

A TRIBUTE TO JOHN F. KENNEDY

—50 YEARS BEHIND—

# THE PRESIDENT FROM THE FUTURE

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# INTRODUCTION

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John F. Kennedy's programs for applying the discoveries of nuclear energy to desalination, power production, space rockets, and construction projects, along with his relaunching of Franklin Roosevelt era water management, would have created a fundamentally different United States and a fundamentally different American citizen, had he lived to complete them.

By making himself an instrument of national sovereignty, Kennedy became the champion of pivotal scientific policies and investments which had been stalled or blocked by Wall Street influences during previous administrations.

The following examination of John F. Kennedy's scientific-economic legacy, demonstrates beyond all doubt, that had his programs been carried through as planned, water availability, food production, power production and consumption, population growth, overall living standards, education, and technological progress would have increased at rates far above those which have taken place since 1970. Had we continued Kennedy's program:

Nuclear desalination, along with major continental-scale water development projects would have allowed for increased water use throughout the 1970s and 1980s, with increased agricultural production for domestic use and export.

Breeder reactors utilizing 100% of the potential energy of uranium and thorium would have been a standard power source in the 1980s; the "waste" heat from reactors would have been integrated with industry in the 1970s.

Nuclear propelled space vehicles reaching the end of the solar system, landing on Mars, and facilitating a permanent moon base would have been operational in the 1970s, and conducting regular trips in the 1980s.

Ignition of fusion would have been achieved in the 1980s, with reactors producing electricity in the 1990s.

Power production and consumption would have increased ten times by the end of the century, instead of

only three, and nuclear power would have made up for at least half of that increase.

There would be 440 million Americans instead of 308 million in 2013, each possessing an overall power three times that of today.

These are the facts. Kennedy was assassinated to prevent a trajectory for the United States and the world which would have put the oligarchical organization of society out of existence, establishing a world of truly sovereign nation-states.

Every real crisis in living standard, technology, and social strife ongoing in the United States today has its root, fundamentally, not in what has occurred since Kennedy's assassination, but in what has not occurred—in the deprivation of what Kennedy made possible.

The toleration of the lies surrounding his and his brother's assassination, which made possible the eventual shutdown of every single one of Kennedy's future-orientated policies, doomed the population of the United States to an increasingly backward existence, as expressed in a declining power of each citizen, production capability, technological progress, and lack of future orientation.

What follows is an in-depth review of six largely unknown, but essential, scientific initiatives of Kennedy, which remain as the true legacy of the United States, though temporarily lost. May this document serve to crush the myths, engineered in recent decades, by demonstrating the actual economic program of a sitting president, which contradicts nearly every false Malthusian, overpopulation, and monetarist dogma.

This tribute to John F. Kennedy, 50 years after his assassination, is dedicated to his creative legacy, which the oligarchical forces behind his assassination sought to permanently take off the agenda of our nation. May the understanding of this legacy increase the power of those who choose to fight to return mankind to his proper role as a continually evolving creative force on the planet, and in the solar system.

# THE BREEDER REACTOR

President Kennedy's first two appointments to the Atomic Energy Commission in 1961 were Chairman Glenn T. Seaborg and Leland J. Haworth. These men were architects of the "Atoms for Peace" age, and were key visionaries who would provide Kennedy with the research necessary to launch a full nuclear age of power, engineering, space travel, and water management.

On March 17, 1962, Kennedy wrote a letter to the Chairman of the Atomic Energy Commission, Glenn Seaborg, on the development of civilian nuclear power, asking that an updated program for nuclear power be developed on the widest possible basis and a broad estimate of electricity needs for the United States be made. The detailed response would amount to a blueprint for complete transition to nuclear power for all electricity needs. The following are quotes from the letter:

The development of civilian nuclear power involves both national and international interests

of the United States. At this time it is particularly important that our domestic needs and prospects for atomic power be thoroughly understood by both the Government and the growing atomic industry of this country which is participating significantly in the development of nuclear technology. Specifically we must extend our national energy resources base in order to promote our nation's economic growth.

Accordingly, the Atomic Energy Commission should take a new and hard look at the role of nuclear power in our economy... It should recommend appropriate steps to assure the proper timing of development and construction of nuclear power projects, including the construction of necessary prototypes. There should also be an evaluation of the extent to which our nuclear

## Glenn Seaborg

JFK discussing nuclear energy with Glenn Seaborg during a visit to the headquarters of the Atomic Energy Commission in Germantown, MD on February 16, 1961. Seaborg, one of the leading nuclear scientists of the 20th Century, was appointed by Kennedy as chair of the Atomic Energy Commission in January 1961, where he oversaw Kennedy's main nuclear energy programs.



Seaborg had been the lead discover of plutonium in 1941, created by bombarding uranium-238 with fast neutrons, to form plutonium-239, and was subsequently involved in the Manhattan project, and a leading developer of the breeder reactor concept. In addition to plutonium, Seaborg was the lead discover of americium, curium, and berkelium, and co-discoverer of californium, einsteinium, fermium, mendelevium, nobelium, and seaborgium. He was one of the pioneers in the field of nuclear medicine, including the creation of an isotope of iodine used to treat thyroid cancer.

power program will further our international objectives in the peaceful uses of atomic energy.

The study being conducted at my request by the National Academy of Sciences on the development and preservation of all our national resources will focus on the nation's longer-term energy needs and utilization of fuel resources. The other study to be launched soon by the Federal Power Commission will determine the long range power requirements of the nation and will suggest the broad outline of possible programs of growth for all electric power companies—both private and public—to meet the great increase in power needs. Your study should be appropriately related to these investigations.

On July 14, 1962, Kennedy wrote to the Chairman of the Joint Committee on Atomic Energy in Congress, "Concerning Use of By-Product Steam from the Hanford Nuclear Reactor," intervening to put the planned N-Reactor at Hanford, Washington onto the commercial electricity grid, which was being blocked. In 1962, the U.S. had only 800 MWe in experimental reactors around the nation, the largest at 200 MWe capacity. The Hanford reactor would be four times larger than any nuclear plant yet built.

My message of March 1 on the nation's natural resources pointed out that a major challenge in resource conservation lies in the efficient utilization of our energy resources, including heat produced as a by-product of industrial processes.

The new production reactor now being constructed by AEC at Hanford, Washington, to manufacture plutonium will produce as a by-product, very large amounts of steam. By direction of the Congress, the reactor, at an additional cost of \$25,000,000 has been designed so that the by-product steam can be used to generate electricity. I was disappointed last year when the Congress, despite strong efforts by you and others,

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"In 1961, I joined Kennedy's "best and brightest" exploring the New Frontier. I first met John Kennedy on the reviewing stand of the inaugural parade. Within weeks he visited the Atomic Energy Commission for a briefing, and I encountered one of the most impressive intellects I have ever met. Even on the esoteric subject of nuclear energy, he responded with penetrating questions reflecting an immediate grasp of the issues. The feeling of youth and energy that pervaded his administration began at the top."  
—Glenn Seaborg

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did not authorize federal construction of generating facilities at Hanford to convert this steam to electric power.

In my judgment, it is clearly in the public interest to utilize the heat output of the Hanford reactor, and to obtain maximum benefits from the public investment already committed for this facility if there is a feasible way to do so.

Two months later, on September 26, 1962, Kennedy signed the "Atomic Energy Commission Authorization Bill," celebrating the victory for nuclear power for electricity.

I am pleased to sign H.R. 11974, the Atomic Energy Commission 1963 Authorization Bill. One portion of this legislation—for which we have waited for quite some time—will make it possible for the steam produced by the Hanford new production reactor to be transformed into electricity and distributed to the homes and factories of the Pacific Northwest.

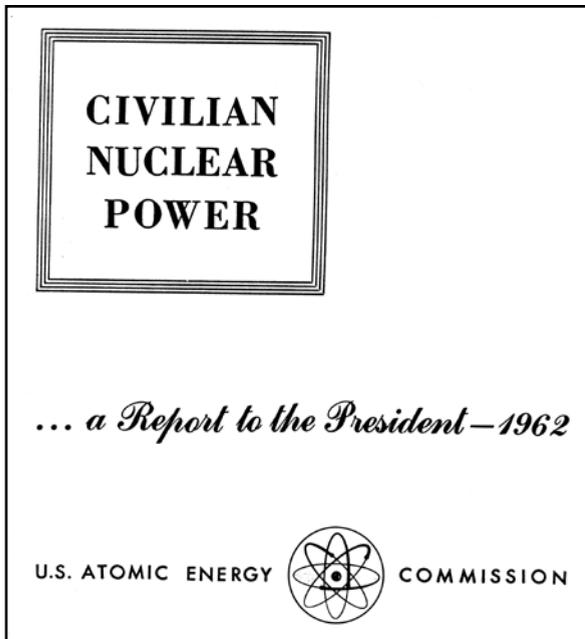
This project is for peacetime application and atomic heat for electricity which will produce a million kilowatts, approximately. It will be four times larger than any other project in the world. It will give the United States a freer margin for superiority in the peacetime use of atomic energy.

## **Civilian Nuclear Power: A Report to the President**

Then, on November 20, 1962, Kennedy received the completed report of the Atomic Energy Commission, drafted by his appointee Leland Haworth, for a complete transition of the U.S. into a nuclear economy. This seventy-six page report, titled "Civilian Nuclear Power, a Report to the President"<sup>1</sup> was far more than a list of suggestions of specific projects. It presented a program

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1. <http://energyfromthorium.com/pdf/CivilianNuclearPower.pdf>



to transition entirely from a fossil fuel driven electrical grid, to one completely nuclear. It presented a plan to transition from then-current reactor technology, to partial breeding (converter reactors), to full breeder reactors, which create more nuclear fissile material (fuel) than they consume, in the course of creating energy. It puts forward the feasibility of dual purpose plants, for high process heat in industry, to be operational by the 1970s, as well as desalination. Here is a brief excerpt:

Our supplies of uranium and thorium contain almost unlimited amounts of latent energy that can be tapped provided “breeder” reactors are developed to convert the fertile materials, uranium-238 and thorium-232, to fissionable plutonium-239 and uranium-233, respectively. Successfully done, this will render relatively unimportant the cost of nuclear raw materials so that even very low-grade sources will become economically acceptable.

The use of nuclear energy for electric power and, less immediately, for industrial process heat and other purposes is technically feasible and economically reasonable.

In addition to its ultimate importance as a means of exploiting a large new energy resource, nuclear electric power holds important near-term possibilities: as a means of significantly reducing power generation costs, especially in

areas where fossil fuel costs are high, as an important contributor to new industrial technology, and to our technological world leadership.

The report detailed the hurdles already crossed to achieve low capital cost of plants, long fuel life, efficiency, and showed the overall physical cost to be below that of coal plants. With these achievements, along with the build-up of the parts and manufacturing base for nuclear power components in the 1950s, nuclear reactors producing electricity were now ready for commercial development, and to be produced within the private sector (a process which did proceed in that decade). The only hang up for long term nuclear power, the report con-

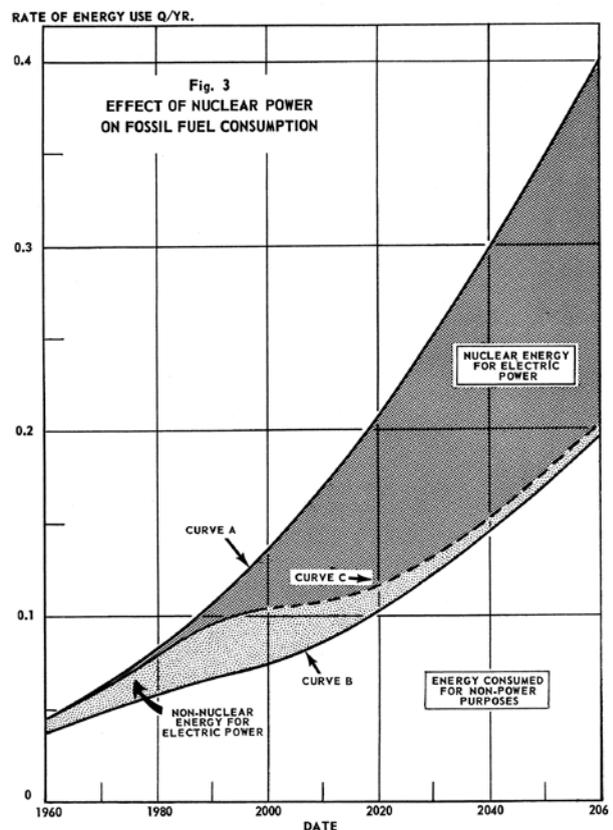
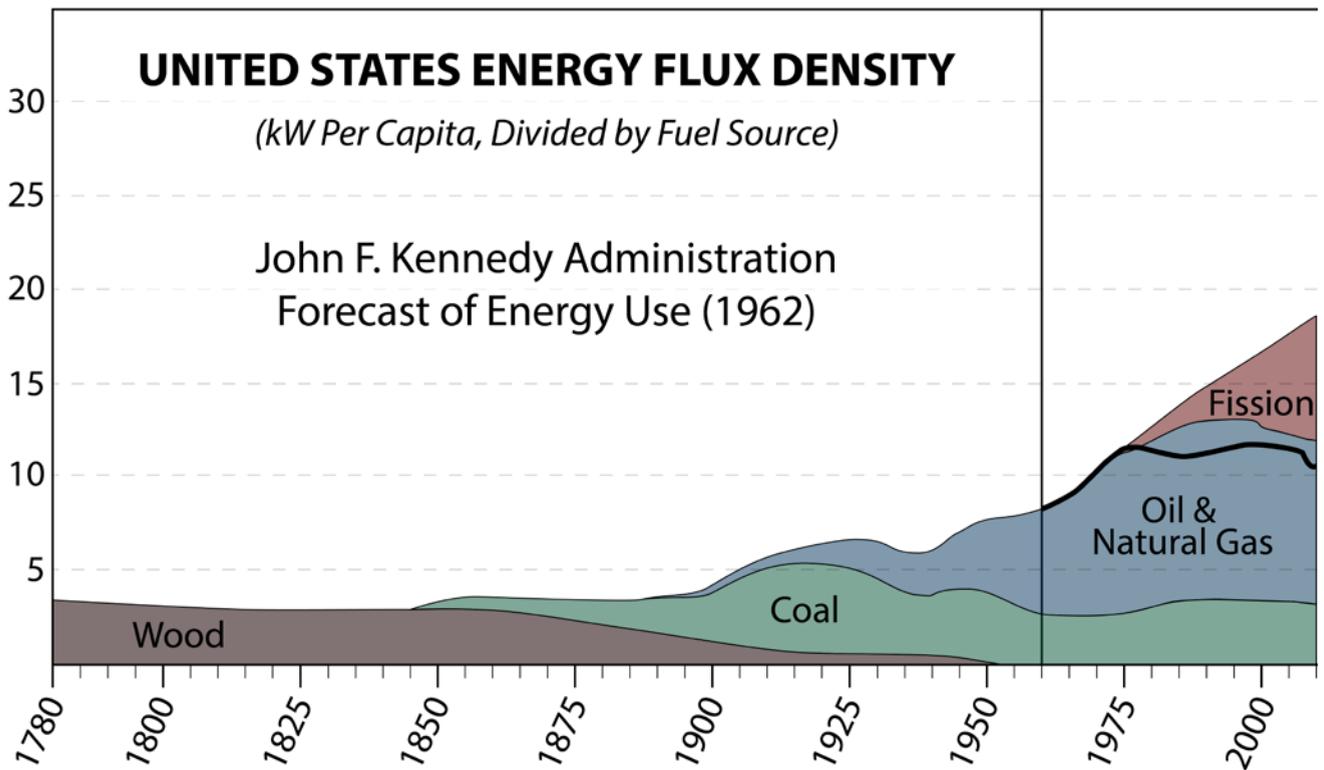


Fig. 3  
EFFECT OF NUCLEAR POWER ON FOSSIL FUEL CONSUMPTION

CURVE A represents total energy on the same basis as Curve C in Fig. 1.  
CURVE B represents energy consumption for other purposes than generating electricity.  
CURVE C is obtained by deducting from Curve A the total nuclear energy consumed in generation of electricity.

This graph from the “Civilian Nuclear Power” report of November 1962, shows the Atomic Energy Commission’s projection of growth of nuclear energy, measured in Q (quintillion BTUs)/yr, where .1Q/year = 3.34 terawatts. In 1960, the U.S. economy used a little less than 1.5 terawatts. Their projection of growth, which was less than what actually occurred for the decade of the 1960s, would have put the U.S. at 5.4 terawatts, nearly double the 3.2 terawatts of U.S. in 2013. Roughly half of this would be electrical, or about 1000 GW of electrical power, mostly nuclear, as compared with only 470 GW of electrical power in the U.S. in 2013, only 20% of which is nuclear.



This graph puts the forecast included in Leland Haworth's report within the overall, constant rise of power per capita in U.S. history, which has taken place in leaps, relative to applied discoveries. The dark line shows the actual power per capita since Kennedy's assassination, decreasing in recent years to 10 kW/capita, versus the 20 kW/capita which the full development of nuclear energy entailed. Power per capita is a measure associated with overall power and organization of society to not only reproduce the current generation, but produce one capable of operating with more power in and over the world.

cluded, was the limitation that the reactors developed only used 1% of the energy available in the uranium mined, since less than 1% of mined uranium is fission-ready U-235. The amount of energy extractable from the uranium reserves known at the time was less than that extractable from known fossil fuel reserves. "If this 1% from uranium were our only potential source, the contribution to our total energy reserves would scarcely be worth the development cost. Fortunately however, this is only a fraction of the story."

The solution of this problem was outlined in great detail in the report, describing the investments needed by the government to develop a commercial breeder reactor, that could utilize 100% of the potential energy in mined uranium, by utilizing all of the U-238.<sup>2</sup>

2. The non-fissile, but plentiful U-238 and Th-232, can be converted into the fissionable isotopes Pu-239 and U-233, respectively, by the absorption of fast neutrons. A small amount of U-235, surrounded by a blanket of U-238 or Th-232, can, in the process of fissioning—thereby releasing energy, utilized in a power plant—simultaneously create an amount of fuel equal to, or even greater

By the breeding of fuel, low grade ores could be used, and even trace amounts of uranium could then be used, making the resource virtually unlimited, due to its prevalence in seawater and dirt.<sup>3</sup> Nuclear energy,

than the initial U-235 introduced into the reactor core.

3. Seaborg later noted in an interview conducted in the 1990s, that after he discovered plutonium in 1941, the concept of the breeder reactor, of which he was one of the main developers and proponents, was quickly apparent. "There was almost immediately, the possibility that it would be possible to use plutonium as an intermediate in what came to be known as a breeder reactor, that is, the Uranium-235 chain reaction operating to produce neutrons that some of which could be absorbed in the uranium, abundant U-238, to form plutonium. And then that plutonium could be used as a fuel to continue the reaction. And if one could produce, as you were burning plutonium, more plutonium than you consumed, then you could continually replenish the core and have a reactor that was, in effect, using as a fuel the non-fissionable uranium-238, through the plutonium as an intermediate. "If we could develop the breeder reactor so that we could use the non-fissionable uranium-238 via the fissionable plutonium-239, then we would have hundreds of times more fuel. And not only that. Because of its abundance, it would be possible to use lower

## Leland J. Haworth



Leland Haworth was one of two appointments made to the Atomic Energy Commission in Kennedy's first month as President, along with Glenn Seaborg. Haworth played a key role in the promotion of Operation Plowshare, led the plan and drafting of Kennedy's requested breeder reactor report "Civilian Nuclear Power," which he considered his most important contribution to the AEC, along with his effort toward the Limited Test Ban Treaty. Haworth is shown here (left) on November 20, 1964 as then Director of the National Science Foundation, viewing the Sun at the prime focus of the McMath Solar Telescope at the Kitt Peak National Observatory near Tucson, Arizona.

NOAO/AURA/NSF

as opposed to fossil fuels, served as an inspiration for cheap power for the world, since its capabilities were independent of geological deposits existing nearby, and not all nations have cheap access to fossil fuels.

They thus concluded that three simultaneous phases should be pursued: 1) early construction of the most competitive existing types of nuclear reactors, 2) development, construction, and demonstration of reactors which produce some fuel but less than used, and 3) intensive development of breeder reactors, which produce more fuel than is used.

In addition, they discussed reprocessing, where fissionable and fertile fuels are recaptured from used fuel assemblies and fission products are removed.

The report stated that some reactor prototypes conceived "may have application for process heat," and "would reach the *full scale operational phase by the early 1970s.*" The report called for eight prototype reactors to be constructed, half partial breeding and half full breeder reactors, and suggested that *breeder reactors would be the standard nuclear reactors for electricity by the early 1980s.* They estimated that by the end of the century, half of electricity would come from nuclear power.

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grade uranium in ores. It would be economically feasible to do that. So you'd have much larger supplies of uranium, enough to last, I don't know how long, thousands of years, probably, if the breeder reactor was developed."

The Federal Power Commission's forecast of a tenfold increase in electric energy use by the end of the century, which they cited, meant that fossil fuel electric energy, being half by their measurement, would still grow four or five times.

The benefits of developing the breeder reactor were long lasting, and would come from new complex designs and materials used to construct the reactor, requiring a period of national investment without quick payback, outside of the cost-benefit analysis which was imposed on the nation after Kennedy's assassination.

When one considers the depth of the complete program, it is clear that Kennedy's requested AEC report is the most ambitious program for full development of nuclear energy, a level from which all administrations have subsequently plunged.

### Kennedy Launches the Nuclear Era

As part of Kennedy's 1963 western states tour, he stopped for a ceremony on September 26, 1963 at the Hanford Nuclear Reservation in Washington State, to celebrate the construction of the Hanford N-reactor, the largest plant of its kind in the world.

Kennedy's dedication launched a new era of 1 GW reactors across the United States. The speech incorporated elements of the report he received the preceding November from Leland Haworth, and presents a con-



ing second to none. I think this is a good area where we should be first, and we are first. We are first.

It is extraordinary how long it took. It is extraordinary what energy, *human energy*, was required to get this concept accepted. But as “Scoop” Jackson said, just as it took a *decade* to get the Grand Coulee, which of all the extraordinary national assets I have seen in the last two days is the most *extraordinary*, because it not only led to the prosperity of this valley, but led to what has been happening here for 20 years, and now leads to this *new breakthrough*...

There are two points on conservation that have come home to me in the last two days. One is the necessity for us to protect what we already have, what nature gave to us, and use it well... that is the traditional concept of conservation...

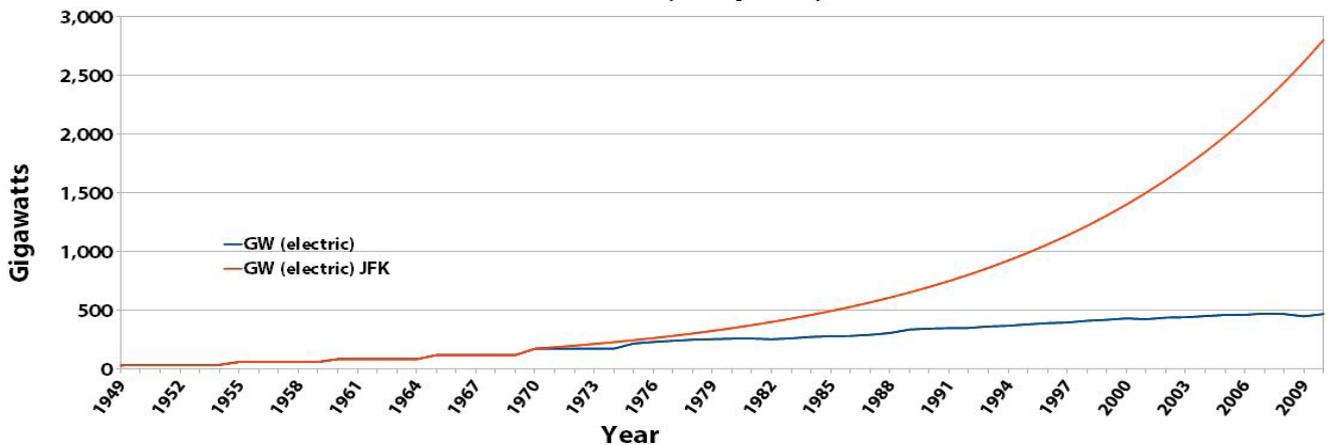
But the other part of conservation is the newer part, and that is to use science and technology to achieve significant breakthroughs as we are doing

As part of his 13 state western tour, on September 26, 1963 President Kennedy participated in groundbreaking ceremonies for the construction of a dual-purpose reactor—designated the N-Reactor—at the Hanford nuclear reservation near Richland, Washington. Kennedy had personally aided in the fight to achieve the public power component of the reactor, making it the nation’s first reactor producing both plutonium and power for the electrical grid. It was also the largest reactor at the time, producing 1 gigawatt of electricity. Here Kennedy is shown with a rod of uranium, holding it to a geiger counter and initiating the groundbreaking.

cept of technological evolutions, brilliantly capturing Kennedy’s personal mission toward mankind as a whole:

I am also glad to come here today because we begin work on the largest nuclear power reactor for peaceful purposes in the world, and I take the greatest satisfaction in the United States be-

### US Electricity Capacity



This graph depicts a growth of the electric capacity increase forecast by the Kennedy administration, as expressed in Kennedy's Hanford speech: "Do you know that... we double the need for electric power every 10 years?" The United States would have had 2,800 GW of capacity (7 electrical kW/capita) in 2013, instead of the 470 GW (1.5 electrical kW/capita) we have today.

today, and in that way to conserve the resources which 10 or 20 or 30 years ago may have been wholly unknown. So we use nuclear power for peaceful purposes and power.

Do you know that in the next 10 years, I hope the people of the United States realize it—we double the need for electric power every 10 years? We need the equivalent of a new Grand Coulee Dam every 60 days. In the next 20 years we are going to have to put in the electric industry \$125 billion of investment, and when we do that this country will be richer, and our children will enjoy a higher standard of living. We don't realize that what we regarded as affluence 30 years ago is now way down below. Air conditioning, television, electricity, and all the rest have changed the life of this country, and we are going to find the same extraordinary changes in the next 20 or 30 years....

We must hasten the development of low-cost atomic power. I think we should lead the world in this. By 1967, 1968, 1970, in the Northeast United States, where power rates are nearly *double* yours, we are going to find atomic power increasingly competitive, and by the end of this century this is going to be a *tremendous* source. Our experts estimate that half of all electric energy generated in the United States will come from nuclear sources.

These are the things we must do, and many more. This great, rich country of ours has a *long*, unfinished agenda, but it has *always* had that agenda in creative times, and this is a creative time in our country and throughout the world. All of the trained and educated men and women who

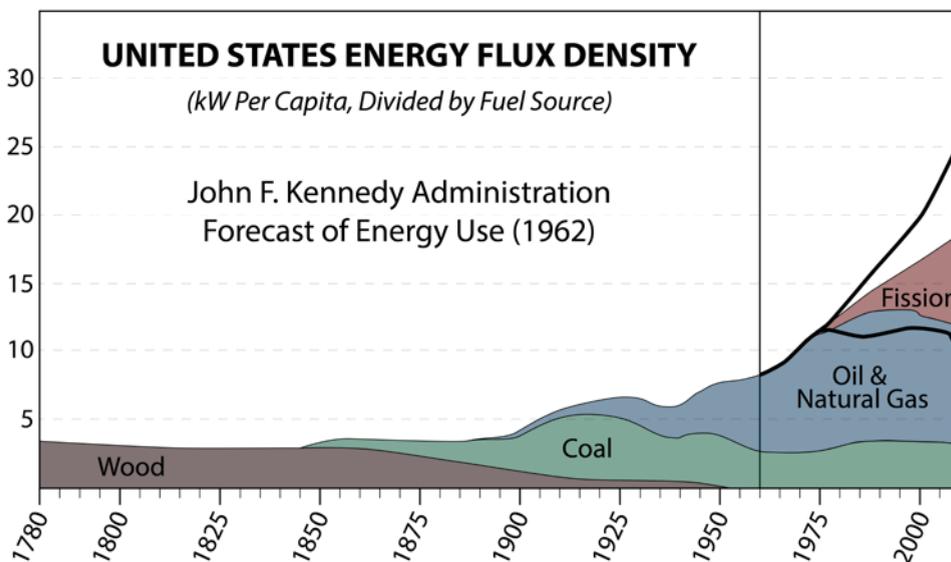
are making our country over, who are building a better standard of living for our people—*this is a time* when we wish to encourage that release of energy, *human energy*, which is the most extraordinary of all.

Therefore, I am proud to come here across the United States as President to express our thanks to you, to express my pride in what is being begun here today, which puts the United States, as I said, once more in the lead in a whole new area, which can mean so much to people around the world.

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"This great, rich country of ours, has a long, unfinished agenda, but it has always had that agenda in creative times, and this is a creative time in our country and throughout the world."

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This graph compares three rates of growth of kW per capita beginning at 1962. The lower dark curve shows that which did occur during the decade of the 1960s, a 2.7% growth in power per capita per annum, before leveling off in the 1970s, and declining in recent years. The second shows the forecast of the Kennedy administration, one the impact of nuclear fission energy. The upper dark curve takes into account a continued annual growth of of power per capita of 2.7% per year (or 30% per decade), which serves as a true standard for growth, as it was actually attained by the overall effects of Kennedy's space program, the investment tax credit, and the implementation of nuclear energy, the latter which took place at a rate much greater than expected in the 1962 Kennedy forecast. This third curve also takes into account the implementation of fusion energy, which would have brought the United States to over 25 kW/capita by 2013.

# NUCLEAR DESALINATION

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Kennedy's program for desalination, which became nuclear desalination in 1963, would have solved most of the world's water problems. Kennedy spoke of desalination in his 1960 campaign speeches and acted on his promise soon after his election. On February 23, 1961 Kennedy gave a special "Message to the Congress on Natural Resources," restarting new projects for flood control, dams, etc., and including saline and brackish water conversion.

No water resources program is of greater long-range importance for relief not only of our shortages, but for arid nations the world over—than our efforts to find an effective and economical way to convert water from the world's greatest, cheapest natural resources—our oceans—into water fit for consumption in the home and by industry. Such a break-through would end bitter struggles between neighbors, states, and nations—and bring new hope for millions who live out their lives in dire shortage of usable water and all its physical and economical blessings, though living on the edge of a great body of water throughout that parched life-time.

This Administration is currently engaged in redoubled efforts to select the most promising approaches to economic desalination of ocean and brackish waters, and then focus our energies more intensively on those approaches. At my request, a panel of the President's Science Advisory Committee has been working with the Secretary of the Interior to assure the most vigorous and effective research and development program possible in this field.

I urge the Congress to extend the current saline water conversion research program, and to increase the funds for its continuation to a level commensurate with the effort our current studies will show to be needed—now estimated to be at least twice the level previously requested.



President Kennedy on June 21, 1961, activating by remote control, the first Saline Water Conversion Plant, built in Freeport Texas.

On June 21, 1961, Kennedy remotely activated a saline water conversion plant in Freeport, Texas, stating:

The dedication of the conversion plant at Freeport, Texas, today is an important step towards the achievement of one of man's oldest dreams: securing fresh water from salt water. The Government of the United States and the people of this country take pride in this research enterprise which holds such high promise for meeting one of man's basic needs in areas where nature has not been generous....

I might say that I can think of no cause and no work which is more important, not only to the people of this country but to people all around the globe, especially those who live in deserts or on the edge of oceans.

I am hopeful that the United States will continue to exert great leadership in this field, and I want to assure the people of the world that we will make all the information that we have available to all people. We want to join with them, with the scientists and engineers of other countries, in their efforts to achieve one of the great scientific breakthroughs of history. I'm sure that before this decade is out, that we will see more and more evidence of man's ability at an economic rate to secure fresh water from salt water, and when that day comes then we will literally see the deserts bloom.

Five days later, on June 26, 1961, he wrote a letter to the President of the Senate and the Speaker of the House, transmitting a bill on saline water research.

Water—one of the most familiar and abundant compounds on the earth's surface—is rapidly becoming a limiting factor on further economic growth in many areas of this Nation and the world. As time goes on, more and more communities will be faced with the prospect of economic distress and stagnation unless alternative sources of suitable water are developed.

It is essential, therefore, that we make every effort at this. Time to search for low-cost processes for converting sea and brackish water into freshwater to meet our future water needs and those of our neighbors throughout the world. I know of no Federal activity that offers greater promise of making a major contribution to the ultimate economic well-being of all mankind than this program.

This bill will provide the Department of the Interior with a wide variety of tools to attack the saline water conversion cost barrier. It contemplates a major acceleration of current programs of basic and applied research, and permits the construction of conversion plants far larger than any now in existence to test the feasibility of known and yet to be developed processes.

Four months later, the bill "to expand and extend the saline water conversion program," was passed, and Kennedy signed the bill on September 22, 1961, writing:

Present shortages of water are already adversely affecting industrial development in important sections of the United States. Unless these necessary steps are taken now, within 15 years these shortages will become a serious handicap. This bill opens the door to development of a means whereby low-cost water can be made available from limitless sources.

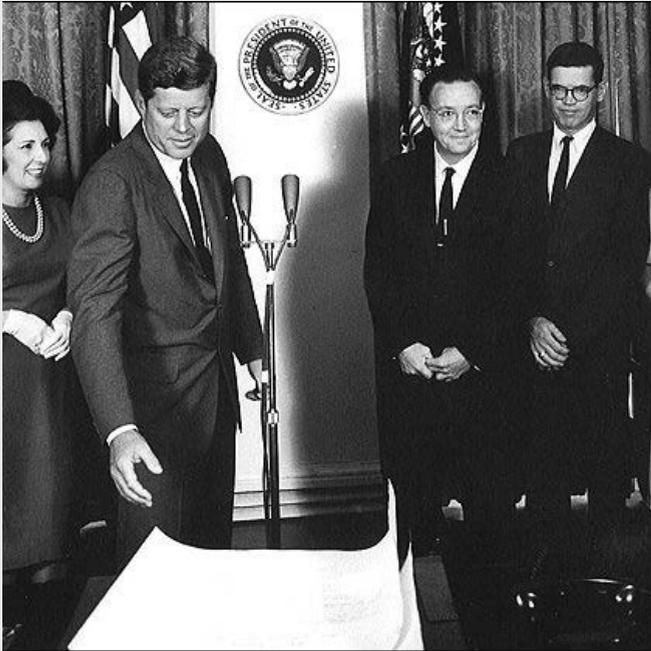
Cheap conversion of saline and brackish water is a goal within our reach, and dedicated efforts will answer the hopes which have attracted the attention of mankind for many centuries.

Six months later, on March 1st, 1962, Kennedy reiterated the commitment toward progress in desalination, referencing his first message to Congress, "In the second month of this Administration I sent to the Congress a message summarizing our plans for the development of our natural resources." He continued:

In the year which followed, heartening progress was made, including the following... The saline water program to find cheaper means of converting salt water to fresh water was given new impetus by legislation enacted last year; three demonstration plants have begun operation and two more will shortly be under construction.

Kennedy returned to this theme months later on May 25, 1962, at the White House Conference on Conservation:

Our great contribution, it seems to me, that we can make in our time, as distinct from the contribution of the Roosevelts and Pinchot which was in a sense the management of resources, their preservation against their unreasonable exploitation by private interests—our great contribution in the fifties and the sixties, it seems to me, is applying the great discoveries of science to this question of conservation, how to get fresh water from salt water at competitive terms, which has been a matter of particular interest to Senator Anderson and Congressman Wayne Aspinall, and which can mean such an extraordinary amount to the people of the West, the Southwest, and really in a sense to people all around the globe. I have felt that whichever country can do this in a competitive way will get a good deal more lasting benefit than those countries that may be even first in space.



## James T. Ramey

James T. Ramey (second from the right), in August 1962, being sworn in by President Kennedy as a commissioner of the Atomic Energy Commission. Ramey had long experience in realizing the potentials of nuclear energy against practical thinking and overawed the inherited Wall Street foot-dragging influences within the AEC. Ramey had previously worked as lawyer to the TVA, drafted contracts for the world's first nuclear submarine with Admiral Hyman Rickover, and helped create Argonne National Laboratory for the development of nuclear reactors.

In 1956 he was appointed as the Executive Director of the Joint Committee on Atomic Energy, Congress's oversight committee for the numerous programs of the Atomic Energy Committee, which received testimony on nuclear space propulsion, peaceful use of nuclear explosives, advanced reactor applications, and other nuclear energy applications.

Within months of Ramey's appointment, Kennedy's requested AEC nuclear energy report was completed, calling for a conversion of the country's power

generation over to nuclear fission, breeders and reprocessing and a special desalination branch was established at the AEC with Kennedy forming a Task Group on nuclear desalination at the White House. Ramey vigorously promoted and defended the nuclear rocket program. Mr. Ramey also played a key role in the critical negotiations that averted nuclear war during the 1962 Cuban missile crisis.

When we think of such a large percentage of the world's land which supports so few people, how extraordinary an accomplishment it will be when we can bring water to bear on the deserts surrounding the Mediterranean and the Indian Sea and all the rest. And I think that is within our grasp and within our lifetime, perhaps even within our decade, and I think it will be the prime accomplishment of science in improving the life of people in the long history of the world. And that is within, as I've said, our reach, and that deserves the greatest effort by us all.

### Desalination Goes Nuclear

In 1962, Kennedy launched the most ambitious program for nuclear energy in the nation's history, calling for a plan to revolutionize electricity use and process heat from nuclear energy, utilizing breeder reactors. In January 1963, in response to a report Kennedy received on the subject, the Presidential Office of Science and Technology established inter-agency task group to investigate the use of large nuclear reactors for producing

energy for sea water conversion. A desalination branch was established in the Division Of Reactor Development And Technology to handle the day-to-day administration and implementation of the AEC's program. The Oak Ridge National Laboratory was assigned a major role in the R & D program for the application of nuclear energy to desalination.

With James T. Ramey as the main author, the agency issued their research of 1963 in March 1964 as "An Assessment of Large Nuclear Powered Sea Water Distillation Plants," and outlined a plan to begin building plants in the 1970s sufficient to supply arid regions throughout the United States. James Ramey testified to Congress on August 18, 1964, summarizing its results.<sup>4</sup>

The report estimated that if an appropriate research and development program were actively pur-

4. Hearings Before the Joint Committee On Atomic Energy; Congress Of The United States, Eighty Eighth Congress, Second Session, On the "Use Of Nuclear Power For The Production Of Fresh Water From Salt Water", August 18, 1964 and September 14, 1966. See: <http://sul-derivatives.stanford.edu/derivative?CSNID=0001878&mediaType=application/pdf> and <http://sul-derivatives.stanford.edu/derivative?CSNID=00002070&mediaType=application/pdf>

sued, large-scale dual-purpose installations could produce 1,000 to 1,900 megawatts of electricity and 500 to 800 million gallons of water per day, .6-.9 million acre feet per year (MAFY). The report also suggested a program to develop and demonstrate a plant operating with an 8,300-megawatt (thermal) reactor and producing approximately 1,400 megawatts of electricity and 600 million gallons of water per day (.7 MAFY).

This 8,300 MWT reactor was the 1975 goal. The 1970 goal was for plants of intermediate size. The task group proposed producing a half dozen intermediate sized units, two in Southern California, one in the greater New York area, several for the Gulf Coast, and one in Florida.

The Metropolitan Water District of Southern California was the first site for such nuclear desalination, and entered into a contract with the Department of the Interior and the AEC in 1964 for a detailed economic and engineering study of dual-purpose plants in the 150 to 750 MWe size range and 50 to 150 mgd production capacity, to be operational by 1970. James Ramey of the AEC remarked, "Such a project could convert more water from the sea than all the other sea water conversion units currently operating in the world."

The final capacity of the large nuclear desalination plant, once expanded to 150 mgd, was to be enough water for a city of about 750,000. Two large conventional light-water nuclear reactors, of about 3,000 thermal megawatts each, were to be the energy source, and the water plant to consist of three large multistage flash distillation sections, each producing 50 million gallons of water per day. The plant would have been 30 times larger than the largest existing water desalination plant at that time.

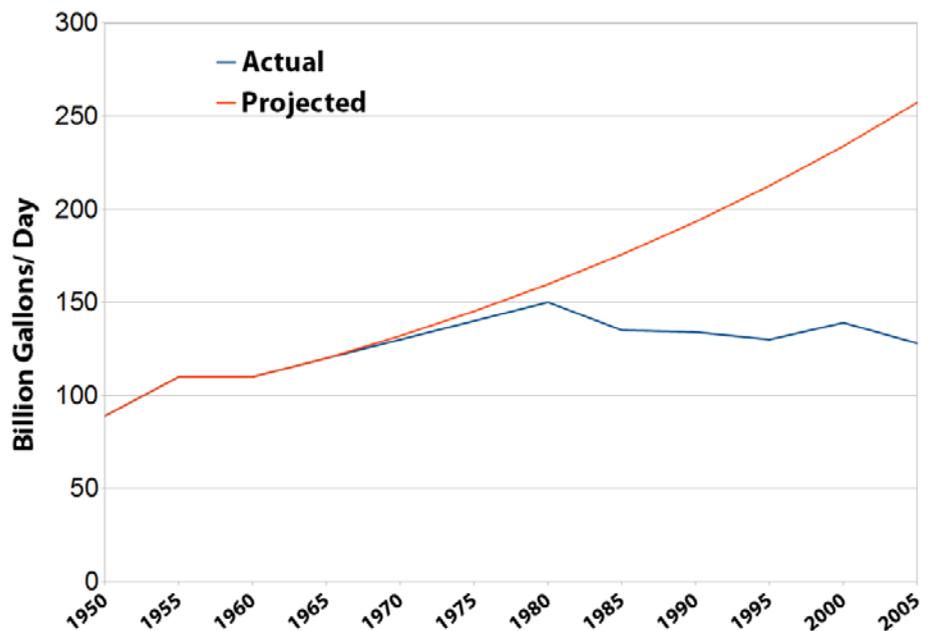
For scale, a desalination plant producing 150 mgd, would provide two times the current water use of San Francisco. Four of these plants, or one 8,300 MWT plant, would provide the water use of Los Angeles.

In a 1966 AEC report,<sup>5</sup> an even larger reactor was illustrated in a drawing, showing a nuclear-powered seawater-conversion plant that would produce 1 billion gallons of fresh water per day and 4.5 GW of power. "Three natural uranium reactors would generate steam, which would operate the turbo generators to produce electricity. The steam would then travel through a flash evaporator plant converting the seawater to pure water." The report continued, "by the 1980s, plants embodying several nuclear reactors in a single installation, with a total capacity as high as 25,000 thermal megawatts, could be in operation. A plant like this would produce 5,950 electrical megawatts at 1.6 mills per kilowatt-hour and 1,300,000,000 gallons of water per day at 19¢ per thousand gallons."

Before Kennedy could push the results of Ramey's report, with as much vigor and passion as he successfully launched the space program, he was assassinated, and the investment in the new technology was blocked.

By cutting out nuclear, water shortages were guaranteed. Since the 1960s, there has not been a water shortage, but rather a nuclear shortage.

### Irrigation Water Use



This graph shows the continued expansion of irrigated agriculture in the United States, increasing at the average annual growth rate from 1950-1965, as compared to the leveling off which occurred in the late 1970s, and recent decline. Under Kennedy's nuclear desalination program, and the national water program presented in the following section, this growth in productivity would have been achievable.

5. 1966 AEC pamphlet, "Nuclear Energy for Desalting," by Grace Urrows, part of the Understanding the Atoms Series.

# NATIONAL WATER PROJECTS

John F. Kennedy planned to reverse the opposition to continuing Franklin Roosevelt scale water projects, imposed under Truman and continued under the Eisenhower Administration. He would prove to be the only President after Franklin Roosevelt, to the present day, that dared to revive and continue his program of water resource development, or to promote the TVA and the REA with as much vigor as FDR himself.

At a campaign event in Salt Lake City on September 23, 1960, he made explicit the shift he would bring about:

Let me make it very clear that I have supported all projects which I considered to be soundly financed for reclamation, conservation, and power resources, from Hells Canyon to the project in this State. I supported the upper Colorado project as it came from the House of Representatives. My judgment is that the next administration, and this is certainly going to be true if I am elected President, *will reverse the policy of no new starts, which has kept this western part of the United States on dead center for the last eight years.* [Applause.] [Emphasis added]

In the second month of his administration, on February 23, 1961, Kennedy delivered a “Special Message to the Congress on Natural Resources,” which included an outline for restarting new projects for flood control and dams, as part of an integrated national program:

Our Nation has been blessed with a bountiful supply of water; but it is not a blessing we can regard with complacency. We now use over 300 billion gallons of water a day, much of it wastefully. By 1980 we will need 600 billion gallons a day.

Our supply of water is not always consistent with our needs of time and place. Floods one day in one section may be countered in other days or in other sections by the severe water shortages which are now afflicting many Eastern urban



areas and particularly critical in the West. Our available water supply must be used to give maximum benefits for all purposes—hydroelectric power, irrigation and reclamation, navigation, recreation, health, home and industry....

A. We reject a “no new starts” policy. Such a policy denied the resource requirements and potential on which our economic growth hinges and took a heavy toll in added costs and even human life and homes by postponing essential flood control projects. I have requested the Director of the Bureau of the Budget, working with appropriate department and agency heads, to schedule a progressive, orderly program of starting new projects to meet accumulated demands...

B. This Administration accepts the goal urged by the Senate Select Committee to develop comprehensive river basin plans by 1970, in cooperation with the individual States. I urge the Congress to authorize the establishment of planning commissions for all major river basins...

C. A major reason for such planning is the ability to identify both the need and the location of future reservoir sites far in advance of construction...

D. The full development of the power and other water resource potentials of the Columbia Basin is a vision that must be fulfilled. The Columbia River Joint Development Treaty with Canada is before the Senate for approval. I urge the Senate to approve this Treaty at the earliest possible time, to permit an immediate start on the immense efforts that can be jointly undertaken...

E. This Administration is committed to strengthening and speeding up our flood control program as rapidly as our fiscal and technical capabilities permit...

F. Complementing larger downstream reservoirs in the control of flood waters are the small watershed projects which are an integral part of our soil and water conservation program, along with terracing, strip cropping, grass waterways and other erosion prevention measures. Nearly 300 million of our nation's 460 million acres of farm crop lands still need these basic practices for preserving our water and soil resources....

On July 13, 1961, he wrote a letter to the President of the Senate and to the Speaker of the House, transmitting a "Water Resources Planning" bill, which included basin planning and a water resources council to oversee all water needs.

I am transmitting herewith a draft of legislation designated as the "Water Resources Planning Act of 1961"... Maximum beneficial use of water rests upon comprehensive and coordinated planning by both Federal agencies and States. This draft legislation will encourage and make possible such planning... The regional or river basin commissions authorized by the bill will prepare and keep up to date comprehensive, integrated, joint plans for Federal, State, and local development of water and related land resources.

Another important feature of the bill is the establishment of an interdepartmental group in the Executive Branch for coordinating river basin plans and for maintaining a continuing study of

water supply, requirements, and management... The first major task of the Water Resources Council will be to establish, subject to my approval, standards for formulating and evaluating water resources projects....

We have a national obligation to manage our basic water supply so it will be available when and where needed and in acceptable quality and quantity—and we have no time to lose.

The next year, on March 1, 1962, Kennedy presented a "Special Message to the Congress on Conservation," urging the Congress to enact his "Water Resources Planning Act," that he had transmitted the previous July to authorize federal grants in aid to assist the States in water resource planning, to authorize "the establishment of river basin commissions representing State and national views to prepare and keep up to date coordinated and integrated basin plans," and to establish a "Water Resources Council of key Cabinet officers to coordinate federal river basin planning and development."

While the foregoing speeches and statements present a program of water management that could be interpreted in multiple ways, Kennedy would present the full depth of his concept a few months later in August 17 and 18, 1962, on a short tour to dedicate two dams, in South Dakota and California, and a water diversion project in Colorado.

In these locations, he made clear his full commitment to a multi-generational outlook on infrastructure, his dedication to Franklin Roosevelt's public works program, and achievement of a constant rise in living standard for the population as a whole through application of technological progress throughout the economy.

Kennedy would then make a historic speech at the 30th anniversary celebration of the TVA on May 18, 1963, which left no room for doubt of his full commitment to repeat and expand FDR's economic legacy. Kennedy would then build and strengthen this outlook during the year, at three speeches on September 26 and 27, at Hanford, Washington and Salt Lake City, Utah, and in particular at Heber Springs, Arkansas, on October 3.

Any American who has not reviewed the following speeches cannot claim to understand the scope of Kennedy's intellect, and his dedication to the future of the United States.<sup>6</sup>

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6.. Video clips of many of these speeches and others in this article have been made available at [www.larouhepac.com/jfk](http://www.larouhepac.com/jfk)

## INFRASTRUCTURE, “A FORM OF SAVING”

August 17, 1962: Oahe Dam, Pierre, South Dakota

This dam will produce enough electric energy, this one dam, to light the city of Edinburgh, Scotland. This dam alone will supply enough irrigation to serve an area larger than the nation of Luxembourg. This dam and the rest of the dams on this river, which 30 years ago would have provided only floods and darkness, now provide irrigation and light, and though those of us who are here today follow in the footsteps of those who made it possible, we share a satisfaction and also a commitment that we must, in our time, make it easy for *future* Presidents of the United States and *future* citizens in the 1970s and 1980s to visit projects like this which have been planned and carried out in our day....

And in 1944, under the administration of President Roosevelt, a *comprehensive* Missouri Basin plan was authorized to accomplish *all* of these great objectives. This is the fifth of six great dams to control the mainstream of the Missouri River. And I can assure those of you at the upper end of the Missouri, and our good friends at the lower end, that it will continue to be *our* policy to regulate the storage and the flow of water in these reservoirs in the most advantageous manner *for all concerned*, that the best engineers in the world can devise.

We take for granted these miracles of engineering, and too often we see no connection between this dam *right out here* and our Nation’s prosperity and our Nation’s security, and our leadership all around the world. The facts of the matter are that this dam, and *many more like it*, are as essential to the expansion and growth of

the American economy as any measure that the Congress is now considering. And this dam and others like it are as essential to our *national strength and security* as any military alliance or missile complex.

When we are inclined to take these wonders *for granted*, let us remember that only a generation or two ago *all the great rivers of America*, the Missouri, the Columbia, the Mississippi, the Tennessee, ran to the sea *unharnessed and unchecked*. Their power potential was wasted. Their economic benefits were sparse. And their flooding caused an appalling destruction of life and of property.

Less than 30 years ago, in the lifetime of most of us here, as you know, fewer than *10 percent* of all our rural homes in this country had electric power.... Then, a farmer had no opportunity to participate in the mainstream of American life, to use labor-saving machinery, nor did his wife; nor did they have light, or a telephone, or a radio. Today, more than 95 percent of rural homes have electric power. The lives of these farmers and their families and their children have been enriched by living in the closest communion with the rest of our country. The REA co-ops and power districts which have marketed this power have been a happy middle ground between private enterprise and

public cooperation....

The key to this century is *power*—power on the farm as well as the factory, power in the country as well as the city. And the need for power on the farm and the countryside continues to grow. Electricity rates *must remain low*. More generating capacity must be devel-



JFK inspecting the dam site, with the chief engineer at the dedication ceremony for the Oahe Dam and Missouri River Basin Power Transmission System in Pierre, South Dakota, on August 17, 1962.



President Kennedy at Pueblo, Colorado on August 17th, 1962, one day after authorizing the Frying Pan Arkansas Dam project to divert water from western to eastern Colorado.

oped. And soon the vast resources of nuclear energy will be tapped.

This is not a choice between spending and saving, for REA is a form of saving, *as is this dam*, hours and lives, saving farms and saving and returning to our Nation's Government *every dollar loaned*, with interest, in taxes on new appliances and new equipment, and new farm income. This program and so many like it have returned to the public treasuries many times the entire cost of the program.

### **“FOR THOSE WHO COME AFTER US”**

*August 17, 1962: Fryingpan Project, Pueblo, Colorado*

To many Members of the Congress, to many Americans, the words Fryingpan-Arkansas must, of necessity, be a name which is taken on faith. But when they come here to this State and see how vitally important it is, not just to this State but to the West, to the United States, then they realize how important it is that all the people of the country support this project which belongs to all the people of the country.

I don't think there is any more valuable *lesson*, for a President or Member of the House and Senate than to fly *as we have flown today* over some of the bleakest land in the United States and then to come to a *river*, and see what grows next to it, and come to this city and come to this town and come to this platform and know how vitally important *water is...*

I hope that those of us who hold positions of public responsibility in 1962 are as farsseeing about the needs of this country in 1982 and 1992 as those men and women were *30 years ago* who began to make this project possible. What are we going to do in 1962, *beginning today*, to determine what projects *we should develop* so that by the end of this century, when there are 300 million people in the United States, there will be available to them *land and water and light and power and resources*, and places to live, and places to rest, and places to work?

So we salute this project today, and we salute those who made it possible. And we look to the future and we look to the past, *and we commit ourselves in 1962* not only to celebrate this project, but to *move ahead* in all

the other areas stretching from California to Cape Cod, Mass., in building this country up...

Every Member of Congress, everyone in the executive branch from the President on, in the field of national resources, has to plan during *their* period of administration or office for the *next generation*, because no project that we plan today will be beneficial to us. *Anything we begin today* is for those who come after us. And just as those who began something years ago make it possible for us to be here, I hope we'll fulfill our responsibility to the next generation that's going to follow us.

Those people who come here from abroad, what they want to see is the Tennessee Valley. Ten years from now they'll want to see this project. And I hope *in space and on the ground* this country will continue its march forward.

### **"A GREAT NATIONAL EFFORT"**

May 18, 1963: 30th Anniversary Celebration of TVA,  
Muscle Shoals, Alabama

There were many who still regarded the undertaking with doubt, some with scorn, some with outright hostility. Some said it couldn't be done. 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, and there are always those who predict everything against something new—they predicted that a Federal regional corporation would undermine the State governments and the local governments, but State and local governments are *thriving* in this valley, and hundreds of State and local park and recreational areas have been set aside through the entire TVA.

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 multi-purpose dams would not work, that rivers could not be developed for navigation and the generation of electricity 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. They are contributing to the life and vigor of the largest supplier of power in the United States. And as the people of this State and valley

who made *this possible*, I congratulate you *all*. Because this has not been made to work in Washington—it has been made to work by the people of the valley.

Despite a record of success, TVA still has its skeptics and its critics. There are still those who call it "creeping socialism," and we recently saw an advertising campaign which implied that TVA and public power were comparable to the Berlin Wall and the East Berlin police as threats to our freedom. But the tremendous economic growth of this region, its private *industry*, its private *income*, make it dear to all that TVA is a *fitting answer* to socialism, and it is not creeping, nor will it in the future.

There are still those, and some of them come from Massachusetts, who say that this asset serves only the valley. There are some people who say about every project to improve the wealth of this country, "That isn't good because that helps the people in the West, or the South, or the Northeast." This great country of ours has been developed because people working *together* made it possible to develop this valley, Congressmen and Senators from the Northeast United States who have voted for it, men from this part of the

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"And the important lesson in *all* of those projects is that progress isn't being made as a result of a *sudden* idea, *suddenly* coming into fruition. This project, the Fryingpan-Arkansas, and the project in South Dakota, represented 10, 20, and 30 years' efforts of devoted citizens. *Things do not happen; they are made to happen...*"  
- JFK, August 18, 1962, Los Banos, California

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country who have helped develop the West. By working together, we have recognized, that *a rising tide lifts all the boats*, and this valley will not be prosperous unless *other sections* of the country are rich, nor will other sections of the country be rich unless the *valley* is prosperous. That is the lesson of the last 30 years.

From time to time statements are made labeling the Federal Government an outsider, an intruder, an adversary. In any free federation of States, of course differences will arise and difficulties will persist. But the people of this area know that the United States Government is not a stranger or not an enemy. It is the people of 50 States joining in a *national effort* to see progress in every State of the Union....

Without the National Government and the people of the United States working together, there would be... no assistance on conserving soil or harvesting trees, no loans to help a farmer buy his farm and no security at the bank. Without the National Government, the people of one country, there could be no Coosa-Alabama River project, with the first dam under way this month at Millers Ferry. Without the people of the United States working together with the National Government, there would be no *Hill-Burton* hospitals, which have helped develop *the best* hospital system in the world today... The list goes on and on. Only a great national effort by a great people working together can explore the mysteries of *space*, harvest the products at *the bottom* of the ocean, and mobilize the human, natural, and material resources of our lands. I cite these examples not to show the growth of Federal activity, for it is small compared to the Nation's, but to show the *positive side* of Federal-State cooperation, of which TVA is an outstanding symbol... For this is and must always be "one Nation under God, indivisible."

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"We must maintain an aggressive program to use our hydro resources to the fullest. *Every drop of water which goes to the ocean without being used for power or used to grow, or being made available on the widest possible basis is a waste, and I hope that we will do everything we can to make sure that nothing runs to the ocean unused and wasted.*"

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—JFK, September 26, 1963, Hanford, WA

## THE SPIRIT OF THE TVA

September 26, 1963, Salt Lake City, Utah

This State knows that the control of water is the secret of the development of the West, and whether we use it for power, or for irrigation, or for whatever purpose, *no drop of water west of the 100th parallel should flow to the ocean without being used*. And to do that requires the dedicated commitment of the people of the States of the West, *working with the people of all the United States* who have such an important equity in the richness of this part of the country....

We will triple the population of this country in the short space of 60 or 70 years, and we want those who come after us to have the same rich inheritance that we find now in the United States....

And I see the closest interrelationship between the strength of the United States here at home and the

strength of the United States around the world. There is *one great natural development* here in the United States which has had in its own way a *greater effect* upon the position and influence and prestige of the United States, almost, than any other act we have done. Do you

know what it is? *It is the Tennessee Valley*. Nearly every leader of every new emerging country that comes to the United States wants to go to New York, to Washington, and the Tennessee Valley, because they want to see what we were able to do with the most poverty-ridden section of the United States in the short space of 30 years, by the wise management of our resources.

## "50 YEARS FROM NOW"

September 27, 1963: Salt Lake City, Utah

As I move through the West, especially in this State and other States where water is short, I realize that nearly all of the standard of living which we enjoy in this part of the United States has been due *partly to our own efforts*, the generation which is now here, but re-



President John F. Kennedy, with Senator Frank Moss (right) speaking at the Mormon Tabernacle, in Salt Lake City, UT, on September 26, 1963, as part of his eleven-state western tour. Here he elevated the resources of the human mind as the most powerful resource to conserve, and that which makes possible great developments like the TVA.

ally even more to the *generation that went before*—the people who started in the early 1920s, for example, to organize the distribution of water along the basin; the people who began to talk many years ago about what we are now putting into practice. So I think it is essential that we, in the 1960s, take steps to provide for the kind of country and State that we are going to have 20 years from now, so that we do for our children the same thing that was done for us.

In this State, this section of the United States, of course, the key is water. And unless we organize every drop to be of service to mankind, this State is going to stand still. You can't possibly grow once the water level remains *the same*. Once the amount of

water you have available for irrigation and reclamation and power *remains the same*, this State stands still. So *water* is the key—the management of water, I think, is the key that will open a very bright future. You may only perceive it very slightly in the next few years, but those who come after you—they will know it, and they will remember it with appreciation...

But the important thing to remember is, for 50 years men have been talking about this project. *It is now a reality*. What are we going to do *now* so that 50 years from *now*, the people who live in Utah and the United States will feel that in the early sixties we made the proper decision for the management of our resources?

### "A RISING TIDE LIFTS ALL BOATS"

*October 3, 1963: Dedication of Greer's Ferry Dam, Arkansas*

This is a great country that was given to us and a great land. It is our job, it seems to me, to make the most of it... to use this great country which in the short space of 30 years ago had only 130 mil-



President John F. Kennedy orders the start of the generators at Flaming Gorge Dam during a visit to Salt Lake City, Utah. Kennedy is accompanied by Utah Senator Frank Moss.

lion people within its borders and by the year 2000 will have 350 million people, to make sure that we take those steps now which will make it possible for those who come after us to have a better life....

If you realize what this State and other States like it went through in the 20 years from 1919 to 1939—the depression of the early twenties, the depression of 11 years, of the thirties, the stagnation on the farms and in the cities—and then realize how this State has boomed relative to the rest of the Nation in the last 5 or 10 years, we realize a good deal of this was due to the wise decisions taken in the thirties when the framework was laid with great opposition to those who objected to what was being done in Washington, great opposition to the efforts which Franklin Roosevelt and the Congress made in those days. And yet, when we look from 1945 to now, almost 20 years, we have had a gradual rising tide of prosperity throughout our entire country.

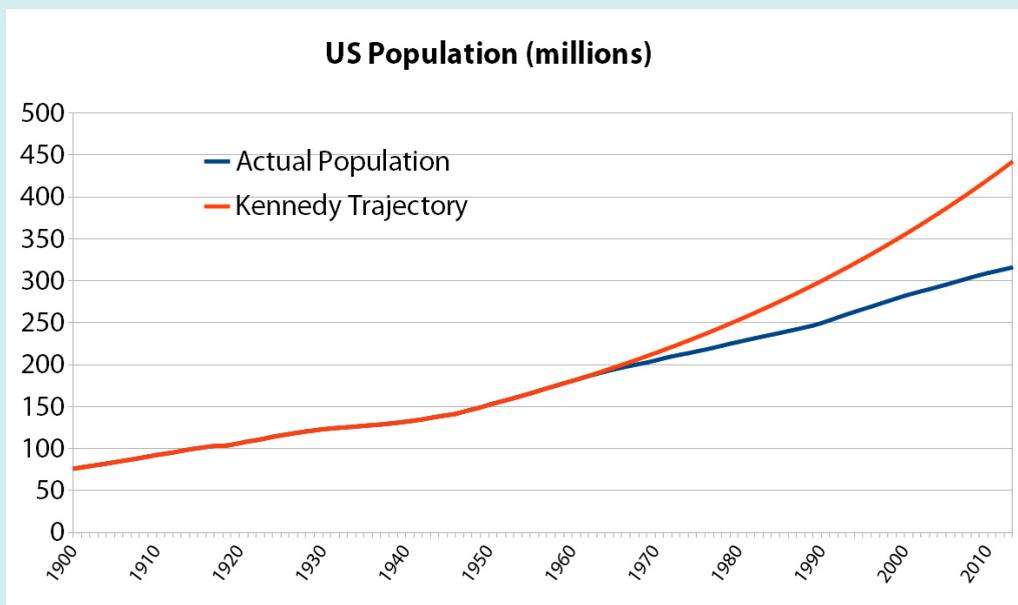
Those two records—that contrast between what we saw then between the wars and what it meant to this State, and others like it, and what we have seen since 1945 should make, it seems to me, a deep impression upon those who seek to end a partnership between the National Government and this State and others which develop the resources of the State and improve the life of the people.

This State is one great country and it seems to me incumbent, north and south, east and west, that we take those decisions now which will provide for a gradually increasing tide of life for the people of this State over the next 20 and 25 years. And those who think it can be left to chance are

wrong. It was left to chance for 20 years between the two wars and as a result of the deliberate decisions made since then, it seems to me, this State is a fine product and example of what can be done by the people here, working together, working hard, and working with the support of intelligent national policies.

And those people who say it is “pork barrel”—which is more wasteful: the waste of life and property and hope or a multi-purpose project which can be used by all of our people? Which is more wasteful: to fail to tap the energies of that river, to let that water flood, to deny this chance for the development of recreation and power, or to use it and to use it wisely? Which is more wasteful: to let the land wash away, to let it lie arid, or to use it and use it wisely and to make those investments which will make this a richer State and country in the years to come?

These projects produce wealth, they bring industry, they bring jobs, and the wealth they bring brings wealth to other sections of the United States... A rising tide lifts all the boats and as Arkansas becomes more prosperous so does the United States and as this section declines so does the United States. So I regard this as an investment by the people of the United States in the United States.



This graph is based on Kennedy's projections of US population growth: "We will triple the population of this country in the short space of 60 or 70 years.... By the year 2000 [this country] will have 350 million people."



been and are continuing to be made to solve the problem of limited water supply, and although great strides have been achieved, so great is the problem and so important its solution that it now has become imperative that consideration be given to what at one time seemed un-

### JFK, FRANK MOSS, & NAWAPA

As is clear from the foregoing, John F. Kennedy was dedicated to solving the long term problem of water scarcity for the nation, especially for the West, as a multigenerational commitment, and integrated with power and land development, as was the TVA.

In the Spring of 1964, a United States Senate Special Subcommittee on Western Water Development was formed, headed by Senator Frank “Ted” Moss, one of Kennedy’s key collaborators in the Congress, to evaluate a plan that newspapers in the U.S. and Canada were soon heralding as the most ambitious public works project in history: The North American Water and Power Alliance (NAWAPA).

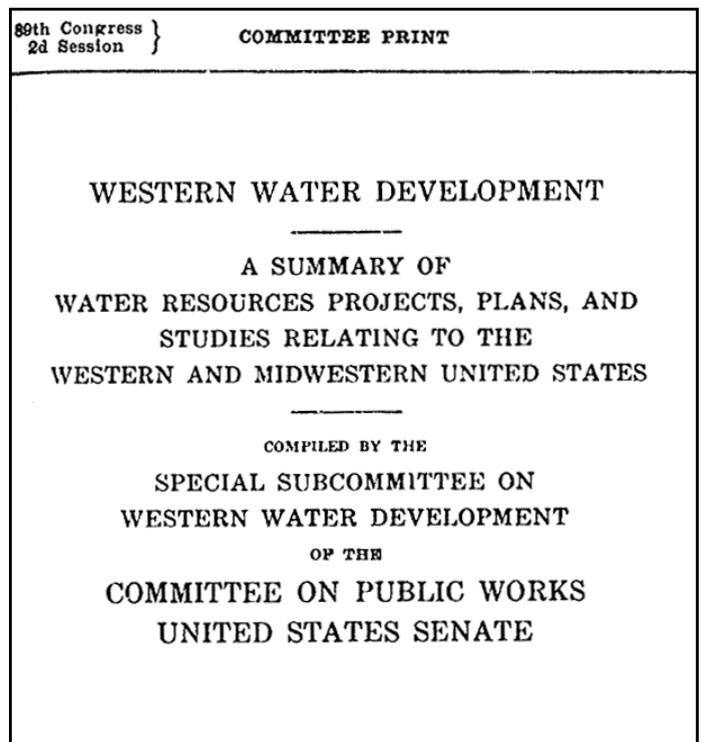
The NAWAPA proposal, in accord with the scale of Kennedy’s scientific outlook, was well known to the government by at least August 1962, but not unveiled as a formal plan until March 1964, five months after Kennedy was assassinated.

The committee headed by Moss published a comprehensive report, originally intended for President John F. Kennedy, by October of that year, titled “A Summary of Water Resources Projects, Plans, and Studies Relating to The Western and Midwestern United States,” whose purpose was “to determine whether the proposal known as the North American Water and Power Alliance warrants a full scale feasibility study.” The subcommittee concluded in the affirmative.

Man’s dependency on an adequate supply of fresh water is an indisputable fact. It is equally a fact that there is an insufficiency of such water and that this insufficiency has been particularly felt in the Western United States. Many efforts have

been made during which this problem can be solved through traditionally local or piecemeal approaches. The solution must be equal in magnitude to the problem. -Frank E. Moss, Chairman, Special Subcommittee on Western Water Development 1964

On September 1965, Moss introduced Senate Concurrent Resolution 55, calling for NAWAPA to be referred to the International Joint Commission, a U.S.-Canadian organization with a mandate to resolve boundary water issues. A similar resolution was introduced six days





# FARMING THE OCEAN

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Another program of Kennedy's which had similar potential to vastly increase the living standard and power of the human species, had Kennedy lived to pursue it, was the development of resources from the world's oceans. For Kennedy, this meant a revolution in accessible resources for mankind, not an increase in offshore drilling of oil.

Kennedy spoke of ocean resources as one of his key programs, and included it in his list of new frontiers at an October 29, 1960 speech at Valley Forge, stating:

I have said in this campaign that we stand today on a new frontier, a frontier that will demand of us all, in each individual home as well as the White House those same qualities of courage and conviction. For we are moving into the most challenging, the most dynamic, the most revolutionary period of our existence—the 1960s. The next ten years will be years of incredible growth and change—years of unprecedented tasks for the next President of the United States.

As part of the “new frontiers in science and space,” Kennedy said “We must find ways in the sixties of obtaining an *endless supply of food and power from the ocean depths themselves and of replacing our dwindling resources of energy from the granite that lies beneath every continent.*” Kennedy would go on to continue this program throughout his Administration, including the four following events:

Special Message to the Congress on Natural Resources, February 23, 1961:

The sea around us represents one of our most important but least understood and almost wholly undeveloped areas for extending our resource base. Continental shelves bordering the United States contain roughly 20 percent of our remaining reserves of crude oil and natural gas. The ocean floor contains large and valuable deposits of cobalt, copper, nickel, and manganese. Ocean waters themselves contain a wide variety of dissolved salts and minerals.

On, March 1, 1962, as part of Kennedy's Special Message to the Congress on Conservation, he said:

Our intensified effort to expand our knowledge and understanding of the vast resources held by the oceans through basic research and surveys of geologic and living resources will surely result in extending our known resource base, *with encouraging prospects for improving our standard of living and adding protein-rich marine products to the diets of the hungry people of the world.*

His May 25, 1962 Remarks to the White House Conference on Conservation asserted:

In addition, we can make the most extraordinary gains in getting food from the ocean depths in the next 10 or 20 years. This question of oceanography has also occupied the attention of the Congress and this administration, how we can double the amount of protein which is available to people around the world. *This is a whole new area of conservation, unknown to those who preceded us but which is now coming into public understanding as a result of your efforts and the efforts of others, and which can make the most profound difference to the lives of people who live rather listlessly because of inadequate proteins.*

In Kennedy's address to the National Academy of Sciences, on October 22, 1963, among other topics, he brought attention to “the understanding and use of the resources of the sea.”

I recently sent to Congress a plan for a national attack on the oceans of the world, calling for the expenditure of more than \$2 billion over the next 10 years. This plan is the culmination of 3 years' effort by the Inter-Agency Committee on Oceanography, and it results from recommendations made by the National Academy.

Our goal is to investigate the world ocean, its boundaries, its properties, its processes. To a surprising extent, the sea has remained a mys-

tery—10,000 fleets still sweep over it in vain. We know less of the oceans at our feet, where we came from, than we do of the sky above our heads. It is time to change this, to use to the full our powerful new instruments of oceanic exploration, to drive back the frontiers of the unknown in the waters which encircle our globe.

I can imagine no field among all those which are so exciting today than this great effort which our country and others will carry on in the years to come. We need this knowledge for its own sake. We want to know what is under the sea, and we need it to consider its bearings on our security, and on the world's social and economic needs.

*It has been estimated, for example, that the yield of food from the seas could be increased five or ten times through better knowledge of marine biology, and some day we will seed and weed and harvest the ocean.* Here, again, the job can best be done by the nations of the world working together in international institutions.

Athelstan Spilhaus, a meteorologist, oceanographer, and inventor of the bathythermograph, was appointed by Kennedy in 1961 as United States Commissioner to the Seattle World's Fair in 1962. Spilhaus designed exhibits showcasing future technologies, and subsequently began working on a vision of future oceanography, coincident with where Kennedy had been pointing, and published his results 1964.<sup>7</sup> Here are a few excerpts:

**Food From the Sea:** The nutrients needed to sustain life in the sea are presently renewed and concentrated by natural process which, when understood, may be artificially emulated by scientists. Winds drive away surface water in the lee



This image, featured in Spilhaus's cited article, had the following caption, "This sketch by Marion Senyk a "forecast for the seventies" depicts a future permanent undersea base, as oceanographic exploration becomes a naval activity of increasing scope and importance, and as burgeoning needs of civil life become more complex.

of a coast, bringing up nutrient-rich lower water. This suggests that barriers placed in the open ocean might form artificial lees with rich patches of water around them. When winds diverge in the open ocean, they also bring up bottom water at the center of the divergence, and the natural stirring of currents plows the sea.

Perhaps a nuclear stove—possibly the waste heat from an underwater nuclear power plant for submarine navigation beacons—could “boil up” the nutrient-rich bottom water.”

**Self-Renewing Mines:** Before man required fresh water from the sea, he desired just the opposite—to extract the salt. This is an ancient art; at first the salt was used only for the seasoning of food. But in the last 40 years, not only have sodium, potassium, and magnesium salts been extracted economically, but also bromine and magnesium metal. The difficulty of getting anything out of seawater is that everything occurs in a highly dilute state, and large amounts of water have to be pumped and processed.

But power is getting cheaper, and perhaps, instead of pumping sea water through plants on land, we will have floating processing plants at

7. "The Future of Oceanography," By Athelstan Spilhaus p.361-373, Annual Report of the Board of Regents of the Smithsonian Institution, published June 1964; republished as "Oceanography: A Wet and Wonderous Journey" p. 11-15, in *Bulletin of the Atomic Sciences*, December 1964.

sea, propelling themselves through the water as they take what they need from it, just as marine animals do. The advantage of such floating “refineries” is that they do not occupy expensive shore land and can move to areas of rich sea “ore.” Perhaps deuterium taken from the seawater itself will power them.

Many valuable elements are so dilute that it is not economical to extract them from sea water, yet nature concentrates them in high grade deposits on the floor of the sea. Nodules on the sea bottom are already being mined for phosphorus, and nodules of manganese, not valuable enough in itself, may contain enough valuable nickel, cobalt, molybdenum, and zirconium to warrant scraping them off the bottom in a deep sea mining enterprise. The most interesting facet of this deep sea mining is that the nodules seem to form at a rate exceeding what we might conceivably take out to cover the present total world consumption of these metals. They are like self-renewing mines.”

However, though these programs warranted further development, full ocean development was yet another example of a frontier to be explored and expanded under President Kennedy, but whose development was cancelled under the guise of cutting costs.



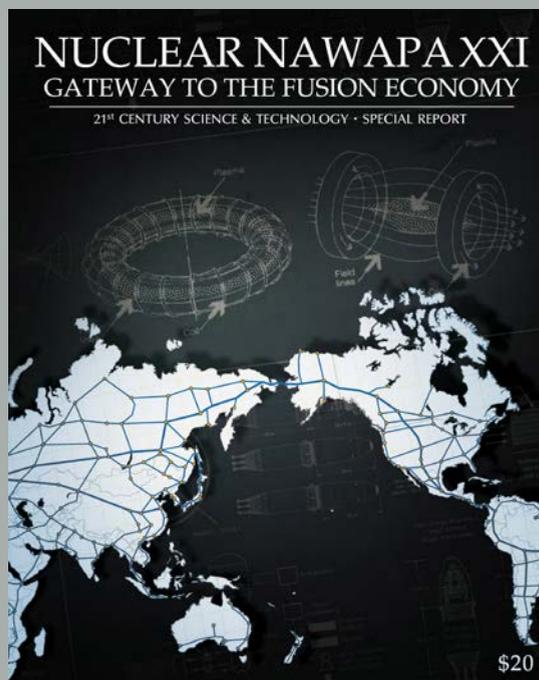
In the Spring of 1961, a team of scientists on board drillship *CUSS 1* (shown here) drilled five holes off the coast of Guadalupe Island, Mexico, the deepest to 601 feet below the se floor in 11,700 feet of water, as an experimental phase of what was called Project Mohole, a program to drill through the Earth’s crust and into the Mohorovic discontinuity (the boundary layer between the mantle and crust). The first phase was a success and proved the technology and expertise needed to drill into the Earth’s mantle, an unknown frontier which would bring with it unforeseen discoveries. The project succeeded in retrieving core samples of the first and second layers

of the ocean crust. Kennedy appointed Leland Haworth to the National Science Foundation in 1963, where he took over direction of Project Mohole. After Kennedy’s murder, phase two of the project was cancelled, and to this day, mankind has not reached the Earth’s mantle.

## 21st Century Special Report

The pathway to regain the trajectory of mankind which was robbed from the American people and the world with the assassination of John F. Kennedy is spelled out in this recent Special Report published by 21st Century Science & Technology.

The report outlines the goal of a global fusion economy, and the process necessary to build the productive potential necessary to achieve it, based on a trans-pacific science driver, and infrastructure partnership.



[www.21stcenturysciencetech.com](http://www.21stcenturysciencetech.com)

# OPERATION PLOWSHARE

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John Kennedy promoted plans the use of peaceful nuclear explosions for construction, resource, and energy development. As it was known at the time, “Operation Plowshare” would have fundamentally transformed the realm of possibilities for large water projects, construction of cities, waterway development, mining, transport systems, and any other large projects involving large-scale earth moving.

A brief look at the studies and experiments of Operation Plowshare makes it clear that the ability to apply the power of nuclear explosives for peaceful purposes would have led to a revolution in the living standard for all of mankind.

Not only could nuclear explosives be used to sculpt terrains on scales difficult or impossible with conventional methods, and dramatically decrease both the construction time and physical costs (by an order of magnitude at least), but it opened up possibilities which gave a qualitatively different meaning to explosions in general.

In August of 1960, The Joint Committee On Atomic Energy, chaired by Clinton Anderson, and directed by James Ramey, published a report, “Frontiers In Atomic Energy Research,” a name likely inspired by John Kennedy’s acceptance speech at the Democratic Convention in July of that year. Part of the report featured a summary of hearings on the use of peaceful nuclear explosives held that March. Among the topics were detailed descriptions of the use of nuclear explosives for scientific study of artificial elements and isotopes, industrial chemical and isotope production, mineral recovery including tar sands and oil shales, direct energy production by conversion of excess heat in underground

explosions to steam, and water resource development in the creation of aquifers, dams, and lakes.

In total, 27 test nuclear explosions were completed, and many others planned, including the following:

**Mineral Recovery:** a 1967 plan for breaking up low yield copper ore bodies making them ready for leaching *in situ*; various approaches included breaking oil shale to obtain it without mining; by breaking ore in preparation for open pit mining, for “block caving,” and to permit the circulation of solutions in order to extract valuable minerals chemically.

One such project was the 1959 Project Oil Sand to release large oil deposits trapped in oil sand formations of the Athabaska tar sands in Alberta, Canada. Other plans for mineral recovery between 1963-1969 included: numerous natural gas stimulation projects, including Project Rusilon, which achieved the liberation of large quantities of natural gas, with radiation levels suitable for industry and commercial use; breaking up oil shale



Project Gnome, conducted in 1961, designed to study three areas: steam creation for energy, scientific measurements for study of neutrons and nuclear reactors, and creation of isotopes for science and industry.

deposits for in situ retorting; plans for oil shale maturation; coal gasification 35 miles east of Buffalo, Wyoming.

**Infrastructure projects:** A 1962 study to use five nuclear bombs to excavate a harbor in Alaska's North Slope; a 1963 plan to create a mountain path over the Bristol Mountains of California for the ATSF railroad and Caltrans; 1965 studies of possibilities for a new sea-level Atlantic-Pacific canal; creation of an underground storage facility for natural gas; joining the Tennessee and Tombigbee rivers in northeast Mississippi, by the excavation of a three mile divide; a 1968 water resource management, dam construction, subsurface water storage, purification, and aquifer modification plan, at Clear Creek or San Simon, Arizona; a 1969 joint US/Australian plan for creating a new harbor at Cape Keraudren on the northwest Australian coast; and cratering studies for a Pan-Atomic canal.

Under John F. Kennedy, Operation Plowshare was mainstream to the United States scientific outlook, not an obscure program conducted in the dark.

It was one of the central projects of Kennedy's leading science advisers, Leland Haworth, who Kennedy appointed to the Atomic Energy Commission in January of 1961, and to lead the National Science Foundation in 1963. As an avid proponent of Project Plowshare, Haworth studied the proposal for a test-harbor in Alaska, Project Chariot in July of 1961. Another of Kennedy's main appointments, James Ramey, had worked with many of its proponents and project managers while serving as executive director of the Joint Committee on Atomic Energy from 1956-1962.

Two executive orders made by Kennedy on the topic of Project Plowshare, spanning the period from 1961 to 1963, further underscore this point:

September 5, 1961: In view of the continued testing by the Soviet Government, I have today ordered the resumption of nuclear tests, in the laboratory and underground, with no fallout.... In addition, as the program progresses, tests will be utilized to provide information in support of the U.S. programs to improve means of detecting and identifying nuclear explosions for possible use in an international nuclear test control system (Vela), and to study the use of nuclear detonations for peaceful purposes (Plowshare).

September 11, 1963: The United States will diligently pursue its programs for the further development of nuclear explosives for peaceful pur-

poses by underground tests within the terms of the treaty, and as and when such developments make possible constructive uses of atmospheric nuclear explosions for peaceful purposes, the United States will seek international agreement under the treaty to permit such explosions.

Kennedy included reference to spirit of Operation Plowshare as one of his new frontiers of science, during a campaign speech on the theme of frontiers. Echoing Plowshare's namesake, the prophet Isaiah, Kennedy, stated, "And, if we can fulfill our hopes for peace, instead of beating our swords into plowshares, and our spears into pruning hooks, we can convert our bombs into power reactors that will electrify the frontier and the jungle."

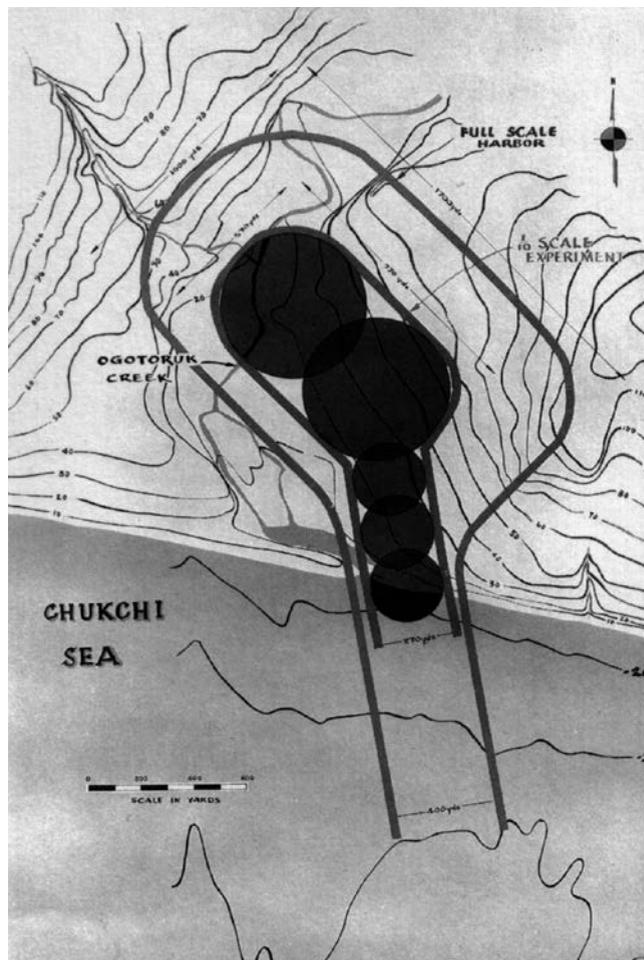


Diagram of Project Chariot, a plan for a harbor in Alaska created by nuclear excavation. Leland Haworth went on an exploratory mission for the project in July of 1961. A nuclear cratering test was proposed for this site but not executed; tracer tests and numerous environmental studies were conducted at the site from 1959-1962.

# NUCLEAR ROCKET PROGRAM

While Kennedy's economic crash program to land on the moon succeeded, and had permanent and qualitative effects throughout the economy, Kennedy's space program was not limited to sending a man to the moon, but aimed at the long-term colonization and control of the solar system, including the development of a nuclear rocket, exploration of Mars, and building a *permanent lunar base*.

Long before U.S. had a serious program to land a man on the moon, there was a vigorous program underway to develop a nuclear space propulsion vehicle for interplanetary travel. In 1957, before the U.S. had launched anything into space, the main proponents of space exploration understood that any serious manned space program depended on nuclear propulsion. As one expert testified to Congress: "The nuclear engine is for astronautics what the combustion engine is for aeronautics."<sup>8</sup> In remarks on the floor of the Senate during the debate on the creation of a civilian space agency, Clinton Anderson, the chair of the Joint Committee on Atomic Energy, stated:

We don't know what space means now, but as we move into it, it will change us, give us different tools, technologies, and ways of looking at our own planet. And only with nuclear rockets can we have manned interplanetary flights, to Mars, and later interstellar travel. As we deliberate, let us be careful, as our decisions will influence those yet unborn, and perhaps someday may lead to peace on Earth, where men's minds are lifted from their Earth-bound hatreds into the universe.

In August 1960, after many of Anderson's hearings in Congress on the nuclear rocket program, the Atomic Energy Commission and NASA created the joint Space Nuclear Propulsion Office to carry out the nuclear rocket project. The same Congressional group put the nuclear rocket into the Democratic platform in November 1960.

While there was reluctance at the end of Eisenhower Administration to embrace the nuclear rocket, the



Kennedy's May 25, 1961 address to Congress, is appropriately remembered as his historic challenge to the nation to land a man on the Moon, but it also indicated a much broader space program, most conspicuously the nuclear rocket, possessing the power to transform mankind's long range control of the solar system and establish a permanent moon base.

John F. Kennedy Administration became the champion of the program, and worked with those in the Congress which had been spearheading efforts since the end of the 1950s.

The anti-technology and Wall Street lobbies made intensive efforts to strangle the space program and to specifically block flight testing for the nuclear rocket.<sup>9</sup> Despite their attempts, Kennedy made clear that Wall Street and related monetarist influences would not control the U.S. government during his watch, when he intervened into the heated debate which had been ongoing over funding of the rocket program. In his famous May 25 1961 special address to Congress on "Urgent National Needs," in addition to launching his moon program, Kennedy approved a test flight for the Rover nuclear rocket. The latter received loud applause.

First, I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth. No single space project in

8. *Frontiers In Atomic Energy Research; Joint Committee Summary, August 1960:* <http://sul-derivatives.stanford.edu/derivatives?CSNID=00002220&mediaType=application/pdf>

9. Marsha Freeman, "Nuclear Power: The Litmus Test for Space Exploration," *EIR*, December 3, 2004.



Right: President Kennedy makes an inspection visit to a Nuclear Rocket Development Station in Nevada on December 8, 1962, making apparent his support for the work. To his right is Dr. Glenn Seaborg, Chairman of the U.S. Atomic Energy Commission. Left: The first ground experimental nuclear rocket engine assembly of the "XE" design, the fourth in a series built in the 1960s, shown here in "cold flow" configuration, as it makes a late evening arrival at Engine Test Stand No. 1 at the Nuclear Rocket Development Station on December 1, 1967.

this period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish. We propose to accelerate the development of the appropriate lunar space craft. We propose to develop alternate liquid and solid fuel boosters, much larger than any now being developed, until certain which is superior. We propose additional funds for other engine development and for unmanned explorations—explorations which are particularly important for one purpose which this nation will never overlook: the survival of the man who first makes this daring flight....

Secondly, an additional 23 million dollars, together with 7 million dollars already available, will accelerate development of the Rover nuclear rocket. This gives promise of some day providing a means for even more exciting and ambitious exploration of space, perhaps beyond the moon, perhaps to the very end of the solar system itself.

Kennedy's space program was not to achieve a moon landing, rather, Kennedy's moon landing was one step of a broader space program that had no end point.

## Nuclear Propulsion 40 Years Ago

In addition to the Rover Rocket whose development Kennedy accelerated in May 1961, a second, more advanced nuclear rocket program was begun by NASA and the AEC to create rocket engines that could survive the shock and vibration of a space launch: the Nuclear Engine for Rocket Vehicle Application (NERVA).

In an interview on the nuclear rocket published on September 21, 1962, Glenn Seaborg, the chairman of the AEC reported that "Tests in Nevada indicate operational status by 1967," and that there would be the "first space vehicle with nuclear propulsion in the 1970s." James Ramey, one of the leading proponents and defenders of the Nuclear Rocket program, was appointed to the Atomic Energy Commission in August 1962. Kennedy made a public visit to the Nuclear Rocket Development Station that December, confirming his support for the program.

Aerojet and Westinghouse NERVA reactors tests started in 1964. By 1966, Harry Finger, appointed as manager of the Atomic Energy Commission/NASA Space Nuclear Propulsion Office in 1960, reported that an operating time of 30 minutes had been achieved at a full design nuclear power reactor for 1,100 megawatts, equivalent to 55,000 pounds of thrust. In 1967 a full-power test reactor had operated for 62 minutes, longer than would be required for most operational space missions. The ability to throttle the nuclear engine, or change the power levels while maintaining a high ef-

efficiency, was also demonstrated. A full 1,100-MW NERVA XE engine test in 1969 was a success.<sup>10</sup>

Due to its success, the projections of NASA in 1969, were for a trip to Mars with a nuclear rocket sometime between 1979-1981, and a permanent lunar base by 1981.

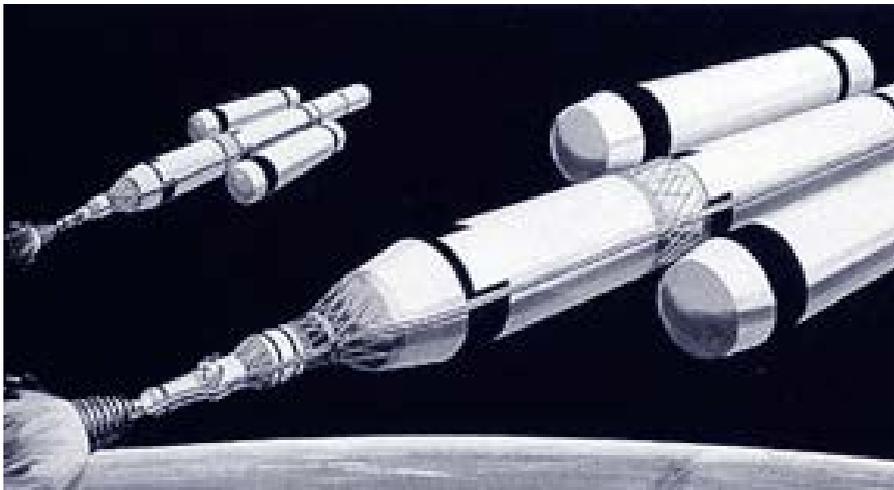
Finger reported in 2011 that no further tests were necessary once the engine “of over 50,000 pounds of thrust... was run for four hours with 28 starts.” However, he continued, the program went nowhere, since “the flight test program had been previously killed for budget reasons in 1965.” In 1973, Project Rover/NERVA was canceled by Nixon. In short, as Finger recently stated,<sup>11</sup> by the late 1960s, “the technology of the nuclear rocket propulsion was fully demonstrated as being ready for flight mission applications... We developed and demonstrated in that program that back in 1970 we were prepared to start planning for early human exploration to deep space including Mars. We’ve been on hold ever since.”

The nuclear rocket achievements tragically took place in a nation whose capabilities to promote its own self-development had been killed by the time of Nixon’s inauguration to the Presidency. NERVA’s successes, launched by Kennedy, still remain the only rational mooring point for manned space exploration and its full implications.

The qualitative, technological effects of Kennedy’s Moon program, whose transmission throughout the economy remains as one of Kennedy’s greatest gifts to mankind, provide us some measure of comparison for the truly unmeasurable transformations which would have occurred, and were meant to occur under Kennedy’s full space program, in which the nuclear rocket stood out front.

10. In addition to achieving general specifications of thrust, thrust to weight, impulse, engine restart, etc., which NASA required, the Los Alamos National Laboratory website reports on related records achieved by Rover/NERVA program: 4,500 megawatts of thermal power; 3,311 K (5,500.4°F) exhaust temperature; 250,000 pounds of thrust; a specific impulse of 850 seconds; 90 minutes of burn time; thrust-to-weight ratios of 3 to 4.

11. <http://anstl.dans.org/NETS2011/Documents/Presentations/Opening%20Finger%20speaker%20notes.pdf>



NASA conceptual illustration of a spacecraft for a manned Mars mission. In 1969, NERVA’s successes prompted NASA-Marshall Space Flight Center director Wernher von Braun to propose sending 12 men to Mars aboard two rockets, each propelled by three NERVA engines. The mission would launch in November 1981 and land on Mars in August 1982.

## Atom-Powered Trip To Mars Forecast

VIENNA, Sept. 20 (UPI) Mars can be contemplated,” Glenn T. Seaborg, chairman he said.

of the United States Atomic Energy Commission, said today the United States is working on a nuclear-powered space rocket which could take two men on a round trip to Mars in the 1970s.

He told a panel discussion of the International Atomic Energy Agency here that such a space ship with two men aboard could make the round trip within a year of launching and that this would give them a month on Mars for exploration.

Mars, on an eccentric orbit, is 35 million miles from the earth at its closest point. At its farthest it is 63 million miles away, but it is still the closest planet to the earth.

Seaborg said a year’s round trip would be possible through new developments in nuclear rockets which would have many advantages over the chemical rockets now used. With nuclear-propelled rockets, he said, it would be possible to transport high payload missiles to the moon and the nearer planets.

“Thus a manned trip to

Seaborg explained that a nuclear rocket creates about twice the specific thrust of a conventional rocket. He said tests which have been carried out in Nevada indicate operational status for the rocket by about 1967. The first space vehicle with nuclear propulsion is expected to fly sometime in the 1970s, he said.

Seaborg also spoke of the development of the use of atomic energy in auxiliary power space vehicles called SNAP. He said developments in this field could contemplate world-wide television satellite stations.

*Washington Post  
September 20th, 1962*

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I will close by reminding you of the election of 1860, when, as Lincoln said, the question was whether the Nation would exist half slave and half free. Now the question is whether the world will exist half slave and half free. And in that campaign of 1860, Lincoln wrote to a friend, "I know there is a God and that He hates injustice. I see the storm coming. But if He has a place and a part for me, I believe that I am ready." Now, 100 years later, we know there is a God and we know He hates injustice, and we see the storm coming, but if He has a place and a part for us, I believe that we are ready. Thank you."

—*John. F. Kennedy, September 23, 1960*

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