BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Electric Powerplant Cancellations And Delays

From 1974 through 1978, the Nation's electric utilities canceled plans for 184 electrical generating units and delayed construction on most other new units. Delays, particularly for nuclear plants, are getting longer each year.

Lower rates of increases in electricity demand, utilities' financial difficulties, and regulatory complexities are the major reasons for cancellations and delays. Continued cancellations and delays may contribute to increased oil consumption, greater dependence on foreign oil, greater potential for electrical service interruptions, and higher electricity rates for consumers.

This report pinpoints major problem areas needing the continuing attention of the Department of Energy, utilities, and utility regulators.

EMD-81-25
DECEMBER 8, 1980

Request for copies of GAO reports should be sent to:

U.S. General Accounting Office
Document Handling and Information
Services Facility
P.O. Box 6015
Gaithersburg, Md. 20760

Telephone (202) 275-6241

The first five copies of individual reports are free of charge. Additional copies of bound audit reports are $3.25 each. Additional copies of unbound report (i.e., letter reports) and most other publications are $1.00 each. There will be a 25% discount on all orders for 100 or more copies mailed to a single address. Sales orders must be prepaid on a cash, check, or money order basis. Check should be made out to the "Superintendent of Documents".

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-200894

CWO 00001

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses the reasons for and impacts of electric powerplant cancellations and delays.

We made this review to inform the Congress of the potential effects of electric powerplant cancellations and delays on the utility industry's ability to continue providing adequate and reliable supplies of electricity.

We are sending copies of this report to the Director, Office of Management and Budget, and to the Secretary of Energy.

Comptroller General
of the United States

AGC00912

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

ELECTRIC POWERPLANT CANCELLATIONS AND DELAYS

D I G E S T

From 1974 through 1978, the Nation's electric utility industry canceled 184 planned, large electric generating units, including 80 nuclear and 84 coal-fired plants. The capacity of these plants would have been equivalent to about 26 percent of the Nation's existing electrical generating capacity as of April 1979. (See p. 6.)

Since 1974, most other new generating units have been delayed. A delay is defined as a slippage or projected slippage beyond the initial projected operational date. During the period January 1974 through December 1978, 189 electric generating units were put in operation. Of these, 149 units (79 percent) experienced delays ranging from under 6 months to over 3 years and averaging 17 months. Another 330 units are projected to be completed by the early 1990s. Of these, 267 (81 percent) have already been delayed an average of 40 months.

Perhaps the most important information on generating unit delays is that the length of the delays is increasing each year. For example, some 33 units that began operation in 1974 were delayed by an average of only 14 months. The 28 units starting operation in 1978 were delayed by an average of 23 months. Nuclear plants have incurred the longest delays during the period of 1974 through 1978--an average of 33 months compared to an average of 10 months for coal units. (See p. 7.)

WHAT CAUSES POWERPLANT CANCELLATION DELAYS?

GAO's discussions with utility industry officials as well as a review of selected documents showed five primary reasons for powerplant cancellations and delays:

--The sharp decrease in the rate of increase in the demand for electricity since 1974. Up to 1974, the demand for electricity had been increasing at a 7-percent annual rate, requiring utilities to double generating capacity every 10 years. Recently, however, nationwide demand has declined to less than a 4-percent annual growth rate and some utilities have reported declines in gross sales of electricity. (See p. 10.)

--Difficulty in financing powerplant construction. This has occurred because (1) construction costs have increased dramatically in recent years and (2) the utilities are not able to attract the necessary capital without paying more for it than in the past. This problem is compounded by the fact that some utilities are not allowed to begin recovering the cost of constructing a generating unit until it is complete--often 8 to 14 years after the utility has begun construction. (See p. 12.)

--The regulatory process by which local, State, and Federal regulatory bodies must approve various aspects of the plant's construction. The utility executives contacted by GAO were frustrated with what they generally regarded as an uncoordinated, cumbersome, complex, and slow regulatory system. (See p. 15.)

--Problems surrounding the acceptability and future of nuclear power. In short, while most utility officials believed that nuclear power was a desirable energy technology with considerable

benefits, the March 1979 accident at Three Mile Island heightened their sensitivity to the public and political opposition to nuclear power. In addition, some industry officials indicated that nuclear units were more subject to delays and cancellations because of the overall uncertainty surrounding nuclear power. (See p. 17.)

--(Construction problems.) Lack of construction material, lack of adequate numbers of skilled craftspeople, and low productivity were noted as causing some problems that can be expected with building any large, complex plant such as a powerplant. (See p. 19.)

WHAT ARE THE IMPACTS OF POWERPLANT CANCELLATIONS AND DELAYS?

The officials contacted by GAO at electric utilities, industry organizations, and Federal and State energy-oriented agencies generally perceive that continued generating unit delays and cancellations may contribute to

--increasing oil consumption, making the United States more dependent on foreign sources;

--jeopardizing the utility industry's ability to provide uninterrupted electrical service; and

--increasing electricity rates as consumers bear the added cost of delays.

This report provides a number of examples of increased oil consumption and higher electricity rates which have already occurred. (See p. 21.)

CONCLUSIONS

Two important considerations in determining whether any action is required to prevent powerplant concellations and delays are (1) assumptions about the rate of increase

in the demand for electricity and (2) the extent to which canceled or delayed nuclear or coal-fired plants have been or are to be used to replace oil-generated electricity plants.

GAO's study shows that:

--Based on a 2.5- to 4.7-percent national growth rate (which is consistent with what most studies found to be a realistic range) and utility efforts to improve load management and power exchange capability, electrical generating capacity should be generally adequate at least to 1988 even if 30 percent of the plants scheduled for completion are canceled or delayed. Because of faster growth and more difficulty in getting capacity added in some regions, however, reserves could be more abundant in some regions than others. (See p. 23.)

--Powerplant cancellations and delays adversely affect the Nation's efforts to reduce the amount of imported oil when a nuclear or coal-fired plant, which could replace oil-generated electricity plants, is canceled or delayed. Decisions on any action that should be taken to avoid such cancellations or delays must be made on a case-by-case basis. In this regard, the Department of Energy is in the process of ordering utilities to convert certain oil burning plants to coal, and the Congress is considering legislation which would permit Federal financing of a portion of the costs of these conversions. (See pp. 21 and 31.)

On the other hand, there are obvious benefits associated with canceling or delaying electric powerplants that are not needed because of reductions in the projected rate of growth in demand for electric power; for example, the costs of plant cancellations and delays to utility customers may be less than the costs of a large investment in a completed but underused plant.

This report pinpoints major problem areas needing the continuing attention of the Department, rate commissions and other regulators, and the utilities. These areas are: (electricity planning, including integrating national energy objectives into regional and local plans; utility finances; and the impacts of environmental and economic regulation on the utility industry.) This report does not make specific recommendations in these areas. GAO has discussed aspects of these problem areas and made some specific observations and recommendations in two recent reports. One report addressed electricity planning and the need for unified and coordinated planning by the Department of Energy and focused on improving State and utility planning practices. 1/ The other report addressed the subject of construction work in progress. 2/

Ensuring that the Nation's need for electric power is met at the lowest economic, environmental, and social cost, and in a manner consistent with national energy policies, will be a continuing challenge to the Department of Energy, utilities, and others. This is especially true with the future possibility of finding ways to substitute electrical energy for energy from oil. GAO will, therefore, continue to examine issues which affect electric power supplies.

The Department of Energy elected not to formally comment on this report. Instead, the Department provided editorial comments of a factual nature which GAO has considered in the report.

1/"Electricity Planning--Today's Improvements Can Alter Tomorrow's Investment Decisions" (EMD-80-112, Sept. 30, 1980).

2/"Construction Work in Progress Issue Needs Improved Regulatory Response for Utilities and Consumers" (EMD-80-75, June 23, 1980).

Contents

ABBREVIATIONS

DOE Department of Energy

GAO General Accounting Office

MWe Megawatts of electricity

NRC Nuclear Regulatory Commission

CHAPTER 1

INTRODUCTION

Electricity is a lifeblood of the Nation's economy. It is used in nearly all aspects of our daily life--our businesses, our houses, and our industries--to the point that some 30 percent of the Nation's primary energy supply is now dedicated to electricity generation. At present, the Nation's utilities can provide an adequate supply of electricity. However, whether there will be enough electricity to meet all the Nation's future energy needs depends on a number of factors.

One of the most important factors, of course, is the ability of the Nation's electric utilities to build electric generating units when they are needed. In recent years, this ability has been increasingly questioned. For example, in 1975 a Presidential committee reported that, at the end of 1974, electric utilities had deferred or canceled the construction of an estimated 106 nuclear powerplants and 129 coal-fired plants. The committee concluded that these extensive delays and cancellations seriously jeopardized our national goal of reducing our dependence on imported oil. It added that the slippages and cancellations might also result in future energy shortages and serious restrictions to the Nation's economic expansion.

The 1975 Presidential committee, however, did not complete an in-depth study of the reasons for or impact of these cancellations and delays. In addition, since that study, neither the Federal Government nor private industry has undertaken a comprehensive evaluation of the number of nationwide cancellations and delays of all types of electrical generating plants and the reasons for these cancellations and delays.

OBJECTIVES, SCOPE, AND METHODOLOGY

Because an adequate supply of electrical power is vital to our national interests, we believe it is important that the Congress have current information on the extent of cancellations and delays as well as the reasons for and impact of such cancellations and delays so that it can initiate any necessary corrective actions. Thus, our objectives in this effort were to answer the following questions:

--How many electric powerplants have been canceled or delayed since 1974? 1/

--What impact have these cancellations and delays had on the Nation's overall energy policy, electric reliability, and consumer costs?

--What are the major reasons for these cancellations and delays?

To answer these questions, we relied heavily on the views and explanations of the electric utility industry and its supporting infrastructure. The information in the report was obtained primarily by interviews with the 21 electric utility companies, selected from nearly all regions of the Untied States, having the most powerplant cancellations and delays in their respective regions. We also interviewed one architect-engineering company, three powerplant manufacturers, four electric utility organizations, and six State regulatory agencies. We selected these organizations to give a good geographical cross-section of electrical generation-related problems and opinions. We also talked to officials of the Department of Energy (DOE), the Nuclear Regulatory Commission (NRC), and the Environmental Protection Agency.

We examined utility and utility organization studies, reports, correspondence, and other documents to determine the number of powerplants being delayed or canceled. Unfortunately, there was very little "hard" evidence available on the reasons for and impacts of delays or cancellations. Therefore, we had to rely primarily on the views and opinions of the individuals interviewed, and in most instances, these views were based on experience and perceptions rather than on a systematic analysis of the problem. Nevertheless, we believe the following organizations, taken together, are representative of the industry and Government organizations integrally involved in providing the Nation with electricity.

Architect-engineering company

United Engineering Co., Philadelphia, Pennsylvania.

1/The year 1974 is often considered the beginning of the Nation's "energy crisis" because of the oil embargo of 1973-74.

Electric utility companies

Alabama Power Co., Birmingham, Alabama.
Arizona Public Service Co., Phoenix, Arizona.
Commonwealth Edison Co., Chicago, Illinois.
Consumers Power Co., Jackson, Michigan.
Detroit Edison Co., Detroit, Michigan.
Duke Power Co., Charlotte, North Carolina.
Duquesne Light Co., Pittsburgh, Pennsylvania.
Georgia Power Co., Atlanta, Georgia.
Gulf States Utilities, Beaumont, Texas.
Middle South Utilities, Inc., New Orleans, Louisiana.
New York State Electric and Gas Co., Binghampton, New York.
Niagara-Mohawk Co., Syracuse, New York.
Northern States Power Co., Minneapolis, Minnesota.
Philadelphia Electric Co., Philadelphia, Pennsylvania.
Potomac Electric Power Co., Washington, D.C.
Public Service Electric and Gas Co., Newark, New Jersey.
Rochester Gas and Electric Corp., Rochester, New York.
Southern California Edison Co., Rosemead, California.
Texas Utilities Co., Dallas, Texas.
Union Electric Co., St. Louis, Missouri.
Wisconsin Electric Power Co., Milwaukee, Wisconsin.

Electric utility organizations

Atomic Industrial Forum, Washington, D.C.
Edison Electric Institute, New York, New York.
Electric Power Research Institute, Palo Alto, California.
National Electric Reliability Council, Princeton, New Jersey.

Federal agencies

Department of Energy, Washington, D.C.
Nuclear Regulatory Commission, Bethesda, Maryland.
Environmental Protection Agency, Washington, D.C.

Powerplant manufacturers

General Atomic Co., San Diego, California.
General Electric Co., San Jose, California.
Westinghouse Electric Co., Pittsburgh, Pennsylvania.

State regulatory organizations

California Energy Commission, Sacramento, California.
Georgia Public Utility Commission, Atlanta, Georgia.
Illinois Electric Reliability Committee, Springfield, Illinois.

Michigan Public Utility Commission, Lansing, Michigan.
Pennsylvania Public Utility Commission, Harrisburg Pennsylvania.
Texas Public Utility Commission, Austin, Texas.

DOE COMMENTS

We provided DOE the opportunity to formally comment on our report's findings and conclusions, but DOE elected not to do so. Instead, DOE provided editorial comments of a factual nature which we considered in finalizing our report.

CHAPTER 2

HOW MANY POWERPLANTS HAVE BEEN CANCELED OR DELAYED?

According to DOE's Energy Information Administration and Federal Energy Regulatory Commission, NRC, the Edison Electric Institute, and the National Electric Reliability Council, the number of powerplants that are being delayed or canceled has continued to increase since 1974. Cancellations have primarily occurred in nuclear and coal-fired plants, while delays have occurred in almost every type of electrical generating power plant. In addition, the length of these delays is increasing. Combining the information available from these four groups, in our opinion, has resulted in the most comprehensive data on powerplant cancellations and delays available.

The following sections provide (1) a perspective on the size of the utility industry by the type of fuel used to generate electricity and (2) a discussion of the number and types of cancellations and delays that are being experienced.

A BRIEF PERSPECTIVE ON THE SIZE OF THE UTILITY INDUSTRY

As of April 1979, the Nation's electric utilities had electric generating units totaling 587,905 megawatts 1/ electric (MWe) in plant capacity and used various fuels to generate over 2 billion megawatt-hours of electricty during 1978. The following table shows the type of fuel used to generate this electricity.

1/A megawatt is equal to one thousand kilowatts. A modern electrical generating plant may have a generating capacity of around 1,000 megawatts.

Powerplants Using Various Types of Fuel

Type of fuel	Installed capacity MWe	Percent
Coal	228,889	39.0
Oil	151,317	25.7
Gas	74,892	12.7
Nuclear	53,604	9.1
Hydro	73,936	12.6
Other	5,267	0.9
Total	587,905	100.0

POWERPLANT CANCELLATIONS

One hundred and eighty-four large electric generating units--those designed to operate at or above 250 megawatts--were canceled from 1974 through 1978. This represents over 155,000 MWe, or about 26 percent of all electric capacity available for operation as of April 1979. A cancellation occurs when the electric utility announces that it no longer intends to build or operate the powerplant.

Mostly nuclear and coal plants were canceled

Over 90 percent of the canceled electrical generating capacity was to be fueled with coal or uranium. The rest were either hydroelectric, gas, or oil-fired plants.

The following table shows the number of various types of electric powerplants cancelled from 1974 to 1978.

Canceled Electric Powerplants (1974 to 1978)

Fuel type	Units	Capacity MWe	Percent
Coal	84	51,067	33
Nuclear	80	89,806	58
Oil	8	4,206	3
Other	12	9,579	6
Total	184	154,658	100

Of the 184 canceled powerplants, 68 were canceled in 1974; and 25, 28, 27, and 36 were canceled in the years 1975 through 1978, respectively. Also, while powerplants have been canceled in nearly all sections of the United States, most of the cancellations have occurred in the mid-Atlantic, Southern, and Central regions.

POWERPLANT DELAYS

Constructing an electric power generating plant is a complex undertaking. Powerplant cost can exceed a billion dollars and, depending on the type and size of the plant, could take about 8 to 14 years to build. Consequently, some difficulties are to be expected which result in delays. A delay is a slippage, or projected slippage, beyond the initial projected operational date.

Since 1974, the majority of all electric powerplants have been delayed. One hundred and eighty-nine electric powerplants were put in operation between January 1974 and December 1978. Of these 189 units, 149 (or 79 percent) experienced delays ranging from under 6 months for 41 plants to 3 years or more for 23 plants. The average delay for these 149 plants was 17 months. Another 330 plants are projected to come on line before the early 1990s. Two hundred and sixty-seven (81 percent) of these units have already experienced delays averaging 40 months.

Powerplant delays are increasing

The length of time that powerplants are being delayed is increasing. The following table shows how the average delay has increased each year for various types of powerplants already in operation.

Average Powerplant Delays (1974 to 1978)

Operation year	Nuclear		Coal		Oil		Other		Total	
	Units delayed	Avg. delay (mos.)	Units delayed	Avg. delay (mos.)	Units delayed	Avg. delay (mos.)	Units delayed	Avg. delay (mos.)	Units delayed	Avg. delay (mos.)
1974	11	26	8	5	7	12	7	9	33	14
1975	9	28	6	5	9	10	5	10	29	14
1976	4	27	10	16	5	12	4	14	23	16
1977	7	45	16	9	9	19	4	15	36	19
1978	3	59	15	11	5	24	5	35	28	23
Total	34	33	55	10	35	15	25	16	149	17

As the table shows, the average length of delays for all powerplants has increased about 65 percent--from 14 to 23 months--since 1974. They now average about 23 months. This large increase in the average length of delays holds true for all types of powerplants. Nuclear plants encountered the most serious delays, however, increasing from an average of 26 to 59 months. Coal plants have had relatively minor delays compared to the nuclear plants, although the length of the delay for coal plants has also doubled.

Most of the 330 powerplants with proposed operational dates are also incurring delays. As of March 1979, 9 powerplants were planned to be completed ahead of schedule, while another 55 were on schedule. However, 267 plants (81 percent) had already been delayed an average of 40 months, and this may be increased since the plants were not yet complete.

The following table shows the types of these future powerplant delays and the average length of delays in months that had occurred as of March 1979.

Average Delays of Future Powerplants (note a)

Fuel type	Total units delayed	Average length of delay (months)
Coal	131	30.4
Nuclear	110	52.7
Oil	11	25.7
Other	15	32.8
Total	267	40.6

a/Future powerplants are defined as those plants either under construction or planned for operation. These delays are only those reported as of March 1979; they may have increased as the plants neared their completion dates.

CHAPTER 3

WHY ARE POWERPLANTS BEING CANCELED OR DELAYED?

We contacted 21 utilities in all sections of the Nation to discuss the reasons behind the cancellation or delay of 114 electric generating units. According to these utilities, cancellations and delays were caused mainly by

--the dramatic change in the Nation's consumption of electricity since 1974,

--the difficulties the utilities have had in obtaining reasonable financing to construct powerplants,

--the difficulties the utilities have had in overcoming various regulatory problems,

--the difficulties that utilities face with the growing uncertainty surrounding nuclear power, and

--construction problems.

Each of these reasons is discussed in detail below.

THE DECREASING DEMAND FOR ELECTRICITY

Because it takes so long for a utility to construct a large electric powerplant, the utility must predict the demand for electricity 10 to 15 years into the future. Prior to 1974, the demand for electricity grew at an average rate of 7 percent each year. Few, if any, foresaw any significant changes to this constant growth. Nearly all utility forecasts presumed that this growth would continue. Consequently, many utilities were planning extensive construction programs aimed at doubling the capacity of powerplants in their system every 10 years.

In 1974, however, the demand for electricity began to decline, and it has generally continued to decline in each succeeding year. In April 1979, the National Electric Reliability Council said utilities then projected a compound annual growth rate of 4.7 percent for the period 1979 through 1988; and, also in April 1979, the Energy Information Administration projected annual growth rates of 4.4 percent from 1977 to 1985 and then 4 percent from 1985 to 1990. The actual annual growth rate for 1978 to 1979, however, was only about 2 percent. Furthermore, the Energy Information Administration's most recent draft annual report

on electric power supply and demand estimates only about a 2- to 3-percent annual growth rate from 1980 through 1983.

Following are some examples of the decreasing growth rate of the demand for electricity:

--In January 1974, the Consumers Power Company of Jackson, Michigan, projected that the annual growth rate for their service area would be 7.2 percent in 1979. Consequently, the utility planned to build two large nuclear units. Because of various energy conservation measures and a downturn in Michigan's economic activities, the utility revised its forecast downward. The utility believed that there would be no demand for the additional capacity and in June 1974 canceled the two units. A December 1978 projection for 1979 demand growth was only 3.8 percent.

--Potomac Electric Power Company finalized plans for a construction program in 1969-70 based on its growth experience for the decade of the 1960s. Included in this plan were two large nuclear units at Douglas Point, Maryland. During the 1970s, the growth pattern changed dramatically. While the utility experienced 9 percent growth in 1973, demand decreased by 4.8 percent in 1974. Overall growth averaged only 2 percent per year from 1973 through 1978.

--Gulf States Utilities has also seen marked changes in its electrical demand. In 1976 and 1977, the growth rates were 11.9 percent and 10.6 percent, respectively. The utility projected that the demand for electricity would rise 6.6 percent in 1979, but through October 1979, only 1.8 percent was experienced. This rapid change has created considerable uncertainty for the utility's planners.

--Duke Power Company had delayed several powerplants because of the decreasing demand projections for its electricity. In 1974, the utility projected an annual growth rate of 7 percent. Both 1974 and 1975, however, were years in which demand did not increase at all. The utility is now experiencing a 4.5-percent growth rate.

The following chart shows the declining demand rates for six other utilities we contacted.

Changing Electric Growth Rates

Utility	1974 projected annual growth rate	Actual growth rate (note a) 1974	1976	1978
	(percent)			
Northern States Power	6.3	1.8	1.9	2.5
Alabama Power Company	8.0	1.6	7.5	4.2
Georgia Power Company	8.5	0.4	5.6	0.7
Texas Utilities Company	8.0	3.3	3.4	7.1
Commonwealth Edison Company	7.0	-1.4	2.8	4.2
New York State Electric and Gas	7.0	.3	5.4	2.7

a/The projected and actual growth rates are not directly comparable because utilities project growth rates based on peak load requirements, and measure growth rates based on annual sales experience.

Five of these six utilities told us that these changing consumption patterns were at least partially responsible for some powerplant cancellations and delays.

FINANCING PROBLEMS

The decision to build an electric powerplant is one of the most important investment decisions made by a utility, often involving upwards of $1 billion. Many utilities--it was the second most frequently cited problem--told us that they had to either cancel or delay a powerplant because they felt that the construction would jeopardize their financial situation.

These utilities generally made this decision because of a number of interlocking factors, including

--the cost of constructing a large powerplant is constantly increasing, due in part to increasing regulatory complexities and inflation;

--the earnings of many utilities have decreased because of (1) delays experienced by various utilities in obtaining adequate rate relief, (2) lags in some regulatory commission responses to such requests, (3) lower than expected sales, and (4) sharply rising fuel costs;

--many utilities do not have the capability to generate the sizable capital requirements from within;

--many utilities are unwilling to borrow funds at available high interest rates; and

--some public utility commissions, according to the utilities, do not allow utilities to begin charging customers for new plant construction costs until the plants are complete, often after 8 to 14 years and hundreds of millions of dollars have been spent.

Although the above is a simplified summary of the financial problems facing many utilities--it does not apply to all utilities--it shows the difficult task utilities face when they decide to construct a large powerplant. The following are some examples where utilities cited financial problems as a specific reason for powerplant cancellations and delays.

--In 1974, the Georgia Power Company projected that electrical demand would increase 8.5 percent each year, indicating that the company would need to increase its generating capacity. However, its financial problems became so severe that the company had to sell $1.5 billion worth of generating capacity and transmission lines. The utility's financial problems were aggravated, according to a senior utility official, by what he considered inadequate rate relief from its public utility commission. Georgia Power had assumed that it would receive adequate relief to pay for additional generating units. When the public utility commission did not approve the utility's rate request, Georgia Power decided that it would delay two large nuclear units and cancel two others.

--Since June 1979, the major reason for powerplant delays in the Commonwealth Edison system has been the utility's inability to finance its construction program. To support its construction program,

the utility must use either short-term unsecured borrowings or receive adequate rate relief to support first mortgage bonds. On September 12, 1979, the utility received a rate increase of 1.65 percent in response to its request for an 18.5-percent increase. This did not allow the utility to support its entire construction program. Based on the rate decision, the utility indefinitely delayed construction of two units and laid off about 70 percent of the construction work force connected with these two units. The utility has since appealed the rate decision and in February 1980 the ratemaking body increased the rate and restored the utility's ability to finance. In the rehearing, according to a utility executive, the Illinois Commerce Commission noted its intent had been to grant a rate increase allowing the utility to finance the entire construction program by providing coverage for first mortgage bonds. Through an error in calculation, the rate increase originally granted was not adequate. The net result has been to delay construction of two units for 1 year.

--The New York State Electric and Gas Company has had to purchase more expensive power from other utilities because three of its plants were delayed as a result of financial problems. A senior official told us that the company cannot build these plants until its public utility commission recognizes the need for the utility to recover its construction costs in its electricity prices during the construction period. The utility feels that support during the construction period is necessary to allow adequate interest coverage ratios and sufficient cash to be generated to pay bond holders. According to a staff officer of the New York State Public Service Commission, the Commission's position is that if the facilities are urgently needed, it would allow some construction costs in the rate base. The Commission feels the utility should (1) establish a joint venture to support its program, (2) construct smaller facilities which would have less capital requirements, or (3) go ahead without assurance that the Commission will allow construction cost in the rate base. The utility wants this assurance and notes that lack of its own facilities increases oil use. (See p. 23.)

Eight of the utilities we met with agreed on one point--their financial plight would not be so grave if they could begin billing their customers for plant construction costs as they incur these costs rather than 8 to 14 years later after plants begin operating. These utilities noted

that if this were allowed, they would not have to compete in the financial marketplace for enormous amounts of capital. Instead, they could generate the funds from within. Large borrowings by the utilities are difficult today because utility bonds are rated low, and many utility stocks now sell below their book value.

While some State utility commissions do allow utilities to include plant construction costs in their rate bases as these costs are incurred, other commissions only allow some of the construction costs, and still other commissions do not permit utilities to begin recovering construction costs until new plants are put into operation.

A number of pros and cons are associated with including construction costs in utilities' rate bases as the costs are incurred. We have analyzed these pros and cons in a separate report entitled "Construction Work in Progress Issue Needs Improved Regulatory Response for Utilities and Consumers," EMD-80-75, June 23, 1980.

REGULATORY PROBLEMS

Regulatory policies and procedures were cited as the third most frequent cause of powerplant cancellations and delays. While none of the organizations we contacted said that regulations to protect the public and the environment were unnecessary, they did feel that the regulatory infrastructure throughout the United States--consisting of all local, State, and Federal regulatory bodies--was so fragmented that, as a whole, it was uncoordinated, cumbersome, complex, and slow.

Most utilities view themselves as a single entity providing a service--electricity. Ideally, they would like to have a single regulatory agency that would approve or disapprove a powerplant's construction. Now, however, no corresponding regulatory body has complete oversite. As a result, conflicts occur when numerous agencies--each with different roles and philosophies--monitor various aspects of the powerplant construction process.

The following are some examples of where a powerplant cancellation or delay occurred, according to utilities, because of a regulatory problem:

--The Consumers Power Company has had serious problems with inconsistent decisions by various regulatory groups. For example, Michigan's Department of Natural Resources had approved a proposed plant as designed, including the proposed cooling system. The Federal Government, however, disagreed with the design. When

the utility sought a permit from the Army Corps of Engineers and the Environmental Protection Agency, the latter decided that another type of cooling system should be used. According to a senior utility official, eventually the Agency decided that the original system, with some modification, could be used. In the meantime, the powerplant had to be delayed 23 months as a result of conflicting decisions by State and Federal agencies, and the plant's cost was increased by at least $60 million.

--The Detroit Edison Company experienced a series of regulatory difficulties. First, it incurred delays on a nuclear plant because NRC required the utility to retrofit some of its systems to more strict NRC standards. Recognizing that it would not be able to operate the plant on time, the utility decided to add two new coal units to the system. These units, which are now under construction, had been fully approved by the State regulatory agency. However, the entire project was subject to question because according to a senior utility official, the Environmental Protection Agency believed that another method to cool the plant should be used. The Environmental Protection Agency subsequently agreed with the original cooling plan, but the net effect was a 6-month to 1-year delay in construction completion.

Another example concerns the Southern California Edison Company. In the early 1960s, Southern California Edison was failing to obtain natural gas supplies. Consequently, it and several other western utilities decided to construct powerplants on the coal fields of Southern Utah. It first sought action to secure water rights from Utah. Utah permitted the use of water; however, since the water was in an area under the Department of the Interior's control, the utility also had to secure Federal approval.

The Department decided a year after Southern California Edison submitted its application that approval of water use would be granted if the Federal Government retained control over the flow of the Colorado River. The State of Utah, however, argued that it had the right to allocate this water. As a result, negotiations between State and Federal agencies lasted for 3 years. In late 1969, the Federal Government granted the utility's request for water.

According to the utility, in 1970 a series of three events further delayed the 7-year-old project:

--The Department of the Interior announced it would delay decisions on further powerplant construction until a Department task force reviewed all factors involved in Southwest energy development.

--The Sierra Club filed a lawsuit designed to halt powerplant construction in the Southwest. The suit sought an injunction to bar Federal cooperation with powerplant development until the Department agreed to comply with the provisions of the National Environmental Policy Act of 1969.

--Inflation began to increase rapidly.

In 1973, following the dismissal of the Sierra Club's civil suit, Southern California Edison's application to the Interior Department was denied for environmental reasons. The Governor, a State senator, two State representatives, and utility representatives met with the Department of the Interior and the Environmental Protection Agency. Subsequently, the Interior Department's decision was reconsidered. The Council on Environmental Quality--another Federal agency--began reviewing the environmental impact statement, which was submitted in July 1975. Then in mid-1975, a participant withdrew from the project, and public hearings on the draft environmental statement began in September 1975. From mid-October until mid-November 1975, a total of nine legal motions, petitions, and official protests were filed against the project.

Twelve years following Southern California Edison's initial actions, the cost of the plants had increased seven times to $3.5 billion. It was the participating utility's conclusion that it could not commit this large a sum to a project faced with so many uncertainties, and it abandoned the project.

NUCLEAR POWER PROBLEMS

Seven of the utilities we contacted indicated that the problems confronting the construction of nuclear plants are unique to that technology. These problems have led directly to numerous cancellations and delays. For instance, chapter 2 pointed out that on the average, nuclear plants coming into operation between 1974 and 1978 have been delayed more than three times longer than coal plants. The utility organizations have a long list of specific problems facing the nuclear industry, but in general this concern centers around the strong belief that the Federal Government is no longer supportive of the nuclear power effort. Many utility officials indicated that they find it very difficult to take any major action without strong Government support. At best, they felt that the Federal Government was ambivalent toward the nuclear option.

The industry points to several instances where it feels the Government is no longer supportive. These include the present administration's

--efforts to control nuclear proliferation,

--efforts to stem the construction of the Nation's first commercial-scale liquid metal fast breeder reactor in Tennessee, and

--decision to defer the commercialization of nuclear fuel reprocessing and recycling.

Following the Three Mile Island accident, the utilities have a heightened awareness of public opposition to nuclear powerplants. Consequently, it appears they may be unwilling to commit themselves to building such expensive projects.

Some examples of nuclear power problems that have caused cancellations or delays follow:

--Utility officials at the Alabama Power Company told us that changes to regulatory requirements--often called "ratcheting" by industry officials--had caused one of their Joseph M. Farley nuclear units to be delayed by over 18 months. They said these revisions and new design criteria, safety guides, and regulatory guides by the NRC, combined with new requirements from the Occupational Safety and Health Administration, also increased the cost of the plant by $218 million.

--In 1974, Wisconsin Electric Company began to plan for two large nuclear plants to be built in Koshkonong, Wisconsin. However, 3 years later the State's Department of Natural Resources disallowed the site for the plant. The utility then decided to move the plants to a new site. Later, the company canceled one plant and delayed the other because the Wisconsin Public Service Commission would not approve the utility's plants until certain nuclear fuel cycle questions were resolved, including the future availability of fuel and radioactive waste disposal.

--Officials at Southern California Edison told us that the California law requiring that nuclear waste disposal had to be in place prior to any new nuclear construction in the State caused the cancellation of one plant. Two other nuclear units were voted down by a public referendum due to concern over the use of agricultural waste water as a reactor coolant.

--Northern States Power Company canceled its plans for two nuclear units at the Tyrone Energy Park. In 1972, the utility began to plan for the Park and later filed for a construction permit from NRC. This permit was granted in 1977. The utility, however, never received permission from the Wisconsin Public Service Commission. It had filed a preliminary application, but the Commission had many problems with it. Finally in March 1979, according to the utility, the Commission found that the utility had not made a sufficient showing of the need for the plant--based on the Commission estimates of projected demand--and disapproved it. On the other hand, the Commission also directed the utility to submit an application for a coal-fired generating plant. Northern States officials told us that, following this decision and the accident at Three-Mile Island, they believe that nuclear power is no longer a viable option although they believe it is the least harmful to the environment and the most cost effective.

CONSTRUCTION PROBLEMS

Construction problems were generally cited as another problem causing powerplant delays, although it was not mentioned as often as the other four major problems discussed above. These construction problems include the lack of construction materials, the lack of adequate numbers of skilled craftspeople, and low productivity.

The following are some examples of construction-related problems that have caused powerplant delays:

--Utility executives at Arkansas Power and Light Company told us that the main reason for the 50-month delay at one of their powerplants is that--following changing regulatory requirements--they were not able to obtain certain types of materials. Further, these increased requirements caused a need for specific craftspeople who were not always available.

--Two powerplants under construction by Texas Utilities Company have been delayed 21 and 14 months, respectively. Some of these delays are due to lower than expected productivity of the workforce. For example, the utility originally estimated that 12 to 16 million work hours would be needed. Now, however, it believes that it will require 40 million hours. The utility has also had some problems with obtaining various components that meet Federal specifications, and

there have been delays in completing the plant's design.

It is important to understand, of course, that these types of construction problems can be expected to occur since building powerplants is complicated and complex.

CHAPTER 4

WHAT ARE THE IMPACTS OF ELECTRIC POWERPLANT CANCELLATIONS AND DELAYS?

Because a large number of variables affect decisions to cancel or delay construction of an electrical generating plant, pinpointing the impact of such delays and cancellations is difficult. A systematic analysis of these impacts is a difficult and time consuming undertaking. Thus, we relied heavily on the views and opinions of industry and State and Federal agency officials experienced in electrical generating problems and activities. These officials believed that continued powerplant delays and cancellations as described in the previous chapter will likely contribute to

--increasing the Nation's consumption of oil, thus helping to make us more dependent on uncertain foreign sources,

--jeopardizing the utility industry's ability to provide uninterrupted electrical service, and

--increasing the future costs of electricity as consumers bear the added costs of powerplant delays and cancellations.

On the other hand, a number of factors could mitigate the consequences of delays and cancellations. These factors include additional conservation and load management efforts by the utility industry. Further, obvious benefits are associated with canceling or delaying electric powerplants that are not needed because of reductions in the projected rate of growth in demand for electric power; for example, the costs of plant cancellations and delays to utility customers may be less than the costs of a large investment in a completed but underused plant. The following sections discuss these views in more detail.

CANCELLATIONS AND DELAYS MAY INCREASE OIL CONSUMPTION

The Nation's energy problems stem primarily from two simple facts: stagnant domestic production and rising demand. To meet the shortfall between production and demand, the United States has had to increase its oil imports at continually rising prices. These imports--controlled by a cartel of oil producing countries--now provide about half of all

the oil consumed in the United States, up from about 30 percent in 1972. The total cost of these imports has jumped from almost $5 billion in 1972, to nearly $42 billion in 1978. This rising dependence on increasingly costly fuel degrades the value of the dollar and contributes to inflation. Further, if these large amounts of imported oil are shut off, as happened in the oil embargo of 1973-74, the Nation must react to economic disruptions of considerable magnitude. This increases the threat to our national security.

Oil used by utilities is, of course, only a portion of the oil consumed in the United States. It is, however, a sizable amount. According to the National Electric Reliability Council, the Nation's utilities burned 647 million barrels of oil in 1978 to generate electricity. This was about 10 percent of all U.S. oil consumption. Furthermore, both DOE and the Council believe that still more powerplant delays could further increase the electric utility industry's oil needs. The Council estimates that if nuclear units encounter an average 5-year delay and coal units encounter an average 3-year delay, utilities will burn 260 million more barrels of oil in 1987 than in 1978. This estimate, however, assumes the compounded 4.7-percent electricity demand growth rate projected by the utility industry in April 1979. As stated on page 23, the actual demand growth rate has been closer to 4 percent over the last 4 years.

Estimating the impact of delays and cancellations on oil consumption is a difficult task. There are a number of reasons for deciding not to construct or to delay construction of a new powerplant. The new plant, for example, may not have replaced an oil-fired plant. Nevertheless, the large number of canceled and delayed nuclear and coal plants represents a sizeable equivalent of oil. In 1978, for example, the difference between the new coal and nuclear capacity actually brought on line and the originally planned capacity was equivalent to 516 million barrels of the 647 million barrels of oil burned to generate electricity.

In view of the Nation's efforts to reduce or, at a minimum, prevent increases in oil imports, using oil to generate electricity when acceptable alternatives exist is not consistent with national energy goals. Because oil is an imported energy source and because of its importance in achieving national energy goals, it should be put to its "highest and best use."

Most utility executives we talked to believe that nuclear and coal powerplants are the only reasonable alternatives to oil in the next few decades, and if they

are not placed into operation in a timely manner, oil consumption will increase. The following are some examples where this has already occurred.

Consumer's Power

In January 1969, Consumer's Power of Michigan applied to the Atomic Energy Commission for a construction permit for its two Midland nuclear powerplants. The utility projected that the two plants would begin operation in February 1974 and February 1975, respectively. The current projected operating dates, however, are September 1984 for the first plant and March 1985 for the second. According to utility officials, these delays caused the utility to construct two 600-MWe, oil-fired plants. The initial unit's first year of operation, in 1975, increased the utility's annual oil needs by 2,872,499 barrels.

New York State Electric and Gas

New York State Electric and Gas Company decided in the late 1960s that powerplants burning either coal or uranium were the only feasible large-scale generation options. Oil was perceived to have future supply and cost problems. Unfortunately, that decision led indirectly to the utility company's increased reliance on oil.

According to utility officials, licensing and regulatory problems have prevented the timely construction of nuclear and coal powerplants. This lack of nuclear and coal capacity, combined with the continued belief that oil is not a viable answer, has created a shortage of generating capacity for the utility. As a result, the utility is now buying electricity from other utilities--electricity generated by oil-fired capacity. During the mild winter of 1979-80, for example, the utility had to purchase 250 MWe of oil-fired capacity. The utility predicts that by the winter of 1983-84, it will have to purchase 30 percent of the electricity needs of its service area, some of which will be generated with oil.

CANCELLATIONS AND DELAYS COULD AFFECT ELECTRICITY SUPPLIES BY THE END OF THE DECADE

If nationwide electrical demand continues at its current rate of increase (under 4 percent a year), there should not be any problem in meeting the needs of customers at least through 1988. Utilities point out, however, that spot regional shortages could still occur under these conditions because of differences in growth rates, cancellations and delays, and

reserve margins among geographic regions. Because of technical limitations on electrical power transfers, these utilities contend, it is not always practicable to satisfy increased electricity demands in some regions with excess capacity in other regions. DOE officials agreed with the utilities' view. These officials said that in some sub-regions, reserve margins might be inadequate, and that unusual occurrences damaging inter-regional transmission facilities could adversely affect electricity supplies for brief periods of time.

Still, in a gross or national sense, electricity supplies should be adequate because utilities have been adding generating capacity at a higher rate than the rate of increase in electricity consumption despite the large numbers of plant cancellations and delays since the 1973-74 oil embargo. Thus, the overall utility industry reserve margin--installed generating capacity in excess of actual demand--has continued to grow as new capacity under construction in the mid-1970s has been brought on line simultaneously with cancellations and delays to projects originally planned for the late 1970s and the 1980s. For example, the reserve margin throughout the contiguous United States was 34 percent in 1978, up from 27 percent in 1974. A reserve margin of 15 to 25 percent is considered prudent by the utility industry.

Based upon an analysis of various rates of nationwide growth in the demand for electricity and capacity additions, we found that the nationwide reserve margin available may be as high as 57 percent or as low as 7 percent by 1988. The table on page 25 shows the reserve margins using three scenarios of annual growth in consumer demand. These growth levels were chosen because

--2.5 percent is a conservative estimate, based on the reduction in consumer demand experienced by several large electric utility systems;

--3.6 percent is the annual growth level projected by DOE and some other organizations associated with the electric utility systems; and

--4.7 percent is the compounded annual growth level for the 1979-88 period currently projected by the National Electric Reliability Council.

1988 Reserve Margins in the United States Under Four Annual Growth Assumptions

Percent of scheduled plant capacity completed	Percent of scheduled plant capacity at 2.5	at 3.6	at 4.7
100	57	41	27
90	52	37	23
80	47	32	19
70	42	28	15
60	37	23	11
50	32	19	7

As indicated by this table, even if only one-half of the scheduled capacity comes online by 1988, with an assumed growth rate of 3.6 percent, there should still be an adequate reserve margin to meet the electric power needs of the Nation. If, however, the annual nationwide growth rate of electricity were to increase and to stabilize at 4.7 percent, and if less than 70 percent of the planned capacity came on line as scheduled, there could be reason for concern. Also, this discussion does not account for differences in reserve margins among geographic regions.

An October 1979 report by the National Electric Reliability Council concluded that if demand increases by as much as 4.7 percent each year and planned nuclear and coal-fired units are delayed beyond present schedules, the industry might be unable to meet this demand, especially when it "peaks" during certain parts of the year. The expected shortfall, according to the Council, will start in the early 1980s and increase in severity to 50,000 MWe by 1988.

Fourteen of 21 utility organizations we contacted in nearly every section of the United States believe their service areas are likely to experience interrupted electrical service because of powerplant delays. Consequently, they said, they will have to obtain higher cost electricity from other utilities in order to provide continued service. The

following are some examples of various utility and public utility commission concerns about the impact of cancellations and delays on electricity supplies.

--Both the Pennsylvania Electric Association (an industry organization for Pennsylvania utilities) and the Pennsylvania Public Utility Commission predict capacity shortages in Pennsylvania by the early to mid 1990s. Both organizations analyzed the State's future needs under various projections of annual growth in demand for electricity and compared that demand to existing and planned capacity. At a 2.5-percent growth rate, demand will exceed capability by 1996. This shortfall could occur as early as 1990 if demand grows at 4 percent. According to the utility commission, this possible shortage will occur because the industry has reacted to criticism about its large reserve margins and is, therefore, not planning to expand its generating capacity. There is also considerable uncertainty surrounding powerplant construction schedules.

--The Illinois Commerce Commission and Commonwealth Edison said there is no danger of electrical outages in Illinois if Commonwealth Edison's nuclear units are completed as scheduled. Commonwealth Edison units depend on adequate rate relief. At the time of our visit, Commonwealth Edison was awaiting the Commission's approval of a request for an 18.5-percent rate increase. According to the utility, approval would enable it to continue a timely construction program; rejection would curtail a portion of the program. An increase of only 1.65 percent was approved and, as a result, Commonwealth Edison curtailed part of its construction program. In February 1980, the Commission approved a new rate increase, restoring the utility's ability to finance. The Commission noted that an error had been made in its calculation of the amount of rate increase which would support the full construction program. According to the utility, the net result was a 1-year delay in the construction of two units.

CANCELLATIONS AND DELAYS MAY CONTRIBUTE TO INCREASED ELECTRICITY COSTS

The cost of electricity has been increasing as it reflects the more expensive cost of fuel and rising construction costs. Powerplant cancellations and, in particular, delays have also added to the rising cost of electricity. To the extent that these cancellations and delays are caused by decreases in demand, however, they may result in lower rates for the consumer over the long-term rather than the building of an expensive, unnecessary plant.

Costs associated with cancellations can clearly be differentiated from those resulting from delays. Cancellations generally occur prior to any construction and, therefore, the utility has only incurred costs for front-end planning, siting, design, and environmental impact analyses and related regulatory proceedings. They may also have to pay termination costs to powerplant vendors and architect engineers. Following are two examples of the costs that various utilities or companies have borne--often passing them on to their customers--as a result of their decisions to cancel powerplants.

--Southern California Edison executives stated that their cancellation decisions have cost their rate payers $30 million. The $20 million front-end planning, siting design, and environmental impact analyses of the Kaipairowitts coal powerplant decision and $10 million in similar costs for the canceled Vidal nuclear units will be passed onto their rate payers.

--Northern States Power executives stated that the Public Service Commission of Wisconsin decided that the benefits of the Tyrone nuclear project were outweighed by the economic risks. They said that the increasing cost of carrying the investment into the 1990s represented an unduly costly alternative to the utility, and the prudent choice was to terminate. This decision will cost Northern States Power's consumers $62 million in front-end planning and another $18 million to close out vendor contracts. These executives said these costs will increase consumers' electric bills in excess of $3.80 per month over a 5-year period.

A powerplant delay, on the other hand, encompassess a different range of costs. Depending on the time when the plant is delayed, these costs may include interest charges

on borrowed money, redesign and retrofit costs, the cost of purchasing replacement power, and increased fuel costs. One industry official estimated that for a 1-year delay on a large powerplant--in this case, a nuclear plant--an additional $100 million is borne by the utility, assuming that replacement power must be purchased, and then passed on to the consumer in his electricity bill or to the utility's stockholders. The following are some examples of costs resulting from delays:

--Union Electric officials stated that the major impact of delays and cancellations will be the increased use of oil. Delays will require Union Electric to purchase power which probably will be generated using oil-fired capacity. This would increase oil use and cost the utility's customers an additional $80 million per year.

--Niagara Mohawk executives stated that a study of their Nine Mile Point Unit 2 Nuclear Project showed that a 12-month delay in commercial operation increased the project's direct costs, distributable costs, indirect costs, clients' costs, quality assurance costs, and escalation costs by a total of $100 million.

--Southern California Edison estimated that the fuel cost penalty associated with a 1-day delay in firm power operation of San Onofre Nuclear Unit 2 is $757,500. This figure is based on the differential cost of energy production between nuclear fuel and oil. It excludes potential changes in operating and startup cost, increased interest expenses, and changes in construction manpower and materials.

Again, it is important to note that if a plant is canceled or delayed because of decreases in electrical demand, the resulting consumer costs may be less than the overall costs that might occur if the plant were built even though it was not needed.

SOME IMPACTS OF DELAYS AND CANCELLATIONS MAY BE MITIGATED

Several factors may help mitigate the impact of the powerplant cancellations on the ability of the Nation's utilities to provide reliable supplies of electricity. These mitigating factors include:

--The possibility that the growth rate in the demand for electricity will stay at, or even decrease from, the present level of under 4 percent a year. As shown on page 25, if the Nation's average annual growth in electrical demand is 2.5 percent, installed reserve capacity would be as high as 32 percent in 1988 even if only 50 percent of scheduled powerplant capacity is completed.

--Utilities and regulators could take stronger load management and conservation actions.

--Utilities could make greater use of their interconnection capabilities to transfer power from one utility to another.

With regard to exchanging power among utilities, although adequate reserves appear to be available nationally, there is a wide range in the reserve margins for the individual reliability councils. In 1978 the highest reserve margin was in the Northeast portion of the country, where the reserve generating capability was almost 54 percent greater than peak-load consumer demand.

In contrast, portions of the Southwest had reserve generating capabilities that ranged from between 6 percent to just over 18 percent in excess of peak load consumer demand. Even though the reserve margins in each of the reliability councils may vary, much of the bulk power system in the United States is interconnected, and is capable of shifting large amounts of electrical power between various regions of the country. Therefore, the areas that may be experiencing difficulties in meeting consumer demands are able to obtain the needed electrical power from regions with available excess supplies. They may, however, pay greater costs for the transferred electricity.

An example of the extent to which interconnection is used can be seen from the fact that the Metropolitan Edison Company is replacing some of the power lost in the Three Mile Island nuclear accident by obtaining power from its own power pool as well as coal-fired units to the West and from generating plants in Canada. Another example of the use of interconnected systems occurred in the Pacific Northwest. Extremely cold weather in late 1978 and early 1979, coupled with several unanticipated generating plant outages, severely stressed the Bonneville Power Administration's ability to meet peak energy loads. Bonneville

borrowed power from Canada and purchased power from local utilities so that it did not have to interrupt power supplies to industrial users under its interruptible contract provisions. This interconnected electric power network not only helps assure adequate and reliable supplies of power through all the regions to accommodate a wide range of operating conditions, but also allows the generation and transmission system to be operated using the least expensive means of producing electricity at any given time.

Our analysis on a regional basis supports the view that utilities can pursue different options to reduce the threat of inadequate supplies if capacity does not come online when expected. For example, an analysis of the Tennessee Valley region 1/ showed that the region's power needs through the year 2000 could be met by completing plants now under construction, emphasizing conservation, improving power management, and using renewable resources. Since that report was issued, the Tennessee Valley Authority announced it was delaying the construction of four nuclear generating units for several years because of declining demand.

Another analysis of electric energy options in the Pacific Northwest showed that implementing policies to encourage cost-effective energy conservation would result in over a 1-percent decline in growth rates. 2/ The analysis further showed that if the demand growth of 2.7 percent occurred in the Northwest, plants already approved for construction would be sufficient to meet regional demand growth through 1995.

1/"Electric Energy Options Hold Great Promise for the Tennessee Valley Authority," EMD-78-91, Nov. 29, 1978.

2/"Region at the Crossroad--The Pacific Northwest Searches for New Sources of Electric Energy," EMD-78-76, Aug. 10, 1978.

CHAPTER 5

CONCLUSIONS

Since 1974, a large majority of the electric utility industry's proposed electrical powerplant projects have been canceled or delayed. To the extent that these plants were canceled or delayed because of a reduction in the rate of demand for electricity--the single biggest reason cited by the utilities--there is no major adverse impact other than the sunken costs of a canceled plant and the added costs of financing a delayed plant. In fact, there are obvious monetary benefits to the consumer from delaying or canceling a plant no longer needed because of reduced electrical demand growth rates. On the other hand, to the extent that nuclear and coal-fired plants could be used to replace oil-burning plants, a very serious adverse impact occurs in that early replacement of these plants could result in a reduction of oil imports--a major national goal--or could release domestic oil for higher and better uses.

Unfortunately, the data available for making a reliable analysis of these impacts and the reasons for these cancellations and delays is sketchy. Nevertheless, our discussions showed that two important considerations in determining whether additional action is needed to mitigate cancellations and delays are (1) assumptions about future rates of increase in the demand for electricity and (2) the extent to which nuclear or coal-fired plants could, if completed on schedule, replace electricity generated using imported and domestic oil.

If nationwide electrical demand continues at its current rate of increase (under 4 percent a year), electric power supplies and industry reserve margins should be adequate on a gross national basis at least to 1988, even if 30 to 40 percent of the plant capacity now scheduled for completion by 1988 is delayed or canceled. If a higher percentage of plants is delayed or canceled and/or the rate of increase in electrical demand is as high as the 4.7-percent assumption, there could be reason for concern. Even then, however, the utilities have options available to them--such as better load management and conservation actions and greater use of interconnection capabilities--which would tend to mitigate this concern. We recognize that regional supply shortages may develop that cannot be adequately compensated for by power purchases from utility systems in other regions. Although utilities can take the above actions to prevent shortgages, prudent planning would seem to dictate that utilities satisfy consumer demand by developing their own resources

and relying on outside power supplies only when it is cheaper to purchase power or when short-term operational conditions threaten system reliability.

To the extent that canceled or delayed nuclear or coal-fired powerplants could replace electrical generating plants fueled with imported oil, there is an adverse impact on the Nation's efforts to reduce oil imports. However, decisions on whether canceling or delaying powerplants will adversely affect national energy goals, and on any actions that should be taken to mitigate such delays or cancellations must be made on a case-by-case basis. Nevertheless, because of the adverse affect on national energy goals of burning imported oil to generate electricity, and because using imported or domestic oil to generate electricity may not be making the highest and best use of that valuable resource, every effort should be made to identify and prevent cancellations or delays to nuclear and coal-fired plants which, if completed, could reduce the Nation's consumption of oil for generating electricity.

In this regard, there are mechanisms in place or under consideration aimed at reducing the Nation's dependence on imported oil. DOE, for example, is now in the process of ordering that certain electrical generating plants be converted to burn coal or alternative fuels instead of oil. In this connection, the Congress is considering legislation which would authorize DOE to make grants, loans, or combinations of these to utilities for the purpose of assisting utilities in meeting the capital costs of converting these oil-fired plants to coal or another alternate fuel.

In this report, we have pinpointed major problem areas which will need the continuing attention of the utilities, rate commissions and other utility regulators, and DOE in order to assure adequate but not excessive levels of electrical generating capacity. These areas are: electricity planning, including integrating national energy objectives into regional and local plans; utility finances; and the impact of Federal, State, and local environmental and economic regulation on the utility industry. This report does not make specific recommendations for Federal actions in these problem areas. We have, however, examined aspects of these problem areas and made specific recommendations in two recent related reports, and are examining other aspects of these problems in still another ongoing review.

In a recent 1980 report, we recommended that DOE undertake a unified and coordinated electricity planning role, focusing on improving State and utility planning

practices and on determining the extent that State and regional electricity policies support the Nation's broader energy objectives. 1/ In another report, we recommended that (1) the Federal Energy Regulatory Commission define criteria on the financial conditions utilities must meet to include construction work in progress in their rate bases and (2) DOE should assist the Commission by providing information on the effects of the regulatory treatment of construction work in progress on the future availability and cost of electric energy supplies. 2/ In an ongoing review, we are finding that recent regulatory initiatives reflect an awareness of the need for increased flexibility in regulation, but regulatory problems will continue unless regulatory agencies can develop greater precision in defining and implementing their regulatory objectives.

Ensuring that the Nation's need for electric power can be met at the lowest economic, environmental, and social cost, and in a manner consistent with national energy policies will be a continuing challenge to DOE, utilities, and others. This is especially true with the future possibility of finding ways to substitute electrical energy for energy from oil. Therefore, we intend to continue to examine these and other issues which affect electric power supplies.

1/"Electricity Planning--Today's Improvements can Alter Tomorrow's Investment Decisions" (EMD-80-112, Sept. 30, 1980).

2/"Construction Work in Progress Issue Needs Improved Regulatory Response for Utilities and Consumers" (EMD-80-75, June 23, 1980).

AN EQUAL OPPORTUNITY EMPLOYER

UNITED STATES
GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES PAID
U. S. GENERAL ACCOUNTING OFFICE

THIRD CLASS