

## **Tennessee Valley Authority Energy Efficiency & Demand Response Plan**

In 2007, the Tennessee Valley Authority (TVA) developed a strategic plan that included plans for energy efficiency and demand response. TVA's peak load was growing 1.8% each year and there was need for additional capacity. Customers felt there was a way of reducing the need for new generation through energy efficiency and demand response programs. TVA held nine public meetings throughout the Tennessee Valley and reviewed the utility's new plans for reducing peak demand. The revised strategic plan was approved by the TVA Board in May 2007.

TVA's plan provides strategic direction and establishes performance measures in five key areas – customers, people, financial, assets and operations. Specific actions to implement the overall direction of the plan will be part of TVA's annual business and performance plans.

TVA retained the services of PA Consulting, a nationally recognized, multi-disciplinary consulting firm with expertise in energy efficiency, to conduct a detailed analysis of the region's energy-efficiency and demand-reduction potential.

The plan seeks to reduce 1,400 megawatts of **peak** demand by 2012. The total projected peak load for TVA in 2012 is 37,740 megawatts which means the energy efficiency goal would be a 3.7% reduction in peak energy use. The average cost per kilowatt is estimated to be \$680.

### **TVA Strategic Plan Overview**

#### Policy and Framework

- Environmental (lower environmental footprint, regulatory requirements, clean energy)
- Financial (Debt to asset ratios, sound financial health, cost per MW and MWH)
- Operational (+/- TVA owned generation, diverse portfolio, energy security)
- Customer (lower bills, reliability, rapid deployment)

#### Guiding Principles

- Recognize as high-priority resource
- Communicate benefits
- Policy rate alignment
- Long-term commitment
- Provide stable funding

#### Goals

Create an Energy Efficiency and Demand Response Plan which would bring about: energy efficiency programs, demand response, end use generation and internal reductions.

- Achieve all reasonable demand and energy reductions by 2025
- Ensure combined program costs per kilowatt are competitive with other generating capacity options
- Inform and educate all stakeholders
- Stimulate and transform the marketplace
- Facilitate the expansion of infrastructure for Advanced Metering Infrastructure (AMI) and Direct Load Control (DLC)
- Support the development of energy-efficiency standards and regulations
- Provide incentives for demand reduction in conjunction with proper pricing signals
- Expand and support clean end-use generation
- Continue the premium Green Power Switch Program.

### **Program Action Plans**

#### Potential Residential Energy-Efficiency Program Concepts

**New Homes** – Modify the existing Energy Right® New Homes Program to cost-effectively increase participation and increase energy efficiency levels over standard construction. Program elements might include incentives to builders for constructing and promoting homes that meet designated Home Energy Rating System (HERS)<sup>3</sup> criteria to build consumer awareness about the benefits of highly efficient new home construction.

**On-Line Home Energy Audit** - Building on the success of TVA's existing do-it-yourself energy audit concept, a mass-market program of this type would be further enhanced to give households additional ways to develop a Home Energy Plan and immediately start becoming more energy efficient.

**Comprehensive Existing Homes** - Combine a comprehensive on-site energy audit with incentives to the homeowner for installing recommended measures. TVA's approach would be to develop the best options for stimulating the market to provide this service over the long-term.

**Manufactured Homes** - Promote the construction of ENERGY STAR® qualified manufactured homes by plants in the region through incentives to manufacturers and local dealers.

**HVAC** - Offer contractor training and incentives for new and replacement high-efficiency residential heating, ventilation and air-conditioning systems. Incentives might be offered in cases where customers are replacing existing central air-conditioning systems or heat pumps, for new construction, and in situations where existing gas furnaces with central air conditioning systems are being replaced.

Efficient Appliances and Lighting - This program would provide incentives to consumers who purchase ENERGY STAR® appliances and lights. As a secondary feature, the program could include a refrigerator/freezer pick-up and recycling service to encourage consumers to remove unused but operational refrigerators or freezer units in return for a minor incentive.

#### Potential Commercial and Industrial Energy-Efficiency Program Concepts

New Construction - Influence energy-efficient construction within the commercial and industrial market sectors and assess new buildings for their potential inclusion in other programs. Areas of focus would include HVAC and lighting systems in new construction and major renovations through education and incentives to local architects, building owners, operators, construction companies and others involved in the construction and renovation businesses.

Existing Commercial Building Performance - Address the unique and complicated building system situations in the commercial and industrial sectors using a whole-building approach. The objective would be to achieve electricity efficiency through prescriptive incentives, building recommissioning and identification of demand-response opportunities.

Efficient Equipment - Provide educational materials, training, and financial incentives for the replacement of individual equipment or systems with high-efficiency alternatives. The program would target equipment that contributes to the summer peak including building envelope (shell improvements), higher efficiency HVAC, water heating, lighting, commercial appliances, motors, refrigeration, plug loads, energy management systems and industrial processes, compressed air systems, and pumping systems.

Residential Direct Load Control – Reduce load at critical peak periods by cycling off central air conditioners and electric water heaters. Participating customers would be paid an incentive for agreeing to have their central air conditioners and/or water heaters controlled.

Commercial and Small Industrial Demand Response - Provide incentives to customers for reducing their load on the TVA system when notified. This program type would target commercial and small industrial customers, including national account customers and customers with emergency or back-up generation.

#### End-Use Generation

TVA will continue voluntary customer choice for green power through the Green Power Switch Program (GPS). TVA proposes increasing visibility of GPS and adding incremental renewable resources. Short-term implementation plans will be designed to put TVA on a path toward achieving national benchmarks for voluntary green power programs in the longer term.

#### Internal Reductions

TVA is developing action plans to minimize its internal energy use and maximize power system performance across the entire power production and delivery process. TVA will provide more information on these activities as plans are finalized.

#### Energy-Efficiency Education

TVA's plan proposes to significantly ramp up communications to all target audiences focused on improving overall understanding and awareness of programs, products and services available to them. This effort will be carried out across a wide span of media channels, through stakeholder outreach efforts, and through participation in national energy-efficiency education programs.

#### New Rate Structures

TVA's current firm wholesale rate structure, called End-Use Wholesale Rates, charges a flat rate by customer class for each kilowatt-hour regardless of TVA's cost to produce that energy at any given time of the day. To make many of the energy-efficiency and demand-response initiatives successful, new rate structures would need to be developed to provide more appropriate price signals to end-use customers.

#### Enabling Technology

For new rate structures to be effectively implemented, the broad application of enabling technologies associated with advanced metering will need to be considered.