

EIRFeature

The world needs the TVA model, not the IMF

by Marsha Freeman

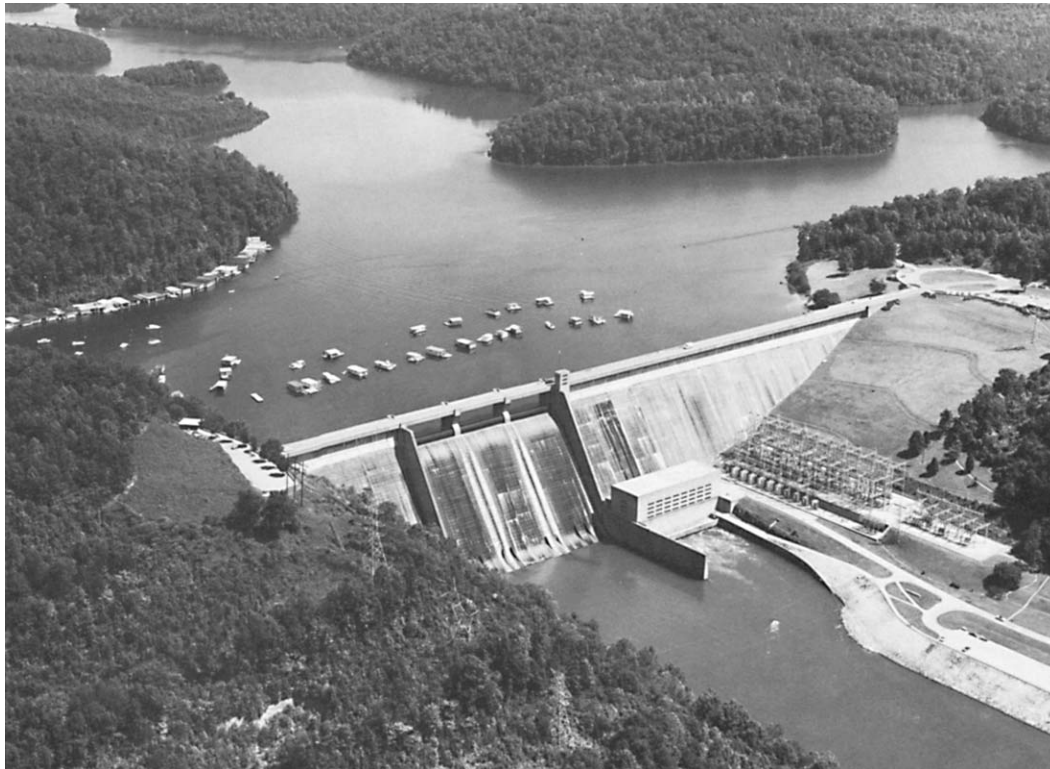
Many nations today, facing the prospect of the dissolution of their economies, are confronted with a choice between the International Monetary Fund's model of austerity and economic contraction, or the financial reorganization of a New Bretton Woods, to make possible large-scale infrastructure investments, such as those represented by the Eurasian Land-Bridge.

Analysts have compared the collapse of the Russian stock market by 50% this year, to the worst days of the Great Depression in the United States. The rapid disintegration of national economies, including those of Indonesia, South Korea, and Thailand, make it imperative that the right pathway be chosen quickly. There is a precedent from the first Great Depression for how infrastructure projects, conceived on a grand scale and implemented by sovereign governments, create the conditions for the rapid growth of the economy, and the transformation of whole populations.

On May 18, 1933, when President Franklin Delano Roosevelt signed the legislation that created the Tennessee Valley Authority (TVA), the economy of the United States lay prostrate. Official unemployment stood at 25%. Steel production had fallen from 44.6 million tons in 1930 to little more than 15 million tons two years later, as construction ground to a standstill. Electric power production had collapsed by 10% in the space of one year.

Various proposals had been put forward to deal with the economic contraction that had taken hold of the United States, and much of the world, during the Depression. As one writer of a TVA history described it: "The Authority was established in the U.S. of A. at a time of economic distress, in the gravest worldwide economic depression ever recorded. It came into being when governments were taking the desperate course of restricting production and destroying produce in the hope of restoring economic welfare.

"The TVA represented an altogether different conception of the management of a modern nation's economic resources: that of enterprise on a large scale, deliber-



Less than three months after the TVA was signed, construction began on the agency's first multi-purpose hydroelectric dam, on the Clinch River. It was named for Sen. George Norris of Nebraska, who led a decades-long fight for the establishment of the TVA.

ately undertaken by the public authorities, with certain social and economic purposes clearly in mind from the beginning. It represented an economic policy of hope and expansion in which the government would play a dynamic part.”

Over the span of eight years, the TVA transformed the Tennessee Valley region, consisting of all or parts of Tennessee, Kentucky, Virginia, North Carolina, Georgia, Alabama, and Mississippi (see **Figure 1**). It brought the people living in the TVA region into the modern industrial and agricultural era, from a standard of living and culture that was little different than that in the Third World. Between 1933 and the end of World War II, the TVA directors managed the biggest construction project on Earth.

More important, and recognized as such by those involved, was the lasting legacy of the TVA. It became the model for large-scale, integrated economic development projects in dozens of countries around the world. After World War II, TVA engineers were called into service by governments in Asia, the Middle East, Ibero-America, Africa, and even Europe, to reproduce the remarkable uplifting of a population through government-directed construction of large-scale infrastructure projects, which the TVA exemplified.

Uplifting an American ‘Third World’

In 1933, when President Roosevelt took office, fewer than 3% of the households in the Tennessee Valley had electric power. The average farmer’s income was \$639, when the national average was \$1,835. Malaria affected up to 30% of

the population in some areas. The average expenditures per child for education were about one-third that of the United States as a whole.

The region was totally vulnerable to the ravages of nature. Unchecked fires burned 10% of its woodlands every year. One and a half million acres were cropped only intermittently. Due to soil depletion, 4.5 million acres were on the decline, and 300,000 acres were practically destroyed. The unpredictable periodic flooding of the Tennessee River and its tributaries prevented the development of cities along the river banks.

In the eight years following the establishment of the TVA, the number of households with electricity went from about 6,000 to almost half a million in the seven-state region. In its first 20 years, the authority built 20 dams, requiring the use of 113 million cubic yards of concrete, rock, and earth, which consumed 12 times more construction materials than was used in the building of the seven great Egyptian pyramids. Nearly 200,000 men and women were employed at various times by the TVA over its first two decades.

In order to gain control over the Tennessee River and its tributaries, an intricate system of dams and reservoirs was built, which can store 22 million acre-feet of water—an amount which could cover the entire state of Illinois to an eight-inch depth. In order to reshape the land, 15,000 families had to be moved from the backwater areas that were to be flooded. More than 19,000 graves were moved from cemeteries, along with 170 schoolhouses and 180 churches; in some instances, whole towns and villages were relocated or physi-

FIGURE 1

TVA service area



cally reorganized to make way for the lakes that were created behind the dams.

TVA built multipurpose dams for both flood control and power, “a policy deprecated by many prominent engineers of that day. In recruiting engineers to bring life to this idea—multiple-purpose dams—those who believed in the feasibility of this approach were sought and found,” according to Gordon Clapp, who was general manager of TVA.

The centerpiece of the TVA’s regional development plan, after the rivers were brought under control, was the introduction of electricity. The TVA’s electrification plan was based on the idea that the way to provide the cheapest possible electricity to all the households and farms in the valley, which was mandated in its charter, was through “mass production,” which had proven so effective in the automobile industry, and by the economy of scale which is possible from a continuously growing demand for power.

In order to create this growing demand, the TVA had to *teach* farmers, housewives, extension service workers from the Department of Agriculture, and children in schools, how to use electricity. The Authority created a promotional program to accomplish this. “The Authority indeed keeps a very watchful eye on the annual sales of electric appliances in its area, as these are the yardstick of its success,” was the way the promotional program was described.

The TVA induced appliance dealers to arrange promotional displays and demonstrations of refrigerators, washing machines, and other household appliances, as well as electric heating and hot water systems, in high schools and other public facilities. TVA had home economists visit households to advise on the use of appliances.

Agricultural productivity in the Tennessee Valley in 1933, virtually without the benefit of electrical equipment or chemical fertilizers, was not substantially different than it had been in the previous century. In addition to bringing electric power to each farm, the TVA approached increasing agricultural productivity from the standpoint of improvements in fertilizers and the use of demonstration farms to teach farmers how to use electricity, fertilizers, and more advanced farming methods.

The TVA organized farmers to work with the Authority to set up “test demonstration” farms. In exchange for free fertilizers and technical advice, demonstration farmers agreed to adopt intensive, five-year farm management programs, to keep careful records, and invite their neighbors in for tours. Between 1933 and 1943, more than 15,000 demonstration farms produced yields that were three times higher than before.

As electric power became available, small and medium-sized raw materials-processing and manufacturing industries grew up in the Tennessee Valley, absorbing the increasing excess population on the land, as the productivity of agriculture improved.

In 1930, the valley had four farm workers for every factory worker. By 1960, factory employees outnumbered farm workers by almost 2 to 1, and manufacturing income was nearly three times that of agriculture. The major growth industries were apparel, food, chemicals, electrical machinery, furniture, primary metals, leather, non-electrical machinery, pulp and paper, and transportation equipment.

In all, TVA-created industrial growth generated almost a half-million jobs in business and industry between 1933 and 1950. For those “free marketeers” who would complain that this was all developed “at the expense of the taxpayer,” bear in mind that the annual income taxes paid into the Federal treasury by the TVA, or the “return on investment” from the Federal spending, is almost six times the yearly investment in TVA.

The new industrial development also stemmed the tide of emigration from the region. Between 1920 and 1930, 120,000 people left the valley. In the following decade, 31,000 people emigrated.

Managers of the TVA recognized that in order for the people of the Tennessee Valley to be able to take advantage of more scientific farming methods and to develop modern manufacturing, there would have to be cultural changes.



In 1942, a member of a local library board stated at a meeting about the future of the book services TVA had established: "We have 6,000 people in Megis County, and no railroad, no telephones, and no newspapers. If we lose the library bookmobile, how will we know what is going on in the world?"

First, was health. Malaria was endemic in more than half the valley area and there were infection rates up to 60% in some parts.

The TVA established its own Health and Safety Department, recognizing that malaria had destroyed the economic potential of whole regions around the world. It undertook extensive investigations into malaria in cooperation with the Department of Preventive Medicine of the University of Tennessee, which it helped to establish. By the mid-1940s, malaria had nearly been eliminated in the valley. The government health departments and the TVA together planned programs with special emphasis on sanitation, and immunization against smallpox, typhoid, and diphtheria.

One of the most important things the TVA brought to the people of the Tennessee Valley was books. When the Watts Bar Dam was under construction, the Tennessee Division of Libraries and County Library Board of Knoxville were contracted with the TVA to provide library services, at the expense of the Authority. The dam library started with 2,000 books.

Libraries were set up at every construction site, eventually in each of the 13 counties in east Tennessee. Only one of these counties had had public facilities for reading books before. Mobile library units reached construction workers at their homes, and also non-employees living in the remote areas.

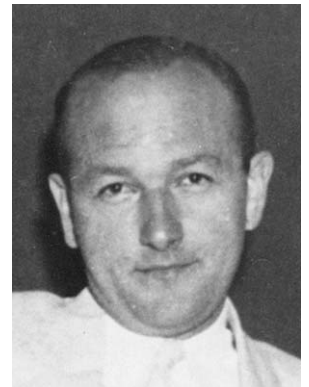
When the dams were completed, and TVA could no longer contribute to the library services it had established, it worked with other government agencies to make them permanent.

After intense lobbying by the citizens, on Feb. 9, 1943, the governor of Tennessee signed a measure setting up an east

Tennessee library regional office, with an initial appropriation of \$20,000. At that time, there were already libraries with 52,000 books distributed from 200 locations. There were 22,000 people registered as borrowers, who, in January 1943, read 250,000 books. By 1951, there were regional library services in 63 counties, servicing a population of more than 1.5 million.

The TVA's legacy

Near the end of World War II, in 1944, the TVA's first director, David Lilienthal, wrote his book, *TVA: Democracy on the March*. In the preface, he stated, "There is almost nothing, however fantastic, that (given competent organization) a team of engineers, scientists, and administrators cannot do today. Impossible things can be done, are being done in this mid-twentieth century."



David Lilienthal

The most important "impossible things" to Lilienthal, were those which harnessed the creative energy of men to transform their circumstances: "No longer do men look upon poverty as inevitable, or think that drudgery, disease, filth, famine, floods, and physical exhaustion are visitations of the devil or punishment by a deity," he wrote.

"The quantity of electrical energy in the hands of the people is a modern measure of the people's command over their



To cheapen the cost of electricity, and upgrade the standard of living of the rural residents of the Tennessee Valley, the TVA introduced the population to labor-saving appliances through public demonstrations, and made government-backed credit available to distributors.

resources and the best single measure of their productiveness, their opportunities for industrialization, their potentialities for the future. A kilowatt-hour of electricity is a modern slave, working tirelessly for men.”

Identifying the philosophical issue, Lilienthal wrote: “The basic objection to all efforts to use the machine for human betterment lies in an attitude of absolute pessimism: that life is an evil in itself; that therefore anything which seeks to mitigate its inescapable pain and utter dullness is misdirected and futile. . . . Democracy is a literal impossibility without faith that on balance the good in men far outweighs the evil. Every effort to cherish the overtones of human imagination in music, painting, or poetry rests upon that same faith, makes that same assumption.”

While the resources of the TVA, particularly abundant electrical power, were crucial for the war mobilization still under way when he wrote his book, Lilienthal states: “History may well record, however, that it is TVA as an idea that represents its greatest significance; that it is in its high sym-

bolic value ‘in a thousand valleys’ beyond the seas that TVA has rendered its greatest service in safeguarding and nurturing freedom in the world.”

Twenty years later, in Muscle Shoals, Alabama on May 18, 1963, exactly 30 years after FDR had signed the legislation creating the TVA, President John F. Kennedy recalled the importance of that act: “There were many who still regarded the undertaking with doubt. Some said it shouldn’t be done. Some said it wouldn’t be done. But today, 30 years later, it has been done. They predicted the government was too inefficient to help electrify the valley. But TVA, by any objective test, is not only the largest but one of the best managed power systems in the United States.

“They predicted that TVA would destroy private enterprise, but this valley has never bloomed like it does today, and hundreds of thousands of jobs have been created because of the work that these men did before us. New forests have been built, new farms have been developed, engineers who testified that multipurpose dams would not work, that rivers could not be developed for navigation and prevention of floods at the same time, were proved wrong. Barge traffic on this system has grown from 33 million tons in 1933 to 2 billion tons today, on a river spanned by more than 30 dams. . . .

“As a final example of its national role, I would cite to you—and I consider this one of the most important contributions of the Tennessee Valley, and it isn’t written in any credit or debit book—the 2,000 people who come from abroad to the TVA, from other lands, Kings, Prime Ministers, students, technicians, people who are uncommitted, people who don’t know which way to go, people who are unsure.

“They come here and gain an impression not by merely visiting Washington or New York, but by coming to this valley. They gain an impression of vitality and growth, and the ability of people to work together in a free society. This has been one of the most powerful advertisements for the picture of the United States around the world that we have had, for these people come from nations whose poverty threatens to exceed their hopes, who do not feel they can solve their problems. They come here and compare this valley today to what it was 30 years ago, and they leave here feeling that they, too, can solve their problems in a system of freedom.

“Finally, there are those who say that TVA has finished

its jobs and outlived its challenges. But all of the essential roles of TVA remain. . . . In short, the work of TVA will never be done until the work of our country is done. There will always be new places for us to go, for, in the minds of men the world over, the initials TVA stand for progress.”

By the middle 1950s, the Tennessee Valley Authority had completed the major work of building dams, providing flood control, and supplying electric power to the seven-state southern region of the nation. By that time, word had spread around the world about how an area suffering Third World conditions, in terms of health, literacy, and agricultural productivity, had been brought into the modern era through such a “great project” as the TVA. The book written by TVA Chairman Lilienthal in 1944, had been translated into 14 languages. By 1953, some 39 million people had visited the TVA, including representatives of nearly every nation in the world.

Lilienthal reports in his book that Supreme Court Associate Justice William O. Douglas used to spend his summers traveling on horseback in remote areas of Asia, and was often asked about the TVA. According to Douglas, “A Druze chieftain, south of Damascus, inquired about it. I was asked about it many times as I traveled the length of the Tigris and Euphrates, the site of the ancient Mesopotamia, reputed cradle of civilization on this globe. Below Baghdad I saw 50,000 people homeless by reason of a flood. They too had heard of the TVA and wanted one for themselves.

“The Tennessee Valley Authority has caught the imagination of all the people across this broad belt of Asia. They think of it as a device for insuring crops in a land where crop failures mean death from starvation. TVA also means to them increased productivity of the land, new forests, the end of erosion, modern methods of farming. . . . It means the harnessing of floods, the storing of rain water, and the installation of modern irrigation systems.”

At the end of World War II, the optimism of peace, the end of imperial empires, and the promise, although left unfulfilled, of Roosevelt’s American Century built upon American methods, led almost every nation in the world to invoke the model of the TVA in order to push forward their own economic transformation.

Taming China’s mighty Yangtze River

Lilienthal remarked in the 1950s, describing the great project needed to tame the Yangtze River, “The terms gigantic or colossal are not inappropriate for this plan, which dwarfs TVA by comparison.” Within a 300 mile radius of the proposed main dam site, which is today known as the Three Gorges Dam (see **Figure 2**), more people would be affected than in the entire United States, he stated.

In addition to ending the centuries of destruction and death from the flooding of the Yangtze, Lilienthal said, the dam would permit ocean-going ships to sail to Chungking, 650 miles from the coast. Hundreds of miles of canals would be excavated and 10 million acres of agricultural land would be

irrigated. The key project would be the 820-foot-high Yangtze Gorge Dam with a 17.5 gigawatt capacity. And it was estimated that an additional 3.042 GW could be provided by 11 projects on the tributaries of the Yangtze.

The TVA’s working relationship with engineers and planners in China went back to the earliest days of the Authority, and Lilienthal developed a close relationship with China’s ambassador to the United States, Hu Shih. Before the war, engineers from the National Resource Commission of China visited the TVA, and during the war, an electrical engineer from the TVA was an adviser to the Chinese War Production Board.

In 1939, Lilienthal reports in his diaries, Ambassador Hu suggested to him that the TVA should help to rebuild China after the war. The two continued to meet during the war, often at Lilienthal’s home, to plan the multipurpose dam development of the Yangtze River. In December 1944, a delegation of 26 Chinese visitors, who were responsible for planning the industrial development of China, came to the TVA for ten days. They brought with them gifts and personal greetings from the chairman of the National Resource Commission of China.

On Feb. 6, 1945, Lilienthal met with Don Nelson, whom he describes as President Roosevelt’s personal representative to China. Nelson said he was having Lilienthal’s 1944 book translated into Chinese. (In less than a year, 50,000 copies were circulating there.) At their meeting, Nelson and Lilienthal discussed the Yangtze Three Gorges project, which was being described as the “Chinese TVA,” and Nelson said that the President wanted Lilienthal to be one of seven industrial leaders to go to China, to help them work out their postwar industrialization plan.

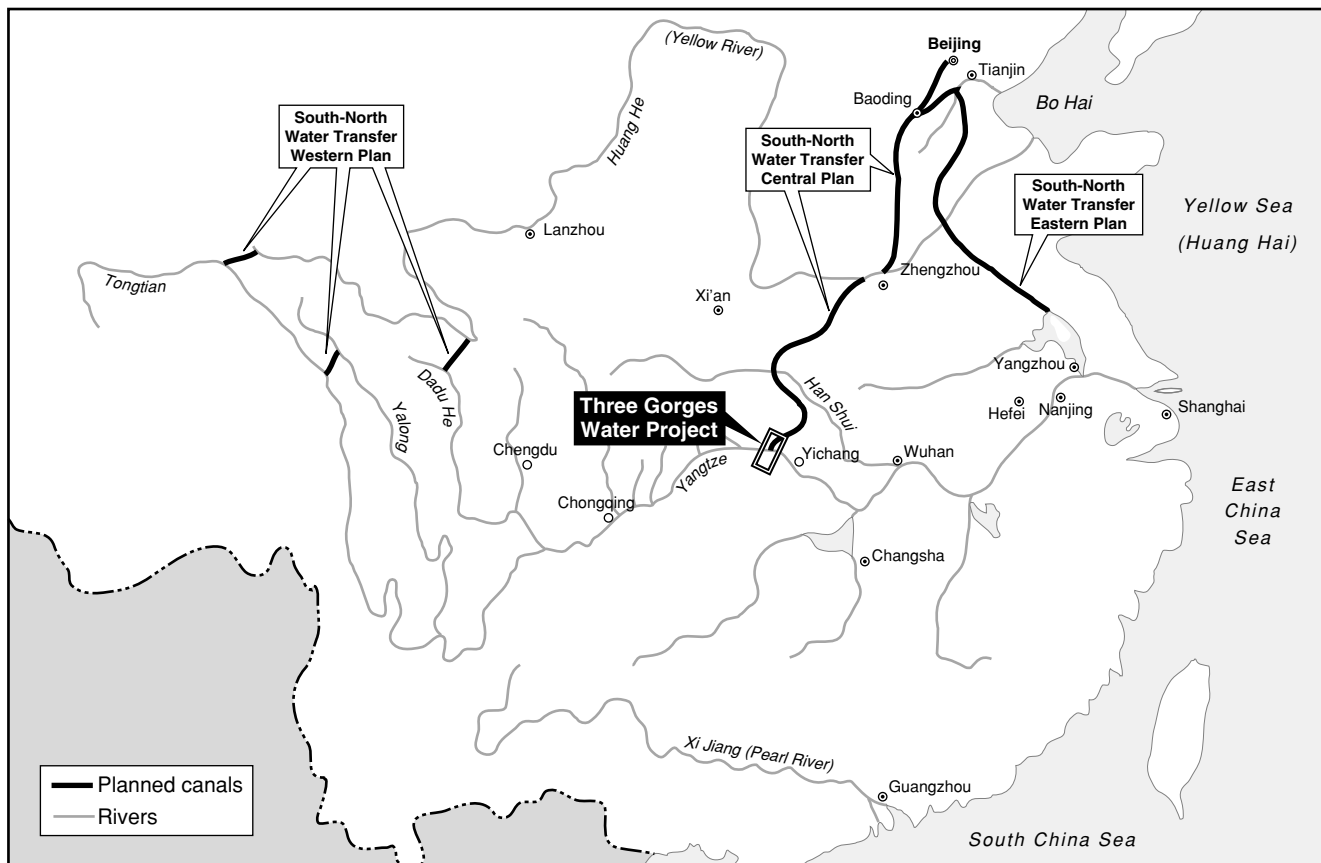
Lilienthal begged off the trip at that time, but two months later, Nelson sent his assistant, Edwin Locke, to confer with Lilienthal about the next steps in the Yangtze River development projects. But winds were about to change. Lilienthal was distraught at the death of Roosevelt, and highly critical of President Truman, undoubtedly aware that geopolitics was replacing Roosevelt’s American Century economic plan, in China and elsewhere.

Flooding along the 3,200 miles of the Yangtze River has killed tens of thousands of people, in this century alone. In a presentation on May 21, 1996 at the general meeting of the Pacific Basin Economic Council in Washington, D.C., Qin Zhongyi from the China Yangtze Three Gorges Project Development Corp. explained that “as early as 1919, Dr. Sun Yat-sen proposed the great idea of building up the Three Gorges Project. The American dam expert, Dr. Salvage, and Chinese engineers selected the first dam site and worked out the first blueprint for the Three Gorges Project.”

The project languished, he reported, until the Seventh National People’s Congress in April 1992, which shifted the project “from the 40-year justification, to implemental process.”

FIGURE 2

Planned water diversion projects in China



Qin explained that, as the largest river in China, the Yangtze accepts the water of 3,600 tributaries, with a total catchment area of 1.8 million km, or 18% of the total area of the country, which is populated by 400 million people, or one-third of the country's total. Work began on the dam in 1994, and in November of last year, the historic closing of the Yangtze River with a temporary dam was completed, and broadcast live on national television. Electric power is scheduled to be produced from the first hydroelectric turbines in 2003.

As the Three Gorges Dam project, which the TVA helped plan, is under way, the TVA has continued to be involved in China's water development plans, to counter the opposition to large-scale water projects. The destructive policies of the "environmentalist" wing of the U.S. government, for example, have prevented Export-Import Bank funding for private companies hoping to participate in the Three Gorges Dam project, and reams of newspaper articles have attacked the project for disturbing dolphins, and the like.

At a workshop last year in Geneva, sponsored by the World Bank and World Conservation Union, it was proposed that a "high-level international group review the experience

of past, current, and planned dams, and improve practices, policy, standards, and participation by those affected." By improving "participation by those affected," is meant the opportunity for anti-growth environmentalists, and "sustainable growth" advocates to disrupt, if not cancel, critical dam and water control projects.

Mindful that the environmentalist lobby in the United States and internationally was setting its sights on the world's most ambitious dam projects in China, the leadership of the TVA, China's water and power development agencies, Tennessee Gov. Don Sundquist, and U.S. Ambassador James Sasser (a former Tennessee senator) organized a joint conference in Beijing in September 1996, on "Economic Opportunities Through Water and Energy."

Representatives from dozens of U.S. companies were invited by TVA to attend, which included not only water and energy experts, but a representative for a U.S. nuclear energy company. China's plans for water and power development were presented, and in side meetings, TVA engineers discussed the plans of China's engineers. During the conference, TVA Chairman Craven Crowell announced that the TVA

and the Minister of Water Resources of China had signed a Memorandum of Understanding for TVA to review the master plan for the development of the Han River, and an MOU was also signed with the Hydro and Power Corp., for assistance in developing the Li River Basin.

With or without industrial participation from the United States, China will complete the Three Gorges Dam development project, while it is also embarking on an ambitious nuclear energy development program. In doing both, it is continuing its six-decade engagement with the experts of the TVA.

The TVA on the Jordan

Since the 1970s, economist Lyndon LaRouche has insisted that the only way to achieve a lasting peace in the volatile Middle East is through region-wide integrated economic development projects. Given the arid conditions in the region, these development projects must center around the construction of water projects for agriculture, industry, and cities.

In the mid-1950s, the men who had played key leadership roles in the Tennessee Valley Authority presented a plan to the nations of the Middle East and to the United Nations, to develop this region, as an alternative to political strife and war.

According to David Lilienthal, writing in 1954, representatives of nearly every nation in the world had visited the TVA over its first 20 years, including Israeli Prime Minister David Ben-Gurion and officials from many Arab countries. The TVA experts proposed to build a “TVA on the Jordan” (Figure 3).

The area of what was called Palestine in the 1940s is slightly over 10,000 square miles, or approximately one-quarter the area of the Tennessee Valley. The major water supply for Palestine and Israel originates in Lebanon, Syria, and Jordan. Lilienthal wrote in 1944 that “cooperation between Israel and the adjacent Arab states would be absolutely essential to the successful execution of the proposed overall plan; only small portions could be developed to an individual country’s advantage without such cooperation.”

It was proposed that the water resources be developed for power and irrigation, through a series of dams on the upper Jordan River and its tributaries, which could store water and also divert some into a network of irrigation canals. In order to compensate the Dead Sea for the loss of these waters, seawater from the Mediterranean would be introduced, starting at a point near Haifa and conducted through tunnels and canals down the below-sea-level Jordan depression to the Dead Sea.

As this seawater dropped into the Jordan Rift, there would be almost 1,300 feet of effective fall for the development of hydroelectric power. It was also proposed to develop underground water resources along the coastal plain from the northern border with Lebanon, south to the Egyptian border. The plan was to be completed in eight stages. It was estimated that

FIGURE 3

The area served by a TVA on the Jordan



irrigation would provide for at least 606,000 newly cultivated acres, and produce 660 million kilowatt-hours of electrical energy per year.

In the mid-1950s, the United Nations Economic Survey Mission for the Middle East was also proposing economic development programs. Gordon Clapp, who had been the general manager of the TVA, served as the head of the mission.

For Syria, Lebanon, and Jordan, the UN recommended “pilot demonstration” projects on the Orontes and Litani rivers, and the Wadis Zerka and Qilt rivers. Reclamation of the large swamps on the Orontes River in western Syria would add 183,000 acres to the land already under irrigation. The Litani River in Lebanon could provide 350 megawatts of power capacity. The experts determined that a dam on the Wadis Zerka in Jordan could double the dry-season flow and double the irrigable land.

Van Court Hare, from the TVA office of chief engineer, served as a member of the mission’s engineering development staff, headed by William L. Voorduin, who was formerly the head project planning engineer for TVA. James B. Hayes, formerly project manager of TVA’s South Holston project and an irrigation and power engineer with over 30 years of

experience, was the Palestine Commission's chief engineer for the development plan. Other TVA people assisted, including Col. Theodore B. Parker, former chief engineer of TVA.

The TVA on the Jordan was not started in 1954, and the Suez Crisis two years later presaged the future of the region without such a perspective. The geopolitical manipulation of the Middle East by the British, which has led to half a dozen wars in the region since the end of the Second World War, has been possible because there are virtually no joint economic development projects under way that would engage the resources of all of the nations in a common goal.

Since the 1997 election in Iran, there have been initiatives from both the Iranian and U.S. side to end the state of diplomatic hostilities between the two nations. Policymakers in Washington would do well to study American relations with Iran, under the leadership of the TVA.

North of the Persian Gulf in southwest Iran, is the region of Khuzistan. It is 58,000 square miles, and in 1954 had a population of 2.5 million, representing one-tenth the total land area and one-eighth the population of the country. It is an oil-producing region which is very isolated and has historically provided only a very poor standard of living for its inhabitants.

After World War II, Iran had a put together a seven-year development plan for the region, with disappointing results. In the mid-1950s, Iran launched a second program, headed by Abol Hassan Ebtehaj, an economist and banker. In 1955 he invited David Lilienthal and TVA General Manager Gordon Clapp to visit Iran. They arrived the following year, and were asked to prepare a comprehensive program for the integrated development of Khuzistan, and to commit themselves to implement the plan. They did two years of surveys and investigations.

The survey found a virtually unlimited amount of natural gas available, five rivers fed from mountain snow, enough water to irrigate 2.5 million acres of agricultural land, and hydroelectric potential of more than 6 million kilowatts.

The former TVA team recommended that the government of Iran build a high, thin-arch multipurpose dam on the Dez River for irrigation, power, and flood control; construct a 132 kilovolt electric transmission line from Abadan north to Ahwaz, in order to utilize idle capacity from a steam plant owned by the oil companies, until power from the dam was available; form an agency to manage electricity production and distribution; cultivate 10,000 acres of sugar cane and build a mill and refinery; plan future irrigation projects, including the test and demonstration of the use of fertilizers; build a polyvinyl chloride plant, as a first step in a comprehensive industrial complex based in part on the region's supply of natural gas.

The program was approved, though the polyvinyl plant project was abandoned for lack of money. In May 1960, an act of the Iranian Parliament created the Khuzistan Water and Power Authority to own and operate the facilities in the program. Approximately 400 non-Iranian employees worked

on the projects, about half of whom were Americans, more than 30 of whom had TVA experience.

By 1967, the initial plan was essentially complete. Of the more than \$190 million invested in the projects, \$42 million was loaned by the World Bank; the rest was internally financed from oil revenues. The 646-foot-high dam on the Dez River had 130,000 kw installed capacity, out of an ultimate capacity of 520,000 kw. Electricity consumption had increased 300% since 1958, when the transmission line was completed. A 50,000-acre pilot irrigation area for improved agriculture, fertilizer use, improved seed varieties, and irrigation, had been established.

A 1967 description of the project reported that, "in the beginning, there was a great amount of cynicism about the Khuzistan program. When plans for the dam and sugar cane factory were announced, only a small minority thought they would actually be built. Once started, many believed that the projects would never be finished. Once finished, it was assumed they probably wouldn't work. But as predictions, one after another, have come to pass, the old spirit of pessimism and cynicism has begun to fade. There is now new hope for a better future in Khuzistan."

The challenge of the Indian subcontinent

From the moment of independence in 1947, economic planners in India looked to the model and experts of the TVA to develop their vast nation. In that year, the draft constitution for the Damodar Valley Corp. (DVC) of India was adopted. This was modelled on the Tennessee Valley Authority by representatives of the government of India, Bengal, and Bihar at the Inter-Provincial Conference held in New Delhi.

Prior to the formation of the DVC, the central government of India secured W.L. Voorduin, formerly head planning engineer of TVA, to work on economic development projects, and other TVA experts served as consultants.

The regions of Bihar and West Bengal, between the Himalayas and the Bay of Bengal, were involved in the Damodar Valley development. The Damodar River joins the Hoogly River, which is an important mouth of the Ganges, about 30 miles below Calcutta, and to the east is what was then the Pakistani province of East Bengal.

The river is 340 miles long, with drainage over an area of 8,500 square miles. The plan called for unified multipurpose development with dams to irrigate 750,000 acres and generate 300,000 kw of electricity. There were 5 million rural inhabitants and 2 million urban dwellers in this region, at that time.

In 1949, work was stated on the Mahanadi Valley Project (MVP), which was to be the first dam of the project. Three multipurpose dams were designed for irrigation, electric power, navigation, and flood control, with an estimated total potential capacity of 900 MW and total areas eventually to come under irrigation, about 2.5 million acres.

Other regions in India were also examining the TVA model. In 1949, Nityananda Kanungo, Minister of Develop-

ment and Industries of the Province of Orissa, spent time at the TVA, studying its plans and programs. In 1951, J.N. Panda, an engineer of the Province of Orissa, wrote a letter, dated May 4, to the TVA chairman, Dr. H.B. Mohanty, from the Secretary to the Government of Orissa, requesting information about TVA, as "it is being used as a model in developing [the] Mahanadi River."

In April 1952, the former Mayor of Bombay, M.R. Masini, wrote in the magazine *Foreign Affairs*: "The United States has no better ambassador-at-large in Asia than the one which bears the initials T.V.A."

Had these initiatives for large-scale infrastructure development been the hallmark of policy for the nations of the Indian subcontinent, rather than the ethnic, religious, and cultural manipulation of what the British carved into India and Pakistan, that region would face a very different situation than it does today.

Nuplexes for the nuclear era

From the 1940s through the late 1960s, before the full-court press by international financial institutions to crush developing nations' economies, and the popularity of the ideology of zero growth and "overpopulation," former and current TVA engineers were advising the governments of Mexico, Peru, Colombia, Puerto Rico, and Brazil on development projects. Plans were drawn up with the governments of numerous countries in Africa, to change the face of that continent.

But by the 1960s, following the promulgation of the Atoms for Peace program by the Eisenhower administration, the TVA took on another responsibility, in developing plans for the large-scale introduction of nuclear power into developing nations.

At the Oak Ridge National Laboratory, in the heart of TVA country, seven studies were done in 1968, on the subject of "Nuclear Energy Centers: Industrial and Agro-Industrial Complexes," which became referred to as "nuplexes." The studies were designed with the idea of allowing developing countries to "leapfrog" ahead in their development.

In the 1968 study done by Perry Stout of Oak Ridge, titled, "Potential Agricultural Production from Nuclear-Powered Agro-Industrial Complexes Designed for the Upper Indo-Gangetic Plain," the author states: "The time has come when the energy derived from nuclear energy can be looked upon very seriously as a key for releasing indigenous agriculture from the bondage imposed by the necessity of securing fuel, fertilizer, and power for tillage all directly from the land without energy resources from outside. . . . Such inputs could free these people from Malthusian limitations hitherto imposed upon their indigenous food supply. . . ."

Scarcely a year after the 1967 war in the Middle East, the engineers at Oak Ridge recommended that a nuclear-centered agro-industrial complex be built, encompassing parts of the Sinai and Negev deserts, to encourage hostile nations to work

together for mutual benefit. This plan was recast more recently by Lyndon LaRouche in his "Oasis Plan."

Nuplexes were designed by the Oak Ridge team for many nations, and every continent. The technologies for linking nuclear power plants to processes for producing fertilizer, steam for industrial processing, electricity for materials processing, and other applications, were tested at the operating nuclear plants, run by the TVA.

Until the early 1970s, the TVA maintained its place as the premier energy technology demonstration resource in the nation. It was the largest nuclear power plant construction site in the world, with 18 power plants in various stages of planning, construction, and operation. Then, under the aegis of the anti-nuclear "energy-conservation" policies of the Carter/Schlesinger administration, the model of the TVA for economic development was repealed, as seventeenth-century wood-burning stoves were brought into TVA territory to demonstrate how households could save energy.

On Dec. 12, 1994, the chairman of the TVA, Craven Crowell, announced that the TVA had decided that it would not complete the last three nuclear power plants that it had under construction. For the time being at least, this was the end of an era.

Today, we can see the disastrous consequences of the IMF's policies, which force developing nations to cut back investment, do anything necessary to "attract" foreign capital (not capital goods), reduce subsidies that give the population a safety net, and eliminate any projects that are deemed not "environmentally sustainable." Under these conditions, the concept and approach of the TVA, embodied in the initiative for the Eurasian Land-Bridge, will once again become the model for worldwide economic development.

Less than three months after the TVA was signed, construction began on the agency's first multi-purpose hydroelectric dam, on the Clinch River. It was named for Senator George Norris of Nebraska, who led a multi-decade fight for the establishment of the TVA.

David E. Lilienthal, appointed in 1933 by President Roosevelt as the first chairman of the board of directors of the Tennessee Valley Authority.

In 1942, a member of a local library board stated at a meeting about the future of the book services TVA had established: "We have 6,000 people in Megis County, and no railroad, no telephones, and no newspapers. If we lose the library bookmobile, how will we know what is going on in the world?"

A TVA nurse checks blood samples for malaria parasites, as part of the malaria control program, which included spraying insecticides, and fluctuating the level of water in the lakes behind the dams, to destroy mosquito habitats.

To cheapen the cost of electricity, and up-grade the standard of living of the rural residents of the Tennessee Valley, the TVA introduced the population to labor-saving appliances through public demonstrations, and made government-backed credit available to distributors.