

Integrated Resource Plan

TVA'S ENVIRONMENTAL AND ENERGY FUTURE



Environmental Impact Statement

Scoping Report

November, 2009

Tennessee Valley Authority

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Introduction

The Tennessee Valley Authority (TVA) is conducting a comprehensive study of alternatives for meeting the future electrical energy needs of the Tennessee Valley. The purpose of this study, the Integrated Resource Plan (IRP), is to develop a plan that TVA can enact to achieve a sustainable future and meet the electricity needs of the Tennessee Valley over the next 20 years. At the conclusion of the study, TVA will implement the plan that best meets the goals of its Strategic Plan and Environmental Policy and the goals of Valley residents. TVA has undertaken this study in response to recent and anticipated changes in the utility industry and recommendations from individuals and stakeholder groups.

Following the requirements of the National Environmental Policy Act (NEPA), TVA is preparing a programmatic Environmental Impact Statement (EIS) in association with the Integrated Resource Plan. See Appendix A for more information on NEPA. NEPA regulations require an early and open process for deciding what should be discussed in an EIS – the scope of the document. The scoping process involves requesting and using comments from the interested public, organizations, and agencies to help identify the issues and alternatives that should be addressed in the EIS. This document summarizes the input that TVA received during the IRP scoping process and defines the scope of the IRP programmatic EIS.

Project Purpose and Description

Like other utilities, TVA develops power supply plans. This planning process includes forecasting the demand for power and developing capacity expansion plans. In the mid-1990s, TVA developed a comprehensive integrated resource plan with extensive public involvement. This process was completed with issuance of the Energy Vision 2020 IRP/Final EIS in 1995 and the associated Record of Decision in 1996. Based on the extensive evaluation, TVA decided to adopt a flexible portfolio of supply- and demand-side energy resource options to meet the growing demand for electricity in the region, prepare for industry deregulation, and achieve the goals of the TVA Act and other congressional directives. The adopted portfolio has subsequently been amended by Records of Decision for various implementing actions. As appropriate, TVA expects to continue to implement the adopted portfolio during this IRP/EIS process. Once completed, the IRP/EIS will replace Energy Vision 2020.

The purpose of this study is to evaluate TVA's current portfolio and alternative future portfolios of energy resource options in order to meet the future electrical energy needs of the TVA region and achieve a sustainable future. Energy resource options include the means by which TVA generates or purchases electricity, transmits that electricity to customers, and influences the end use of that electricity through energy efficiency and demand response programs. As part of the integrated resource planning process, TVA will evaluate the future demand for electricity by its customers, characterize potential supply- and demand-side options for meeting future demand, and assemble these options into portfolios. TVA will then, with public input, evaluate the portfolios for several criteria including capital and fuel costs, reliability, compliance with existing and anticipated future regulations, environmental impacts, their flexibility in adapting changing future conditions, and other factors. The "best" portfolio will be identified as TVA's preferred alternative and submitted to the TVA Board of Directors for approval.

Integrated Resource Plan

The IRP/EIS will align with TVA's 2007 Strategic Plan and the evaluation criteria will include the objectives in TVA's 2008 Environmental Policy. Principles in the Strategic Plan include: 1) Maintain power reliability, provide competitive rates, and build trust with TVA's customers; 2) Adhere to sound financial guiding principles to improve TVA's fiscal performance; and 3) Improve performance to be recognized as an industry leader.

TVA's Environmental Policy establishes the goals of: 1) Cleaner, reliable, and still-affordable energy; 2) Sustainable economic development; and 3) Proactive environmental stewardship. It then establishes objectives for the following six environmental areas:

1. Climate Change Mitigation, with the objective of stopping the growth in the volume of greenhouse gas emissions and reducing the rate of greenhouse gas emissions by 2020;
2. Air Quality Improvement, with the objective of continuing efforts to reduce emissions of criteria air pollutants and mercury;
3. Water Resource Protection and Improvement, with the objective of improving reservoir and stream water quality, reducing the impact of operations, and leveraging alliances to promote water conservation;
4. Waste Minimization, with the objective of driving increased sustainability by focusing on waste avoidance, minimizing waste generation, and increasing recycling;
5. Sustainable Land Use, with the objective of maintaining the lands under TVA management in good environmental health, balancing their multiple uses, and improving land transaction processes to support sustainable development; and
6. Natural Resource Management, with the objective of being a leader in natural resource management through the implementation of sustainable practices in dispersed recreation while balancing the protection of cultural, heritage, and ecological resources.

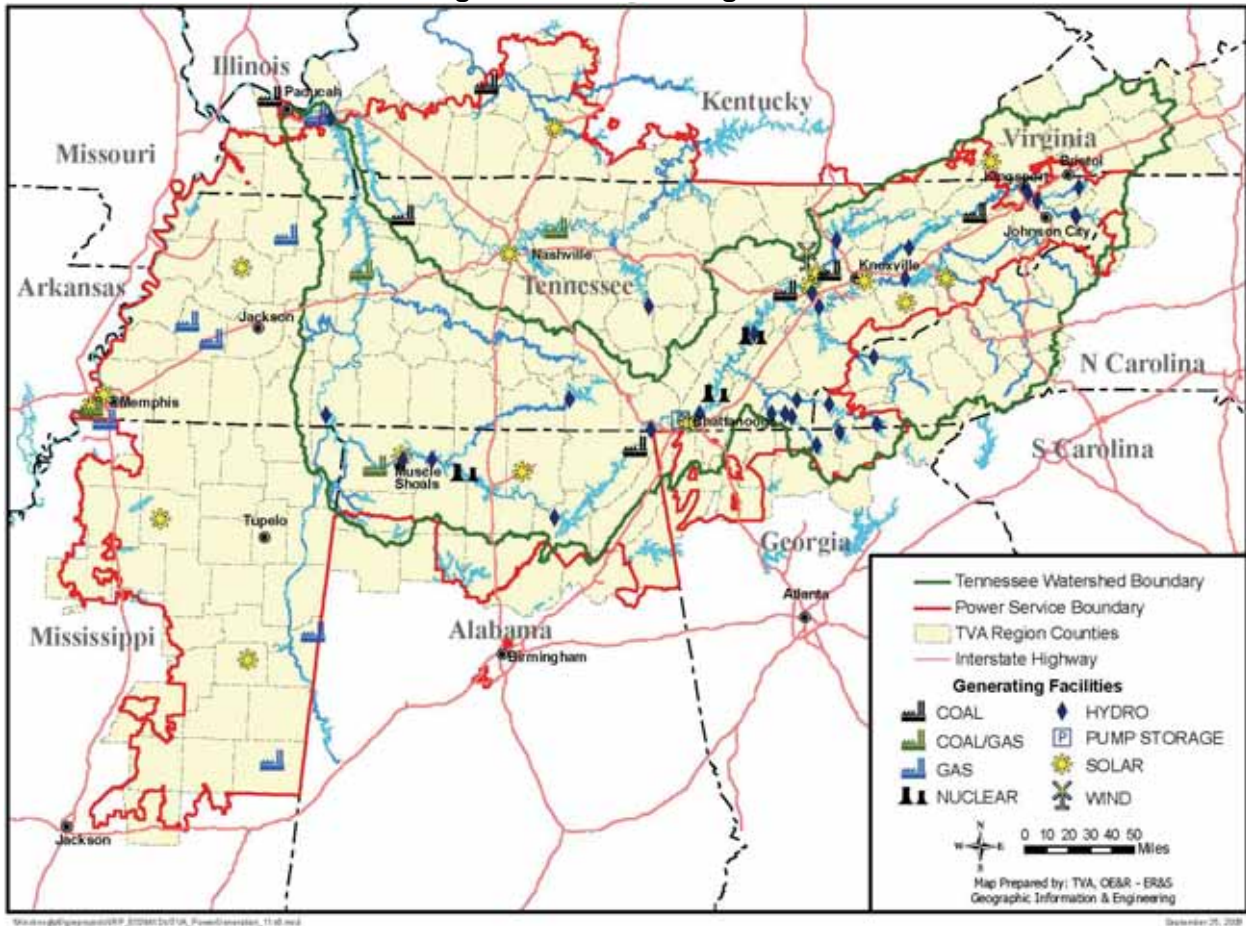
The evaluations in the IRP will focus on the Climate Change Mitigation, Air Quality Improvement, and Waste Minimization goals and associated critical success factors as they are most directly related to power system operations.

When the IRP was announced to the public, TVA anticipated that its scope would be broader and address TVA's natural resource management activities. TVA has since determined that its natural resource management activities can be better addressed in a separate planning process. Information on this Natural Resource Plan is available at www.tva.gov/environment/reports/nrp/index.htm.

Geographic Scope

The geographic area covered by this study is generally the Tennessee River watershed and TVA's power service area (Figure 1). It also includes the location of TVA's Paradise Fossil Plant which is outside this primary area. The geographic area includes all of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. It includes 201 counties and about 90,000 square miles. Due to the nature of some resources (e.g., air quality) affected by the operation of TVA's power system, the geographic scope of some analyses will extend beyond the TVA region.

Figure 1. The TVA region.



The TVA Power System

TVA operates the nation's largest public power system, producing 4 percent of all the electricity in the nation. TVA provides electricity to most of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. It serves about 9 million people in this seven-state region through 158 power distributors and 58 directly served large industries and federal facilities. The TVA Act requires the TVA power system to be self-supporting (i.e., TVA receives no tax dollars), operate on a nonprofit basis, and sell power at rates as low as are feasible.

Dependable capacity on the TVA power system is about 37,000 megawatts. TVA generates most of this with 3 nuclear plants, 11 coal-fired plants, 9 combustion-turbine plants, 29 hydroelectric dams, a pumped-storage facility, a wind farm, a methane-gas cofiring facility, and several small solar photovoltaic facilities. A portion of delivered power is provided through long-term power purchase agreements. About 60 percent of TVA's annual generation is from fossil fuels, predominantly coal; 30 percent is from nuclear; and the remainder is from hydro and other renewable energy resources. TVA transmits electricity from these facilities over 15,000 miles of transmission lines. TVA has power interchange agreements with adjacent utilities and purchases and sells power on an economy basis almost daily.

Public and Agency Involvement

The public scoping of the IRP project began on June 15, 2009 with the publication of the Notice of Intent in the Federal Register and closed on August 14, 2009. TVA issued news releases about the project and advertised the public meetings in local newspapers and on its website (www.tva.gov/irp). The IRP website materials included background information, a form for submitting scoping comments, a scoping questionnaire, addresses for submitting comments by mail, email, or fax, and information on public scoping meetings. Letters requesting comments on the scope of the IRP were mailed to 80 state and federal agency offices and 21 Indian tribal representatives.

TVA held seven public meetings between July 20 and August 6 (Table 1). About 180 people attended these meetings; attendees included members of the general public, representatives from state agencies and local governments, TVA power distributors, non-governmental organizations, and other special interest groups. Exhibits, fact sheets, and other materials were available at each public meeting to provide information about the study and the EIS. TVA personnel introduced the project and answered questions about the planning process, the EIS, the TVA power system, supply- and demand-side options, and environmental issues.

Table 1. IRP Public Scoping Meetings

Date	Location
Monday, July 20	Nashville, TN
Tuesday, July 21	Chattanooga, TN
Thursday, July 23	Knoxville, TN
Tuesday, July 28	Huntsville, AL
Thursday, July 30	Hopkinsville, KY
Tuesday, August 4	Starkville, MS
Thursday, August 6	Memphis, TN

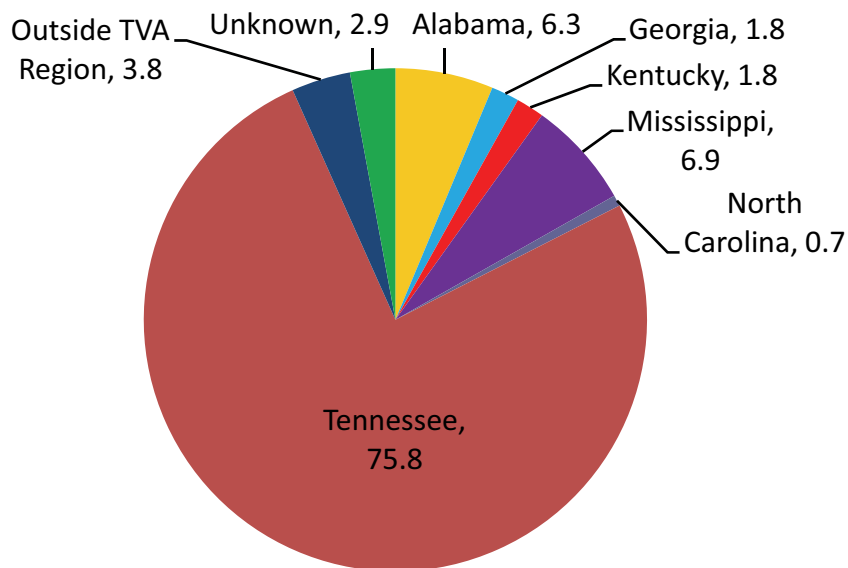
TVA established a Stakeholder Review Group consisting of individuals who will serve as a source of information and coordination throughout the Integrated Resource Plan process. The 15-member review group is composed of representatives of state agencies, the Department of Energy, TVA distributors, industrial groups, academia, and non-governmental organizations. These members are expected to represent their constituency and report to them the working of the IRP process, as well as give input to TVA on the process. One review group meeting was held during public scoping and several more are planned throughout the study, including meetings where the public will be invited. Additional information about the review group, including a list of members and meeting materials, is available at <http://www.tva.gov/environment/reports/irp/stakeholder.htm>.

As part of scoping, TVA received over 1,000 individual comments. About 40 attendees submitted oral or written comments during the seven scoping meetings. Sixty-five email comments were received from individuals and organizations and an additional 50 comments were submitted through the TVA website. Eight hundred forty-five people completed at least part of the online scoping questionnaire, and almost 640 of these respondents answered the

write-in questions as well as the multiple-choice questions. Responses were received from nine offices of four federal agencies and from 20 state agencies representing six of the seven TVA region states. Some of these agency responses included specific comments which are incorporated below; others stated they had no comments at this time but would like to review the draft IRP/EIS. Some comments from agencies, organizations, and individuals were specific to TVA’s natural and cultural resource stewardship activities and are not included in this scoping report.

Scoping comments were received from six of the seven TVA region states as well as several other states. Figure 2 shows the distribution of scoping comments by geographic area.

Figure 2. Distribution of scoping comments by geographic area, in percent.



Overview of Scoping Comments

Scoping comments addressed a wide range of issues, including the integrated resource planning process, preferences for various types of power generation, support for increased energy efficiency and demand response efforts, and the environmental impacts of TVA’s power generation, fuel acquisition, and power transmission operations. Comments on these issues are briefly summarized below and the scoping comments are listed in more detail in Appendix A.

The most frequently mentioned issue in the scoping comments was the cost of electricity. While a large number of commenters were opposed to any future price increases, a majority of those completing the questionnaire expressed willingness to pay more. Reliability and the ability to meet future demand were also among the most frequently mentioned issues. A large number of commenters also expressed concern about and/or dissatisfaction with TVA leadership, TVA facility maintenance, and TVA’s ability to adapt to future conditions. A majority of those completing the questionnaire also expressed willingness to take various

measures to reduce their energy use; the willingness to undertake some measures increased with the availability of financial incentives.

The Integrated Resource Planning Process

Several commenters addressed the integrated resource planning process. Their comments recommended that TVA: follow industry standard practices; enter the process without preconceptions about the adequacy of various resource options; be open and transparent throughout the planning process; treat energy efficiency and renewable energy as priority resources, and address the total societal costs and benefits, including externalities.

Recommended Energy Resource Options

Many scoping comments included general recommendations about TVA's future supply-side and demand-side resource options. Common themes throughout a large number of the comments were that TVA's future resource portfolio avoid or minimize rate increases, minimize or reduce pollution and other environmental impacts, and be reliable. The most frequently mentioned generalized resources included increased renewable generation (including wind, solar, locally sourced biomass and low-impact hydro), decreased coal-fueled generation, and increased nuclear generation. Somewhat less frequently mentioned were decreased nuclear generation, increased energy efficiency and demand response programs, reliance on a diversity of fuel sources, avoidance of uneconomical renewable generation, and the need for a modernized or "smart" transmission system. A few commenters recommended specific goals such as 15 and 20 percent renewable generation capacity by 2020, 60-70 percent nuclear generation capacity by 2029, and a 1 percent annual increase in energy efficiency savings through 2020. Many commenters recommended that TVA take a leadership role (or reestablish its former leadership role) in the research and development of a wide range of supply-side and demand-side options.

Environmental Impacts of Power System Operations

A majority of the commenters expressed concerns about the environmental impacts of the TVA power system. General concerns about pollution were the second most frequently mentioned issue, and over half of questionnaire respondents ranked the issues of air pollutants, greenhouse gas emissions/climate change, spent nuclear fuel, and coal combustion byproducts as of high importance. The Kingston Fossil Plant ash spill in December 2008 was frequently mentioned. Many written comments encouraged TVA to decrease its emissions of greenhouse gases while others questioned the human influence on climate change. Several commenters also raised the issue of the impacts of buying coal from surface mines, particularly mountain-top removal mines, and recommended that TVA stop this practice.

Options to Be Evaluated

TVA will evaluate an extensive list of demand- and supply-side resource options. This list will include the options currently used by TVA, options mentioned during public scoping (see Appendix A), and options identified by TVA staff. Each option will be characterized by a suite of factors (see "Issues to Be Addressed" below) and initially screened by various feasibility criteria. The feasible resource options will then be grouped into portfolios consisting of specific combinations of demand- and supply-side options.

Issues to Be Addressed

The various resource options are screened and then combined into possible 20-year capacity expansion plans (resource portfolios). The portfolios are evaluated against a long list of criteria or issues. This list has been developed from standard industry practices, public scoping comments, and TVA staff input. In both the options screening and resource portfolio evaluations, TVA will consider numerous criteria; these are likely to include technological maturity and availability; operational criteria such as duty cycle, capacity, reliability, and fuel requirements; transmission requirements; environmental criteria such as air pollutants, greenhouse gas emissions, water requirements and thermal discharges, solid waste generation, and land requirements; financial criteria such as construction/implementation costs, operating costs, and decommissioning costs; and workforce requirements. Some of these criteria will be quantitatively evaluated in industry-standard models; others will be evaluated qualitatively. These criteria address many of the environmental objectives and critical success factors listed in TVA's 2008 Environmental Policy.

The portfolios will be evaluated against a set of scenarios that address uncertainties in predicting economic conditions, power demand and load shape, environmental regulations including reductions in greenhouse gas emissions, renewable energy standards, commodity prices, cost of financing, cost of purchased power, construction cost escalation, and risks associated with licensing, permitting, and the schedule for new generating and transmission facilities. The ranges of forecasts associated with these key uncertainties have been aggregated into six preliminary scenarios tentatively named: 1) Economy recovers dramatically; 2) Environmental focus is a national policy; 3) Prolonged economic malaise; 4) Game-changing technology; 5) Energy independence; and (6) Carbon legislation creates an economic downturn. The results of the evaluation of each of the resource portfolios against the criteria in this range of scenarios will be a key factor in selecting the preferred portfolio and associated short- and long-term action plans.

Alternatives to Be Evaluated

TVA's current power supply plan will form the No Action Alternative. The Action Alternatives will consist of the final short list of portfolios which are evaluated against the range of scenarios.

Work Assignments

Work on the IRP/EIS is being directed by a Core Project Management Team composed of representatives of a wide range of TVA organizations. Overall project management and EIS management responsibilities are in TVA's Office of Environment and Research. Overall responsibility for the power supply planning and analysis process is in TVA's Power Supply and Fuels organization. The project interdisciplinary team is composed of representatives of several TVA organizations with contractor support.

Project Schedule

The draft IRP/EIS is scheduled to be issued for public review in early 2010. The final IRP/EIS is scheduled to be issued in late 2010. TVA Management's recommendation of a preferred portfolio is scheduled to be submitted to the TVA Board in early 2011.

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Appendices

Appendix A.

The National Environmental Policy Act and Environmental Impact Statement Process

Authority

Wholly owned by the U.S. Government, TVA was established by Congress in 1933 primarily to foster the social welfare of residents in the Tennessee Valley region and promote the wise use of the region's natural resources.

The evaluation will be performed within the framework of the National Environmental Policy Act (NEPA) 42 USC §§ 4321 et seq., Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA 40 CFR Parts 1500-1508, and TVA's environmental review procedures.

National Environmental Policy Act

NEPA requires Federal agencies to consider the impact of their proposed actions on the environment before making any decisions. If an action is expected to have a significant impact on the environment, the agency proposing the action must develop a study for public and agency review. This study is an analysis of the potential impacts to the natural and human environment from the proposed action as well as from a range of reasonable alternatives. This study is called an Environmental Impact Statement (EIS). In making a decision on a proposed major action, the agency must consider the full range of alternatives addressed in the EIS. The CEQ regulations require Federal agencies to make environmental review documents, comments, and responses a part of their administrative record.

Environmental Impact Statement Process

As soon as possible after the decision to prepare an EIS is made, the Federal agency (TVA) prepares and makes available a Notice of Intent (NOI) to Prepare an EIS. This notice briefly describes the proposed action, reasonable alternatives, and probable environmental issues to be addressed in the EIS. The NOI also describes the scoping process for the particular project, and where and when public scoping meetings will be held. Normally there is a public input period of 30 days from the date of publication of the NOI in the *Federal Register*. TVA has prepared this Scoping Document to summarize the public input and comments from interested agencies received on the proposed action, the alternatives to be evaluated, and environmental and other major issues relevant to the project.

Based on the information obtained and decisions made during the project scoping process, a Draft EIS is prepared. The completed Draft EIS is distributed to interested individuals, groups, and federal, state, and local agencies. It is transmitted to the Environmental Protection Agency (EPA) who publishes a notice of its availability in the *Federal Register*.

The Draft EIS public comment period begins with the publication of the notice of availability by EPA in the *Federal Register* and normally lasts at least 45 days. During this public comment period, the agency may hold public meetings as a forum to obtain comments on the Draft EIS. Notice of public meetings is distributed through appropriate media and direct mailings.

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At the close of the Draft EIS public comment period, the agency will respond to the comments received and incorporate any required changes in the Final EIS. The completed Final EIS is sent to those who received the Draft EIS or submitted comments on the Draft EIS. It is also transmitted to EPA who publishes a notice of its availability in the *Federal Register*.

The agency makes the decision on the proposed action no sooner than 30 days after the notice of availability of the Final EIS was published in the *Federal Register*. This decision is based on the anticipated environmental impacts, as documented in the EIS, along with cost, schedule, technological and other considerations. The agency then issues a Record of Decision (ROD). The ROD normally includes: (1) what the decision was; (2) the rationale for the decision; (3) what alternatives were considered; (4) which alternative was considered environmentally preferable; and (5) any associated mitigation measures and monitoring, and enforcement requirements.

Appendix B.

Summary of Scoping Comments

1. Specific Resource Option Recommendations

Supply Side

Nuclear:

- Small modular nuclear plants, e.g., the Hyperion Power Module
- Nuclear fuel reprocessing/reuse
- Fast breeder reactor
- Promote fusion reactor research
- Gas Turbine Modular Helium Reactor, potentially developed at Arnold Air Force Base/Engineering Development Center in cooperation with Air Force
- Complete Yellow Creek Nuclear Plant

Coal:

- Use of gas from plasma arc coal gasification for electrical generation, e.g., work by Dr. Lou Circeo, Georgia Tech Research Institute
- Burn cleanest, lowest-sulfur coal available
- Replace old turbines in coal plants with new high efficiency turbines. Could gain 600 MW for ~\$1 billion with no increase in fuel use or emissions
- Stop use of coal from mountaintop removal mines
- Develop ash and scrubber sludge disposal sites that can be redeveloped as residential or industrial sites
- Promote development of carbon capture and storage

Solar:

- Space-based solar power, e.g., by Solaren Corp.
- Promote solar subdivisions
- TVA developed/owned large scale solar plants, rather than rely on other businesses and residents to produce bulk of solar
- Install PV on the miles of outdoor conveyors at fossil plants, use output for station service power
- Purchase PV panels in bulk from manufacturers, resell at cost to individuals, contract for their installation
- Solar cogeneration

Wind:

- Install wind turbines on Shawnee Fossil Plant elevated dry ash stacks

Biomass:

- Produce biofuel from algae at fossil plants using captured CO₂ and waste heat
- Recover methane (from anaerobic digestion and gasification) and use as power plant fuel; sources include sewage treatment plants, confined animal feeding operations, dairy farms, other non-landfill sources
- Cofiring biomass at existing thermal facilities
- Cofiring biomass at new natural gas facilities

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- Combustion of forest biomass, e.g., wood pellets, including those produced by better management of TVA timberlands
- Promote increased use of forest biomass for electric generation by TVA serving as consultant/aggregator/purchasing agent, or facilitating the establishment of 3rd party consultants/aggregators/purchasing agents to assist private non-industrial forestland owners interested in providing whole tree or post-harvest residue for fuel
- High temperature combustion of trash (metals included); consider Arnold AFB as potential site with necessary rail access

Natural Gas:

- Replace existing aging coal plants with generation from existing, state-of-art, underutilized combined cycle plants in TVA region
- Acquire and develop natural gas supplies

Hydro:

- Accelerate completion of HMOD program
- Addition of hydroelectric turbines to non-hydro dams - both TVA dams and others
- Incremental hydro
- In-river run-of-river turbines
- More pumped storage - including larger Hiwassee Dam-type systems

Renewable (general):

- Expand Green Power Switch Generation Partners program to pick up more upfront costs of new generating facilities
- Support community-owned wind and solar generation
- Direct TVA payments for installation of renewable generating systems by homeowners, businesses
- TVA loans for installation of renewable generating systems by homeowners, businesses

Hydrogen / Fuel Cells

- Explore co-location of hydrogen production facilities at fossil and especially nuclear plants, operate them during off-peak times, and then promote TVA-owned hydrogen filling stations for transportation fuels as well as residential, commercial, and industrial on-site fuel cells

Combined Heat and Power / Waste Heat Recovery

- Promote combined heat and power at industrial and commercial facilities
- Generation from waste heat recovery at natural gas compressor stations
- Heat pumps for heat recovery in commercial settings

Waste to Energy

- Promote waste-to-energy generation. It should be considered renewable.

Transmission

- Improve transmission line designs for public acceptance and the smaller available urbanized spaces. Consider new ES-series structures or similar. Use discounted power rates to help compensate for new TL ROW properties.

- Work directly with distributors or indirectly through TVPPA to provide distributors with better line and substation location and design services and standards of practice that coordinate with TVA standards
- Protect the transmission and distribution grid against Severe Space Weather Events (see http://www.nap.edu/catalog.php?record_id=12643)
- Cooperate with other utilities in developing 800-kV transmission system

Demand Side

- Energy storage to better integrate intermittent generation. Specific recommendation that each intermittent generation project should have accompanying storage equivalent to 10 minutes of projects output. A new form of capacitor storage was also mentioned.
- Electric vehicles and their integration for power storage
- Rate designs to change consumer behavior, promote energy efficiency
- Preferential rates for users of alternative energy sources
- Promote end use of natural gas - e.g., for heating, cooking, instead of more expensive, dirtier, less efficient electricity
- Reduction in (wasteful) energy use at TVA facilities, particularly at generating facilities
- Work with water systems to promote “local” water resources instead of distant resources with high energy use for pumping
- Work with water systems to maximize off-peak pumping (e.g., for refilling storage tanks, water harvesting)
- Encourage/partner with water systems to incorporate renewable energy sources and energy efficient equipment into water treatment and distribution system designs
- Promote water conservation and associated reductions in energy use during 26a permitting
- Promote use of geothermal heat pumps by increasing heat pump loan limit to at least \$20,000 to better fund installations
- Reduce/eliminate the cost of the \$150 home energy audit for low income households
- Provide loans for customer installation of renewable generation repayable through electric bills
- Purchase of negawatts under performance contracts
- Promote use of light-colored roofing materials
- Promote use of compact fluorescent light bulbs
- Promote development of and use of LED lighting
- Promote use of Spring Hill auto plant for construction of electric buses
- Publicize Federal and State incentives for energy conservation
- Promote the use of natural gas or solar-thermal absorption chillers or natural gas engine-driven chillers (instead of electricity) for air conditioning or refrigeration.
- Develop and market less-polluting fertilizers that require less energy to produce
- Promote the following measures organized by sector:
 - Residential Sector
 - Higher-efficiency appliances (air conditioners, refrigerators, stoves, water heaters, electronic devices)
 - Devices that save hot water (efficient washing machines, plumbing fixtures)
 - Automatic lighting controls
 - Building envelope improvements (insulation, window improvements) to reduce cooling, heating, and lighting needs

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- Water heater controllers for household applications, either through simple timers that turn off appliances during peak times or electronic controls activated by the utility system operator
- Increased emphasis on multi-family dwellings
- Commercial/Institutional Sectors
 - Higher-efficiency air conditioning, refrigeration equipment
 - High-efficiency fluorescent bulbs, lamp ballasts, and lighting fixtures
 - Lighting, cooling, space heating, and water heating controls
 - High-efficiency office equipment
 - Building envelope improvements
 - High-efficiency electric motors, drives, and controls
- Industrial Sector
 - Process improvements
 - High-efficiency electric motors, drives, and controls
 - Applicable commercial/institutional sector measures
 - Use of natural gas or solar energy (instead of electricity) to provide space heat, water heat, or industrial process heat
- Other Sectors
 - High-efficiency cooling and refrigeration equipment for the agricultural sector
 - High-efficiency electric motors, drives, and controls for mining and transport applications
 - High-efficiency lighting products for street lighting

Climate Change Mitigation

- Better manage TVA lands/forests for CO₂ sequestration
- Purchase forest land for CO₂ sequestration, with associated fish and wildlife benefits, and develop partnerships with conservation groups and resource agencies to assist in managing the properties
- Manage new and existing transmission line right-of-ways to promote native vegetation, recovery of T&E species. Establish off-site mitigation areas for loss of native forest and shrubs removed from ROWs and to offset CO₂ emissions.

2. Integrated Resource Planning Process Recommendations

A few commenters made specific recommendations about the planning process. Following is a summary of these recommendations.

The Overall Process

- Keep the process open and transparent
- Actively involve all interested parties including government agencies, consumer groups, and public interest groups
- Undertake the process without preconceptions about the adequacy of various resources
- Use true-cost accounting, including external social and environmental costs and benefits
- Prioritize energy efficiency
- Prioritize renewable energy
- Explain how greenhouse gas emissions/carbon credits are factored into the modeling
- Delay the IRP until Congress has enacted climate change legislation

- Address barriers to more effective implementation of demand-side options including rate designs and relationships with TVA distributors
- Consider the least environmentally damaging alternative as the preferred alternative
- Define criteria and process for monitoring achievement of key objectives
- Define a process for the regular periodic review and amendment of the IRP
- Define adequate mitigation measures to compensate for the resulting environmental impacts on natural and cultural resources as well as influences on climate change
- Describe necessary transmission system upgrades and evaluate their costs and impacts

Attributes of Supply-Side Options

Include the following in the evaluation of supply-side options:

- Capacity
- Availability what proportion and what time of year
- Efficiency – net electricity production per unit of fuel input
- Fuel costs
- Reliability
- Capital and operating costs
- Operating lifetime
- Environmental impacts including air emissions, liquid and solid wastes per unit of energy produced, land requirements including prime farmland, construction and decommissioning impacts, mitigation costs, and impacts from fuel production and transportation

Attributes of DMS Options

Include the following in the evaluation of DMS options:

- Applicability: To what sectors and end-uses can the DSM measure be applied? What is the size of the market for which the measure is applicable?
- Fuel type: For fuel-switching measures, what fuel is used?
- Reliability and lifetime: How has the measure performed in previous applications? What is its typical lifetime?
- Efficiency: How much energy and power does the measure save, relative to standard equipment?
- Capital and operating costs: What does it cost to own, operate, and maintain the technology?
- Environmental impacts: What are the impacts of the technology, relative to standard demand-side options?

3. Scoping Questionnaire Responses

An 11-part scoping questionnaire was available on the IRP website and in paper form at the public scoping meetings. 845 people filled out at least part of the questionnaire. The questionnaire asked respondents for their zip code; over $\frac{3}{4}$ of the respondents were Tennessee residents and about 7% were from outside the TVA region. The responses to this question on the geographic location of respondents are incorporated into Figure 2 in the main body of this scoping report.

Following is a summary of the questionnaire responses; this summary omits the Questions 3, 6 and 10 which are specific to TVA's non-power related natural and cultural resource stewardship activities. Those activities are the subject of the separate Natural Resources Plan EIS process.

Question 1 asked “Rank the following public benefits provided by TVA in terms of their importance to you on a scale of 1 (least important) to 5 (most important).” Figure A-1 shows the rankings of the seven public benefits. Electricity production had the highest number high importance ranks (#4 and #5), followed by environmental protection and management of natural. Question 1 also allowed respondents to write in an answer in an “other” field; Table A-1 summarizes the 47 “other” responses.

Figure A-1. Ranking of public benefits provided by TVA.

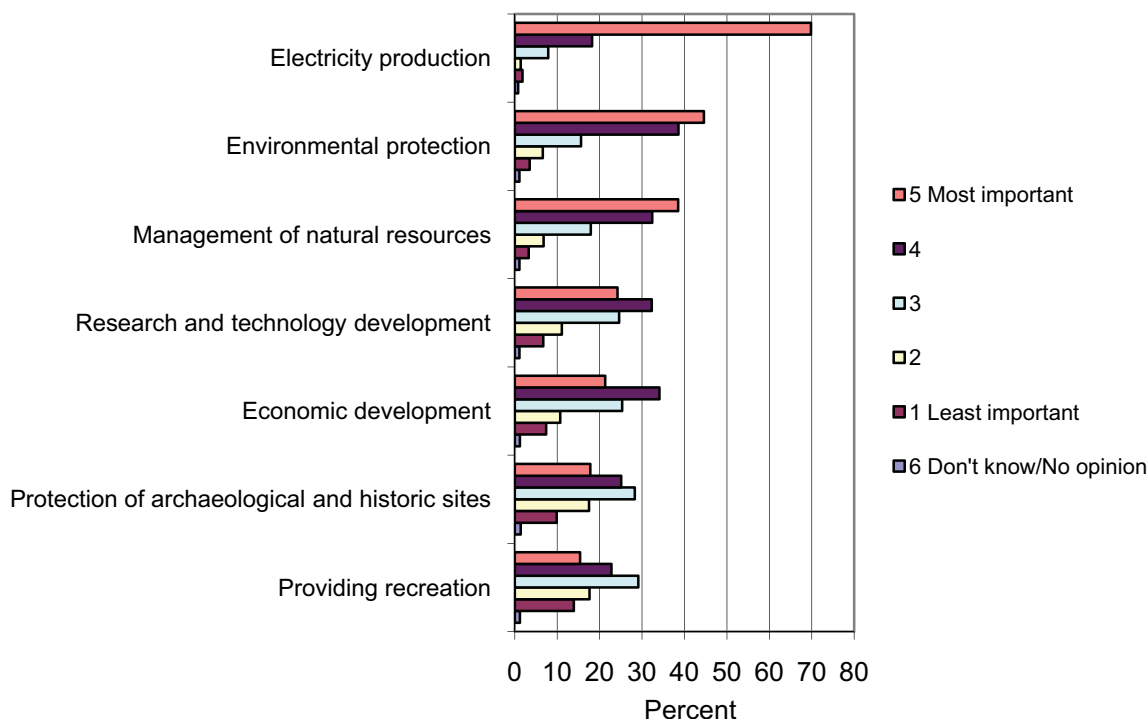


Table A-1. Summarized open-ended responses to the “other” field of Question 1 on the importance of public benefits provided by TVA. Responses are listed in descending order of frequency.

More renewable energy
Natural and cultural resource stewardship issues
Energy efficiency / demand reduction/energy conservation
Low cost electricity
Flood control
Stop / reduce use of coal
More nuclear generation
Enhanced transmission system/smart grid
Clean energy
Decrease greenhouse gas emissions
Alternative energy sources
Leadership in energy production and use
Health and safety

Table A-1. Summarized open-ended responses to Question 1 (continued)

Water quality
Stop / reduce nuclear generation
Green job creation

Question 2 was more specific to power issues and asked “Rank the following power generation issues in terms of their importance to you on a scale of 1 (least important) to 5 (most important)”. Figure A-2 shows the rankings of the ten power issues. Reliability had the highest number of high importance ranks (#4 and #5), followed by the closely grouped rankings of amount of power bill, air pollutants, and smart grid. Question 2 also allowed respondents to write in an answer in an “other” field; Table A-2 summarizes the 40 “other” responses.

Figure A-2. Ranking of power generation issues.

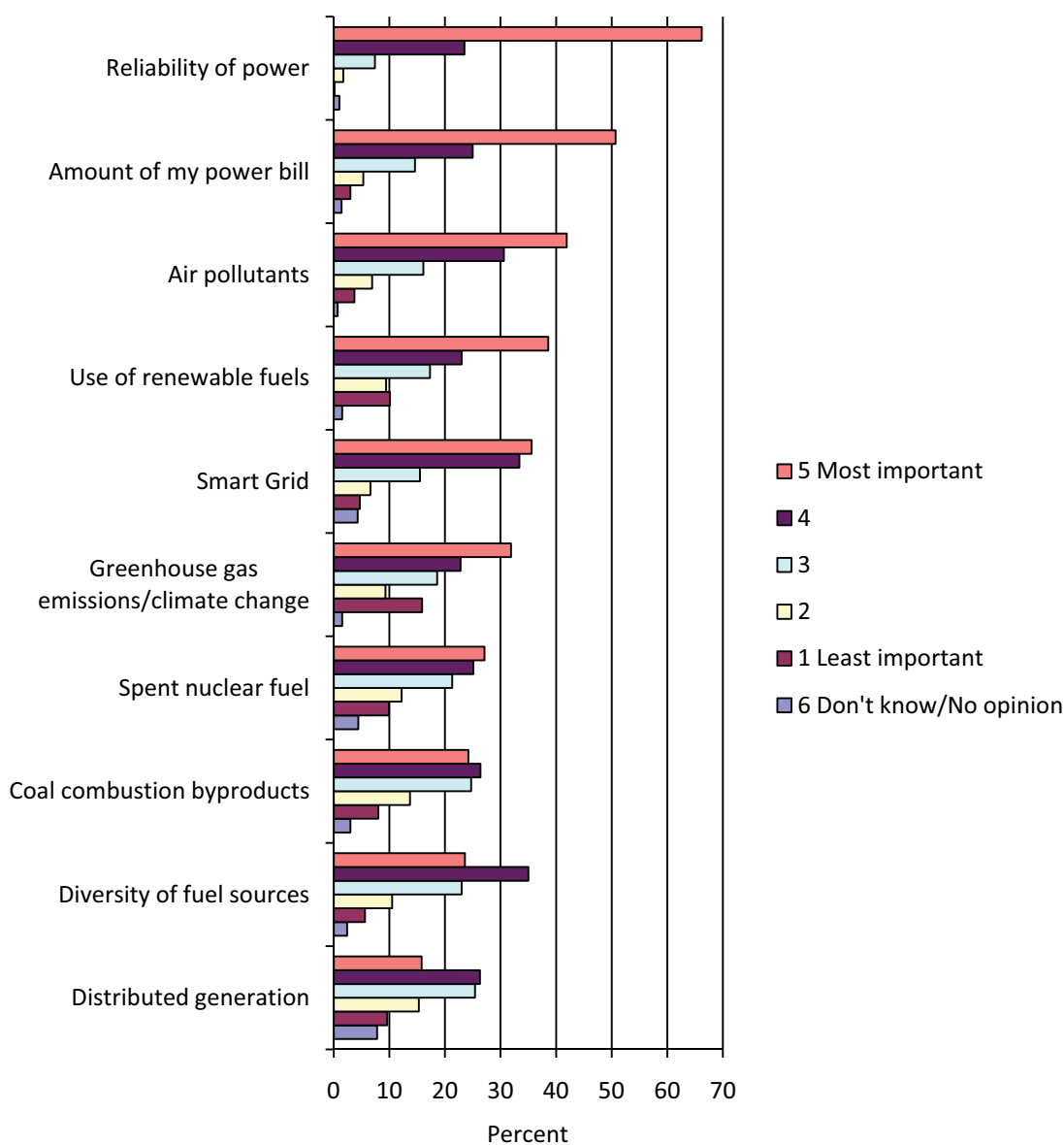


Table A-2. Summarized open-ended responses to the “other” field of Question 2 on the importance of various power issues. Responses are listed in descending order of frequency.

More nuclear generation
More renewable energy
Energy efficiency/demand reduction/energy conservation
Stop / reduce use of coal
Low cost electricity
Stop / reduce nuclear generation
Leadership in clean/affordable energy
Stop / reduce use of uneconomical renewable generation
More hydroelectric generation
Reverse / net metering
Water
More research and development, innovation
Finish Yucca Mountain nuclear waste repository
Recycle/reuse spent nuclear fuel
Maintain high reservoir water levels
Climate change is natural, not human-influenced

Questions 4 and 5 asked about the respondents’ willingness to take actions to reduce their use of electricity and install their own renewable generation. Question 4 (Figure A-3) was “TVA is developing new programs to help consumers reduce their use of electricity. Some of these will require consumers to take action. How likely are you to take the following actions?” Question 5 (Figure A-4) modified Question 4 by adding a provision for financial incentives: “Considering your answers to the previous question, how likely would you be to take the following actions if there were financial incentives to help offset their cost?”

Many respondents were likely to install high efficiency appliances, improve their insulation, and change the timing of their electricity use in response to time of day rates. Their likelihood of taking these three actions, as well as reducing water consumption, increase with financial incentives. There was resistance to allowing TVA or the distributor to alter respondents’ electricity use by turning off appliances or changing thermostat settings.

Figure A-3. Willingness to take actions to reduce use of electricity and install renewable generation.

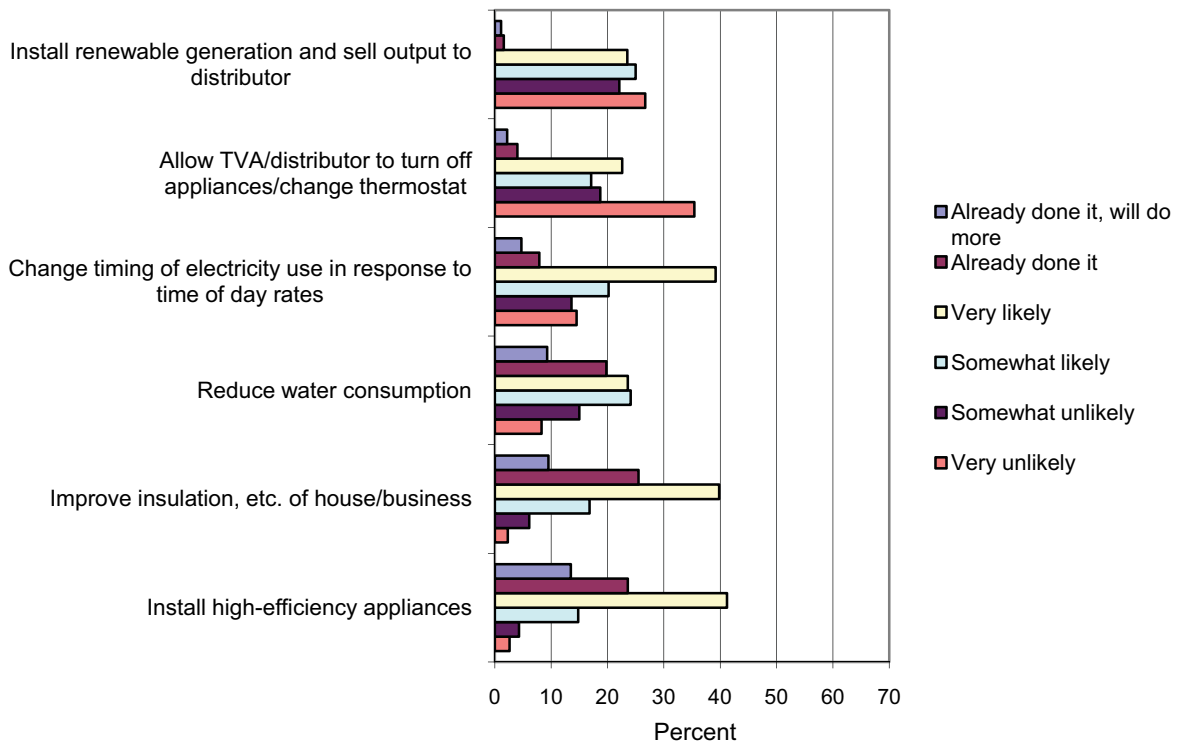
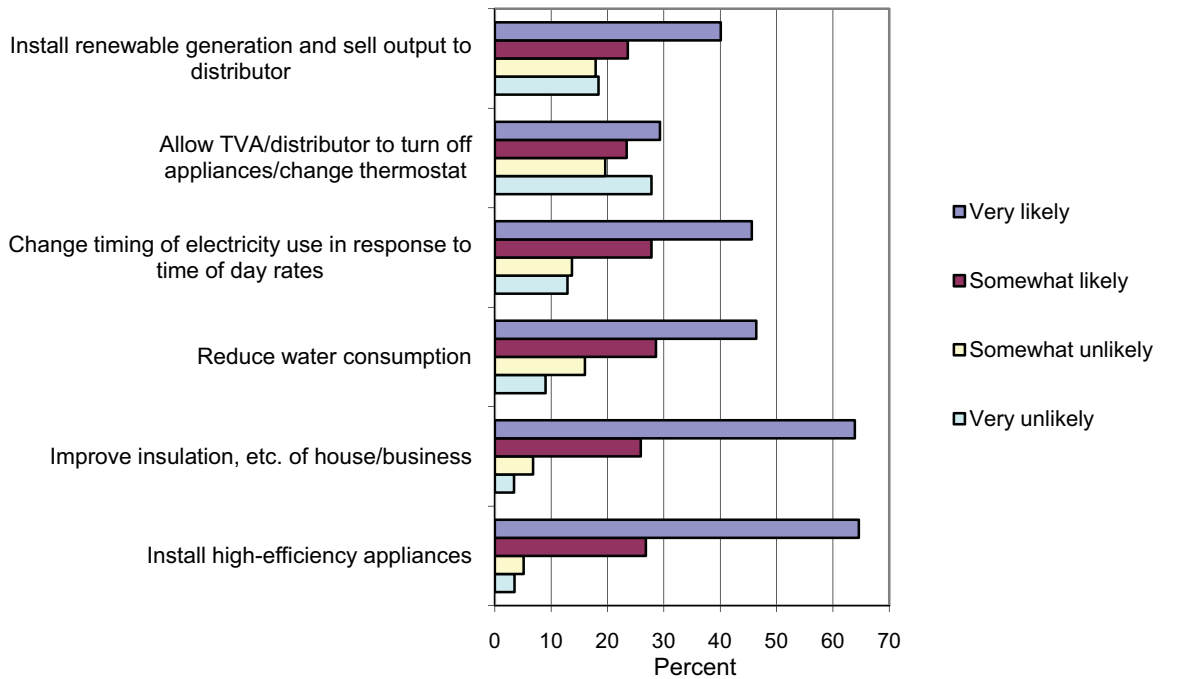
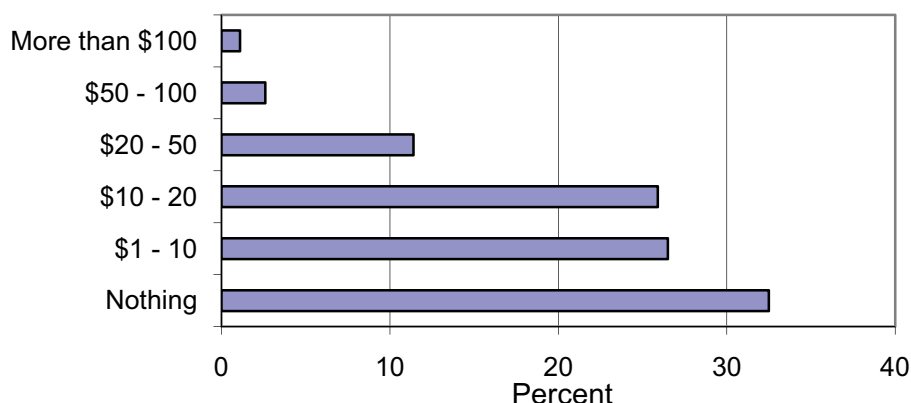


Figure A-4. Willingness to take actions to reduce use of electricity and install renewable generation with financial incentives.



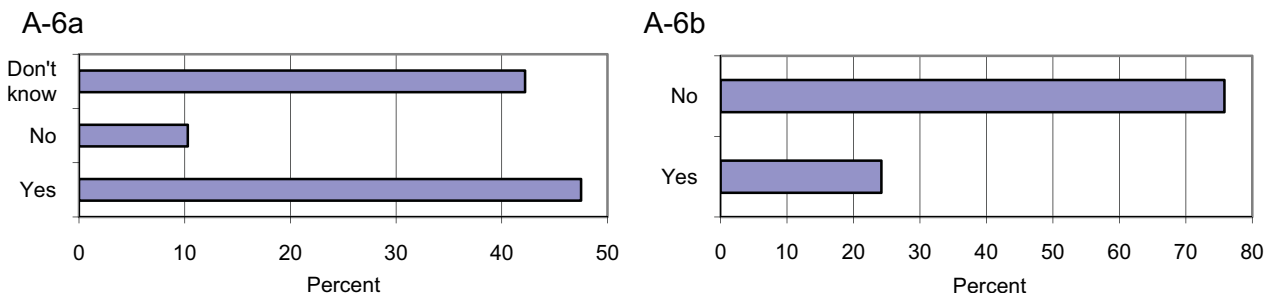
Questions 7 stated “TVA has a goal of increasing the proportion of its power generation from sources that do not emit greenhouse gases from 30 percent to 50 percent. This change could increase the cost of electricity. How much more would you be willing to pay per month for TVA to make this change?” About a third of the respondents were unwilling to pay more for TVA to increase its generation from non-greenhouse gas emitting sources; about half of respondents were willing to pay either \$1 – 10 or \$10 – 20 per month more (Figure A-5).

Figure A-5. Willingness to pay more for TVA to increase generation from non-greenhouse gas emitting sources.



Questions 8 and 9 asked about respondent’s familiarity with and participation in TVA’s Green Power Switch program. Question 8 asked “Is TVA’s Green Power Switch program available in your area? This program gives customers the choice of buying power generated from renewable sources.” If Green Power Switch was available to them, they were asked Question 9: “Are you a participant in TVA’s Green Power Switch program?” Almost half of respondents stated Green Power Switch was available in their area (Figure A-6a), and about a quarter of these respondents were Green Power Switch subscribers (Figure A-7b). The 12 percent subscription rate among respondents is much greater than the overall subscription rate of a fraction of one percent. 42 percent of respondents did not know if Green Power Switch was available in their area.

Figure A-6. Availability of the Green Power Switch program (a) and participation in the Green Power Switch program (b).



The last question, Question 11, was open-ended and asked “What is your biggest concern related to the TVA power system?” 647 respondents answered the question, and many of them listed more than one concern (Table A-3). The cost of power was the most frequently

mentioned concern; it was mentioned in about a quarter of the responses and almost twice as often as the second most frequent concern.

Table A-3. Summarized responses to the open-ended Question 11 on biggest concerns related to TVA’s power system. Responses are listed in descending order of frequency, and do not include responses specific to TVA’s natural and cultural resource stewardship mission.

Cost of power (in general; some specific cost issues are listed below)
Pollution / environmental damage, including air and water pollution, loss of wildlife habitat
More renewable generation, including wind, solar, biomass, incremental hydro
Stop / decrease use of coal
Problems with TVA leadership and management
More nuclear generation
Reliability
Stop / decrease nuclear generation
Climate change is natural, not human-influenced
Coal ash and waste management (in general)
Ability to meet future demand
Spent nuclear fuel
Increase energy efficiency, demand response, conservation efforts
Continued reliance on old facilities, especially coal plants
Cost of future environmental compliance requirements
Politics and political interference
The Kingston Fossil Plant ash spill
More research and development, innovation
Lack of maintenance, cost-cutting at generating facilities
Greenhouse gas emissions reduction
Stop use of coal from surface mines, mountaintop removal mines
Stop / reduce use of uneconomical renewable generation
Overemphasis on power system / under-funding of resource stewardship
Financial management and restrictions imposed by debt ceiling
Diversity of fuel sources
Modernize transmission system, convert to smart grid
Hydroelectric system operation, including reservoir levels, river dewatering, equitability
Accelerate modernization of hydroelectric generators
Continue using coal
The risk of nuclear disaster
Loss of public credibility and negative media coverage
Problems with the Green Power Switch program – funds do not pay for green power, poor incentives, inadequately informed distributors
The future availability of water
Adequacy of the future workforce
Prepare for and promote electric vehicles
Reduce reliance on natural gas
Power system security
More distributed generation including waste heat recovery, district heating
Cost of fuel
Retention of industry

Table A-3. Summarized responses to the Question 11 (continued)

Power sales to national grid increasing local power costs
Potential terrorist activities
No more big hydroelectric dams
Need for more partnering with local businesses, communities on power issues
More pumped storage hydroelectric generation, including Hiwassee Dam-type systems
Ability of TVA / distributor to control individual's power use
Electric utility deregulation, ability to remain competitive
Safe operation of generating facilities
Too much emphasis on cheapest, easiest purchased power / not enough TVA-owned generation
High power rates for low income populations
Long term decommissioning and disposition of generating facilities
The future of the TVA Koppers Coal Reserve
The power sales contract with Alcoa, Inc.
Excessive TVA control over customer-owned generation
Energy independence
Excessive concern for low rates
Remove TVA from federal control, operate as private utility
Power revenues paying for non-power activities for which other agencies get appropriations
Increase natural gas generation
Promote breeder reactors
TVA's shrinking support of local distributors

Appendix C.

Integrated Resource Plan Environmental Impact Statement Preliminary Outline

Cover Sheet

Summary

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