



Memorandum from the Office of the Inspector General

May 2, 2012

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FINAL REPORT – INSPECTION 2011-14061 – REVIEW OF ENERGY EFFICIENCY AND DEMAND RESPONSE

We initiated a review of the effectiveness of Tennessee Valley Authority's (TVA) Energy Efficiency and Demand Response (EEDR) organization. We conducted this review because energy efficiency and demand reduction initiatives are important components of TVA's plan to meet future power needs in its service territory. The objectives of this review were to determine (1) how TVA measures the effectiveness of its energy efficiency and demand response programs and (2) if its goals in these areas are being met.

We found EEDR has established a method to measure and verify the programs in place to accomplish the goals. Specifically, EEDR has contracted with an independent consultant to help measure the effectiveness of the programs. In addition, we found that EEDR has performed well overall with respect to its plan for energy efficiency and demand response. Specifically, TVA achieved its 2011 targets for energy efficiency and demand reduction and only missed its planned demand reduction for 2009 and 2010 by 2 megawatts (MW) and 16 MW, respectively. The Green Power Switch program¹ planned a 14-percent increase in sales over the last three years through a series of yearly goals. The program came close to achieving its goals for 2009 and 2010; however, fell significantly short of its goal in 2011.

BACKGROUND

"Improving energy efficiency and reducing peak demand are significant actions that help slow demand growth in a cost-effective manner while addressing air pollution and global climate change," according to TVA's 2007 Strategic Plan. Energy efficiency programs are designed to encourage residential and commercial users in TVA's service area to save energy. Examples of energy efficiency programs include TVA's in-home energy evaluation, heat pump retrofitting, incentives for higher efficiency new home construction, and commercial and industrial incentives for lighting and heating, ventilation, and air-conditioning. Demand Response programs reduce demand for energy at critical high-use/high-price (peak) times through more efficient use of current supply resources. Demand Response offsets the need for investment in peaking resources. Additionally, in

¹ While this program does not directly contribute to energy efficiency or demand response, it was included in this review because it fell under the EEDR organization. As of September 2011, the Green Power Switch program has been moved to the Renewable Energy Programs organization rather than EEDR.

2000, TVA began the Green Power Switch program, which is described as a program where consumers can pay \$4 a month, and TVA will add 150 kilowatt hours of electricity generated by a renewable resource. Green Power Switch reflects TVA's commitment as a public utility to develop low-impact energy sources.

TVA's 2007 Strategic Plan stated that TVA will strive to be a leader in energy-efficiency improvements and peak-demand reduction over the next five years. Based on this goal, in May 2008, a new organization, EEDR, was formed to design and deliver products to benefit customers, consumers, and the TVA system. The initial objective of this organization was to reduce peak-demand growth by 1,400 MW by the end of fiscal year (FY) 2012.

In August 2010, TVA's Board of Directors adopted a renewed vision to become one of the nation's leading providers of low-cost and cleaner energy by 2020. As part of that vision, the Board set a goal for TVA to be a leader in the Southeast for energy efficiency. To achieve this vision, EEDR has been tasked with an energy savings goal of 3.5 percent of sales by 2015.² In addition, the goal for reducing demand was revised to 1,900 MW between 2011 and 2015.

In October 2011, the Government Accountability Office (GAO) issued a report that, in part, examined TVA's efforts to use energy efficiency to meet demand for electricity. GAO found that TVA may not be fully considering this alternative because (1) TVA had not completed a study of the energy efficiency potential for its service area; (2) TVA's use of energy efficiency is constrained by factors, such as its planning model; and (3) unlike many other utilities, TVA is not subject to mandates and incentives, which would lead it to consider energy efficiency before other resources.

TVA contracted with an external contractor to do a study of the energy efficiency and demand response potential for its service area. The study was completed in December 2011 and found TVA's energy efficiency programs are off to a strong start, with a comprehensive suite of programs currently moving from the planning to the implementation phase.³ In addition, the results of the demand response assessment reveal that TVA has significant potential for demand response resources over the next two decades.

In TVA's response to GAO's concern regarding the planning model, TVA indicated it ". . . studied five EEDR portfolios in its Integrated Resource Plan. The planning model itself does not make a determination of the most cost-effective, individual-efficiency programs. TVA does have a process in place to screen programs for total resource cost and utility cost prior to constructing the efficiency portfolios. As a prudent utility practice, models are excellent tools to inform expert judgment. However, the planning process must also include business expertise and strategic recommendations from knowledgeable planners."

² The 3.5 percent energy savings goal is being revised based on the budget.

³ Global Energy Partners, "Tennessee Valley Authority Potential Study," December 21, 2011, pp. 24-35.

TVA is not subject to mandates and incentives that would lead it to consider energy efficiency before other resources. Some states have adopted Energy Resource Standards that set requirements for energy efficiency for utilities and, in some cases, offer incentives for meeting these requirements. However, there is potential legislation that, if passed, could lead to federal standards and/or more states to adopt Energy Resource Standards.

OBJECTIVE, SCOPE, AND METHODOLOGY

This review was performed because energy efficiency and demand reduction initiatives are important components of TVA's plan to meet future power needs in its service territory. The objectives of this review were to determine (1) how TVA measures the effectiveness of its energy efficiency and demand reduction programs and (2) if its goals in these areas are being met.

To achieve our objectives we:

- Reviewed policies and procedures to identify the methodology used for measuring performance.
- Researched applicable laws and regulations to determine if there were any standards EEDR should be following.
- Interviewed key TVA personnel to gain an understanding of the process used for setting goals and evaluating performance.
- Reviewed documentation, such as strategic plans, consultant reports, and performance reports, to determine the goals for the organization and if it was meeting those goals.

The scope of this review included FY 2009 through FY 2011. This review was conducted in accordance with the "Quality Standards for Inspection and Evaluation."

FINDINGS

We found EEDR (1) has contracted with an independent consultant to provide evaluation, measurement, and verification services⁴ and (2) achieved its planned energy efficiency and demand reduction for 2011 and only missed its planned demand reduction in 2009 and 2010 by 2 MW and 16 MW, respectively. The Green Power Switch program planned a large increase in sales (14 percent) over the last three years through a series of yearly goals. The program came close to achieving its goals for 2009 and 2010; however, fell significantly short of its goal in 2011.

To help determine the effectiveness of its programs, EEDR has had a contract with an external consultant, DNV KEMA,⁵ since 2009 to provide evaluation, measurement, and verification services of the energy efficiency and demand reduction programs.

⁴ Evaluation, measurement, and verification services include the use of modeling software to produce estimates for program potential and impact of various variables. This may include surveys, usage tracking, verification of installations, and performance of manufacture claims.

⁵ DNV KEMA describes itself as a global, leading authority in energy consulting and testing and certification.

Evaluation includes establishing baselines and assessing market potential, identifying opportunities for process improvement, and estimating the true impact of a resource. Measurement and verification services include verifying installations and measuring results to determine actual performance. This process includes reviewing rate payer usage amounts based on three years of billing to obtain an overall net effect of the program. DNV KEMA evaluated TVA's In-Home Energy Evaluation and Online Audit programs in 2011, and six more programs are planned to be evaluated in 2012. In addition, EEDR plans to hire personnel to be points-of-contact for DNV KEMA and assist with gathering requested information.

Another gauge of the effectiveness of a program has been based on whether EEDR was meeting its overall energy efficiency and demand reduction goals. Achieving these goals is based on the performance of the individual programs and does not attempt to take credit for external factors, such as the economy. Looking at the performance since 2009, EEDR met or came very close to meeting its goals on a yearly basis, except for the Green Power Switch in 2011.

As discussed above, EEDR had a goal of reducing peak demand by 1,400 MW by the end of FY 2012. Along with the Board's renewed vision came a revised goal of 1,900 MW between 2010 and 2015. For years 2009 and 2010, we compared EEDR's performance based on the plan set to achieve the original 1,400-MW goal. For 2011, we compared performance to the plan to achieve the 2010 revised goals. As seen in Figure 1 below, EEDR exceeded their goal in 2011 and were, at most, 16 MW away from achieving it in previous years.

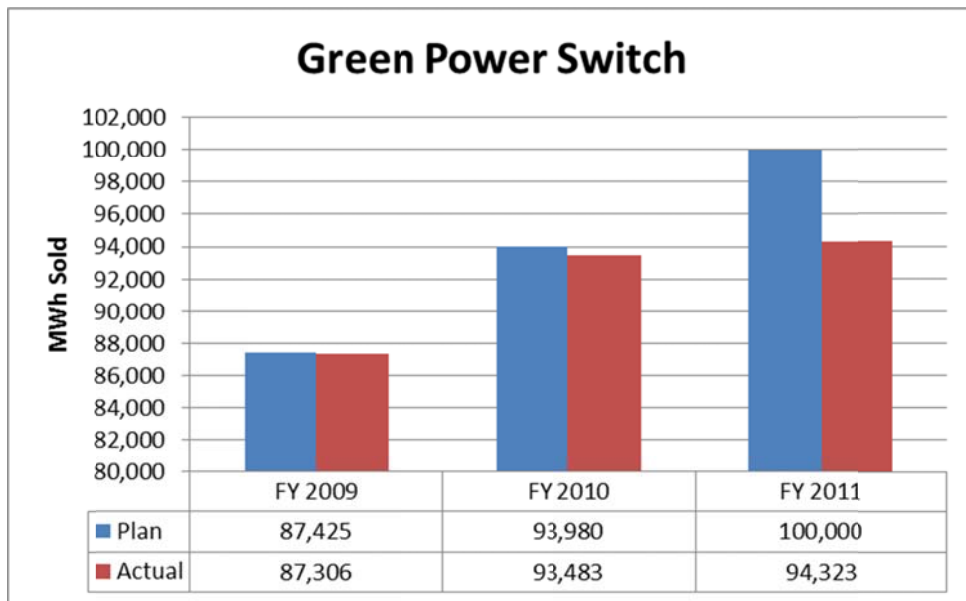
Figure 1: EEDR Demand Reduction Performance

Year	Plan (Cumulative)	Actual (Cumulative)
2009	207 MW	205 MW
2010	317 MW	301 MW
2011	662 MW	675 MW

As for energy efficiency, the goal to become a leader in the Southeast by 2015 was set in August 2010. Therefore, the only year of data to evaluate is 2011. Energy savings is measured in gigawatt hours (GWh). Based on performance reports, EEDR exceeded their goal for 2011 of 550 GWh by 9 GWh.

TVA’s Green Power Switch program performed well during 2009 and 2010; however, it did not meet its three-year goal of a 14-percent increase in sales. As seen in Figure 2 below, it was only 119 megawatt hours (MWh) short of the planned 87,425 MWh in 2009 and 497 MWh short of the planned 93,980 MWh in 2010. In 2011, however, performance declined, falling 5,677 MWh short of its 100,000 MWh goal. In its year-end report for 2011, this decline was attributed to a delay in two new university purchases and lower than expected distributor participation in the Direct Mail pilot program. According to TVA management, one of the university contracts has been signed, and purchases will begin in April 2012. In addition, while distributor participation in the Direct Mail program is voluntary, the Green Power Switch program continues to develop materials and plan events to promote and encourage end-use customers to participate.

Figure 2: Green Power Switch Performance



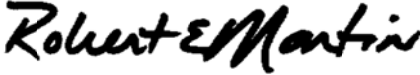
This memorandum does not include any recommendations and is to be used for informational purposes only. Accordingly, no response is necessary.

Information contained in this memorandum may be subject to public disclosure. Please advise us of any sensitive information in this report that you recommend be withheld.

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Page 6
May 2, 2012

If you have any questions or wish to discuss our observations, please contact Heather R. Kulisek, Senior Auditor, at (423) 785-4815 or Greg R. Stinson, Director, Evaluations, at (423) 785-4867.



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