

Report of the  
ENERGY CRISIS STUDY COMMISSION  
to the  
GENERAL ASSEMBLY OF NORTH CAROLINA  
1974

January 1974  
State Legislative Building  
Raleigh, North Carolina 27611





STATE OF NORTH CAROLINA  
**DEPARTMENT OF MILITARY AND VETERANS AFFAIRS**

JAMES E. HOLSHOUSER, JR.  
GOVERNOR

January 1974

JOHN J. TOLSON, III  
SECRETARY

TO THE MEMBERS OF THE 1973 GENERAL ASSEMBLY  
SECOND SESSION 1974

The 1973 General Assembly ratified Senate Joint Resolution 868 creating an Energy Crisis Study Commission to study the energy crisis and report to the General Assembly.

The report was adopted by the Commission and in accordance with the mandate of the resolution a report is herewith respectfully submitted. The Commission's recommendations to the General Assembly are: 1) that an Act be passed to grant to the Governor emergency powers to meet the energy crisis, and a recommended bill is proposed; 2) that a permanent State Energy Division be established in State Government to enable the State to cope with energy matters; 3) that a North Carolina Energy Council be appointed to succeed the Energy Crisis Study Commission in advising the State Energy Division; and 4) that action on State power plant siting legislation be deferred until the position of the Federal government is clarified.

ENERGY CRISIS STUDY COMMISSION

A handwritten signature in cursive script, reading "John J. Tolson, III".

John J. Tolson, III  
Chairman



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Carolina Power and Light Company

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Region Manager, Exxon Company - USA

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## I. THE EMERGENCE OF THE ENERGY CRISIS

Usable energy became scarce in most of the industrialized world in 1973. The shortage emerged slowly. In several parts of the country early in the year, space-heating fuels became in short supply. Some air terminals were unable to fuel their usual traffic. The State of North Carolina was for the first time unable to contract for its annual oil requirements.

The heating season was followed by the motoring season and a major gasoline shortage was averted to a great extent by extensive publicity. Americans drove less. In late summer as the demand for agricultural crop-drying fuels peaked in first one place and then another around the country, great shifts in the normal distribution patterns of petroleum products were necessary to avert disastrous agricultural losses.

Late in the year the shortage intensified. As the heating season returned, so did political instability in the Middle East. After successive crude oil production curtailments against the allies of their enemy, the Arab petroleum exporting countries, clamped-on a total oil embargo.

During the summer the Federal Government put into effect a voluntary allocation plan for the distribution of gasoline. Late in the year a mandatory allocation plan for middle distillates and one for propane gas were put into effect. A rationing system has been developed but has not been placed into effect in spite of the potentially enormous shortfall of petroleum products as 1973 ended.

As early as May 1973, our great dependence upon petroleum products and, to a lesser extent, natural gas was becoming quite apparent, as the shortage emerged. At that time the North Carolina General Assembly ratified "A Joint Resolution Establishing The Energy Crisis Study Commission," sponsored by Senator Robert J. Barker, subsequently appointed to the Commission, to assess the so-called

"energy crisis" and its impact on North Carolina and her citizens. The Resolution appears in the back of this Report as Appendix A. For an account of the Commission operations, see Section V, Summary of State Actions, page 1.

## II. AN ANALYSIS OF THE ENERGY CRISIS IN THE UNITED STATES

The period 1950-1970 was the era of abundant and low-cost energy in America within which massive growth and development occurred, based on an energy intensive economy and life style. The nation's annual rate of growth in total energy demand over this period was approximately 3.6 percent, gross national product increased 3.6 percent per year, and population growth averaged 1.5 percent per year.<sup>1</sup> Increasing population and increasing per capita energy consumption have produced a very large national energy appetite. For the first time in its history, the demand for energy in the United States is running substantially ahead of available supply. With less than six percent of the world's population, we consume more than one-third of the world's annual energy production. And by the end of the century, consumption in the United States is expected to triple.

### ENERGY DEMAND: AN ANALYSIS

Projection of the energy requirements and the energy supply for the Nation's economy show that past trends of total supply and consumption are expected to continue. Energy requirements by sector through the year 2000 are summarized below in Table 1., which is taken from United States Energy Through The Year 2000, U. S. Department of Interior, December 1972<sup>2</sup>. Figures are in trillions of Btu.

Table 1.

<u>Sector</u>	<u>1971<sup>1</sup></u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>2000</u>
Household & Commercial . . . . .	14,281	15,935	17,500	18,960	21,920
Industrial . . . . .	20,294	22,850	24,840	27,520	39,300
Transportation . . . . .	16,871	19,070	22,840	27,090	42,610
Electrical Generation . . . . .	17,443	22,410	29,970	40,390	80,380
Synthetic Gas . . . . .	-	-	870	2,670	7,690
<b>Total . . . . .</b>	<b>68,989</b>	<b>80,265</b>	<b>96,020</b>	<b>116,630</b>	<b>191,900</b>

<sup>1</sup> Actual

In Table 2.<sup>3</sup> below the sources of energy and their proportionate contributions necessary to supply the requirements of Table 1. are shown, likewise in trillions of Btu.

Table 2.

<u>Energy Source</u>	<u>1971<sup>1</sup></u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>2000</u>
Coal . . . . .	12,560	13,825	15,140	21,470	31,360
Petroleum . . . . .	30,492	35,090	42,190	50,700	71,380
Natural Gas . . . . .	22,734	25,220	26,980	28,390	33,980
Nuclear Power . . . . .	405	2,560	6,720	11,750	49,230
Hydropower . . . . .	2,798	3,570	3,990	4,320	5,950
<b>Total . . . . .</b>	<b>68,989</b>	<b>80,265</b>	<b>96,020</b>	<b>116,630</b>	<b>191,900</b>

<sup>1</sup> Actual

Not only is energy consumption expected to increase but per capita consumption as well. As Table 3.<sup>4</sup> below shows, net energy per capita almost doubles by the year 2000 and gross energy\* per capita more than doubles.

Table 3.

<u>Year</u>	<u>Net energy per capita</u>	<u>Gross energy per capita</u>
1971 <sup>1</sup>	274.8	333.3
1975	301.2	371.4
1980	330.8	418.5
1985	369.9	479.2
2000	500.9	686.1

<sup>1</sup> Actual

\*The difference between gross energy and net energy represents losses experienced in converting primary energy to secondary energy.

Consumption. In Table 1. direct energy consumption by sectors is presented and totals are equal to gross energy inputs. When electricity and synthetic gas are distributed to the final consuming sectors--household and commercial, transportation, and industrial--the figures are in terms of disposable energy or net energy. These figures can be seen in Table 4.<sup>5</sup>

Table 4.

<u>Consuming sector</u>	<u>1971<sup>1</sup></u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>2000</u>
Household & Commercial . . . . .	17,441	20,175	23,860	27,700	39,630
Industrial . . . . .	22,623	25,860	29,390	34,870	57,780
Transportation . . . . .	16,989	19,090	22,870	27,130	42,660
<b>Total . . . . .</b>	<b>57,053</b>	<b>65,125</b>	<b>76,120</b>	<b>89,700</b>	<b>140,070</b>

<sup>1</sup> Actual

Each of the three consuming sector's demands are summarized below and the primary assumptions of the forecast are set forth. The Household and Commercial Sector energy input is expected to increase from 17,441 trillion Btu in 1971 to 39,630 in the year 2000, an average annual rate of increase of 2.9 percent, as can be seen in Table 5.<sup>6</sup> Expected changes in the energy mix to this sector include the disappearance of coal by the year 2000; petroleum decline over the period from 37.5 percent to 28.1 percent; the decline of natural gas inputs from 42.2 percent to 27.2 percent; the appearance of synthetic gas and a rise of 6.7 percent input by the year 2000; and the significant increase of electricity's share from 18.1 percent to 38.0 percent.

From 1950 to 1970 the use of energy per capita increased at an average annual rate of 2.2 percent. The forecasters projected a

Table 5.

Demand for energy inputs to Household and Commercial Sector: 1971 actual, and projected to the year 2000

	1971 <sup>1</sup>	1975	1980	1985	2000
<b>Fossil Fuels</b>					
<b>Coal<sup>2</sup></b>					
Millions of tons . . . . .	14.6	12	11	4	-
Trillions of Btu . . . . .	390	325	300	100	-
Percent of total <sup>3</sup> . . . . .	2.2	1.6	1.3	.4	-
<b>Petroleum</b>					
<b>Fuel Uses</b>					
Millions of barrels . . . . .	982.4	1,040	1,163	1,347	1,712
Trillions of Btu . . . . .	5,435	5,750	6,440	7,480	9,520
<b>Non-fuel Uses</b>					
Millions of barrels . . . . .	167.2	181	193	199	241
Trillions of Btu . . . . .	1,110	1,200	1,280	1,320	1,600
<b>Total Petroleum</b>					
Millions of barrels . . . . .	1,149.6	1,221	1,356	1,546	1,953
Trillions of Btu . . . . .	6,545	6,950	7,720	8,800	11,120
Percent of total <sup>3</sup> . . . . .	37.5	34.5	32.4	31.7	28.1
<b>Natural Gas<sup>2</sup></b>					
Billions of cubic feet . . . . .	7,125.0	8,400	9,195	9,758	10,475
Trillions of Btu . . . . .	7,346	8,660	9,480	10,060	10,800
Percent of total . . . . .	42.2	42.9	39.7	36.3	27.2
<b>Total Direct Fossil Fuels</b>					
Trillions of Btu . . . . .	14,281	15,935	17,500	18,960	21,920
Percent of total . . . . .	81.9	79.0	73.4	68.4	55.3
<b>Synthetic Gas<sup>2</sup></b>					
Billions of cubic feet . . . . .	-	-	320	940	2,640
Trillions of Btu . . . . .	-	-	320	940	2,640
Percent of total <sup>3</sup> . . . . .	-	-	1.3	3.4	6.7
<b>Electricity Purchased<sup>2</sup></b>					
Billions of Kwhrs . . . . .	926.1	1,242	1,770	2,286	4,417
Trillions of Btu . . . . .	3,160	4,240	6,040	7,800	15,070
Percent of total <sup>3</sup> . . . . .	18.1	21.0	25.3	28.2	38.0
<b>Total Sector Energy Input</b>					
Trillions of Btu . . . . .	17,441	20,175	23,860	27,700	39,630

<sup>1</sup> Actual data.

<sup>2</sup> No non-fuel uses.

<sup>3</sup> Refers to percentage of total energy inputs to sector.

declining rate of increase of per capita energy use in this sector, with an average annual rate of 1.9 percent. This condition is based on two assumptions: 1) the population growth rate will decline from the one experienced over the 1950-1970 period, and 2) an increasingly larger segment of the population will become saturated with central heating and air conditioning and other energy intensive devices. In forecasting consumption of electricity for this sector it was assumed that present trends in electrical home heating and air conditioning would continue to the extent that a declining rate of population growth and home appliance saturation would be offset.

In the Transportation Sector energy input is expected to increase from 16,989 trillion Btu in 1971 to 42,660 in the year 2000, an average annual rate of increase of 3.2 percent over the period, as can be seen in Table 6.<sup>7</sup>

Table 6.

Demand for energy inputs to the Transportation Sector, 1971, actual and projections to the year 2000

	1971 <sup>1</sup>	1975	1980	1985	2000
<b>Fossil Fuels</b>					
<b>Petroleum</b>					
Millions of barrels .....	3,004.9	3,360	3,992	4,739	7,450
Trillions of Btu .....	16,139	18,050	21,440	25,450	40,010
Percent of total <sup>2</sup> .....	95.0	94.6	93.8	93.8	93.8
<b>Natural Gas</b>					
Billions of Cubic feet .....	800	989	1,358	1,591	2,522
Trillions of Btu .....	825	1,020	1,400	1,640	2,600
Percent of total <sup>2</sup> .....	4.9	5.3	6.1	6.1	6.1
<b>Total Fossil Fuels</b>					
Trillions of Btu <sup>3</sup> .....	16,971	19,070	22,840	27,090	42,610
Percent of total <sup>2</sup> .....	99.9	99.9	99.9	99.9	99.9
<b>Utility Electricity</b>					
Billions of Kwhrs .....	5.34	6	9	11	15
Trillions of Btu .....	18	20	30	40	50
Percent of total <sup>2</sup> .....	.1	.1	.1	.1	.1
<b>Total Energy Inputs</b>					
Trillions of Btu <sup>3</sup> .....	16,989	19,090	22,870	27,130	42,660

<sup>1</sup> Actual data.

<sup>2</sup> Refers to percentage of total energy inputs to sector.

<sup>3</sup> Includes coal: 7 trillion Btu.

Few significant shifts in energy inputs are expected in this sector. Trends will remain constant, particularly through 1985, since we are locked into present transportation systems. Long lead times preclude radical shifts and there is little evidence to indicate that the necessary research to accomplish major changes is underway. Barring a major national effort change will be only evolutionary.

Offsetting developments in the automobile mode will be decreased combustion efficiencies due to environmental regulation and a trend toward compact vehicle. Increasing automobile saturation and a declining rate of population growth will also be factors which will retard energy growth in this sector. Shifts from rail and barge to trucks and air will contribute to increasing energy demand in the transportation sector, but the net effect is expected to be a level trend.

In the final consuming sector, the Industrial Sector, energy input is expected to increase from 22,623 trillion Btu in 1971 to 57,780 in the year 2000, an average annual growth rate of 3.3 percent, as can be seen in Table 7.<sup>8</sup>

Expected changes in the energy mix to this sector include the decline in coal's share of energy input from 19.7 percent to 11.6 percent over the period; the slight increase of petroleum's share from 23.8 percent to 25.5 percent; the decline of the natural gas share from 46.1 percent to 31.0 percent; the appearance of synthetic gas will add 4.9 percent; and the significant increase in the electrical sector input from 10.4 percent in 1971 to 27.0 by the year 2000.

Non-energy inputs of fossil fuels to the Industrial Sector is expected to increase from 3 percent in 1971 to 20.9 percent by the



Table 7.

Demand for energy inputs to industrial sector, 1971 actual, and projected to the year 2000

	1971 <sup>1</sup>	1975	1980	1985	2000
<b>Fossil Fuels</b>					
<b>COAL</b>					
Fuel Uses					
Millions of tons .....	159.4	163	168	178	195
Trillions of Btu. ....	4,332	4,450	4,550	4,820	5,300
Non-fuel Uses					
Millions of tons .....	4.9	6	7	12	52
Trillions of Btu. ....	133	150	200	330	1,400
Total Coal					
Millions of tons .....	164.3	169	175	190	247
Trillions of Btu. ....	4,465	4,600	4,750	5,150	6,700
Percent of total <sup>2</sup> .....	19.7	17.8	16.2	14.9	11.6
<b>PETROLEUM</b>					
Fuel Uses					
Millions of barrels .....	569.4	666	750	953	1,310
Trillions of Btu. ....	3,363	3,910	4,410	5,600	7,820
Non-fuel Uses					
Millions of barrels .....	412.6	520	633	710	1,360
Trillions of Btu. ....	2,028	2,600	3,180	3,530	6,840
Total petroleum					
Millions of barrels .....	982.0	1,186	1,383	1,663	2,670
Trillions of Btu. ....	5,391	6,510	7,590	9,130	14,660
Percent of total <sup>2</sup> .....	23.8	25.2	25.8	26.1	25.5
<b>NATURAL GAS</b>					
Fuel Uses					
Billions of cubic feet .....	9,460	10,710	11,394	12,062	16,530
Trillions of Btu. ....	9,753	11,040	11,750	12,440	17,040
Non-fuel Uses					
Billions of cubic feet .....	665	677	730	780	871
Trillions of Btu. ....	685	700	750	800	900
Total natural gas					
Billions of cubic feet .....	10,125	11,387	12,124	12,842	17,401
Trillions of Btu. ....	10,438	11,740	12,500	13,240	17,940
Percent of total <sup>2</sup> .....	46.1	45.4	42.5	38.0	31.0
Total Direct Fossil Fuels					
Trillions of Btu. ....	20,294	22,850	24,840	27,520	39,300
Percent of total .....	89.6	88.4	84.5	79.0	68.1
<b>SYNTHETIC GAS</b>					
Billions of cubic feet .....	-	-	380	1,060	2,860
Trillions of Btu. ....	-	-	380	1,060	2,860
Percent of total <sup>2</sup> .....	-	-	1.3	3.0	4.9
Electricity Purchased					
Billions of Kwhrs .....	682.6	882	1,221	1,843	4,578
Trillions of Btu. ....	2,329	3,010	4,170	6,290	15,620
Percent of total <sup>2</sup> .....	10.4	11.6	14.2	18.0	27.0
Total Sector Energy Input					
Trillions of Btu. ....	22,623	25,860	29,390	34,870	57,780

<sup>1</sup> Actual data.

<sup>2</sup> Refers to percentage of total energy inputs to sector.

end of the century. The sector is expected to become less energy intensive over time for the following three reasons: 1) a change of mix from energy intensive products to less energy intensive products; 2) increased efficiency of energy utilization in the sector; and 3) a shift to electricity with the corresponding shift of losses to the electrical sector.

These are the energy supply and demand balance sheets for the nation's economic future. The suddenness with which the energy crisis has bloomed is vividly illustrated by these projections of consumption, supply, and per capita consumption. The assumptions about population, industrial production, gross national product, fuel availability, and others used in the study are made explicit. "The forecast explicitly takes into consideration all supply limitations for fuels. The forecast is, therefore, a forecast of consumption, not demand."<sup>9</sup> As this report will show, there have now manifest grave supply limitations for fuels. There will doubtlessly be unavoidable reflections in demand.

#### ENERGY SUPPLY: AN ANALYSIS

The nation's primary energy sources are petroleum, natural gas, coal, nuclear, and hydropower. Electricity and synthetic gases are secondary forms. While electricity is the fastest growing energy sector, the contributions of synthetic gases are only token, but are expected to be significant by 1980, as Table 1. shows.

1. Primary Sources of Energy

Hydropower. Hydropower is not expected to contribute significantly to energy growth in the future because of limited available natural sites and very high capital costs of new projects. The share of total energy currently supplied by hydropower is approximately 1 percent and will decline as total energy increases.

Nuclear Energy. Nuclear energy has held great promise since World War II, particularly for the generation of electricity, but has developed slowly for a number of reasons. Because of increasing costs and limited supplies of fossil fuels and increasingly stringent environmental quality criteria, future electric power generation plants are expected to be mostly nuclear-powered. Technical questions concerning the use of nuclear energy which remain not sufficiently answered for much of society include the adequacy of emergency core cooling design and of radiation emission standards, as well as, questions of the disposal of contaminated materials, which would accumulate rapidly as the number of plants in operation increased. Technical improvements such as standardization of reactor components are expected to expedite the development of this energy form in the immediate future.

The breeder reactor and nuclear fusion are developments with future possibilities. Breeders are not expected to be commercially significant before 1990 and fusion is a doubtful contribution until the next century.

Past projections of the role nuclear energy would be playing at this time have been optimistic. Uncertainty in licensing procedures and delays in starting construction for environmental reasons are

significant contributing factors. In Japan it takes about four years from the decision to build a nuclear plant until its completion. The interval is ten years in this country and lengthening. Nuclear power is expected to provide approximately one-half of the nation's electric capacity by the year 2000,<sup>10</sup> and electricity is expected to provide one-half of total energy. Nuclear energy is expected to be the key to the U. S. energy future.

Coal. The role coal has played has shrunk in this century for a number of reasons which fall into two categories -- convenience, relative to substitute fuels, and environmental quality. From providing 70 percent total energy in 1900, this fuel's share has been reduced to less than 20 percent in 1971 and will be further reduced to 16.3 percent by century's end, as can be seen in Table 2.

The conversion by railroads to diesel engines was a large factor. The development of a national network of high-pressure gas transmission lines greatly extended the availability of natural gas, a fuel with many characteristics more desirable than coal, including transportation and other handling characteristics. Organized labor cut its teeth in the coal industry, a factor which made coal less competitive with other fuels. The concern with air quality brought a new wave of conversions from coal. Other environmental quality considerations associated with strip-mining, and continuing mine-safety and labor problems beleaguer the coal industry today. Capital problems plague all energy industries and coal is not different. The supply and demand situations of energy today--called a crisis--is new. It is not clear what "new" role is developing for coal, but the extension of existing trends forward to future years to determine coal's role is folly.

The Federal Power Commission (FPC) released a "Staff Report on the Potential for Conversion of Oil-Fired and Gas-Fired Electric Generating Units to Use of Coal" in September 1973.<sup>11</sup> The Report made the following observations concerning boiler conversions to oil in recent years.

In the eight-year period from 1965 through 1972, as shown in Table 8, 398 coal-fired boilers with a total capacity of 28,785 megawatts (about seven percent of the total generating capacity of the U. S. at this time) converted to the use of oil. Initially, utilities converted to oil for economic reasons. More recently, however, the principal reason for converting to oil has been the requirement to meet strict sulfur emission regulations which the utilities were unable to do using coal. Most of the conversions took place on the East Coast, at plants with easy access to ocean and river barge transport.

The concern is with the increasing dependence upon oil for the generation of electricity. There was introduced in the Congress in late 1973 a bill called the National Coal Conversion Act of 1973, which was sent immediately to the Senate Interior Committee, of which one co-sponsor is Chairman. Major provisions of the bill include:<sup>12</sup>

The bill would authorize the President to require that existing base-load power plants and industrial installations which burn oil or natural gas, and which the Federal Power Commission determines to have the capability to burn coal, must convert to use of coal. The industrial boilers affected would be those with a capacity of 100 million Btu an hour or more. The conversions of existing plants would be required within one year, contingent on the availability of suitable coal and the maintenance of reliable service.

The President would also be authorized to require that plants now being built or planned must have the capability of rapid conversion to all three major fuels, maximize the use of coal as their primary fuel, and comply with the new source performance standards of the Clean Air Act. The President could also require that within five years, all plants subject to the new bill which have a projected useful life of more than 10 years must develop a three-fuel capability and, insofar as possible, use coal as their primary fuel.

Table 8.

ELECTRIC UTILITY BOILER CONVERSION FROM COAL TO OIL <sup>1/</sup>  
1965 - 1972

Year	Number of Boilers Converted from Coal to Oil	Total Nameplate Capacity of Generators Associated with Boilers Converted from Coal to Oil, Megawatts	Associated Generator Nameplate Capacity of Boilers Re-Convertible to Coal, Megawatts <sup>2/</sup>	Associated Generator Nameplate Capacity of Boilers Not Re-Convertible to Coal, Megawatts
1965	9	651.9	35.5	616.4
1966	16	1411.0	375.0	1,036.0
1967	36	1,703.9	1,267.7	436.2
1968	51	2,295.3	1,427.4	867.9
1969	51	5,589.4	5,048.6	540.8
1970	63	4,602.5	4,430.0	172.5
1971	87	7,512.6	6,608.4	904.2
1972	<u>85</u>	<u>5,018.5</u>	<u>3,511.3</u>	<u>1,507.2</u>
TOTAL	398	28,785.1	22,703.9	6,081.2
Percent of Total		100.0	78.9	21.1

<sup>1/</sup> The totals differ slightly from Tables 3(A) and 3(B) because of the 1965 cut-off date. Furthermore, this table aggregates only boilers which were initially converted from coal to oil.

<sup>2/</sup> The electric utilities estimated the total cost of re-conversion at \$106.5 million

The bill would empower the President to direct the Environmental Protection Agency to grant temporary variances from emissions standards--state or federal--for individual existing plants where the only available coal supplies cannot meet the standards, so long as the variance does not violate any national primary ambient air quality standard. Such a variance would be reviewed every 90 days.

The bill also directs the Cost of Living Council to grant automatic increases in the price of coal which reflect on a dollar-for-dollar basis any increases in coal production costs due to the requirements of the bill.

As far as fossil fuel reserves are concerned, it is contended that over 90 percent are coal and that approximately 60 percent of that coal is in the United States. As the demand for energy continues to grow and the costs and availability of alternate fuel restrict their supply, the position of coal in the energy equation will doubtlessly improve.

Petroleum and Natural Gas. Petroleum and natural gas have grown at an astounding rate in the nation in this century. From a combined total of approximately 6 percent in 1900, petroleum products supplied over 44 percent of total energy to the nation in 1971, and natural gas supplies almost 33 percent.<sup>13</sup> In addition to the railroad conversion to diesel and the development of a national network of high-pressure gas-transmission lines, the automobile population explosion and the development of an expanded national fleet of jet aircraft are recent occurrences which have placed tremendous demand on petroleum products. Over the decade 1960-1970, for example, the automobile population grew twice as fast as the human population in this country.<sup>14</sup> The development of a system of super highways, the Interstate System, and other major highway development programs, coupled with the public's desire

for and the auto industry's response with large, inefficient, luxury automobiles, have all conspired to produce a transportation system which has placed enormous demands on the petroleum industry. The recent concern with air quality has caused engine modifications for the purpose of emissions control which, at a time when the number of automobiles was drastically increasing, has resulted in reducing engine efficiency markedly. As was noted in the discussion of the role of coal, conversions from coal for air-quality reasons contributed to expanding the petroleum and natural gas industries. These industries have responded to rapidly growing demand until recently.

When the nation turned to peace-time production following World War II, a great energy demand was produced. The petroleum industry responded and by the mid 1950s began building up substantial excess capacity to produce both domestic and foreign crude. Over this period prices increased, and technological developments occurred in exploration and producing techniques. The search for and development of foreign oil intensified and became so successful that the Federal Government had to restrict the flow of foreign crude into the country to protect the domestic oil producing industry. The oil import program kept domestic crude prices somewhat above the world average until 1973.

Such has not been the case with natural gas, however. New suppliers of domestic gas are almost nonexistent, reserves are rapidly diminishing, and world prices far exceed what Americans are accustomed to paying. The natural gas industry is divided into three distinct parts. Exploration and production has been primarily performed by major petroleum companies. Interstate pipeline companies purchase the gas from major oil companies and transport it across the country.



Distribution companies purchase from the pipeline companies and retail the gas locally to consumers.

Gas is a very clean and therefore desirable fuel. Its price has been held low in relation to its intrinsic value--the cost of alternative fuels--and its demand has been greatly stimulated. The artificially low price, however, severely restricted the petroleum industry's ability to generate the capital required to finance the search for natural gas on a magnitude necessary to keep pace with increasing demand. Production peaked in 1972 and is now on a downward trend. Production has exceeded additions to reserves in the last four years and this trend is expected to continue.

Declining production will be offset somewhat in the late 1970s by the arrival of Alaskan and Artic gas. By 1985 total gas supply will be approximately 78.5 billion cubic feet per day, while potential demand will be 107.0 billion cubic feet per day.<sup>15</sup> Along with Canadian exports, synthetic gas, and liquefied natural gas imports, the Alaskan and Artic gas is expected to contribute about one-half of the total gas supply in the year 2000. Gas energy will be less than 18 percent of total energy at that time, compared with about one-third now, as can be seen in Table 2.

Elsewhere in the petroleum industry the excess capacity to produce both domestic and foreign crude has disappeared quite suddenly and the Nation is struggling to allocate the available supply in a manner which will protect vital activities: employment, space heating during winter months, and mobility. Three major developments are primarily responsible for our position today.<sup>16</sup>

The first development is the rapid growth of petroleum demand in this Country, which in the past 18 months has been at an annual rate of 7%. This is a growth rate 40% higher than the 5% per year average from 1965 to 1971. This accelerated increase in demand was caused by a number of things:

- (a) Increased gasoline consumption,
- (b) An increasing shortage of natural gas,
- (c) New air quality regulations which have restricted the use of coal, our most plentiful energy resource,
- (d) And substantial delays in the startup of nuclear generating capacity.

These last three items, plus restrictions on the use of higher sulfur fuel oil, have caused a significant and to some extent unanticipated increase demand for distillate fuels and low sulfur fuel oil by industrial and utility consumers.

The second development is in the area of refining capacity. In recent years the rate of increase in refining capacity east of the Rockies has been less than half the rate at which product demand have grown. As recently as 1971, there was perhaps 500MB/D spare refining capacity in the U. S. but today all this capacity is being utilized to the extent possible, and the disparity between U. S. product requirements and the capacity of U. S. refineries to make these products has been increasing.

The third major development relating to the current situation is the outlook for crude oil supplies. In the United States, for over a year now, crude production has been at full efficient capacity, and domestic production rates have begun to decline. As a matter of record, domestic crude producing capacity has been insufficient to fill U. S. refineries since 1971. Thus there is today a significant and growing gap between domestic crude oil production and the volume of crude required to fill U. S. refineries.

This gap can be closed only by importing foreign crude. But world demand for oil has been increasing at an even faster rate than in the U. S. as a result, spare producing capacity in the free world has dropped to essentially zero. Further complicating this problem is the fact that the limited spare foreign supplies which may be available are mainly high sulfur heavy crudes, while there are shortages of the lighter low sulfur crudes for which most U. S. refineries were originally designed.

Concurrent with the disappearance of world-wide spare producing capacity, foreign crude prices have risen rapidly; today the cost of foreign crude delivered in this Country is considerably higher than domestic crude. Under Phase IV Rules, this difference is likely to

increase substantially in the future. Finally, political interference with crude oil supply in foreign producing countries has occurred, and we should not assume that this problem will necessarily disappear in the future.

As can be seen in Table 9.<sup>17</sup> below, the nation's petroleum requirements will more than double by the year 2000 and it is expected that domestic production at that time will provide less than 30 percent of the total.

Table 9.

Petroleum	<u>1971</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>2000</u>
Domestic supply . . . . .	22,569	22,130	23,770	23,600	21,220
Percent of total . . . . .	74.0	63.1	56.3	46.6	29.7
Supplemental supplies . . . . .	7,923	12,960	18,420	27,100	50,160
Percent of total . . . . .	26.0	36.9	43.7	53.4	70.3
<b>Total . . . . .</b>	<b>30,492</b>	<b>35,090</b>	<b>42,190</b>	<b>50,700</b>	<b>71,380</b>

## 2. Secondary Sources of Energy

Secondary energy sources are produced by converting primary fuels. Conversion efficiencies for synthetic gas and electricity can be seen in Tables 10. and 14.

Synthetic Gas. Synthetic gas, identified earlier as a supplement to natural gas, is expected to make a significant contribution by 1980, as its input requirements in Table 1. indicate. No more than token production is expected by 1975. Primary energy inputs are petroleum and coal, in the proportions illustrated (in percentages) in Table 11.<sup>18</sup> Petroleum inputs are expected to be converted only as a stopgap effort to head-off the natural gas shortfall, and the long term contributions will be made by gasification of coal. Conversion efficiencies are estimated as 90 percent for petroleum and 70 percent for coal.

Synthetic Gas Primary Energy Input Requirements

Table 10.

	1980	1985	2000
Coal			
Millions of tons	6	26	92
Trillions of Btu	120	600	2,140
Petroleum			
Millions of barrels	6	13	11
Trillions of Btu	40	70	50
Total conversion losses			
Trillions of Btu	170	670	2,190

Table 11.

Year	Petroleum		Coal	
	Inputs to sector	Outputs to consuming sector	Inputs to sector	Outputs to consuming sector
1980	51	57	49	42
1985	25	30	75	70
2000	7	10	93	90

Electricity. Electricity is the most rapidly growing energy sector in both energy output and primary energy input requirements. In 1970 almost 10 percent of the nation's energy input to the consuming sectors was electrical and its generation required 26 percent of gross consumption.<sup>19</sup> The national growth rate for electricity is such that every ten years electric utilities must construct as much new generating capacity as they have built in all their previous history. As was pointed out earlier, over 50 percent of total energy in the year 2000 will be electric and 50 percent of that will be nuclear. Net generation will increase from 1,614 billion kilowatt hours in 1971 to 9,010 in the year 2000, as can be seen in Table 12.<sup>20</sup>

Table 13. shows existing and projected fossil fuel mix for electric generation.<sup>21</sup> While coal is shown capturing almost 70 percent of fossil fuel inputs to the electrical sector, in the year 2000, fossil fuels will provide well under 50 percent of total inputs to the electrical sector by that time. Environmental factors affecting both production and consumption will limit coal's contribution to both secondary energy

Table 12.

Electric Utility Industry - Installed Generating Capacity; net generation and thermal equivalent resource inputs, 1971 actual, and projected to 2000

Period	Installed Generating Capacity - MW	Load Factor	Net Generation Billion KWhrs	Heat Rate Btu/Kwhr	Energy Resource Inputs (Trillion Btu)
<b>1971:</b>					
Fuel burning plants <sup>1</sup> . . . . .	302,810	.50	1,310	10,870	14,240
Nuclear plants <sup>2</sup> . . . . .	8,687	.50	38	10,660	405
Hydropower plants <sup>3</sup> . . . . .	55,898	.55	266	10,494	2,798
<b>Total . . . . .</b>	<b>367,395</b>	<b>.51</b>	<b>1,614</b>	<b>10,807</b>	<b>17,443</b>
<b>1975:</b>					
Fuel burning plants . . . . .	350,000	.50	1,540	10,575	16,280
Nuclear plants . . . . .	50,000	.55	240	10,660	2,560
Hydropower plants . . . . .	80,000	.50	350	10,200	3,570
<b>Total . . . . .</b>	<b>480,000</b>	<b>.51</b>	<b>2,130</b>	<b>10,560</b>	<b>22,410</b>
<b>1980:</b>					
Fuel burning plants . . . . .	445,000	.50	1,950	9,875	19,260
Nuclear plants . . . . .	120,000	.60	630	10,660	6,720
Hydropower plants . . . . .	95,000	.50	420	9,500	3,990
<b>Total . . . . .</b>	<b>660,000</b>	<b>.52</b>	<b>3,000</b>	<b>9,990</b>	<b>29,970</b>
<b>1985:</b>					
Fuel burning plants . . . . .	580,000	.50	2,540	9,575	24,320
Nuclear plants . . . . .	215,000	.60	1,130	10,400	11,750
Hydropower plants . . . . .	120,000	.45	470	9,200	4,320
<b>Total . . . . .</b>	<b>915,000</b>	<b>.52</b>	<b>4,140</b>	<b>9,760</b>	<b>40,390</b>
<b>2000:</b>					
Fuel burning plants . . . . .	720,000	.45	2,840	8,875	25,200
Nuclear plants . . . . .	960,000	.65	5,470	9,000	49,230
Hydropower plants . . . . .	200,000	.40	700	8,500	5,950
<b>Total . . . . .</b>	<b>1,880,000</b>	<b>.58</b>	<b>9,010</b>	<b>8,920</b>	<b>80,380</b>

<sup>1</sup> Fuel burning plants include steam, internal combustion, and gas turbine plants. Heat rate based on energy inputs to all fuel burning plants.

<sup>2</sup> Energy input for nuclear power converted at an average heat rate based on AEC data for projected nuclear plant mixes.

<sup>3</sup> Hydropower plants include hydro and pumped storage plants. Converted to theoretical energy inputs on the basis of national average heat rates for fossil-fueled steam-electric plants.

Table 13.

Fossil fuel inputs to the electrical sector, 1971 actual, and projections to the year 2000

	1971	1975	1980	1985	2000
<b>Coal</b>					
Million short tons . . . . .	331.6	384	460	613	755
Trillion Btu . . . . .	7,698	8,900	10,660	14,220	17,520
Percent of total . . . . .	54.1	54.7	55.3	58.5	69.5
<b>Petroleum</b>					
Million barrels . . . . .	386.9	573	800	1,064	307
Trillion Btu . . . . .	2,417	3,580	5,000	6,650	5,040
Percent of total . . . . .	17.0	22.0	26.0	27.3	20.0
<b>Natural gas</b>					
Billion cubic feet . . . . .	4,000	3,686	3,492	3,346	2,561
Trillion Btu . . . . .	4,125	3,800	3,600	3,450	2,640
Percent of total . . . . .	28.9	23.3	18.7	14.2	10.5
<b>Total</b>					
Trillion Btu . . . . .	14,240	16,280	19,260	24,320	25,200

Source: FPC

sources--synthetic gas and electricity--unless significant progress is made. Supply factors will obviously restrict the availability of natural gas for electrical generation. Environmental factors, economic forces, and shortfalls of natural gas explain the prospect of a large growth of petroleum inputs to electric generation.

Conversion losses from the electrical sector are shown in Table 14.<sup>22</sup> Caution is necessary in interpreting these figures. Hydropower losses are the result of the convention of converting this power to an equivalent fossil fuel base. They do not exist. Since there is no opportunities cost for nuclear fuels--no alternative application--these conversion losses cannot be avoided if the plants are built. Only the fossil fuel conversion losses are true losses, since here an alternative direct application could have prevented the loss. As is shown in Table 14., conversion losses from fossil fuel inputs are expected to decline to 31.2 percent by the year 2000.

Table 14.

Conversion losses for the electrical sector, 1971 actual, and projections to the year 2000

	1971	1975	1980	1985	2000
Fossil fueled plants					
Trillions of Btu	9,771	11,030	12,600	15,660	15,510
Percent of total	81.9	72.9	63.9	59.6	31.2
Hydropower plants					
Trillions of Btu	1,889	2,380	2,550	2,720	3,560
Percent of total	15.8	15.7	13.0	10.4	7.2
Nuclear plants					
Trillions of Btu	276	1,730	4,570	7,890	30,570
Percent of total	2.3	11.4	23.1	30.0	61.6
Total conversion losses					
Trillions of Btu	11,936	15,140	19,720	26,260	49,640

### 3. Other Supply Factors

From the above discussion of the nation's sources of primary energy -- hydropower, nuclear, coal, petroleum, and natural gas -- it is easy to see that increasingly the supply of any of them or therefore, secondary sources, without increasing imports is hardly possible. One study of the short-term prospects for energy growth, Energy In The Near Term, by Dr. Otto H. Zinke, a study supported by the State of Arkansas and the Ford Foundation, concludes that "energy growth in the United States has ended or will soon end," and advances March 1973 as the suggested date.<sup>23</sup> Locked into a pattern of energy supply that is not immediately alterable, Zinke conclude that 1) anticipated energy shortages and efforts to minimize environmental impact have resulted in complete dependence upon petroleum products for energy growth; 2) limited refinery capacity -- fixed for the next four years -- places the dependence on petroleum products on imported petroleum products; and 3) the import rate of refinery products either has or will level.

The consequences of the end of the growth, according to Zinke, will be unemployment at the rate of at least one million jobs additionally every year. Zinke defined the near term, that period of time over which nothing can be done to alter our supply, in terms of events and developments, not just years, as can be seen below.<sup>24</sup>

Technology determines the type and amount of energy available to society for its use in any particular period. "Available energy technology" will be defined here as the type and number of facilities for the gathering, conversion, transportation, and consumption of energy. Such technology is responsible for the facilities already in operation within a given period and for the facilities which may be built within that period. Availability is determined by economic restrictions and acceptable environmental impact. The "near term" as defined

here is also that period where availability means that the energy facilities are already built or are under construction. Thus, the near term is a period of time in which the fuels available to society are relatively fixed, and energy production and consumption can be predicted with considerable confidence given assumptions concerning the economic health of the country.

Available energy technology is a sweeping term which can include numbers and types of such diverse facilities as oil wells, coal mines, uranium mines, electric power lines, coal cars and railroad lines, oil tankers, deep-water ports, nuclear reactors, coal-electric converters, commuter trains, and dams. It may also include building insulation, air conditioning, building and water-heating units. If the various forms of available energy technology are examined, particularly in view of production of fuels, the near term seems to be no shorter than three years and possibly as long as five to seven years. The thesis developed here is that the principal item in the gathering, conversions, and distributions which could shorten the near term is the construction of refineries, together with the development of a concomitant ability to supply the refineries with crude, either through developing additional U. S.--controlled oil resources or through imports.

Since the near term cannot be longer than the period where energy facilities are available or being constructed, so-called exotic fuels can offer no relief. Solar energy, geothermal energy, and fusion are all from 10 to 20 years away. Fast breeders are as distant. Oil shale conversion, coal gasification, and desulphurization of coal and oil, are probably 7 to 10 years off. Irrespective of the estimates which are made of the future availability of these processes, they simply cannot be considered as factors in any realistic energy estimates until such time as full-sized plants are operating within applicable economic and environmental restrictions.

Legislation should not be framed which depends on unavailable energy technology. Stringent restrictions on energy technology which cannot be fulfilled by current technology but which are nevertheless made mandatory may cause unexpected and nationally damaging excursions in fuel-use patterns. The State Implementation Plans for the 1970 Clean Air Act are an example. Those plans have caused a switch of electrical burners from domestically available coal to oil, principally in the form of oil product imports. Last year 61 coal-electric burners in the Northeast Region switched to oil. Legislation which requires technology beyond that presently available should always first provide for the development of that technology before imposing restrictions based upon it.



#### 4. The New Economics of Petroleum Imports

Earlier in this Report it was stated that the exploration and development of foreign crude oil by U. S. petroleum companies during the 1950's was so successful that it became necessary to restrict the flow of foreign crude to protect the domestic industry. The oil import program kept domestic crude prices somewhat above the world average until 1973. Consequences of the growing dependence of the United States on foreign petroleum in recent years were forewarned by The Chase Manhattan Bank in Outlook for Energy in the United States to 1985, released in June of 1972.<sup>25</sup>

Currently, the cost of imported petroleum amounts to approximately 4 billion dollars per year. That outflow is more than offset by the repatriated earnings of American petroleum companies operating abroad and the funds derived from the export of related technology and equipment. If the United States is forced to import the amounts of oil and natural gas indicated earlier the necessary outflow by 1985 is likely to be in excess of 30 billion dollars per year. In no sense would it be realistic to expect that the outflow of dollars would be offset by a corresponding inflow. Indeed, the annual balance of payments deficit for petroleum alone could be as much as 25 billion dollars-- a deficit the nation could not tolerate. It could possibly be even greater if foreign producing countries raise their prices more than presently estimated. As a major importer of necessity and with no ready alternatives, the United States would have virtually no bargaining power and would be forced to pay almost any price demanded by the producing countries.

"Almost any price demanded" is apparently what petroleum consuming nations will be expected to pay very soon. The year 1973 was a quantum leap-year in world petroleum "economics". Economics is no longer the proper scientific context because supply and price, economic variables, are related more to international politics than other economic variables. After successive production reductions late in the year, the Arab nations placed a full embargo in effect against the allies

of their enemy, Israel. The world posted oil price, \$2.59 in January 1973, is \$11.65 by December 1973.

This report does not purport to assess in any detail the developing phenomena set out above. The purpose here is to indicate the drastic change--direction, not magnitude--that has recently occurred and is occurring in foreign petroleum supply and demand. What is now clear to even the most casual observer is that the era of abundant and low-cost energy is ended.

#### PROSPECTS FOR SOLUTION OF THE U. S. ENERGY CRISIS

The term crisis when associated with the continued supply of usable energy has been given wide application recently. The validity of the application apparently rests on two conditions. First, the difference between a shortage of energy and an energy crisis appears to be one of degree. Criteria for the distinction should be whether or not vital activities of society are threatened. Second, since the supply of energy cannot be instantly increased, the lead time necessary to increase supply must be available to allow concomitant increases in supply for anticipated increases in demand. If the necessary time is not available then a shortage or crisis in the supply of energy will occur at a future point in time. The determination of which activities are vital depends to a great extent upon who is making the determination. Tourism is an industry which would be difficult to relate to national defense but it is an industry which employs thousands of people, large numbers of whom would become job-less if that industry was contracted significantly. Residential space-heating fuel supply is vital to both

residents and fuel jobbers.

The automobile manufactures and the airline companies have both laid-off --"furloughed"-- significant numbers of employees. Other industries and employees are threatened with similar actions. The available supply of energy cannot be appreciably increased in the "near term".

There are a number of factors upon which the "solution" to the energy crisis will depend which are not discernable at the time which this report is being prepared. The timely development of a national energy policy and programs necessary to ameliorate the crisis conditions in energy are necessary. The necessary investment in the production of natural gas and petroleum must be made. The supply of foreign petroleum depends upon unpredictable and uncontrollable factors. The change in demand corresponding to changes in energy prices and availability are not known. The following assessment of prospects for the solution of the crisis will therefore be made based upon available information.

Petroleum. The nation has become very dependent upon petroleum products for energy and energy growth. As can be seen in Table 9. the percentage of domestic supply of petroleum products was 74 in 1971 and is expected to fall to 29.7 by the year 2000. More importantly, the table shows that domestic supply will decline from 22,569 trillion Btu in 1971 to 22,130 in 1975 and rise only to 23,770 by 1980. The lack of investment in both domestic crude production and refinery capacity is evidenced in these projections and stated explicitly in the preceding section on petroleum supply.

The availability of foreign petroleum products and crude is not clear. Production cutbacks, embargos, and drastic changes in price will drastically effect petroleum demand as retail prices rise. While Middle East nations provide only 6 percent of the U. S. imports of crude, they also provide the crude to countries from which the U. S. has received refinery products. An assessment of the possible effects of the embargo appeared in an energy newsletter by Cyrus J. Lawrence:<sup>26</sup>

- 1) U. S. shortfall of 4.0 million barrels per day (mb/d) by February 1, 1974 or 22 percent of 1974 assumed winter demand.
- 2) Gas rationing by January 1974 (14 gallons per week per car).
- 3) Choice between America's economic security and Israel's military security will be the former and Israel will be told to obtain best terms possible that will include the resupply of oil to the world.
- 4) Volumes equal to exports at the time of embargo will be restored at approximately mid-May 1974, after the embargo is lifted in April/May 1974.
- 5) There will be a three or four month lag before full product availability is achieved at the fingertips of U. S. distribution system.
- 6) Inventories will be at minimum levels for possibly years; the U. S., Europe and Japan will be kept on a short political/economic leash with no chance to build an economic cushion.
- 7) It is estimated that Saudia Arabia will only immediately return to the 8.3 mb/d level obtaining prior to the embargo, and not to the 9.5 mb/d goal planned by the companies for early 1974.
- 8) In regulating future growth it is believed that Arabian American Oil Company (Aramco) will be limited to 12 or 13 percent per year instead of the normal (and projected) 25 to 28 percent per year.
- 9) Crude oil should continue to be in tight supply even after the embargo is lifted and the political power of oil will continue to play a persuasive role for consuming countries.

Natural Gas. Produced by major oil companies natural gas production suffers from the same lack of investment as other petroleum products. With a potential demand of 107 billion cubic feet per day in 1985, the supply is expected to be 78.5 billion cubic feet per day. The contribution of synthetic gas from coal and petroleum is expected to become significant by 1975.

Coal. As has been stated earlier our most abundant fossil fuel resource is coal. The lack of demand for coal has caused the role of this fuel to become greatly contracted. Increased demand is expected to reverse this trend. The rate at which the supply of coal will increase will depend upon 1) the pressure of demand for coal; 2) the ability of the industry to attract capital; 3) environmental accommodation; 4) labor and mine safety problems; and 5) the response by the railroads to the increased demand for coal handling.

Nuclear Power. The potential of this energy form is expected to be realized beginning immediately. By the year 2000 nuclear power is expected to provide one-half of the nation's electric capacity and electricity is expected to provide one half of total energy. The contribution of the breeder reactor and fusion are expected to begin after 1990.

Hydropower. Hydropower is not expected to contribute to energy growth in the future because of limited available natural sites and the high capital costs of new projects.

Solar Energy. The following assessment of solar energy appeared in September 1972.<sup>27</sup>

In discussing solar energy it is important to distinguish between using the sun's energy to generate electricity and using solar energy directly to heat and cool buildings

and to heat water. The former depends on a relatively advanced technology that is not yet economically feasible. The latter, on the other hand, has long been used to meet some of man's energy needs. This section focuses on the use of solar energy directly for heating. Not only does this appear to be technically and economically feasible, it also holds the promise of substantially reducing demands for conventional energy sources.

Solar energy is abundant but diffuse. Thus, relatively large collecting areas are needed for capturing meaningful quantities of energy. Typical collecting areas for heating water in Florida for a one-family residence are of the order of 56 ft<sup>2</sup> (4 x 14 ft). For space heating in Washington, D. C., the collecting area would be of the order of 800 ft<sup>2</sup> per family. Since the energy is available only during sunny days but is wanted for use at night and on cloudy days as well, it must be stored for subsequent use. (Typically, it is stored as hot water in a large tank.) Also, some means must be provided for transferring the stored energy to where it is needed. Solar energy use, therefore, involves collection, storage, and energy transfer.

Commercial solar water heating units can be purchased in certain parts of the country (e.g., Florida). Solar energy for space heating has been used---primarily for experimental or demonstration purposes---in about a dozen houses across the United States. The use of solar energy in air conditioning, however, is still in the early experimental stages. It has been used in one office building in Albuquerque, New Mexico but has not been applied to a residence, although there are no theoretical reasons why it could not be. Until the present, interest in making use of solar energy for such purposes has not been widespread in the United States. There are a number of reasons, one of the most important being the low cost of other available fuels. Others include the unpredictability of the supply of sunshine, which requires that auxiliary sources of conventional energy must be provided for use during long spells of cloudy weather, and the fact that solar space heating and cooling systems are not commercially available. Also, houses making maximal use of solar energy must literally be designed around the concept, which tends to place restrictions on the shape of the house, its orientation on the lot, its relationship to neighboring structures, and its architectural style. These restrictions will undoubtedly limit their acceptability among house buyers who are likely to more concerned with other factors such as appearance, suitability to family needs, and eventual resale value. Future advances in the cost of conventional sources of energy and public acceptance of the concept of solar houses could change this assessment. The process of increasing acceptability could be hastened by state and federal government encouragement to use solar heating devices.

With the prices of alternative sources of energy on the increase solar energy is expected to become more attractive rapidly. Space heating units are expected to be commercially available by 1975.

Other "Exotic" Energy Forms. The term exotic has been applied to forms of energy different from those in use today. With the exception of solar, the others -- geothermal, wind, and tidal -- are not expected to make a contribution in the foreseeable future for a variety of reasons including technological, limitations of natural sites, other environmental, and potential of the source.





### III. NORTH CAROLINA AND THE ENERGY CRISIS

With the exception of hydro electric power generation, which provides about one percent of the State's energy, North Carolina is entirely dependent upon external sources of energy. As the Nation goes, so goes the State, as far as energy is concerned. It has been shown that the U. S. cannot appreciably increase energy supply over the near term. Since North Carolina imports virtually all of her primary energy sources, it follows that there are no actions available to the State which would result in increased supply.

Since supply will not be equal to potential demand, some demand will go unmet. Which demands should not be met in a socio-political-economic system such as ours cannot be left to market forces entirely. The available supply of energy to the State must be effectively managed to protect vital activities.

In the preceding section the expected growth in the national economy was set forth. We have a vigorous economy. The State economy is likewise vigorous and will require large quantities of energy to maintain its vigor. The ability to effectively manage available energy supply is essential.

A summary of the energy sources and distribution patterns of North Carolina follows. The difficulty with constructing accurately where our energy comes from and how we use it is a reflection of the era of plentiful, low-cost energy which has ended. The energy accounting and monitoring of energy flows necessary to permit detailed analysis was not necessary when the nation operated from an energy surplus.

Petroleum. The flow of petroleum is particularly difficult to summarize because of the tremendous number of retail marketers, oil jobbers, and major oil companies operating in the State. The petroleum industry is structured roughly as follows: crude production, refining, distribution, and marketing. Among major

oil companies, a single company may be involved in each step: producing or buying from independents its crude requirements; refining or importing its product for its brand marketers and perhaps selling its surplus to "independent terminal suppliers"; transporting its product to marketers; and finally marketing its product. There are also independent producers, independent refiners, independent terminal suppliers, and independent marketers. The last two--independent terminal suppliers and independent marketers--are frequently related as "chain wholesalers" or "jobber retailers". These independents haul from bulk storage terminals to their retail stations (including heating fuel oils in this operation, as local distributor).

Taxes paid on motor fuels provide a close approximation of certain fuels requirements in the State. During the fiscal year ending June 30, 1970 road taxes were paid in North Carolina on gasoline and special fuels (diesel, kerosene) totaling 3,006,417,200 gallons; ending June 30, 1971: 3,099,118,400; ending June 30, 1972: 3,294,382,000. According to Mr. Fred London, N. C. Department of Revenue, Gas Tax Division, the North Carolina taxpaid fuel market is shared as follows: Exxon: 14.14%; Gulf: 8.07%; Texaco: 7.9%; Shell: 6.55%; American: 6.53%; Phillips: 5.4%; Union: 4.74%; Cities Service: 2.26%; Sunoco: 2.04%; and others doing less business. According to Mr. Carl Lowendick, Executive Director of N. C. Petroleum Council, each major company's prospects are different with respect to 1) firm crude and 2) refinery capacity. Conditions have greatly changed in both crude and product imports since these data were compiled and these changes are expected to affect each company differently. British Petroleum and Atlantic Richfield have left the North Carolina market.

North Carolina annual petroleum consumption for 1971 and 1972 and the percentage of change in each product between those years appear in Table 15. This table was prepared by the North Carolina Oil Jobbers Association from data compiled by the U. S. Bureau of Mines.

Most petroleum products are under federal mandatory allocation programs as is explained in Section IV and VI.

Natural Gas. Natural gas comes into the State by interstate pipeline from the gas-producing states on the Gulf of Mexico. The pipeline, operated by Transcontinental Gas Pipe Line Corporation (Transco), continues northward to the Northeastern United States. Transco is the only pipeline providing natural gas to North Carolina gas distributing companies and has been unable for several years to meet its contractual obligations to its North Carolina customers due to the nationwide shortage of natural gas.

Since 1971 Transco, pursuant to agreement between the Federal Power Commission and all of its distribution customers, has been operating under an interim curtailment program whereby all distribution customers regardless of their location on the pipeline have been curtailed ratably, that is all distribution customers have received the same percentage curtailment of their annual contractual volumes of gas.

In early 1973 Transco filed its request with the Federal Power Commission to extend for one year until November 15, 1974 the interim curtailment plan which had been working well since 1971. The Federal Power Commission denied Transco's application for extension of the plan and directed that Transco file by July 1, 1973 a curtailment plan based upon so called end use of natural gas. Under such a plan Transco's distribution customers would be curtailed depending upon the use their individual customers make of the gas. The end use plan provides for nine categories of customers with the interruptible customers being curtailed first and residential customers being curtailed last. Because of the mild climate of North Carolina, the historical development of gas service to consumers and because of the lack of underground storage, the impact of an end use curtailment plan would drastically affect sales to interruptible industrial customers in this State and the loss of

TABLE 15.

NORTH CAROLINA ANNUAL PETROLEUM CONSUMPTIONS

(U. S. Bureau of Mines, Annual Reports, 1971 and 1972)

<u>FUEL</u>	<u>1971</u> <u>Gallons, Thousands</u>	<u>1972</u> <u>Gallons, Thousands</u>	<u>Percent</u> <u>Change</u>
Gasoline	2,572,506	2,793,722	+ 8.6
Kerosene (Heating)	416,640	354,606	-15.0*
No. 1 Fuel	47,586	41,874	-12.0*
Kerosene (Non-Heating)	47,501	45,570	- 4.1*
No. 2 Oil & Diesel:			
Heating	464,352	452,676	- 2.5*
Industrial	45,990	107,646	+134.0
Oil Company Use	3,024	1,680	-44.0
Electric Utilities	41,496	49,224	+18.6
Railroads	70,644	66,360	- 6.0
Vessels	3,864	3,486	- 9.8
Military	11,046	13,608	+23.2
On-Highway	173,040	183,414	+ 6.0
Off-Highway	28,182	30,240	+ 7.3
All Other	17,178	15,582	- 9.3
Total No. 2 & Diesel	858,816	923,916	+ 7.6
No. 4 Residual Oil (Htg.)	1,176	1,470	+25.0
No. 5 Residual Oil (Htg.)	39,102	42,840	+ 9.6
No. 6 Residual Oil (Htg.)	36,960	33,978	- 8.9
Non-Heating Nos. 5 & 6 Oils			
Industrial	284,172	400,428	+40.9
Electric Utilities	55,062	170,016	+209.7
Vessels	3,192	3,276	+ 2.6
Military	2,856	2,100	-27.5
Oil Company Use	1,932	1,722	-10.9
Railroads	294	210	-28.6
Other Uses	14,616	14,322	- 2.0
Total <u>All 4, 5, &amp; 6 Oil</u>	439,362	670,362	+52.6

\*Reflects Less Degree Days (Warmer Weather)  
 Adjusting for climate, No. 2 Oil (Heating) would be + 9.7%  
 Kerosene (Heating) would be -3.0%.

such sales would have an economic impact on the residential, commercial and firm industrial customers of this State. At his appearance before the Federal Power Commission in Washington in September of 1973 Governor Holshouser summarized the potential impact of the FPC end use plan as follows (See Appendix C).

"Preliminary estimates indicate that if this permanent curtailment plan goes into effect in November of this year, the curtailment of gas to consumers in North Carolina will increase from 7.4 to 38.3%, if the priorities 6-9 as established by the Federal Power Commission are interrupted completely on an annual basis. The impact of such a plan would require large volume consumers of gas in North Carolina to obtain 364,000,000 gallons of oil or propane over and above the amount of oil and propane necessarily purchased in the past to compensate for the 7.4% curtailment under the interim plan. Total requirements for heating oils and propane for use within the State of North Carolina are projected at 1.5 billion gallons during the next 12 months. Therefore, the addition of 364,000,000 gallons of oil or propane as a substitute for gas removed under the proposed curtailment plan would represent an increase of 25% in the requirements of North Carolina for these alternate fuels. Because all petroleum products are in extreme short supply, the procurement of an increased requirement of this magnitude is completely unrealistic, even assuming transportation and storage problems could be solved.

"If the approximately 200 consumers using gas in priority 6-9 are, in fact, interrupted completely and if alternate fuels are not available, as is clearly indicated at this time, this would necessarily result in the closing of plants, unemployment and all other related economic and social problems which would naturally follow.

"If this permanent plan is approved as proposed, and additional loss of gas volumes occurs in North Carolina, the resulting economic burden on the residential

and commercial gas consumers would be substantial, as they would be required to make up for the loss of revenue as a result of curtailment if gas utilities in North Carolina are to earn their legitimate or a fair rate of return on their property investments committed to the public service.

"The State of North Carolina is itself a substantial purchaser of gas for its institutions, including governmental buildings, schools, mental hospitals and prisons. This use is exclusively related to critical human needs including heating and preparation of food. Notwithstanding this, the fuel requirements of some of these institutions, under valid interpretations of the plan, fall in priorities 6-9, and if these institutions are deprived of their historical gas supplies and cannot obtain the additional volumes of alternate fuel necessary, it would place the State of North Carolina in an untenable position."

Transco filed a new request to extend the interim curtailment program now in effect until the Federal Power Commission can hold hearings to determine the effect on Transco's customers of the end use curtailment program recommended by the Federal Power Commission. The FPC attempted to place the end-use plan in effect in mid-November 1973 but a stay was granted by the courts on procedural grounds. Hearings are to be held in January 1974 which will remove the procedural impropriety upon which the stay was granted.

Faced with drastic reduction in industrial gas supplies, the North Carolina Utilities Commission, which regulates intra-state gas, is developing emergency procedures for allocation of natural gas which are designed to effect conservation in the use of gas.

Coal. Coal is used primarily in boiler-fired utility and industrial plants and has been available in amounts and characteristics (sulphur content) demanded. The national demand for coal is expected to drastically change, as described in

the previous section, and the effect that increased national demand will have on the North Carolina supply is not clear.

Electricity. The Nation's electric growth rate is such that electric capacity doubles every ten years. In North Carolina capacity is doubling every seven years. The State is served by four Class A Companies which serve 99% of the customers in the State, and by seven smaller companies.

The capacity of Carolina Power and Light Company (CP&L), Duke Power Company (Duke), and Virginia Electric and Power Company (VEPCO) appear in Table 16, below.

	Total Power Resources (Mega Watts)	Anticipated Peak (Mega Watts)	Reserves (Mega Watts)	Percent Reserves
CP&L	5509	4717	792	16.8
Duke	9128	8101	1027	12.7
VEPCO	8258	7010	1248	17.8

Caution should be exercised in interpreting the data on reserves. The Federal Government could direct coal for the generation of electricity to other areas. The Federal Power Commission may direct power from one area to other regions which are experiencing severe shortages.

The 1972 generation estimated from plant heat rates and fuels consumption for CP&L and Duke appear in Tables 16 and 17. The 1972 estimated generation by fuels appears as Table 18. Of the total electrical energy output in 1972, only 0.93% of CP&L's generation and 2.14% of Duke's generation were produced with internal combustion peaking units.

TABLE 16.

1972 GENERATION ESTIMATED FROM PLANT HEAT RATES  
AND FUELS CONSUMPTION

Duke Power Company

<u>Plant</u>	<u>Type</u>	<u>Avg. Heat Rate</u>	<u>MWh</u>		
			<u>Coal</u>	<u>Gas</u>	<u>Oil</u>
Riverbend	Combined Cycle	10,605	3,150,307	506,683	403,146
Buck	Combined Cycle	10,814	2,282,060	496,948	105,796
Dan River	Steam	10,348	1,942,181	-	-
	I C turbine	15,459	-	28,037	101,979
	Diesel	11,215	-	-	12,200
Cliffside	Steam	10,271	3,607,205	-	-
Tiger	Steam	31,113	13,660	-	-
Lee	Steam	10,038	2,474,180	136,181	-
	I C turbine	16,515	-	120,866	69,232
Allen	Steam	9,332	8,089,597	-	-
Marshall	Steam	8,760	13,863,199	-	217,918
Urquhart	I C turbine	17,525	-	127	14,832
Greenwood	Steam	14,038	-	76,743	81,716
Buzzard Roost	I C turbine	15,342	-	345,090	174,226
	Steam	18,455	65,772	-	-
Various Small Plants	Hydro			1,960,677	



TABLE 17.  
1972 GENERATION ESTIMATED FROM PLANT HEAT RATES  
AND FUELS CONSUMPTION

Carolina Power and Light Company

<u>Plant</u>	<u>Type</u>	<u>Avg.</u> <u>Heat Rate</u>	<u>Nuclear</u>	<u>MWH</u>		
				<u>Coal</u>	<u>Gas</u>	<u>Oil</u>
Cape Fear	Steam	9,959		2,105,601	-	5,426
	I C turbine	16,363		-	-	26,040
	(heat recovery)	-		-	-	7,346
Weatherspoon	Steam	11,103		529,005	273,643	3,796
	I C turbine	15,321		-	20,769	57,496
H. F. Lee	Steam	10,094		2,088,704	72,097	9,701
	I C turbine	15,903		-	136	47,585
L. V. Sutton	Steam	11,013		375,934	113,405	1,591,921*
	I C turbine	19,538		-	82	9,545
H. B. Robinson	Steam	10,588		587,241	96,739	11,804
	Nuclear	10,982	4,828,594	-	-	-
	I C turbine	21,003		-	1,259	512
Asheville	Steam	9,585		2,298,962	-	8,467
Roxboro	Steam	9,461		6,410,730	-	14,401
	I C turbine	18,622		-	-	1,648
Morehead	I C turbine	19,864		-	-	1,010
Blewett	I C turbine	15,858		-	-	43,439
Various Small Plants	Hydro				881,985	

\* Largely residual oil instead of No. 2 fuel oil.

TABLE 18.

ESTIMATED 1972 GENERATION BY FUELS

<u>Type</u>	<u>Fuel</u>	<u>CP&amp;L</u>		<u>Duke</u>	
		<u>MWH</u>	<u>%</u>	<u>MWH</u>	<u>%</u>
Hydro	-	881,985	3.92%	1,960,677	4.86%
Nuclear	-	4,828,594	21.44%	(None until 1973)	
Fossil Steam	Coal	14,403,523*	63.94%	35,488,161	87.97%
	Resid. Oil	1,591,921	7.07%	-	-
	Light Oil	53,595	0.24%	808,576	2.02%
	Gas	555,884	2.47%	1,216,555**	3.02%
I. C. Peaking Units	Gas	22,246	0.10%	494,120	1.22%
	Oil	<u>187,275</u>	0.83%	<u>372,532</u>	0.92%
Total		22,525,023		40,340,621	

\* Includes 7346 MWH of heat recovery.

\*\* Includes combine cycle generation.

#### IV. SUMMARY OF FEDERAL ACTIONS

The suddenness with which the energy crisis has become a reality has caused a great deal of accelerated action at the national level which is intended to both manage available supply and find ways to increase it. A brief summary of the more salient actions appear in this section.

##### 1. Legislative Bills Passed.

Emergency Petroleum Allocation Act of 1973. This Act was signed by the President on November 27, 1973 and requires the allocation of crude oil, residual fuel oil, and refined petroleum products manufactured in or imported into the United States with certain exceptions for some special products or limited use products such as petroleum coke and asphalt. The law requires allocation to users of petroleum products throughout the distribution chain on an equitable basis wherever practicable. It is intended that all regions and economic sections receive equitable shares of available fuels and that this be achieved primarily at the wholesale level.

Accordingly, neither the Emergency Petroleum Allocation Act of 1973 nor the regulations issued pursuant to that Act specify rationing to end-users; instead, firms or corporations which act as suppliers or middle men are required to distribute their available products equitably to end-users in accordance with the objectives of the Act.<sup>1</sup>

Permanent Daylight Savings Time. President Nixon December 15, 1973 signed into law a bill (HR 11324) which will establish year-round daylight saving time beginning Sunday, January 6, 1974. Clocks will be advanced one hour at 2 a.m. January 6. Under Public Law 93-182, DST will continue through October 1975.

The President has estimated that this measure will save the equivalent of 150,000 barrels of oil daily. Daylight saving time throughout the year, President

Nixon said, "will mean only a minimum of inconvenience and will involve equal participation by all." The President will have the authority to exempt any state if the Governor shows DST would work undue hardship, or that remaining on standard time during the winter months would save more fuel. States split by two time zones will be allowed to exempt one zone so that the entire state could remain on the same time. The law automatically exempts Indiana and Hawaii. Governor Holshouser decided that N. C. did not have a case for exemption.

The U. S. has not been on year-round DST since World War II.<sup>2</sup>

Maximum Highway Speeds Set at 55 MPH. President Nixon signed into law January 2 legislation establishing a uniform maximum highway speed limit of 55 miles per hour. States failing to lower speed limits to 55 mph could lose federal highway trust funds.

In a statement from San Clemente, Calif., the President said the law would aid in reducing gasoline and diesel fuel consumption and notes that observing a national speed limit of 55 mph could save nearly 200,000 barrels of fuel daily. While 55 mph is the maximum speed that states can set for highways, under the new law state governors will be able to set speed limits even lower. The new law provides for expenditures of up to \$1 million for programs to encourage carpools. It also calls for a report by the Department of Transportation on the effectiveness of carpooling.<sup>3</sup>

## 2. Pending Legislation.

National Emergency Petroleum Act of 1973 (S2539). House and Senate conferees reached agreement December 19, 1973 on a compromise bill giving the President greater authority to impose additional energy conservation measures to restrict consumption. The conferees met until midnight on December 18 to iron out differences in an attempt to have the legislation on President Nixon's desk before Congress adjourned.

for the holidays. The conferees agreed to give the President unlimited authority to impose gasoline rationing without the consent of Congress. However, all other conservation measures ordered by the President would be subject to veto by either House. Under the agreement, the President would be allowed to institute conservation provisions until June 30, and they would be subject to veto after that time.

On December 19 the conferees agreed to strike from the conference report a House-passed provision to prohibit the use of fuel for busing children to desegregated schools.

The conferees reportedly agreed to:

- 1) Authorize the Administration to order the oil companies to produce certain types of petroleum products at different times. This would include increased gasoline for the summer, and increased heating oil for the winter.
- 2) Authorize federal regulatory agencies, including the Federal Maritime Commission, the Interstate Commerce Commission, and the Civil Aeronautics Board, to adjust their rules to aid in alleviating fuel shortages.
- 3) Delete a provision in the Senate bill which would have authorized federal subsidies for mass transit fares.
- 4) Authorize \$5 million for a campaign to promote car-pooling.
- 5) Adopt a House-passed provision granting limited antitrust law exemptions for oil companies assisting the government in combatting fuel shortages.
- 6) Drop a similar provision for retail outlets.
- 7) Authorize the President to authorize federal payments to the states to allow extension of the unemployment benefits for workers displaced by the energy shortages.

By a vote of 265 to 112, the House December 15 passed the "Energy Emergency Act" after tacking on 50 amendments to the bill as reported out by the House Commerce Committee.

The House-passed version would give the Federal Energy Administrator restricted leeway in ordering energy consumption curbs with the administrator having to obtain prior approval by Congress for almost all actions. The major exception to the provision would be gasoline rationing which the administrator could impose at his discretion, subject to a congressional veto.<sup>4</sup>

National Coal Conversion Act of 1973 (S2652). For a discussion of the major provisions of this pending legislation see Coal in Section II, page 10.

A list of 46 electric power plants that may be required to convert from fuel oil to coal to relieve the current fuel shortage was released November 16, 1973, by the Environmental Protection Agency. The plants are in 12 states along the East Coast. While most of the plants listed converted to fuel oil in recent years to meet air-quality standards, many of the power plants may be required to switch back to coal because of the fuel oil shortage. About half of the 46 plants could be directed to convert under the proposed National Coal Conversion Act introduced November 2 by Senators Jennings Randolph and Henry M. Jackson.

EPA Administrator Russell E. Train sent letters November 16, 1973 to the governors of the states affected by the list, asking them to study the possibility of converting the power plants to coal. An EPA spokesman added that the agency is now "encouraging" many of the 46 plants to switch voluntarily to coal and added that EPA is ready to allow the necessary lowering of air-quality standards for coal conversion. EPA estimated that the 46 plants burn a total of 399,000 barrels of oil each day, less than one seventh of the present projected shortage of three million barrels per day. EPA contended that conversion to coal could reduce the expected U. S. oil shortage by about one fourteenth. The list of 46 plants was broken down into categories. The first category included plants that could be converted to coal within one week, while the second category would require up to

eight weeks to complete the conversion. However, industry spokesmen have contended that coal conversion would require months, not weeks, to accomplish.

The EPA spokesman noted that the 46 plants are only a preliminary appraisal that could change and that many of the plants will not be able to convert to coal because of logistic problems and the unavailability of coal in many parts of the U. S. The data for the list was obtained from the Federal Power Commission, EPA added. One plant in N. C., Carolina Power and Light Company's Sutton Plant near Wilmington, was on the list.<sup>5</sup>

Subsequent to the EPA action the Federal Energy Office asked 19 East Coast utilities December 7, 1973 to convert 26 power plants from residual fuel oil to coal. The power companies also are likely to be the first utilities ordered to convert to coal when Congress grants FEO authority to impose fuel-switching.

William E. Simon, FEO administrator, contacted each power company by telegram, calling on them to convert to coal as soon as possible. He also sent telegrams to 40 other utilities, requesting information on the possibility of converting 40 more power plants from oil to coal. Fuel oil shortages are expected to total about 860,000 barrels throughout the U. S. in the first quarter of 1974, but 72 percent of the shortfall will occur on the Atlantic Coast. Converting all 26 plants to coal would save about 250,000 barrels of oil per day, according to Simon.

According to FEO, each plant could convert to coal within a few weeks and none of the utilities notified should have any difficulty either obtaining or transporting coal. All the plants reportedly could be converted without damage to the environment, although coal conversion would require air-quality variances from the Environmental Protection Agency. The CP&L Sutton facility was also on Mr. Simon's list.<sup>6</sup>

### 3. Executive Actions.

Voluntary Petroleum Allocation Program. A national voluntary petroleum product allocation program was placed into effect on May 10, 1973. On Friday, May 11, 1973, The Oil Daily reported that Mr. William Simon, Deputy Treasurer and Chairman of the President's Oil Policy Committee (OPC) "told Congress on that date that the administration has adopted a program of "voluntary" allocations by suppliers 'of no less than the proportion of 1971 and 1972 sales to independent and other customers at prices not to exceed posted and rack prices charged by refiners, marketers, distributors, and jobbers'".

"He said this program will be under the surveillance of the OPC and will be administered by the Office of Oil and Gas in the Interior Department."

"Our purpose' Simon told the senate banking committee, 'is to apportion, as evenly as possible, any curtailment in consumption that will result from gasoline and distillate shortages'".<sup>7</sup>

Federal Energy Policy Office. In a news conference on June 29, 1973, President Nixon announced the creation of a new Energy Policy Office in the White House and named Colorado Governor John A. Love as Director. These changes are part of the Chief Executive's top-level energy plan. The President's program is summarized below:

Appointment of Colorado Gov. John Love as special assistant on energy and director of new White House Energy Policy Office, reporting directly to Nixon.

Proposal to Congress for establishing a new Department of Energy and Natural Resources, built on the Interior Department.

Expansion of federal energy R&D funding to \$10 billion over five years: an immediate increase of \$1100 million to a level of about \$850 million for fiscal 1974.

An appeal to Americans to cut their use of energy 5% over the next 12 months, and orders to federal agencies to reduce their use by 7%.

A shift of the energy R&D work in the government to the Atomic Energy Commission -- including OCR and Bureau of Mines work.



Split AEC into two agencies -- one a new energy research agency, the other nuclear commission, headed by the five present commissioners.

The State Department is moving to consult with both major oil-producing countries to insure future oil supplies and consuming countries to develop sharing, stockpiling, and rationing plans.

Renewed urging to congress that it enact legislation to free prices at the well head for "new" gas, superports, right-of-way bill for TAPS, powerplant siting, and rational controls over surface-mining.<sup>8</sup>

Mandatory Propane Gas Allocation Program. A mandatory propane gas allocation program was placed into effect on October 2, 1973 by the Energy Policy Office. The Director stated that the scarcity of home heating oil should be most pronounced in the Northeast and the upper Midwest, while shortages of propane gas are likely to occur in rural and food-producing areas. He said that, for a number of reasons, the independent distributors in these areas are obtaining fewer supplies than in previous years and thus are unable to maintain previous deliveries.

A priority propane uses list was established. Priority users include: residential use; agricultural production; food processing; mass transit vehicles; and buildings for housing medical and nursing patients, and where no feasible alternate fuel is available; industrial vehicles or equipment used in enclosed facilities; essential government services; oil and gas well drilling and field-production operations, and fuel for pipelines and other transportation for delivering propane to markets; commercial requirements with total annual consumption not exceeding 15,000 gallons per year per location; and peak shaving by natural gas utilities.

The propane allocation plan specified that no priority will be granted to natural gas utilities so long as they continue serving interruptible industrial customers or customers who can use fuel other than natural gas.<sup>9</sup>

Mandatory Middle Distillate Fuel Allocation Program. A mandatory middle distillate fuel allocation program applicable to the wholesale level become effective November 1, 1973. The plan announced jointly by the White House Energy Policy Office and the Department of the Interior October 12 is based on historic distribution

criteria. The program announced October 12 covers derivatives of petroleum, such as kerosene, jet fuel, home heating oil, range oil, stove oil, diesel fuel, and gas oil, which have a 50 percent boiling point in the American Society for Testing and Materials' D86 standard distillation test falling between 350 and 700 degrees Fahrenheit.

Under the program, wholesale purchasers of middle distillate fuels will be allocated up to 100 percent of the quantities purchased in calendar year 1972, or, if these quantities are not available, a proportional share of the supplier's allocable supplies. Wholesale purchasers not in business during the entire base period, or who have had substantial increases in fuel requirements, may petition the Department of the Interior to be assigned a supplier or to receive increased allocations.

State governments may recommend redirection of future deliveries of middle distillates within their states from one or a number of wholesale purchasers to other wholesale purchasers to alleviate exceptional hardships of end users. The redirection will be authorized by an Interior Department representative within the state that makes the recommendation.<sup>10</sup>

New Federal Energy Office. President Nixon issued an executive order December 4, creating the Federal Energy Office and names Deputy Treasury Secretary William E. Simon as its administrator. Simon also was designated as administrator of the proposed Federal Energy Administration, which Congress has been asked to create for two years. Mr. Nixon said the proposed Energy Administration had been planned for several weeks and that he had discussed the proposal with key congressional leaders. He said the Middle East oil embargo meant that the Government must be involved in operational matters as well as policy.

Plans call for the Energy Office to remain a White House agency after the creation of the Federal Energy Administration which is expected to become part of

the proposed Department of Energy Administration which is expected to become part of the proposed Department of Energy and Natural Resources within two years. Pending enactment of legislation to create FEA, the heads of the various units involved in the transfer have been directed by their superiors to be responsive to the Energy Office administrators. These include the Offices of Petroleum Allocation, Energy Conservation, Energy Data and Analysis, and Oil and Gas from the Interior Department and the energy division of the Cost of Living Council. When fully activated, FEA will have six assistant administrators. The new agency will inherit 1,100 positions from OPA and its \$24 million budget; 20 people and a \$7 million appropriation; from OEC; 50 people and a \$2 million budget from OEDA; 110 people and a \$2 million budget from OOG; and 55 people with a \$1 million appropriation from CLC. FEO-FEA will be housed temporarily in the New Executive Office Building and is expected to relocate by December 20 to a private office building. In addition to the steps already taken by the President, Simon said FEO-FEA would take any actions necessary to reduce gasoline consumption, and that this might require some combination of gasoline price increases, taxes, and/or rationing, as well as voluntary and mandatory conservation.

Simon said residential and commercial energy use must be cut without reducing jobs or industrial output. This will require some price increases or taxes on natural gas as well as electricity, in addition to the allocation program already announced for home-heating oil. Refinery output would be shifted to increase supplies of fuel oil and vital petrochemical feedstocks. He said the Cost of Living Council would announce price increases to stimulate the shifts. The FEO administrator said plans are being explored to convert commercial airplanes from kerosene to naphtha-based jet fuel and the Government is pressing to have 26 utility plants switched from oil to coal. The Government also is urging states to increase the maximum efficient rate (MER) on oil wells, which could bring on line as much as 150,000 to 200,000 additional barrels per day. He said the U. S. could no

longer delay development of domestic energy resources, and needs to develop Naval Petroleum Reserve Number Four in Alaska, lay a second trans-Alaska pipeline, and speed construction of nuclear plants and other energy facilities. "A major problem in dealing with the energy problem has been the fact that too many energy-related responsibilities have been dispersed throughout the Government," Simon said. "FEA will put all of these elements together in one unified body, thus enabling us to act on energy policies immediately."<sup>11</sup>

Mandatory Allocation Program for Petroleum Products. Under the provisions of the Emergency Petroleum Allocation Act of 1973 the Federal Energy Office established a new and revised mandatory allocation program for all petroleum products, with minor exception, effective January 15, 1974. This program covers motor gasoline, residual fuel oils, crude oil, butane, and certain other products including petrochemical feedstocks and lubricants, in addition to propane and middle distillates which were already covered in earlier mandatory allocation programs.

#### 4. Executive Action Pending.

Contingency Gasoline Rationing Plan. Gasoline is distributed in two ways, bulk and retail. All purchases of gasoline at retail outlets will be made through the rationing system, and bulk purchasers will obtain their supplies according to priorities set in the allocation system.

Gasoline coupons will be distributed monthly to all Americans 18 years or older who have valid driver's licenses. The number of coupons a person receives per month will depend upon the population density of the area in which he lives, a surrogate measure for average current needs. The distribution will average 32-35 gallons per month per eligible person. Other factors such as availability of mass transit will also be considered.

Special arrangements will be made for commercial and priority users who need additional coupons to bring them to parity with their counterparts who buy in bulk.

Gasoline cannot be sold unless purchasers have valid coupons. At the time of purchase the driver will sign his name and license plate number on the coupon to prevent its reuse. The coupons are good for 60 days and freely exchangeable on the open market. Negotiations with institutions for distributing coupons and providing accounting services are underway. Banks are prime candidates.

Local boards may be set up by the states to adjudicate appeals for variances to the federal guidelines governing individual ration allotments. Overall management of the state allocation of gasoline will be the responsibility of the states. State boards will also be responsible for the management and control of local boards and for adjudicating appeals from local board decisions. Functions at the federal level include setting guidelines for ration allotments, monitoring the enforcement system, producing coupons, and auditing and accounting for coupons. Gallonage valuation of coupons each month will also be federally determined.

Mr. John C. Sawhill, the Federal Energy Office Deputy Administrator, released the following letter with the notice of the contingency plan for gasoline rationing on January 16, 1974:

On December 27, 1973, a fact sheet describing a contingency gasoline rationing plan was released by the Federal Energy Office. At that time the Administrator underlined the necessity of presenting such a plan in further detail for public comment. This notice fulfills that commitment by expanding on the earlier fact sheet. This notice is not intended as a proposed regulation but rather as a vehicle for further comment and discussion.

If the gap between supply and demand of motor gasoline (hereinafter called gasoline) becomes too great to manage through conservation measures and allocation regulations, gasoline rationing may be necessary. A contingency rationing plan must be prepared against this possibility. The purpose of this notice is to set forth and solicit comments on such a contingency plan.

The goals of this contingency program are consistent with those set forth in the Mandatory Fuel Allocation Regulations. In brief, this plan seeks to:

- (1) Provide an equitable system of supply;
- (2) Preserve economic stability;
- (3) Maximize individual freedom of choice, and;
- (4) Establish a workable administrative framework.

The Federal Energy Office is interested in public comments and suggestions dealing with this particular system of gasoline rationing and in refinements of the system. In order to insure timely consideration, public comments and views regarding this proposed plan should be received not later than January 30, 1974. Comments should be directed to:

William E. Simon, Administrator, Box GR, Federal Energy Office,  
1016 16th St. NW., Washington, D.C. 20036.<sup>12</sup>

## V. SUMMARY OF STATE ACTIONS

North Carolina leadership also moved quickly, when the energy crisis began in early 1973, to reduce its impact on the State and the citizens of North Carolina. The following are short summaries of the more salient action taken at the State level.

### 1. Legislation Passed

On May 23, 1973 the General Assembly ratified Senate Joint Resolution 868 establishing the Energy Crisis Study Commission. The General Assembly, noting that fuel and energy shortages were interrupting normal activities around the country, charged the Commission to assess the seriousness of the crisis and assess its probable impact on North Carolina. A wide range of topics related to the supply of energy to and the demand for energy within the State were set forth for investigation.

The Commission membership appointments were completed just prior to the first meeting which was held on July 17, 1973. Governor Holshouser opened the initial meeting and emphasized the seriousness of the energy problem and the importance of the Commission's work. ".....the General Assembly has recognized that the State also has a responsibility to face up to this problem. The Assembly recognized that there are things we can and must do to meet our own energy needs, now and in the future, to help keep catastrophe from our door.

"In creating this commission -- and giving it broad, but specific responsibilities -- the legislature determined that it was not a time for panic, but a time for swiftly gathering the facts, carefully analyzing them, thoughtfully appraising our responses to them, and -- wherever possible -- decisively acting upon them."

The Commission met monthly thereafter. On October 10, 1973 a public hearing was held in Raleigh. Chairman Tolson presided. At the outset brief assessments of the prospects for the supply of petroleum products, natural gas, and electricity

were made by Commission members T. Frank Smith, J. David Pickard, and Sherwood H. Smith, Jr., respectively. Dr. Arthur W. Cooper, Assistant Secretary, Department of Natural and Economic Resources, outlined the relationship between energy and environmental standards, and Archibald Y. Beal, Assistant Director of the Commission staff, briefly assessed conservation potentials. A number of statements were heard from the floor presented by environmentalists, energy marketers, consumers, and representatives of other interest groups and organizations. A summary of the presentations and statements appears as Appendix B.

After a thorough investigation of all subjects related to North Carolina energy, the Commission concluded that there are three actions which can be taken by the General Assembly to reduce the impact of the energy crisis in North Carolina. These actions are listed in the next section -- Legislation Pending.

## 2. Legislation Pending.

Commission Legislative Proposals. The following three legislative actions are proposed by the Energy Crisis Study Commission:

- A. A Bill To Be Entitled An Act Relating To The Management Of The Emergency Energy Crisis In North Carolina. A proposed bill appears in its entirety as Appendix E.
- B. A Bill To Be Entitled An Act To Establish A Permanent State Energy Division.



C. A Joint Resolution Establishing The North Carolina Energy Council.

The following bills are to be proposed by the North Carolina Department of Transportation and Highway Safety:

A. Bicycle Recognition Act

B. Bicycle Funding Act

C. Mass Transit Funding Bill. This bill will authorize State financial assistance to intra-urban mass transit systems (see also Section VI, c. Additional emphasis on mass transit, page 3).

### 3. Executive Action Taken.

Governor's Energy Panel. On May 7, 1973, Governor Holshouser established the Governor's Energy Panel. The mission of the Panel was to quickly assess the energy crisis and recommend appropriate State response to the problem, and to work closely with the Energy Crisis Study Commission. Membership on the Panel included Mr. William L. Bondurant, Secretary of the Department of Administration; Mr. James E. Harrington, Jr., Secretary of the Department of Natural and Economic Resources; Mr. Bruce A. Lentz, Secretary of the Department of Transportation and Highway Safety; and Mr. Tenney I. Deane, Jr., Secretary of the Department of Commerce. In June, General John J. Tolson, III, Secretary of the Department of Military and Veterans Affairs, was named to the Panel and named Chairman.

The Panel represented the State of North Carolina at the Southern Governor's Conference Power and Energy Seminar held in Little Rock, Arkansas, on June 22-23, 1973. All aspects of the energy crisis were covered at that seminar including the federal voluntary allocation program in effect at that time (see Section IV, page 6). The work of the Panel -- in conjunction with the Department of Agriculture, the North Carolina oil and liquified petroleum gas associations, and

and oil and gas marketers around the State -- was instrumental in averting the potentially disastrous effect of fuel shortages on the agriculture industry during the crop-drying season.

At the recommendation of Panel Chairman Tolson, who subsequently became additionally the Energy Crisis Study Commission Chairman, the Executive Director of the Commission staff also became the Governor's Coordinator for fuel and Energy. In this role the Director directed the staff work of both the Panel and the Commission (see Section VI, 4. Allocation of fuels in short supply, p. 11). The work of this part of the staff has been invaluable as the crisis intensified and the various federal allocation programs appeared and grew more complex (see Section IV, 3. Executive Actions, p. 6).

Governor Holshouser Contests FPC Natural Gas End Use Plan. On September 18, 1973 Governor Holshouser appeared before the Federal Power Commission to argue against a proposed natural gas curtailment plan that would severely reduce North Carolina's supply of natural gas. A special Washington Counsel was obtained by North Carolina to assist the Attorney General's Office and the State Utilities Commission in the case. A stay of execution against the plan was granted by the courts on procedural grounds (see Section III, Natural Gas, p. 4). The statement presented by the Governor before the FPC appears in its entirety as Appendix C.

State Agency/Institutions Conservation. For a discussion of administrative action taken under this topic see Section VI, 2.e., Specific conservation measures for state agencies/institutions, p. 9.

Department of Education Administrative Action. The Department of Education issued the following Fuel Situation Fact Sheet on July 10, 1973:

The Department of Education, having been informed by the Department of Administration of an impending fuel oil shortage, began to take measures to cope with the crisis in February. Workshops were held at four locations throughout the state to meet with representatives of all school administrative units to explain methods of conserving fuel and to stress the urgency of coping with the crisis. At these

workshops and through memoranda to all superintendents, units were urged to obtain as much reserve storage capacity as possible and to purchase fuel oil from any available source, even though purchase prices might be extremely high.

In cooperation with the Department of Administration, the Education Department established two primary processes of distributing fuel oil. These will dovetail with procedures being established by the Department of Administration covering the entire state. The Education Department completed a survey determining the total storage capacity, total seasonal need based on boiler size and the amount of oil actually in storage as of June 1, 1973. With this information, the Education Department will be in a position to keep the Department of Administration completely informed as to school requirements through monthly reporting by all school units. The shifting of quotas is already taking place to insure the complete filling of all storage capacity at an early date. Presently, approximately 20,000,000 gallons are stored (approximately 9,000,000 more than one year ago) against an estimated requirement of 33,000,000 for the next heating season. The other process includes the establishment of a "clearing house" within the Department of Education to use the monthly reports to maintain tabulated needs of each school campus so that "spur of the moment" fuel availabilities can be taken advantage of within any location of the state.

To further cope with the crisis, officials of the Education Department at the above mentioned workshops stressed many methods of conserving fuel. These were studied carefully by school unit representatives and almost all school units are implementing all or some of the methods. It is estimated by Education Department engineers that over 6,000,000 gallons of fuel oil can be saved over last heating season's requirements if fuel participation of school units are realized in the conservation program. The response by school administrative units has been overwhelming. Leading the list of conservation techniques is the combustion testing of heating plants. Over 90% of the school units have purchased and are using portable combustion testing laboratories to achieve maximum combustion efficiency.

Energy Conservation Measures Directed by the Governor. The following memorandum from Governor Holshouser to all Executive Cabinet Members was issued on November 12, 1973:

I have today asked the Department of Administration to undertake immediate energy conservation measures which will affect all departments of State Government. Most of those listed below are "common sense" measures designed to cut down on the use of a variety of energy sources. A great many other energy saving proposals are now being considered and further announcements will be forthcoming in the days to come.

Effective immediately, I have asked the Secretary of Administration to institute the following energy conservation measures:

1. Beginning on Wednesday, November 14, the inside temperature level in all State-owned and State-leased office buildings will be reduced to an average of 68 degrees F.

2. State Motor Pool personnel have been instructed to utilize the compact cars in the Motor Pool fleet before full-size cars will be issued. Every effort should be made to reduce travel by more careful planning by user agencies and single occupant trips should be avoided whenever possible.

3. Drivers of all State-owned motor vehicles have been instructed to reduce highway speeds to a maximum of 50 miles per hour. Tests made in recent months have shown that when cars are driven at 50 miles per hour instead of the usual 60 and 65 miles per hour, substantial gas savings will occur.

4. All State employees are encouraged to form car pools whenever possible, not only with other State employees, but also with employees of businesses and industries in the Raleigh area.

I am pleased to announce that a committee is being formed to devise a car pool plan for this community. The committee will be composed of representatives from the City of Raleigh, North Carolina Departments of Transportation and Administration. This pilot program will be for State employees initially, but I envision that it can be the model program for the City of Raleigh as well as other communities in the State. December 1 has been established as the target date for implementation of the plan.

5. In the coming months, fleet cars purchased for the State Motor Pool and other State agencies will, for the most part, be in the compact class. The present goal is to eventually arrive at a fleet made up of 75 percent compact cars and 25 percent full-size cars and station wagons.

In announcing these directives the following day, November 13, 1973, in a news conference at the State Capital, the Governor additionally announced:

We have a responsibility in State government to conserve energy, not only as part of the total conservation effort, but also to set an example for others. Obviously, however, the effort of State government is only a small part of the total effort that must be made.

In line with the President's recommendations, we will reduce the speed limit on all North Carolina highways, effective November 21, to 55 miles per hour. This we have the authority to do under State law.

In addition, we will ask the General Assembly when it convenes in January to give us the authority, on an emergency basis, to reduce the speed limit to less than 55 miles per hour.

We also will ask the legislature to establish the Energy Office as a permanent division of State government. Obviously, the energy problem is going to be with us for some time. Therefore, we should be prepared to deal with it on a continuing long-range basis.

Extended Christmas Holiday Period. On December 5, 1973, Governor Holshouser announced a change in the holiday schedule of most State employees, which would conserve energy.

I also want to commend our State officials and employees -- including those who had the new highway speed limit signs in place last Saturday -- for the positive attitude they have shown in meeting our requests.

Today, I would like to announce several new steps we are taking in our effort to meet this situation.

We are approaching the Christmas holiday period. Normally, in State government, eight of the 11 days from Saturday, December 22, until Tuesday, January 1, would be holidays or weekends.

Over the years in most departments, 40 to 50 percent of our employees have taken annual leave during this period. This means that productivity is greatly reduced while the full amount of energy is being consumed to keep the buildings open.

Recognizing the need for energy, therefore, I am advising all agencies of State government that, with a few certain exceptions, State offices will be closed for this entire period.

We are told that if State buildings are shutdown completely during the full 11-day period, rather than opening for three days, there is a possible energy savings of 65 percent of that which would normally be used during this period.

This will be accomplished by dropping building temperatures to a much lower point that would be possible over a shorter period of time, such as a weekend. Lighting will be reduced in all hallways and circulation fans will be cut off.

It is estimated that such a shutdown will mean a savings of 12,000 to 15,000 gallons of No. 6 fuel oil at the central heating facility in Raleigh alone.

It would be nice to simply give our employees three more vacation days, but we recognize that all of us are simply trustees for the taxpayers of North Carolina.

Therefore, the office closing is being handled through use of the regular annual leave granted State employees.

Emergency Adjustments of Air Quality Compliance Schedules. Also on December 9, 1973 the Governor announced the initiation of emergency procedures for air quality compliance.

One of the real problems inherent in the energy crisis is the impact on environmental standards. It has become obvious that some hard choices will have to be made. We can't afford to totally ignore environmental considerations, and at the same time, we can't ignore the hard realities of our homes and jobs and the need for heat.

We already have been advised by one oil company, the Amerada Hess Corporation, that it will be unable to provide its normal fuel oil to approximately 75 major North Carolina customers, but that it does have available a substitute fuel oil with a higher sulphur content. This same situation could apply to other suppliers.

Under the existing air quality compliance schedules being followed by our Board of Water and Air Resources, this substitute fuel could not be legally burned in North Carolina, even though it meets the primary air quality standards established by the Environmental Air Protection Agency.

North Carolina is presently the only state in the nation that already has air quality compliance schedules that have been approved by the U. S. Environmental Protection Agency. The EPA has set a July, 1975, deadline for each state to meet approved standards.

The customers depending on the Hess fuel oil supplies include not only a number of industries and businesses employing many North Carolinians, but also such institutions as the Methodist Home for Children in Raleigh, Watts Hospital in Durham, Duplin General Hospital in Duplin County and Sampson County Memorial Hospital.

It is obvious that this is a problem that must be resolved quickly. Therefore, I have asked the Board of Water and Air Resources to initiate appropriate action to permit some emergency adjustments and at the same time see that the environmental impact of this change in fuel oil supplies be minimized.

I also am requesting that the board undertake a full examination and thorough public hearing on this matter, including a determination of whether more North Carolina customers who are supplied fuel oil by other companies may face a similar situation.

Energy Conservation Measures and Policies in the North Carolina National

Guard. Extensive conservation practices for both Army and Air N.C.N.G. facilities have been instituted. Primarily they involve the reduction in the amount and frequency of heating, lighting, and water heating in all facilities, and public and civic non-emergency use of facilities has been minimized.

The Army National Guard has instituted conservation practices involving the use of both vehicular and aviation fuels. The Air National Guard has instituted conservation practices involving ground operating procedures, mission profile requirements, and recovery procedures.





## VI. TOPICS INVESTIGATED

At the second meeting of the Energy Crisis Study Commission, September 14, 1973, a list of topics to be investigated by the Commission was determined. Topics chosen were judged to have potential for minimizing the impact of the crisis, and were topics upon which legislative action might prove expedient.

1. Assessment of energy requirements and supply both within the immediate future (1 to 5 years) and over a longer term (5 to 10 years).

Given the size of the staff, period of time in which to prepare a Commission Report, and the fact that preparation of a North Carolina Energy Management Plan was under preparation in the Department of Administration, Office of State Planning (OSP), the Commission decided not to prepare this topic in detail but to assist the OSP in any way possible. Their study has just begun. An outline of the study appears as Appendix D.

The first phase study is now underway in a joint effort involving staff of OSP and the Center for Development and Resource Planning at the Research Triangle Institute. The objective of the first phase of work is to measure present energy use and project future energy use to 1990, based on alternative assumptions about the size of the population and economy in the State and about rates of energy consumption, which may be expected to vary as the result of price changes and government policy. Based upon the findings of this study, OSP expects to follow up with work on potential government policies; the role of various State agencies; and analysis of energy requirements of alternative State development patterns, with the final result being the development of a State Energy Management Plan.

2. Conservation possibilities including, but not limited to:

- a. Modifications of Building Codes to require better insulation and more efficient heating/cooling systems.

While it was initially apparent that legislative action might be necessary to accomplish the objectives of minimum standards in the North Carolina Building Code,

that deficiency was resolved by the Code Council by amending the Code on December 11, 1973.

It was generally felt that the Code had remained unamended with respect to either or both of the above named standards because 1) they are not specifically named in G.S. 143-138 (b) Contents of the Code, and/or because 2) national building code standards required as evidence of good engineering practice have not to-date adopted building insulation or equipment efficiency standards. The Council's interpretation of "evidence of good engineering practice" required by G.S. 143-138 (c), Standards to be Followed in Adopting the Code, requires that one or more of the national standards listed adopt a requirement before the Council can be permitted to do so.

The North Carolina Attorney General provided an opinion that the North Carolina Building Code Council does have the authority pursuant to G.S. 143-138 to amend the Building Code to require insulation of buildings, private residences, etc., and to provide minimum efficiency standards for heating, cooling and ventilating equipment in order to conserve energy. Interim standards were adopted by the Council until national standards are completed in January 1974, at which time they will be adopted as permanent standards.

b. Labeling appliances with efficiency ratings and providing standards to exclude inefficient equipment from sale.

The U. S. Department of Commerce (USDC) was directed by President Nixon on April 18, 1973 to develop, in coordination with the Council on Environmental Quality, a voluntary system of energy efficiency labels for major home appliances. Proposed procedures appeared in the Federal Register on June 5, 1973 and comments were solicited from Governor Holshouser by letter from the Secretary of Commerce on August 21, 1973.

There are serious reservations concerning the effectiveness of self-certification and the voluntary nature of the USDC program. A general principle of industry regulation is that industry will cooperate with requirements which apply uniformly because the costs incurred by such cooperation can be passed to the consumer uniformly without loss of competitive position. Without the assurance of uniform applicability which a mandatory program would bring, industry reluctance could arise.

While it is the position of the Commission that a mandatory program administered at the federal level would provide the greatest probability for achieving the desired efficiency in appliances and equipment with the least industry-confusion and recalcitrance, North Carolina will most assuredly cooperate with the USDC to the fullest extent possible in promoting efficient energy utilization through the Voluntary Labeling Program.

The USDC hopes to establish proposed Voluntary Energy Conservation Specifications for room air conditioners in January 1974. Guidelines for state cooperation are expected to be furnished at that time. No legislative action is recommended in regards to Appliance Labeling topic.

c. Additional emphasis on mass transit.

While it is now a time of crisis in energy, particularly in petroleum products, and the crisis conditions cannot be alleviated in the next three to five years, it is also the end of the era of bountiful and low-cost energy. The efficient utilization and stringent management of energy resources will be essential from now on. Transportation policies and programs must now be designed which can provide alternatives for mobility within the new energy efficiency criteria.

The 1973 General Assembly ratified a joint senate resolution directing the North Carolina Department of Transportation and Highway Safety (NCDOT) to conduct a mass transit study. Three bills are pending from that Session now which address defining the role for the State in public transportation, including providing for

a Mass Transportation Division in the NCDOT. The following is a portion of an NCDOT policy statement on mass transportation.

Presuming an increasing involvement by the State DOT in mass transportation planning, technical assistance, and financing - particularly with the opportunities available through various provisions of the Federal-aid Highway Act of 1973, the State DOT is developing a mass transportation work program. At this stage, it by no means represents State policy, but is indicative of the type program which the DOT staff feels appropriate. Its initial major thrust is a strong State assistance role for local governments to encourage participation in UMTA (Urban Mass Transit Act)-funded programs. This has never been done in the State.

Briefly, the major activities of the recommended plan of work include the following:

1. Assess the operational and financial status of local urban and rural mass transportation systems throughout the State.
2. Recommend short and long range actions to be taken by the State to assist local mass transportation systems, including policies and procedures for administering financial aid, if appropriate.
3. Assist local governments in the preparation and submission of applications for Federal assistance programs in mass transportation.
4. Capitalize on outside research activities on all aspects of mass transportation as it relates to North Carolina.
5. Coordinate with the Division of Highways to insure that mass transportation is realistically considered as an integral part of local and regional thoroughfare plans.
6. Emphasize the availability of mass transportation facilities and services to help meet the needs of the elderly, the poor, the young, and the handicapped - an oft-neglected, carless minority.
7. Investigate the transportation regulation/planning interface to insure that complementary actions are pursued at the State level.
8. Develop a model for community involvement in mass transportation planning which will insure citizen participation in the decision-making process.

In conclusion, it may be observed that most public mass transit interest in North Carolina has tended to polarize around the academic community, some legislative leaders, and the press corps. Decisive actions on the part of State and local decision-makers engaged in the day-to-day activities of trying to make transportation systems work have been considerably less than enlightening from a mass transportation viewpoint.

North Carolina has some particularly challenging transportation problems which beg for consideration of mass transit alternatives. It is clearly in the best interest of the State that the DOT should elect to actively develop and pursue a mass transportation program.

The emerging state policy for and role in public mass transportation is a product of forces which at the outset may not have included energy shortages. Even if the energy shortage was a factor considered, the crisis-within-the crisis -- embargoed Middle East Oil -- could not have been foreseen. Emphasis must be shifted in recognition of a considerably exacerbated energy shortage and expedite elements of a public mass transportation role which can deliver very short-term pay-offs.

- d. Possible curtailment of certain activities within State to conserve energy, e.g. recreational and entertainment activities, electrical advertising signs, etc.

The energy crisis in its simplest terms is a condition wherein demand exceeds supply. Supply, already growing at a decreasing rate, has been reduced abruptly by the Middle East hostilities. Demand, continually boosted by growth, is now being driven up faster by approaching winter. There will not be sufficient fuel for all of our activities. The welfare of the public requires that we become quite selective with respect to those activities which will be permitted to consume available energy resources.

The selection process, once established, can be implemented most effectively by prohibiting those activities not selected. The situation in which all demands cannot be met becomes an emergency condition when the energy supply to vital activities becomes threatened. The ability to quickly prohibit the use of scarce energy resources by non-vital activities is necessary to minimize the threat to vital activities. Chief executives are vested with certain emergency powers which, under specific conditions, enable them to respond with appropriate measures in a timely manner when emergencies materialize. Several states have recently given their chief executive such powers within the context of the current energy crisis.

In September, in a memorandum to the Attorney General, General Tolson sought the following opinions.

1. Does the Governor now have necessary authority to direct allocations of fuel stemming from a program directed at the federal level?
2. If not, what legislative authority is needed at the State level?
3. Does the Governor have authority to initiate allocation or rationing program within N. C. in the absence of a federal program?
4. If not, what additional legislation would be required?
5. Under either a state or federal program does the Governor have the authority to initiate energy measures relating to transportation and storage of energy or is additional legislation needed?
6. What authority does the State have to stop or curtail such activities as automobiles and motorcycle racing, night athletic events, etc., in order to save energy?

The Deputy Attorney General responded with the following opinions:

The answer to (number one) would be based upon the terms of the federal legislation. Federal legislation directing mandatory allocations, rationing, etc., and then vesting specific powers in the chief executives of each of the states, coupled with guidelines for action, we feel would be valid and legal. We do not think (number two) any additional legislative authority is needed at the state level for the Governor to act under any federal program which gives such power to the chief executive of a state. There is no question that the Governor of the State of North Carolina is empowered to carry out such federal mandates.

Your (third) question asked if the Governor has authority to initiate allocation or rationing programs within North Carolina in the absence of a federal program. Please be advised that we have reviewed the applicable law in North Carolina and it is our view that such power does not exist in the office of the chief executive of North Carolina. There are numerous statutes giving the Governor emergency power in such areas as civil defense, riots and civil disobedience, etc. Under N.C.G.S. 147-33.1, the Governor is granted substantial power to take such actions as you have inquired about; however, this statute, passed by the General Assembly in 1945, can only be reasonably interpreted to apply to a war-time situation. We do not believe the powers vested in the Governor under N.C.G.S. 147-33.1 can be applied to a situation such as currently exists now. Furthermore, we would sincerely doubt the validity of (number four) any state legislation which would attempt to grant the Governor additional power in this area. The power of any individual state to deal with the regulation of trade or commerce is severely limited by the United States Constitution.

You have also inquired (number six) as to the authority of the Governor to stop or curtail such activities as automobile and motorcycle racing, night athletic events, etc., in order to save energy. We believe the answers given above would apply and that the Governor does not have the power to limit these activities.

From these answers, we have inferred that question number five is answered in part by the opinions set forth for questions number one and number three. In these opinions the Governor is limited by the terms of a federal program on the one hand and by the limitations of N.C.G.S. 147-33.1 on the other.

Judging by what is now happening in other states around the country, state legislation vesting additional powers in the chief executive is valid. Emergency power to mandate energy cuts was given to the Governor of Washington by a special session of the Washington Legislature in September 1973. Maryland more recently added substantially to the power of the chief executive to deal with emergency energy situations. That bill also vested veto power in a committee of ten legislators. It should be noted that bills in other states vary in form in part due to differences in State Constitutions.

A sub-committee of the Commission was established to pursue this topic further and their report appears in the following section: Commission Recommendations.

e. Specific conservation measures for state agencies/institutions.

On April 16, 1973 the Secretary of the Department of Administration sent a memorandum to Chief Executive and Business Managers of all State Institutions and Agencies Operating Physical Properties. The memorandum requested the establishment of a program which would provide a saving of energy of a minimum of 10 percent. The memorandum included a number of techniques which could contribute to energy saving. A subsequent memorandum requested that a report on the progress of each institution and agency be submitted quarterly. Summaries will be prepared from the information received and distributed so that each can benefit from the

experiences and ideas of the other. The Commission staff resources have not been sufficiently adequate to prepare and distribute summaries of agency and institution quarterly reports. This is an operational function which is recommended for a permanent State Energy Office.

- f. Educational programs for all citizens and industrial/commercial groups. Specific voluntary conservation measures appropriate for individuals and industries within the State.

There are a number of agencies and institutions in the State which have education missions and the staff is cooperating with several of these. There is neither the time nor resources to develop a program within the Study Commission staff, nor was such ever intended.

The role we are playing is one of stimulating, encouraging, and cooperating with educational organizations to develop and present citizen, commerce, and industry education programs designed to educate, generally, and to specifically prepare everyone to use energy reasonably and intelligently, stressing the importance of conservation. Two programs are already well developed.

First, Admiral Martin, Executive Director of the Energy Crisis Study Commission staff, has been named to the Steering Committee of the Energy Information Program (EIP), N. C. Environmental Information and Education Network (NCSU). The EIP role is one of public information and the clientele are the people of N. C., emphasis on lay public. A series of 30 minute video-tape programs will be developed during the next three months. The first will cover the critical aspects of North Carolina's supply and demand situation and the State's role in the Federal Allocation Program. Follow-up tapes will emphasize various clientele groups and their energy conservation problems; homeowners, industry, and government. All tapes will be aired on television stations throughout the State. In the spring, a series of symposia will be held. They will include an Energy Inquiry for North Carolina and a symposium on energy and air quality.



The second program is a workshop sponsored primarily by NCSU School of Engineering staff dealing with industries energy conservation. This program was held at the Sheraton Inn in Raleigh on December 4-5. This 1½ day program consisted of overview presentations for all participants during the first morning session; workshops for major industry-wide groups during the afternoon sessions; and workshops the second morning for concentrated attention on specific energy conservation practices for those activities or operations which are common to all plants. In both workshops, participants were divided into sub-groups to encourage easy and greater exchange of ideas.

The NCSU EIP additionally is prepared to provide some consulting services at no cost to the user to develop materials and courses on energy education. The Assistant State Superintendent for Program Services, NC Department of Public Instruction, has contacted the EIP with a purpose of combining their efforts to produce materials and coursework and to provide instruction in the public schools.

3. Speed up and simplify process for approval of siting of generating plants.

In North Carolina it now takes about ten years from the decision to build a nuclear plant until its completion, and that period is becoming longer. The utility company must deal individually with the numerous agencies among whom the responsibility for the determination of public convenience and necessity is fragmented. Numerous hearings are required, each intended to publicly examine segments of the certification responsibility. The scheduling and lead-time involved impose hindrances on all parties, deter full representation of interests, and are grossly inefficient.

In the 1971 North Carolina General Assembly, legislation was introduced (S.B. 862) which provided for a single proceeding before the N. C. Utilities Commission which allowed each agency with statutory responsibility for natural resources, environmental quality, or public health to file an environmental compatibility report,

twenty days prior to the proceeding, which would state whether there was or was not reasonable assurance that the major utility facility would conform to applicable State laws, ordinance, and to rules and regulations adopted pursuant thereto, and all other determinations and responsibilities vested in that agency. In general the so-called one-stop bill provided (a) a single proceeding involving certification of large generating or transmission projects before the State Utilities Commission, in which all interested parties may participate fully; (b) opportunity for all parties to be heard a second time after having evaluated the proposals of other parties; (c) an opportunity for any of the State's principal environmental agencies to veto the project if it finds the project not compatible with the laws it administers (such as the water and air pollution control laws); and (d) "quick-take" eminent domain powers granted to power companies. The bill was tabled and expired there.

A sub-committee of the Commission was established to pursue this topic further and their report appears in the following section: Commission Recommendation.

4. Allocation of fuels in short supply.

Effective November 1, 1973, the Federal Government instituted a Mandatory Allocation Program for certain petroleum products including propane and middle distillates. Kerosene, number 2 fuel oil, diesel and aviation jet fuels are the primary products included in the distillate category. The purpose of the program was to insure the most equitably possible allocation of products which are in short supply. Although most of the authority and responsibility under this program was lodged with the Federal Government, the states were granted authority to handle exceptional hardship cases. For example, in the month of December 1973 the allocations section of the Governor's Energy Panel Office processed the following cases:

<u>Product</u>	<u>#Cases</u>	<u>Gallons of Product</u>
#2 Fuel Oil	51	1,786,175
Diesel	14	161,073

<u>Kerosene</u>	<u>40</u>	<u>1,434,793</u>
Total	105	3,382,041

In addition to processing cases, the allocations section answered hundreds of telephone calls, numerous written communications and held conferences with large number of walk-in visitors seeking information and guidance on the allocation program.

As a result of a law passed by Congress in December of 1973 a completely revised allocation program was placed in effect as of January 15, 1974. This program encompasses essentially all petroleum products including crude oil. Again the State will participate handling hardship cases involving motor gasoline, propane, residual fuels oil (# 4, 5, and 6) and the middle distillates.

A reserve of from 1.5 to 4 percent, depending upon the product, of the total supply being delivered into the State in any one month has been set aside for State use in handling emergency hardship cases. A State may only act on a case for one month at a time. Any permanent adjustment, or assignment of a permanent supplier, must be handled by the Federal Energy Regional Office in Atlanta.

The State Office in Raleigh only handles hardship cases for oil jobbers and other distributors of bulk product or large businesses. Small businesses must apply through their supplier. Individual householders seek relief by contacting a county energy coordinator. Early in the program it was decided to utilize the Civil Preparedness communication network and organizational structure to provide local assistance and guidance. Each Chairman of the Boards of County Commissioners was requested to appoint an individual, preferably his Civil Preparedness Officer, to assist local citizens in understanding and obtaining help under the allocation program. The six Civil Preparedness Coordinators provide overall supervision and they in turn receive technical guidance from the Governor's Energy Panel Office. Use of the Civil Preparedness organization and communication network has been of great value. This form of decentralization is an essential feature in the program.

5. Identification of specific industries/institutions which could, on a practical basis, return to use of coal.

The identification of specific industries and institutions which could, on a practical basis, return to the use of coal involves a number of factors, most of which relate to the probability of obtaining a continuous and adequate supply of coal. As the supply of other fuels lessens, the demand nationally for coal is expected to increase greatly. It is expected to increase far beyond the ability of the coal industry to supply it.

There is concern that the nation has become too dependent upon residual oil for the generation of electric energy (See: Section II, Coal, Page 10). Also there is in the Congress now a proposed National Coal Conversion Act of 1973 (S 2652) (See: Section IV, 2. Pending Legislation, Page 4) which would, if enacted and implemented, affect all industrial boilers with a capacity of 100 million Btu an hour or more. Existing plants would be required to convert to coal within one year, contingent upon the availability of suitable coal and the maintenance of reliable services. An analysis of the coal supply/price situation vis-a-vis the expected increased demand by utilities appeared in the Wall Street Journal on 12 November 1973, and in the 12 November 1973 issue of Electrical Week. It seems apparent the demand and price will increase while supply will not, appreciably.

Recommendations and requirements for conversion to coal-fired boiler operations are matters to be resolved at the National level of government and in the market. No interests are served by State action in this question.

6. Restrict the use of distillate fuel by utilities.

Heating fuels are now in both peak demand and extreme short supply. Nationally and world-wide there is a great interest in shifting patterns of fuels consumption in order to relieve the demand on gas and distillate heating oils. Coal has been identified as a fuel that could be substituted for the scarce fuels. Major users that could switch relatively easily include utilities and industrial operations.

The use of distillate fuels by utility companies in North Carolina is, however, minimal with respect to practical operations. First, the 1972 electrical energy output of Carolina Power and Light Company (CP&L) and Duke Power Company (Duke) produced by oil burned in internal combustion turbines was 0.83 percent and 0.92 percent, respectively, of total generation. Secondly, the energy generated by internal combustion peak-shaving units was 0.93 percent of the CP&L and 2.14 percent of the Duke total generation in 1972. Thirdly, the other uses of fuel oils by utilities are in coal-fired steam plants for the purposes of light-off (start-up) and flame stabilization. As a practical matter such uses of oil cannot be eliminated without forcing a cessation of operation. Much of the peak-shaving unit consumption is in summer, when electric energy demand peaks.

It is clear that the utilization of coal, rapidly becoming a national objective, is dependent upon the use of a certain small utilization of fuel oil. It has been contended that because of inefficient use of primary fuels in the generation and transmission of electricity, electric space-heating should not be permitted. A fallacy of such reasoning arises from the fact that elimination of electric space heating would serve mainly to eliminate practical methods of space heating from hydropower, nuclear energy (percentage of which is increasing rapidly) and coal (residential burning of coal would lack pollution control devices of large utility boilers and would be a detriment to the environment). Therefore, to eliminate electric heat as a viable means of space heating would be unwise from a conservation of energy standpoint in that it would most probably increase the total requirements for scarce oil while prohibiting the use of more plentiful fuels.

From an economic viewpoint, elimination of electric space heating would have an adverse impact on all of the electric power consumers in North Carolina. Electric space heating provides a highly diversified load during the company's off-peak periods. This off-peak usage tends to flatten a utility's load curve, thereby improving its load factor and providing increased revenues per fixed investment cost. On the other hand, electric power consumption with high capacity demand

during peaking periods with relatively little accompanying energy usage (air conditioning, for example) requires a utility to install facilities adequate to meet the peaking demand without producing a compensating rise in revenues. The peaking capacity tends to remain idle during off-peak periods, thereby producing fewer revenues per installed capacity than facilities which are used more constantly on a yearly basis. Appropriately, charges for a more constant usage can be lower because the fixed investment cost of required facilities are spread over a larger number of kilowatt-hours. A high load factor helps a utility keep its overall rates low. Elimination of electric space heating would tend to reduce a utilities load factor forcing electric power rates up.

7. Determine if State-implemented environmental standards contribute to the shortage of fuels.

The environmental standards implemented and administered by the State which have so far been identified as having some potential to contribute to the fuel shortage are the State's Ambient Air Quality Standards. The relationship between these standards and fuels availability will become restrictive only if fuels with much higher sulphur content than presently available become the only ones available to our utilities and large industrial users.

Variances from the standards are available under certain conditions. The following is the authority of the Board of Water and Air Resources to grant a variance.

§143-215.3(e) "Variances. Any person subject to the provisions of G.S. 143-215.1 or G.S. 143-215.73 may apply to the Board for a variance from rules, regulations, standards or limitations established pursuant to G. S. 143-214.1, G. S. 143-215, or G. S. 143-215.72. The Board may grant such variance, but only after public hearing on due notice, if it finds that:

"A. The emission of air contaminants occurring or proposed to occur do not endanger human health or safety; and

"B. Compliance with the rules, regulations, standards or limitations from which variance is sought cannot be achieved by application of best available technology achievable at the time of application for such variance, or would produce serious hardship without equal or greater benefits to the public."

The Board of Water and Air Resources is currently acting on individual variances in reaction to spot shortages of low sulphur oil.

8. Off-shore exploration, superport, refineries, and a petrochemical complex for North Carolina.

There has been considerable interest shown in exploring and developing the possible petroleum resources of the Atlantic outer continental shelf, including that portion adjacent to our coast. President Nixon, in his April 1973 energy message, identified both the Atlantic and the Gulf of Alaska outer continental shelves as areas which should be explored as soon as possible.

There has also been considerable interest among large oil firms in locating a refinery or refineries on the middle-Atlantic Seaboard. A superport may or may not be necessary or desired in order to deliver crude to the refinery site. The three member-states of the Coastal Plains Regional Commission (CPRC), North Carolina, South Carolina, and Georgia, have jointly commissioned a feasibility study to determine the feasibility of locating in the coastal area of these states a privately-owned common carrier, offshore large tanker unloading facility and storage to handle imported crude oil shipments; a privately-owned common carrier crude oil pipeline from the above storage to one or more refinery/petrochemical complexes; a privately-owned refinery and petrochemical complex or complexes; and a privately-owned distribution system. This study includes elements of land use, economy,

and community facilities; will take six months to complete; and will be done by oil company staff. This initial feasibility study would be followed, if its results are positive, by a detailed economic and environmental impact analysis to identify the site or sites in the three states where such facilities could be located. The study-design for the initial feasibility study and the corresponding contracts are in the preliminary stage and are expected to be finalized by the end of the year, and the study commenced at that time.

The rights to drill in the outer continental shelf are leasable by the U. S. Department of Interior, but leases to interested oil firms have been held up by environmental and other factors. Therefore, the President instructed the Council on Environmental Quality (CEQ) to investigate and make a determination in this matter. Consistent with that charge, the CEQ held hearings in Alaska and on the East Coast.

Before such a hearing on October 16, 1973, Mr. James E. Harrington, Jr., Secretary of Natural and Economic Resources and a Commission member, presented the North Carolina position on the matter.

We feel very strongly that state government should have prime responsibility in the area of resource management and land use planning and that any federal action that directly, or indirectly, affects the states in these areas should be developed only in full partnership with the states. The preceding comments are designed to show that North Carolina is willing, and able, to accept responsibility for management of her coastal zone.

The question of opening the Atlantic Outer Continental Shelf area to petroleum exploration activities must also be decided in partnership with the states. Although we understand that these activities will probably take place far offshore and not necessarily near North Carolina waters, we are gravely concerned over the possible damage to our coast that could result from accidental spills and blowouts such as those that have occurred off the coast of California and in the Gulf of Mexico.

We are equally concerned over the national energy situation and the effects that a prolonged energy shortage would have on our social and economic systems.



Of the several alternatives available for increasing domestic energy supplies, utilizing the production from the Outer Continental Shelf seems to be one of the most preferable. Furthermore, as part of a comprehensive energy policy statement, the Southern Governors concurred in the President's decision to speed leasing on the Gulf Outer Continental Shelf (OCS) and to advance the schedule for leasing on the Atlantic OCS under appropriate environmental safeguards, after consultation with the affected states.

It is North Carolina's legal position that the State has jurisdiction over the Outer Continental Shelf, contiguous to North Carolina, and that it is in the state's power to adopt its own policy, which may or may not be consistent with that of the United States Government, in regard to drilling for oil in the Outer Continental Shelf. This position is set out in the state's amicus brief in the case now before the United States Supreme Court entitled, U.S. v. Maine. Therefore, until the Supreme Court makes a decision in this case, this state does not recognize the authority of the federal government to regulate and control the development of the Outer Continental Shelf.

In either resolution of this jurisdictional question, however, and if your study findings support an affirmative recommendation with respect to environmental aspects, we shall support OCS exploration and development under the following conditions.

1. Assurance that present technology is available that will reduce danger of spills, blowouts and other accidents to the lowest feasible minimum.
2. That all oil and gas leases contain stringent safety requirements, based on the best technology available, with strict enforcement clauses, supported by adequate funding to assure effective management and enforcement.
3. That the states retain primary control over secondary impacts, such as refinery siting, pipe lines, etc.
4. That federal authorities will coordinate their leasing, management and production control activities with those of the coastal states.
5. That the coastal states share in revenues derived from the sale and production of offshore oil and gas to support research and coastal management and enforcement programs.
6. That high priority be given to expanding research in the ecology of the Continental Shelf with special emphasis on preventing adverse effects of mineral exploration or development as they relate to marine life, recreation and other values.
7. That programs be expanded for the collection and dissemination of basic geological and geophysical data in order to relate mineral development to other resources and values effectively and to evaluate leasing proposals fairly.

North Carolina looks forward to continued cooperation among the states and the federal government in this important area. We appreciate the opportunity to present our views at this hearing.

Offshore exploration adjacent to our coast and the locations of refineries, a superport and petrochemical complexes along our coast are very distinct possibilities which could be realized in a few years. Since this is a recent prospect and North Carolina has been little touched by such activities in the past, the General Assembly has not previously needed to address itself to the regulation of such activity.

While the State is now becoming involved in land use planning, coastal area management, oil pollution control, and other areas of environmental protection, the tools for dealing with these subjects are quite general and are just now evolving. Specific regulations for regulating the siting and operation of specific facilities will be necessary in order to enable the agencies of state government with duties and responsibilities for the protection of the environment to perform their duties adequately. Legislation pertaining to refinery permitting will be submitted by NER to the Legislature this session.

9. Permanent State Energy Office.

Since the energy crisis is fully expected to be quite drawn-out and since it is also fully expected that we shall never return to the care-free days of abundant and low-cost energy, it will be necessary to manage energy resources very carefully in the future. A permanent office for the State will be necessary. It could logically function in two parts, as follows.

ALLOCATIONS SECTION

This section is responsible for furnishing information and answering inquiries from all interested parties within the State regarding various allocation programs governing distribution and consumption of petroleum products. Calls and correspondence are received from citizens, oil distributors, industrial, commercial and institutional users.

The section provides guidance through the Civil Preparedness Organization of the State to local boards and to others designated by County Chairman to administer allocation programs at the local level.

The section processes, reviews and approves or disapproves requests for hardship assistance in obtaining petroleum products for distributors, and large industrial, commercial and institutional users. The section makes the necessary arrangements with suppliers to furnish product to cover hardship requirements. Records are kept of available product to satisfy hardship cases, allocations against such product, and balances available for future allocations.

#### RESEARCH, POLICY PLANNING AND COORDINATION SECTION

##### I. RESEARCH

- A. Construct an economic model of state economy.
- B. Determine energy supply and demand patterns for state.
- C. Determine end uses of all energy in state.
  1. Obtain industry institutionalization of energy metering and accounting.
- D. Set optimum energy efficiency criteria for all activities.

COMMENT: Information concerning the sources of energy supply to the State and the intra-state demand pattern is essential in order to estimate the implications of external changes in energy supply. The pattern of ultimate end uses of energy will illustrate where energy is consumed by form and allow policy determinations to be made which can minimize the disruption of activities due to inadequate energy. The institutionalization of metering and accounting of energy is essential to accurately depicting the economy in model form and to making intelligent decisions about the use of energy. The protection of productivity, employment, and income, and the setting of priorities of consumption when demand exceeds supply are possible systematically using modeling techniques.

## II. POLICY PLANNING

A. Based on energy consumption patterns and efficiency criteria evaluate:

1. Public transportation
2. Building Codes
3. Auto use, size, weight, and horsepower
4. Rate and state tax structure vis-a-vis price elasticity of energy
5. Car pooling
6. Many, many others.

B. Consumption Patterns Alteration

1. Determine optimum energy form of each of classes of activities
2. Recommend, induce, regulate changes for non-conformers.

C. Conservation and Education

1. Develop conservation techniques relative to all energy consumption in the state.
2. Develop conservation education program designed to change consumer behavior.
3. Maximize state and federal agency and university resources to accomplish 1. and 2. above.

COMMENT: Policy alternatives could be developed in this section to accomplish specific objectives and they could be simulated on the model to estimate their impact.

## III. COORDINATION

A. Coordinate state policies and actions with those of the agencies of the Federal Government, other states, and local units of government.

B. Coordinate all energy-related activities of State Government to produce a unified state policy effort.

C. Coordinate energy policy with emerging land use and environmental protection policies.

COMMENT: This section will coordinate energy activities by agency and function to assure comprehensive and efficient development of state energy policy.

A sub-committee of the Commission has been established to pursue this topic further and their report appears in the following section: Commission Recommendations.

10. Economic affects of the energy crisis including, but not limited to, deterring new industry, effect on mobility of citizens, tourism, agriculture, fertilizer, employment, wages, taxes, welfare.

The energy crisis is the herald for a new era in which energy will be neither abundant nor low-cost. There will be many economic adjustments caused by scarcity and increased prices. We are still in the old era as far as understanding the consequences of the energy shortfall. The methodology, data, and accounting procedures necessary to evaluate changes in production, wages, employment, revenues, and the multiplier effect for changes in energy inputs will be a task of the permanent energy office.

When the State was faced with natural gas curtailment late in 1973 a poll of industries which would be affected was conducted for the Governor's Office to determine what the impact might be. The results of the poll are set forth below.

Total Plants and Institutions covered (includes Burlington, but not Fieldcrest)- 242

Number of Plants anticipating total shutdown - 143                      Employing 80,300

Number of Plants anticipating partial shutdown - 26                      Employing 12,840

TEXTILES:

Number of Plants: 166    Total number of employees - 137,000

Number of Plants total shutdown - 114                      Employing 66,150

Number of Plants partial shutdown - 14                      Employing 10,000

Note: Several of the small plants indicate they will fold up if extended shutdown.

BRICK MANUFACTURERS:

Number of Plants: 16	Total number of employees - 1,600
Number of Plants total shutdown - 10	Employing 950
Number of Plants partial shutdown - 4	Employing 265

Note: Spin-off impact on building industry from these shutdowns is obvious.

Note: Brick kilns could convert in many instances to #2 fuel oil, but it is not available as they were generally not users in 1972 - hence no allocation.

OTHER SPECIALIZED PLANTS: (Chemicals, metals, pipe, etc.)

Number of Plants - 13	Total number of employees - 7,645
Number of total shutdown - 6	Employing 4,300
Number of partial shutdown - 5	Employing 1,075

Note: Spin-off impact on other industries is especially heavy from these.

ALL OTHERS:

Number of Plants: 40	Employees - 31,600
Number of total shutdowns - 13	Employing 8,900
Number of partial shutdowns - 3	Employing 1,500

It was concluded that the collection of data without an economic model and a methodology for systematically evaluating the data was not useful. The State does not now have the capability to do more than isolate and estimate some impacts of the energy shortage.

11. Energy Crisis Study Commission Successor.

The energy crisis will not be immediately solved and we will never again return to a time of abundant and low-cost energy. It is clear that the work begun by the Commission/Panel staff in mid-1973 will not be finished with the completion

of the Energy Crisis Study Commission Report. The staff will continue to function in allocation operations. The development of new ways and means by which the State can adjust to the new conditions of scarce energy is a very important function to be undertaken by the staff. The staff budget is approved through June 30, 1974 and has been recently increased in order to enlarge the staff capability. Consistent with these and other circumstances, it is deemed desirable to succeed the present commission with a body capable of advising the staff without loss of continuity. This topic has been referred to the Permanent State Energy Office sub-committee for further study and their recommendation appears in the next section: Commission Recommendations.





## VII. COMMISSION RECOMMENDATIONS

From the topics investigated, four were determined to have the potential for legislative action which could reduce the impact of the energy crisis on North Carolina. The following are the recommendations of the Commission on each of the four topics.

1. Possible curtailment of certain activities within State to conserve energy, e.g., recreational and entertainment activities, electrical advertising signs, etc.

The recommendation of the Commission on this topic is in the form of proposed legislation entitled "A Bill To Be Entitled An Act Relating To The Management Of The Emergency Energy Crisis In North Carolina" and is included as Appendix "E".

The purpose of the proposed bill is to grant to the Governor emergency powers to meet the energy crisis. The bill itself declares that a state of emergency exists due to the current fuel shortage; no gubernatorial proclamation regarding a state of emergency is required. Cooperation with the President and federal agencies is stressed throughout the bill; in fact, it is anticipated that major management actions such as rationing, use of quotas and allocations would be undertaken only incident to federal action. At the same time, in matters peculiar to North Carolina, the Governor is authorized to take appropriate steps to protect the public peace, health and safety, and preserve life, property and the operation of the economy and society within the State. The bill confers investigative powers upon the Governor to ascertain the degree and impact of the crisis within the State and to identify the factors creating or contributing to the emergency. The Governor, after consultation with the Council of State, could carry out the provisions of the bill by appropriate executive orders, rules and regulations. The proposed bill will take effect upon ratification and remain in force until April 1, 1975.

2. Permanent State Energy Division.

The Commission recommendation is that a permanent Energy Division be established in State Government. The Energy Division should be composed of two functional sections -- an Allocations Section and a Research and Conservation Section -- and should be located as a unit in the Department of Military and Veterans Affairs. It should be staffed by the current Commission/Panel staff and that staff of six (6) should be increased to thirty-one (31). The proposed budget for supplemental monies necessary was approved by the Commission as it appears in Appendix F, with the proviso that the recommendation to the appropriate Appropriations Sub-committee may be modified (either by increase or decrease) subject to any further Federal Regulations which may be promulgated prior to the final actions of the Appropriations Committee. The recommended form for the Energy Division is as follows:

DIRECTOR'S OFFICE

The Director and his immediate staff assistants will be responsible for directing the day-to-day activities of the Allocations Section and the Research and Conservation Section. Since the energy crisis is not just a North Carolina problem, all of the other states as well as agencies of the Federal government will be involved in activities to reduce and eliminate the problem and to minimize its impact. The Director's Office will have primary responsibility for coordinating the energy activities of the State with those of other states, the Federal Government, and other agencies and institutions with similar missions.

ALLOCATIONS SECTION

This section is responsible for furnishing information and answering inquiries from all interested parties within the State regarding various allocation programs governing distribution and consumption of petroleum products. Calls and correspondence are received from citizens, oil distributors, industrial, commercial, and institutional users.

The section provides guidance through the Civil Preparedness Organization of the State to local boards and to others designated by County Chairmen to administer allocation programs at the local level.

The section processes, reviews and approves or disapproves requests for hardship assistance in obtaining petroleum products for distributors, and large industrial, commercial and institutional users. The section makes the necessary arrangements with suppliers to furnish product to cover hardship requirements. Records are kept of available product to satisfy hardship cases, allocations against such product and balances available for future allocations.

Personnel requirements are difficult to forecast but a basic force of 16 people is envisioned. This may have to be supplemented from time to time with temporary employees borrowed from other State organizations to handle peak work load situations.

#### RESEARCH AND CONSERVATION SECTION

Energy scarceness over the next three to five years (near term) places a premium upon maximizing the effectiveness of energy utilization. The development of policies and regulations to manage energy consumption in both the public and private sectors will be necessary. Understanding how energy is used in North Carolina will be essential to establishing priorities and contingency plans, if and when our supply becomes severely limited, in order to protect our vital activities, employment, wages, productivity, and revenues.

Conservation. The reduction of energy demand is essential, since the supply cannot be appreciably increased during the near term. Reduction means conservation. The development of conservation techniques applicable to all forms of energy consumption and to all users in the State must be done. Optimum energy efficiency criteria for all activities must be established. There must also be established an effective energy-conservation education program to acquaint all energy users with conservation techniques and efficiency criteria. Performance measures and feed-back must also be established in order to guide the conservation/education program and to encourage and challenge the citizenry.

Economic Model Modification. In the preceding era of plentiful and low-cost energy strict accounting of energy inputs has not been necessary. That is no longer true. Relationships between energy and production must be established throughout the North Carolina economy. Relationships between energy and employment, energy and wages, and energy and revenues must be clarified in order to develop the policies necessary to optimize the mix of jobs, wages, productivity, and revenues for a given level and mix of energy.

To understand the energy-implications within the State economy and their inter-related nature sufficiently well to act intelligently, it will be necessary to modify the North Carolina input-output model of the economy in order to depict the flows of energy and critical materials. Information concerning the sources of energy supply to the State and the intra-state demand pattern is essential in order to estimate the implications of external changes in energy supply. The pattern of ultimate end-uses of energy will illustrate where energy is consumed by form and allow policy determinations to be made which can minimize the disruption of activities due to inadequate energy. The institutionalization of metering and accounting of energy is essential to accurately depicting the economy in model form and to making intelligent decisions about the use of energy. The protection of productivity, employment, and income, and the setting of priorities of consumption when demand exceeds supply are possible systematically using modeling techniques.

Environmental Standards. An evaluation of state-implemented environmental standards vis-a-vis energy utilization will be made in order to identify and evaluate environmental constraints which are binding on energy utilization. Conditions will be continually monitored.

Short-Range Objectives. Conservation techniques have received national attention recently and many are well-known. Others are being developed. Some are applicable only to a few processes, are quite technical, and can save significant

quantities of energy. The State Energy Division, maximizing the resources of other state agencies and institutions, can reasonably quickly collect, evaluate, and distribute conservation techniques.

There also already exists educational institutions whose missions could include the dissemination of energy conservation information. Cooperation and assistance to these institutions in developing programs to reach target populations could constitute the basis of an energy-conservation education program. Also, federal education and research assistance, and assistance from civic, professional, philanthropic, and other private organizations could be coordinated by the State Energy Division.

Both the development of conservation techniques and the development of a systematic approach to energy-conservation education could be started immediately and fully developed and operating within one year.

The evaluation of state-implemented environmental standards, a continuing process, could also be started immediately.

The development of a model of the energy and critical materials flow for the State can be accomplished in two years, with useful statistical and other information spun off earlier. The State Energy Division would be assigned primary responsibility for collecting and evaluating the energy policy matter, explicit or implicit, of all state agencies and institutions, and for formulating policy recommendations for energy-related activities and practices. The authority to collect and evaluate non-proprietary information from the private sector deemed useful in the construction of the modeling ability necessary to adequately protect the health, welfare, and safety of the State population will be granted to the State Energy Division. Recommendations based upon the analysis of energy in the North Carolina economy will be made.

3. North Carolina Energy Council.

The activities specified above are very complicated and technical and their performance is compounded with procedural value-judgments, including equity among users facing possible curtailment. The development of recommendations concerning the flow of energy and materials vitally effects the entire society. It is therefore recommended that there be appointed a North Carolina Energy Council to serve in an advisory relation to the State Energy Division. The number of Council members shall be sixteen (16), and they shall be appointed in the following manner: four (4) shall be appointed by the Speaker of the House of Representatives; four (4) shall be appointed by the Lieutenant Governor; and eight (8) shall be appointed by the Governor. In addition to advising the State Energy Division, the Council will serve as liaison with the Legislature.

4. Speed up and simplify process for approval of siting of generating plants.

The Commission recognized the need to seek to achieve methods of expediting the licensing, construction, and operation of electric generating plants in order to provide an adequate supply of electricity for the citizens of the State, but the Commission was of the opinion that because of the divided authority and jurisdiction of various federal and state agencies, and because of the desirability of coordinating any State action on plant siting with federal action, and because of the need to avoid any action which might have the effect of compounding and duplicating existing regulatory requirements rather than expediting the licensing, construction, and operation of electric generating plants, therefore consideration of possible State power plant siting legislation should be deferred pending the possibility of further federal action, and that the subject be kept under advisement by any successor commission or council to this Energy Crisis Study Commission.

## FOOTNOTES

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Section II An Analysis of the Energy Crisis in the United States

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7. Ibid., page 27.
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10. Statement by Sherwood H. Smith, Jr., Commission member and Senior Vice President of Carolina Power & Light Company, at the October 10, 1973, Public Hearing.
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14. Earl Cook, The Flow of Energy in our Industrial Society, SCIENTIFIC AMERICAN, October 1971.
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- 27 Doctor, R.D. and Anderson K.P., California's Electricity Quandary: III Slowing The Growth Rate, The Rand Corporation, September 1972, page 59.

Section III North Carolina and the Energy Crisis.

Section IV Summary of Federal Actions.

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- 5 Electric Power: EPA Releases List Of 46 Plants That May Be Required To Convert From Oil To Coal, Energy Users Report, 15 A-30, November 22, 1973.
- 6 Electric Power: Simon Asks 19 Utilities To Convert 26 Power Plants From Oil To Coal, Energy Users Report, 18 A-7, December 13, 1973.



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- 8 The Oil Daily, July 2, 1973, page 1.
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- 10 Allocations: White House Issues Mandatory Middle Distillate Fuel Program, Energy Users Report, 10 AA-1, October 18, 1973.
- 11 Reorganization: Nixon Names Simon To Head New Federal Energy Administration, Energy Users Report, 17 A-24, December 6, 1973.
- 12 Federal Energy Office Notice of Contingency Plan For Gasoline Rationing (January 16, 1974, 39FR 2066), Energy Users Report, 23 B-1, January 17, 1974.



GENERAL ASSEMBLY OF NORTH CAROLINA  
1973 SESSION  
RATIFIED BILL

RESOLUTION 108

SENATE JOINT RESOLUTION 868

A JOINT RESOLUTION ESTABLISHING THE ENERGY CRISIS STUDY COMMISSION.

Whereas, there has been a great deal of recent publicity devoted to the apparent approach of a serious petroleum shortage during this summer and in the coming decade; and

Whereas, last winter saw many areas of the country with closed businesses and schools because of shortages of petroleum and other fuels; and

Whereas, airlines have been unable to acquire all of the fuel they needed resulting in extra fuel stops and cancelled flights; and

Whereas, our North Carolina State Purchasing Department has been unable to contract for the State oil requirements; and

Whereas, a number of major oil companies are starting to ration supplies to their distributors; and

Whereas, we appear to be approaching increased use, higher prices, and shorter supply of gasoline and diesel fuel, and savings in our uses of these fuels is desirable; and

Whereas, on April 3, 1973, the Chase Manhattan Bank, in its regular review of the petroleum situation, said that the looming oil shortage could "tend to cripple the nation's transportation system"; and

Whereas, our North Carolina passenger and freight transportation is heavily dependent on private cars and trucks

which are inefficient energy users compared to trains and buses, and by our tax structure and use of taxes we can affect this business; and

Whereas, there has been a series of recent electrical power failures in the South that have caused problems of dramatic proportions, and a continuing reliable source of electric power is necessary for the well being of our citizens; and

Whereas, present limitations on providing natural gas to new industries limits the expansion of industry and may soon limit gas available for homes; and

Whereas, in efforts to conserve energy the federal government has changed the FHA Insulation Requirements and the states of California and Minnesota have changed their Building Codes to include better insulation; and

Whereas, there have been serious delays in construction and start up of new utility plants to serve our area, and there have been shortages of coal, oil, and gas for existing plants; and

Whereas, there has been much discussion of the potential effects of newly developed natural or synthetic fuels, such as synthetic coal gas, solar energy, geothermal energy, and nuclear power; and

Whereas, North Carolina is entirely dependent on the import of energy sources such as gas, oil, coal, and atomic energy, and is thus highly sensitive to the United States and International energy situation; and

Whereas, the depletion of our domestic oil supplies and our increased oil usage will lead to much larger oil imports with

implications to oil spills, port business, need for offshore super ports; and

Whereas, since energy availability influences the types of industry wanted, the population growth desired, and the type of transportation system needed, we must have information on future energy sources to guide our actions in these matters; Now, therefore, be it resolved by the Senate, the House of Representatives concurring:

Section 1. There is hereby created the Energy Crisis Study Commission, to be made up of three (3) members appointed by the Speaker of the House of Representatives, three (3) members appointed by the Lieutenant Governor, and six (6) members appointed by the Governor. The Governor's appointees shall include one (1) representative of the liquid petroleum industry, one (1) representative of the natural gas industry, and one (1) representative of the electric power industry; there shall be no restrictions or limitation on his three remaining appointments. The Speaker and Lieutenant Governor may choose to appoint members of the General Assembly, but they are not required to do so. The Governor shall designate one of his six appointees to serve as Chairman.

Sec. 2. The first meeting shall be at the call of the Chairman of the Commission.

Sec. 3. The Commission's study shall include, but not limit itself to, consideration of:

- (1) Present sources of energy supply to North Carolina and the possibilities of their curtailment at

levels below our needs; to answer the question, "Is the problem real to North Carolina?".

- (2) Possible changes in the cost of energy; the effects of curtailed supplies and higher prices for energy on the people and industry of North Carolina.
- (3) Measures that might be taken to minimize the impact of energy shortages on the people and economy of North Carolina; conservation, mass transit...
- (4) Other pertinent studies that are now underway; S.I.N.B., Ford Foundation, Federal Government...
- (5) Actions that have been taken by other states and cities; California and Minnesota building regulations on insulation, proposed New York legislation on labeling appliances with efficiency and electrical usage...
- (6) Interactions between environmental constraints and energy needs; sulfur content of fuel oil, limiting availability of oil...
- (7) Effects of land use planning on energy needs.
- (8) Possible impact of potential energy sources (such as solar, geothermal, controlled fusion) on the situation.
- (9) Effect of the energy crisis on fertilizer and other supplies for the Agricultural Industry, and on the demand for agricultural products.
- (10) Implications of the energy crisis on employment and wages, and thus on taxes and welfare.

(11) Possible needs for citizen-industry-government educational programs on energy conservation and how to start such programs.

(12) Effect of the energy crisis on the mobility of our citizens and on tourism.

Sec. 4. The Commission shall have the authority to employ clerical assistance, to make arrangements for professional staffing and consultants, to purchase supplies and equipment, and to call and interview witnesses.

Sec. 5. Any supplies or equipment not used by the Commission shall become the property of the General Assembly on termination of the Commission.

Sec. 6. Compensation and travel and expense allowance for Commission members shall be the same as for State Boards and Commissions under G.S. 138-6.

Sec. 7. Expenses of the Commission shall be paid out of the Contingency and Emergency Fund.

Sec. 8. On or before January 30, 1974, the Commission shall report to the General Assembly and thereafter cease to exist.

Sec. 9. This resolution shall become effective upon ratification.

In the General Assembly read three times and ratified, this the day of May, 1973.

JAMES B. HUNT, JR.

James B. Hunt, Jr.

President of the Senate

JAMES E. RAMSEY

James E. Ramsey

Speaker of the House of Representatives



APPENDIX B

SUMMARY OF ENERGY CRISIS PUBLIC HEARING--OCTOBER 10, 1973--RALEIGH, N. C.

1. Study Areas to be Undertaken by the Commission, Fowler Martin, Commission Executive Director

He enumerated the following areas:

Forecast of demand and supply of energy within the State.  
Conservation measures.  
Siting of power plants.  
Allocation of fuels.  
Use of fuels including distillate by utilities and potential for shift to coal.  
State environmental standards.  
Expansion of fuel supply through development of additional terminal, storage, pipeline facilities, refinery, deep water port.  
Relationship between utility rate structure and use of energy.  
Economic affects of energy crisis on the State.

2. Forecast of Availability of Fuel and Energy

A. Petroleum Products, T. Frank Smith, Commission Member and Southeastern Marketing Region Manager Exxon Company

He outlined the major causes of our energy crisis from the standpoint of the petroleum industry, citing increased demand, shortage of other fuels such as natural gas, air quality regulations, and delays in construction of nuclear generating capacity. Also, lack of sufficient refining capacity in the U. S. and a world wide tight market for crude. He stated government policies and regulations have not provided a favorable climate for the petroleum industry. He forecasted that the supply picture for the coming months would be tight, particularly severe if there is any curtailment from the overseas producing countries. He stated that Exxon expects to be able to supply its customers over the winter months with product equal to all contractual commitments and that the winter situation would be workable if unforeseen events do not work against the company. He forecasted about the same situation for residual fuel.

B. Natural Gas, J. David Pickard, Commission Member and President Piedmont Natural Gas Company

Mr. Pickard stated that Transco, the pipeline company which supplies the gas distributing companies in N. C., curtailed N. C. by about 7½% in calendar year 1972 and are estimating a curtailment of 15% in calendar year 1973. Now they are curtailing the N. C. customers by 20%. He stated that during the past year the Federal Power Commission has modified its regulations in a way which could seriously curtail N. C.\* Industrial, interruptible customers would be most severely impacted. They would require very large quantities of fuel oil to replace the gas. Residential, commercial and firm users would be adequately supplied. He stated that the gas companies need help from all groups, governmental and private, in the State to overcome their difficulties. He made a strong plea for development of additional energy sources including off shore exploration for gas and oil. He also emphasized new energy sources such

and coal and hydrogen.

- \* The Service of N. C. has filed motion for stay with the Federal Power Commission and a motion to preserve status quo pending appeal to the U. S. Court of Appeals for the District of Columbia in an attempt to prevent the Public Utility Regulatory Power Commission from becoming effective on November 13, 1974.

6. Electrical Energy, Sherwood H. Smith, Jr., President, Carolina Power & Light Company

He stated that N. C. electrical growth rate is approximately 10% larger than the U. S. as a whole. By the year 2000 U. S. energy will multiply by 1.5 times. Electricity will increase from 10% of total energy in 1970 to 17% in 2000. The changes in fuel mix to generate total electric power are: oil and gas, from 46% in 1970 to 28% in 2000; coal, from 32% to 25%; and nuclear, from 18% to 47%. Two problems with increasing electrical power are: 1) doubling the production of coal and the sulphur dioxide removal problem and 2) how long it will take to generate nuclear generating procedures in an orderly fashion and in a reasonable length of time.

CEA, Duke Power, and VEPCC are making a substantial investment in nuclear generating capacity; expect to be 45% in capacity by 1982. If they are not able to bring these units on line as scheduled, N. C. will not have enough electricity in the late 70's and early 80's. N. C. will be well advanced in nuclear technology by the late 70's. It is expected to be by 2000. Nuclear power is not only safe but is a financially competitive source of power. Economic expansion, employment, wages, and living standard depend upon the expansion of electric power. Sound planning and energy conservation are a necessary part of energy. Energy will become more expensive over the 20 year period.

3. Relationship between Energy and Environmental Standards, Dr. William W. Cooper, Assistant Secretary, NER

He stated that current problems with energy stem from the fact that the rate of consumption of energy has been greater than the discovery, production, and marketing of new resources. The following three actions await a proper response, in the opinion of NER. First, discover, develop, and deliver new sources of those fuels upon which we now rely, with proper measures for environmental protection. Second, develop competent and carefully thought-out programs for the conservation of existing energy resources. Third, a major commitment to research on new sources of energy and more efficient techniques for utilizing present resources is essential. N. C. should focus on one and two, and the third is national in scope. NER is now making a careful evaluation of N. C. policies with respect to the petroleum industry including exploration in the Beaufort and our coastal waters, and to the development of re-fueling facilities. Careful thought must be given to future site requirements and specific locations for electric generating facilities.

Air pollution standards are the principal environmental standards involved with the energy crisis in N. C. N. C. air pollution standards regulate visible emissions, particulate emission, and sulphur dioxide (SO<sub>2</sub>) emission. These standards were developed for N. C., do not prohibit use or use of any fuel

because of SO<sub>2</sub> content or any other characteristic, and, therefore, are expected to have little impact on availability of fuels. Of the five principal stationary fuels --- natural gas, propane, #2 fuel oil, heavy oil, and coal --- only heavy oil and coal, used principally by industry, have compliance problems, generally speaking.

Coal is susceptible to visible, particulate, and SO<sub>2</sub> emission problems, heavy oil has no particulate and visible emissions are controlled by good operation and maintenance practices. Particulates control is obtainable with electrostatic precipitators. Coal with SO<sub>2</sub> content low enough to permit user compliance has generally been available to N. C. Maximum SO<sub>2</sub> emissions permitted are 2.3 pounds of SO<sub>2</sub> per million BTU in-put. Heavy<sup>2</sup> oil (#6) with SO<sub>2</sub> content not exceeding 2% by weight permits user compliance and there has been no procurement difficulties in N. C.

New sources cannot emit more than 1.6 pounds of SO<sub>2</sub> per million BTU in-put, a rate which requires oil containing no more than 1.5% of SO<sub>2</sub> by weight. NER is aware of some proposed or modified sources difficulties in obtaining 1.5% oil. Consideration will be given to amending the standard to 2.3 pounds of SO<sub>2</sub> per million BTU in-put if it can be shown that that rate of emission will not result in ambient air quality standards being exceeded.

4. Conservation Potentials, Archie Beal, Commission Staff

He stated that the problem could not be solved by increased supply alone but that energy demand must be contracted. GNP, employment, and a high standard of living will not be severely disturbed by a lower rate of consumption which conservation and efficiency could produce. Space heating and cooling and water heating in the residential and commercial sectors require one-fourth of our total energy. Insulation, weatherstripping, lower thermostat settings, and minimized use of heat-producing appliances could yield large savings in these sectors. Industry could reduce consumption by 10% by eliminating wasteful practices, shutting off unused lights and machines, and beneficently using waste heat and other wastes. Transportation savings could result from minimizing use of autos, keeping the auto properly tuned, driving slower, using mass transit, shifting freight from air and truck to rail, and reducing number and speed of jet-liner flights. The State has instituted conservation programs for State agencies and institutions and have realized encouraging results. Everyone must be conservation-minded and convinced their part is important and indispensable.

STATEMENTS FROM THE FLOOR

1. Watson Morris, ECOS, Inc.

He stated that the serious "energy crisis" is a symptom of a fundamentally wrong approach to using natural resources. A more rational approach is the reduction of wasteful use of energy instead of increasing the supply. Suggestions for the Commission were: 1) have an environmentalist appointed to Commission; 2) set up an advisory committee on each aspect of the energy crisis, with an environmentalist on each; 3) consider most carefully the proposed oil refinery and superport; 4) adopt a "go slow" policy on licensing

process for nuclear power plants because of too many unsolved problems of both engineering and ethics; 5) reverse the electric rate structure (progressive instead of regressive); 6) ban outdoor electric advertising at night and ban throw-away beverage containers, as Oregon has done; and 7) encourage recycling wastes, improved building design for efficient energy use, and public transportation, and discourage inefficient appliances, automobile use, and highway proliferation.

2. Jerome Kohl, Sierra Club

He offered the help of the Sierra Club in connection with the Commission's activities. He recommended that the Commission establish advisory committees to provide additional input into their studies, to help provide public education and to gain support for legislation and executive action. (We have written to him for more specifics on his suggestions).

3. Don M. Ward, N. C. Oil Jobbers Association

He stated the fuel shortage was world-wide in scope and encompassed all products with the possible exception of coal. He said the shortage had been predicted as long as 1970. Mr. Ward commented to the effect that not only independent but also major oil companies have had to close outlets in N. C. He stated the shortage has not been corrected. He feels that environmental controls have been a major cause of the shortage, citing among other things delays in the Alaska pipeline and slow growth of nuclear plants. He stated that one of the major causes of the shortage of petroleum is the rapid rate of growth in consumption with N. C. growing at a faster rate than the average for the nation as a whole. He pointed out that part of the supply problem in N. C. stems from withdrawal or cut back by major suppliers representing 12% of the N. C. total for gasoline in the past 2 1/2 years.

Mr. Ward feels that the major weapon for coping with the shortage is for all to become more energy conscious and to emphasize conservation. In addition, we should encourage off shore exploration. He feels there is a general misunderstanding and lack of interest on the part of the public, largely unwarranted, toward the petroleum industry.

4. Bobbie O'Neal, N. C. Liquid Petroleum Gas Association

She stated her association was not in favor of the mandatory allocation program recently announced by the Federal Government and that adequate measures have not been developed to implement it. She said too many suppliers have moved out of the State and the gas line which supplies product to N. C. is too small. Further contributing to the shortage is the increased use of LPG as a standby fuel, principally for natural gas. She enlisted the support of the Commission to insure the State gets its fair share of gas.

5. Darryll Pederson, Appalachian State University

He stated the only feasible way of dealing with the shortage over the short run is reduced consumption. He said the educational institutions in the State are practicing conservation. He suggested a number of conservation measures including staggering of working hours, penalty taxes on inefficient cars, desirable mass transit, daylight athletic events and, above all, public education. He emphasized the need for planning now for new fuels. He pointed out the great danger inherent in nuclear fuels but felt fusion to be a promising area. Also solar and hydrogen. Full support of R&D for new sources is essential.

6. W. D. Goldston, N. C. Motor Carriers Association

He stated nationwide the trucking industry uses 17% of the distillates and 3.3% of all petroleum fuels. Trucking usage of fuel is increasing at about 10% per year. Trucking industry does not create a demand for its services but merely responds to a demand and a shortage of fuel would be chaotic for the economy. N. C. is eighth from the top in total number of trucks licensed in the country. The trucking industry is very conservation minded.

7. John Sledge, N. C. Farm Bureau Federation

He stated the farmers are concerned because they need large quantities of fuel energy to produce food energy. Not only in the area of operating farm machinery and drying crops but in the production of fertilizer. He stated farmers are conservation minded, saving fuels wherever possible. He stated fuel is becoming critical because of increased farm production and the farmer is unable in most cases to shift from one type of fuel to another. He stated there is a forecasted shortage of 1 million tons of nitrogen, produced from natural gas, and that N. C. is one of the largest users in the country. He had the following recommendations: discourage black market practices, prevent oil companies from reducing competition, do not restrict petroleum imports, educate the public it is better to have food and heat than to starve to death in clean air, see that purposes and guidelines of mandatory allocation plan are carried out, use more coal, in setting priorities on interruptible services, carefully investigate the critical nature of the industry.

8. Bill Wilder, N. D. Department of Agriculture

He stated shortage of energy for the farmer would inevitably result in higher food prices. He said a major failing of the Federal Government is they do not consider lack of fuel as a problem until there has been a complete run out. Also, mandatory programs do not provide for a growth factor. Natural gas curtailment is critical to food processors. Agriculture is the largest segment of the fuel users as relates to the economy of the State. Agriculture must have its fair share.

9. O. L. Thomas, N. C. Coal Association

He stated the coal industry has reserves in the ground to prevent a fuel shortage in the future. Recoverable reserves in the U. S. between 0 and 1,000 feet total 650 years supply at todays consumption; at 0 to 6,000 feet 2,675 years. Problems in meeting short term needs are serious. Many utilities using other fuels could convert back to coal but new mines would be needed and even if the "climate" were favorable it takes 2 to 3 years from start to production of coal. Many new regulations and laws impede coal production including pollution controls, strip mining restrictions and safety regulations.

10. N. M. Coleman, GE Company in Asheboro

He cited the dependence of his company on natural gas and propane. They are faced with a severe curtailment of gas and are finding propane difficult to procure. Industry is not a priority user under the new mandatory propane allocation system. His difficulties in the future are likely to be compounded.

11. Gene W. Dyer, N. C. District Manager, Texas City Refinery Company

He outlined the plight of the independent oil dealer who has been cut off from his only or principal supplier. Many small companies in N. C. have found themselves in this position. His company, TCR, had been supplying a group of independents in N. C. but had to cut them off because the refinery has only enough crude to operate at 2/3 of capacity and because the refinery did not have written contracts with the affected N. C. dealers.

At the conclusion of the presentations and statements, most of the discussion and debate centered around two topics. First, the relative safety of nuclear power plants and secondly, the plight of the small independent oil dealer. One person in the audience claimed he had facts and figures to prove that the major companies were increasing their business within the State at the expense of the small companies.

APPENDIX C

STATEMENT OF JAMES E. HOLSHOUSER, JR.  
GOVERNOR OF THE STATE OF NORTH CAROLINA  
BEFORE THE FEDERAL POWER COMMISSION

IN

TRANSCONTINENTAL GAS PIPE LINE CORPORATION

DOCKET NO. RP72-99, CURTAILMENT PROCEEDING

September 18, 1973

As Governor of North Carolina, my purpose in appearing at this hearing today is to state emphatically the great concern of the State of North Carolina with respect to the permanent gas curtailment plan which has been submitted by Transcontinental Gas Pipe Line Corporation for approval to this Commission pursuant to its Order #467, and the consequences which appear inevitable in the State of North Carolina if such a plan goes into effect in November of this year. I wish to express the opposition of the State of North Carolina to this proposed plan which, although referred to as an end use plan, appears to be based on size of purchase by volume and nature of contractual arrangement rather than the end or ultimate use of the gas.

The precise measurement of the impact of this proposed plan on the State of North Carolina cannot be ascertained at this time, due to lack of data available and information as to how the plan will be implemented. However, it is known that Transco has curtailed the contract entitlements of the three major gas utilities in North Carolina for the 12 months ending April 30, 1973, by 7.4 percent under the present interim plan as approved by this Commission, which plan is based on ratable curtailment of contract entitlements.

Preliminary estimates indicate that if this permanent curtailment plan goes into effect in November of this year, the curtailment of gas to consumers in North Carolina will increase from 7.4 to 38.3%, if the priorities 6-9 as established by the Federal Power Commission are interrupted completely on an annual basis. The impact of such a plan would require large volume consumers of gas in North Carolina to obtain 364,000,000 gallons of oil or propane over and above the amount of oil and propane necessarily purchased in the past to compensate for the 7.4% curtailment under the interim plan. Total requirements for heating oils and propane for use within the State of North Carolina are projected at 1.5 billion gallons during the next 12 months. Therefore, the addition of 364,000,000 gallons of oil or propane as a substitute for gas removed under the proposed curtailment plan would represent an increase of 25% in the requirements of North Carolina for these alternate fuels. Because all petroleum products are in extremely short supply, the procurement of an increased requirement of this magnitude is completely unrealistic, even assuming transportation and storage problems could be solved.

If the approximately 200 consumers using gas in priority 6-9 are, in fact, interrupted completely and if alternate fuels are not available, as is clearly indicated at this time, this would necessarily result in the closing of plants, unemployment and all other related economic and social problems which would naturally follow.

If this permanent plan is approved as proposed, and additional loss of gas volumes occurs in North Carolina, the resulting economic burden on the residential and commercial gas consumers would be substantial, as they would be required to make up for the loss of revenue as a result of curtailment if gas utilities in North Carolina are to earn their legitimate or a fair rate of return on their property investments committed to the public service.

The State of North Carolina is itself a substantial purchaser of gas for its institutions, including governmental buildings, schools, mental hospitals and prisons. This use is exclusively related to critical human needs including heating and preparation of food. Notwithstanding this, the fuel requirements of some of the institutions, under valid interpretations of the plan, fall in priorities 6-9, and if these institutions are deprived of their historical gas supplies and cannot obtain the additional volumes of alternate fuel necessary, it would place the State of North Carolina in an untenable position.

North Carolina has relied on the volumes of gas which have been previously certificated by the Federal Power Commission after hearings based on need as required by public convenience and necessity. The residential, commercial and industrial customers, as well as the gas distributing utilities in North Carolina, have made substantial investments in facilities in order to utilize this gas in reliance upon these prior certifications of the Federal Power Commission. Any reduction in these volumes, in addition to resultant inability to fulfill basic human needs and the immediate suffering this will entail, would simply cause the loss of these facilities and investments, the loss of existing industry and future industrial development, and would result in an economic crisis substantially affecting virtually every citizen in North Carolina.

It is my understanding that the interim plan has been in effect for approximately 7 years, that it has been tested and proven effective in protecting the highest priority customers, and that it has the strong support and endorsement of not only the gas distributing utilities, but also Transco. The State of North Carolina is, therefore, strongly opposed to the plan now proposed and adds its endorsement to the present plan. The present interim plan is workable, fair, would protect the highest priority customers and should be permanently adopted by this Commission.



## APPENDIX D

### Suggested Outline of North Carolina Energy Management Plan

#### I. INTRODUCTION AND SUMMARY

##### A. General

(This section will be devoted to discussing the nature of the report and the study and identifying the principal participants. Additionally, this section will present the objectives for the study).

##### B. Scenario of Possible Future Situations

(In this section we will present one scenario that will portray important conditions and events in North Carolina during the 1980's. The purpose of this section is to point out the major aspects of the energy issue and move the reader in the direction of understanding the need for governmental involvement in the North Carolina energy system).

##### C. Dimensions of Problem

###### 1. Recent Experience with Shortages and Projections of Future Shortages

(This subsection will present brief general statements of what the energy crisis is all about. The purpose is to intensify the reader's concern, to justify the study, and to promote reading of the report.)

###### 2. Current Limitations

(This subsection will introduce the subject of obstacles to increasing present supplies and serve to interrelate the present crisis and barriers to expansion of fuels and electrical energy supply - very brief.)

###### 3. Environmental Aspects

(This subsection will introduce general concepts of potentially increased degradation that they may result from some alternatives to the energy crisis.)

###### 4. Potential Impact on Life Styles

(The potential threat to the ways people live, work, travel, and accomplish other activities will be discussed in very general terms. This subsection will emphasize the long term consequences of substantially reduced consumption of energy.)

#### D. Summary of Study

(This section should give the reader a summary of the results of the study, starting with an improved statement of the problem and ending with the conclusions derived from the study.)

##### 1. Overview

(This subsection should give a restatement of the energy issue as it can be supported from the information derived in the study.)

##### 2. Demand and Overall Growth Trends

(This subsection should provide aggregate data on demand and overall growth and provide brief comments as to the implications that are suggested.)

##### 3. Supply and Apparent Trends

##### 4. Conclusions

##### 5. Implications and Recommendations

### II. CURRENT ACTIVITIES OF SIGNIFICANCE

(The purpose of this chapter is to bring the reader up to date on the current forces or activities that are changing the present situation for better or worse.)

#### A. International, Political and Economic Activities

#### B. Activities in North America

#### C. State and Regional Activities

### III. ENERGY CONSUMPTION IN NORTH CAROLINA

(It is anticipated that this chapter will be fairly extensive and intensive.)

#### A. Present Consumption and Significant Factors in Demand

##### 1. Residential

##### 2. Commercial and Institutional

##### 3. Industrial

##### 4. Transportation

##### 5. Government

##### 6. Agriculture

##### 7. Utilities

(In each of the above sectors of consumption, it is anticipated that we will provide detailed breakdowns. For instance in the residential sector we should provide breakdowns of energy consumption for activities such as space heating, space cooling, water heating, and refrigeration.)

8. Summary of Present Consumption by Fuel Types and Geographical Source

9. Significant Factors that Determine Present Consumption

(Population, income and such.)

B. Interrelationships Among Sectors with Respect to Energy Consumption

(In this section we should discuss the ways in which increases in consumption in one sector may change consumption in another sector. Additionally, we should discuss the questions of fuel switching and how consumption might swing from one energy source to another because of costs changes or supply limitations. Price elasticity will be discussed.)

C. Growth

(In this section we should provide a subsection for each one of the seven categories of consumption listed in A above. An introduction to this section will present the assumptions used such as population growth factors.)

1. Residential

a. Growth in Sector

(Population and households)

b. Trends and Changes in Energy Consumption

(Types and rates of usage)

c. Projections of Energy Demand

D. Current and Projected Generation of Fuel Consumption Residuals

IV. SUPPLY OF ENERGY TO NORTH CAROLINA

A. Description of Energy Supply Networks

(It is anticipated that in this section we will provide a subsection for each one of the energy sources.)

1. Electrical Networks

a. General Description

b. Sites and Capacities with Energy Sources and Options

(Capabilities for switching from one fuel type to another should be discussed in this part of the report.)

c. Utilization Patterns

(Profiles of loading on the electrical supply networks for typical days and for peak days in the summer and peak days in the winter should be presented. Peak loading will be explained to the extent possible in terms of consumer uses.)

d. Changes Anticipated in Networks and Problems Involved

e. Interrelationships Among Electrical Utilities

2. Coal Supply Networks

(A section similar to this will be provided for each of the fuel types to include, in addition to coal, natural gas, fuel oil, residual oil, and other.)

a. General Description of Network

(This description should take the network back to the source of the fuel involved.)

b. Capacities and Constraints on Networks

c. Usual Model of Operation and Decisionmaking within the Network

(The purpose of this subsection is to describe the probable degree of governmental regulation. The types of decisions that are made by the principal factors involved are important. In general, where existing practices or regulations exist, the discussion should trace these back to their origins and present the rationale for each.)

d. Costs

1) Historical Costs

2) Determining Factors

3) Trends and Projections in Costs

e. Scheduled and Projected Increases in Capacities and Problems Associated with Capacity Increase

(This subsection should deal with limiting factors such as scarcity of deposits, engineering, construction, political, and economic considerations. In this subsection we also deal with environmental aspects of capacity increase and increases in residuals.)

f. National and Global Potentials

(This will be a summary of available studies.)

B. Future Source and Technology Developments

V. INTERACTION OF DEMAND AND SUPPLY CONDITIONS

A. Background

1. Summary of Increasing Demand
2. Summary of Supply Conditions
  - a. Availability
  - b. Production Costs

B. Implications for Prices

C. Implications for Patterns of Consumption

1. Short Term
2. Long Term
3. Social and Institutional Changes

VI. ENERGY CONSERVATION POTENTIAL

(This chapter will present the first order factors in energy consumption that can be influenced in a manner that will conserve energy. The degree of change and the potential reduction in energy that could result will be portrayed here.)\*

A. For Residential Users

1. In Space Heating
  - a. Space Design and Construction
  - b. Heating Systems
  - c. Consumer Practices

(A subsection of this organization would follow for all types of energy uses in residences. Each category of consumption, e.g., commercial and institutional, would be considered in the sections to follow.)

\* It is beyond the scope of the study to trace indirect and second-order effects and substitutions.

VII. GOVERNMENTAL INITIATIVES

A. Categorization of Policy Domain

- B. Taxation
- C. Energy Allocation
- D. Change in Regulations
- E. Promotion of New Supplies
- F. Import and Export Regulations
- G. Institutional Change and Coordination
- H. Research and Exploration Support

#### VIII. CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

- A. The Energy Shortfall
- B. Implications of Shortfalls
  - 1. Economic and Social Implications
  - 2. Necessary Transitions
- C. Recommendations
  - 1. Acquisition of Additional Information
  - 2. Meeting Research Needs
  - 3. Establishing Policies and Priorities
  - 4. Concepts for Energy Management

#### Bibliography

- Appendix A: Glossary of Terms
- Appendix B: Conversion Factors
- Appendix C: Energy Consumption Rates and Comparisons

APPENDIX E

A BILL TO BE ENTITLED  
AN ACT RELATING TO THE MANAGEMENT OF  
THE EMERGENCY ENERGY CRISIS OF NORTH CAROLINA

The General Assembly of North Carolina enacts:

Section 1. Short Title. This Act shall be known as the Emergency Energy Crisis Management Act of 1974.

Section 2. Findings, Purposes and Policy. The General Assembly hereby finds and declares that, because of the crisis in the availability of fuels required for heat, light, transportation, generation of electric energy, and other industrial, commercial and residential uses now threatening the health, safety and welfare of the people of North Carolina and of the United States of America, it is necessary to grant to the Governor emergency powers of energy crisis management and the incidents thereof enumerated herein. It is further declared to be the purpose and policy of this Act to assist the President of the United States in effective management and control of such factors and situations which occasion and contribute to this emergency, to cooperate with other States and the Federal Government in matters relating to the crisis effort, to meet the extraordinary conditions and problems resulting in North Carolina from the crisis by establishing such organizations and taking such steps as are necessary and appropriate to carry out the provisions of this Act; and, generally, to meet this crisis, protect the peace, health and safety, and preserve the lives and property of the people of this State.

Section 3. General Emergency Energy Crisis Management Powers of the Governor. The Governor is authorized and empowered:

(a) To cooperate with the President of the United States and federal departments, agencies and independent establishments, and the officers and agencies of other States in matters pertaining to the crisis; and, in connection therewith, to take any measures which he may deem proper to carry into effect any request of the President and such other federal officers and agencies as may be charged with responsibilities related to the crisis effort, for the protection of the public peace, health, and safety, and the preservation of life, property and the operation of the economy and society within the State.

(b) To employ such measures and give such directions to State and local officers and agencies as may be reasonable and necessary for the purpose of securing compliance with the provisions of this Act and with orders, rules and regulations made pursuant thereto.

(c) To utilize the services, recommendations, and facilities of the North Carolina Utilities Commission, the North Carolina Board of Water and Air Resources, the North Carolina Board of Transportation, the North Carolina Board of Health Services, and all existing officers, offices, departments, commissions, boards, bureaus, institutions and other agencies of the State and its political subdivisions; and all such officers and agencies shall cooperate with and extend their services and facilities to the Governor as he may request.

(d) To use and employ within the State, from time to time, and as he may deem expedient, any property, services and resources of the State for the purposes set forth in this Act.



Section 4. Investigations, Surveys to Ascertain the Degree and Impact of the Crisis. The Governor is authorized and empowered to ascertain the degree and impact of the crisis within the State and to identify the factors creating or contributing to the emergency; and in making such investigation and surveys, to compel by subpoena the attendance of witnesses, and the production of books, papers, records, and documents of individuals, firms, associations and corporations; and all officers, boards, commissions, departments, bureaus, institutions and other agencies of the State, and its political subdivisions, having information with respect thereto, shall cooperate with and assist him in making such investigations and surveys.

Section 5. Orders, Rules and Regulations.

(a) The Governor, after consultation with the Council of State, may make, amend and rescind such executive orders, rules and regulations as he may deem advisable to carry out the provisions of this Act. By way of enumerated example rather than limitation, the Governor may control, restrict and regulate by rationing, use of quotas, allocations, prohibitions on shipments, or other means, the sale, distribution and use of fuels and other sources of energy; and suspend or modify existing standards and regulations affecting or affected by the use of energy resources such as those relating to air quality control, the type and composition of various energy resources, the production and distribution of energy resources, and the hours and days during which public buildings and commercial and industrial establishments may or are required to remain open.

(b) All orders, rules and regulations promulgated by the Governor shall have the full force and effect of law upon filing a copy thereof with the Secretary of State. All existing laws, ordinances, rules and regulations

inconsistent with the provisions of this Act, or of any order, rule, or regulation issued under the authority of this Act, shall be suspended during the period of time and to the extent that such conflict exists.

(c) To the extent necessary to accomplish the purposes of this Act, all orders, rules and regulations promulgated by the Governor supersede the provisions of any private agreement, understanding or contractual arrangement inconsistent therewith. It shall be a defense to any legal proceeding brought for breach of any such private agreement, understanding or contractual arrangement that such breach resulted solely from compliance with the provisions of any order, rule or regulation issued pursuant to this Act.

(d) Any person aggrieved by any order, rule or regulation issued pursuant to this Act may, within 10 calendar days from the date of issuance, unless the Governor shall permit a longer period of time for this purpose, petition the Governor and request appropriate relief. The Governor may grant, modify or deny such petition as the public interest may require. Failure to take action on any petition within 15 days after receipt shall be treated as a denial of the petition. Within 10 calendar days after gubernatorial action on the petition (or within 25 days after filing the petition where the Governor fails to take any action) an appeal may be taken to the Superior Court of Wake County. The matter on appeal shall be heard and determined de novo.

(e) In order to attain uniformity so far as practical throughout the country in measures taken to aid in energy crisis management, all actions taken under this Act and all orders, rules and regulations made pursuant thereto shall be taken or made with due consideration to the orders, rules, regulations, actions, recommendations, and requests of Federal authorities relevant thereto and, to the extent permitted by law, shall be consistent with such Federal orders, rules, regulations, actions, recommendations and requests.

Section 6. Enforcement.

(a) The law enforcing authorities of the State and its political subdivisions shall enforce the orders, rules and regulations issued pursuant to the Act.

(b) Any person who knowingly or willfully violates any order, rule or regulation issued pursuant to the Act shall be guilty of a misdemeanor punishable as provided in G. S. 14-3(2).

(c) Whenever it appears to the Governor that any person has engaged, is engaged, or is about to engage in acts or practices constituting a violation of any order, rule or regulation issued pursuant to this Act, the Governor may request the Attorney General to bring an action to enjoin such acts or practices and upon a proper showing a temporary restraining order or a preliminary or permanent injunction shall be issued. The relief sought may include a mandatory injunction commanding any person to comply with any such order, rule or regulation and restitution of money received in violation of any such order, rule or regulation. The Attorney General may institute such action in the Superior Court of Wake County, or, in his discretion in the superior court of the county in which the acts or practices constituting a violation occurred, are occurring or may occur.

Section 7. Liberality of Construction. This Act shall be construed liberally in order to effectuate its purposes.

Section 8. Severability. If any provision of this Act (including any order, rule or regulation issued pursuant thereto), or the application thereof to any person or circumstances, is held invalid, such invalidity shall not affect other provisions or applications which can be given effect without the invalid provision, and to this end the provisions of this Act are declared to be severable.

Section 9. Effective Date; Termination. This Act shall take effect immediately upon ratification and shall remain in force until April 1, 1975.

APPENDIX F

RECOMMENDED BUDGET AND STAFFING FOR A  
DIVISION OF ENERGY

Salaries and support funds for six (6) personnel was approved by the Advisory Budget Commission and appears in the recommended budget as: \$104,371

The Legislative Energy Crisis Study Commission recommends the increase of staff to thirty-one (31) and the creation of a Division of Energy with a supplemental appropriation recommendation to support the increase in staff of: \$337,358

Total amount needed for salaries and support of thirty-one personnel in a Division of Energy: \$441,729