

## Learn More About TVA

Want to know more about the nation's largest public provider of electric power? Go to [www.tva.com](http://www.tva.com).

### Other important sources of information:

- Get up-to-the-hour reservoir-level information and water-release schedules at <http://lakeinfo.tva.com>, or call one of these numbers:  
  
Knoxville, Tennessee: 865-632-2264  
Chattanooga, Tennessee: 423-751-2264  
Muscle Shoals, Alabama: 256-386-2264  
Elsewhere in the Tennessee Valley: 800-238-2264 (toll-free)  
TDD (hearing impaired): 800-438-2264
- Find out about employment opportunities at [www.tva.com/employment](http://www.tva.com/employment).
- Read more about TVA economic development at [www.TVAed.com](http://www.TVAed.com).
- Learn about shoreline property use and current land-use actions at [www.tva.com/river/landandshore](http://www.tva.com/river/landandshore).
- Locate TVA reservoirs and power plants at [www.tva.com/sites](http://www.tva.com/sites).
- Shop for topographic maps, aerial photography, and navigation charts at <http://maps.tva.com>, or call 800-MAPS-TVA (800-627-7882).
- Browse our catalog of surplus materials at [www.tva.com/surplus](http://www.tva.com/surplus), or call 615-374-7400.
- TVA Watershed Teams work to improve water quality and reservoir access across the Valley. Contact your team at [www.tva.com/river/landandshore/landuse\\_contacts.htm](http://www.tva.com/river/landandshore/landuse_contacts.htm).
- Get information on investing in TVA power bonds at [www.tva.com/finance](http://www.tva.com/finance).

# Valley facts

*a guide to the  
Tennessee Valley Authority*

**www.tva.com**

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## All About the Tennessee Valley Authority



**T**he Tennessee Valley Authority is the nation's largest public power provider, generating electricity that serves about 8.6 million people through local distributors. This unique federal corporation provides reliable, affordable electricity for consumers in the seven-state Tennessee Valley region. But TVA does much more than generate power. It also works to support economic development in the Valley and serves as an environmental steward of the nation's fifth-largest river system.

# What TVA Does

## Supplies reliable, affordable power

TVA is on the job 365 days a year. It generates electricity at 29 hydroelectric dams, 11 coal-fired plants, six combustion turbine sites, three nuclear plants, a pumped-storage hydropower plant, and 18 green power sites that employ wind turbines, methane gas, and solar panels. That energy travels through 17,000 miles of transmission lines and a network of 158 local distributors to reach the homes and businesses of about 8.6 million people. TVA also serves 61 large industries directly. In addition, research activities at TVA showcase technologies that will shape the future of power production and delivery.



*Learn more online at [www.tva.com/power](http://www.tva.com/power).*

## Supports a thriving river system

TVA manages the Tennessee River system in a comprehensive way to ensure that various goals are appropriately supported. TVA dams prevent millions of dollars in flood damage annually and generate clean, efficient electric power. The river highway formed by TVA's dams and locks—652 navigable miles on the Tennessee River alone—helps speed more than 50 million tons of goods to market each year. Careful stewardship protects invaluable wildlife habitat and a vast supply of drinking water that serves more than four million people. TVA also manages about 100 public recreation areas that offer opportunities



for boating, fishing, hiking, and camping.

TVA holds all these uses of the river in a delicate balance. It has managed the river system since 1933, and its years of stewardship experience add up to one clear result: skilled and dedicated protection of the Valley's water and land resources.

*Learn more online at [www.tva.com/river](http://www.tva.com/river).*

## Stimulates economic growth

For more than 70 years, TVA has been working to help generate prosperity in the Tennessee Valley. In partnership with public and private organizations, TVA has helped attract a diverse set of major industries that have fostered a highly talented workforce in the region. Through its economic development programs, TVA offers an abundance of services and financial resources, such as capital investment loans for new and expanding businesses, site-selection services, small- and minority-business support, community development, economic research, and engineering and design services. All of this direct support to the Valley economy has helped companies add or retain hundreds of thousands of jobs. The fact is that economic development is at the core of TVA's reason for being—to improve the quality of life in the Tennessee Valley.



*Learn more online at [www.TVAed.com](http://www.TVAed.com).*



## The Business of Public Power

TVA is different from utilities that have shareholders, people who expect a financial return. Instead, TVA has stakeholders—the Tennessee Valley residents who have a vital stake in the resources we all share. That's what it means to be a public power company. And no tax dollars support TVA's programs; they're entirely financed from power operations. In fact, TVA pays more than a quarter of a billion dollars each year in lieu of taxes to state and local governments in the Valley. These payments help fund schools, roads, and other public services.

**Providing power in the public interest is what drives TVA's bottom line. What is the company doing to make sure that it continues to bring its unique mix of benefits to the Tennessee Valley?**

### STRATEGIC FOCUS

- Improving life in the Tennessee Valley through integrated management of the river system and environmental stewardship. *TVA continues to balance the competing demands on the river system and carefully manage the environmental and safety impacts of all its operations.*
- Meeting customers' needs with reliable, affordable electric power. *TVA supplies electricity at rates that are well below the national average, and its power system has maintained 99.999 percent reliability every year since 2000.*
- Providing leadership in sustainable economic development. *In the past three years, TVA and its partners*

*have attracted or retained over 150,000 jobs and leveraged \$7.3 billion in capital investment.*

- Continuing the trend of debt reduction. *In the past seven years, TVA has reduced the balance of its total financing obligations by \$2.1 billion.*
- Reducing TVA's delivered cost of power relative to the market. *TVA is improving production processes and cutting operating costs. It's also working closely with local utilities and industrial customers to ensure that TVA continues to be the power supplier of choice.*
- Strengthening working relationships with all of TVA's stakeholders. *TVA maintains an ongoing dialogue with stakeholders on vital issues.*

*Learn more at [www.tva.com/abouttva](http://www.tva.com/abouttva).*

### Initiatives

TVA collaborates with partners on the following programs to help improve the quality of life in the Valley:

- **energy right®:** Offered through distributors of TVA power, this program helps everyone use electricity wisely at home and at work. Learn more at [www.energyright.com](http://www.energyright.com).
- **Green Power Switch®:** TVA and local power distributors have created a program that produces electricity from renewable energy sources and adds it to the Valley's power mix. Read about it at [www.tva.com/greenpowerswitch](http://www.tva.com/greenpowerswitch).
- **Geothermal Heat Pumps:** TVA and Valley power distributors offer technical and financial assistance to help schools and businesses save on heating and cooling costs by installing geothermal heat pump systems. Learn more about the program at [www.tva.com/products/business/geothermal.htm](http://www.tva.com/products/business/geothermal.htm).



# The TVA Power System

**TVA's power system derives flexibility and reliability from its diverse generation mix. Coal-fired plants and combustion turbines provide about 62 percent of total generation, nuclear plants about 28 percent, and hydro plants 10 percent. Green power also adds to the mix.**

## Coal-Fired Plants

- TVA's coal-fired plants generated 98.5 billion kilowatt-hours of electricity in 2005.
- Thirty percent of these plants have scrubbers to reduce sulfur dioxide (SO<sub>2</sub>) emissions, and 60 percent of the plants have state-of-the-art selective catalytic reduction (SCR) systems to reduce nitrogen oxide (NO<sub>x</sub>) emissions. NO<sub>x</sub> emissions during the summer ozone season and year-round SO<sub>2</sub> emissions are down by 80 percent.
- TVA has spent more than \$4.4 billion on emission control equipment at its plants since 1977 and will spend more than \$3 billion to implement EPA's new Clean Air Interstate and Mercury Rules.

## Combustion Turbines

**Combustion turbines are designed to start quickly to help meet the demand for electricity during peak operating periods.**

- Lagoon Creek Combustion Turbine Plant in West Tennessee was the first TVA facility to generate power using combustion turbines alone. The Kemper County Combustion Turbine Plant was TVA's first generating plant in Mississippi. Combustion turbines are also located at four of TVA's coal-fired power plants.

## Nuclear Plants

- TVA's nuclear plants have won nine Nuclear Energy Institute Top Industry Practice awards, including Best of the Best; three *USA Today*/Rochester Institute of Technology Quality Cup awards; and the Tennessee Quality Award for the highest level of excellence, world-class processes, and superior results.
- TVA's nuclear plants continue to achieve high levels of safe and efficient operation. Sequoyah Unit 1 was ranked among the world's

most efficient generators in 2004 and 2005, and Browns Ferry Unit 2 was named one of the most efficient nuclear units in 2004.

## Hydro Plants

**TVA's hydro system includes 29 conventional hydropower plants and a pumped-storage project at Raccoon Mountain, near Chattanooga. Hydropower is vital to the TVA system because it's reliable, clean, and economical, and it can be brought online quickly when the demand for electricity is high.**

- At 480 feet—the equivalent of a 50-story skyscraper—Fontana is the tallest dam in the TVA power system. It's located on the Little Tennessee River in the mountains of western North Carolina.
- Wilson Dam in northwest Alabama has the largest conventional hydroelectric plant in the TVA power system. Its 21 units have a total generating capacity of more than 660,000 kilowatts of electricity.
- Norris Dam, on the Clinch River in East Tennessee, was TVA's first hydroelectric project. Construction began in October 1933, just a few months after the creation of TVA, and was completed in 1936.

## Green Power

- TVA's Green Power Switch program gives Valley residents the opportunity to choose renewable energy to supply their needs. TVA has built a wind power farm on Buffalo Mountain in East Tennessee and 15 solar sites across the Valley. Methane from a wastewater treatment plant is also burned to provide electricity for the program.

## Power Transmission















- TVA's dependable transmission system has served its customers with 99.999 percent reliability every year since 2000. TVA also works toward regional solutions to industry-wide transmission issues. It is cooperating with nearby utilities and transmission organizations to coordinate electricity flow, strengthen grid reliability, and minimize the risk of future disturbances on the interconnected grid.

*Learn more about TVA power at [www.tva.com/sites](http://www.tva.com/sites).*

# Where TVA Is




### LEGEND

-  Water
-  Power Service Area
-  TVA Watershed
-  TVA Hydroelectric Dam
-  TVA Non-Power Dam
-  TVA Coal-Fired Plant
-  TVA Nuclear Plant
-  TVA Combustion Turbine Plant
-  TVA Pumped-Storage Plant
-  TVA Customer Service Office
-  TVA Economic Development Office
-  Green Power Switch® Solar Site
-  Green Power Switch® Wind Site
-  Green Power Switch® Methane Site

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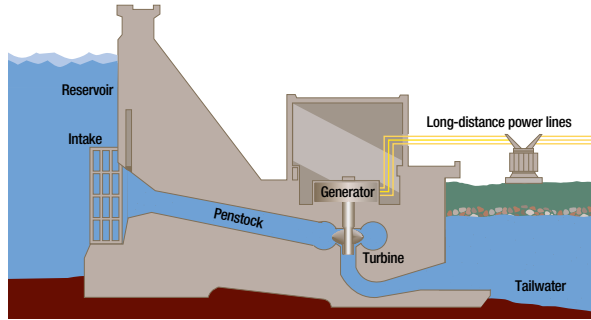
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# How TVA Power Plants Work

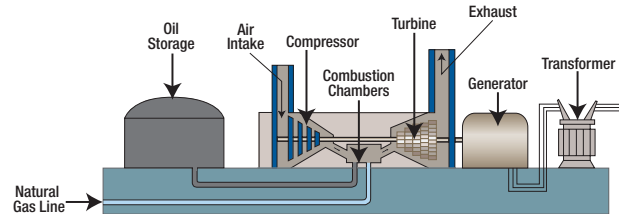


## Hydroelectric Dam



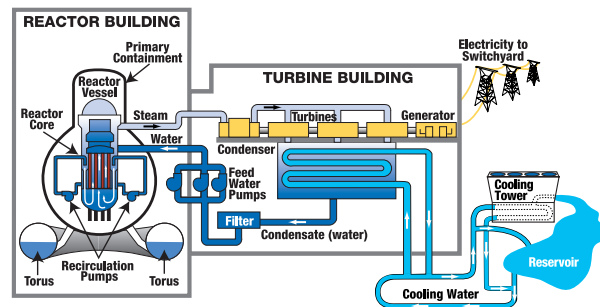
Water from the reservoir rushes through the penstock into the powerhouse. The water spins the turbine, which drives the generator. Inside the generator is a large electromagnet that spins within a coil of wire, producing electricity.

## Combustion Turbine



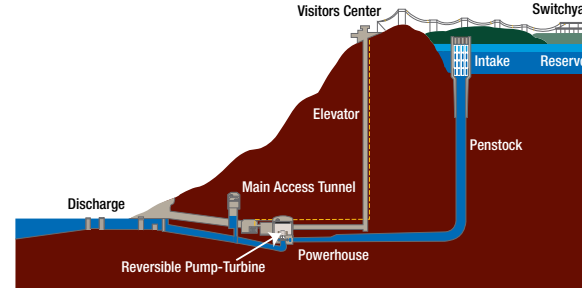
The turbine burns either natural gas or oil. Fuel is mixed with compressed air in the combustion chamber and burned. High-pressure combustion gases spin the turbine, which drives the generator.

## Nuclear—Boiling Water Reactor



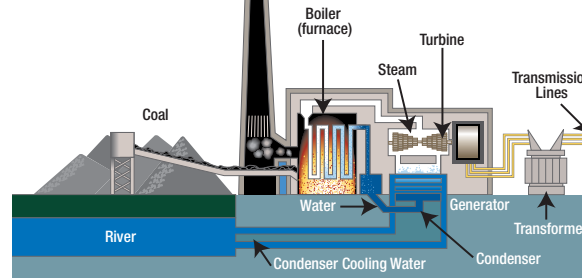
Water is heated through the controlled splitting of uranium atoms in the reactor core and turns to steam. Pumps force the water through the reactor at top speed, maximizing steam production. Steam drives the turbines that turn the generator to make electricity. Cooling water drawn from the river condenses the steam back into water. The water is discharged directly back to the river, reused in the plant, or cooled first in the cooling tower before discharge or reuse.

## Pumped Storage



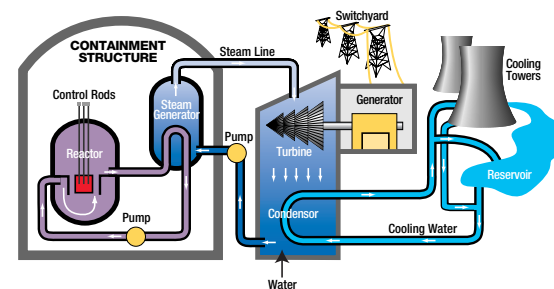
During periods of low power demand, the pump-turbine pumps water up into the mountaintop reservoir. During periods of high demand, water from the mountaintop reservoir flows into the penstock, or large pipe, to the turbines and generator, spinning them to produce electricity in the underground power plant.

## Coal-Fired



Coal burned in the boiler heats water to produce steam. The steam spins the turbine, which drives the generator. Several TVA coal plants include equipment called scrubbers to reduce sulfur dioxide emissions, and all have some form of controls to reduce nitrogen oxides (not depicted in this diagram).

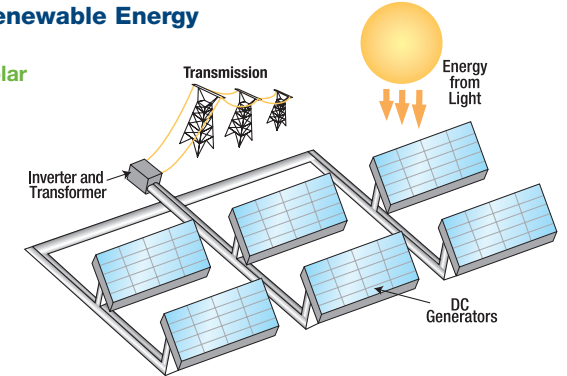
## Nuclear—Pressurized Water Reactor



Water is heated by splitting uranium atoms in the reactor core, then held under high pressure to keep it from boiling. It produces steam by transferring heat to a secondary water source, and the steam is used to generate electricity. As in a boiling water reactor, river water condenses the steam and is then discharged back to the river, reused, or cooled in the tower.

## Renewable Energy

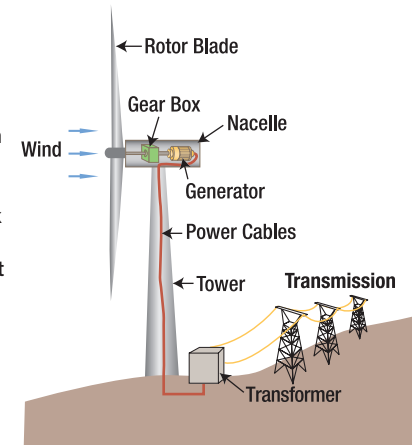
### Solar



Photovoltaic (PV) systems use semiconductor cells that convert sunlight directly into electricity. Direct current from the PV cells, which are arrayed in flat panels, flows to inverters that change it to alternating current.

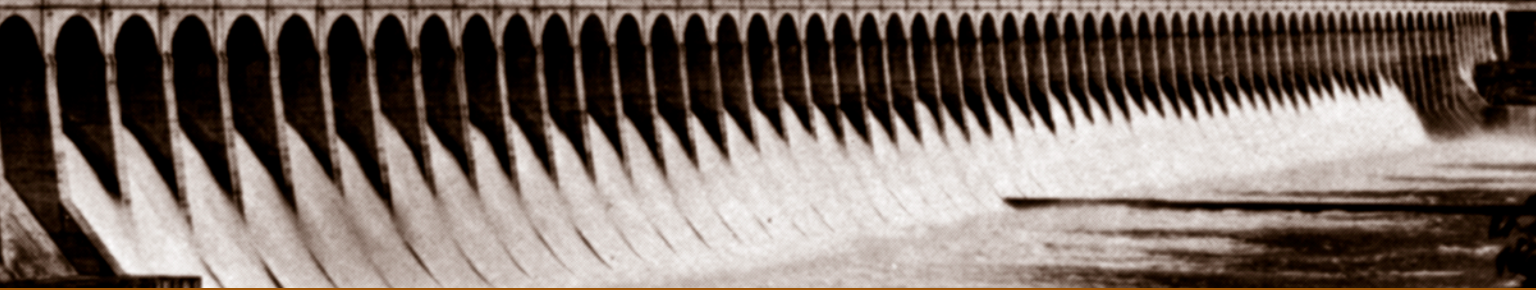
### Wind

The turbine's long rotor blades catch the wind's energy. In the housing at the top of the tower, the rotor-driven gearbox increases the speed of the drive shaft that turns the generator to make electricity. A transformer boosts the voltage and feeds it to the power system.



## Green Power Switch Fast Facts

- In total, TVA has **37.7 megawatts** of renewable generating capacity from solar, wind, and methane gas.
- TVA has expanded the number of wind turbines from three to 18 at its wind power farm near Oak Ridge. The expanded facility **provides enough power for 3,780 homes**.
- TVA has 16 solar photovoltaic sites located throughout the Tennessee Valley. Daily generation figures for each site are available at [www.greenpowerswitch.com](http://www.greenpowerswitch.com).



## The History of TVA

*It all began in 1933, when Congress signed the TVA Act. The legislation created a new kind of federal agency, one “clothed with the power of government but possessed of the flexibility and initiative of a private enterprise . . . charged with the broadest duty of planning for the proper use, conservation, and development of the natural resources of the Tennessee River.”*



TVA completed Norris, its first dam, in 1936. By the end of World War II, the agency had built 16 more. Electric power wasn't the only benefit of these dams. They were built mainly to provide a channel for



commercial navigation and to prevent the flooding that had ravaged the Tennessee Valley. Those benefits drew industry to the region, creating desperately needed jobs and building a strong agricultural base. And the newly navigable river linked the Valley to the

inland waterway system, opening an avenue for importing and exporting goods and increasing the Valley's economic viability.

As the century progressed, so did TVA. In 1959 the agency's power program became self-financed; it was no longer tax-supported, but began to pay its own way. To meet the Valley's growing energy needs, TVA expanded its power production facilities, adding fossil fuel and nuclear energy plants in the 1950s, '60s, and '70s. Today Valley residents pay electricity rates that are among the lowest in the nation, and TVA serves as a global example of sustainable resource management and economic development.



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