



# Privatizing the Tennessee Valley Authority: Options and Issues

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## Summary

In its budget proposal for FY2014, the Obama Administration proposed a “strategic review” of the Tennessee Valley Authority (TVA), a federal government corporation established by the Tennessee Valley Authority Act (TVA Act) (16 U.S.C. 831) in 1933. The preamble to the TVA Act lists flood control, reforestation, and agricultural and industrial development as primary considerations in the original establishment of the TVA. TVA is now required by the TVA Act to be self-supported using funds from the sale of electric power.

The TVA Act authorizes TVA to issue bonds, notes, or other forms of indebtedness up to \$30 billion at any one time. These instruments are used to provide financing for construction of power plants and other related capital needs. TVA currently has approximately \$24.1 billion in indebtedness in outstanding bonds and notes which counts toward the statutory cap of \$30 billion (which has been in place since 1979). TVA’s debts are paid solely from TVA’s net proceeds for the sale of electricity. TVA’s debts are not guaranteed by, nor are they obligations of, the federal government. However, while TVA pays for this debt principally using bonds, the federal government still records TVA’s debt as part of the federal deficit since it is a federal government corporation.

The electric power industry in the United States is in a period of transition, and TVA is facing the same forces driving change as is the rest of the electric power industry. Primary concerns include fuel cost issues of coal-fired power generation vs. natural gas, and the cost of complying with existing and anticipated environmental requirements, which could make continued operation of many of TVA’s aging coal-fired generation units not cost-effective, and perhaps result in their retirement. The Obama Administration’s FY2014 budget projects that the capital costs to fulfill TVA’s environmental responsibilities and modernize its aging generation system will likely cause TVA to exceed its \$30 billion statutory cap on indebtedness.

In proposing the strategic review, the Administration says that TVA has achieved its original objectives, and thus no longer requires federal participation. The strategic review may thus consider options for addressing TVA’s financial situation and its effect on the federal deficit, with divestiture of TVA (in whole or part) to be considered among the potential alternatives, most of which would require amending the TVA Act. Congress may want to consider various options for TVA, which range from allowing TVA to continue as it does, funding its capital needs from operating revenues and power program financings, to modifying TVA’s missions. Congress may also opt to redefine TVA’s status and designation as a government corporation. Since TVA debt securities are not obligations of the U.S. government and do not carry a government guarantee, TVA’s current indebtedness has arguably little or no real impact on the federal budget. Congress may also wish to examine the issue of TVA’s indebtedness and investigate potential options. These may include raising the statutory limit thus allowing TVA to fund the projected investment, examining TVA’s capital investment plans and process, investigating ways to reduce TVA’s statutory cap with an eye to reducing the impact on the federal deficit, or looking at ways to restructure TVA’s indebtedness, with a goal of either reducing or paying off TVA’s indebtedness.

TVA’s principal mission is arguably the minimization of flood damage and stewardship of water resources and navigation, with the dams on TVA’s system being key to this mission and power generation arguably being a secondary concern. The operation of multiple use dams must be designed to accommodate several objectives, and releases of water for hydroelectric generation can also contribute to other water uses. Congress may want to consider how the navigation, flood

control, and related missions may be safely and legally accomplished under a privatized scenario, since maximization of flows for optimum power generation may not be consistent with other demands of the river and reservoir system.

## **Contents**

Introduction.....	1
TVA’s Mission.....	2
TVA’s Electric Power Program .....	3
Existing Power Generation Capacity.....	4
TVA Electricity Rates .....	6
Technology Innovation .....	9
Electric Power—An Industry in Transition .....	10
TVA Planning for Change.....	11
TVA’s Regulatory Assets .....	14
TVA’s Statutory Debt Limit .....	14
Electricity Sales Fund TVA’s Water Resource Management Programs .....	15
Discussion and Issues for Congress.....	16

## **Figures**

Figure 1. TVA Service Territory .....	4
Figure 2. Electric Utility Residential Rates .....	8
Figure 3. Electric Utility Commercial Rates.....	9

## **Tables**

Table 1. TVA Power System .....	5
Table 2. TVA Average “Effective” Retail Rates.....	7
Table 3. TVA IRP Recommended Planning Direction .....	12
Table 4. TVA Estimated Environmental Expenditures .....	13

## **Contacts**

Author Contact Information.....	19
Acknowledgments .....	19

## Introduction

In its budget proposal for FY2014, the Obama Administration proposed a “strategic review” of the Tennessee Valley Authority (TVA), a federal government corporation established by the Tennessee Valley Authority Act (TVA Act) (16 U.S.C. 831).

Reform TVA. Since its creation in the 1930s during the Great Depression, the federally owned and operated Tennessee Valley Authority (TVA) has been producing low-cost electricity and managing natural resources for a large portion of the Southeastern United States. TVA’s power service territory includes most of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia, covering 80,000 square miles and serving more than nine million people.

TVA is a self-financing Government corporation, funding operations through electricity sales and bond financing. In order to meet its future capacity needs, fulfill its environmental responsibilities, and modernize its aging generation system, TVA’s current capital investment plan includes more than \$25 billion of expenditures over the next 10 years. However, TVA’s anticipated capital needs are likely to quickly exceed the agency’s \$30 billion statutory cap on indebtedness. Reducing or eliminating the federal Government’s role in programs such as TVA, which have achieved their original objectives and no longer require Federal participation, can help put the Nation on a sustainable fiscal path. Given TVA’s debt constraints and the impact to the Federal deficit of its increasing capital expenditures, the Administration intends to undertake a strategic review of options for addressing TVA’s financial situation, including the possible divestiture of TVA, in part or as a whole.<sup>1</sup>

In proposing the strategic review, the Administration says that TVA has achieved its original objectives, and thus no longer requires federal participation. However, some have expressed their disagreement with the Administration’s position, and support TVA’s current role.<sup>2</sup> The strategic review (to be conducted by the Office of Management and Budget) may thus consider options for addressing TVA’s financial situation and its effect on the federal deficit, with divestiture of TVA (in whole or part) to be considered among the potential alternatives. TVA, for its part, is cooperating with the strategic review.<sup>3</sup>

This report will discuss the history and role of TVA mostly from an energy standpoint, considering current and future obligations, and other issues related to TVA’s provision of electrical energy. Issues for Congress may involve consideration of whether a federal role is still necessary to achieve the TVA Act’s objectives.

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<sup>1</sup> See [http://www.whitehouse.gov/sites/default/files/omb/budget/fy2014/assets/21st\\_century.pdf#page=4](http://www.whitehouse.gov/sites/default/files/omb/budget/fy2014/assets/21st_century.pdf#page=4).

<sup>2</sup> Jim Snyder, *Parties Switch Roles over Possible U.S. Sale of New Deal TVA*, Bloomberg, April 12, 2013, <http://www.bloomberg.com/news/2013-04-12/parties-switch-roles-over-possible-u-s-sale-of-new-deal-era-tva.html>.

<sup>3</sup> Hank Hayes, “White House ‘Strategic Review’ of TVA May Put Agency Up for Sale,” *Times News*, May 12, 2013, <http://www.timesnews.net/article/9061864/white-house-strategic-review-of-tva-may-put-agency-up-for-sale>.

## TVA's Mission

TVA is a federal government corporation<sup>4</sup> originally established by Congress in response to the Great Depression,<sup>5</sup> essentially to “exist in perpetuity.”<sup>6</sup> The preamble to the TVA Act of 1933 lists flood control, reforestation, and agricultural and industrial development as primary considerations in the original establishment of the TVA.

To improve the navigability and to provide for the flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; to provide for the agricultural and industrial development of said valley; to provide for the national defense by the creation of a corporation for the operation of Government properties at and near Muscle Shoals in the State of Alabama, and for other purposes.<sup>7</sup>

TVA has incorporated the preamble into its mission statement, which lists these duties essentially in terms of TVA priorities.

The mission of the Tennessee Valley Authority is to develop and operate the Tennessee River system to improve navigation, minimize flood damage, and to provide energy and related products and services safely, reliably, and at the lowest feasible cost to residents and businesses in the multi-state Tennessee Valley region. TVA's integrated management of the entire Tennessee River watershed optimizes the benefits of the water resource. Major functions of the corporation include:

- Management of the Tennessee River system for multiple purposes including navigation, flood control, power generation, water quality, public lands conservation, recreation, and economic development;
- Generation of electricity;
- Sale and transmission of electricity to wholesale and large industrial customers;
- Stimulation of economic development activities that generate a higher quality of life for citizens of the Tennessee Valley;
- Preservation and environmentally-sensitive management of TVA assets and federal lands entrusted to TVA; and
- Research and technology development that addresses environmental problems related to TVA's statutory responsibilities for river and land management and power generation.<sup>8</sup>

The operation of the Tennessee River system to improve navigation and minimize flood damage arguably remains TVA's primary obligation. Power generation at TVA was a part of the industrial

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<sup>4</sup> While no single definition exists of a federal government corporation, it is generally an agency of the federal government established by Congress to perform a public purpose, which provides a market-oriented product or service and is intended to produce revenue that meets or approximates its expenditures. See CRS Report RL30365, *Federal Government Corporations: An Overview*, by Kevin R. Kosar.

<sup>5</sup> Tennessee Valley Authority, *From the New Deal to a New Century*, 2013, <http://www.tva.com/abouttva/history.htm>.

<sup>6</sup> Many government corporations, such as the Tennessee Valley Authority, have been established to exist in perpetuity. Other government corporations, such as the U.S. Enrichment Corporation, though, have been designed to serve as transition vehicles to transform from governmental entities into private firms. Ibid.

<sup>7</sup> 48 Stat. 58-59, 16 U.S.C. §831.

<sup>8</sup> See [http://www.tva.gov/pdf/gprafy00\\_perfrpt.pdf](http://www.tva.gov/pdf/gprafy00_perfrpt.pdf).

development mission of TVA, with hydroelectric generation possibly being viewed as an opportunity which arose from dams mostly built for flood control and navigation purposes.<sup>9</sup>

## **TVA's Electric Power Program**

While the focus of TVA's activities originally was largely on its flood control and economic development roles, TVA is now essentially a power generation company. TVA's business metrics are focused on optimizing TVA's financial position, and its operational goals are focused on providing electricity at the lowest feasible rates to its wholesale customers in the multi-state Tennessee Valley region.

Initially, federal appropriations funded all TVA operations. Appropriations for the TVA power program ended in 1959, and appropriations for TVA's environmental stewardship and economic development activities were phased out by 1999. TVA is now fully self-financing, funding operations through electricity sales and power system bond financing. TVA makes no profit and receives no tax money.<sup>10</sup>

As shown in **Figure 1**, TVA's electric power service territory covers almost all of Tennessee, and portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. TVA is overseen by a Board of Directors with nine members (appointed by the President and confirmed by the U.S. Senate), each of whom serves a staggered five-year term.<sup>11</sup> The Board of Directors sets TVA's wholesale electric power rates without approval by any other regulatory body.

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<sup>9</sup> See TVA Act, §9a. "The Board is hereby directed in the operation of any dam or reservoir in its possession and control to regulate the stream flow primarily for the purposes of promoting navigation and controlling floods. So far as may be consistent with such purposes, the Board is authorized to provide and operate facilities for the generation of electric energy at any such dam for the use of the Corporation and for the use of the United States or any agency thereof, and the Board is further authorized, whenever an opportunity is afforded, to provide and operate facilities for the generation of electric energy in order to avoid the waste of water power, to transmit and market such power as in this Act provided, and thereby, so far as may be practicable, to assist in liquidating the cost or aid in the maintenance of the projects of the Authority." [49 Stat. 1076, as amended by 118 Stat. 2966, 16 U.S.C. §831h-1]

<sup>10</sup> TVA, *TVA at a Glance*, December 2012, [http://www.tva.com/abouttva/pdf/tva\\_glance.pdf](http://www.tva.com/abouttva/pdf/tva_glance.pdf). See [http://www.tva.com/abouttva/pdf/tva\\_glance.pdf](http://www.tva.com/abouttva/pdf/tva_glance.pdf).

<sup>11</sup> Tennessee Valley Authority, *Frequently Asked Questions*, 2012, <http://www.tva.com/abouttva/board/faq.htm>.

**Figure 1. TVA Service Territory**



**Source:** TVA Energy Vision 2020. See [http://www.tva.gov/environment/reports/energyvision2020/ev2020\\_vol1ch01.pdf](http://www.tva.gov/environment/reports/energyvision2020/ev2020_vol1ch01.pdf).

**Notes:** Major electric utilities in surrounding states are shown but not their specific service territories.

TVA provides electricity in an area that is largely free of competition from other electric power providers. This service territory is defined primarily by two provisions of federal law: the “fence,” and the “anti-cherry-picking” provision. The fence limits the region in which TVA or distributors of TVA power may provide power.<sup>12</sup> The anti-cherry-picking provision limits the ability of others to use the TVA transmission system for the purpose of serving customers within TVA’s service area.<sup>13</sup> From time to time there have been unsuccessful efforts to modify the protection of the anti-cherry-picking provision.

## Existing Power Generation Capacity

**Table 1** lists TVA’s electric power generation capacity by category. As of 2010, TVA owned 11 coal-fired power generating stations, with a net summer capacity<sup>14</sup> of 14,573 MegaWatts (MW).<sup>15</sup>

<sup>12</sup> See [http://www.tva.gov/environment/reports/energyvision2020/ev2020\\_vol1ch01.pdf](http://www.tva.gov/environment/reports/energyvision2020/ev2020_vol1ch01.pdf).

<sup>13</sup> Ibid.

<sup>14</sup> The net summer capacity is the maximum output, commonly expressed in megawatts (MW), that generating equipment can supply to system load, as demonstrated by a multi-hour test, at the time of summer peak demand (period (continued...))



Units range in size from 107 MW (Johnsonville Units 1-6) to Cumberland Unit 1 at 1,239 MW. TVA operates 92 natural gas-fired combustion turbines with a net summer capacity of about 5,270 MW, mostly co-located at the coal power stations. Five combined cycle units are located at three stand-alone power stations, adding a further 2,143 MW of capacity. TVA also operates three nuclear power stations with six units currently operating with a total net summer capacity of 6,632 MW. TVA is currently completing construction of a second nuclear unit at the Watts Bar station, which will add a further 1,180 MW of net summer capacity.

TVA's conventional hydropower system consists of 109 generating units at 28 sites mostly along the Tennessee River, with a total net summer capacity of approximately 4,157 MW. Pumped storage hydropower adds a further 1,653 MW from the Raccoon Mountain facility. TVA also sells hydropower produced by eight U.S. Army Corps of Engineers dams, and four dams owned by Alcoa on the Little Tennessee River.

**Table 1. TVA Power System**

Fiscal 2010 TVA-Owned Summer Capacity by Type of Generation

Type of Generation	Capacity (MW)	Percent
Coal	14,573	42
Nuclear	6,632	19
Natural Gas (C.T.)	5,270	15
Hydropower	4,157	12
Hydro Pumped Storage	1,653	5
Natural Gas (C.C.)	2,143	6
Diesel	13	<1
Other Renewables	2	<1
TOTAL	34,443	100

**Source:** TVA. Integrated Resource Plan. See <http://www.tva.gov/environment/reports/irp/>.

**Notes:** C.T.: Combustion Turbine. C.C.: Combined Cycle.

TVA owns very little non-hydro renewable generation itself, opting to rely instead on a "Standard Offer" (SO) for purchasing renewable energy.<sup>16</sup> TVA says the SO "will help support TVA's vision and long-term strategy to emphasize cleaner air and greater energy efficiency."<sup>17</sup> TVA buys various amounts of renewable energy throughout the year, varying generally by season and time of day for fixed rates of 4 to 16 cents per kiloWatt-hour (kWh) of energy produced. Power

(...continued)

of June 1 through September 30.) This output reflects a reduction in capacity due to electricity use for station service or auxiliaries. See <http://www.eia.gov/tools/glossary/index.cfm>.

<sup>15</sup> As pollution control equipment is added, this capacity will decrease slightly due to power being consumed by the equipment.

<sup>16</sup> A program approved by the TVA Board of Directors to encourage development of new renewable energy projects in the TVA service territory. See <http://www.tva.gov/renewablestandardoffer/overview.pdf>.

<sup>17</sup> See <http://www.tva.gov/renewablestandardoffer/index.htm>.

purchase agreements (PPAs) are available for up to 20 years for projects between 200 kiloWatts and 20 MW in capacity located within the TVA footprint. The SO resulted in four renewable projects with the potential for approximately eight MegaWatts of generating capacity.<sup>18</sup>

To connect generating facilities to its customers, TVA's transmission system consists primarily of approximately 15,940 circuit miles of transmission lines operating at the 500 kiloVolt (kV) and 161 kV levels, supported by 498 transmission substations, switchyards, and switching stations.<sup>19</sup>

## **TVA Electricity Rates**

The sale of electric power by the TVA is governed by the Tennessee Valley Authority Act of 1933,<sup>20</sup> which requires electricity rates to cover power system operating costs, debt service, and other costs at rates as low as feasible.

The Corporation shall charge rates for power which will produce gross revenues sufficient to provide funds for operation, maintenance, and administration of its power system; payments to States and counties in lieu of taxes; debt service on outstanding bonds, including provision and maintenance of reserve funds and other funds established in connection therewith; payments to the Treasury as a return on the appropriation investment pursuant to subsection (e) hereof; payment to the Treasury of the repayment sums specified in subsection (e) hereof; and such additional margin as the Board may consider desirable for investment in power system assets, retirement of outstanding bonds in advance of maturity, additional reduction of appropriation investment, and other purposes connected with the Corporation's power business having due regard for the primary objectives of the Act, including the objective that power shall be sold at rates as low as are feasible.<sup>21</sup>

Most of the power generated by TVA is sold at wholesale<sup>22</sup> rates to electric distribution utilities. Rates for electricity are established by the TVA Board, in accord with the TVA Act. There are 155 distribution companies—municipal utility companies and cooperatives—that resell TVA power to end-use consumers. The municipal utilities make up the largest block of TVA customers. Cooperatives are customer-owned companies, many of which were originally formed to bring electricity to the most remote parts of the TVA region. Municipals and cooperatives represent the wholesale base of TVA's business, accounting for 85% of total revenue. TVA also sells power directly to 50 large industrial customers, and 6 federal government installations, and sells power to 12 utilities outside TVA's service territory.<sup>23</sup>

When comparing rates for electricity with electric utilities in other states, it should be noted that these are often the result of a number of local factors. Rates in two neighboring states in a region can differ measurably due to regulatory regime, types and sizes of power generation plants, costs of fuel, infrastructure, local geography, and other factors.

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<sup>18</sup> See [http://tva.com/news/keytopics/renewable\\_energy.htm](http://tva.com/news/keytopics/renewable_energy.htm).

<sup>19</sup> See <http://www.tvaed.com/pdf/competitiverates.pdf>.

<sup>20</sup> 16 USC 831-831ee; as amended.

<sup>21</sup> TVA Act, §15d. (f)

<sup>22</sup> A sale for resale to the ultimate consumer.

<sup>23</sup> TVA, *Our Customers*, p. 2012, [http://www.tva.gov/power/power\\_customer.htm](http://www.tva.gov/power/power_customer.htm).

TVA provided retail rate data for purposes of comparison with other states, submitting the following summary information for a “residential average effective rate,” and a “non-residential average effective rate” (which represent retail residential and commercial rates).<sup>24</sup>

Both sets of rates are shown in **Table 2**.

**Table 2. TVA Average “Effective” Retail Rates**

<b>TVA Fiscal Year</b>	<b>Residential Effective Rate (Cents per kWh)</b>	<b>Non- Residential Effective Rate (Cents per kWh)</b>	<b>Total Retail Effective Rate (Cents per kWh)</b>
2000	6.42	4.88	5.42
2001	6.37	4.92	5.44
2002	6.48	4.88	5.44
2002	6.51	4.92	5.49
2004	6.96	5.14	5.77
2005	6.97	5.23	5.83
2006	7.73	5.89	6.55
2007	7.82	6.09	6.71
2008	8.54	6.60	7.27
2009	9.74	7.72	8.47
2010	9.04	7.13	7.86
2011	10.5	7.97	8.75

**Source:** TVA.

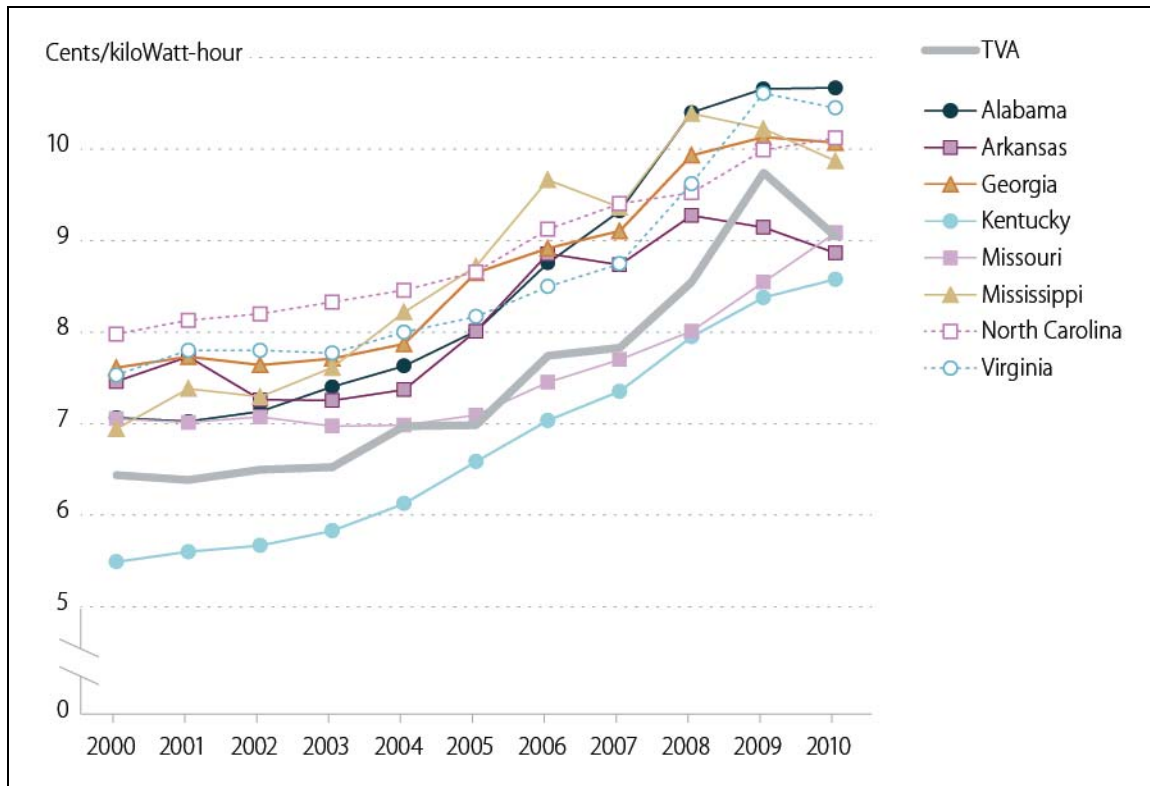
**Note:** kWh = kiloWatt-hour.

TVA states that it has a goal to have its overall effective retail rate in the top quartile (with regard to being among electric utilities with the lowest rates) as benchmarked against the top 100 electric utilities by 2020.<sup>25</sup> This is intended to help ensure that TVA’s rates are competitive and conducive to its economic development goals.

<sup>24</sup> E-mail from TVA, July 19, 2012. TVA has defined rates for commercial and industrial customers (under Service Class GSA 1, 2, and 3), and rates for strictly commercial customers (under Service Class GSB, GSC, and GSD). TVA also has separate rate information for its larger industrial customers (under Service Class MSB, MSC, and MSD).

<sup>25</sup> TVA, *2011 Performance*, A Year End Review of TVA’s Accomplishments and Challenges, October 2011, [http://www.tva.com/news/releases/octdec11/nov\\_board/performance\\_white\\_paper.pdf](http://www.tva.com/news/releases/octdec11/nov_board/performance_white_paper.pdf).

**Figure 2. Electric Utility Residential Rates**  
Average Price by State by Provider (Electric Utilities)



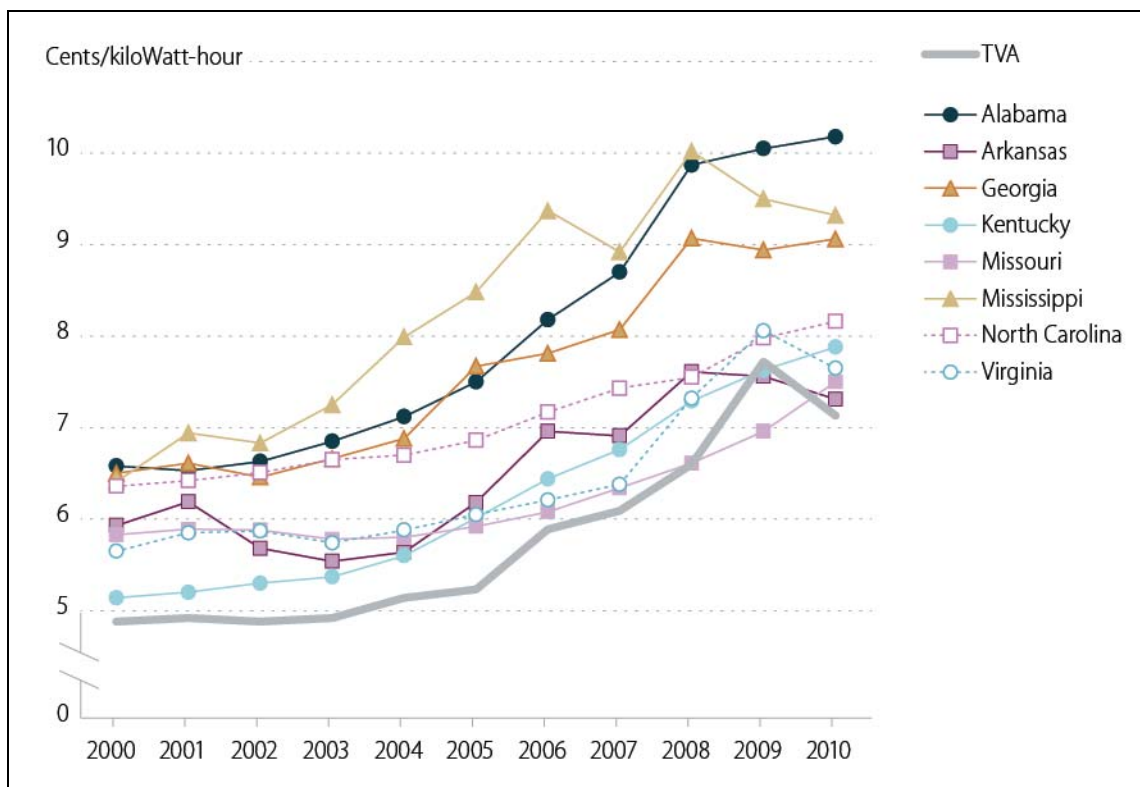
**Source:** Form EIA-861 data and TVA effective residential rates.

Effective residential rates may be directly compared to residential rates reported to the U.S. Department of Energy's Energy Information Administration (EIA) by electric utilities.<sup>26</sup> **Figure 2** shows electric utility residential rates for the period 2000 to 2010 reported from states surrounding TVA's service territory, compared to TVA's reported effective residential rate. As the figure shows, the residential electricity rates for the TVA are lower in the early years of the period than all compared states except Kentucky, and rise to mid-range for the latter years in the period. Given the overlap of TVA's service territory into several states (principally Mississippi, Alabama, and Kentucky), some of the state rates include TVA rates as a component.

A similar representation of commercial customer rates from electric utilities is shown in **Figure 3**. As shown in the graph, the TVA non-residential average effective rate (e.g., commercial rate) is the lowest band for all compared states for most years in the period.

<sup>26</sup> From EIA Form 861 data. See <http://www.eia.gov/electricity/data/eia861/index.html>.

**Figure 3. Electric Utility Commercial Rates**  
Average Price by State by Provider (Electric Utilities)



Source: Form EIA-861 data and TVA effective commercial rates.

## Technology Innovation

As also directed by the TVA Act, TVA has a role in providing economic and agricultural development, environmental stewardship, and the mission which is closest to electricity provision—technological innovation in the use of electric power. TVA's technology innovation mission comes from Section 10 of the TVA Act:

... the Board is hereby authorized and directed to make studies, experiments, and determinations to promote the wider and better use of electric power for agricultural and domestic use, or for small or local industries, and it may cooperate with State governments, or their subdivisions or agencies, with educational or research institutions, and with cooperatives or other organizations, in the application of electric power to the fuller and better balanced development of the resources of the region.

TVA appears to have embraced this mission, with current initiatives including grid modernization and the Smart Grid,<sup>27</sup> energy utilization (focused on technologies that can lead to new and potentially more efficient ways of using electricity in residential, commercial, and industrial settings, and the transportation sector),<sup>28</sup> clean energy (investigating the performance, cost,

<sup>27</sup> See [http://www.tva.com/environment/technology/smart\\_grid.htm](http://www.tva.com/environment/technology/smart_grid.htm).

<sup>28</sup> See [http://www.tva.com/environment/technology/energy\\_utilization.htm](http://www.tva.com/environment/technology/energy_utilization.htm).

sustainability, and availability of clean energy technologies),<sup>29</sup> and electric vehicles and support systems.<sup>30</sup> TVA is also preparing for the deployment of four small modular nuclear reactors (SMRs) at its Clinch River site, in connection with the *mPower America* consortium, which received a U.S. Department of Energy (DOE) cost-sharing award in 2012 for design and licensing.<sup>31</sup> DOE will reimburse TVA for up to 50% of the eligible costs toward licensing the SMRs.

Past TVA initiatives in technology innovation have helped with development of synchronous compensators, which can regulate voltage without expensive external capacitors or reactors,<sup>32</sup> and can provide voltage support in the form of reactive power to the transmission grid.<sup>33</sup> TVA also conducts an environmental research program at the TVA Environmental Research Center in Muscle Shoals, AL.<sup>34</sup>

## Electric Power—An Industry in Transition

The electric power industry in the United States is in a period of transition. The average age of power plants in the United States is now over 30 years, with the average life expectancy of most power plants being about 40 years. As with electric power plants, electric transmission and distribution system components are also aging, with power transformers averaging over 40 years of age, and 70% of transmission lines being 25 years or older. New environmental regulations under development at the U.S. Environmental Protection Agency (EPA) are imposing additional costs, and lower prices for natural gas resulting from new supplies of shale gas are bringing competition with regard to power generation choices.

New and proposed EPA regulations would impose new requirements on fossil fuel-fired power plants. Some of these rules would be implemented at the federal level, while others would be implemented at the state level. They include the Cross-State Air Pollution Rule<sup>35</sup> (which replaced the Clean Air Interstate Rule); the Mercury and Air Toxics Standards (MATS) (also known as the Utility Maximum Achievable Control Technology [MACT]) rule to reduce emissions of mercury, other metallic toxics, acid gases, and organic air toxics; proposals to regulate coal combustion residues; and the Clean Water Act Section 316(b) cooling water intake rule. However, only the Utility MACT rule is currently in effect.<sup>36</sup> EPA also proposed standards in April 2012 for

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<sup>29</sup> See [http://www.tva.com/environment/technology/clean\\_energy.htm](http://www.tva.com/environment/technology/clean_energy.htm).

<sup>30</sup> See [http://www.tva.com/environment/technology/electric\\_transportation.htm](http://www.tva.com/environment/technology/electric_transportation.htm).

<sup>31</sup> See Small Modular Reactors at <http://www.tva.com/environment/technology/smr.htm>.

<sup>32</sup> U.S. Department of Labor—Occupational Safety and Health Administration, *Substation Equipment—Synchronous Condensers*, 2013, [http://www.osha.gov/SLTC/etools/electric\\_power/illustrated\\_glossary/substation\\_equipment/synchronous\\_condensers.html](http://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/substation_equipment/synchronous_condensers.html).

<sup>33</sup> U.S. Energy Information Administration, *New Generators Help California Meet Summer Challenges to Electric Reliability*, June 7, 2013, <http://www.eia.gov/todayinenergy/detail.cfm?id=11591>. [http://www.osha.gov/SLTC/etools/electric\\_power/illustrated\\_glossary/substation\\_equipment/synchronous\\_condensers.html](http://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/substation_equipment/synchronous_condensers.html).

<sup>34</sup> The program develops tools and methods to minimize and clean up pollution from industrial, municipal, and agricultural systems. See TVA, *Environmental Services and Technologies*, 2013, <http://www.tva.com/environment/envservices/index.htm>.

<sup>35</sup> On August 21, 2012, in a 2-1 decision, the D.C. Circuit Court of Appeals vacated and remanded the rule, finding that EPA's imposition of Federal Implementation Plans, without first giving the states an opportunity to develop their own plans, was unlawful. See CRS Report R41563, *Clean Air Issues in the 112<sup>th</sup> Congress*, by James E. McCarthy.

<sup>36</sup> The proposed regulations are discussed in the CRS Report R41914, *EPA's Regulation of Coal-Fired Power: Is a* (continued...)



greenhouse gas (GHG) emissions which would require all new power plants to meet carbon dioxide emissions standards.

President Obama recently announced a new climate change initiative in June 2013 which directed EPA to re-propose GHG emission standards for new electric power plants, and directed the agency to develop GHG standards for existing power plants by June 2015.<sup>37</sup> Electric power generation is responsible for approximately 37% of U.S. domestic carbon dioxide emissions (the primary anthropogenic GHG), and over one-third of all U.S. GHG emissions.<sup>38</sup> While most of these plants are well-maintained, they are generally not as efficient as newer power plants. With electric plant aging and new environmental requirements necessitating investment to continue operations, many utilities are looking at retirement or replacement decisions, especially for older coal plants.

## **TVA Planning for Change**

TVA is facing the same forces driving change as is the rest of the electric power industry. To plan for the future of its system, TVA was required by the Energy Policy Act of 1992 (P.L. 102-486) to use a least-cost planning process to select energy resources for system use.<sup>39</sup> TVA thus employs the integrated resource plan (IRP)<sup>40</sup> methodology to account for system costs which set the cost of service used as the basis for its electricity rates.

The [IRP] will equip TVA to meet its customers' needs effectively while addressing the substantial challenges that face the electric utility industry. The planning direction it recommends will give TVA flexibility to make sound choices amid economic and regulatory uncertainty. This recommended planning direction balances costs, energy efficiency and reliability, environmental responsibility and competitive prices for customers.<sup>41</sup>

In the 2011 IRP, TVA states that it expects growth in the demand for electricity in its service territory, but not at the levels in past periods. However, when considering overall growth in demand and the levels of power generation it can expect from its viable generation resources, TVA identified a need for additional resources.

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(...continued)

*"Train Wreck" Coming?*, by James E. McCarthy and Claudia Copeland.

<sup>37</sup> CRS Report R43127, *EPA Standards for Greenhouse Gas Emissions from Power Plants: Many Questions, Some Answers*, by James E. McCarthy

<sup>38</sup> U.S. Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2008*, DOE/EIA-0573(2008), December 2009, [http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573\(2008\).pdf](http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573(2008).pdf).

<sup>39</sup> In conducting a least-cost planning program under subsection (a) of this section, the Tennessee Valley Authority shall employ and implement a planning and selection process for new energy resources which evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) in order to provide adequate and reliable service to electric customers of the Tennessee Valley Authority at the lowest system cost. See 16 USC 831m-1: Tennessee Valley Authority Least-Cost Planning Program.

<sup>40</sup> Generally, an IRP is a 10- to 20-year look forward at options for meeting future energy demand which is revisited typically every three to five years to help ensure the continued validity of the planning process.

<sup>41</sup> TVA, *Integrated Resource Plan—TVA's Environmental and Energy Future*, March 2011, [http://www.tva.gov/environment/reports/irp/pdf/Final\\_IRP\\_complete.pdf](http://www.tva.gov/environment/reports/irp/pdf/Final_IRP_complete.pdf).

TVA listed increasing competition, technological change, fuel costs, and environmental concerns as issues it faces. A primary concern has been the cost of complying with existing and anticipated emissions reduction requirements, which could make continued operation of many of TVA's aging coal-fired generation units not cost-effective, possibly resulting in their removal from service, perhaps permanently.

TVA faces challenges related to fluctuating fuel prices and compliance with current and emerging environmental laws and regulations. In order to comply with these laws and regulations, TVA may install clean air equipment on coal-fired units and replace generating capacity of idled coal-fired units with cleaner-emissions nuclear and gas-fired units. Meeting these needs will require significant capital expenditures on TVA's part ...<sup>42</sup>

TVA states its goal in the IRP process is to “[c]reate a flexible plan that allows for uncertainty and permits adjustment in response to changed circumstances.”<sup>43</sup> The 2011 IRP developed a “recommended planning direction,”<sup>44</sup> which TVA has accepted as being consistent with its environmental policy and strategic vision. Among other actions, the IRP anticipates the idling of 2,400 MW to 4,700 MW of coal-fired capacity, replacing it with a variety of sources (as summarized in **Table 3**).

**Table 3. TVA IRP Recommended Planning Direction**

Plan Components

Component	Guideline MW Range	Window of Time	Recommendations
Energy Efficiency and Demand Response (EEDR)	3,600-5,100 (11,400-14,400 GigaWatt-hours)	By 2020 <sup>a</sup>	Expand contributions of EEDR in the portfolio
Renewable additions	1,500-2,500 <sup>b</sup>	By 2020 <sup>a</sup>	Pursue cost effective renewable energy
Coal-fired capacity idled	2,400-4,700 <sup>c</sup>	By 2017	Consider increasing amount of coal-fired capacity idled
Energy storage	850 <sup>d</sup>	2020-2024	Add pumped-storage capacity
Nuclear additions	1,150-5,900 <sup>e</sup>	2013-2029	Increase contribution of nuclear generation
Coal additions	0-900 <sup>f</sup>	2025-2029	Preserve option of generation with carbon capture
Natural gas additions	900-9,300 <sup>g</sup>	2012-2029	Utilize natural gas as an intermediate supply source

**Source:** TVA IRP, issued March 2, 2011. See <http://www.tva.gov/environment/reports/irp/index.htm>.

- a. This range includes EEDR savings achieved through 2010. The 2020 range for EEDR and renewable energy does not preclude further investment in these resources during the following decade.

<sup>42</sup> TVA Form 10-Q, filed 03/31/2013. (TVA10Q).

<sup>43</sup> [http://www.tva.com/environment/reports/irp/pdf/IRP\\_PublicMtgs\\_Presentation.pdf](http://www.tva.com/environment/reports/irp/pdf/IRP_PublicMtgs_Presentation.pdf).

<sup>44</sup> [http://www.tva.gov/irp/pdf/irp\\_fact\\_sheet.pdf](http://www.tva.gov/irp/pdf/irp_fact_sheet.pdf).



- b. TVA's existing wind contracts that total more than 1,600 MW are included in this range. Values are nameplate capacity. Net dependable capacity would be lower.
- c. TVA has previously announced plans to idle 1,000 MW of coal-fired capacity, which is included in this range. MW values based on maximum net dependable capacity.
- d. This is the expected size of a new pumped-storage hydro facility.
- e. The completion of Watts Bar Unit 2 represents the lower end of this range.
- f. Up to 900 MW of new coal-fired capacity is recommended between 2025 and 2029.
- g. The completion of John Sevier combined-cycle plant represents the lower end of this range.

TVA's 2011 IRP also plans for the addition of 850 MW of pumped-storage hydropower in the 2020 to 2024 timeframe to "increase reliability and operational flexibility." It should be noted that while the IRP presents a range of options for generating resource development, it does not present a specific commitment or timeline for new generating resources.

**Table 4** lists TVA's current estimate of costs and its planned expenditures for dealing with current and expected environmental requirements related to its coal-fired power plants.

**Table 4. TVA Estimated Environmental Expenditures**

(Estimates Subject to Change)

	Estimated Timetable	Total Estimated Expenditures (\$ millions)
Coal combustion residual conversion and remediation <sup>a</sup>	2013-2023	1,400
Proposed clean air projects <sup>b</sup>	2013-2022	2,200
Clean Water Act requirements <sup>c</sup>	2013-2020	1,200

**Source:** CRS, from TVA Form 10-Q filed 03/31/2013.

- a. Includes closure of impoundments, construction of lined landfills, and construction of dewatering systems.
- b. Includes air quality projects that TVA is currently planning to undertake to comply with existing and proposed air quality regulations, but does not include any projects that may be required to comply with potential GHG regulations or transmission upgrades.
- c. Includes potential projects that TVA is currently planning to comply with revised rules under the Clean Water Act (i.e., Section 316(b) and effluent limitation guidelines for steam electric power plants).

However, with new and proposed environmental requirements for power plants,<sup>45</sup> the long-term costs of meeting these requirements and modernizing TVA's power plants are expected to be much greater. The Obama Administration's 2014 budget projects that the capital costs to fulfill TVA's environmental responsibilities and modernize its aging generation system will likely cause TVA to exceed its \$30 billion statutory cap on indebtedness.

<sup>45</sup> CRS Report R43127, *EPA Standards for Greenhouse Gas Emissions from Power Plants: Many Questions, Some Answers*, by James E. McCarthy

## **TVA's Regulatory Assets**

As of March 2013, TVA recorded provisions for almost \$11 billion in regulatory assets,<sup>46</sup> which it regards as “incurred costs that have been deferred because such costs are probable of future recovery in customer rates.”<sup>47</sup> They include funds for decommissioning<sup>48</sup> of its nuclear plants, non-nuclear decommissioning, clean-up of the coal ash spill at its Kingston coal plant, and unrealized losses on its commodity and interest rate derivatives. TVA's largest regulatory asset, accounting for over \$5 billion of the total amount, is for deferred pension and other post-retirement benefits costs. TVA describes the process for recording regulatory assets, and the probability of recovering these costs (subject to approval by the TVA Board of Directors), as follows:

TVA assesses whether the regulatory assets are probable of future recovery by considering factors such as applicable regulatory changes, potential legislation, and changes in technology. Based on these assessments, TVA believes the existing regulatory assets are probable of recovery. This determination reflects the current regulatory and political environment and is subject to change in the future. In the event that accounting rules for rate regulation were no longer applicable, TVA would be required to write off its regulatory assets and liabilities, resulting in charges to net income and other comprehensive income.<sup>49</sup>

If TVA is to undergo privatization or some change of its status as a government corporation, it is possible that a write-down or write-off of these regulatory assets will occur, as large deferred regulatory assets and costs present a potential financial risk to any acquiring entity in terms of cost recovery.

## **TVA's Statutory Debt Limit**

TVA is required by the TVA Act to be self-supported using funds from the sale of electric power. The TVA Act also authorizes TVA to issue bonds, notes, or other forms of indebtedness up to \$30 billion (total outstanding amount) at any one time. These instruments of indebtedness are used to provide financing for construction of power plants and other related capital needs.

The Corporation [i.e., TVA] is authorized to issue and sell bonds, notes and other evidences of indebtedness (hereinafter collectively referred to as “bonds”) in an amount not exceeding \$30,000,000,000 outstanding at any one time to assist in financing its power program and to refund such bonds. The Corporation may, in performing functions authorized by this Act, use the proceeds of such bonds for the construction, acquisition, enlargement, improvement, or replacement of any plant or other facility used or to be used for the generation or transmission of electric power (including the portion of any multiple-purpose structure used or to be used for power generation); as may be required in connection with the lease, lease-

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<sup>46</sup> Regulatory assets are specific costs or revenues that a regulatory agency permits a U.S. public utility (usually an energy company) to defer to its balance sheet. These amounts would otherwise be required to appear on the company's income statement and would be charged against current expenses or revenues. See <http://www.investopedia.com/terms/r/regulatoryasset.asp>.

<sup>47</sup> TVA10Q.

<sup>48</sup> Retirement of a nuclear facility, including decontamination and/or dismantlement. See <http://www.eia.gov/tools/glossary/index.cfm>.

<sup>49</sup> TVA10Q, page 14.

purchase, or any contract for the power output of any such plant or other facility; and for other purposes incidental thereto.<sup>50</sup>

TVA recognizes the challenge that this limit poses to its plans to comply with environmental requirements and modernize its power plants, and has begun to explore ways to fund these needs.

TVA faces challenges related to fluctuating fuel prices and compliance with current and emerging environmental laws and regulations. In order to comply with these laws and regulations, TVA may install clean air equipment on coal-fired units and replace generating capacity of idled coal-fired units with cleaner-emissions nuclear and gas-fired units. Meeting these needs will require significant capital expenditures on TVA's part, but TVA is constrained by the TVA Act which authorizes TVA to issue bonds, notes, or other evidences of indebtedness ("Bonds") in an amount not to exceed \$30.0 billion outstanding at any one time. Without a legislative solution, this limitation may require TVA to seek alternative financing arrangements.

... The TVA Act authorizes TVA to issue Bonds in an amount not to exceed \$30.0 billion outstanding at any time. Due to this limit on Bonds, TVA may not be able to use Bonds to finance all of the capital investments planned over the next decade. However, TVA believes that other forms of financing not subject to the limit on Bonds, including lease financings (such as the lease-purchase transaction involving the John Sevier [combined cycle facility]), can provide supplementary funding. Also, the impact of energy efficiency and demand response initiatives may reduce generation requirements and thereby reduce capital needs.<sup>51</sup>

TVA had revenues of \$11.2 billion in FY2012, but had a net income on those revenues of only \$60 million, with fuel costs and purchased power being TVA's single largest expense at \$3.9 billion, followed by operations and maintenance expense at \$3.5 billion. TVA currently has approximately \$24.1 billion in indebtedness in outstanding bonds and notes, which counts toward the statutory cap of \$30 billion (which has been in place since 1979).<sup>52</sup> TVA's debts are paid solely from TVA's net proceeds for the sale of electricity. TVA's debts are not guaranteed by, nor are they obligations of, the federal government.<sup>53</sup> However, while TVA pays for this debt principally using (non-federally guaranteed) bonds, the federal government still records TVA's debt as part of the federal deficit since it is a federal government corporation.

## **Electricity Sales Fund TVA's Water Resource Management Programs**

TVA's principal mission is arguably the minimization of flood damage and stewardship of navigation, with the dams on TVA's system being key to this mission. Hydropower may thus be seen as a secondary opportunity arising from the control of the Tennessee River and its

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<sup>50</sup> TVA Act, §15d (a).

<sup>51</sup> TVA10Q.

<sup>52</sup> TVA, *Budget Proposal and Management Agenda*, For the Fiscal Year Ending September 30, 2014, 2013, [http://www.tva.com/abouttva/pdf/budget\\_proposal\\_2014.pdf](http://www.tva.com/abouttva/pdf/budget_proposal_2014.pdf).

<sup>53</sup> "TVA meets its funding needs with operating revenues and power program financings. TVA debt securities are obligations of its power system and are only issued for power program purposes, including refinancing of existing debt. TVA debt securities are not obligations of the U.S. government and do not carry a government guarantee."

See <http://www.tva.com/finance/opportun/>.

tributaries. However, revenues from the sale of electricity are now required to fund TVA water resource programs which were previously funded by federal appropriations and user fees.<sup>54</sup> In 2011, TVA received almost \$12 billion from sales of electricity.

Multiple purpose dams and reservoirs are designed to balance water flows, taking in water during periods of high flow when rainfall is high to prevent or reduce downstream flooding, and releasing water during periods of low flow. During dry periods, hydroelectric generation may be curtailed to allow reservoirs to fill.

The dam and reservoir system must maintain sufficient water volumes to accommodate other water resource needs, including drinking water, navigation, maintenance of fish habitats, and maintaining downstream water quality. The operation of multiple use dams must therefore accommodate several objectives, and releases of water for hydroelectric generation must include these other uses.<sup>55</sup> If the hydropower assets were to be sold to private owners, how the navigation, flood damage mitigation, water quality, recreation, water supply, and land use missions could be safely and legally accomplished would be at question. Maximization of water flows for optimum power generation may not always be consistent with other demands of the river and reservoir system.

## Discussion and Issues for Congress

In its FY2014 budget, the Obama Administration proposed a strategic review of the TVA, concerned that the agency is likely to incur substantial future costs as it seeks to modernize and meet environmental requirements. The strategic review may involve the definition of various options affecting the structure of TVA, and may involve some type of cost vs. benefits analysis of these options. At this time, however, the details and direction of the Administration's review of TVA are not publicly known.

The opinion of most TVA stakeholders seems to be in favor of keeping TVA as a federal government corporation,<sup>56</sup> and they would likely oppose any proposal which might result in higher electricity rates. However, implementation of the current or a revised IRP is likely to result in increased electricity rates, even without a change in TVA's status.

The Energy Policy Act of 1992 required TVA to institute a least cost planning program, which is manifested in TVA's current IRP process. Under the TVA's 2011 IRP, certain capital expenditures were envisioned requiring TVA to plan for more than \$25 billion over the next 10 years in capital investment. This projected level of investment could mean that the agency's \$30 billion statutory limit would be quickly exceeded, given that current indebtedness is approximately \$24 billion. TVA's own concerns on how to fund the costs of meeting anticipated environmental requirements and modernizing power plants highlighted the issue, with cost reductions, higher rates, creative lease and leaseback agreements, or raising the \$30 billion statutory cap on indebtedness suggested

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<sup>54</sup> See "Frequently Asked Questions About TVA," at <http://www.tva.gov/abouttva/keyfacts.htm>. "TVA no longer receives congressional appropriations to help fund its activities in navigation, flood control, environmental research, and land management. Today all of its programs are paid for with power revenues."

<sup>55</sup> See River Management at <http://www.tva.com/river/index.htm>.

<sup>56</sup> Ed Marcum, *TVA prepares for Obama administration review*, Knoxville News Sentinel, May 4, 2013, <http://www.knoxnews.com/news/2013/may/04/tva-prepares-for-obama-administration-review/>.

as possible solutions.<sup>57</sup> While the potential for a sale of TVA's assets (in whole or part) has been raised, Congress may wish to examine the issue of TVA's indebtedness and investigate whether it should:

- Raise the statutory limit. This option would allow TVA to fund the projected capital investment plan recommended by the 2011 IRP.

The current \$30 billion statutory limit has been in place since 1979. An average expected service life for a fossil or nuclear steam power plant is approximately 40 years. Such an option would allow TVA to continue functioning as it does now, but would increase the federal deficit.

Another option would be to allow other electricity providers or competition within TVA's service territory, thus reducing the need for new TVA-owned or leased generation resources. A revision to the TVA Act would likely be required.

- Maintain the current statutory limit.

Such an option may require a reduced power generation mission, with strict limits on power plants or related infrastructure built to replace retired units. A new IRP would be focused on a reduced capital investment plan. The TVA Act would likely have to be revised to allow other or competing entities to supply power in TVA's service territory to make up for lost TVA generation.

- Reduce the statutory limit.

Such an option would likely involve a federal plan to restructure TVA's indebtedness, with a goal of either reducing or paying off TVA's indebtedness. Such a plan may ultimately reduce the power generation mission of TVA. Funding of TVA's navigation, flood damage control, and other water resource missions may have to revert to federal government appropriations. The TVA Act would likely have to be revised to allow other or competing entities to supply power in TVA's service territory to make up for lost TVA generation.

TVA's electric power mission requires that "power shall be sold at rates as low as are feasible." Largely because of this directive, TVA's electric rates have been among the lower rates for electricity. However, given TVA's projected capital requirements identified by the IRP process, and TVA's statutory limit on indebtedness, Congress may want to consider:

- Whether to amend the TVA Act, allowing TVA to sell (either in whole or in part) its wholesale power at market-based rates.

Such an option may modify the mission to provide power at costs as low as possible, but may reduce the need for TVA to finance some portion of its future power plant construction needs, and thus may reduce TVA indebtedness.

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<sup>57</sup> "TVA anticipates that capital spending needs can be met with a combination of Bonds, lease arrangements, energy prepayments, additional power revenues through rate increases, cost reductions, or other ways." TVA10Q.

The Administration has stated its belief that TVA has achieved its original objectives, and these original objectives no longer require federal participation. However, keeping TVA as a federal government corporation appears to be the preference of most TVA stakeholders. In looking at the issue, Congress may want to:

- Allow TVA to continue as it does, funding its needs from operating revenues, power program financing, and creative approaches to financing new power plant construction.

No change to the current mission of TVA would be made. However, given the ongoing strategic review, some type of administrative determination may be required at some point to ensure that TVA has the means to capably address its projected future cost obligations.

- Redefine TVA's status and designation as a government corporation.

Since TVA debt securities are not obligations of the U.S. government and do not carry a government guarantee, TVA's current indebtedness has arguably little or no real impact on the federal budget. Since no single definition of "government corporation" currently exists, a potential definition of a new "self-sustaining" entity may be designed to remove TVA's indebtedness from the balance sheets of the federal government. New legislation would likely be required.

Among other implications, such an approach is likely to increase TVA's financing costs, since any perceived backing of TVA's debt by the federal government would be removed.

- Consider modifying TVA's missions.

For example, TVA's navigation, flood control, and related obligations and funding could be separated from its economic development, power generation, and technology innovation missions, perhaps investing these roles in at least two separate federal corporations. Such an option would likely require legislation to revise or repeal the TVA Act.

- Examine TVA's diverse missions, and determine itself whether these missions have been accomplished to such an extent that, going forward, federal participation is no longer warranted.

Ending the federal role may mean a substantial portion of TVA's debt could be removed from being counted under the federal deficit. Such an option would likely require legislation to revise or repeal the TVA Act.

If privatization were to follow, dissolution of TVA as a single entity may ensue. A market-based valuation of TVA's assets would likely be required, with possible write-downs of some of these assets. It is possible that some of TVA's nuclear or fossil power generation may remain under federal ownership or trust, as decommissioning or other obligations related to these plants may inhibit sale at a fair market price or discourage private ownership altogether.

If the hydropower assets were to be sold to private owners, how the navigation, flood damage mitigation, water quality, recreation, water supply, and land use missions could be safely and legally accomplished would be at question. Maximization of water flows for optimum power generation may not always be consistent with other demands of the river and reservoir system.

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