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Report to the Honorable
Richard H. Baker,
House of Representatives

May 2002

TENNESSEE VALLEY AUTHORITY

Information on Benchmarking and Electricity Rates

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Contents

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Accountability * Integrity * Reliability

United States General Accounting Office
Washington, D.C. 20548

May 30, 2002

The Honorable Richard H. Baker
House of Representatives

Dear Mr. Baker:

This report responds to your request of June 14, 2001, to review potential ways for the Tennessee Valley Authority (TVA) to accelerate its debt reduction. As competition spread in the electric utility industry, TVA officials became increasingly aware of the need to prepare for the day when TVA might be required to compete with other utilities. In 1997 TVA declared its intent to reduce its cost of power and increase its financial flexibility to respond to competitive pressure largely by reducing debt by over half from $27.4 billion to about $13.2 billion by 2007. However, according to estimates that TVA provided to the Office of Management and Budget (OMB) in support of the president's 2003 budget, TVA now plans to reduce outstanding debt to about $22.2 billion by 2007; this represents $9 billion less debt reduction than planned in 1997.

Your concern over TVA's decision to reduce its debt reduction goal prompted you to ask us to determine whether TVA is in a position to reduce debt by more than currently planned. Specifically, you asked that we determine (1) what benchmarking studies regarding staffing levels have been performed to compare TVA to other electricity providers, the results of these studies, and what changes TVA has made as a result of them, and (2) how TVA's electricity rates compare to those of likely competitors and whether the rates are low enough for TVA to consider raising them.

Results in Brief

Since the 1980s, TVA has used benchmarking[1] as a means of identifying ways to improve efficiency. Initially used to assess staffing levels for its nuclear program, it also began to have benchmarking studies performed for its non-nuclear business units in 1998. While opportunities for improvement exist for all of TVA's business units, recent studies have indicated that TVA's nuclear and transmission power supply units are close

[1]Benchmarking is a management tool used to study a competitor's business practices in order to improve the performance of one's own company. Benchmarking determines who is the very best, who sets the standard, and what that standard is. In the electric utility industry, benchmarking is primarily used to assess cost efficiency.

to the industry's best in terms of staffing efficiency. Based on observations of the benchmarking studies, TVA has taken several actions to improve performance and efficiency, including reorganizing its human resources and business services organizations and initiating the automation of its hydropower production facilities to reduce future staffing. TVA continues to utilize benchmarking to assist in identifying opportunities for improvement.

TVA's current electricity rates are low when compared to those of 12 likely competitors and to national averages. TVA's residential rates are lower than all 12 likely competitors and its industrial rates are lower than 10 of the 12, while its commercial rates are lower than 4 of the 12. For each of the three rate classes, TVA's rate is lower than the national average rate. Table 1 compares TVA's electricity rates to the competitors' averages and to national averages.[2]

Table 1: Comparison of TVA's Fiscal Year 2000 Average Electricity Rates to Likely Competitors' Average Rates and National Average Rates (cents per kWh)

	Residential	Commercial	Industrial
TVA and distributors	6.39	6.40	3.85
TVA competitors' average	7.99	6.59	4.35
National average	8.22	7.42	4.59

Source: GAO analysis based on data from RDI POWERdat.[3]

Although TVA's electricity rates are relatively low, it is presently legislatively protected from most competition, and it has the statutory authority to raise rates, there are several factors that would enter into any decision to raise rates. If TVA were to choose to raise electricity rates

[2]VA primarily sells wholesale power to 158 distributors, which in turn distribute the power on a retail basis to the ultimate consumers. TVA also sells power directly to about 62 large customers. In doing the rate comparisons, we used rates for TVA that reflect the rates charged to the ultimate consumers and thus are comparable to the rates charged by the group of likely competitors. According to a TVA official, the distributors' costs represent about 15 percent of the retail rates charged to the ultimate consumers.

[3]The RDI POWERdat is a database of electric power companies and their plants compiled and maintained by Resource Data International, Inc. RDI POWERdat contains data on over 5,000 electric power companies and their plants. It is widely used in the electric utility industry for market and competitive information.

selectively and use the additional cash generated to repay debt, it could accelerate debt repayment and reduce fixed interest costs. Doing so would enhance TVA's ability to respond to future competitive pressures. On the other hand, TVA is already subject to some competitive pressures and any decision to raise electricity rates would need to consider both those pressures as well as potential long-term negative consequences on power sales. TVA is concerned that an increase in electricity rates could affect the distributors' perception of TVA just before the distributors may be given the choice of selecting their suppliers. According to TVA officials, increasing electricity rates could result in the loss of some customers, lower power sales, and possibly less overall revenue. Another potential negative consequence is the impact an increase in electricity rates could have on the regional economy as a whole. Also, any decision to increase rates would need to be considered differently for each rate category because the difference between TVA's rates and the rates of other utilities varies by rate category.

In written comments on a draft of this report, TVA characterized our report as fair and insightful.

Background

TVA is a multipurpose, independent, federal corporation established by the Tennessee Valley Authority Act of 1933 (TVA Act). The act established TVA to improve the quality of life in the Tennessee River Valley by improving navigation, promoting regional agricultural and economic development, and controlling the floodwaters of the Tennessee River. To those ends, TVA erected dams and hydropower facilities on the Tennessee River and its tributaries. To meet the subsequent need for more electric power, TVA expanded beyond hydropower, adding coal-fired power plants and nuclear generating units to its power system. TVA primarily sells wholesale power to 158 municipal and cooperative distributors and about 62 directly served large industrial customers and federal agencies. The distributors, in turn, sell the power on a retail basis to more than 8.3 million people in an 80,000 square mile region. In fiscal year 2000, about 43 percent of the operating revenue TVA and its distributors generated from sales to the ultimate consumers came from sales to residential customers, 29 percent from sales to commercial customers, and 28 percent from sales to industrial customers.[4]

[4]These percentages are based on the distributors' retail sales to residential, commercial, and industrial customers, and TVA's direct sales to industrial customers and federal agencies.

Under the TVA Act, as amended, TVA continues to operate like a traditional regulated monopoly and is not subject to most of the regulatory and oversight requirements that commercial electric utilities must satisfy. The act vests all authority in TVA's three-member board of directors to run and operate TVA in a manner consistent with the purposes and objectives of the act, including the objective of keeping TVA's electricity rates "as low as are feasible." The board decides when to raise electricity rates and sets its rates at whatever level it deems necessary to recover TVA's annual budgeted expenses, plus a margin determined by the board to help ensure it meets financial tests and other financial objectives required by the TVA Act and the Basic TVA Power Bond Resolution.[5] Unlike other utilities, the rates TVA charges for its electric power are not subject to review and approval by state public utility commissions or the Federal Electric Regulatory Commission (FERC). In contrast, regulated investor-owned utilities (IOUs) must justify rate changes to their public service commissions based on cost requirements determined to be "just and reasonable" plus a regulated return to shareholders. However, an increasing portion of "wholesale" power sales have been made by independent power producers and marketers at market-based prices which are not subject to regulatory approval.

The Energy Policy Act of 1992 (EPAct) requires utilities to use their transmission lines to transmit wholesale electricity for other utilities. This act has enabled wholesale customers to obtain electricity from a variety of competing suppliers, thus increasing wholesale competition in the electric utility industry across the United States. In addition, restructuring efforts in many states have created competition at the retail level. If, as expected, retail restructuring continues to occur on a state-by-state basis over the next several years, then industrial, commercial, and, ultimately, residential consumers will be able to purchase their power from one of several competitors rather than from one utility monopoly.

Currently, legislation limits competition between TVA and other utilities. The TVA Act was amended in 1959 to establish what is commonly referred to as the TVA "fence," which prohibits TVA, with some exceptions, from entering into contracts to sell power outside the service area that TVA and its distributors were serving on July 1, 1957. In addition, EPAct provides TVA with certain protections from competition, called the "anti-cherry

[5]In addition to having sole authority to set wholesale electric power rates, TVA's board approves the retail rates charged by its distributors.

picking" provisions. Under EPAct, TVA is exempt from having to allow other utilities to use its transmission lines to transmit ("wheel") power to customers within its service area.[6] This legislative framework generally insulates TVA from direct wholesale competition. As a result, TVA remains in a position similar to that of a regulated utility monopoly.[7]

Because of ongoing restructuring efforts in the electric utility industry, TVA management, like many industry experts, expects that in the future TVA may lose its legislative protections from competition. TVA's management recognized the need to act to better position TVA to compete in an era of increasing competition and, in July 1997, issued a 10-year business plan with that goal in mind. TVA established a 10-year horizon because a majority of the long-term contracts with its distributors could begin expiring at that time, and TVA could be facing greater competitive pressures by 2007. The plan contained three strategic objectives: (1) reduce TVA's cost of power in order to be in a position to offer more competitive prices by 2007, (2) increase financial flexibility by reducing fixed costs, and (3) build customer allegiance.

To help meet the first two strategic objectives noted above, one of the key goals of TVA's 10-year plan was to reduce its interest expense by reducing debt by over half from its 1997 level, to about $13.2 billion. To increase its financial flexibility and future competitiveness by generating cash that could be used to reduce debt, TVA increased its electricity rates beginning in 1998, and planned to reduce expenses and limit capital expenditures. TVA's plan to reduce debt while it is still legislatively protected from competition was intended to help it achieve its ultimate goal of being in a position to continue to offer competitively priced power after 2007. In a competitive market, TVA would be in danger of losing customers if its high debt service costs caused its price of power to be above market.

Over the first 4 years of the 10-year plan (through September 30, 2001), TVA reduced its debt by about $2 billion. By reducing debt, and refinancing

[6]However, TVA is subject to some forms of indirect competition. For example, TVA has no protection against its industrial customers relocating outside its service area or businesses deciding not to move into its service area for reasons related to the cost of power. In addition, customers can decide to generate their own power.

[7]However, TVA primarily sells its power at wholesale rates to 158 distributors who sell the power to the ultimate consumers, while IOUs primarily sell power at the retail level to the ultimate consumers.

some debt at lower interest rates, TVA has reduced its annual interest expense. TVA's interest expense has dropped from about $2.0 billion in fiscal year 1997 to about $1.6 billion in fiscal year 2001. Its net interest expense through the first 6 months of fiscal year 2002 was $717 million. However, TVA has fallen behind in meeting the debt reduction goal in the original 10-year plan, and consequently has revised this goal downward. According to estimates that TVA provided to OMB in support of the president's 2003 budget, TVA expects to reduce its debt by about $5.2 billion by 2007 rather than the planned $14.2 billion, which represents $9 billion less debt reduction than planned in 1997. TVA's most recent projections show a debt level of about $18 billion by 2012. The revision to the debt reduction estimate is due primarily to lower revenues than projected in 1997, and the use of a portion of the cash originally targeted for debt reduction to pay for greater than estimated annual cash operating expenses and capital expenditures for new generating capacity and environmental controls.[8] TVA officials told us that the above debt reduction estimates would be affected by the recent decision to recover and restart Browns Ferry unit 1.[9]

Objectives, Scope, and Methodology

To identify the benchmarking studies regarding staffing levels that have been performed to compare TVA to other electricity providers, the results of these studies, and the changes TVA has made as a result of them, we interviewed officials from TVA, Standard & Poor's, investor-owned utility members of TVA Exchange, and the American Public Power Association. In these discussions of efficiency in the electricity industry, we identified several staffing-related benchmarking studies prepared for TVA by Tim

[8]TVA is now projecting that capital expenditures to comply with the requirements of the Clean Air Act will amount to about $2.5 billion through fiscal year 2009. TVA's 10-year plan acknowledged that TVA's capital expenditures would increase if it is required to comply with new environmental regulations, and/or increase generating capacity to meet the growth in demand for power.

[9]On May 16, 2002, TVA's board of directors approved a staff recommendation to return unit 1 at Browns Ferry Nuclear Plant to service. TVA currently estimates that doing so will cost about $1.7 to $1.8 billion and take about 5 years to complete.

D.Martin & Associates[10] (Navigant), which we obtained and analyzed. We analyzed staffing-related studies dated September 1998 through March 2000 that pertained to TVA's major business units, including Fossil Power Group, Nuclear, Transmission Power Supply, and River System Operations & Environment. In addition, to assess the quality and reliability of data available for this purpose, we interviewed a Navigant official to discuss their staffing benchmarking methodology for TVA and other electric utilities, the number of utilities included in their database, and their overall experience in benchmarking staffing levels in the electric utility industry. Further, we inquired of industry experts regarding their familiarity with and use of Navigant in performing staffing analyses. However, given the fact that Navigant's staffing database is proprietary, we could not verify the accuracy of the data used in the studies.

To determine how TVA's electricity production costs and rates compare to those of other electricity providers, we first identified its likely competitors through discussions with officials from TVA, TVA's Office of Inspector General (IG), investor-owned utility members of TVA Exchange, and the American Public Power Association. We then analyzed TVA's costs and electricity rates and compared them to those of a group of investor-owned utilities that could comprise TVA's likely competitors in a competitive environment. We obtained electricity production cost and rate data for fiscal year 2000 for TVA and the group of likely competitors from RDI POWERdat, which is a database of electric power companies and their plants compiled and maintained by Resource Data International, Inc. Further, we reviewed various reports related to TVA finances, and our own as well as prior TVA IG reports.

To determine whether TVA's electricity rates are low enough to support a rate increase, we analyzed the results of the production costs and rate comparisons and interviewed TVA officials regarding this issue. Additional information on our scope and methodology is in appendix I.

We conducted our review from July 2001 through May 2002 in accordance with generally accepted government auditing standards. We requested

[10]Over the past 15 years, Tim D. Martin & Associates has developed proprietary databases with industrywide benchmarking information, which is used to analyze and control plant-staffing levels, for organization design and for other management programs. On June 4, 2001, Navigant Consulting, Inc. acquired Tim D. Martin & Associates. Navigant Consulting is an energy and management consulting company. Its energy practice provides services to the electric utility industry.

comments from the chairman of TVA or his designated representative on a draft of this report. TVA's chairman provided written comments, which are reproduced in appendix II. We also received oral comments of a technical nature from the senior advisor to TVA's chief financial officer (CFO), which we incorporated as appropriate.

TVA Has Used Benchmarking to Make Changes and Identify Other Potential Areas for Improvement

TVA has been benchmarking since the 1980s and since the early 1990s has primarily used Navigant to perform staffing benchmarking studies.[11] These studies initially assessed the staffing levels of TVA's nuclear program and, in 1998, TVA began to assess its non-nuclear business units as well. Recent benchmarking studies performed by Navigant have indicated that TVA's nuclear and transmission units are close to the industry's best in terms of staffing efficiency, but that opportunities for improvement exist in all four of the business units most recently benchmarked—Fossil Power Group, Transmission Power Supply, Nuclear, and River System Operations & Environment. TVA has used these studies to initiate automation and reorganization at the business unit level, and also to make organizationwide changes. TVA continues to utilize benchmarking to assist in identifying potential areas for improvement.

Because staffing needs of different business units vary and utilities have a differing mix of business units, simply using benchmarking to compare total number of employees would not provide meaningful comparisons. This is further complicated by the fact that TVA primarily sells wholesale power and other electricity providers primarily sell retail power. However, benchmarking studies can provide meaningful comparisons at the business unit level.

TVA's goal is for its business units to be among the best performing in the industry. To accomplish this, TVA's staffing levels would have to be comparable to those of the industry's best. TVA's business units include: Nuclear, River System Operations & Environment, Fossil Power Group, Transmission Power Supply, Bulk Power Marketing, Customer Service, and

[11]According to a Nuclear Energy Institute (NEI) official, Navigant was heavily involved in the nuclear industry as a consultant on staffing levels and is considered influential in the nuclear industry. Navigant had developed a proprietary database that included approximately 70 percent of the nuclear sites. Because of this, many of NEI's member companies used Navigant to determine the appropriate spans of control and size of staff for plants.

Corporate. According to TVA officials, the results of benchmarking studies are used as a management tool to determine the best areas to target to improve performance and operate more efficiently. TVA's business units use benchmarking studies that focus on staffing to identify trends by functional areas (e.g., operations, technical engineering) in the electric utility industry to assist in workforce planning.

While the results are not strictly used as "performance indicators" or "targets," they are considered in determining appropriate staffing levels. Since 1981, TVA has reduced staffing from a high of about 47,000 employees to about 13,000 employees in 2001. These reductions are primarily attributable to the discontinuation of the nuclear construction program in the early 1980s and a major cost-cutting program beginning in the late 1980s. TVA had planned to build 17 nuclear facilities with its own design and construction staff. When TVA began to curtail its nuclear construction program, there was no longer a need for a large number of these staff. TVA officials also told us that other electricity providers have downsized over the years, but not as significantly as TVA since the others had not planned to build as many nuclear facilities with their own design and construction staff. According to TVA officials, although significant staff reductions resulted from the curtailment of nuclear construction activities and major cost-cutting initiatives from the 1980s through 1997, in recent years staff reductions have been a result of process improvements, work elimination, and efficiency gains.

Navigant, the firm primarily used by TVA in recent years, generally uses three benchmarks: average, best, and lowest. "Average" is the average staffing per job function[12] of all plants and utilities in Navigant's database. "Best" is the median staffing per function of the best performing plants/utilities.[13] "Lowest" is the least number of staff in each function (that is, a nonexistent "ideal" company comprised of a composite of the industry's best performing plants/utilities). For this reason, utilities assessed as being in the lowest category are considered "ideal" plants and we will refer to this category as "ideal" throughout the remainder of the report. To account for differences in the type of plant such as size, fuel type, and age, Navigant normalizes the benchmarks by plant (i.e., the

[12]Job functions are based on the duties performed and not actual job classifications or titles.

[13]While the criteria for being included in the "best performing" subset vary by business unit, this subset generally includes those plants or utilities that are in the top half of Navigant's database in terms of performance.

benchmarks are adjusted to account for the differences to ensure a valid comparison). Then, Navigant performs a regression analysis and produces a report summarizing the results. The purpose of the reports is to direct management's attention to job functions and/or organizations[14] within business units where staffing levels differ from the benchmarks.

TVA has commissioned studies in several business units, including Fossil Power Group, Transmission Power Supply, Nuclear, and River System Operations & Environment.[15] The most recent Navigant reports (dated September 1998 through March 2000) for each of the four business units we reviewed showed differences between TVA's staffing levels and the benchmark utilities by function and by organization within the business unit. The reports also identified possible explanations for the differences as well as observations on functions for which management attention was warranted.[16] For example, a March 2000 nuclear benchmarking study indicated that TVA's nuclear unit overall was close to the industry's best in terms of staffing efficiency; however, several functions fell in the average category and some warranted management attention.[17]

For TVA's non-nuclear units, benchmarking studies performed by Navigant within the last 4 years indicated that these units generally had fewer staff than average staffing levels at benchmark utilities, but more staff than the best performing utilities. For example, a March 1999 staffing analysis of the Transmission Power Supply business unit found that it had about 9 percent fewer staff than the average benchmark and about 3 percent more staff than the best performer benchmark, placing it among the best in the industry. However, a March 2000 staffing analysis of the River System Operations & Environment business unit indicated that for hydropower

[14]A business unit may have several "organizations." For example, Energy Research and Technology Applications is an "organization" in the River System Operations & Environment business unit.

[15]TVA has not yet completed staffing benchmarks for all business units. However, TVA officials told us that they have studies underway in the remaining units.

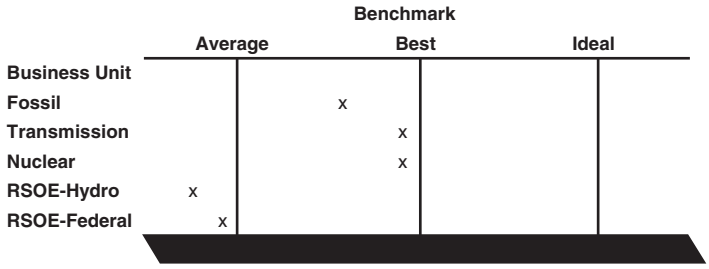
[16]For example, staffing levels may be significantly above (excessive number of staff) or below (insufficient number of staff) benchmarks, indicating possible inefficiencies or performance limitations.

[17]Of the 46 functional areas identified by the Navigant study, 20 had fewer staff than the best performer benchmark and of these, 7 had fewer staff than the ideal benchmark, 1 had the same staffing levels as the best performer benchmark, and 25 had more staff than the best performer benchmark.

functions, TVA generally had more staff than the average benchmark, while staffing for "federal-based" functions, which include land and watershed management and environmental protection activities, was close to the average benchmark.[18]

Figure 1 summarizes the overall results of the four most recent staffing benchmarking studies we reviewed. For TVA's River System Operations & Environment business unit, we categorized the functions into two groups to differentiate between the "federal-based" functions and hydropower functions (comparable to utility benchmarks) within the business unit. The "x" indicates, in general, how each business unit's overall staffing level[19] compared relative to the benchmarks used by Navigant.

Figure 1: Overall Staffing Levels of Four TVA Business Units Compared to the Benchmarks



Source: GAO analysis based on data from Navigant's benchmarking studies on TVA staffing dated September 1998 through March 2000.

[18]For Navigant's March 2000 staffing analysis of TVA's River System Operations & Environment business unit, Navigant categorized the activities into nonfederal (hydropower) and federal functions (land and watershed management and environmental protection). For TVA's federal functions, Navigant included certain federal entities (e.g., National Park Service) with the average benchmark in order to provide more comparability for TVA's land management functions.

[19]Staff includes full-time TVA employees and long-term contractors.

TVA officials provided us information pertaining to how they addressed each of the observations in the benchmarking studies, indicating that they took several actions to improve performance and operate more efficiently. For example, in Navigant's March 2000 staffing analysis of TVA's River System Operations & Environment hydropower operations, staffing levels were above the "average" benchmarks. To address this observation, TVA has an ongoing project to automate the hydropower production facilities as a process improvement to enable River System Operations & Environment to reduce future staffing levels. This change is expected to eliminate work by turning over the operation of the generating units to a central dispatching location and will reduce the requirement for the around-the-clock onsite operating staff at the plant sites.

In addition, TVA officials cited two other major initiatives underway designed to improve efficiency in the hydro operations area. These are: (1) the "multi-skilling" program which will reduce staffing by eliminating the need for job handoffs among multiple craft personnel, and (2) the "hydro modernization" program which increases the generation capacity of existing hydro units and thereby improves system efficiency on a kWh output-per-employee basis.

In addition, even though TVA's Nuclear business unit overall is close to the best performer benchmark, in Navigant's March 2000 staffing analysis, seven functions were identified where management attention was warranted because the staffing levels were either considerably above the best performer benchmark or below the ideal benchmark. According to TVA officials, they continue to focus on areas where the March 2000 staffing analysis identified potential efficiency gains. For example, the staffing analysis confirmed the need to reorganize and centralize the Human Resources organization. In June 2001, all human resources functions were transferred to the Operations Support organization under the chief operating officer. The human resources functions were reduced by 28 positions (i.e., 86 positions to 58 positions).[20]

Although the benchmarking studies are performed at the business unit level, TVA has evaluated observations from benchmarking studies and initiated organizationwide changes. For example, as a result of an

[20]The staffing reduction of 28 positions was the total reduction of human resource functions for the Nuclear, Fossil Power Group, Transmission Power Supply, and River System Operations & Environment business units.

observation made in the March 1999 Navigant staffing analysis of the Transmission Power Supply business unit, and in conjunction with the results of the *2001 Human Capital Benchmarking Report* prepared by the Saratoga Institute,[21] TVA is monitoring the number of employees supervised by a single supervisor to determine if adjustments are needed to meet a target ratio of 1 supervisor to every 6.44 employees. The 1999 benchmarking study found that the Transmission Power Supply business unit had a higher percentage of managers supervising fewer than 6 people than the benchmark utilities. At the time of the Saratoga Institute study, TVA's corporate wide ratio was 1 supervisor to 5.61 staff. TVA will decide how to proceed upon review of the results of the performance indicator.

TVA continues to benchmark staffing levels to assist in identifying potential areas for improvement and expects any future reductions to be the result of (1) gains in efficiency, (2) elimination of certain types of work, and/or (3) process improvements, such as the previously mentioned automation of hydropower production facilities. According to TVA officials, TVA hopes to achieve cost savings by getting its various business units to be among the best performing in the industry.

TVA's Electricity Rates are Relatively Low Compared to Likely Competitors

TVA has the statutory authority to raise its electricity rates, is legislatively protected from most competition, and has current rates that are low when compared to likely competitors.[22] If TVA were to choose to raise electricity rates selectively and use the additional cash generated to pay down debt, it

[21]TVA participated in the *2001 Human Capital Benchmarking Report* prepared by the Saratoga Institute. The report contained a wide range of data comparisons, at the corporate level, related to staffing and labor costs across the industry. The ratio of 1 supervisor to 6.44 staff was identified in the report as the benchmark for the best performing utilities.

[22]Our assessment is based on how TVA's fiscal year 2000 electricity rates compare to those of its likely competitors and national average rates. It is not possible to predict TVA's future competitive position, which will be affected by a number of issues, including (1) the specific requirements of any legislation that might remove TVA's legislative protections, including whether it would be able to retain some or all of the competitive advantages described previously, (2) actions being taken by TVA's competitors, and (3) the amount of time TVA has to prepare for competition and the actions it takes during that time.

could reduce its financing costs (interest expense),[23] thereby strengthening its ability to respond to future challenges (as discussed in previous GAO reports[24]). Although TVA's variable costs (e.g., production costs) are low when compared to likely competitors, previous GAO reports have noted that its fixed costs such as financing costs and the unrecovered costs associated with nonperforming nuclear units are high.[25] These costs could pose competitive challenges because they would limit TVA's financial flexibility to adjust its electricity rates to respond to competitive pressures.[26] TVA is, however, currently subject to some level of competition. Therefore, in determining whether to raise rates, TVA would need to consider current market rates and the potential negative consequences, such as the impact on power sales and the regional economy.

When comparing TVA's electricity rates to those of 12 likely competitors,[27] we found that its fiscal year 2000 (1) residential rates were lower than all 12 of the other utilities, (2) industrial rates were lower than 10 of the 12 others, and (3) commercial rates were lower than 4 of the 12 others. When comparing TVA's electricity rates to the averages of each category, we found that TVA's fiscal year 2000 rates were lower than the comparable averages for the 12 utilities in our comparison group as well as the national

[23]Differences in financing structures between TVA and likely private sector competitors make direct comparisons somewhat difficult. Financing costs include (1) interest expense on debt (TVA and IOUs), (2) returns on appropriation investment (TVA only), and (3) preferred and common stock dividends (IOUs only.) The fixed portion of financing costs includes interest expense on debt and returns on appropriation investment (for TVA) and interest expense on debt and preferred stock dividends (for IOUs).

[24]*Tennessee Valley Authority: Financial Problems Raise Questions About Long-term Viability* (GAO/AIMD/RCED-95-134, August 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, September 19, 1997); and *Tennessee Valley Authority: Debt Reduction Efforts and Potential Stranded Costs* (GAO-01-327, February 28, 2001).

[25]Fixed costs remain fairly constant and do not fluctuate with the volume of production. Variable costs fluctuate in the same manner as the volume of production.

[26]TVA has acknowledged the need to reduce debt (and related interest expense) and begin recovering the costs of its deferred nuclear generating assets. In fiscal year 2001, TVA reduced the carrying value of certain of its assets by $3.4 billion, which included adjustments of $2.6 billion to the unrecovered costs of nuclear plants. TVA officials said TVA made this adjustment to strengthen its competitive position, more accurately reflect the value of its assets, and help TVA maintain competitive prices in the future.

[27]See appendix I for a description of how we selected the comparison group.

averages.[28] Table 2 compares TVA's fiscal year 2000 average electricity rates for each customer class to the national average and the utilities in the comparison group.

Table 2: Comparison of TVA's Fiscal Year 2000 Average Electricity Rates to Likely Competitors and the National Average (cents per kWh)

TVA competitors	Residential	Commercial	Industrial
American Corporation	7.28	5.99	3.74
American Electric Power Company Inc.	6.68	5.88	3.91
Cinergy Corporation	6.97	5.70	3.79
DTE Energy Company	9.10	8.45	5.27
Dominion	8.00	5.70	4.07
Duke Energy Corporation	7.24	5.83	4.06
Entergy Corporation	7.89	6.89	4.95
Exelon Corporation	9.40	6.95	4.00
FPL Group, Inc.	7.56	6.21	4.79
FirstEnergy Corporation	10.25	8.40	5.13
Progress Energy, Inc.	8.29	6.32	4.77
Southern Company	7.33	6.27	4.15
TVA and distributors	6.39	6.40	3.85
TVA competitors' average	7.99	6.59	4.35
National average	8.22	7.42	4.59

Source: GAO analysis based on data from RDI POWERdat.

[28]As stated previously, in doing the rate comparisons, we used rates for TVA that reflect the costs (TVA's and its distributors') to the ultimate consumers and thus are comparable to the rates charged by the group of likely competitors.

Since TVA remains in a position similar to that of a traditional regulated utility monopoly, its electricity rates continue to be cost based.[29] Its variable production costs are low when compared to likely competitors. TVA's fiscal year 2000 production costs, which consist of the costs of operations and maintenance, fuel, and purchased power, were lower than 11 of the 12 utilities in the comparison group. TVA's production costs are low primarily because a greater portion of its power is produced by low-cost hydropower and nuclear plants.[30]

While production costs are a key factor in setting a utility's rates, they do not represent the total cost of power[31] because they do not include fixed costs such as depreciation and amortization and interest expense. While TVA's total cost of power is relatively attractive, its cost structure is heavily weighted toward these fixed costs. As a result, TVA would be at risk should its revenues decline since each unit sold would have to recover a greater portion of the fixed costs. Our previous reports[32] have noted that TVA's high financing costs[33] could impede its ability to compete in the future because they reduce its flexibility to lower rates. TVA's financing costs stem largely from the debt burden associated with its nuclear power program.

[29]In a regulated environment, utilities are required to meet the demand for electricity within their service territories and to make investments in generating assets to do so. Regulators approve the utilities' investment decisions in advance and the costs are approved to go into the utilities' rate bases.

[30]These plants tend to require high capital investments to build but in return produce electricity at relatively low cost. Hydropower plants are relatively inexpensive to operate and have no fuel cost. Nuclear plants benefit from having low-cost fuel.

[31]For fiscal year 2001, production costs represented about 51 percent of TVA's total cost of power.

[32]*Tennessee Valley Authority: Financial Problems Raise Questions About Long-term Viability* (GAO/AIMD/RCED-95-134, August 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, September 19, 1997); and *Tennessee Valley Authority: Debt Reduction Efforts and Potential Stranded Costs* (GAO-01-327, February 28, 2001).

[33]TVA's high financing costs are primarily the result of its high outstanding debt. TVA remains the only AAA-rated utility in the United States, and as a result of its high bond ratings, the private lending market has provided it with access to billions of dollars of financing at low interest rates, an advantage that in turn results in lower interest expense than if it had lower ratings.

Although TVA has made progress in reducing its debt and the corresponding financing cost,[34] its financing costs are high when compared to its likely competitors. As we reported in February 2001, 28 cents of every revenue dollar earned by TVA in fiscal year 1999 went to pay for fixed financing costs (i.e., interest costs related to TVA's debt), a considerably higher portion than the 9 cents for TVA's competitors.[35] Since TVA's fiscal year 2001 interest expense represented about 24 percent of total operating revenue, debt reduction would be a key element of any efforts to prepare for competition. TVA would be better positioned to operate in the future competitive environment if it continued to reduce these fixed costs, thereby increasing its financial flexibility to lower rates, if necessary, in response to competitive pressures.

Prior GAO reports have also pointed out that TVA has not made a final decision on whether to complete its deferred nuclear generating units. The recovery of the costs of these assets is not required until they are completed and placed in service or cancelled.[36] As of September 30, 2001, the balance of TVA's deferred nuclear generating units amounted to $4.1 billion, which pertained to two unfinished nuclear units (Bellefonte units 1 and 2). TVA could be vulnerable to future competition if it has to begin recovering the costs of its deferred nuclear units at a time when competitive pressures prevent it from setting rates at levels sufficient to recover them. Therefore, beginning to recover these costs now would improve TVA's ability to offer competitively priced power in the future.

[34]From September 30, 1997, through September 30, 2001, TVA reduced its debt from about $27.4 billion to about $25.4 billion. This debt reduction, along with refinancing debt at lower interest rates, enabled TVA to reduce its annual interest expense from about $2.0 billion (or 34 percent of revenue) in fiscal year 1997 to about $1.6 billion (or 24 percent of revenue) in fiscal year 2001.

[35]*Tennessee Valley Authority: Debt Reduction Efforts and Potential Stranded Costs* (GAO-01-327, February 28, 2001).

[36]TVA accounts for the financial effects of regulation in accordance with Statement of Financial Accounting Standards No. 71, *Accounting for the Effects of Certain Types of Regulation*. Under regulatory accounting, TVA is not required to begin writing off the costs of its deferred nuclear units until they are either completed and placed in service or cancelled. However, in fiscal years 1999 through 2001, TVA accelerated the amortization of certain deferred charges when earnings exceeded levels required by the TVA Act and the Basic TVA Power Bond Resolution. A TVA official told us that to the extent future earnings exceed these earnings levels, TVA may begin to write off the cost of its deferred nuclear units—even before a final decision is made on whether to complete or cancel them.

TVA's electricity rates are relatively low, it is presently legislatively protected from most competition, and it has the statutory authority to raise rates;[37] however, there are several factors that enter into a decision to raise electricity rates. Any positive benefits that accrue to TVA from raising rates and accelerating debt repayment would need to be weighed against potential negative consequences. TVA officials told us that they believe an increase in electricity rates could result in the loss of customers, lower power sales, and possibly less overall revenue. Another potential negative consequence is the impact a rate increase could have on the regional economy as a whole. A rate increase could also affect the distributors' perception of TVA just before they may be given the choice of selecting their suppliers.

TVA officials also cited two other reasons they would be reluctant to raise electricity rates. Because of commitments given to customers and ongoing contract negotiations,[38] TVA officials said it would be particularly difficult to raise rates before 2007, unless it is required to cover additional costs, such as for additional environmental controls. In addition, the officials cited both the TVA board's responsibility and pressure from customers to abide by TVA's statutory responsibility to provide power at rates "as low as are feasible." Nonetheless, the TVA officials acknowledged that TVA's board has the authority and obligation to adjust TVA's rates as necessary to cover costs and provide adequate margin for the protection of investors.

As suggested by the data in table 2, any decision to raise electricity rates would need to be considered differently for each rate category because the difference between TVA's rates and those of its likely competitors varies by rate category. TVA's residential and industrial rates are generally well below the competition, while its commercial rates are lower than only 4 of the 12 likely competitors. Therefore, while raising some rates would be

[37]The TVA Act gives TVA the authority to set rates at levels sufficient to cover all costs and generate additional revenue that could be used to repay outstanding bonds in advance of maturity. The TVA Act also requires TVA to sell its power at rates that are "as low as are feasible."

[38]TVA is currently negotiating with its distribution customers to allow them to purchase up to 10 percent of their power needs from other power suppliers. To plan for the needs of the system, TVA anticipates that it will require customers to give 2-years notice to purchase power from another source and to identify the type of power (e.g., peak, baseload) they plan to purchase. TVA does not plan to allow its customers to purchase more than 10 percent of their power from alternate sources unless TVA loses its protections from competition.

feasible, TVA would need to carefully consider which rates to raise and by how much.

Agency Comments and Our Evaluation

In written comments on a draft of this report, TVA's chairman commended us for producing a fair and insightful report. In addition, the chairman offered his perspectives on TVA's responsibilities for setting rates, and on the results of TVA's recent efforts to bring its staffing levels in line with the industry's best. TVA also provided us with oral technical comments, which we have incorporated as appropriate. TVA's written comments are reproduced in appendix II.

We are sending copies of this report to appropriate House and Senate committees; interested members of the Congress; TVA's board of directors; the Secretary of Energy; 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, please call me at (202) 512-9508. Major contributors to this report are listed in appendix III.

Sincerely yours,

Linda M. Calbom
Director
Financial Management and Assurance

Objectives, Scope, and Methodology

Staffing Benchmarking Studies

To assess the overall quality of the staffing benchmarking studies, we

- interviewed a Navigant Consulting, Inc. (Navigant) official to obtain an understanding of their staffing benchmarking analysis for TVA and other electric utilities, the number of utilities in their database, and their overall experience in benchmarking staffing levels in the electric utility industry;
- inquired of industry experts regarding their familiarity with Navigant; and
- interviewed TVA officials involved in workforce planning in the Chief Operating Office regarding Navigant's observations.

To determine the changes TVA has made as a result of benchmarking studies, we interviewed TVA officials and examined supporting documents; however, we did not independently verify the results of TVA's actions.

Comparison of Electricity Rates

To determine how TVA's electricity rates compared to those of electricity providers that could comprise TVA's likely competitors in a competitive environment, we identified TVA's likely competitors through discussions with officials from TVA, TVA's IG, investor-owned utility members of TVA Exchange, and the American Public Power Association. Based on these discussions, we selected investor-owned utilities or holding companies that had 50 million MWhs or more in net generation in fiscal year 2000[39] in the eastern interconnect.[40]

We selected utilities with net generation over 50 million MWhs to eliminate smaller utilities that do not represent a significant portion of the annual sales in the TVA area, and are less relevant to TVA. We limited our group to utilities in the eastern interconnect because the high cost of transmitting electricity will limit TVA's competition to utilities in states located close to TVA's service territory. We did not include independent power producers

[39]The fiscal year 2000 data were the latest available at the time of our review.

[40]The eastern interconnect is one of five electric system networks of high-voltage power transmission wires in North America, connecting everything from the Rockies to the Atlantic, and from Florida up into Canada.

and other power marketers in the comparison group because they are not required by federal regulations to make certain data publicly available, and therefore, the data needed to compare production cost and rates were not available.

We then analyzed TVA's electricity production costs and rates and compared them to those of TVA's likely competitors. We obtained electricity production cost and rate data for fiscal year 2000 for TVA and the group of likely competitors from RDI POWERdat. Further, we reviewed various TVA financial-related reports, including GAO and TVA IG reports.

To determine whether TVA's electricity rates are low enough for TVA to consider raising them, we analyzed the results of the cost and rate comparisons; analyzed data on the future market price of power; and interviewed TVA officials regarding this issue.

Organizations Contacted

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

Federal Agencies

- Tennessee Valley Authority
- Tennessee Valley Authority Office of Inspector General

Bond Rating Agency

- Standard & Poor's

Customer Representative or Trade Groups

- TVA Exchange
- American Public Power Association
- Nuclear Energy Institute

Other

- Navigant Consulting, Inc.

Comments from the Tennessee Valley Authority

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

Glenn L. McCullough, Jr.
Chairman

May 15, 2002

Ms. Linda Calbom
Director
Financial Management and Assurance
U.S. General Accounting Office
Washington, DC 20548

Dear Ms. Calbom:

Thank you for the opportunity to provide comments on the GAO's draft report entitled, *Tennessee Valley Authority—Information on Benchmarking and Electricity Rates.* We commend GAO for producing a fair and insightful report on this subject.

We were pleased to see that GAO's analysis confirms that TVA's operating costs and staffing levels compare favorably to the industry and, in particular, that "...TVA's nuclear and transmission power supply units are close to the industry's best in terms of staffing efficiency." I am proud of the work that the 13,500 men and women at TVA have done in achieving this level of performance and we will continue striving for the highest standard of excellence in business performance and public service.

The report also finds that while "TVA's current electricity rates are low when compared to those of 12 likely competitors and to national averages...TVA is already subject to some competitive pressures and any decision to raise electricity rates would need to consider those pressures." As further described in the report, TVA must set rates consistent with the objectives of the TVA Act which include keeping those rates "as low as feasible." The Act also requires that TVA's rates be sufficient to cover TVA's cost of doing business including the cost of debt service. While we will always strive to keep TVA's rates as low as feasible, we will also take action to responsibly raise rates as necessary to ensure the financial security of TVA.

We at TVA are focused on achieving excellence in our business performance and in our public service, and we value our relationship with GAO toward this end.

Thank you again for the opportunity to provide these comments.

Very truly yours,

Glenn L. McCullough, Jr.

GAO Contact and Staff Acknowledgments

GAO Contact

Robert E. Martin, (202) 512-6131

Acknowledgments

In addition to the individual named above, Carolyn A. Frye, Mary B. Merrill, Donald R. Neff, and Lisa J. Crye made key contributions to this report.

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