United States Government Accountability Office

GAO

Report to the Chairman, Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure, House of Representatives

August 2006

TENNESSEE VALLEY AUTHORITY

Plans to Reduce Debt While Meeting Demand for Power

GAO-06-810

August 2006

TENNESSEE VALLEY AUTHORITY

Plans to Reduce Debt While Meeting Demand for Power

GAO Accountability · Integrity · Reliability

Highlights

Highlights of GAO-06-810, a report to the Chairman, Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure, House of Representatives

Why GAO Did This Study

Competition in the electricity industry is expected to intensify, and restructuring legislation may dramatically change the way electric utilities do business in the future. To be competitive, the Tennessee Valley Authority (TVA) needs to reduce fixed costs and increase its flexibility in order to meet market prices for power. TVA plans to reduce its financing obligations, which include statutory debt and other financing arrangements, by $7.1 billion by the end of fiscal year 2015. GAO was asked to (1) describe how TVA plans to meet its goal for reducing financing obligations, (2) assess the reasonableness of TVA's approach in developing its plan, (3) identify key factors that could impact TVA's ability to successfully carry out its plan, and (4) identify how TVA's plans for meeting the growing demand for power in the Tennessee Valley may impact its ability to reduce financing obligations. To fulfill these objectives, GAO interviewed TVA officials and others, and reviewed budget submissions, financial projections, and other documentation supporting the plan.

What GAO Recommends

GAO makes two recommendations to help TVA (1) augment its data sources for estimates of key input variables in its cash flow model, and (2) better illustrate the range of outcomes of the model. In comments on a draft of this report, TVA agreed with these recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-06-810.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Robert E. Martin at (202) 512-6131 or martinr@gao.gov.

What GAO Found

TVA plans to reduce its financing obligations by about $7.1 billion from fiscal years 2004 through 2015 by increasing revenue, controlling the growth of its operating expenses, and limiting capital expenditures. TVA's financing obligations include statutory debt, which it plans to reduce by $6.7 billion, and alternative financing obligations such as energy prepayments, which it plans to reduce by $0.4 billion.

Overall, GAO's review found TVA's approach to developing its plan to reduce financing obligations reasonable. TVA performed detailed competitive analyses and modeled different market scenarios to estimate its future competitive environment, then used its internal budget process to project annual cash flows and refine its goal with a cash-based accounting model. Many of the variables used in the models were based on recognized data sources. Augmenting these sources with prices from options markets could provide more accurate estimates in volatile markets. TVA also made fixed assumptions about actions it would take, such as building new power generation, and events, such as the advent of new environmental regulations. While these assumptions are reasonable, they carry uncertainty that is not reflected in the model. Modeling them as variables might better reflect that uncertainty and provide broader information for planning purposes.

GAO identified several key factors that could impact TVA's ability to successfully carry out its plan. Factors such as the timing of electricity industry restructuring, potential increases in interest rates, and costs associated with meeting potential new environmental requirements, are key factors that are difficult for TVA to control. TVA has more control over other key factors, such as its decisions on whether or not to construct new power generating facilities before 2015 and to limit operating and maintenance expenses, but these are also affected by outside forces and contain an element of uncertainty. Future rate increases and a fuel-cost adjustment clause are factors that should help cover any unforeseen costs, capital expenditures, or revenue shortfalls.

TVA's plan includes the capital expenditures it believes will be needed to expand capacity of existing generating facilities to meet the growing demand for power in its service area through 2015; however, any new or unplanned expenditures prior to 2015 could lessen TVA's ability to achieve the $7.1 billion goal. By 2015, TVA has estimated that it will need more baseload generation to meet growth in demand. TVA officials are considering a number of options to meet this projected increase in demand for power, including partnering with outside parties to build new generation. TVA's current projections assume that it will not invest in any new generation through 2015 other than restarting Browns Ferry Nuclear Plant Unit 1; however, any new or unplanned capital expenditures could use cash otherwise intended to be used to reduce financing obligations.

Contents

GAO
Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

August 31, 2006

The Honorable John J. Duncan, Jr.
Chairman, Subcommittee on Water Resources
and Environment
Committee on Transportation and Infrastructure
House of Representatives

Dear Mr. Chairman:

Competition in the electricity industry is expected to intensify, and restructuring legislation may dramatically change the way electric utilities do business in the future. To remain competitive, the Tennessee Valley Authority (TVA) needs to have low fixed costs and the flexibility to meet market prices for power. Recognizing this, in 1997, TVA embarked on a plan to reduce its debt by one half to about $13.2 billion by 2007. It will not meet this goal, however, and in fiscal year 2004 it issued a strategic plan that included a target to reduce debt by $3 to $5 billion from 2004 through 2015. TVA continues to carry a relatively high level of debt, currently about $23.1 billion, and acknowledges that reducing debt is critical to improving its financial condition and competitive prospects.

Because of concerns that TVA might not meet the targets in its debt reduction plan and that this could negatively impact its future competitiveness, you asked us to (1) describe how TVA plans to meet the debt reduction goal identified in its 2004 strategic plan, (2) assess the reasonableness of TVA's approach in developing its debt reduction plan, (3) identify key factors that could impact TVA's ability to successfully carry out its debt reduction plan, and (4) identify how TVA's plans for meeting the growing demand for power in the Tennessee Valley may impact its ability to meet its debt reduction goal.

In performing our work, we interviewed officials from TVA, TVA's inspector general's office, the Tennessee Valley Public Power Association, the Congressional Budget Office, and the Knoxville Utilities Board. We also reviewed TVA's 2004 strategic plan, budget submissions, annual reports, and documents and analyses supporting the debt reduction plan. To determine the types of revenue and costs TVA had reported, we reviewed TVA's audited financial statements. In addition, we reviewed prior GAO reports. We conducted our work from June 2005 through

August 2006 in accordance with generally accepted government auditing standards.

Results in Brief

TVA set a goal of reducing statutory debt by $3 to $5 billion in its 2004 strategic plan. Subsequently, TVA expanded the scope of its debt reduction efforts to include debt-like transactions such as lease-leasebacks and energy prepayment arrangements, referred to in this report as alternative financing. TVA calls this larger group of obligations total financing obligations, or TFOs. In its 2007 budget, TVA increased its TFO reduction goal to $7.1 billion. This includes reducing statutory debt by $6.7 billion and alternative financing obligations by $0.4 billion. TVA plans to meet this goal by increasing revenue, controlling the growth of its operating expenses, and limiting capital expenditures. TVA projects it will gain additional revenue through its October 2005 rate increase, a fuel-cost adjustment clause to automatically adjust rates up or down when fuel prices change, and increased sales from growth in the demand for electricity. TVA's plan also calls for controlling the growth of operating costs and limiting spending on capital expenditures to $12.1 billion for fiscal years 2006 through 2015. TVA officials believe that this plan will allow it to be financially flexible while continuing to offer competitive electricity rates.

Overall, we found TVA's approach to developing its plan to reduce financing obligations to be reasonable. TVA used a strategic planning process to develop its plan, which focused on its core mission as a long-term provider of low-cost power. As part of this process, TVA looked not only at its financing obligations, but at external business and market risks. To assess these outside risks, TVA performed detailed competitive analyses and modeled different market scenarios to estimate its future competitive environment. It considered the results of these market risk analyses in formulating its strategic plan and determining the initial possible range for reducing financing obligations through 2015. As part of its annual internal budget process, TVA then used an accounting model to project annual cash flows and refine its goal. Many of the variables used in the models were based on data from Global Insight, *The Wall Street Journal*, and other recognized sources of economic data and forecasts. TVA estimated the price volatility of commodities such as coal and natural gas with a combination of historical data and projected trends. It did not, however, use prices from options markets, which could help identify more accurate estimates of the range of possible prices in volatile markets. In using the results of the accounting model to refine its TFO reduction goals, TVA also made assumptions about actions it would or would not take,

such as building new baseload generation, and events outside its control, such as the speed of electricity market restructuring and the advent of new environmental regulations. While these assumptions are reasonable, they carry uncertainty that is not reflected in the model. Modeling them as variables rather than fixed assumptions might better reflect that uncertainty and provide TVA with a broader range of potential outcomes for planning purposes.

We identified several key factors that could impact TVA's ability to successfully carry out its plan. The timing of electricity industry restructuring, potential increases in interest rates, and costs associated with meeting potential new environmental requirements are key factors that are difficult for TVA to control. TVA has more control over other key factors, such as its decisions not to build new power generating capacity before 2015 and to limit operating and maintenance expenses, but these are also affected by outside forces and contain an element of uncertainty. Rate increases that were not considered in TVA's current plan, as well as adding a fuel-cost adjustment clause to its customer contracts in fiscal year 2007, are factors that should help cover any unforeseen costs, capital expenditures, or revenue shortfalls.

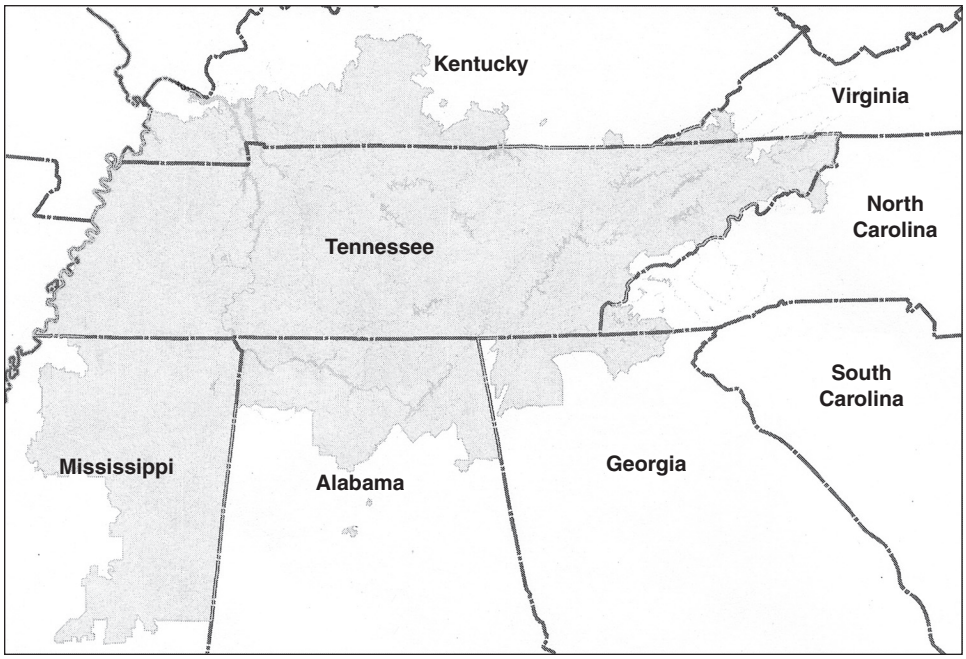
TVA's plan includes the capital expenditures it believes will be needed to meet the growing demand for power in the Tennessee Valley through 2015; however, any additional, unplanned capital expenditures prior to 2015 could affect TVA's ability to achieve its plan. By 2015, TVA has estimated that it will need more electricity generation to meet growth in demand and its plan includes the estimated costs to restart one of its idle nuclear generating units, Browns Ferry Nuclear Unit 1. TVA officials are considering a number of additional options to meet this projected increase in demand for power, including partnering with outside parties. Since TVA's current projections assume that it will not invest in any new generation through 2015, other than restarting Browns Ferry Nuclear Unit 1, any new or unplanned capital expenditures would use cash otherwise intended to be used to reduce financing obligations, thus affecting TVA's ability to meet its planned TFO reduction.

We are making two recommendations to help TVA (1) augment its data sources for estimates of key input variables in the model, and (2) better illustrate the range of outcomes in its cash flow model for planning purposes. In comments on a draft of this report, TVA agreed with these recommendations.

Background

TVA is an independent, wholly owned federal corporation established by the TVA Act of 1933 (TVA Act), as amended.[1] 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. To meet the subsequent need for more electric power, TVA expanded beyond hydropower to other types of power generation such as natural gas, coal, and nuclear plants. As of September 30, 2005, TVA sold electricity at wholesale rates to 158 retail distributors that resell electricity to consumers, and sold electricity directly to 61 large retail customers. As illustrated in figure 1, TVA's service territory includes most of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. The area covers 80,000 square miles with a population of more than 8.6 million.

Figure 1: TVA's Service Territory



Source: TVA.

[1] 16 U.S.C. §§ 831-831ee.

From its inception in 1933 through fiscal year 1959, TVA received appropriations to finance its internal cash and capital requirements. In 1959, however, the Congress amended the TVA Act to provide TVA the means to self-finance its power program and required it to repay a substantial portion of appropriations[2] it had received to pay for its capital projects. At the same time, the Congress required that TVA's power programs be self-financing through revenues from electricity sales. For its capital needs in excess of funds generated from operations, TVA was authorized to borrow by issuing bonds and notes. TVA's authority to issue bonds and notes is set by the Congress and cannot exceed $30 billion outstanding at any given time.

Until recently, TVA had been administered by a three-member board of directors appointed by the President of the United States and confirmed by the U.S. Senate. An Executive Committee worked with the board to determine TVA's strategic mission and future direction, provide management oversight, and ensure policies of the board were carried out. The Consolidated Appropriations Act, 2005, which was signed into law in December 2004, changed the structure of TVA's management. The act contained provisions that restructured the board from three full-time members to nine part-time members, established the position of Chief Executive Officer (CEO) to be appointed by the board, required TVA to begin filing financial reports with the Securities and Exchange Commission (SEC), and required TVA's new board to create an Audit Committee to be composed solely of board members independent of management. The audit committee will be responsible for reviewing inspector general and external audit reports and making recommendations to the board. The legislation specifies that seven of the nine board members must be legal residents of TVA's service area and that the members will be appointed by the President and confirmed by the Senate. After a transition period, members will serve 5-year rather than the current 9-year terms. In general, the board will establish TVA's strategic direction and policies while the CEO will oversee their implementation as well as TVA's overall operations. The new board became effective on March 31,

[2] 16 U.S.C. § 831n-4(e). TVA makes annual principal payments to Treasury from net power proceeds plus interest expense on the balance of this amount, which was about $428 million as of September 30, 2005. The annual principal payments, which totaled $20 million for fiscal year 2005, are to continue until the unpaid balance of the appropriation debt is paid down to $258.3 million. TVA is to continue paying interest on the remaining balance each year. The interest on the unpaid appropriation balance was $16 million in fiscal year 2005.

2006, when six new board members took the oath of office and joined two existing members to hold the first board meeting under the new governance structure.[3]

Along with annual reporting to the SEC, in fiscal year 2006 TVA will also be required to comply with certain provisions of the Sarbanes-Oxley Act of 2002, including the requirement that its officers certify annual and quarterly financial reports and report on the effectiveness of internal controls over financial reporting. TVA's external auditor, in addition to auditing and issuing an opinion on TVA's financial statements, will be required to issue an opinion on the effectiveness of TVA's internal controls over financial reporting. Based on the current guidance from the SEC, TVA will file the first report on internal controls with its September 30, 2007, financial statements.

Under the TVA Act, as amended, TVA has not been subject to most of the regulatory oversight requirements that commercial utilities must satisfy. Legislation has also limited 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 service area that it and its distributors were serving on July 1, 1957. This is commonly referred to as the "fence" because it limits TVA's ability to expand outside its July 1, 1957, service area. In addition, the Energy Policy Act of 1992 (EPAct) exempted TVA from being required to allow other utilities to use its transmission lines to send power to customers within its service area, effectively reducing the opportunities for TVA's wholesale customers to choose other suppliers. This exemption is often referred to as the "anti-cherrypicking" provision. TVA is still subject to some forms of indirect competition common to all utilities. For example, the cost of power would 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.

[3] As of August 15, 2006, the ninth member of the board had been nominated by the President, but not yet confirmed by the Senate.

For more than 20 years, the federal government has been taking a variety of steps to restructure the electricity industry with the goal of increasing competition in wholesale markets and thereby increasing benefits to consumers, including lower electricity prices and a wider variety of retail services. Electricity restructuring is evolving against a backdrop of constraints and challenges, including shared responsibility for implementing and enforcing local, state, and federal laws affecting the electricity industry and an expected substantial increase in electricity demand by 2025, which will require significant investment in new power plants and transmission lines.

Prior to this restructuring, electricity was generally provided by electric utilities that exclusively served all customers within a specific geographic region. Under these conditions, the federal government, through the Federal Energy Regulatory Commission (FERC) and its predecessors, regulated wholesale electricity sales (sales for resale) and interstate transmission by electric utilities[4] and set prices at cost-based rates. Because the utilities were monopolies, states regulated retail markets, approving utility company investments and rates paid by customers. In 1978, the federal government laid the groundwork for restructuring and competition in the electricity industry with the Public Utility Regulatory Policies Act, which opened wholesale power markets to electricity producers that were not regulated utility monopolies. In the 1990s the federal government greatly expanded these efforts. First the EPAct provided for broader participation in wholesale electricity markets by nonutilities[5] and allowed these entities to produce and sell electricity at market prices. Second, in 1996 the FERC issued Orders 888 and 889, which greatly expanded opportunities for competition by requiring utilities to provide access to their transmission lines to all users under the same prices, terms, and conditions. This change allowed the new nonutilities to compete with utilities and others for the opportunity to sell electricity in wholesale markets on more equal terms.[6] By 2002 a number of states had

[4] Some entities such as utilities owned by municipalities, rural electric cooperatives, and others were not generally subject to federal oversight on rates.

[5] Nonutility generators or power producers can be corporations, persons, or other entities that own electric-generating capacity and are not electric utilities. They can include mining and manufacturing establishments, railroads, and other small or independent power producers that do not have a designated service area.

[6] Although it was not required by the Federal Power Act to comply with these orders, TVA took steps to do so, consistent with its obligations under the TVA Act.

made efforts to introduce competition to the retail markets that they oversee, allowing nonutilities to compete with utilities and others for the opportunity to sell electricity directly to consumers.

Beginning in 2000, some restructured wholesale and retail electricity markets encountered a number of problems. From the summer of 2000 through early 2001, California saw a sharp increase in wholesale electricity prices, electricity shortages leading to rolling blackouts, and the deteriorating financial stability of its three major investor-owned utilities. These problems, along with the largest blackout in U.S. history along the East Coast in 2003, drew attention to the need to examine the operation and direction of the industry. Efforts to expand restructuring slowed down as many states analyzed the factors that contributed to these problems, among them failure to meet increasing demand for electricity with new generation and transmission capacity.

TVA management and many industry experts, however, expect that TVA will eventually be drawn into the restructuring of the electric utility industry and will eventually lose its legislative protections from competition. There have already been some indications of such changes. For instance, S.1499, introduced in July 2005, would remove any area within Kentucky from coverage by the "anti-cherrypicking" provision in the EPAct. If the bill becomes law, TVA would be required to transmit power from another supplier over its transmission lines for use inside the Kentucky portion of its service area without being able to similarly expand its service area. The bill was referred to the Senate Energy and Natural Resources Committee, where it remained as of August 15, 2006.

Our prior reports have indicated that TVA's high debt and related interest expense could place it at a disadvantage in continuing to offer competitively priced power if it were to lose its legislative protections from competition.[7] TVA's management has also recognized the need to reduce its debt and other financing obligations to increase its flexibility to

[7] GAO, *Tennessee Valley Authority: Financial Problems Raise Questions About Long-Term Viability*, GAO/AIMD/RCED-95-134 (Washington, D.C.: Aug. 17, 1995); *Federal Electricity Activities: The Federal Government's Net Cost and Potential for Future Losses*, Volumes 1 and 2, GAO/AIMD-97-110 and 110A (Washington, D.C.: Sept. 19, 1997); *Tennessee Valley Authority: Assessment of the 10-Year Business Plan*, GAO/AIMD-99-142 (Washington, D.C.: Apr. 30, 1999); *Tennessee Valley Authority: Debt Reduction Efforts and Potential Stranded Costs*, GAO-01-237 (Washington, D.C.: Feb. 28, 2001); and *Tennessee Valley Authority: Information on Lease-Leaseback and Other Financing Arrangements*, GAO-03-784 (Washington, D.C.: June 30, 2003).

meet competitive challenges. In July 1997, TVA issued a 10-year business plan with steps necessary to improve its financial position for an era of increasing competition. Two key strategic objectives of the plan were (1) to reduce the cost of power by reducing debt and the corresponding financing costs, and (2) increase financial flexibility by reducing fixed costs. To help meet these objectives, the plan called for TVA to reduce its debt by half over a 10-year period to about $13.2 billion by increasing its electricity rates beginning in 1998, reducing certain expenses, and limiting capital expenditures.

TVA did not meet the 1997 debt reduction goal because it used cash intended for debt reduction to cover greater than estimated annual operating costs and capital expenditures. In fiscal year 2000, TVA began entering into alternative financing in the form of lease-leaseback arrangements to obtain a lower cost of capital than it could by selling bonds. TVA entered into these arrangements in fiscal years 2000, 2002, and 2003 to refinance 24 existing power generators that were designed for use during periods of peak power demand. TVA financed and built the generating units and leased them to investors in exchange for cash. It then leased the generators back and is making payments to investors. TVA also implemented other alternative financing arrangements that allowed its customers to prepay for power in exchange for discounted rates. For example, in November 2003, TVA entered into an energy prepayment agreement with its largest customer, Memphis Light, Gas, and Water Division (MLGW). Under this agreement, MLGW prepaid TVA $1.5 billion for electricity to be delivered over a 15-year period. TVA also offered a discounted energy units program in fiscal years 2003 and 2004, under which TVA customers could purchase power, usually in $1 million increments, in return for a discount on a specified quantity of power over a certain period of years. TVA did not offer the DEU program in 2005. During our review, TVA's management[8] told us they have no current plans to enter into additional alternative financing arrangements.

[8] The majority of our field work was conducted before the restructured board took office on March 31, 2006, and included interviews with key members of TVA's management, including the Chairman of the Board; Chief Operating Officer; Executive Vice President and General Counsel; Chief Financial Officer; Senior Vice President for Strategic Planning and Analysis; and Vice President, Risk Management and Economic Analysis. Our references to TVA management in this report apply to the TVA management team in place before the new board took effect on March 31, 2006.

Generally accepted accounting principles require that lease-leaseback and other alternative financing arrangements be classified as liabilities. In 2003 we reported[9] that the lease-leaseback arrangements, while not considered debt for purposes of financial reporting, had the same effect on TVA's financial condition as traditional debt financing. The Office of Management and Budget (OMB) treats the cash proceeds TVA receives from private parties at the inception of lease-leaseback arrangements as borrowing. Accordingly, in the President's Budget for fiscal year 2004, OMB began classifying TVA's lease-leaseback arrangements as debt. Table 1 shows that although TVA reduced its outstanding statutory debt by about $4.3 billion from fiscal years 1997 through 2005, its use of alternative financing arrangements rose, adding nearly $2.5 billion to its total financing obligations as of September 30, 2005, resulting in a net reduction of about $1.8 billion.

Table 1: TVA's Total Financing Obligations at Year-end for Fiscal Years 1997 through 2005

Dollars in millions									
Debt and obligations	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Statutory debt	$27,379	$26,684	$26,376	$25,985	$25,375	$25,255	$24,875	$23,250	$23,088
Lease-leaseback	0	0	0	300	271	559	1,238	1,178	1,143
Energy prepayments	0	0	0	0	0	0	47	1,455	1,350
Total financial obligations (Debt + alternative financing)	**$27,379**	**$26,684**	**$26,376**	**$26,285**	**$25,646**	**$25,814**	**$26,160**	**$25,883**	**$25,581**

Source: GAO analysis of information obtained from TVA.

In fiscal year 2004, burdened with total financing obligations of almost $26 billion, TVA's board adopted a new strategic plan for reducing debt that called for increasing revenue, controlling costs, and reducing the growth of capital expenditures. However, TVA also began measuring its debt reduction more realistically and transparently in terms of TFOs, which, as shown in table 1, are comprised of its statutory debt as well as its liabilities under alternative financing arrangements.

Since issuing its strategic plan in 2004, TVA has raised its power rates twice—a 7.52 percent increase in firm wholesale electric rates effective October 1, 2005, and a 9.95 percent increase effective April 1, 2006. On July 28, 2006, TVA's board approved a 4.5 percent decrease in firm wholesale

[9] GAO, *Tennessee Valley Authority: Information on Lease-Leaseback and Other Financing Arrangements*, GAO-03-784 (Washington, D.C.: June 30, 2003).

power rates in conjunction with a fuel-cost adjustment clause. Utilities surrounding the Tennessee Valley also increased rates in 2005, and 12 of the 14 surrounding utilities have fuel-cost adjustment clauses that allow them to pass increases in the price of fuel to customers automatically. TVA is working with distributors and the Tennessee Valley Public Power Association (TVPPA)[10] to develop future wholesale pricing options and new long-term contract options.

Scope and Methodology

To determine how TVA plans to meet the debt reduction goal identified in its 2004 strategic plan, we: (1) interviewed TVA officials, (2) reviewed documentation and analyses supporting TVA's debt reduction plan including its 2004 strategic plan and budget submissions for fiscal years 2006 and 2007, and (3) reviewed TVA's fiscal years 2004 and 2005 annual reports, information statements, and audited financial statements.

To assess the reasonableness of TVA's approach in developing its debt reduction plan, we interviewed TVA officials responsible for developing the 2004 Strategic Plan and performing analyses with the Competitive Risk Model and the Enterprise Risk Model. To assess these models, we obtained documentation describing the structure of the models and the sources of variables used in the models, and discussed this information with relevant TVA staff. We examined the structure of the models in order to ascertain whether the relationships between the variables in the models were logical and included the most important sources of costs and revenues, and considered the extent to which the data are independent, widely used, and relevant.

To identify the key factors that could impact TVA's ability to successfully carry out its debt reduction plan we (1) interviewed officials from TVA, TVA's Office of Inspector General, the Tennessee Valley Public Power Association, and the Knoxville Utilities Board; (2) reviewed prior GAO reports on issues confronting TVA; (3) reviewed TVA's fiscal years 2004 and 2005 annual reports, information statements, and audited financial statements to determine the types of revenue and costs TVA had reported; and (4) interviewed an official from CBO with expertise in issues pertaining to TVA.

[10] TVPPA is a nonprofit, regional service organization that represents the interests of consumer-owned electric utilities operating within the TVA service area.

To identify the impact that growth in demand for power in the Tennessee Valley may have on TVA's ability to meet its debt reduction plan, we (1) interviewed officials from TVA, TVA's Office of Inspector General, the Tennessee Valley Public Power Association, and the Knoxville Utilities Board; (2) reviewed prior GAO reports on issues confronting TVA; (3) reviewed TVA's fiscal years 2004 and 2005 annual reports, information statements, and audited financial statements to determine the types of revenue and costs TVA had reported; and (4) interviewed an official from CBO with expertise in issues pertaining to TVA.

During the course of our work, we contacted the following organizations:

- Congressional Budget Office
- Tennessee Valley Authority
- Tennessee Valley Authority, Office of Inspector General
- Tennessee Valley Public Power Association, Chattanooga, Tennessee
- Knoxville Utilities Board, Knoxville, Tennessee

We provided a draft of this report to officials at TVA for their review and incorporated their comments where appropriate. We conducted our work from June 2005 through August 2006 in accordance with generally accepted government auditing standards.

TVA Plans to Increase Revenue, Control Operating Expenses, and Limit Capital Expenditures

TVA set a goal of reducing statutory debt by $3 to $5 billion in its 2004 strategic plan. Subsequently, TVA expanded the scope of its debt reduction efforts to include debt-like transactions such as lease-leasebacks and energy prepayment arrangements, referred to in this report as alternative financing. TVA calls this larger group of obligations total financing obligations, or TFOs. In its 2007 budget, TVA increased its TFO reduction goal to $7.1 billion.[11] This includes reducing statutory debt by $6.7 billion and alternative financing obligations by $0.4 billion. TVA plans to meet this goal by increasing revenue, controlling the growth of its operating expenses, and limiting capital expenditures. TVA projects it will gain additional revenue through its October 2005 rate increase, a fuel-cost

[11] GAO was asked to look at TVA's 2004 Strategic Plan, which addressed debt reduction plans through 2015. This report is based on information supporting the $7.1 billion figure made public in December 2005, which covers the original debt reduction period. Subsequently, TVA expanded its debt reduction period to 2016 and raised its TFO reduction goal to $7.8 billion. This increased TVA's goal for reducing statutory debt to $7.3 billion and alternative financing arrangements to $0.5 billion.

adjustment clause to adjust rates up or down automatically when fuel prices change, and increased sales from growth in the demand for electricity. TVA's plan also calls for controlling the growth of operating costs and limiting spending on capital expenditures to $12.1 billion through fiscal year 2015.

TVA's management told us that they are committed to reducing TFOs and that achieving the $7.1 billion TFO reduction goal would give TVA an estimated 3.1 interest rate coverage ratio[12] by fiscal year 2015. As of fiscal year 2005, TVA's interest coverage ratio was 2. The interest coverage ratio is a quick way to identify a company's ability to pay interest on debt, which TVA uses to gauge its financial health. TVA officials said the 3.1 ratio would allow TVA to be a financially flexible enterprise and continue to offer competitive electricity rates. Table 2 shows TVA's annual and cumulative targets for reducing total financing obligations for fiscal years 2004 through 2015.

[12] An interest coverage ratio of 1.5 is considered the minimum for any company in any industry. For an established utility, an interest coverage ratio of 2 is acceptable, while 3 is the minimum for more volatile industries. This ratio is generally calculated by dividing a company's earnings before interest expense and taxes by its interest expense. Because TVA's capital structure differs from investor-owned utilities, it calculates this ratio by dividing the sum of cash from operations plus interest expense by interest expense, which we believe is reasonable.

Table 2: TVA's Actual and Targeted Reduction of Total Financing Obligations for Fiscal Years 2004 through 2015

Dollars in millions													
Actual and projected reductions by fiscal year	**2004[a, b]**	**2005[a]**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Alternative financing	$(1,347)	$140	$140	$142	$148	$147	$152	$160	$165	$172	$169	$176	**$364**
Statutory debt	1,625	161	200	387	404	545	556	537	605	654	412	649	**6,735**
Total annual TFO reduction	278[c]	301[c]	340	529	552	692	708	697	770	826	581	825	**$7,099**
Cumulative TFO reduction	$278	$579	$919	$1,448	$2,000	$2,692	$3,400	$4,097	$4,867	$5,693	$6,274	$7,099	

Source: GAO analysis of information obtained from TVA.

[a]Reflects actual amount.

[b]During fiscal year 2004, TVA reduced the balance of its TFOs by $278 million by using $1.5 billion from a prepayment agreement with Memphis Light, Gas, and Water Division (MLGW) plus $125 million generated from operations to reduce statutory debt by $1.625 billion. At the same time, the balance of TVA's alternative financing arrangements increased by $1.5 billion from the MLGW prepayment agreement minus a reduction in the balance of other alternative arrangements of $153 million for a net increase of $1.347 billion.

[c]Targeted reduction was $225 million.

TVA exceeded its targets for reducing TFOs for the first 2 years of the plan. In fiscal year 2004, TVA reduced its TFOs by $278 million, or 24 percent more than its target of $225 million. In fiscal year 2005, TVA reduced its TFOs by $301 million, or 34 percent more than its target of $225 million.

TVA Projects Several Sources of Additional Revenue

The projections supporting TVA's current TFO reduction goal show that the annual increases in operating revenue over the fiscal year 2004 level for fiscal years 2005 through 2015 will total $16.7 billion. TVA plans to use the additional revenue to cover projected increases in operating costs and capital expenditures, and to reduce TFOs. About $9.6 billion of this additional revenue will come primarily from increased sales from growth in demand. TVA also projects that about $5.7 billion will come from the October 1, 2005, rate increase. From fiscal years 2007 through 2015, TVA expects about $1.4 billion to come from the fuel-cost adjustment (FCA) clause that will be added to customer contracts in fiscal year 2007. The FCA will automatically increase or decrease rates to cover changes in the cost of fuel and purchased power. TVA plans to use the budgeted fuel and purchased power estimates for fiscal year 2006 as the baseline for fuel and purchased power prices it pays. In subsequent years, it will compare those prices to the baseline and automatically adjust rates upward or downward for changes in these expenses. Although the FCA will not generate

additional cash that can be applied to TFO reduction, it will prevent increases in the cost of fuel and purchased power from eroding cash balances that TVA planned to apply toward TFO reduction.

The revenue projections supporting the current TFO reduction goal do not include several factors, such as the 9.95 percent rate increase that took effect on April 1, 2006, the 4.5 percent decrease approved on July 28, or any future rate increases. The April 1, 2006, increase took effect after TVA approved its 2007 budget and was undertaken to cover projected increases in the cost of fuel and purchased power. The rate decrease was approved in conjunction with the FCA. Future rate increases (excluding the FCA) were not included because TVA plans to use them as necessary to cover increases in operating costs (excluding fuel and purchased power) that exceed estimates that were used in formulating the current TFO reduction goal. The revenue projections also assume that an environmental surcharge that was added to rates on October 1, 2003, to fund anticipated clean air compliance costs for the next 10 years will be discontinued at fiscal year end 2013, as originally planned.

TVA Plans to Control the Growth of Its Operating Costs

TVA's TFO reduction plan includes an emphasis on controlling the growth of operating costs. Management plans to constrain TVA's baseline operating and maintenance (O&M) costs, excluding fuel and purchased power, by limiting the growth of these expenses to one-half of a percentage point below inflation, as measured by the consumer price index (CPI). TVA estimates that this will make about $1.1 billion in cash available from fiscal year 2007 through fiscal year 2015. TVA plans to hold O&M expenses down by implementing better discretionary spending discipline through top-down budgeting guidance and performance measures, and then maintaining the efficiency gains throughout the planning period. The plan includes establishing overall financial targets and allocating them to TVA's individual business units.

TVA officials also project that bringing Browns Ferry Nuclear Unit 1 (BFN 1)[13] on line will help control the growth of operating costs. A 2002 analysis prepared by TVA shows that the completion of BFN 1 will allow TVA to reduce the cost of its fuel, purchased power, and other operating

[13] BFN 1 was taken off line in 1985 for plant modifications and regulatory improvements. In May 2002, TVA's Board determined the restart of BFN 1 could reduce TVA's delivered cost of power relative to the market and initiated activities to return BFN 1 to service.

costs. Because completion of BFN 1 is embedded in TVA's current forecasts, it could not provide current projections of the incremental savings from completing and bringing BFN 1 on line. The 2002 analysis projected that TVA's cash flow would improve when BFN 1 is brought on line in May 2007, and TVA would recover all of its costs from the project, including interest expense, by 2015. This analysis, however, could not consider subsequent changes, such as the significant increases in power supply costs that have occurred since 2002, which will increase TVA's projected savings from bringing BFN 1 on line. TVA also projects that its interest expense will be reduced over time as it lowers the balance of its outstanding debt.

TVA Plans to Spend $12.1 Billion on Capital Expenditures through Fiscal Year 2015

TVA's TFO reduction plan includes $12.1 billion from fiscal year 2006 through fiscal year 2015 for capital expenditures to complete BFN 1, meet known requirements of the Clean Air Act, and cover ongoing efforts to uprate its generating assets and maintain transmission assets. Any changes in this amount would affect the cash available for TFO reduction. Table 3 shows TVA's planned capital expenditures by major category from fiscal year 2006 through fiscal year 2015.

Table 3: TVA's Planned Capital Expenditures by Major Category from Fiscal Year 2006 through Fiscal Year 2015

Dollars in millions

Category	Planned expenditures	Percentage of planned expenditures
Browns Ferry Nuclear Unit 1	$501	4
Clean Air Act Requirements	3,481	29
Fossil	2,552	21
Nuclear	1,462	12
Transmission	2,828	24
Hydro	762	6
Corporate	529	4
Total	**$12,115**	**100**

Source: TVA.

To help meet its capital expenditure goals, TVA will consider deferring or canceling capital projects when necessary and adjusting its investment criteria to reflect changes in its customer contracts and commitments.

TVA's plan includes estimated capital expenditures for its current environmental program to reduce sulfur dioxide, nitrogen oxide, and particulates, which are expected to reach a cumulative total of about $5.7 billion by 2010. TVA had already spent about $4.4 billion, or 77 percent of this amount, by September 30, 2005. TVA's plan, however, does not factor in costs for additional reductions in airborne pollutants that it may be required to meet in the future, or the potential cost to comply with proposed legislation that would require reductions in carbon dioxide. Projections for meeting TVA's TFO reduction goal do not include capital expenditures for building any major new generating assets through 2015, other than completing BFN 1.

TVA Used a Reasonable Approach to Developing Its Plan to Reduce TFOs

Overall, we found TVA's approach to developing its TFO reduction goal was reasonable. TVA used a strategic planning process to develop its current goal, which focused on its core mission as a long-term provider of low-cost electricity. As part of this process, TVA looked not only at its financing obligations, but at external business and market risks. To assess these outside risks, TVA performed detailed competitive analyses and modeled different market scenarios to estimate its future competitive environment. It considered the results of these market risk analyses in formulating its strategic plan and determining the initial range of possible debt reduction through 2015. As part of its annual internal budget process, TVA used an accounting model to project annual cash flows and refine its goal. TVA continues to project cash flows annually and to analyze changing market conditions as necessary using the accounting model.

TVA Assessed Its Business and Market Risks to Prepare Its Strategic Plan

TVA assessed its competitive environment and performed detailed analyses of business and market risks to determine the effect of possible future conditions on its ability to reduce debt. Among the tools used in TVA's strategic planning process was a competitive risk model (CRM). The CRM is a scenario model that shows the range of financial outcomes TVA might face if electricity industry restructuring moved forward and its distributors were free to choose alternative suppliers. Scenario analysis develops a set of potential events and conditions that management may wish to consider, and calculates the likely impact on cash flow and debt reduction in each. TVA's CRM shows the probability of loss of load, or customer demand for energy, over many market scenarios. The model calculated the potential impact of each market scenario on TVA assuming that distributors could choose other suppliers and modeled the potential for loss of load using three pricing scenarios:

- holding prices flat at current levels,
- setting prices equal to TVA's projected costs, and
- setting prices equal to the projected average competitor price.

The results were then used to produce probabilities of different potential financial outcomes to identify types of market conditions under which load loss was likely to occur.

TVA included the following assumptions in the CRM:

- it would begin facing competitive pressures in 2008;
- its contracts would include provisions for distributors to satisfy some of their power needs from sources other than TVA, referred to as partial requirements; and
- it could sell power elsewhere.

TVA conducted its competitive risk analysis in 2003. In a little less than one-third of the scenarios, the CRM showed that TVA could lose load if other utilities had both cheap natural gas and high reserve margins, or unused available capacity. Because natural gas prices have risen and movement toward electricity competition has slowed, TVA has not considered it necessary to run the model again.

TVA used the results of its competitive risk analysis as well as professional judgment in developing its 2004 strategic plan and the initial range of $3 billion to $5 billion for its statutory debt reduction goal. The plan looks at the larger picture of what TVA needs to do to succeed in a more competitive environment. It concluded that TVA needs to concentrate on four areas over the next few years. These are:

- developing new, more differentiated pricing structures, services, and contract terms that more closely tie the cost and risk of TVA's products to their terms and pricing;
- addressing issues related to wholesale market design and transmission pricing, including how it will interface with surrounding markets to ensure reliable power and how it will charge for transmitting power inside its service area when distributors can choose other suppliers;
- accelerating debt reduction to increase financial flexibility; and
- maintaining and operating company assets to continue to meet electricity supply obligations safely and reliably.

TVA Uses an Accounting Model to Refine Its TFO Reduction Targets by Determining Likely Cash Flow

TVA uses the Enterprise Risk Model (ERM) as part of its annual internal budgeting process to refine its TFO reduction targets by determining likely cash flow in given situations. The ERM is a simplified cash-based accounting model that can project key financial data by modeling TVA's system based on a power supply plan and a long-range financial plan. The ERM uses Monte Carlo simulation[14] to assess the probable range of uncertain inputs, or variables, such as interest rates or coal prices, redispatch the TVA system,[15] and recalculate cash flows multiple times while showing a range of probable values for each variable.

The ERM's Monte Carlo simulations use 13 variables that include key costs and key determinants of revenue:

- electricity market peak ($/MWh)
- electricity market off-peak ($/MWh)
- natural gas prices ($/mmBtu)
- coal prices ($/mmBtu)
- long-term interest rates (%)
- short-term interest rates (%)
- total operating and maintenance expenses
- capital expenditures
- selling, general and administrative expenses
- benefits expense
- coal plant availability
- nuclear plant availability
- hydro generation

For example, a simulation might use key costs such as prices for coal and natural gas, and combine this information with key determinants of revenue, such as peak and off-peak electricity prices, and quantities sold at those prices. The output of the model is an estimate of the annual net cash flow for TVA. For each scenario estimated, the model shows net cash flows and financing obligations repayment over each of the next 20 years

[14] Monte Carlo simulation is an approach to risk assessment that allows an analyst to assess the probable range of various uncertain inputs, such as interest rates or coal prices, and recalculate cash flows multiple times while drawing values that fall within a probability distribution for each of the uncertain inputs. The results are examined in the context of their probability distribution covering all potential outcomes of the analysis as well as reporting the average or other values.

[15] Dispatch is the process of allocating load among the available generation units so that the cost of operation is minimized. The ERM uses an economic dispatch routine to simulate the operation of TVA generating assets to achieve the lowest possible cost of generation.

for the values assumed in that scenario. Assuming that this net cash flow is applied to reducing financing obligations, the model provides an estimate of the level of obligations at the end of the simulation, which can then be used to refine projections used in coming up with its goals.

The model uses a variety of reliable sources for estimates of the key input variables. For instance, the variability of rainfall for hydropower is calculated using historical data. Interest rates are based on forecasts from Global Insight and the Wall Street Journal. The volatility of commodity prices for coal or natural gas is estimated with a combination of historical data and projected trends. Other sources may also provide reasonable estimates for key variables in the model, however. For example, some of the commodities used in the model, such as natural gas, have active options markets, which could help identify more accurate estimates of the range of possible future prices in volatile markets. For example, when Hurricane Katrina destroyed a large number of natural gas rigs in the Gulf of Mexico, there was an enormous increase in implied volatility for natural gas prices. This was because no one knew how long it would take to repair the rigs or what the market consequences would be of a sudden withdrawal of a large percentage of the natural gas supply. In such a case, the options market may provide a more accurate estimate of price volatility than historical activity and might result in a more comprehensive characterization of the distribution of possible TFO reduction levels.[16]

In designing the ERM and using its output to devise its current goal for reducing financing obligations, TVA made the following key business assumptions:

- Brown's Ferry Nuclear Unit 1 will be completed on time,
- TVA will not self-fund any new baseload generation,
- distributors who have given notice they will not be renewing contracts are excluded,
- TVA will meet or exceed current environmental regulations,

[16] In many energy markets, options are traded that give purchasers the right to buy or sell commodities in the future at a set price. From the prices on these options, it is possible to determine traders' expectations about the extent to which prices are likely to fluctuate in the future. At times of fundamental changes in a market, such as storm damage to production facilities, traders may reasonably believe that price fluctuations in the future will be larger than those based on past history.

- TVA's credit rating remains AAA,[17] and
- distributors do not gain rights to partial requirements or transmission.

TVA has generally made reasonable assumptions concerning the level and variability of the key inputs to its Monte Carlo model. As with any modeling effort, there are some inherent limitations, and areas in which the modeling may be improved. TVA's key business assumptions, while reasonable, limit the range of outcomes from the model by making certain events appear more fixed or settled than they are. Allowing the range of possible outcomes attached to some of the fixed assumptions to be modeled as variables may better reflect the uncertainty attached to TVA's TFO reduction estimates. For example, TVA could determine a range of likely dates for the completion of Brown's Ferry Nuclear Unit 1, and use these dates as part of the Monte Carlo simulation. Another example might be to use the range of possible costs from potential environmental legislation as inputs to the model. Modeling these and other fixed assumptions as variables might better illustrate the range of outcomes for TVA to evaluate in setting and refining its TFO reduction goals.

Several Key Factors Could Impact TVA's Ability to Successfully Carry out Its Plan for Reducing TFOs

We identified several key factors that could impact TVA's ability to successfully carry out its plan. Some factors are more difficult for TVA to control than others. The timing of electricity industry restructuring, potential increases in interest rates, and costs associated with meeting potential new environmental regulations are factors outside TVA's control. Future rate increases and a fuel-cost adjustment clause are factors that will help TVA cover unforeseen costs, which will help TVA meet its TFO reduction goal. TVA's planned reduction in interest expense could be affected by increases in interest rates. Although the TFO reduction plan includes the capital expenditures TVA estimates it will need to comply with all existing environmental regulations, the plan does not include potential capital expenditures needed to comply with any changes to the current environmental regulations. Building new generating capacity could require capital expenditures not included in the plan.

[17] AAA is a bond rating category assigned to an electric utility by bond analysts to represent their opinion on the general creditworthiness of an entity. AAA is the highest bond rating category representing the smallest degree of investment risk and an extremely strong ability to pay interest and principal.

The Timing of Restructuring within the Electricity Industry and the Changes It May Impose Are Key Variables in TVA's TFO Reduction Plan

Restructuring is the major reason TVA has undertaken TFO reduction, and its timing and the organizational and structural changes it may impose are key variables in TVA's plans. TVA's management and industry experts believe TVA may eventually lose its legislative protections from competition and have to compete with other utilities. Even if TVA does not lose its legislative protections, its management has recognized the need to take action to better position the agency to be competitive in an era of increasing competition and customer choice. TVA management undertook both the 1997 business plan and the 2004 strategic plan to position TVA to meet the challenges it would likely face in the coming restructured marketplace.

The extent to which TVA would be affected by loss of its legislative protections from competition would be influenced by (1) when TVA loses its protections, which would affect how much time it has to continue to improve its competitive position; (2) how TVA would be structured to operate in a competitive environment, including whether it would be given the ability to compete for customers outside its service area; and (3) how TVA's financial condition compares to its competitors at the time it loses its protections from competition. Loss of its protections from competition could affect TVA's ability to set rates at levels sufficient to recover all costs, which could negatively impact the amount of cash available to reduce TFOs.

According to a TVA official, one option TVA could pursue to help meet its goal for reducing TFOs is to negotiate long-term contracts with its customers. Long-term contracts would help reduce TVA's risk by providing a steady revenue stream for a certain period of time. If TVA's distributors were to gain the rights to purchase a portion of their electric power requirements from other utilities, it could have a negative material effect on TVA's ability to meet its TFO reduction goal. For example, excluding the Kentucky portion of TVA's service area from the anti-cherrypicking provision of the EPAct is currently under consideration.[18] In the event this legislation is enacted, TVA officials believe other distributors would seek similar treatment.

[18]In July 2005, Senators Jim Bunning and Mitch McConnell introduced S.1499, which would remove any area within Kentucky from coverage by the "anti-cherrypicking" provision in EPAct.

Future Rate Increases and a Fuel-cost Adjustment Clause Will Help TVA Reduce Total Financing Obligations

Future rate increases and a fuel-cost adjustment clause allowing TVA to adjust rates for the rise and fall in the prices of fuel and purchased power that result from changes in market conditions will help TVA meet its TFO reduction goal. TVA's TFO reduction goal reflects the October 2005 rate increase and the FCA that TVA plans to implement in fiscal year 2007. The plan does not reflect any additional rate increases through 2015. TVA estimates that the FCA will cover net increases in the cost of fuel and purchased power of $1.4 billion from fiscal year 2007 through 2015, which will free this amount of cash to apply toward TFO reduction. In addition, TVA's management told us that they would consider additional rate increases if necessary to cover increases in operating costs other than fuel and purchased power. In determining whether to raise rates, TVA's management recognizes that they would need to consider current markets and any potential negative consequences, such as the impact on power sales and the regional economy. The April 2006 rate increase and any future increases will help TVA cover any unforeseen increases in projected operating costs or capital expenditures, as well as shortfalls in projected revenue.

Limiting the Growth of Operating and Maintenance Expenses Will Be Difficult for TVA to Achieve

TVA will be challenged to meet its goal of reducing projected O&M expenses by $1.1 billion from fiscal year 2007 through 2015. TVA has been focusing on reducing O&M expenses since it issued its 1997 business plan, and has already taken many steps to trim these expenses. TVA officials have said that the $1.1 billion savings will come from baseline O&M expenses, which TVA defines as the ongoing costs of operating and maintaining its internal business units that are routine and recurring. In fiscal year 2005, these expenses represented about $1.3 billion, or about 54 percent of the $2.4 billion reported for O&M expenses, and about 20 percent of TVA's total operating expenses. According to a TVA official, the growth limit for the baseline O&M expenses will be applied to the total for all business units and any excess increases in these expenses by one unit will have to be absorbed by the other business units. For example, the amount budgeted for one of TVA's business units in fiscal year 2007 was $30.7 million over what it would have been if it had been limited to projected inflation less one half of a percentage point, and according to a TVA official, this excess will have to be absorbed by the other business units in order for TVA to meet its overall growth limit.

Planned Reduction in Interest Expense Could Be Affected by Increases in Interest Rates

TVA projects that it will continue to reduce annual interest expense as it reduces the balance of outstanding debt and, if the situation presents itself, refinance debt at lower interest rates. Like all outstanding debt approaching maturity dates, TVA's interest expense is subject to interest rate risk. As TVA's outstanding debt matures, the portion that is not repaid will need to be refinanced at current rates, thus exposing TVA to the risk of rising interest rates and higher interest costs. TVA has reduced its annual interest expense from more than $2 billion in fiscal year 1997 to about $1.3 billion in fiscal year 2005, a 35 percent reduction. TVA was able to lower its interest expense by refinancing debt at lower interest rates, reducing the outstanding balance of debt, and entering into alternative financing arrangements. Alternative financing arrangements help reduce interest expense because they are classified as liabilities in TVA's financial statements. This means that rather than being classified as interest on debt, the costs of these arrangements are recorded as increases in operating expenses or reductions in revenue. TVA attributes approximately 80 percent of the reduction of interest expense from fiscal year 1997 to 2005 to refinancing debt at lower interest rates.

As of September 30, 2005, TVA had about $8.3 billion in outstanding debt that will mature and either need to be repaid or refinanced over the next 5 years ($3.1 billion in long-term debt and about $5.2 billion in short-term debt). By the end of this 5-year period, for every 1 percentage point change in TVA's average borrowing costs for the $8.3 billion, its annual interest expense would increase or decrease by about $83 million. If future interest rates are higher than the rates used in TVA's projections, TVA may have difficulty meeting its targets for reducing interest expense.

Changes to Current Environmental Regulations Could Require Substantial Capital Expenditures

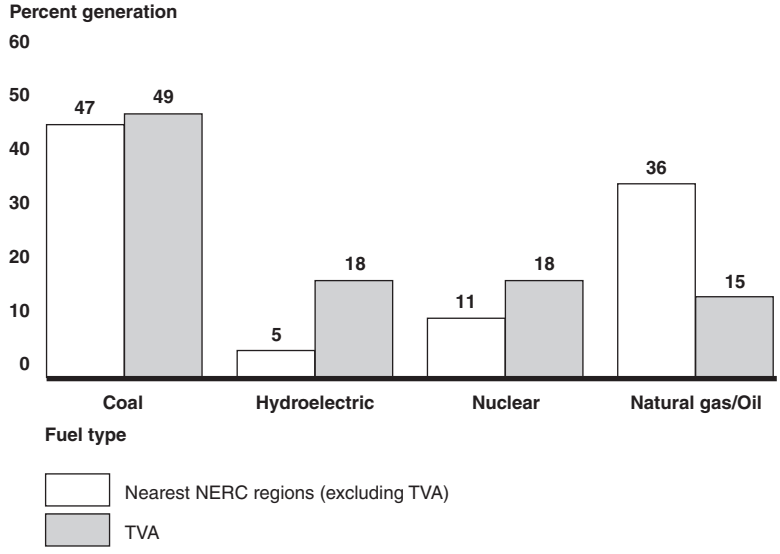
Although TVA's TFO reduction plan includes all of the capital expenditures it projects will be needed to comply with existing environmental regulations, the plan does not include potential capital expenditures needed to comply with any changes to the current environmental regulations. According to TVA's 2005 Information Statement, several existing regulatory programs are being made more stringent in their application to fossil-fuel units[19] and additional regulatory programs affecting fossil-fuel units have been announced. According to TVA, its TFO reduction plan does not include the estimated future costs to comply with more stringent regulations because it is difficult to predict

[19] Fossil-fuel plants use coal, petroleum, or gas as their source of energy.

how these regulations would affect TVA. However, TVA officials estimate that the cost to comply with future regulations could run between $3.0 billion and $3.5 billion through 2020. TVA officials said they would include an estimate of these costs in the plan if their level of certainty ever increases. The plan also does not include the potential cost of complying with legislation that has been introduced, but not yet passed, in the Congress to require reductions in carbon dioxide. If this legislation is enacted, TVA estimates that the cost of complying with it could be substantial.

The extent to which new environmental regulations affect any utility depends on several factors, including the type and condition of its generating equipment, the portion of its power generated by fossil fuels, the types of controls it chooses to meet the new environmental regulations, and the availability of excess generating capacity. Compared to surrounding regions, TVA has roughly the same amount of coal-fired capacity, nearly twice as much nuclear, nearly four times as much hydro, and less than half as much natural gas fired capacity. Figure 2 shows TVA's generation mix compared to the surrounding North American Electric Reliability Council (NERC) regions.

Figure 2: Generation Capacity by Fuel Type, TVA vs. Nearest NERC Regions



Source: TVA.

The extent to which different producers will be affected by new environmental regulations, and the resultant impact on their power prices, is unknown at this time. Although new environmental regulations would likely present challenges to TVA in meeting its TFO reduction goal, they may not necessarily affect its competitive position relative to its neighboring utilities.

Building New Generating Capacity Could Require Capital Expenditures Not Included in the Plan

Building new generating capacity during the current TFO reduction period to meet the projected demand for power beginning in 2015 would likely cause TVA to incur new debt and use cash that is currently projected to be available to reduce TFOs. TVA officials told us they plan to meet load growth in the TVA service area through 2015 by completing BFN 1, increasing the capacity of existing generating units, and purchasing power from the marketplace. TVA's current projections include the capital expenditures it projects will be needed to meet this plan. TVA also projects that it will need additional generating capacity beginning in 2015. TVA plans to satisfy this need by partnering with other power providers. Its current goal assumes that it will not finance any new baseload plants,[20] other than BFN1, through 2015. If growth in demand or market changes force TVA to build new generation, as happened after its 1997 plan, TVA's ability to reduce TFOs could be affected.

TVA Will Require Continued Management Commitment to Reducing TFOs

TVA officials told us they recognize that in order to improve TVA's financial situation, it will need to operate within its means and reduce TFOs. TVA will require continued management commitment to continue reducing financing obligations. According to officials, TVA did not meet the debt reduction goal in the 1997 business plan because the amount of cash left over after meeting its other business needs was not sufficient to meet the goal. Since issuing its 2004 strategic plan, TVA's management has demonstrated its commitment by exceeding the planned targets for the first 2 years of the TFO reduction plan. In addition, their actions have included adding annual TFO reduction targets as revenue requirements in the budgets used for its annual rate reviews, tying portions of its overall incentive payroll compensation to accomplishing the TFO reduction goal, and demonstrating a willingness to raise rates to meet the goal. Although

[20] Baseload plants are normally operated to take all or part of the minimum load of a system, and consequently run continuously, producing electricity at an essentially constant rate. These units are operated to maximize system mechanical and thermal efficiency and minimize system operating costs.

TVA has a new board structure as of March 31, 2006, the continued commitment of the board toward TFO reduction will be needed to meet the current goal.

Growing Demand for Power Could Affect TVA's Ability to Meet Its TFO Reduction Goal

The growing demand for power could affect TVA's ability to meet its goal since TVA's current projections assume that it will not invest in any new generation through 2015, other than restarting BFN 1. TVA's plan includes the capital expenditures needed to expand generating capacity in existing generating facilities to meet projected increases in demand for power through 2015. By 2015, however, TVA estimates that it will need more baseload generation to meet growth in demand. As a result, it will need to take action to meet that need during the current TFO reduction period. TVA officials are considering a number of options to meet this projected increase in demand for power, including partnering with outside parties.

TVA's current plan assumes that one option for meeting the growth in demand for electricity is by uprating, which is the process of increasing the capacity of existing generating assets. To its 30,644 megawatts of generating capacity, TVA currently plans to add:

- 1,280 total megawatts of capacity a year by restarting Browns Ferry Unit 1 in fiscal year 2007;
- 125 megawatts each, for a total of 250 megawatts a year, by uprating or adding capacity to Browns Ferry Units 2 and 3;
- approximately 15-30 megawatts of capacity a year through 2015, or a total of approximately 150 to 300 megawatts of annual capacity by the end of the TFO reduction period, by continuing to modernize its hydropower facilities;
- 36 total megawatts a year by uprating the Raccoon Mountain Pumped Storage Plant; and
- 16 total megawatts a year by uprating the Cumberland Fossil Plant through 2010.

TVA also plans to meet future needs by continuing to purchase low-cost power from the Southeastern Power Administration and through other long-term contracts. In addition, TVA plans to purchase power from the market when it is cheaper than generating its own power.

Even with these plans in place, TVA expects that it will still need new baseload capacity beginning in 2015. TVA officials told us they will consider partnering with others to help finance the acquisition of new assets or they will consider building new assets themselves if they cannot find a suitable partner. TVA expects a partner would help share risk.

Although the benefits, costs, and risks would vary depending on the type of partnership it eventually enters into, according to TVA officials, forming a partnership would help meet new demand for electricity while reducing the cash requirements for building new generating assets. As of April 2006, TVA management did not have any firm plans for a partnership, but were discussing potential partnerships with several interested parties.

One partnering option TVA is considering includes working with the NuStart Consortium,[21] which selected TVA's Bellefonte site as one of the two potential sites in the country for a new advanced design nuclear plant. In the late 1980s, TVA stopped construction on Bellefonte, a nuclear plant which has never been operated. NuStart plans to use the Bellefonte site, as well as one other potential site, on applications for licenses it plans to submit for new nuclear plants, but currently there have been no decisions to construct a plant. Another option being considered by TVA is entering into a partnership with another industry consortium[22] to build an Advanced Boiling Water Reactor on the Bellefonte site.

TVA and TVPPA also indicated that TVA's customers are interested in partnering with TVA. Partnering with a customer would allow TVA to earn fee income for operating a new generating asset, while its customer would finance and own all or a share of the asset. TVA officials also noted that TVA's customers have not owned generating assets before and, as a result, may not have the needed in-house expertise, or be familiar with the risks involved. Despite ongoing conversations between TVA and potential partners, however, there are no current firm plans to partner with another party, and TVA could not provide us with criteria it would use in selecting partners. As a result, it is difficult to determine TVA's likelihood of finding suitable partners to help meet the growth in demand projected in its service territory.

[21] NuStart Energy Development, LLC, is a limited liability company formed in 2004 with nine member companies. These members, plus TVA and two reactor vendors, form the NuStart Consortium. The consortium objectives are to: 1) demonstrate the U.S. Nuclear Regulatory Commission's licensing process for obtaining a combined Construction and Operating License for an advanced nuclear power plant, and 2) complete the design engineering for the two selected reactor technologies.

[22] TVA led an industry consortium that prepared a cost and schedule study on building an Advanced Boiling Water Reactor on the Bellefonte site. This consortium included Toshiba Corp., General Electric Corp., Bechtel Corp., United States Enrichment Corp., and Global Nuclear Fuels—Americas.

One of TVA's largest distributors noted that TVA could also pursue other options to reduce the demand for power. These include giving customers access to obtaining a portion of their power needs from other suppliers or changing the rate structure to provide incentives to reduce the peak demand for electricity. In 2002, we reported that TVA's demand-side management programs, which are designed to reduce the amount of energy consumed or to change the time of day when it is consumed, were limited in scope and impact when compared to similar programs managed by other utilities and recommended that, as appropriate, TVA expand its demand-side management programs.[23] TVA officials told us they have continued to expand the use of demand-side-management programs, which will reduce the amount of power TVA would need to generate or purchase from the market.

TVA's decision to complete BFN 1 reversed a policy dating from the late 1990s to rely primarily on purchasing power from other power suppliers when its own power system cannot meet demand. Building new capacity itself provides two potential key benefits for TVA. First, TVA would likely be able to generate power at a lower cost than purchasing a like amount of power from other utilities, thereby reducing its cost of power. Second, a decision to build new generating capacity would give TVA control over its source of power and remove the uncertainty of having to rely on other utilities for power. It would reduce the chances that TVA would need to purchase power from the market when there may be limited excess capacity and high prices, but increases the risk that its generating costs could be higher than market prices. According to TVA, if it can recover the cost of building new generating assets through rates, increased demand would have no effect on its ability to meet its TFO reduction goal. However, TVA officials acknowledged the need to be sensitive to rate increases, stating that raising rates too quickly could trigger action that would jeopardize its relationship with customers and ultimately threaten its current monopoly status.

TVA's $7.1 billion goal for reducing TFOs through 2015 assumes that any demand for power not met by its generating capacity will be purchased from the marketplace. TVA's 1997 business plan also assumed that it would not invest in any new generating capacity. Ultimately, the need to build its own additional generating capacity in lieu of purchasing power

[23] GAO, *Air Quality: TVA Plans to Reduce Air Emissions Further, but Could Do More to Reduce Power Demand*, GAO-02-301 (Washington, D.C.: Mar. 8, 2002).

from the market in the late 1990s meant that TVA increased its capital expenditures and reduced the amount of cash available for debt reduction, which contributed to its failure to meet the debt reduction goal in its 1997 business plan. Although TVA currently has no specific plans to build new generation, any decision to build new generating assets would likely affect its ability to fully meet its TFO reduction goal.

Conclusions

TVA's TFO reduction goal was based on a strategic planning approach and an assessment of market risks and projected cash flow. As with any effort that incorporates economic models, there are some limitations and areas where they could be improved. While TVA's key business assumptions are reasonable, holding them fixed, rather than modeling them as variable assumptions, limits the range of outcomes from the model. Modeling different scenarios under which TVA may need to meet new environmental regulations or pay for new capacity, for instance, would allow TVA to better illustrate the possible range of outcomes, and thus the uncertainties of many factors in its plan. In addition, while TVA uses a variety of factors to estimate key variables, in the case of commodity prices, expanding the sources would provide a more comprehensive characterization of the range of possible TFO reduction levels in situations where markets are volatile. Finally, given the numerous factors that could affect TVA's ability to meet its goal, management's continued commitment to reducing TFOs will be necessary to keep TVA on course.

Recommendations

We are making two recommendations to the Chairman of the Board of Directors of the Tennessee Valley Authority to (1) explore additional data sources for estimates of key input variables in the Enterprise Risk Model, and (2) better illustrate the range of outcomes in the Enterprise Risk Model used for planning purposes. Specifically, we are recommending that:

- TVA consider incorporating the variability surrounding certain assumptions that are now held fixed, such as the starting date for Browns Ferry Nuclear Unit 1 or possible new environmental legislation. In cases where professional judgment is used to quantify the uncertainty, the effects of incorporating that judgment should be documented.

- TVA augment its sources for projections of key model inputs with sources such as commodity prices and the volatility of those prices. Market prices for commodities with active futures and options markets

can be used to determine the expectations of market participants concerning prices and their volatility.

Agency Comments and Our Evaluation

In written comments on a draft of this report, TVA's Acting Chief Executive Officer, President, and Chief Operating Officer agreed with our report and recommendations. We also discussed technical comments with TVA officials, which we have incorporated into the final report as appropriate. TVA's written comments are reproduced in appendix I.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its date. At that time, we will send copies of this report to appropriate House and Senate committees, interested members of the Congress, TVA's board of directors, and the Director of the Office of Management and Budget. We will also make copies available to others upon request. In addition, the report will be available at no charge on GAO's Web site at http://www.gao.gov.

If you or your staff have any questions on matters discussed in this report, please contact me at (202) 512-6131, or martinr@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 who made major contributions to this report are listed in appendix II.

Sincerely yours,

Robert E. Martin
Director, Financial Management
and Assurance

Appendix I: Comments from the Tennessee Valley Authority

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1401

July 7, 2006

Mr. Robert E. Martin
Director, Financial Management & Assurance
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Martin:

Thank you for the opportunity to review GAO's draft report entitled *Tennessee Valley Authority - Plans to Reduce Debt While Meeting Demand for Power.* The staff has told me of the professional manner with which GAO conducted the audit. We appreciate GAO's efforts to thoroughly understand TVA's work to achieve greater financial flexibility, and we commend your fair analysis.

Regarding GAO's specific financial modeling recommendations, we agree with the suggestion to strengthen the range of modeled outcomes by incorporating variability on assumptions that were previously held fixed in scenarios. Variability in the start dates for new TVA generating assets or in future environmental costs can be implemented to improve the range of outcomes used in TVA's planning. Structural changes to the expected increased competitive market environment, however, would be more speculative than we feel comfortable using in base planning efforts. TVA will continue to monitor both regulatory and market forces which would impact the current planning assumptions.

We appreciate your further recommendation to explore additional data sources for estimates of key input variables, including volatility estimates based on commodities futures and options prices. This is likely to be especially valuable where the commodity market has adequate depth and liquidity for a significant period forward, particularly for the purpose of model simulation to estimate ranges on financial outcomes.

On March 31, 2006, six new TVA Board members were sworn into office marking the transition from a full-time, three-member Board to a part-time nine-member Board. While GAO's report is consistent with the information available at the time of GAO's research, TVA continues to evaluate its budget and rate policy. The Board met on June 28, 2006, and approved parameters with which staff will develop the fiscal year 2007 budget that will be voted on by the Board on July 28, 2006. Among these parameters are the implementation of a fuel cost adjustment clause, a rate decrease in the range of 3½ - 5 percent, and a reduction in total financing obligations of $529 million during FY 2007. The Board also discussed its plans to develop a new strategic plan for TVA prior to the development of TVA's FY 2008 budget. TVA's future debt reduction plans will be addressed in the context of this new strategic plan.

Thank you again for the opportunity to comment on what we believe overall is a fair report.

Sincerely,

Tom Kilgore
Acting Chief Executive Officer
President and Chief Operating Officer

cc: Mr. William B. Sansom
Chairman
Board of Directors
Tennessee Valley Authority
400 West Summit Hill Drive, WT 7B
Knoxville, Tennessee 37902-1401

Mr. Dennis C. Bottorff
Chairman, TVA Finance, Strategy
& Rates Committee
Tennessee Valley Authority
400 West Summit Hill Drive, WT 7B
Knoxville, Tennessee 37902-1401

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Robert E. Martin, (202) 512-6131 or martinr@gao.gov

Acknowledgments

In addition to the contact named above, Donald Neff (Assistant Director), Lisa Crye, Austin Kelly, Mary Mohiyuddin, and Brooke Whittaker made key contributions to this report.

GAO's Mission

The Government Accountability Office, the audit, evaluation and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's Web site (www.gao.gov). Each weekday, GAO posts newly released reports, testimony, and correspondence on its Web site. To have GAO e-mail you a list of newly posted products every afternoon, go to www.gao.gov and select "Subscribe to Updates."

Order by Mail or Phone

The first copy of each printed report is free. Additional copies are $2 each. A check or money order should be made out to the Superintendent of Documents. GAO also accepts VISA and Mastercard. Orders for 100 or more copies mailed to a single address are discounted 25 percent. Orders should be sent to:

U.S. Government Accountability Office
441 G Street NW, Room LM
Washington, D.C. 20548

To order by Phone: Voice: (202) 512-6000
TDD: (202) 512-2537
Fax: (202) 512-6061

To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: www.gao.gov/fraudnet/fraudnet.htm
E-mail: fraudnet@gao.gov
Automated answering system: (800) 424-5454 or (202) 512-7470

Congressional Relations

Gloria Jarmon, Managing Director, JarmonG@gao.gov (202) 512-4400
U.S. Government Accountability Office, 441 G Street NW, Room 7125
Washington, D.C. 20548

Public Affairs

Paul Anderson, Managing Director, AndersonP1@gao.gov (202) 512-4800
U.S. Government Accountability Office, 441 G Street NW, Room 7149
Washington, D.C. 20548