



BILLING CODE 8120-08-P

TENNESSEE VALLEY AUTHORITY

Integrated Resource Plan

AGENCY: Tennessee Valley Authority.

ACTION: Issuance of Record of Decision.

SUMMARY: This notice is provided in accordance with the Council on Environmental Quality's regulations (40 CFR 1500 to 1508) and TVA's procedures for implementing the National Environmental Policy Act (NEPA). TVA has decided to adopt the preferred alternative in its final supplemental environmental impact statement (SEIS) for the Integrated Resource Plan (IRP). The notice of availability (NOA) of the Final Supplemental Environmental Impact Statement for the Integrated Resource Plan was published in the Federal Register on July 17, 2015. The TVA Board of Directors approved the IRP and authorized staff to implement the preferred alternative at its August 21, 2015 meeting. This alternative, the Target Power Supply Mix, will guide TVA's selection of energy resource options to meet the energy needs of the Tennessee Valley region over the next 20 years. The energy resource options include new nuclear, natural gas-fired and renewable generation, increased energy efficiency and demand reduction, and decreased coal-fired generation.

FOR FURTHER INFORMATION CONTACT:

Charles P. Nicholson, NEPA Compliance, Tennessee Valley Authority, 400 West Summit Hill Drive, WT 11D, Knoxville, Tennessee 37902-1499; telephone 865-632-3582 or e-mail cpnicholson@tva.gov.

Gary S. Brinkworth, IRP Project Manager, Tennessee Valley Authority, 1101 Market Street, MR 3K-C, Chattanooga, Tennessee 3740s; telephone 423-751-2193, or e-mail gsbrinkworth@tva.gov.

SUPPLEMENTARY INFORMATION: TVA is an agency and instrumentality of the United States, established by an act of Congress in 1933, to foster the social and economic welfare of the people of the Tennessee Valley region and to promote the proper use and conservation of the region's natural resources. One component of this mission is the generation, transmission, and sale of reliable and affordable electric energy. TVA operates the largest public power system in the nation, providing electricity to about 9 million people in an 80,000-square mile area comprised of most of Tennessee and parts of Virginia, North Carolina, Georgia, Alabama, Mississippi, and Kentucky. It provides wholesale power to 155 independent power distributors and 59 directly served large industrial and federal customers. The TVA Act requires the TVA power system to be self-supporting and operating on a nonprofit basis and directs TVA to sell power at rates as low as are feasible.

Dependable generating capability on the TVA power system is about 37,200 megawatts (MW). TVA generates most of this power with 3 nuclear plants, 10 coal-fired plants, 9 combustion-turbine plants, 6 combined cycle plants, 29 hydroelectric plants, a pumped-storage facility, and several small renewable facilities. These facilities generated 142.2 billion kilowatt-hours in fiscal year 2014. The major sources for this power were coal (40

percent), nuclear (33 percent), natural gas (13 percent), and hydroelectric (10 percent). Other sources comprised less than 1 percent of TVA generation. Total power delivered to customers in fiscal year 2014 was 161 gigawatt-hours (GWh). A portion of this delivered power was provided through long-term power purchase agreements.

The recently completed IRP updates TVA's 2011 IRP. Consistent with Section 113 of the Energy Policy Act of 1992, codified within the TVA Act, TVA employed a least-cost system planning process in developing the IRP. This process took into account the demand for electricity, energy resource diversity, reliability, costs, risks, environmental impacts, and the unique attributes of different energy resources.

Future Demand for Energy

TVA uses state-of-the-art energy forecasting models to predict future demands on its system. Because of the uncertainty in predicting future demands, TVA developed high, medium, and low forecasts for both peak load (in MW) and annual net system energy (in GWh) through 2033. Peak load is predicted to grow at average annual rates of 1.1 percent in the medium-growth Current Outlook Scenario, 0.3 percent in the low-growth forecast, and 1.3 percent in the high-growth forecast. Net system energy is predicted to grow at an average annual rate of 1.0 percent in the medium-growth forecast, remain flat in the low-growth forecast, and grow at an average annual rate of 1.1 percent in the high-growth forecast.

Based on these load growth forecasts, TVA's current firm capacity (TVA generation, energy efficiency and demand response measures, and power purchase agreements), and including a 15 percent planning reserve margin, TVA would need additional energy

resources in the future. The medium-growth case needs are 2,500 MW of additional capacity and 14,000 GWh of additional energy by 2020, growing to 11,600 MW and 51,000 GWh by 2033.

Alternatives Considered

Six alternative energy resource strategies were evaluated in the Draft SEIS and IRP. These resource planning strategies were identified as potential alternative means of serving future electrical energy demands on the TVA system while meeting least-cost system planning requirements. These alternative strategies are:

Baseline Case (No Action Alternative): The continued implementation of the 2011 IRP as modified by subsequent decisions by the TVA Board of Directors.

Strategy A—The Reference Plan: This strategy is similar to the Baseline Case but treats energy efficiency and renewable energy resources as selectable resources instead of defined inputs.

Strategy B—Meet an Emission Target: Resources are selected under this strategy to create a lower emitting carbon dioxide (CO₂) profile by reducing system-wide direct emissions of CO₂ by 50 percent (to 557 lbs/megawatt-hour) by 2033 and by 80 percent by 2050 from 2005. The targeted CO₂ rate is measured at a system-wide level and thus differs from the state-by-state and technology-specific baselines in the recently issued Clean Power Plan.

Strategy C—Focus on Long-Term, Market-Supplied Resources: Under this strategy, TVA would minimize capital investments in owned energy resources by meeting most capacity needs through power purchase agreements.

Strategy D—Maximize Energy Efficiency: Energy efficiency would be given priority in meeting capacity needs with other resources selected to serve the remaining need.

Strategy E—Maximize Renewables: Renewable energy resources (hydroelectric, biomass, wind and solar) are emphasized by setting near-term and long-term renewable energy targets.

The alternative strategies were analyzed in the context of five scenarios or future “worlds” that were determined to be reasonably possible to occur. The scenarios were TVA’s current outlook, a stagnant economy, a growth economy, a de-carbonized future, and a distributed energy marketplace. Each scenario is a set of uncertainties relevant to power system planning that include plausible future economic, financial, regulatory and legislative conditions, as well as social trends and adoption of technological innovations. Potential 20-year capacity expansion plans or resource portfolios were developed for each combination of alternative strategy and scenario using a capacity planning model. The model built each portfolio from a range of potential energy resource options that included TVA’s existing energy resources and new coal, nuclear, natural gas, hydroelectric, wind, solar, and biomass generation, energy storage, and energy efficiency and demand response resources. Each portfolio was optimized for the lowest Present Value of Revenue Requirements while meeting energy balance, reserve, operational, and other requirements. The portfolios were then evaluated using an hourly production costing program to determine detailed revenue requirements and near- and long-term system average costs. Recognizing the uncertainty in long-range planning studies, extensive stochastic analyses were also conducted to identify risk exposure within each scenario. Additional metrics developed to rank the portfolios included financial risk, CO₂ emissions, water consumption, coal waste generation and changes in

regional personal income. These metrics were used to compare the alternative strategies and their associated portfolios.

Strategies A–C had similar scores for most metrics and the scores for Strategies A and B were almost identical and for some metrics slightly better than Strategy C. Strategy E, with the greatest emphasis on renewable energy resources, scored the best on the three environmental metrics of CO₂ emissions, water consumption, and coal waste production. Strategy D had somewhat greater environmental impacts than Strategy E, and Strategies A–C had the greatest and similar environmental impacts. To better inform the development of the preferred alternative, TVA conducted additional sensitivity analyses that varied key resource assumptions involving nuclear additions, energy efficiency, renewable resources, fundamental drivers such as load growth and fuel pricing, and the effect of forcing the model to consider resource types and/or amounts that it otherwise would not. The results of these analyses supported the energy resource ranges identified in the initial portfolios.

TVA then developed a preferred alternative, the Target Power Supply Mix, based on guideline ranges for key energy resources. In developing it, TVA took into account its least-cost planning requirement and customer priorities of power cost and reliability, as well as other comments it received during the public comment on the Draft IRP and SEIS. The Target Power Supply Mix establishes ranges, in MW, for coal plant retirements and additions of nuclear, hydroelectric, demand response, energy efficiency, solar, wind, and natural gas capacity. The recommended ranges are based on Strategies A–C and the Current Outlook Scenario, expressed over the 20-year planning period with more specific direction over the first 10-year period. The Target Power Supply Mix also includes broader ranges resulting from the sensitivity analyses. Shifts in

resource additions within the ranges would be based on changes in the load forecast, the price of natural gas and other commodities, the price and performance of energy efficiency and renewable resources, and impacts from regulatory policy or breakthrough technologies.

Public Involvement

TVA published a notice of intent to prepare the IRP SEIS in the Federal Register on October 31, 2013. TVA then actively engaged the public through public scoping and public briefings during the development of the IRP and SEIS. TVA also established an IRP Working Group to more actively engage stakeholders. Group members included representatives of local power companies (distributors of TVA power), state agencies, direct-served customers, academia, and energy and environmental non-governmental organizations. Members of the group met frequently with IRP staff to review and provide input during the development of the plan.

The Notice of Availability of the Draft IRP and SEIS was published in the Federal Register by the U.S. Environmental Protection Agency (USEPA) on March 13, 2015. TVA accepted comments on the draft plan and SEIS until April 27, 2015. During the comment period, TVA held seven public meetings to describe the project and accept comments. TVA received about 200 comments signed by more than 2,400 individuals. After considering and responding to all substantive comments, further evaluating the alternative strategies, and developing the Target Power Supply Mix, TVA issued the Final IRP and SEIS. The NOA for the Final IRP and SEIS was published in the Federal Register on July 17, 2015.

Environmentally Preferred Alternative

All of the alternative strategies, as well as the Target Power Supply Mix, have several common features that affect their anticipated environmental impacts. The only new baseload generation added is the extended power uprate of three nuclear units, a component of all alternative strategies. All result in decreases in coal-fired generation and increases in the reliance on energy efficiency and renewable resources. All also add varying amounts of new natural gas-fueled generation to meet peak loads. Emissions of air pollutants and CO₂, and generation of coal waste would decrease significantly under all alternative strategies, including the Target Power Supply Mix. Water-related impacts would also decrease, although by smaller proportions. The major differences in the alternative strategies that affect their environmental impacts are in the expansion of energy efficiency and natural gas and renewable resources.

Strategies A–C and the Target Power Supply Mix have similar environmental impacts and their impacts to most environmental resources are greater than those of Strategies D and E. Because of its greater reliance on generation by fossil fuels, Strategy D has somewhat greater impacts to most environmental resources than Strategy E. Strategy E has the greatest reliance on renewable energy resources, which, particularly for utility-scale solar generation, have large land requirements. Strategy E would therefore directly affect the largest land area, almost twice that of the other alternative strategies and the Target Power Supply Mix. Relative to other types of generation, impacts of solar facilities on land resources are low. Overall, Strategy E is considered the environmentally preferred alternative.

Decision

On August 21, 2015, the TVA Board of Directors approved the preferred alternative, the Target Power Supply Mix. The Board also directed staff to monitor future developments to help determine when deviations from the recommended resource ranges should be made and to initiate an update to the IRP no later than 2020 and earlier if future developments make this appropriate.

Mitigation Measures

The reduction of environmental impacts was an important goal in TVA's integrated resource planning process and all of the alternatives assessed by TVA do that. Because this is a programmatic review, measures to reduce potential environmental impacts on a site-specific level were not identified. As TVA deploys specific energy resources, it will review and take measures to reduce their potential environmental impacts as appropriate. TVA's siting process for generation and transmission facilities, as well as processes for modifying these facilities, are designed to avoid and/or minimize potential adverse environmental impacts. Potential impacts will also be reduced through pollution prevention measures and environmental controls such as air pollution control systems, wastewater treatment systems, and thermal generating plant cooling systems. Other potentially adverse unavoidable impacts will be mitigated by measures such as compensatory wetlands mitigation, payments to in-lieu stream mitigation programs and related conservation initiatives, enhanced management of other properties, documentation and recovery of cultural resources, and infrastructure improvement assistance to local communities.

Dated: October 16, 2015

Van M. Wardlaw,

Executive Vice President and Chief External Relations Officer.

[FR Doc. 2015-27129 Filed: 10/23/2015 08:45 am; Publication Date: 10/26/2015]