

How the TVA Transformed the Tennessee Valley

The following is an excerpt from a 2011 article by Marsha Freeman, entitled Roosevelt's TVA: The Development Program that Transformed a Region and Inspired the World. It is published with her permission. The full article can be found [here](#).

Electricity for All

The first challenge facing the Tennessee Valley Authority (TVA) was to gain control over the Tennessee River and its major tributaries. A series of dams would be constructed, but these would not just be flood control dams, or irrigation dams, or hydroelectric power dams, or navigation locks and dams—they would be all of the above. Many engineers insisted that such multi-purpose dams could not be built. TVA hired those who believed they could.

On October 1, 1933, the first day of the new fiscal year, and less than five months after the President signed the legislation creating the TVA, shovels were in the ground, with the start of construction of Norris Dam on the Clinch River. In its first 20 years, the TVA built 20 dams. This required 113 million cubic yards of concrete, rock, and earth, or 12 times the bulk of the seven great pyramids of Egypt. The TVA employed nearly 200,000 people over the course of its first 20 years, and apprentice programs created skilled craftsman out of sharecroppers, and mechanics out of tenant farmers.



Norris Dam, the first to be completed by the TVA

TVA's dams can store 22 million acre-feet of water, enough to cover the state of Illinois to an eight-inch depth. The completion of the dams created a navigable water transportation artery stretching from Western Virginia to the Ohio River, and connecting the Eastern United States to the Mississippi and the Gulf of Mexico. The placement of dams on the larger tributaries of the Tennessee River greatly reduced flooding, and also helped regulate water flow in both the Ohio and Mississippi Rivers.

But unquestionably, the contribution that the dams made to the Tennessee Valley that was felt most by the largest number of people was the provision, for the first time, of electricity. In 1933, only 3 percent of the farms in the Valley had electric power. A year later, the TVA had 18 megawatts of electric generating capacity. By 1942, there was a near order-of-magnitude increase in generating capacity on line—1.37 gigawatts. In 1934, the TVA had 6,507 retail customers. In 1942, there were nearly half a million. There were zero miles of transmission lines being built in 1934. From 1938 to 1942, approximately 5,000 miles were built each year.

An overriding mandate of the TVA was to provide reliable electric power to the entire population, at the lowest possible rate. In order to do both, the approach of the TVA was to encourage the maximal use of electricity. Over most of its history, TVA electric rates have been about half the national average, while annual use per capita is about twice the national average. About half the farms in the Valley had electricity by the start of World War II, but most farmers did not know what to do with it. The TVA sent out convoys of trucks, with the help of students from area colleges, and set up tents in rural areas to demonstrate the use of electrical appliances. Lilienthal persuaded President Roosevelt to form the Electric Home and Farm Authority (financed by the

Reconstruction Finance Corporation), which provided low-interest loans to stimulate the sales of electric appliances. In 1938, sales of home appliances were \$1.61 million. By 1941, sales were \$18.5 million.

But the dams, electricity transmission systems, the new roads, rail tracks, and new towns could not be built with a population suffering from disease. Malaria was attacked by reducing the mosquito population, because there was (and still is) no effective vaccine. By 1934, working with county health departments, the TVA provided typhoid shots at dam work sites, and made the shots mandatory for all TVA employees. After an epidemic of smallpox, one of the biggest killers in the South, broke out in Alabama in 1938, the TVA offered free smallpox shots. By 1951, TVA had inoculated half a million people in the region, helping to produce a regional revolution in public health.



TVA linemen install electricity in the Valley. (TVA)

In 1933, the Valley had many totally isolated counties with populations in the thousands, with no railroad service, no newspapers, no radio, and no public library. As the TVA sent armies of workers in to remote areas to build the dams and

power systems, it decided to provide access to books, for the “welfare and well-being” of the workers and their families. TVA set up rural libraries, located in stores, post offices, and gas stations. Bookmobiles travelled the countryside. By the late 1930s, TVA was circulating about 13,000 books a month. When the construction of TVA’s dams was almost complete, David Lilienthal lobbied—and secured—state support for the continuation of the libraries.

Reclaiming the Land

In 1933, the primary economic activity of the Valley region was farming. Immediate measures had to be taken to restore the productivity of the ravaged land.

Teams of chemists and chemical engineers were assembled to begin operation of a phosphate-based fertilizer production program, to take farming out of the 19th Century. Two hundred TVA experts fanned out across the Valley, to meet with farmers, introducing them to scientifically based modern farming methods. Thousands of demonstration farms were set up, with TVA donating its new phosphate-based fertilizer, and the demonstration farmer opening his farm to share his results with his neighbors. In 1935, TVA produced 24,000 tons of concentrated superphosphate, which grew to 136,000 tons by 1953. TVA fertilizer, which was shipped all over the country, accounted for 24 percent of national fertilizer production between 1934 and 1955. By 1941, 47 states had tested the TVA fertilizer, and 27 were conducting test demonstration programs.

The TVA program had a dramatic impact worldwide. It is estimated that 2-3 billion people, or nearly half the world’s population, are alive today because of the development of synthetic fertilizer, more than 70 percent of which was developed at TVA’s National Fertilizer Development Center in Muscle Shoals, Alabama. An investment of \$41 million through 1981 returned \$57 billion to U.S. agriculture. Fertilizers are

responsible for more than a third of U.S. crop production, according to the International Center for Soil Fertility and Agricultural Development at Muscle Shoals. Dr. Norman Borlaug, father of the "Green Revolution," which saved millions in the Third World from starvation, was on the board of directors of TVA's International Fertilizer Development Center from 1994 to 2003.



Teaching the farmers about replenishing the land. (TVA)

The only *bona fide* desert east of the Mississippi in the 1930s was the Copper Basin in southern Tennessee, which is more than 50 square miles of desolation. It has been compared to the Dakota Badlands, the Gobi Desert, and the Moon.

Ninety years of processing the mined copper that had been discovered there in the 1840s, had killed flora and fauna, and parts of the Ocoee River. Nearly 35,000 acres were completely bare, losing nearly 200 tons of soil a year, and silting the river where TVA had three dams and reservoirs. By 1944, the TVA had planted more than 150 million trees in the Valley. Today more than 90 percent of the Copper Basin has been reforested.

By 1941, the TVA was well on the way to transforming the economy, and lives of the people of the Tennessee Valley. But its greatest challenge was to come.

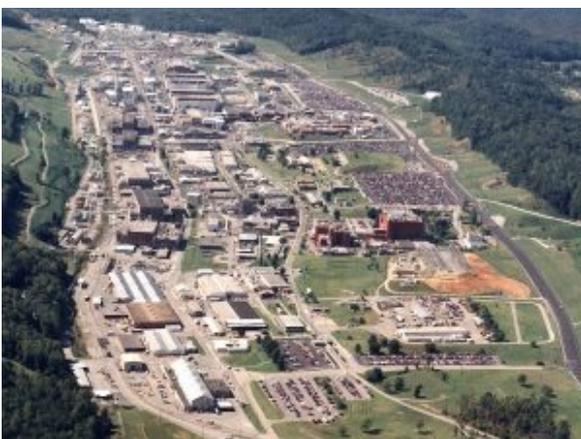
Winning the War

It is reported that not even TVA Chairman Lilienthal knew what was going on in the buildings at the "Clinton Engineering

Works,” not too far from TVA’s Knoxville headquarters, in 1943. Seemingly overnight, new facilities, housing, and a whole new town had sprung up in Oak Ridge, Tennessee.

When the decision was made by [President Roosevelt](#) to embark upon the Manhattan Project to develop an American nuclear weapon, there were two prerequisites for success: the best scientific minds the nation could mobilize, and a virtually unlimited source of reliable electrical power. The President turned to the TVA, giving what became the Oak Ridge National Laboratory the task of producing the nuclear materials for the bomb, enriching uranium, and then separating the plutonium. Enrico Fermi, who had built the nation’s first “graphite pile” reactor in Chicago, then built the Graphite Reactor at Oak Ridge, which produced the world’s first sustained nuclear reaction. After the war, this reactor produced the world’s first medical isotopes.

Even before the United States was fighting in the war, in preparation, President Roosevelt asked Congress to approve funding for Douglas Dam in east Tennessee in 1941. Opposition on the part of the Congress ended with the bombing of Pearl Harbor. Douglas Dam was completed in a record-breaking 12 months and 17 days. During the war mobilization, the TVA built 10 dams, working 24- hours-a-day, utilizing three shifts, and using floodlights at night.



Oak Ridge, Tennessee could only do its scientific work

due to the TVA's abundant electricity.

Since 1935, the Aluminum Company of America (Alcoa) had been buying TVA power for its factory near Knoxville, which was then the largest aluminum plant in the world. In 1941, as World War II loomed, Alcoa gave the government its Fontana property, a prime site for a dam, and the bill authorizing construction of the dam was signed just 10 days before Pearl Harbor. The Fontana site was located in the remote Smoky Mountains of North Carolina, and in order to build the dam, a railroad was built to transport supplies. Almost overnight, the TVA erected dormitories, houses, trailers, and tents for the workers and their families. A hospital, bank, library, post office, and schools were built from scratch.

In addition to aluminum for planes during the war mobilization, the Valley processed metals, food, fibers (for uniforms), timber, and chemicals, and manufactured ship boilers, gas masks, and explosives. The fertilizer plants in Muscle Shoals supplied the raw materials for thousands of tons of munitions, in addition to the fertilizer to help grow food.

In 1943, the U.S. Army asked the TVA for help in preparing survey maps of enemy-held territory. The first assignment was to map 30,000 square miles of Nazi-occupied France, based on its experience in mapping the Valley. The Armed Forces acquired 470 TVA mapping experts and technicians. The TVA, together with the U.S. Geological Survey, developed advanced mapping techniques and made maps from aerial photographs of a half-million square miles of foreign territory during World War II. An estimated 70 million of TVA-produced maps were used to prepare for the Normandy invasion in June 1944.

After the war, the Federal Power Commission declared that without the TVA, the United States in 1941 would not have been prepared to fight. ...