired
29%	Coal-fired
33%	Nuclear

**Data Table Figure 2: Tennessee Valley Authority’s Actual Debt and Projected Debt, Fiscal Years 2013 through 2023**

<b>Fiscal Year</b>	<b>(dollars in billions)</b>
2013	27.5
2014	26.1
2015	26.1
2016	26.2
2017	26.9
2018	26.5
2019	25.5
2020	24.5
2021	23.6
2022	22.8
2023	21.8

**Data Table Figure 3: Tennessee Valley Authority’s Actual and Planned Capital Expenditures, Fiscal Years 2006 through 2023**

<b>Fiscal year</b>	<b>Actual and planned capital expenditures (in millions)</b>
2006	1248
2007	1252
2008	1994
2009	2020
2010	2422
2011	3091
2012	2152
2013	2211
2014	2673
2015	3427
2016	2887
2017	2819
2018	2031
2019	1787
2020	1956
2021	2030
2022	2091

Fiscal year	Actual and planned capital expenditures (in millions)
2023	1789

**Data Table Figure 4: Tennessee Valley Authority’s Construction Expenditures and Debt Issued, Fiscal Years 2006 through 2016**

Fiscal year	Construction expenditures	Debt issued (power bonds)
2006	1370	1132
2007	1379	1040
2008	1984	2105
2009	1793	2369
2010	2015	1666
2011	2417	1587
2012	2119	1126
2013	2051	2122
2014	2384	989
2015	2850	973
2016	2710	0

**Data Table Figure 5: Tennessee Valley Authority’s Debt and Unfunded Pension Liabilities, Fiscal Years 2006 through 2016**

Fiscal year	Debt	Unfunded pension liabilities
2006	25.3	1.3
2007	24.7	0.7
2008	25.1	1.9
2009	25.2	2.6
2010	25.8	3.6
2011	26.7	4.7
2012	26.9	5.0
2013	27.5	4.3
2014	26.1	4.8
2015	26.1	6.0
2016	26.2	5.9

**Data Table Figure 6: Tennessee Valley Authority Retirement System Pension Plan Assets, Liabilities, and Funded Status, Fiscal Years 2003 through 2016**

<b>Fiscal year</b>	<b>Liabilities</b>	<b>Assets</b>	<b>Funded status</b>
2003	6950	5930	85.3237%
2004	7754	6415	82.7315%
2005	8433	7015	83.1851%
2006	8600	7328	85.2093%
2007	8642	7977	92.3050%
2008	8080	6188	76.5842%
2009	9266	6643	71.6922%
2010	10394	6792	65.3454%
2011	11255	6546	58.1608%
2012	11995	7029	58.5994%
2013	11471	7221	62.9500%
2014	12265	7507	61.2067%
2015	12824	6797	53.0022%
2016	13083	7145	54.6129%

## Agency Comment Letter

### Text of Appendix II: Comments from the Tennessee Valley Authority

#### Page 1

March 2, 2017

Mr. Franklin W. Rusco

Director, Natural Resources and Environment

U.S. Government Accountability Office 441 G Street, NW

Washington , DC 20548

GAO DRAFT REPORT - ACTIONS NEEDED TO BETTER  
COMMUNICATE DEBT REDUCTION PLANS AND ADDRESS BILLIONS  
IN UNFUNDED PENSION LIABILITIES

Dear Mr. Rusco:

Thank you for the opportunity to provide the Tennessee Valley Authority's (TVA) comments on the subject report. TVA appreciates the U.S. Government Accountability Office's (GAO) professionalism in conducting its review and issuing this report.

We appreciate GAO's recognition of the strategic debt goal adopted by the TVA Board in August 2013 and the actions TVA has taken in support of that goal. TVA's strategic debt goal is to reduce its debt to approximately \$22 billion by fiscal year 2023, a reduction of approximately \$6 billion over a 10-year period. In addition to being approved by the TVA Board, our strategic debt goal was endorsed by our customers and the Office of Management and Budget.

Approximately four years have passed since the TVA Board established the strategic debt goal, and through strong financial and operational performance achieved to date, TVA is well positioned to meet and potentially exceed the debt goal on a consistent rate trajectory to the TVA Board-approved plan. As part of TVA's normal business planning cycle, assumptions will be reviewed and are subject to change, yet even as assumptions change, TVA remains committed to maintaining competitive rates and to reducing its debt to approximately \$22 billion by FY23.

This report contains two recommendations, and both of these have been shared with TVA's Board of Directors. First, the report recommends that TVA better communicate its plans and goals for debt reduction and reducing unfunded pension liabilities in its annual performance plan and report. TVA agrees to include additional details on these matters in future performance plans and reports.

TVA is committed to transparency with its stakeholders on its financial and operational performance and demonstrates this commitment in numerous ways, including public Board meetings, regular meetings with customers and public officials, and financial reports filed with the Securities and Exchange Commission. TVA believes that its annual performance plan and annual performance report comply with the applicable reporting requirements, but we recognize

Page 2

that they provide another available vehicle to communicate with our stakeholders. Accordingly, we will incorporate GAO's recommendation for additional transparency in these reports with the next iteration (FY19) of these documents.

Second, the report recommends that TVA take steps to have its retirement system adopt funding rules designed to ensure the pension plan's full funding. TVA is committed to working with the TVA Retirement System Board of Directors (TVARS Board) to ensure a fully-funded retirement system.

Established in 1939, the TVA Retirement System (TVARS) is a separate legal entity from TVA. The TVARS Rules and Regulations are administered by the seven-member TVARS Board with three of the directors elected by and from the membership, three appointed by TVA, and a seventh director selected by the other six. Amendments to the TVARS Rules and Regulations must be approved by the TVARS Board and become effective 30-days after approval unless vetoed by TVA.

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Thank you again for the opportunity to review this report and provide these comments. We appreciate GAO's recommendations on these important matters.

Sincerely,

William D. Johnson

President and Chief Executive

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## Strategic Planning and External Liaison