

Aerial photo showing the hydroelectric Fontana Dam on the Little Tennessee River in North Carolina. The dam was constructed in the early 1940s at the height of World War II to accommodate skyrocketing energy demands.

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President Franklin D. Roosevelt (seated) signs the Tennessee Valley Authority Act, creating TVA on May 18, 1933.

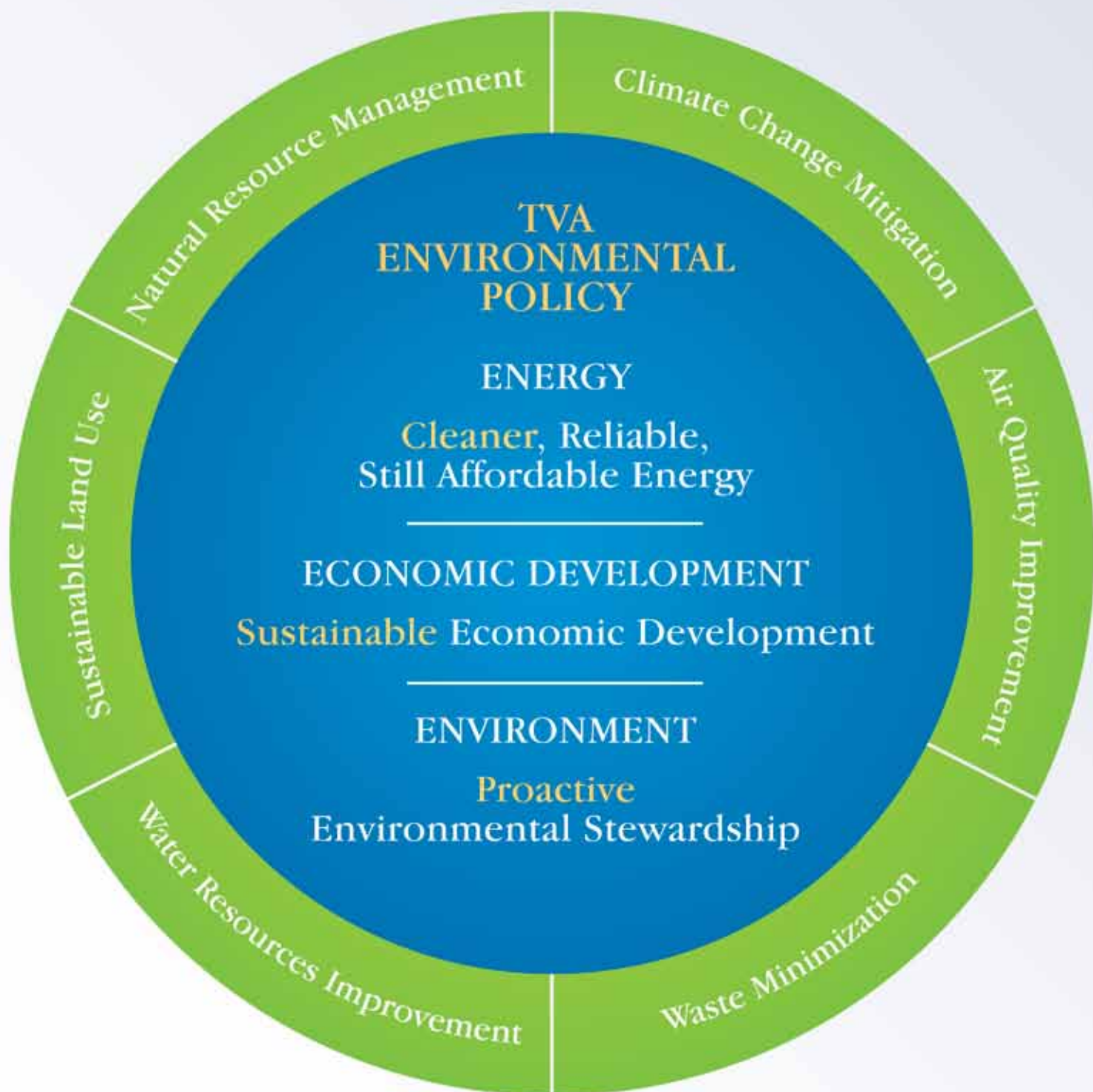


Trout fishing in the Clinch River near Norris Dam is just one of the many recreational amenities available to the people of the Tennessee Valley.



Construction overlook of the Norris Dam located in Anderson and Campbell Counties in Tennessee, c. mid-1930s.

TVA's Environmental Policy



1 TVA's Environmental and Energy Future

After more than two years of development, the Tennessee Valley Authority (TVA) has completed its Integrated Resource Plan (IRP), entitled TVA's Energy and Environmental Future. This IRP is the product of extensive analysis and collaboration with many of TVA's partners and stakeholders.

Many electric utilities use the integrated resource planning process as a decision tool to help define both near- and long-term challenges. For TVA, the process was expanded to consider impacts on the environment and the economy. The IRP provides guidance in choosing the best resource options to meet future energy demand by considering future uncertainties, power reliability, financial, economic and environmental impacts associated with those options.

TVA's IRP has been developed to support TVA's mission for meeting the electric power needs of the Tennessee Valley region in a sustainable manner. The 20-year strategy recommended by the IRP provides direction for decisions that require a long lead time. It is consistent with TVA's Environmental Policy and its renewed vision – to become one of the nation's leading providers of low-cost and cleaner energy by 2020. The renewed vision and this IRP will better equip TVA to meet the substantial challenges facing the electric utility industry for the benefit of TVA stakeholders.

1.1 TVA Overview

1.1.1 Yesterday – An Innovative Solution

TVA stands as one of President Franklin D. Roosevelt’s most innovative ideas. He envisioned TVA as “a corporation clothed with the power of government but possessed with the flexibility and initiative of a private enterprise.”

TVA is a federal agency and corporation, wholly owned by the people of the United States and tasked by Congress to:

- Improve the quality of life for the residents of the Tennessee Valley region
- Foster economic development
- Promote conservation and wise use of the region’s natural resources

Since its inception, TVA has worked to improve the quality of life for the people who live in the TVA service area. For more than 75 years, TVA has succeeded in its unique mission of serving the region through energy, environment and economic development. TVA established integrated resource management as the means for solving the competing and often conflicting interests of its mission, such as managing the Tennessee River system for navigation, flood control, recreation and power production. While the challenges evolved and new ones developed, TVA has relied on its strategy of devising integrated solutions.

1.1.2 Today – The Mission Continues

TVA’s multi-faceted mission of providing low-cost, reliable power; serving as a catalyst for economic development; protecting the environment; stimulating technological innovation and managing an integrated river system in the Tennessee Valley region is the same today as it was 78 years ago.

TVA operates the nation’s largest public power system. It provides power to more than nine million people, through 155 distributors of TVA power and 56 directly served customers, in an area encompassing 80,000-square-miles, including most of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina and Virginia.

Low-Cost Power

Maintaining a diverse portfolio of generation resources helps TVA keep power rates in the Tennessee Valley competitive regionally and nationally. TVA operates 56 active coal-fired units, six nuclear units, 109 conventional hydroelectric units, four pumped-storage units, 87 simple-cycle combustion turbine units, eight combined cycle units, nine diesel generator units, one digester gas site, one wind energy site and 14 solar energy sites.¹

¹As of Sept. 30, 2010

A portion of TVA's electrical supply is purchased from third-party operators under long-term purchased power agreements (PPAs). This diverse supply portfolio has enabled TVA to meet the region's energy demands, reliably and at competitive prices.

While keeping prices low, TVA has maintained world-class transmission reliability. TVA's transmission system is one of the largest in North America. It efficiently delivered more than 177 billion kilowatt-hours to customers in 2010. For the past 12 years, the system has achieved 99.999 percent reliability.

Economic Development

A benefit of TVA's large power system is the ability to produce power at prices below the national average, thus attracting industry to the region and making TVA a national leader in economic development. During the past five years, TVA has helped attract or retain 265,000 jobs in its service territory and has secured more than \$27 billion in capital investment for the region through its Valley Investment Initiative program.

The Watts Bar Nuclear Plant's Unit 2 project created 3,200 construction jobs.

After completion in 2013, it will provide 300 permanent jobs.

In 2010, TVA worked in partnership with state and local officials in the recruitment and/or expansion of 150 companies in the TVA service area. One of TVA's most recent economic development initiatives has been the Megasites program. Through the Megasites program, five large industrial sites were sold to Dow Corning/Hemlock Semiconductor, Volkswagen, Paccar, Toyota and SeverCorr.

Environmental Stewardship

TVA's environmental stewardship (non power) programs include managing the Tennessee River and approximately 293,000 acres of reservoir lands to protect natural resources, to enhance economic development, and to provide recreational opportunities, adequate water supply and improved water quality within the Tennessee Valley watershed.

TVA's Environmental Policy provides objectives for an integrated approach related to providing cleaner, reliable and affordable energy, supporting sustainable economic growth, and engaging in proactive environmental stewardship. The Environmental Policy provides additional direction in several environmental stewardship areas, including air quality improvement, climate change mitigation, water resource protection and improvements, sustainable land use and natural resource management.

Aligning with the objectives of the Environmental Policy and TVA's renewed vision, TVA is committed to continue minimizing the environmental impacts of its operations. In 1995, TVA was the first utility in the nation to participate in a voluntary greenhouse gas reduction program sponsored by the U.S. Department of Energy. As a result, TVA has reduced or avoided more than 305 million tons of carbon dioxide (CO₂) from being emitted into the atmosphere.

Today, air quality across the region is the best it has been in more than 30 years. Since 1977, TVA has spent more than \$5 billion on clean air controls. The controls have reduced sulfur dioxide (SO₂) emissions by 82 percent and nitrogen oxide (NO_x) emissions by nearly 86 percent from 1990 levels.

Technological Innovation

TVA is also committed to technological innovation. In 2000, TVA developed the first wind farm in the Southeast, and five of today's 14 solar photovoltaic sites were constructed for its green power pricing program, Green Power Switch[®]. In 2001, the program was expanded to include methane co-firing at Allen Fossil Plant in Memphis, Tenn.

Recently, TVA partnered with Nissan North America, the State of Tennessee, the Electric Transportation Engineering Corporation and local distributors to develop a plan to deploy electric vehicle charging stations. In January 2011, TVA and the Electric Power Research Institute unveiled an electric vehicle charging station that can make electricity from sunlight, store it and put it back in the power grid when needed.

Integrated River Management

TVA has remained focused on its mission to manage the nation's seventh-largest river system. TVA works constantly to balance energy production, navigation, flood control, recreation and water supply to provide multiple benefits from its management of the river system and associated public lands. In an average year, TVA prevents about \$240 million in flood damage in the Tennessee Valley region and along the Ohio and Mississippi rivers.

TVA Customers

TVA delivers electricity to three main customer groups—local utilities (distributors of TVA power), directly served customers and off-system customers. A priority for TVA is to serve customers by meeting their needs in a reliable, responsible manner. Partnership with the distributors of TVA power is crucial in the delivery of low-cost, reliable power to end-use customers.

Distributors of TVA power comprise the bulk of TVA's customer base and are the backbone of the region's power distribution system. Accounting for roughly 81 percent of total

TVA sales and 87 percent of total TVA revenue, the distributors consist of municipally-owned and consumer-owned utilities. TVA generates and delivers electricity to the local utilities, which deliver electricity to their residential, commercial and industrial end-use customers. Municipal distributors comprise the largest block of TVA customers. Many of the consumer-owned cooperative utilities were formed to bring electricity to then-sparsely populated rural, remote areas of the Tennessee Valley region.

Large industries and federal installations, such as Oak Ridge National Laboratory, that buy electricity directly from TVA, account for 19 percent of total sales and 13 percent of TVA's total revenue. The remainder of TVA's sales and revenue comes from off-system customers that buy power from TVA on the interchange market.

TVA power contracts govern the relationships between TVA and the distributors of TVA power, including the pricing structure under which power is sold. These contracts provide for distributors' total power requirements, meaning TVA agrees to generate and deliver enough electricity to meet the distributors' full electric load, including reserves, both now and in the future.

1.1.3 Future – A New Era

In the face of challenging economic conditions, tougher emissions standards, an aging generating fleet and emerging customer needs, TVA needed to examine its strategic direction. In August 2010, TVA President and Chief Executive Officer, Tom Kilgore, announced a renewed TVA vision. The renewed vision is the first step toward establishing a new strategic direction for TVA.

TVA's renewed vision – to become one of the nation's leading providers of low-cost and cleaner energy by 2020 – will help the region and the nation achieve a cleaner energy future. The vision has three components:

1. To be the nation's leader in improved air quality
2. To be the nation's leader in increased nuclear production
3. To be the Southeast's leader in increased energy efficiency

In support of the renewed vision, TVA plans to idle nine coal-fired units (1,000 MW) over the next five years.

TVA will work to achieve this vision while being dedicated to improving its core business of low rates, high reliability and responsibility.

1.2 Looking Ahead

1.2.1 Bridging the Gap

TVA undertook the IRP process at a critical time. Nationally, there is a consensus that energy should be produced in cleaner ways—a direction that TVA has embraced in specific goals set forth in its environmental policy and renewed vision. Achieving these goals and keeping electricity affordable is a significant challenge. Analyses of stakeholder concerns, operational constraints and the trade-offs necessary to develop an acceptable long-term solution make the challenge particularly difficult, especially when coupled with the recovering economy and regulatory uncertainty facing the utility industry.

TVA last completed an Integrated Resource Plan, entitled *Energy Vision 2020* (EV2020), in 1995. EV2020 was a comprehensive assessment of alternative strategies developed for meeting future electricity needs through 2020 based on projected future conditions in the Tennessee Valley region.

While EV2020 accurately reflected the challenges, forecasts and opportunities at the time of publication, significant changes in the industry and changing customer demand called for a fresh analysis and plan.

This IRP was built from the foundation established in EV2020, incorporates changes that have transpired and will ensure the best possible solutions are implemented for TVA and its stakeholders.

1.2.2 Challenges Facing TVA

The size of TVA's power system and its influence on the region's economy, environment and resources make integrated resource planning significant to the public it serves. The competitive success of businesses and industries, as well as the ability to sustain and improve the quality of life for the millions served by TVA electricity, are significantly impacted by the decisions that will be guided by the results of the IRP process.

Electricity cannot yet be stored economically in meaningful quantities, so the supply of electricity must constantly be balanced with the demand. Therefore, electricity providers such as TVA must project the future demand and take the necessary steps to meet the forecasted demand. This involves the construction of generating capacity and the procurement of purchased power. Given the long lead times required to plan, permit and build generating facilities, demand forecasts involve 10- to 20-year outlooks.

Effective transmission is usually a cost-effective means of providing power system flexibility and reliability. However, potential effects on water, vegetation, wildlife and other environmental concerns make this an option that must be carefully evaluated.

Transmission expansion also requires long lead times and is a vital component in meeting forecasted demand. It is particularly necessary to acquire renewable energy, which tends to be located outside TVA's service area and is intermittent in nature.

In addition to building generating facilities and purchasing power from independently owned facilities through long-term contracts, TVA and distributors of TVA power can meet demand by deploying programs that encourage energy efficiency and reduce demand during daily periods of peak power use. These activities entail associated uncertainty and risk that must be managed to ensure reliability.

Designing and executing an effective strategy is a major planning challenge for all electric utilities. TVA meets the challenge by working with stakeholders to design a long-term resource plan that recognizes the choices that must be made to achieve a common goal of an affordable, clean and reliable supply of electricity.

1.3 Integrated Resource Planning

1.3.1 Role of the Integrated Resource Plan

Integrated resource planning is a crucial element for success in a constantly changing business and regulatory environment and is based on comprehensive, holistic and risk-aware analysis. The integrated approach considers a broad spectrum of feasible supply- and demand-side options and assesses them against a common set of planning objectives and criteria, including environmental impact.

The IRP objective is to help meet future customer demand by identifying the need for generating capacity and determining the best mix of resources to fill the need. The capacity gap is the difference between the projected firm (or known) requirements and existing firm supply.

The following strategic principles guided development of this IRP:

- Mitigate risk at a reasonable cost
- Balance generation resources to reduce supply and price risk
- Balance production and load
- Minimize environmental impacts of the portfolios
- Provide incentives to customers to optimize the load factor
- Provide flexibility to adapt to changing market conditions and future uncertainty

- Improve credibility and image through a comprehensive, balanced and transparent approach
- Integrate perspectives of internal and external stakeholders throughout the process

1.3.2 Integrated Resource Planning Process

Instead of one correct answer, this IRP entails a robust, “no-regrets” plan that balances competing objectives while reducing costs and risks and retaining the flexibility to respond to future risks and opportunities.

This IRP was framed to assess future demand and the cost and quantity of future supply options. Therefore, forecasts of various inputs (e.g., inflation, commodity prices and environmental regulations) were simultaneously evaluated. Constraints (e.g., corporate strategic and environmental objectives) were considered as different combinations of strategies and futures were analyzed and evaluated. Afterward, additional extensive computer modeling, analyses, public input, reviews and dialogue with TVA’s leadership led to the consideration of strategic alternatives.

TVA recognizes that the future is uncertain and that forecasts and stakeholder concerns can change. To take advantage of updated information and encourage ongoing public involvement in defining the region’s future energy needs, TVA is committed to begin the next IRP effort by 2015.

“No-regrets” is a plan that best balances competing objectives while reducing costs and risk and retaining the flexibility to respond to future risk and opportunities as they unfold.

1.4 IRP Deliverables

1.4.1 Draft and Final IRP Documents

The Draft IRP was released Sept. 15, 2010, for public review and comment. It provided a broad look at all options considered by TVA and the long-term implications of various business strategies.

The final IRP recommends a robust, flexible strategy that supports TVA’s renewed vision. The Recommended Planning Direction entails an outcome that balances costs, efficiency in electricity generation, reliability, energy efficiency, environmental responsibility and competitive prices for customers.

1.4.2 Natural Resource Plan

Since the June 15, 2009, publication of the IRP Notice of Intent, TVA determined that planning processes for the Environmental Policy goals that are not closely tied to energy production and consumption would be better addressed in a separate study.

Therefore, a Natural Resource Plan will evaluate the implementation of TVA's reservoir lands planning, natural resource management, water resources management and recreation processes and strategies. The content of the accompanying environmental impact statement will be consistent with TVA's Environmental Policy, TVA's Land Policy, the previous Shoreline Management Initiative Environmental Impact Statement and the Reservoir Operations Study Environmental Impact Statement.

1.4.3 Draft and Final Environmental Impact Statement

As a federal agency, TVA must comply with the National Environmental Policy Act of 1992 (NEPA). The act requires all federal agencies to consider the impact of its proposed actions and alternatives on the environment before making decisions with potential environmental impacts. The NEPA process provides a structured means for analyzing competing options and for involving the public in TVA's decision-making process. The primary product from the NEPA process is an environmental impact statement (EIS).

Even though the IRP and the associated EIS were combined into one document for EV2020, they are published as two separate documents for this IRP. The components of the associated EIS were incorporated into the overall integrated resource planning process. This provided a preferred resource plan that focuses on reducing costs and risk while improving TVA's environmental performance.

TVA chose to develop a programmatic level EIS as opposed to a project- or site-specific document because of the broad nature of integrated resource planning.

As part of the final IRP, TVA prepared an associated EIS in accordance with the NEPA 42 USC §§ et seq., Council on Environmental Quality regulations for implementing NEPA.

1.5 IRP Outline

This IRP consists of nine chapters and six appendices.

Chapter 1	TVA's Environmental and Energy Future – history of TVA, TVA overview, looking ahead, the IRP's role and purpose, the goals and objectives of this IRP, the overall process, release of the Draft IRP and the associated EIS, incorporation of public input and IRP deliverables
Chapter 2	IRP Process – seven distinct steps of the IRP process and how public participation was incorporated in each step
Chapter 3	Public Participation – public participation components during this IRP process and summary of the valuable input received
Chapter 4	Need for Power Analysis – TVA's need for power analysis, TVA power supply, base-load, intermediate, peaking, storage resources and TVA's generation mix
Chapter 5	Energy Resource Options – potential supply- and demand-side options for future TVA power portfolios
Chapter 6	Resource Plan Development and Analysis – overview of scenario and strategy development, key uncertainties that defined the scenarios, planning strategies, portfolio development, planning strategy scorecard (including ranking and strategic metrics), scorecard calculation and planning strategy evaluation
Chapter 7	Draft Study Results – results from the Draft IRP analysis which includes the identification of the preferred planning strategies
Chapter 8	Final Study Results and Recommended Planning Direction – results from the final IRP study which includes the identification of the Recommended Planning Direction
Chapter 9	Next Steps – identifies next steps and recommendations
Appendix A	Method for Computing Environmental Metrics – process and results from the analysis used to determine the impact of the Recommended Planning Direction on the TVA environment
Appendix B	Method for Computing Economic Impact Metrics – process and results from the analysis used to determine the impact of the Recommended Planning Direction on the TVA economy
Appendix C	Energy Efficiency and Demand Response – process used to develop EEDR portfolio used in the Draft IRP and final analysis for the Recommended Planning Direction
Appendix D	Development of Renewable Energy Portfolios – process used to develop the renewables portfolio used in the Draft IRP and the final analysis for the Recommended Planning Direction
Appendix E	Draft IRP Phase Expansion Plan Listing – 20-year expansion plans for each strategy evaluated during the Draft IRP analysis
Appendix F	Stakeholder Input Considered and Incorporated – comments were reviewed in detail and input was incorporated

