

Learn More About TVA

Want to know more about the nation's largest public provider of electric power? Go to 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 (toll-free)
- Find out about employment opportunities at www.tva.com/employment.
- Read more about TVA economic development at www.TVAed.com.
- To learn more about TVA's watershed teams or contact a team near you, go to www.tva.gov/river/landandshoreline/landuse_contact.
- Locate TVA reservoirs and power plants at 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 toll-free).
- Browse our catalog of surplus materials at www.tva.com/surplus, or call 615-374-7400.
- Get information on investing in TVA power bonds at www.tva.com/finance.
- Learn about transmission line rights-of-way at www.tva.com/power/rightofway/index.htm.
- Learn more about TVA power distributors and directly served customers at www.tva.com/power/power_customer.htm.
- Contact TVA's Environmental Information Center to ask questions about a variety of environmental topics at www.tva.com/environment/eic or call 800-882-5263 (toll-free).



Valley facts

A guide to the
Tennessee Valley Authority

www.tva.com



All About the Tennessee Valley Authority



The Tennessee Valley Authority is the nation's largest public power provider, generating electricity that serves nearly 9 million people through local utilities. This unique, not-for-profit, federal corporation provides reliable, affordable electricity for consumers in the seven-state Tennessee Valley region. But TVA does much more than generate power. It works to support economic development in the Valley and serves as an environmental steward of the nation's fifth-largest river system. TVA is financed entirely from power operations and receives no tax dollars to support its programs. In fact, TVA provides more than a quarter of a billion dollars each year in tax-equivalent payments to state and local governments in the Valley. The payments help fund schools, roads, and other public services.



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, 11 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. The energy generated travels through about 16,000 miles of transmission lines and a network of 158 local distributors to reach the homes and businesses of approximately 9 million people. TVA also serves 58 large industries and federal installations directly. In addition, TVA is striving to become an industry leader in energy-efficiency improvements and peak-demand reduction.



Learn more online at www.tva.com/power.

Supports a thriving river system



TVA dams store the water needed to generate clean, efficient electric power and help prevent hundreds of millions of dollars in flood damage in an average year. The river highway formed by TVA's dams and locks—652 navigable miles on the Tennessee River alone—helps transport more than 50 million tons of cargo annually, reducing shipping costs and prices for consumers. Careful stewardship protects invaluable wildlife habitat and drinking water for about 4.7 million people and ensures a reliable supply of water for power generation, industry, and irrigation. TVA also manages summer reservoir levels for recreation and

operates about 100 public recreation areas that offer opportunities for boating, fishing, hiking, and camping.

TVA holds all these competing—and sometimes conflicting—uses of the river in a delicate balance with one clear goal: to deliver the greatest value for the people of the Tennessee Valley. This is accomplished by making sure water is available when and where it is needed and by careful stewardship of the Valley's water and land resources.

Learn more online at www.tva.com/river.

Stimulates economic growth

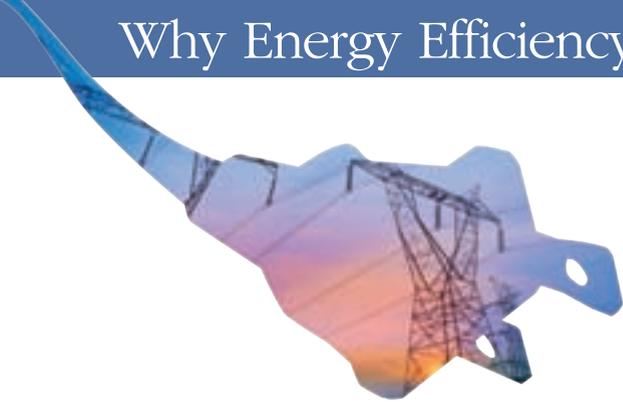


Part of TVA's core mission is to serve as a catalyst for sustainable economic development in the Tennessee Valley. For more than 75 years, TVA has been helping to recruit and retain jobs and make the Valley a better place to live and work. TVA works in partnership with local power distributors and federal, state, regional, and local economic-development organizations to improve the region's economy for the benefit of all its residents.

Through its economic-development programs, TVA offers an abundance of services and financial resources, such as site-selection services, existing business and industry support, community preparedness, loan funds, economic research, and engineering and design assistance. All of this direct support to the Valley economy has helped companies add or retain hundreds of thousands of quality jobs, make new investments, and foster a highly talented regional workforce.

Learn more online at www.TVAed.com.

Why Energy Efficiency?



As the population and economy of the Tennessee Valley grows, so does the need for power.

While growth is a good thing for the region, TVA advocates for smart use of resources, including electricity. In addition to building more generation facilities in the coming years, TVA must continue to promote energy efficiency and environmentally responsible programs. The combination of all these things helps TVA continue providing reliable, affordable electricity to the Valley while still fostering healthy economic growth.

As power needs grow and change, TVA is committed to using environmentally sound energy sources. TVA projects that low- and zero carbon-emission sources will comprise 50 percent of its generation portfolio by 2020. TVA defines renewable energy as generation that is sustainable and often naturally replenished. TVA's renewable portfolio includes conventional hydro, wind, solar, methane, and biomass co-firing.

TVA is doing its part by:

- Supporting incentive programs for building energy-efficient homes and buildings.
- Hosting educational opportunities for consumers to learn more about how to reduce their electricity usage.



energy right®

The *energy right* program is offered through participating distributors of TVA power. It encourages and supports the wise and efficient use of electricity in Valley homes. Programs include low-interest, fixed-rate financing on energy-efficient heat pumps and access to qualified contractors.

For more information on how you can make a difference, go to www.energyright.com.

Green Power Switch®

TVA and local distributors created Green Power Switch (GPS) to produce electricity from renewable sources. Wind, solar, and methane-gas facilities throughout the Valley generate millions of kilowatt-hours of electricity each year.

Both residential and commercial customers can join Green Power Switch online at www.tva.com/greenpowerswitch.

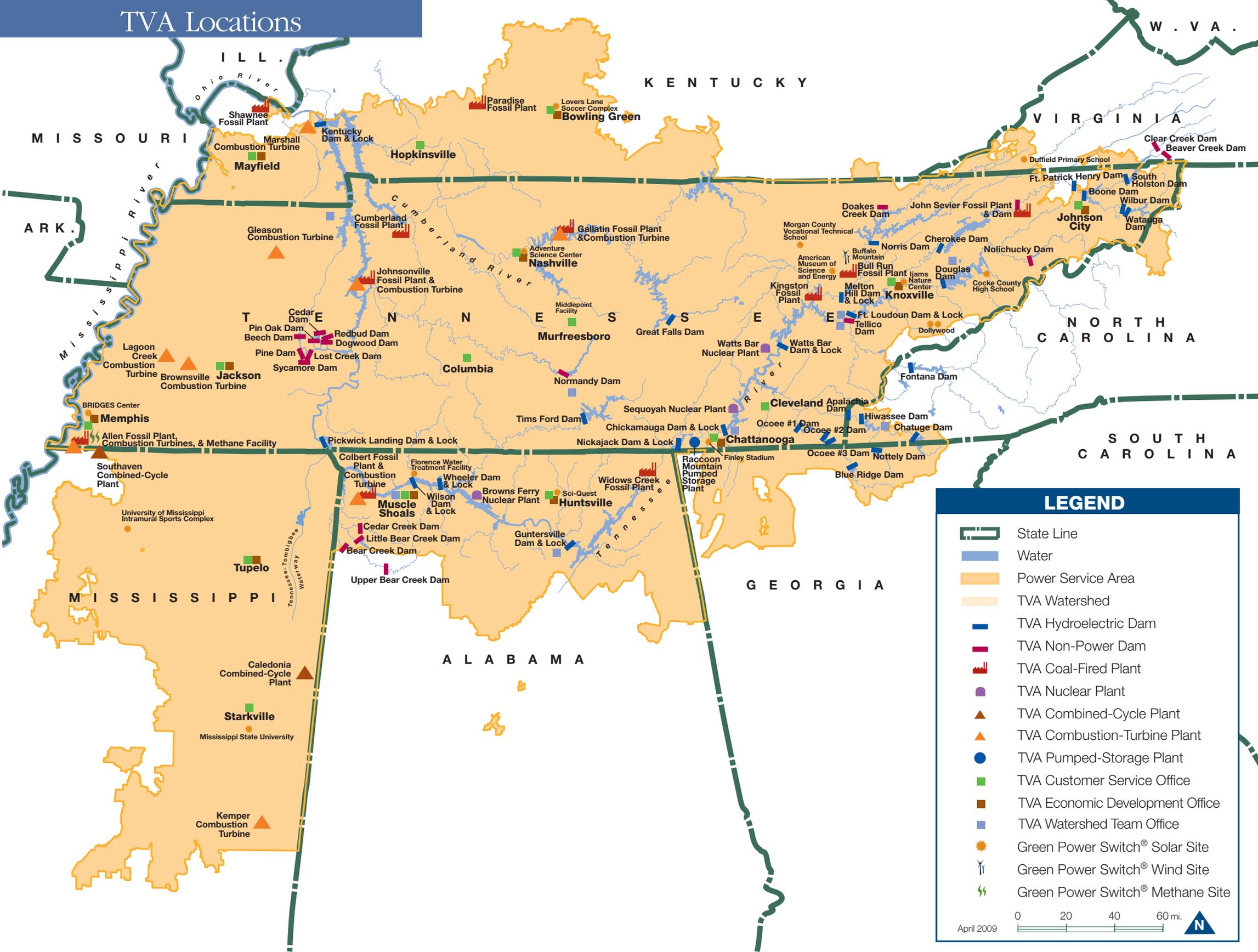
Generation Partners

TVA and participating power distributors offer consumers a great opportunity to support the growth of green power in the Tennessee Valley through Green Power Switch Generation Partners®. This program provides support and incentives for the installation of renewable resources such as solar and wind facilities. It makes more green power available for GPS subscribers, and it creates a market for small-scale renewable generation by homeowners and small businesses.

More information about how to participate in this program can be found at www.tva.com/greenpowerswitch/partners.



TVA Locations



LEGEND

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

0 20 40 60 mi.

April 2009



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 60 percent of total generation, nuclear plants about 30 percent, and hydro plants about 10 percent.

Coal-Fired Plants

- TVA's coal-fired plants generate more than 100 billion kilowatt-hours of electricity each year.
- Several units, representing more than 35 percent of the total coal-fired generation, have scrubbers installed to reduce sulfur-dioxide (SO₂) emissions, and many units (60 percent of the coal-fired generation) have state-of-the-art selective catalytic reduction (SCR) systems to reduce nitrogen-oxide (NO_x) emissions. NO_x emissions are down by 81 percent since 1995, and SO₂ emissions are down by 82 percent since 1977.
- TVA has spent more than \$4.8 billion on emissions-control equipment at its plants since 1977 and will spend more than \$3 billion to meet federal and state standards in the next few years.

Combustion Turbines

- TVA combustion turbines (CTs) are designed to start up, shut down, and change their generation quickly when system load is rapidly changing at times of high electric demand. This is known as "peaking service." Most of TVA's combustion turbines can be at full power in less than 12 minutes from shut-down. Most are able to operate on either natural gas or diesel fuel.
- Combined-cycle (CC) plants operate more efficiently than CTs and are therefore suitable for longer periods of generation.
- In recent years, TVA has purchased or leased several additional combustion-turbine and combined-cycle plants because of the operating flexibility they provide for the power system. These purchases or leases have increased TVA's CT and CC generation capacity to 8,217 megawatts.

Nuclear Plants

- Since 1998, TVA's nuclear power plants have achieved annual average production of about 45 million megawatt-hours of electricity.
- With the restart of Browns Ferry Unit 1, TVA now has six operating nuclear units providing clean, safe, and affordable electricity to the Tennessee Valley. Browns Ferry Nuclear Plant won the American Nuclear Society's Utility Achievement Award in 2007 for the return of Unit 1 to the TVA power system.
- TVA is completing construction of Unit 2 at Watts Bar Nuclear Plant to help meet the Valley's demand for electricity. Unit 2 will add nearly 1,180 megawatts of generating capacity to the TVA system by 2013 when it begins operating.
- TVA's Bellefonte site in northeast Alabama is the location of two unfinished nuclear units. Though no decision to complete the existing plant or build a new nuclear plant there has been made, TVA could add to its carbon-free generation with either of these projects. In 2007, TVA submitted an application for a new advanced nuclear plant at the site to demonstrate the new licensing process for nuclear plants.



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 megawatts 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.
 - Raccoon Mountain Pumped-Storage Plant is TVA's largest hydro facility. The plant was completed in 1978 and has 528 acres of water surface. When the plant's upper reservoir is full, it can provide 22 hours of continuous power generation.

Renewable Resources

- TVA has a wind-turbine site on Buffalo Mountain in East Tennessee and 15 solar sites across the Valley. Methane from a wastewater-treatment plant near Memphis is also co-fired with coal to provide electricity for the program.

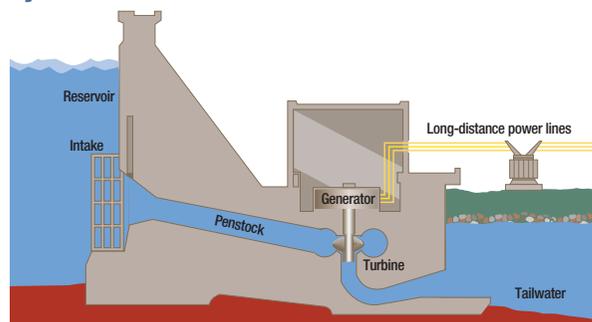
Power Transmission

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.

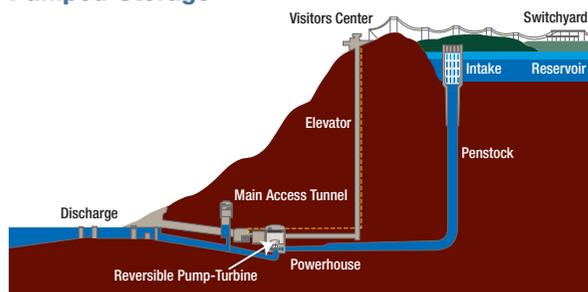
How TVA Power Plants Work

Hydroelectric Dam



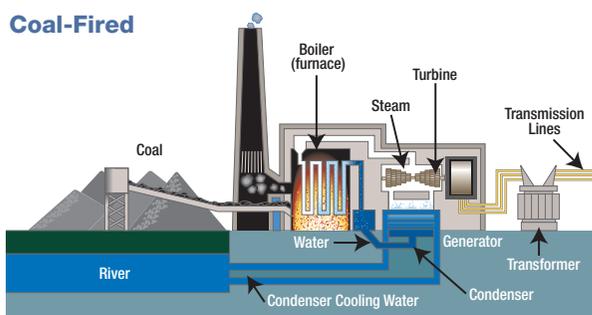
Water from the reservoir rushes through the penstock into the powerhouse. The water spins the turbine, which drives the generator. Inside the generator is a large electromagnet that spins within a coil of wire, producing electricity.

Pumped-Storage



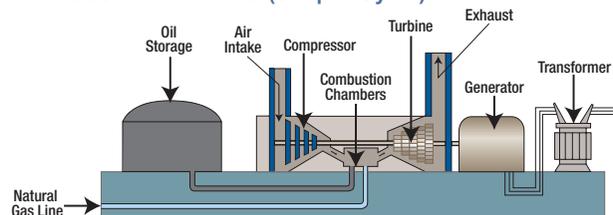
During periods of low power demand, the pump-turbine pumps water up into the mountaintop reservoir. During periods of high demand, water from the mountaintop reservoir flows into the penstock, or large pipe, to the turbines that spin generators to produce electricity in the underground power plant.

Coal-Fired



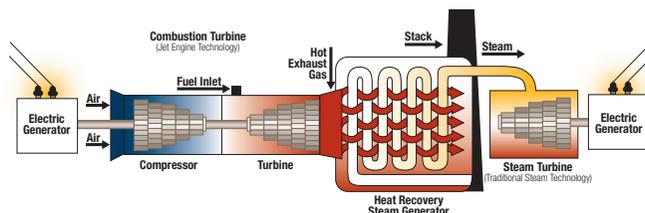
Coal burned in the boiler heats water to produce steam. The steam spins the turbine, which drives the generator. Several TVA coal plants include equipment called scrubbers to reduce sulfur-dioxide emissions, and all have some form of controls to reduce nitrogen oxides (not depicted in this diagram).

Combustion Turbine (Simple Cycle)



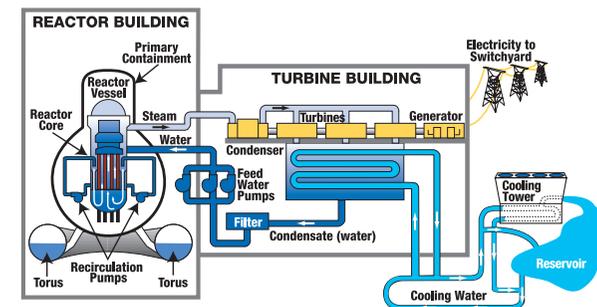
The turbine burns either natural gas or oil. Fuel is mixed with compressed air in the combustion chamber and burned. High-pressure combustion gases spin the turbine, which drives the generator.

Combustion Turbine (Combined Cycle)



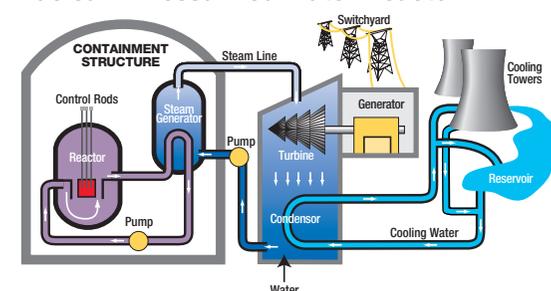
A natural-gas, combined-cycle combustion-turbine plant generates electricity in the same manner as the simple-cycle combustion-turbine plant described above and then uses the heat in the exhaust gases to produce steam. The steam is then used to spin a separate turbine that drives a second generator. This makes additional electricity that increases overall efficiency to about 30 percent greater than that of a simple-cycle combustion-turbine system.

Nuclear—Boiling Water Reactor



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

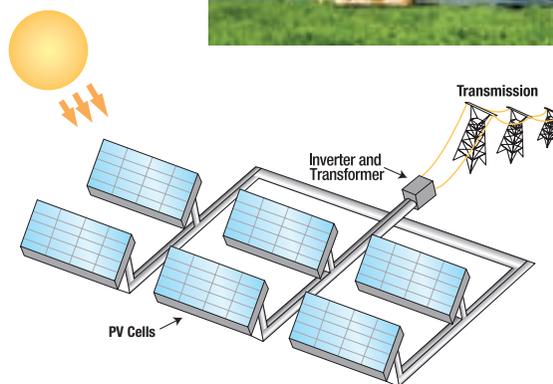
Nuclear—Pressurized Water Reactor



Water, held under high pressure to keep it from boiling, is heated by splitting uranium atoms in the reactor core. The heated, pressurized water produces steam by transferring heat to a secondary water system, 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 cooling tower.

Clean Energy

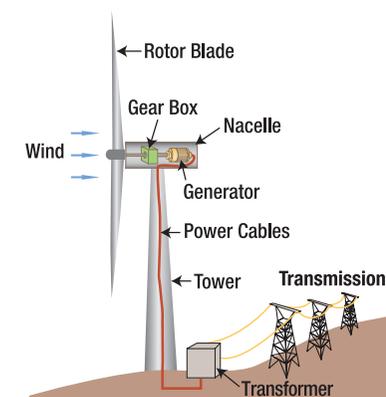
Solar



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.



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 from these dams. They were built mainly to prevent the flooding that had ravaged the

Tennessee Valley and to provide a channel for commercial navigation. 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. In 2008, TVA marked its 75th anniversary with Valley residents still enjoying electricity rates that are among the lowest in the nation and a river system that remains a national and global model for integrated resource management.

Learn more online at www.tva.com/abouttva.

