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FINAL REPORT

of the

LEGISLATIVE COMMISSION

ON ENERGY

June, 1975

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STATE OF MINNESOTA

Final Report of the
LEGISLATIVE COMMISSION ON ENERGY

to

THE MINNESOTA LEGISLATURE

and

THE GOVERNOR OF MINNESOTA

June 10, 1975

FORWORD

The Legislative Commission on Energy was created by the 1974 Legislature to assist the Minnesota Energy Agency in its first year of operations and to provide the Governor and the Legislature with an independent assessment of the state's energy situation -- both present and future.

The Commission held numerous hearings and meeting from June 1974 through June 1975 during which time many individuals from the public and private sectors assisted the Commission's attempts to gather the information that is included in this report.

The report itself contains the following parts:

Section 1 is an assessment of the probable energy supply and demand situation in Minnesota to the year 1985. This section was prepared by Commission staff with the full cooperation of Agency personnel. Data for the section were gathered from testimony before the Commission, from Agency statistical histories, and from assorted other informational sources available to the public.

Section 2 is the Commission's suggested game plan to be used in managing the state's energy future in such a way that the negative social, economic, and environmental impacts of energy shorages projected for coming years are minimized. It should be noted that this is only one of several possible game plans. It is a first cut and is presented here for purposes of stimulating discussion that will eventually lead to the adoption of a rational "state energy policy."

Section 3 is a listing of legislation proposed by the Commission. It has been prepared on the basis of policy goals stated in Section 2.

Section 4 is the Commission's evaluation of the directions in which the Energy Agency is moving and suggestions for changes that would make the Agency more responsive to the current and future needs of Minnesota. Information for this section was gathered by repeated contact with Agency personnel and from numerous written communiques between Commission members and Agency administrators. Additional information came from publications of the Agency, some of which are appended to this report.

Section 5 consists of a brief discussion of the Commission and its activities.

I would like to express my deep gratitude to the individuals who served with me on the Commission during the past year:

Senator Hubert H. Humphrey, III, LCE Vice Chairman

Senator John Bernhagen

Representative William Kelly

Representative Richard Andersen (June 1974 - January 1975)

Mr. Alan Greene, Mound

Dr. William Cunningham, St. Paul

Mr. Charles Rafferty, St. Paul

Commission member Alan Greene deserves a special word of thanks for his yeoman efforts in serving as Chairman of the Legislative Drafting Subcommittee and Chairman of the Subcommittee which drafted this report. I would also like to take this opportunity to thank Mr. Sam Rankin who served admirably as the Commission's staff member.

-- Rep. Willard M. Munger, Chairman
Legislative Commission on Energy

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SUMMARY OF COMMISSION RECOMMENDATIONS

It is recommended by the Legislative Commission on Energy that the State of Minnesota engage in the following activities to achieve a better balance between energy supply and demand in the years ahead:

I. Energy Resources Policy

Short term activities:

1. Secure a stable supply of natural gas and petroleum products through federal allocation programs.
2. Encourage the development of alternative supply routes (particularly through-Canada routes) for natural gas, crude oil, and petroleum products.
3. Establish and administer a program for the allocation of natural gas to end users in Minnesota.
4. Prohibit the extension of natural gas use for space heating and water heating purposes.
5. Develop acceptable standards for the use of coal.
6. Encourage the gradual substitution of alternative fuels, particularly coal, for oil and natural gas whenever possible.
7. Minimize the use of oil-fired and gas-fired electric generating plants by the adoption of peak-load-pricing utility rates.
8. Explore schemes to maximize the utilization of base-load (coal-fired, nuclear, hydro) power plants.
9. Review with caution, limitation, and restriction the siting and construction of additional nuclear power plants until the industry develops a nuclear fuel cycle that is both safe and environmentally benign.
10. Use whatever means are available and necessary to encourage the development and utilization of solar and wind powered energy systems and other alternative energy sources suitable to Minnesota.

I. Energy Resources Policy (continued)

Short term activities (continued):

11. Fund and encourage federal funding for research projects that convert municipal wastes into usable energy.

Long term activities:

1. Encourage federally funded research on fusion energy.
2. Explore the possibility of interfacing electric utility distribution facilities with residential and commercial energy systems powered by solar or wind energy.

II. Commercial and Industrial Energy Use

Short term activities:

1. Agriculture, forestry, and food processing sector:
 - A. Protect our agricultural and forestry economic base by assuring adequate supplies of fuel and fertilizer for these activities.
 - B. Encourage low-energy technologies and practices in agriculture and forestry.
 - C. Discourage the processing and use of food or forestry products that require large inputs of energy.
 - D. Encourage low-energy or renewable-energy food processing technologies and processes.
 - E. Restrict commercial or residential development on agricultural or forestry land.
2. Recreation sector:
 - A. Encourage low-energy recreational activities and tourism.
 - B. Discourage motorized recreational vehicles in favor of hiking and bike trails, wilderness campsites, canoe routes, etc.
3. General:
 - A. Encourage commercial and industrial energy conservation measures.

II. Commercial and Industrial Energy Use (continued)

Short term activities (continued):

3. General (continued):

- B. Encourage high-efficiency technological designs.
- C. Protect and promote low-energy use industries (especially those that are labor-intensive).

Long term activities:

- 1. Encourage industries to be energy efficient (especially those using petroleum and natural gas).
- 2. Discourage energy-intensive industries.

III. Transportation Energy Use

Short term activities:

- 1. Strongly encourage car-pooling and van-pooling.
- 2. Require that existing autos be operated at maximum efficiency and that autos brought into the state in 1980 and thereafter achieve 20 miles per gallon.
- 3. Assure improved metropolitan public transit facilities and service.
- 4. Assist in upgrading intercity passenger service by both bus and rail as an alternative to the use of private automobiles.
- 5. Retain and strictly enforce a 55 mile per hour speed limit.

Long term activities:

- 1. Assist in the development of mass transit facilities.
- 2. Control transportation corridor development to restrict increased transportation energy use.
- 3. Assist in upgrading rail passenger and freight service.
- 4. Encourage communication as a substitute for transportation.

III. Transportation Energy Use (continued)

Long term activities (continued):

5. Encourage development projects which will minimize the need for transportation by clustering residences, commercial establishments, and employment opportunities.

IV. Personal Energy Use

Short term activities:

1. Develop a program to encourage the insulation and energy efficiency upgrading of residences in the state.
2. Encourage wiser residential energy use patterns, particularly in the areas of space conditioning, lighting, and appliance selection and operation.
3. Encourage the rehabilitation of central-city residences.
4. Encourage walking, bicycle riding, car-pooling, and the use of mass transit whenever possible.
5. Encourage low-energy consumption uses of leisure time.

Long term activities:

1. Encourage cluster housing and multiple-family residences.
2. Encourage the development and construction of new housing styles that are more energy efficient.
3. Encourage the extended use of consumer purchases followed by the maximum practicable recycling.

It is recommended by the Legislative Commission on Energy that the Legislature take the following actions in relation to the Minnesota Energy Agency and major energy policy issues:

1. Retain the Energy Agency and support it with appropriations sufficient for carrying out the energy policies and goals of the state.
2. Require that the Agency employ feasibility studies to establish project priorities.
3. Request that all Agency projects be restricted to reasonably short, well-defined time frames.
4. See that an energy "supply and demand" game plan be developed, aired publicly, refined, and periodically updated.
5. Consider reorganizing the Agency in such a way that the "Planning" function is independent of other operating divisions -- possibly reporting to the director or deputy director.
6. Consider requiring that energy impact statements be submitted prior to construction on all large projects in the state.

INTRODUCTION

Citizens of Minnesota are far from unique in their concern over the availability and cost of energy. The shock of suddenly realizing that energy may not be an unlimited commodity has dealt a severe emotional and financial blow to all segments of society in nearly every country. Prospects appear dim for a return to the price and availability structures that prevailed even five years ago, and many experts foresee increasing problems in supplying energy for future demand -- even if the rate of growth in demand is considerably reduced.

Increasing Energy Use

Extensive use of fossil fuels began during the Industrial Revolution and has increased at a nearly exponential rate ever since. Energy consumption in the United States grew at an average annual rate of about 3.5 percent from 1950 to 1965 (a doubling time of 20 years) and increased at about 4.5 percent per year from 1966 through 1973 (doubling time of 16 years). Growth in the use of energy in Minnesota has approximately paralleled that of national patterns. The reasons for such growth are several, of which only a few of the most significant will be considered here.

Increased use has been encouraged in part by steadily declining real prices for energy and by strongly growth-oriented energy delivery industries. Volume discounts have made increased consumption particularly attractive.

A continuing attempt to raise the standard of living for citizens in this country has also resulted in increased energy use. Many tasks once performed by human or animal labor are now performed by machinery, equipment, or appliances. With "cheap" energy readily available during most of the past hundred years, little thought was given to the energy efficiency of these devices. In addition to the energy actually consumed by the operation of mechanical devices, considerable energy is used in the process of creating and fabricating the machines in the first place.

It has been almost universally believed that economic growth in an industrialized society is inseparably dependent upon growth in energy consumption. This belief has led to energy consumption being considered a worthy goal in and of itself.

Increased energy use has also resulted from radical changes in transportation systems during the past thirty or forty years. Because of the convenience, flexibility, and privacy of the automobile, it has replaced public transit for the vast majority of travel trips made in this country. The result has been a severe deterioration in the availability and quality of public transit, making the automobile a virtual necessity for large segments of the population. Voluntary and forced dependence on the automobile has resulted in the consumption of larger and larger amounts of petroleum products. In Minnesota, transportation used slightly over 27 percent of all energy consumed during 1972 and accounted for 53 percent of the petroleum products used in the state in that year.

Changing Fuel Mix

Aside from changes in the total amount of energy consumed, there have been changes in the mix of fuels used in the United States and in Minnesota. For many years the proportion of energy derived from coal -- the country's most abundant energy source -- has been declining and the use of petroleum products and natural gas has increased. The shift away from coal was accelerated during the mid- and late-1960's by the implementation of clean air standards that in many cases made the burning of petroleum products and natural gas relatively cheaper than the continued use of coal.

During the period of increasing use, the pool of resources from which energy supplies are drawn has been depleted -- particularly that portion of the pool that is most easily and least expensively extracted. Recently, for both economic and other reasons, the ability of the domestic energy industry to produce has fallen behind the growth in domestic demand, and potential shortfalls have been made up by ever-increasing imports. The Arab embargo on deliveries of oil to the United States focused public attention squarely on the declining ability of the United States to meet its energy "needs" from domestic sources.

Several important factors make Minnesota particularly vulnerable to energy shortages. They are: 1) We have no conventional fuel deposits in the state -- therefore, we are entirely dependent on imports from other states and from Canada. In such a position, we are more or less at the mercy of the energy exporters. 2) The supplier of 96 percent of the natural gas used in Minnesota has

indicated that the amount of this fuel delivered for use in Minnesota will be decreased substantially during coming years.

3) Canada has announced and has begun to implement a policy of curtailing and eventually terminating exports of crude oil from the Prairie Provinces to the United States -- all of which presently flow through Minnesota and supply 90 percent of the feed stock for Minnesota's three refineries. Alternative sources for crude oil to supply the state's refineries are not apparent.

It is highly unlikely that synthetic energy forms such as gas from coal or oil from oil shale will arrive in Minnesota in significant quantity before 1985, and a more realistic estimate might be 1990 or later.

As the following sections of this report will show, the people of Minnesota are faced with some hard choices in the area of policy development and life-style expectations if dislocations and hardships are to be avoided.

SECTION 1

MINNESOTA'S ENERGY PICTURE TO 1985

An assessment of the balance between expected energy supply and expected energy demand must contain a minimum of two components. First, a projection of "demand" must be calculated. "Demand" may be derived by either simple or complex formulas ranging from linear projections of historic trends to sophisticated computer models that consider population trends, economic activity, technological advances, and a host of other factors as integrated variables. Second, the assessment must take into account the probable availability of the various energy fuels in the years ahead. Aggregation of the energy from all fuels yields the supply side of the equation. Only by knowing, or more accurately by trying to make educated guesses at these quantities, can a picture of the evolving situation be obtained.

Historic information on Minnesota's energy consumption has been accumulated by at least two independent studies -- the Minnesota Energy Project (1973-74) and the Minnesota Energy Agency (1974). While data on the use of individual fuels in certain years do not coincide perfectly, the discrepancies are so small that it is reasonable to assume that historic demand and supply are "known" (see Table 1 and Figure 1). It is recognized that energy shortages in late 1973 and early 1974 led to somewhat reduced consumption of virtually all fuels. The trend of diminishing energy use appears to have largely disappeared in early 1975, and growth in the consumption of fuels has returned nearly to the pre-1973 rates. For

TABLE 1

MINNESOTA ENERGY SUPPLY
BY FUEL TYPE

FUEL CONSUMPTION IN
TRILLIONS OF BTU

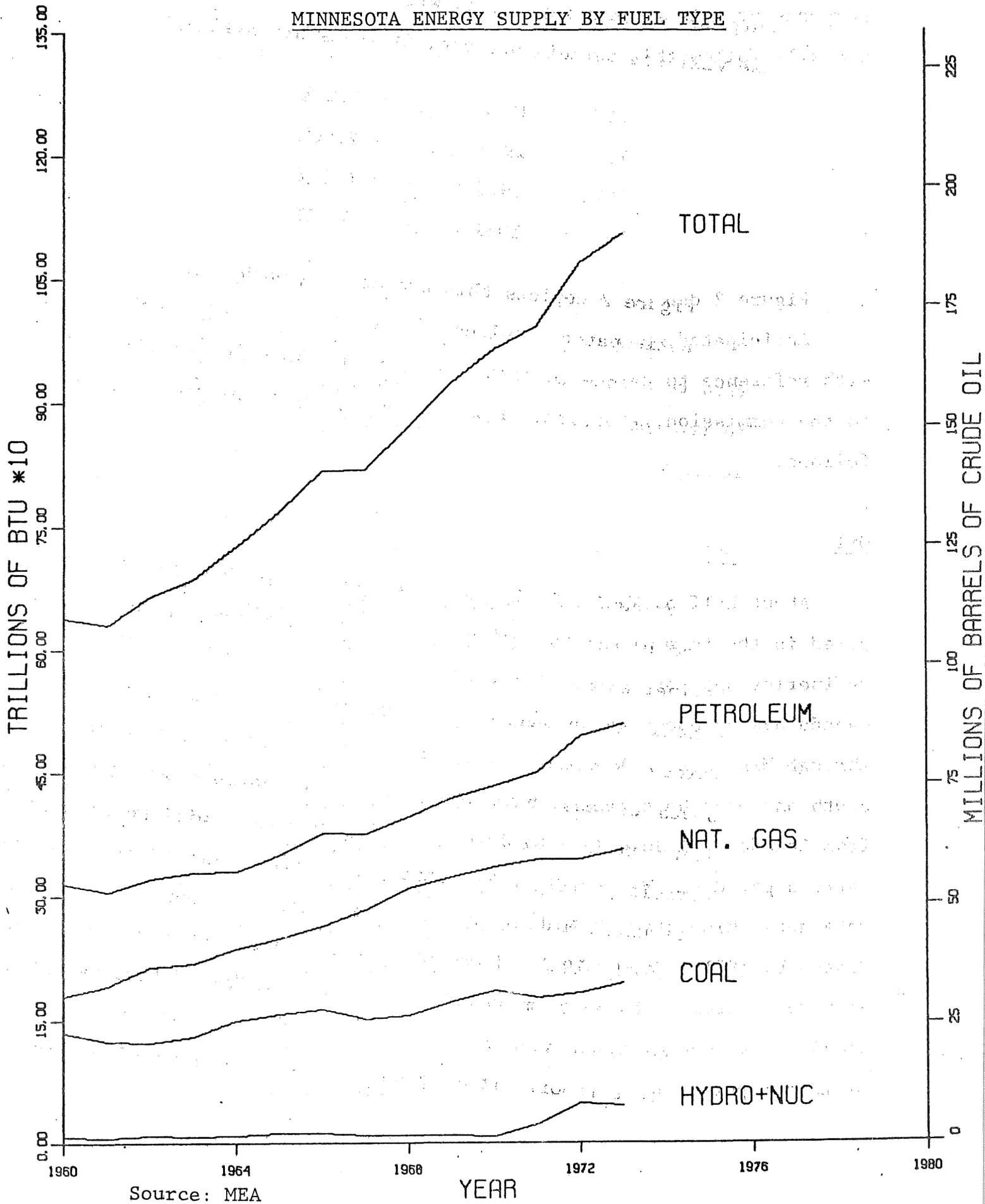
GROWTH RATE IS PERCENT
INCREASE OVER PREVIOUS YEAR

<u>YEAR</u>	<u>NATURAL GAS</u>	<u>COAL</u>	<u>HYDRO + NUCLEAR</u>	<u>PETROLEUM</u>	<u>TOTAL</u>	<u>GROWTH RATE</u>
1957	147.732	113.241	9.460	277.692	548.125	
1958	149.042	102.923	8.921	291.625	552.511	.800
1959	161.390	114.175	8.558	296.147	586.270	5.024
1960	179.827	135.341	8.041	315.530	638.739	10.076
1961	192.584	125.066	6.622	305.199	629.471	-1.451
1962	214.130	122.455	8.701	321.379	666.665	5.909
1963	219.047	130.416	7.623	329.190	686.276	2.942
1964	236.976	150.245	8.657	330.627	726.505	5.862
1965	248.741	157.229	11.638	350.214	767.822	5.687
1966	264.488	163.046	12.276	377.093	816.903	6.392
1967	283.086	151.625	9.251	375.382	819.344	.299
1968	309.139	155.658	9.339	395.617	869.753	6.152
1969	322.694	171.963	9.097	418.045	921.799	5.984
1970	334.872	186.166	7.986	433.699	962.723	4.440
1971	343.573	176.485	22.198	449.779	992.035	3.045
1972	343.940	183.406	48.587	492.798	1068.731	7.731
1973	355.372	194.488	45.562	507.916	1103.338	3.238

Source: MEA

FIGURE 1

MINNESOTA ENERGY SUPPLY BY FUEL TYPE



Source: MEA

YEAR

purposes of this report, it will be assumed that growth in energy use will follow this pattern, if fuels are available:

1973	-	+ 3.25%
1974	-	- 2.00%
1975-80	-	+ 4.00%
1981-85	-	+ 3.00%

Figure 2 depicts this projected growth rate.

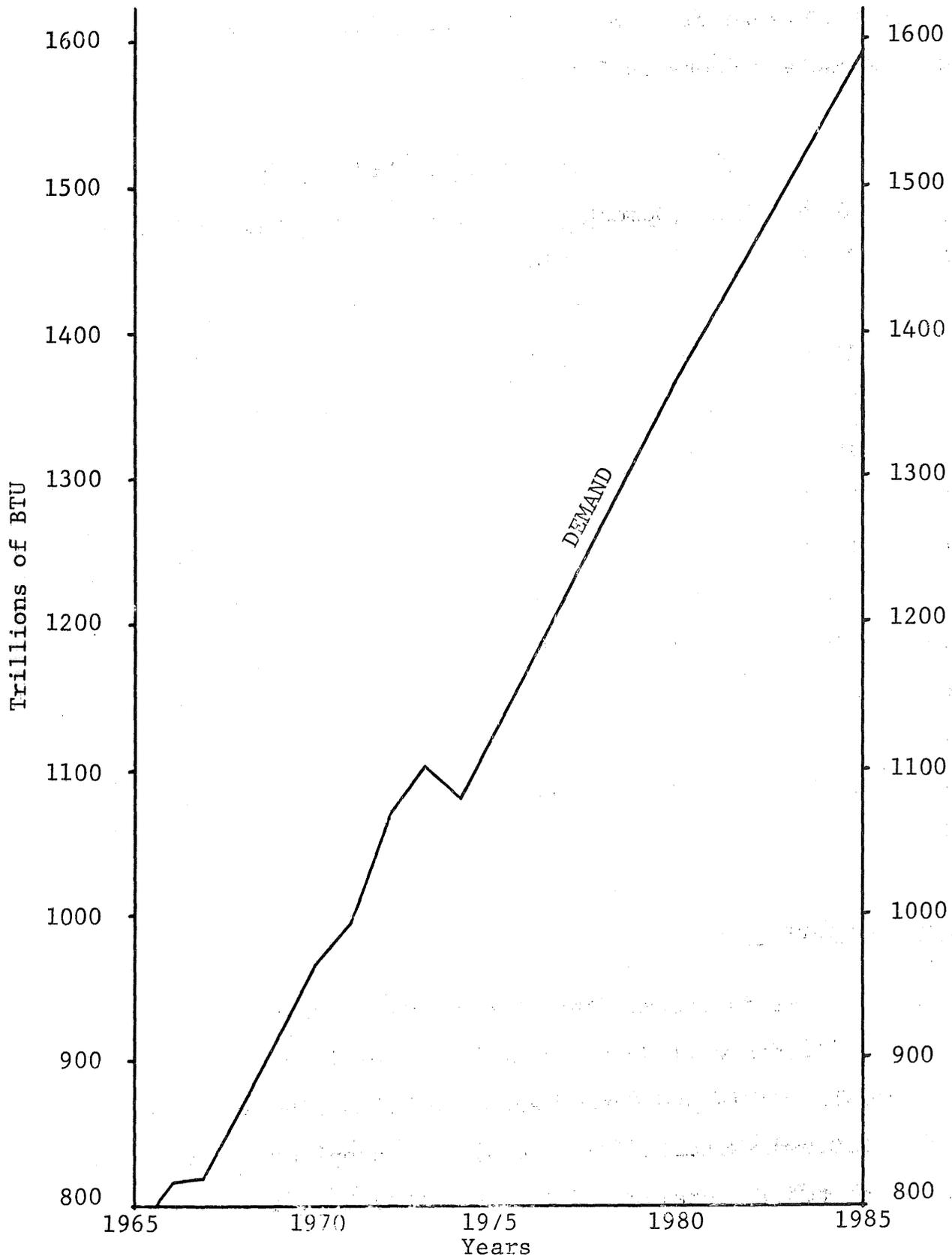
Anticipated supplies of the various energy fuels are estimated with reference to testimony and published information available to the Commission. For each energy type the projections are as follows:

Oil

About half of Minnesota's oil comes from Canada. It is supplied in the form of crude oil for refinement in Minnesota's three refineries and for through-shipment to other U.S. refineries. Canada has announced a program to curtail the export of crude oil through Minnesota. In recent years, Minnesota and points to the south and east have received 860,000 barrels per day of crude oil from Canada. By June 1, 1975, the amount will be reduced to 610,000 barrels per day. We anticipate further reductions at a steady rate until Midwestern U.S. refineries receive no crude oil from Canada by 1981. Some of this decreased oil supply will surely be made up from domestic sources or a "swap" arrangement with Canada, but such details have not been worked out yet. For purposes of this report, it is assumed that 80 percent of the reduction in

FIGURE 2

TOTAL ENERGY CONSUMPTION IN MINNESOTA TO 1985



Canadian oil will be made up from domestic or other sources. The cost of replacement oil will undoubtedly be higher -- perhaps in the range of 5 to 10 cents per gallon. Thus, the oil supply pattern looks as follows:

Trillions of BTU Per Year

<u>Year</u>	<u>Domestic Sources</u>	<u>Canadian Sources</u>	<u>Total</u>
1973	238	270	508
1974	180	255	435
1975	250	231	481
1976	281	192	473
1977	312	153	465
1978	343	114	457
1979	374	75	449
1980	405	36	441
1981	436	0	436
1982	436	0	436
1983	436	0	436
1984	436	0	436
1985	436	0	436

Natural Gas

It is assumed that the amount of natural gas delivered to Minnesota will decrease at a rate of five percent per year through 1985. This projection seems to be in line with predictions of Northern Natural Gas Company, the supplier of 96 percent of the state's natural gas. Supplies thus look as follows:

<u>Year</u>	<u>Trillions of BTU Per Year</u>
1973	356
1974	360
1975	342
1976	325
1977	309
1978	293
1979	279
1980	265
1981	251
1982	239
1983	227
1984	215
1985	205

Hydroelectric and Nuclear

No major nuclear or hydroelectric plants are expected to come on line in Minnesota before about 1985, but it is entirely possible that purchases of electricity from Canada and neighboring states will add somewhat to Minnesota's energy supply. For purposes of this report, it is assumed that hydro, nuclear, and imported electricity will remain at about 55 trillion BTU per year through 1978 at which time they will increase to 65 trillion until 1982 when they will account for 70 trillion through 1985.

Coal

Coal appears to be the conventional fuel with the greatest potential for increased use in Minnesota. Our proximity to the large coal fields in North Dakota and Montana offer a resource that, barring unforeseen difficulties, could supply considerably more energy to our state. It is projected that the use of coal will increase at seven percent per year from 1975 to 1985. This increase can take place only if facilities are available to utilize coal as a boiler fuel. Annual energy contributions from coal should look as follows:

<u>Year</u>	<u>Trillions of BTU Per Year</u>
1974	205
1975	219
1976	235
1977	251
1978	269
1979	288
1980	308
1981	329
1982	352
1983	377
1984	403
1985	431

Alternative Energy Sources

A vigorous program to push alternative energy source systems -- which the Commission recommends -- could supply in the neighborhood of 20 to 25 trillion BTU of energy to the state by 1985. By far the greatest contribution would come from solar heating. It is assumed in this report that such a program is initiated and that two trillion BTU are added to the supply each year from 1977 to 1980. The added contribution from 1981 through 1985 is three trillion BTU per year.

Summary of Expected Supply and Demand

Table 2 presents the probable picture for availability of energy in the years ahead. The same information is presented graphically on Figure 3. As can be readily seen in Figure 4, Minnesota consumers are expected to desire considerably more energy than will probably be available. The basic fact is that consumption cannot exceed available supply. If available supplies are insufficient to meet demand at a given price, allocation will necessarily take place -- either by the marketplace, by supplier decision, or by a governmental mechanism for rationing.

TABLE 2

PROBABLE SUPPLIES OF ENERGY FOR MINNESOTA TO 1985

(in Trillions of BTU)

<u>Year</u>	<u>Oil</u>	<u>Natural Gas</u>	<u>Hydro Nuke</u>	<u>Coal</u>	<u>Alternative</u>	<u>Total</u>
1974	435	360	55	205	0	1055
1975	481	342	55	219	0	1097
1976	473	325	55	235	0	1088
1977	465	309	55	251	2	1082
1978	457	293	55	269	4	1078
1979	449	279	65	288	6	1087
1980	441	265	65	308	8	1087
1981	436	251	65	329	11	1092
1982	436	239	65	352	14	1106
1983	436	227	70	377	17	1127
1984	436	215	70	403	21	1145
1985	436	205	70	431	24	1166

FIGURE 3

MINNESOTA PROJECTED ENERGY SUPPLY TO 1985

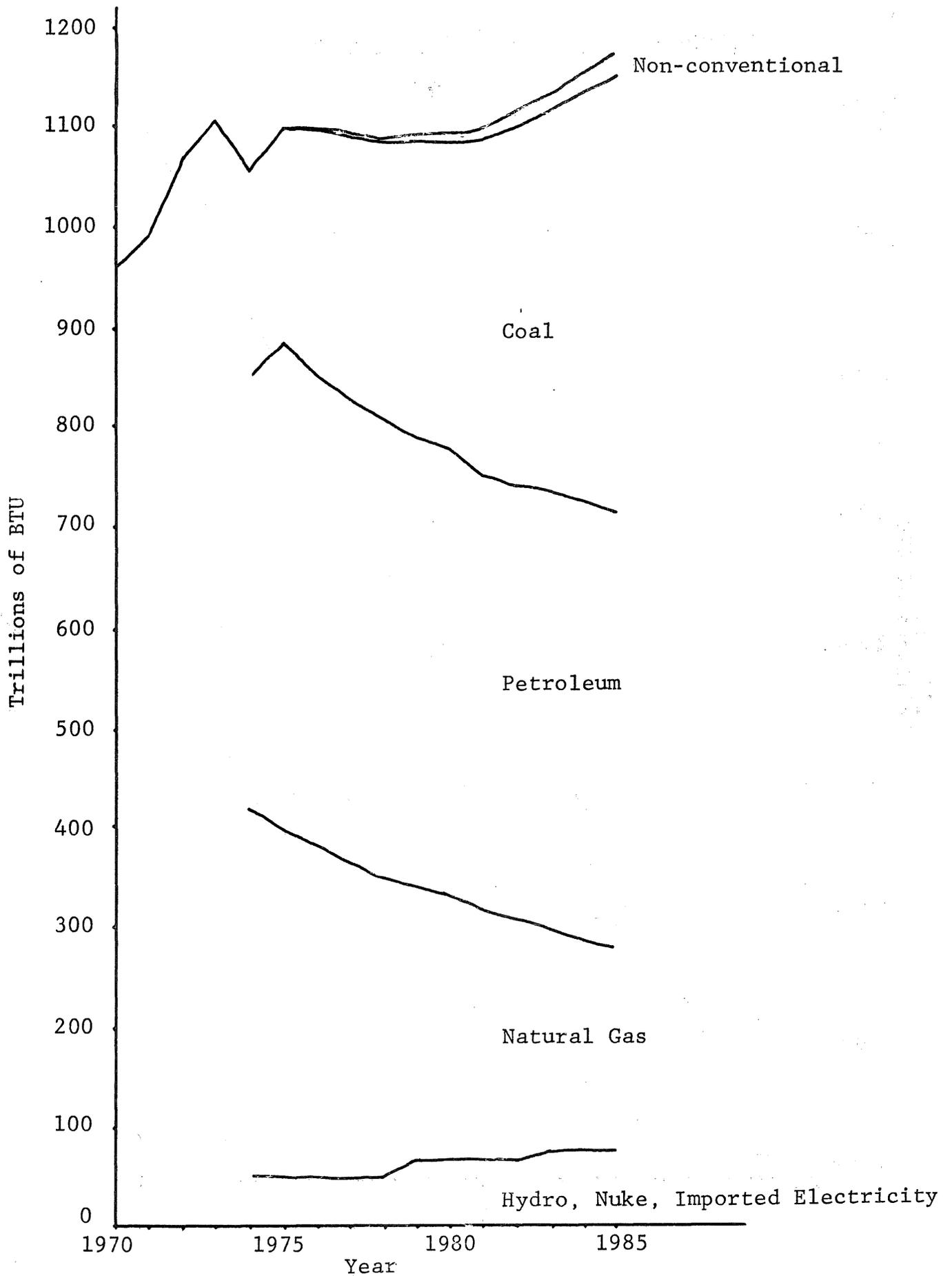
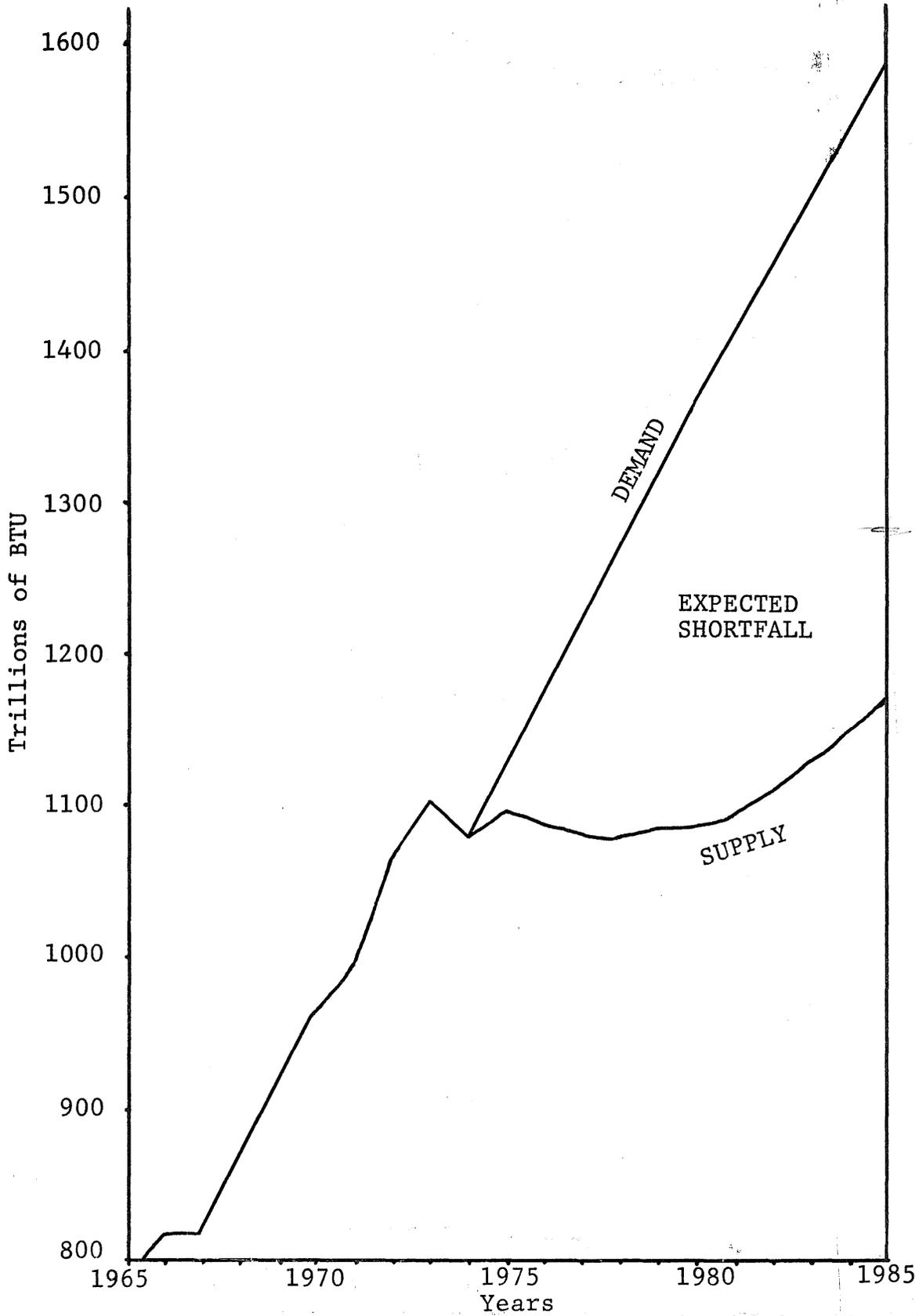


FIGURE 4

EXPECTED ENERGY DEMAND AND SUPPLY TO 1985



SECTION 2

A MINNESOTA ENERGY POLICY PLAN - PROPOSED

The Legislative Commission on Energy is aware of no existing statement of an energy policy plan for Minnesota. Because serious energy problems are apparently at our doorstep -- curtailed deliveries of natural gas and Canadian crude oil, greatly increased prices for traditional energy fuels, etc. -- it is deemed by Commission members to be intolerable that the state is leaving virtually all energy policy decisions to energy suppliers, federal authorities, and the marketplace. Leaving major energy decisions in these quarters is to run the serious risk of allowing the state to slip into consumption patterns that will eventually be altered only at the time of crisis and will probably be accompanied by widespread social and economic dislocations. How much better it would be to use a degree of foresight and prepare an energy policy plan that will minimize or eliminate serious dislocations.

A policy plan begins with a statement of goals and culminates in the implementation of activities that are based on strategies for achieving the goals. An energy policy plan is no different. This section of the report briefly sketches an energy policy goal and plan that the Commission suggests the state consider. There is nothing sacrosanct about this plan. It can be accepted, modified, or replaced as may seem appropriate to the people of Minnesota, but should be given consideration as a springboard for policy consideration.

Goals of Minnesota's Energy Policy Plan

Minnesota's energy policy plan should be formulated with two major goals in mind. Simply put, they are:

1) To achieve, by some specific year in the future, a stable economy that is low in its consumption of energy while offering ample, emotionally rewarding employment opportunities for all citizens.

2) To ease the transition from an energy-flush society to an energy-conscious society. Many strategies may have to be employed in accomplishing these goals, but their aim is to minimize possible social, economic, and environmental consequences of reduced energy supplies for Minnesota.

Accomplishing these goals will not be a quick or easy task, yet it must be begun immediately. Strategies must be established, explained, and justified. Some of the strategies that might be applicable are: state appeal for federal action; public education; subsidies for research and development, studies and impact statements, and direct assistance; regulation by the state; tax credits or exemptions; and tax penalties. The final four pages of this section give an idea of the applicability of these strategies to specific recommendations.

Proposed Energy Policy

As has been noted on several occasions in this report, Minnesota faces potential energy shortages in the years ahead. Particular difficulties are expected for the fuels of natural gas and

petroleum -- both of which are scheduled for curtailment under present projections. The state could perhaps sustain moderate cutbacks in one fuel or the other without unmanageable dislocations, but reductions in both fuels at the same time would pose severe problems for the economy and welfare of the state. It is obviously not within the power of an individual state to arrange interstate flows of fuels in such a way as to assure continued sufficiency of supply. It is recommended that authorities in Minnesota appeal to federal allocation officials for guarantees of at least the minimum needed quantities of natural gas and petroleum. In making an appeal for assurances of supply it is important for Minnesota to demonstrate that it is making responsible use of conservation measures and is asking for no more than a reasonable portion of United States energy supplies.

It is recommended that Minnesota work at the federal level to encourage the development of new energy supply routes that would be of direct benefit to the state. Several possibilities exist for getting Alaskan oil to Minnesota's refineries and customers. The most economical method of transporting gas and oil is by pipeline, but several other considerations must be taken into account. It must be recognized that no method of transportation, not even a pipeline, is environmentally benign and that those constructed in arctic climates can be especially damaging to the local environment. Nevertheless, through-Canada pipelines for Alaskan natural gas and crude oil should probably be considered. Pipelines coming to the Midwest by way of the Mackenzie River Valley seem to offer several advantages over alternate transport routes: 1) no transshipment

is involved, thus there is greatly reduced chance of spillage and consequent environmental damage; 2) the Mackenzie River Valley is much less likely to experience earthquake damage than other suggested pipeline routes; 3) direct pipeline connections between the Upper Midwest and Alaska's North Slope via the Mackenzie River Valley will probably offer the lowest delivered cost for gas and oil. These lines would serve not only Minnesota and neighboring states but also a fairly large portion of the population surrounding the Great Lakes. A second possible route for Alaskan oil would be a "swap" arrangement by which Canada would use Alaskan crude oil delivered to the Seattle/Vancouver area and in return supply Prairie Province crude oil, through existing pipelines, to Minnesota's refineries. A third alternative would be the shipment of Alaskan crude to the Seattle/Vancouver area, pumping it north-eastward through the Trans-Mountain pipeline (which would have to be reversed), and finally delivery to Minnesota by the same lines that presently serve us with Canadian oil. New north-bound pipelines for domestic crude oil or petroleum products should also be considered as an alternative, but at present these appear to be less attractive because of the limited availability of domestic oil and the limited demand that one or even a few states could offer relative to the very high costs of constructing or extending a pipeline.

As a demonstration of Minnesota's commitment to using energy from scarce sources for the highest good, it is recommended that a program to allocate natural gas and heating oils to end users in the state be established. Besides its energy conservation advantages, an efficient and effective program of this type would prove

that our state is acting responsibly in the face of energy shortages. Included in the allocation program should be a mechanism to prohibit new hookups to natural gas lines for water heating and space heating purposes. These "low-grade" heat requirements can be met satisfactorily by solar energy or some of the other alternative energy systems. There may have to be exceptions to the space heating and water heating prohibition, as for large multiple-unit residential buildings, but they should be as few as possible.

The use of coal, probably the most abundant fuel available to Minnesota in the years ahead, is presently plagued by serious environmental and socio-economic problems. The two major factors that stand in the way of rapid substitution of coal for more scarce fuels are: 1) legal and political constraints on the production of coal in the coal-rich states to the west, which are based on fears of environmental and socio-cultural degradation; and 2) air quality standards that necessitate considerable investment in "clean-up" equipment before coal can be burned. Less serious problems with the transportation and use of coal include: increased rail traffic, the necessity for storage facilities, and the added cost of coal handling and burning equipment.

Negative feelings on the part of citizens of North Dakota and Montana will be difficult, if not impossible, to change, but a display of responsibility in the use of fuels by Minnesotans will be essential and should make our neighbors to the west less reluctant to allow the extraction of their energy resources.

It is recommended that Minnesota participate with other states and the federal government in the development of realistic, acceptable

standards for the use of coal. Hopefully, such studies will result in relatively benign technologies for the burning of coal.

As standards for the use of coal are developed and as other fuels become less available, those industries and commercial enterprises that have the capability to convert to the use of coal should be encouraged to do so. It is recommended that some type of tax incentive be offered to enterprises that are willing and able to switch to the use of coal as their major fuel. This incentive is particularly important for those applications where conversion to coal would require an economic hardship to the enterprise. Substitution of coal for other fuels should be encouraged at a gradual and environmentally acceptable pace.

The generation of electricity uses a significant and constantly increasing fraction of Minnesota's total energy input. Electricity is commonly generated by falling water, nuclear power, coal, oil, and natural gas. The use of natural gas for electric generation is scheduled to be phased out in the very near future. Electric generation is a reasonable means of converting the energy contained in falling water and nuclear fuel to more readily usable forms, and the burning of coal in central power plants is not unrealistic given present technologies -- particularly since air and water quality are most easily and economically preserved by large facilities equipped with large-volume filtering devices. However, oil and natural gas can be utilized at much higher levels of net efficiency (50 to 70 percent) when used directly rather than after conversion to electricity (15 to 30 percent). More total usable energy

is therefore available to the state when the use of oil-fired and gas-fired generating plants is minimized. Most oil-fired and gas-fired plants are used only during those hours of the year when electric consumption is greatest or when base-load plants (hydro, nuclear, coal) are down for maintenance or repair. Minimizing peaks in demand would allow base-load plants to carry a larger share of the total generating load and would decrease the consumption of oil and natural gas. It is recommended that peak-load-pricing or some other system that flattens peaks, maximizes utilization of base-load plants, and discourages the use of oil-fired and gas-fired peaking power plants be adopted.

The continuing controversy over the safety and security of nuclear fission power plants leads to the recommendation that the state continue to review with caution, limitation, and restriction the siting and construction of additional nuclear facilities until the energy industry perfects a nuclear fuel cycle that is both safe and environmentally benign. The risks are too numerous to recount here, but it is felt that the societal benefit of nuclear power plants is in all likelihood less than the potential for societal problems.

Because of the projected declines in energy fuel availability in Minnesota and the recommendation on siting and construction of new nuclear facilities, it is essential that the state seek energy from non-traditional sources. Such sources apparently available to Minnesota include the sun, wind, forestry and agricultural wastes, municipal wastes, and possibly peat. These energy sources

should be developed and exploited in a speedy but orderly manner so that our dependence on imported fuels will be reduced to the lowest practicable level. It is recommended that research and development funds be made available for projects exploring the use of alternative and unconventional fuels available to Minnesota. The state should also encourage federal funding for projects of this type.

Since solar energy systems are approaching the stage of commercial availability, it is recommended that solar application be encouraged by favorable tax treatment -- possibly including property tax exemptions and/or income tax credits.

The long-term future presents some problems involving the application of alternative energy sources. At times when "home" electric or gas generating units are working at capacities exceeding demand within the "home", it would be logical to transfer the excess production to existing distribution networks -- assuming, of course, that the "home" generated energy is of comparable quality with that in the distribution facility. At present, no plan for an interface system between alternative energy systems and commercial utilities exists. It is recommended that study begin now on interface systems and policies.

Industrial and commercial activities that have a high value added per unit of energy consumed or high employment per unit of energy consumed are particularly desirable for a state that is facing energy shortages. The industries of forestry and farming have always been of great importance to the economy of Minnesota. In their raw-product stage these industries have relatively low

direct energy requirements for each dollar of value added. It is believed that the continued dominance of these two industries in Minnesota, particularly at the raw-product stage, is highly desirable. It is, therefore, recommended that fuels and fertilizers be allocated in sufficient quantity to meet the needs of these activities.

It should be recognized that the ultimate processing of agricultural and forestry products can be relatively energy intensive. For example, beet sugar processing requires the purchase of 1290 megawatt hours of electricity (or its equivalent) for each employee. This same agricultural production requires an average of 44.5 kilowatt hours of electricity (or its equivalent) for each dollar of value added. As another example, the processing of paperboard necessitates the purchase of 2041 MWH of energy per employee and 81.9 KWH for each dollar of value added. Both of these industrial processes are very energy intensive with respect to value added or employment.

It is recommended that those traditional and developing phases of agriculture and forestry processing that are most energy intensive be discouraged in the state and that low-energy and renewable-energy processing technologies be encouraged.

Recreation is another industry important to Minnesota. Some forms of recreation and tourism (snowmobiling, auto-tripping) are much more energy intensive than others (cross-country skiing, canoeing, wilderness camping, bicycling, local camping). It is recommended that more encouragement be given to the low-energy

recreational activities the state can offer and less to energy intensive activities. The use of motorized recreational vehicles should be discouraged.

Minnesota's tenuous energy future makes it highly desirable that growth of or additions to industrial and commercial enterprises be in the least energy intensive sectors possible. The addition of energy intensive industries would further strain the energy delivery systems and might needlessly deprive existing customers -- residential, commercial, and industrial -- of needed energy. Another possible result of growth in energy intensive industries would be intensified competition for fuel supplies that could inflate prices to all consumers.

In order to achieve and maintain a stable economy with maximum employment, it is recommended that the state protect and promote low energy industries -- especially those that are labor intensive. Protection and promotion could take the form of favored tax treatment or low-interest loans.

For both existing and new enterprises, energy conservation should be strongly encouraged -- and in some cases even required. Conservation should include reducing heat loss from buildings, minimizing unnecessary energy usage, and the use of high-efficiency technological designs. Measures of this type will assure that the greatest value will be derived from each BTU of energy delivered to Minnesota.

If the above measures (encouraging energy efficient enterprises with high employment, employing conservation measures, etc.) do not go far enough toward the goal of matching energy supply and demand,

it may be necessary to discourage new -- and possibly even existing -- enterprises that are highly energy intensive. In no other way can the state be assured of continuous employment based on limited quantities of energy. Some persons seem to favor unrestricted economic development and the implementation of an energy allocation plan to handle periodic energy shortages. Such a program, if it led to the proliferation of energy intensive industries, would result in unemployment for many workers during periods of energy scarcity and have the result of creating a highly unstable "boom and bust" economy. It would be far better to follow an economic growth plan that takes both present and future energy supply prospects into consideration. This is not to say that no emergency fuel plan will be needed if we plan economic growth with energy supply in mind, but the plan would be used much less often and could be held in reserve for "emergency" situations rather than applied to routine energy shortages resulting from inadequate planning. It should be noted here that constraints on energy intensive industries would probably center only on those using petroleum and natural gas -- the growth of industries using coal as a main energy source poses fewer problems.

Transportation presently requires some 27.6 percent of the total energy and 60 percent of the petroleum consumed in Minnesota. Obviously, any energy savings in this sector will be of profound importance to the state. The private automobile is a significant and often wasteful consumer of gasoline. It is recommended that, to reduce the consumption of gasoline by automobiles, all existing and new vehicles be operated at maximum efficiency. This would be

accomplished by minimizing energy-robbing accessories, assuring that all autos are properly tuned at all times, and establishing a minimum 20 miles per gallon standard for all cars registered in the state in 1980 and thereafter. The use of automobiles should be reduced to the necessary minimum by the encouragement of car pooling and by industry-sponsored van-pooling programs. Automobile use for commuting purposes in urban areas would also be reduced by improved public transit facilities and service. For intercity travel, passenger service by rail and bus offers considerable energy advantages over the private auto and should be encouraged by upgrading these modes of travel.

As a short term means of conserving gasoline used in automobiles, it is recommended that the 55 mile per hour speed limit be retained -- and strictly enforced. In the longer term, increases in transportation energy use could be controlled by restricting further commercial development along existing and future transportation corridors. The justification for such a restriction would be twofold: 1) existing corridors should be filled in before they, or others, are extended; and 2) the proliferation of commercial services along highways farther and farther from commercially developed urban areas encourages greater use of the private automobile.

Transportation energy would also be saved by the substitution of communication (written or spoken) for travel and personal contact. Wide acceptance of such substitution for shopping, business contacts, etc., would go a long way toward reducing unnecessary travel trips. It is, therefore, recommended that the people of Minnesota be encouraged to use communication rather than transportation whenever practical.

The ultimate method for minimizing transportation energy use is to eliminate the need for travel. It is recommended that planning begin now for the encouragement of development projects which cluster residences, commercial enterprises, and employment opportunities in communities of such a size that few, if any, vehicular trips will be needed. Projects of this type seem to be proving successful in some European countries and should be carefully considered for Minnesota.

Energy use by the citizens of Minnesota could be reduced without seriously, if at all, affecting life style. For example, insulation to decrease the amount of heat lost from uninsulated residences would make available for other purposes several percent of the state's annual energy consumption while improving the health and comfort of persons living in affected residences. It is recommended that the state develop a program to assure that all residences are adequately insulated.

The selection and use of lighting and heating equipment and appliances also affects household energy consumption. It is recommended that an educational program be established to inform people in Minnesota of their energy use options and the consequences of selecting one option over others.

One of the factors causing the steady increase in energy consumption by residences and in transportation during the past 25 or 30 years has been the widespread shift from central city dwelling to single-family suburban living. In many cases numerous central city houses are deteriorating or stand empty while the suburban

outskirts of urban areas grow ever larger. It is recommended that the rehabilitation of central city residences be encouraged. The benefits of rehabilitation go far beyond energy considerations, but are too numerous and complex to be mentioned here.

In the longer term, consideration should be given to the development of more energy efficient housing styles. It has long been acknowledged that multiple-family residences have lower energy costs, on the average, than single-family dwellings, but it is possible that alternative styles of the single-family residence could be developed that are very low in their use of energy. Energy savings from this source would not be immediate or dramatic in quantity for several years, yet any increased efficiency, no matter how small, would free up energy supplies for other purposes.

Other energy economies could be realized by Minnesota if all persons made maximum use of consumer purchases and then recycled those that could be recycled. This policy suggestion might be considered to imply changes in life style since it would be a shift from a "throw-away mentality" to an attitude of greatest utility from each resource. It is, nevertheless, recommended that consumers be made aware of the conservation-oriented options to discarding articles that are still usable.

ENERGY RESOURCE POLICIES

	Growth Goal	Tax Penalty	Tax Credit +	Regulation	Subsidy	Education	Federal Action
NATURAL GAS							
Short term	-						x
A. Assure stability of supply							x
B. Prohibit new customer hook-ups				x			
C. Eliminate easily substituted uses (switch to coal)		x	x	x		x	
D. Establish an allocation plan and procedure				x			
Long term	-						
A. Planned substitution and replacement					R	x	
B. Get delivery from new sources							x
COAL							
Short term	+						
A. Encourage use to minimize economic and social impacts of shortages in other fuels			x				x
Long term	+	x	x	x			x
A. Develop benign technologies						S	x
B. Careful study of syngas and syncrude plans							x
C. Promote responsible use ethic							x
OIL							
Short term	-						
A. Achieve priority allocation to stabilize supply				x			x
B. Eliminate easily substituted uses (switch to coal)		x	x	x			
C. Develop alternative supply routes/sources				x			x
D. Minimize oil-fired peak-load generating plants				x		x	
Long term	-	x				R	x
A. Develop new sources (stable, domestic)		x				R	x
B. Planned substitution and replacement							
ELECTRICITY							
Short term	+						
A. Restrict new nuclear				x			
B. Increase utilization				x			
C. Substitute for oil and gas							x
Long term	?						
A. Accept nuclear if proven benign							
B. Develop interface with solar, wind systems			x				x
ALTERNATIVE ENERGY SOURCES							
A. Solar	+	x			R		x
B. Wind	+	x			R		x
C. Geothermal	+	x			R		x
D. Methanation	+	x			R		x
E. Municipal waste	+	x			R		x

R = Research and Development funding
 S = Funded study
 x = Applicable tool to accomplish goal
 + = Positive growth
 - = Negative growth

COMMERCIAL AND INDUSTRIAL ENERGY USE

	Tax Penalty	Tax Credit +	Regulation	Subsidy	Education	Federal Action
Short term						
A. Priority allocation of Canadian crude oil						X X
B. Development of new domestic energy sources/supplies				?		X X
C. Prohibit new natural gas customer hook-ups				X		
D. Protect the state's agricultural and forestry economic base						
1. Allocation of fuels and fertilizer			X			
2. Development of low-energy technologies and practices		X	X		X	
3. Preservation of the land			X			
E. Food processing						
1. Discourage high energy use products/production	X		?			X
2. Encourage low energy or solar energy processing		X		R		
F. Encourage low energy recreation and tourism		X		X	X	
G. Conservation						
1. Waste-saving programs		X				X
2. Technical redesign		X	X			
H. Protection of labor-intensive industries		X	X			
Long term						
A. Encourage energy-efficient industries		X	?			
1. High value-added per unit of energy						
2. High employment per unit of energy						
B. Discourage new energy-intensive industries	X		X	R	X	
C. Develop and encourage low-energy recreation and tourism		X		R	X	
D. Careful study of syngas and syncrude plans for the state					S	
E. Require energy impact statements on major projects			X			

R = Research and Development funding
S = Funded study
x = Applicable tool to accomplish goal

TRANSPORTATION

	Tax Penalty	Tax Credit +	Regulation	Subsidy	Education	Federal Action
Short term						
A. Car-pooling	x	x	?	x		
B. Achieve maximum vehicle efficiency (tires, engines, etc.)	x	x		x		
C. Improve public transit services						
1. Metropolitan areas (bus)	x	?	x	x		
2. Intercity						
a) Rail	x	x	x	x		
b) Bus	x		?	x		
D. Speed limits			x			
E. Restrictions on recreational vehicles	x	x				
Long term						
A. Upgrade mass transit systems				x	x	x
B. Control development of transportation corridors			x			
C. Upgrade and encourage rail traffic						
1. Passenger	x		?	x	x	
2. Freight	x		?		x	
D. Establish growth and development policies						
1. Encourage the use of communications rather than transit		x		R		
2. Cluster residences, commerce, employment	x	x	x	x	x	x

R = Research and Development funding
x = Applicable tool to accomplish goal

PERSONAL ENERGY USE

	Tax Penalty	Tax Credit +	Regulation	Subsidy	Education	Federal Action
HOUSING						
Short term						
A. Reinsulation		x		x	x	
B. Energy use patterns, residential						
1. Appliance and lighting efficiencies	x				x	
2. Space conditioning	x		x		x	
C. Rehabilitation of central city residences		x		?		
Long term						
A. Encourage cluster housing	x	x	?		x	
B. Cluster residences, commerce, employment		x	?	R	x	
C. Creation of new housing styles		x	?	R	x	
TRANSPORTATION						
Short term						
A. Encourage walking, bicycling, mass transit	x				x	
B. Stay home					x	
C. Car-pooling	x		x		x	
Long term						
A. Upgrade mass transit				x		
B. Cluster residences, commerce, employment		x	?	R	x	
C. Substitute communication for travel					x	
USE OF LEISURE TIME						
Short and long term						
A. Substitute communication for travel					x	
B. Use of education as recreation				?	x	
C. Encourage gardening, creative hobbies					x	
CONSUMPTION OF MANUFACTURED GOODS, SERVICES						
A. Recycle whenever possible	x		?		x	
B. Extend life of products			?		x	
C. Encourage the use of services during off-peak times					x	

R = Research and Development funding
x = Applicable tool to accomplish goal

SECTION 3

LEGISLATION PROPOSED BY THE COMMISSION

In fulfillment of the Commission's charge (Minnesota Statutes 1974, Chapter 116H.04) to: "(k) Recommend to the governor and the Legislature any future energy legislation which it considers necessary or desirable;", the Commission approved the following resolutions and recommends that the following bills be considered during the 1975 session of the Legislature:

Resolution #1 - Adopted January 27, 1975

"BE IT RESOLVED by the Minnesota Legislative Commission on Energy: That the Legislature of the State of Minnesota be encouraged to recognize the energy efficiency of returnable container systems relative to other types, and to give great weight to the potential energy benefits in various container bills which come before it during the 1975 session."

Resolution #2 - Adopted January 27, 1975

"BE IT RESOLVED by the Minnesota Legislative Commission on Energy: That it be state policy that all energy imported for end use or for central plant conversion within the state of Minnesota be produced in such a manner that the negative worker, environmental, and societal impacts be no greater than those permitted by current laws and regulations were the production to occur in Minnesota. Regulations that are changed from time to time shall apply at the time of their applicability to new production and not to production facilities in operation or under construction."

Introduced by Munger, W. Kelly, Voss,
Ulland, Haugerud
April 9th, 1975
Ref. to Com. on Environment & Natural Resources
Reproduced by PHILLIPS LEGISLATIVE SERVICE

H.F. No. 1437
Companion S.F. _____
Ref. to S. Com. _____

1

A bill for an act

2 relating to energy; providing for certain
3 restrictions on the use of energy in this state;
4 requiring disclosure of energy consumption data in
5 the sale of certain goods; establishing an energy
6 research and development program; authorizing
7 loans for improving home heating efficiency;
8 prescribing penalties; appropriating money;
9 amending Minnesota Statutes 1974, Sections
10 116H.02, by adding subdivisions; 116H.12, by
11 adding a subdivision; 462A.02, by adding a
12 subdivision; 462A.03, by adding a subdivision;
13 462A.05, by adding a subdivision; and Chapter
14 116H, by adding sections.

15 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

16 Section 1. Minnesota Statutes 1974, Section 116H.02,
17 is amended by adding a subdivision to read:

18 Subd. 10. "Decorative gas lamp" means a device
19 installed for the purpose of producing illumination by
20 burning natural, mixed, or LP gas and utilizing either a
21 mantle or an open flame, but does not include portable camp
22 lanterns or gas lamps used to supply light for the interior
23 of camp trailers or cabins not served by an electric
24 utility.

25 Sec. 2. Minnesota Statutes 1974, Section 116H.12, is
26 amended by adding a subdivision to read:

27 Subd. 3a. Beginning six months after the effective

1 date of this section, no person shall install or use a
2 decorative gas lamp in Minnesota. No natural gas utility or
3 LP gas distributor shall provide service to a customer if
4 some or all of the gas provided to the customer is utilized
5 for a decorative gas lamp.

6 Sec. 3. Minnesota Statutes 1974, Chapter 116H, is
7 amended by adding a section to read:

8 [116H.121] [ENERGY CONSERVATION IN PUBLIC SCHOOLS.]
9 Subdivision 1. The commissioner of administration, after
10 consultation with the director of the Minnesota energy
11 agency and the commissioner of education and within one year
12 of the effective date of this act, shall establish heat
13 loss, illumination and climate control standards for public
14 school buildings to accomplish energy conservation. The
15 standards shall be economically feasible in that the
16 resultant savings in energy procurement costs shall exceed
17 the cost of the energy conservation measures amortized over
18 the life of the building.

19 Subd. 2. After July 1, 1980, no state-aid school funds
20 shall be distributed to a school district which has failed
21 to implement conservation measures conforming to the
22 standards promulgated pursuant to this section.

23 Subd. 3. A school district may increase its levy as
24 certified to the county auditor pursuant to section 124.02,
25 by an amount sufficient to pay the costs of building
26 modifications undertaken to comply with standards
27 promulgated under this section. The levy authorized by this
28 section shall not be included in any levy limitation
29 otherwise imposed by law.

30 Sec. 4. Minnesota Statutes 1974, Chapter 116H, is
31 amended by adding a section to read:

32 [116H.122] [ENERGY CONSERVATION IN STATE OWNED

1 BUILDINGS.] The commissioner of administration, in
2 cooperation with the director of the Minnesota energy
3 agency, shall survey all buildings owned by the state of
4 Minnesota, including buildings and associated facilities of
5 the university of Minnesota, the state college system, the
6 state fairgrounds as defined in section 37.01, and the
7 Minnesota historical society building, to determine whether
8 energy savings can be accomplished through insulation,
9 climate control or illumination modifications, or changes in
10 building structures and systems. If the commissioner
11 determines that a modification is economically feasible, in
12 that savings in fuel procurement costs will exceed the cost
13 of the modification amortized over the life of the building,
14 he shall implement the modification in a manner designed to
15 maximize the reduction in costs resulting from the
16 modification.

17 Sec. 5. Minnesota Statutes 1974, Section 116H.02, is
18 amended by adding a subdivision to read:

19 Subd. 11. "Major appliance" means a water heater,
20 clothes washer, clothes dryer, range, oven, refrigerator,
21 freezer, dish washer, or room air conditioner intended for
22 noncommercial use.

23 Sec. 6. Minnesota Statutes 1974, Chapter 116H, is
24 amended by adding a section to read:

25 [116H.123] [DISCLOSURE OF APPLIANCE ENERGY
26 CONSUMPTION.] Subdivision 1. After July 1, 1976, a major
27 appliance displayed for sale in this state shall have
28 affixed in a conspicuous location a tag or label containing
29 information on the appliance's energy consumption. If a
30 major appliance is offered for sale by mail or through a
31 catalog distributed in this state, the solicitation shall
32 include as part of the offering a statement of the

1 appliance's energy consumption. A catalog distributed prior
2 to July 1, 1978, may list energy consumption information for
3 offered items on separately printed pages supplied with the
4 catalog.

5 Subd. 2. The director, by January 1, 1976, shall by
6 rule designate a recognized testing procedure to be used to
7 determine energy consumption data for the purposes of this
8 section. If an acceptable testing procedure for a certain
9 type of major appliance has not been developed prior to
10 January 1, 1976, the director shall by rule delay
11 implementation of disclosure requirements for that type of
12 major appliance until an acceptable testing procedure is
13 established.

14 Subd. 3. Energy consumption data on each brand and
15 model of major appliance offered for sale in Minnesota or to
16 be offered within the following six month period shall be
17 submitted by the manufacturer to the agency on December 1
18 and June 1 of each year. The director shall maintain
19 information on appliance energy consumption, and on January
20 1 and July 1 of each year beginning on July 1, 1976, he
21 shall prepare a list showing the energy consumption of each
22 major appliance, by brand and model, offered for sale in
23 Minnesota. This list shall be made available without cost
24 to any resident of Minnesota upon request.

25 Subd. 4. The director by rule shall adopt standards
26 for the tags and labels required by this section and shall
27 provide for the enforcement of the energy consumption
28 testing and labeling program established by this section.

29 Sec. 7. Minnesota Statutes 1974, Chapter 116H, is
30 amended by adding a section to read:

31 [116H.124] [DISCLOSURE OF AUTOMOBILE GASOLINE
32 CONSUMPTION.] Subdivision 1. After January 1, 1976, no new

1 motor vehicle intended for use on public streets or highways
2 shall be sold or offered for sale in Minnesota unless a
3 label is affixed to a window of the vehicle, in close
4 proximity to the price sticker, setting forth the estimated
5 number of miles that may be traveled on one gallon of fuel
6 under ordinary city and highway driving conditions. The
7 label shall also state that driving habits and other factors
8 may influence the estimated fuel mileage. The information
9 contained on the label shall be in accordance with the
10 specific labeling program of the federal environmental
11 protection agency, except that information from the general
12 labeling program may be used in the absence of information
13 under the specific labeling program.

14 Subd. 2. A violation of this section or any rule or
15 regulation promulgated under this section is a misdemeanor
16 for the first offense and a gross misdemeanor for each
17 subsequent offense. Each day of violation is a separate
18 offense.

19 Sec. 8. Minnesota statutes 1974, Chapter 116H, is
20 amended by adding a section to read:

21 [116H.131] [ENERGY RESEARCH AND DEVELOPMENT PROGRAM.]
22 Subdivision 1. The director of the Minnesota energy agency,
23 at the direction of the energy research council, shall make
24 grants to qualified applicants for research studies and
25 demonstration projects of alternative energy systems and
26 methodologies including:

27 (a) Solar energy systems for heating and cooling;
28 (b) Energy systems using wind, agricultural wastes,
29 forestry products, peat, and other nonconventional energy
30 resources;

31 (c) Devices and technologies increasing the energy
32 efficiency of energy consuming appliances, equipment, and

1 systems; and

2 (d) Such other projects as the energy research council
3 deems appropriate and of direct benefit to Minnesota and
4 other states of the upper midwest,

5 Subd. 2. [ENERGY RESEARCH COUNCIL.] A council to be
6 known as the energy research council, consisting of nine
7 members, is hereby established. One member of the council
8 shall be the director of the Minnesota energy agency or his
9 designee and the other eight shall be appointed by the
10 governor. The governor's appointees shall include:

11 (a) Three members from institutions of higher learning
12 in Minnesota;

13 (b) Two members who are registered professional
14 engineers associated with energy or related industries in
15 Minnesota; and

16 (c) Three members at large drawn from labor,
17 environmental groups, consumer groups, human welfare
18 interests, or agriculture.

19 Each member of the council shall represent the state at
20 large and not any particular area thereof;

21 Members of the council shall serve terms of three years
22 and shall elect from among themselves a chairman and such
23 other officers as deemed necessary. Three of the governor's
24 initial appointees shall serve first terms of one year,
25 three shall serve first terms of two years, and two shall
26 serve first terms of three years, all terms beginning on
27 July 1 following the effective date of this section. A
28 vacancy on the council occurring otherwise than by
29 expiration of the term shall be filled for the unexpired
30 term in the same manner as the original appointment.

31 Members of the council shall meet at the call of the
32 chairman, and shall be paid \$35 per day compensation plus

1 travel expenses incurred to attend meetings, in the same
2 manner and amount as provided for state employees.

3 Subd. 3. [DUTIES OF THE COUNCIL.] The council shall
4 establish research priorities, analyze grant applications,
5 and determine which proposals are to be funded and shall
6 transmit this information to the director of the Minnesota
7 energy agency.

8 The council shall actively promote the program of
9 grants established by this section; solicit research
10 proposal applications; conduct a program of contests with
11 prizes to encourage energy related inventions; sponsor
12 educational fairs; and conduct such other activities as
13 deemed appropriate.

14 The council shall prepare an annual report for the
15 governor and the legislature.

16 Subd. 4. [ADMINISTRATION.] The director of the
17 Minnesota energy agency shall supply personnel as necessary,
18 not to exceed one full-time employee, to effectively
19 administer the energy research and development program. The
20 employee shall serve as executive secretary to the council,
21 receive proposal applications, distribute moneys as directed
22 by the council, maintain information on all energy research
23 projects in the state, make periodic reports to the council
24 on the status of funded projects, and perform such other
25 duties as the council may direct.

26 Sec. 9. Minnesota Statutes 1974, Section 462A.02, is
27 amended by adding a subdivision to read:

28 Subd. 9. It is further found and declared that many
29 residential dwellings in Minnesota are much less efficient
30 in their use of space heating energy than is socially and
31 economically acceptable, causing unnecessarily high fuel
32 costs for the residents and aggravating the recognized

1 shortage of all types of energy in the state, To the extent
2 that any residential dwelling uses more space heating energy
3 than is necessary, available supplies of energy are reduced
4 for all users and costs are increased. Increased costs for
5 energy are disproportionately heavy burdens for persons and
6 families of low and moderate income, It is therefore a
7 valid public purpose for the state to assist in improving
8 the energy efficiency of all residential dwellings in
9 Minnesota, regardless of the income level of the residents.

10 Sec. 10. Minnesota Statutes 1974, Section 462A.03, is
11 amended by adding a subdivision to read:

12 Subd. 16. "Dwelling unit" means a house, apartment,
13 group of rooms, or single room occupied or intended for
14 occupancy as a separate living unit. A separate living unit
15 is one in which the occupants do not live or eat with any
16 other persons in the structure and which has either (a)
17 direct access from the outside of the building or through a
18 common hall or, (b) complete kitchen facilities for the
19 exclusive use of the occupants.

20 Sec. 11. Minnesota Statutes 1974, Section 462A.05, is
21 amended by adding a subdivision to read:

22 Subd. 17. (a) Notwithstanding any limitation otherwise
23 imposed by this chapter, the agency shall make available to
24 the owner of a dwelling unit constructed in this state prior
25 to 1965 a low interest loan for improving the energy
26 efficiency of the dwelling through the installation or
27 upgrading of insulation, storm windows and doors, or
28 caulking and weatherstripping.

29 (b) Loans shall be limited to a maximum of \$1,500 per
30 dwelling unit, or to \$500 per dwelling unit if the loan is
31 to be used only for the installation or upgrading of
32 insulation.

1 (c) Loans shall be for no more than the applicable
2 inspection fees and the actual cost of materials if the
3 materials are to be installed by the owner of the dwelling
4 unit, or the actual cost of materials and labor if the
5 materials are to be installed by a party other than the
6 owner of the dwelling unit.

7 (d) The agency shall actively advertise and promote the
8 availability of loans for energy efficiency upgrading in
9 dwelling units.

10 (e) The agency shall oversee a program of inspection to
11 assure that workmanship and materials for energy
12 improvements are satisfactory. The agency shall rely to the
13 greatest extent possible on existing municipal or other
14 local inspection departments. A municipality or other local
15 unit of government providing inspection services to the
16 agency may charge a loan applicant a reasonable fee for
17 inspection.

18 Sec. 12. [APPROPRIATIONS.] The sum of \$2,000,000 is
19 appropriated from the general fund to the Minnesota energy
20 agency for the purposes of section 4. The sum of \$3,000,000
21 is appropriated from the general fund to the Minnesota
22 energy agency for the purposes of section 8.

23 Sec. 13. [EFFECTIVE DATE.] This act takes effect on
24 the day following its final enactment.

Introduced by Munger, W. Kelly, Hanson,
 Voss, A. Carlson
 April 23rd, 1975
 Ref. to Com. on Taxes
 Reproduced by PHILLIPS LEGISLATIVE SERVICE

H.F. No. 1718
 Companion S.F.
 Ref. to S. Com.

1 A bill for an act
 2 relating to energy; providing a tax exemption for
 3 certain property used to generate energy through
 4 innovative technologies; providing a tax credit
 5 for the cost of certain technologically advanced
 6 energy systems; imposing an excise or use tax on
 7 certain energy inefficient motor vehicles;
 8 amending Minnesota Statutes 1974, Sections 272.02,
 9 by adding a subdivision; 290.06, by adding a
 10 subdivision; 297B.09; and Chapter 297B, by adding
 11 a section.

12 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

13 Section 1. Minnesota Statutes 1974, Section 272.02, is
 14 amended by adding a subdivision to read:

15 Subd. 5. Real or personal property used primarily for
 16 the purpose of producing or generating energy by means of
 17 innovative technologies which are more energy efficient or
 18 which reduce the use of nonrenewable resources, including
 19 but not limited to solar collection and wind powered
 20 generating systems, shall be exempt from taxation to the
 21 extent provided by this subdivision. A taxpayer requesting
 22 exemption of property under this subdivision shall file an
 23 application with the commissioner of revenue. The property
 24 shall conform to the standards, regulations, and other
 25 criteria, which the director of the Minnesota energy agency
 26 may by rule prescribe. At least once every two years the

1 director shall review and revise the standards, regulations,
2 and criteria promulgated pursuant to this subdivision to
3 remove technologies which are of general commercial
4 availability and are no longer innovative. The director of
5 the Minnesota energy agency shall, upon request of the
6 commissioner of revenue, determine whether the property
7 qualifies for exemption. If the director of the Minnesota
8 energy agency determines that the property qualifies for
9 exemption, the commissioner of revenue shall issue an order
10 exempting the property from taxation for a period of ten
11 years.

12 Sec. 2, Minnesota Statutes 1974, Section 290.06, is
13 amended by adding a subdivision to read:

14 Subd. 9b. [ENERGY CONSERVING EQUIPMENT.] A credit of
15 seven percent of the net cost of equipment for
16 technologically advanced energy systems, including but not
17 limited to solar energy systems, wind powered systems,
18 systems for the generation of gas from agricultural,
19 municipal, forestry, or other wastes, and other equipment
20 and devices approved by the director of the Minnesota energy
21 agency, which systems are purchased, installed and operated
22 within this state, may be deducted from the tax due under
23 chapter 290 in the taxable year in which the equipment is
24 purchased.

25 On January 1 of 1976 and each year thereafter the
26 director of the Minnesota energy agency shall promulgate and
27 make available to the public, free of charge, a list of the
28 specific energy systems entitled to the tax credit granted
29 by this section.

30 Sec. 3, Minnesota Statutes 1974, Chapter 297B, is
31 amended by adding a section to read:

32 [297B.21] [TAX ON INEFFICIENT MOTOR VEHICLES.]

1 Subdivision 1. At the time of the first registration in
 2 this state of a passenger automobile or station wagon as
 3 defined in section 168,011, there shall be applied and
 4 collected in addition to all other fees, taxes, and
 5 assessments, an excise or use tax based on the estimated
 6 gasoline mileage of the vehicle. Exempted from the tax
 7 imposed by this section are;

8 (a) Vehicles registered after July 1 of the year
 9 following the model year of the vehicle;

10 (b) Vehicles certified to have been driven 12,000 miles
 11 or more prior to registration in Minnesota;

12 (c) Vehicles that are otherwise exempted from taxation
 13 pursuant to this chapter or section 168,012; and

14 (d) Vehicles not exempt from taxation under any of the
 15 foregoing but which are determined by the director of the
 16 division of motor vehicle services to be and to have been
 17 the personal property of a person establishing a legal
 18 residence in Minnesota after having been a legal resident of
 19 some other state or country.

20 Subd. 2. The excise or use tax imposed by this section
 21 shall be based on the average (arithmetic mean) of the
 22 federal environmental protection agency mileage estimates
 23 for city driving and for country driving for the specific
 24 make and model of vehicle. The average of these two mileage
 25 estimates shall be known, for purposes of this section, as
 26 the mileage factor.

27 Subd. 3. The excise or use tax imposed by this section
 28 shall be determined in accordance with the following
 29 schedule:

	<u>Mileage factor</u>	<u>Tax</u>
31	<u>20 or more</u>	<u>\$ 0.00</u>
32	<u>19.5</u>	<u>13.00</u>

1	<u>19,0</u>	<u>26,50</u>
2	<u>18,5</u>	<u>40,50</u>
3	<u>18,0</u>	<u>55,50</u>
4	<u>17,5</u>	<u>71,50</u>
5	<u>17,0</u>	<u>88,00</u>
6	<u>16,5</u>	<u>106,00</u>
7	<u>16,0</u>	<u>125,00</u>
8	<u>15,5</u>	<u>145,00</u>
9	<u>15,0</u>	<u>166,50</u>
10	<u>14,5</u>	<u>189,50</u>
11	<u>14,0</u>	<u>214,50</u>
12	<u>13,5</u>	<u>240,50</u>
13	<u>13,0</u>	<u>269,00</u>
14	<u>12,5</u>	<u>300,00</u>
15	<u>12,0</u>	<u>333,50</u>
16	<u>11,5</u>	<u>369,50</u>
17	<u>11,0</u>	<u>409,00</u>
18	<u>10,5</u>	<u>452,50</u>
19	<u>10,0 or less</u>	<u>500,00</u>

20 Sec. 4, Minnesota Statutes 1974, Section 297B.09, is
 21 amended to read:

22 297B.09 [ALLOCATION OF REVENUE.] All moneys collected
 23 and received under ~~Laws 1971, Chapter 853,~~ this chapter
 24 shall be allocated monthly by the motor vehicle registrar to
 25 the state commissioner of revenue and by him shall be paid
 26 to the state treasurer and shall be deposited and
 27 transmitted as provided in ~~sections~~ section 297A.44 and
 28 297A.51 .

29 Sec. 5. This act becomes effective on the day
 30 following its final enactment except that sections 3 and 4
 31 become effective on September 1, 1977.

SECTION 4

THE MINNESOTA ENERGY AGENCY

Preface

One of the mandates before the Legislative Commission on Energy is that of review of the newly created Energy Agency. Perhaps this is the single most important service the Commission can offer to justify its own existence. At no time is review of an agency more important than immediately following its first year of operation. For, as the operation has thus progressed, so also is the future operation of an agency made predictable.

The review can range from the larger question of need for the agency all the way down to the smaller questions of personnel conduct and the use of expense accounts. Both extremes to the review serve useful purposes. This report focuses mainly on the direction in which the Minnesota Energy Agency programs are moving and changes deemed necessary for the future.

The question "Should there be an Energy Agency?" seems both too trite and unrealistic to be dwelt on in this report. It is the firm conviction of the Commission that the Energy Agency is necessary and should be retained as a permanent unit within state government. Sections 1, 2 and 3 of this report support the need for the agency and most especially the development of a sound energy management plan. It is the premise of the Commission that the implementation of such a plan, however constructed, will require

consolidated leadership and assistance and that the Energy Agency is best suited to fulfill that requirement.

To give the reader some insights into the ways in which this critique was assembled and the significance of the supporting materials contained in the appendices, two points are worthy of note:

1. The entire report was written in subcommittee. Consideration of agency performance and management techniques generally emanated from general discussions among subcommittee members that culminated in the composition of letters to the Director of the Agency requesting clear and concise answers to specific questions. These communiques between the Director and the subcommittee are appendicized.

2. As early as October of 1974, members of the Commission became concerned about the lack of an energy plan for Minnesota. There was also concern about methods the agency was using in establishing priorities for projects being considered for implementation. These concerns find expression throughout this report.

The Agency's first-year workload has been heavy, and it is the judgment of the Commission that this workload has been met admirably with both hard work and dedication. There is a high degree of excellence that pervades the staff at all levels. The major focus of this report is, then, on the directions in which the agency is moving -- not on how well or how poorly it is doing its assigned tasks.

Review of Agency Organization

The agency is organized along three divisional lines of responsibility -- Conservation and Planning, Research, and Fuel Allocation. These three divisions are headed by directors who report to the deputy director who, in turn, reports to the director. This organization is effective in placing specific project development responsibility for the day-to-day work of the agency and has the advantage of simplicity that is easily understood by both those within and those outside of the agency.

The style of each of the directors in the management of his or her division is apparent in their preparation of the Six Months Progress Report (July 1, 1974 to December 31, 1974) (Appencicized). A review of the contrasts among the divisions follows.

The Research Division is very "goal oriented." Its mission is laid out with job assignments, targeted completion dates, priorities, and the discipline of interim progress reports that insures accurate and timely results.

This is not unusual, for this is a division of highly skilled analytical personnel who both understand and respond to well-defined goals. Personal contact, publications, and presentations before the Commission confirm the "goals orientation" of this division.

The Research Division has placed its own manifesto of goals, notably that of "Improving Energy Management," as the introduction to its Six Months Progress Report. This is a most important step taken by that division and one which is not found demonstrated to a like degree by the other divisions nor by the Agency as a whole.

One project of the Research Division deserves special comment. This is the Regional Energy Information System (REIS). REIS is being developed to provide a constantly updated, readily available body of data on energy supplies, flows, and demands in Minnesota. The system offers distinct advantages for energy policy and planning decisions since it will end the need to gather data -- often unavailable, incompatible with intended use, outdated, or inaccurate -- from a variety of federal and state sources. It is believed that REIS will be a valuable tool that should be supported with adequate funding and staff.

The Fuel Allocation Division serves to implement a narrow band of guidelines that do not require so much project orientation but which rather require an ongoing administrative effort to respond to applications for assistance. Certain of this department's work that requires special studies, such as the "Market Share Study" (that will enable the states to chart changes in petroleum by major oil companies), has been given top priority and does give indication of some of the additional kinds of workload that will be placed upon the division from time to time.

It might be well for the Agency to consider this division as having seasonal staffing requirements to meet the expected allocation workloads that will be increasing in the years ahead -- rather than having permanent staffing (as is presently the case) and undertaking studies during slack periods.

There are both pros and cons to either arrangement with no specific recommendation from the Commission. Studies that deal with

energy supply and use seem to be duplicative of those going on within other divisions. On the other hand, it is understood that the agency must have sufficient qualified personnel available on a moment's notice to administer fuel allocations when applications are at peak volume.

An evaluation of this division's manning requirements should be developed by the agency and should be available for review purposes -- especially in light of an expected rise in allocation applications as a result of future natural gas and petroleum shortages. Such an evaluation is not know to exist at this time.

The Conservation and Planning Division is heavily engaged in project work, much like the Research Division. In this division, however, there is far less "goals orientation" (desirable for timely project completion) than has been made evidenced in the Research Division. Of the 20 projects identified in the Six Months Progress Report, 13 are assigned no completion dates -- rather they are looked upon by the agency as continuing project.

The Commission does not agree with the apparent direction the agency is assuming in matters over which it should have "one-time" or "periodic" interest. For example:

1. There is no reason for the agency to have a continuing interest in state purchasing. This matter should be studied and guidelines should be developed and recommended to the Department of Administration for implementation. This project should have a reasonable completion date assigned and be scheduled for only periodic review thereafter.

2. Likewise, there should not be a continuing agency responsibility to assure that state government has an energy-efficient telecommunications system, or that kindergarten through 12th grade energy education is being implemented. Once established, guidelines that result from study projects should be left for implementation by the affected operating agencies or departments.

The important point here is that if the agency, by virtue of its staff expertise, is to attempt to "stay on top" of state government matters outside the agency's jurisdiction -- and this seems to be occurring with the Conservation Division -- the following circumstances are likely to develop:

1. The agency will itself become burdened with the business of government rather than energy; and

2. Other departments may come to rely on the expertise of the agency to the extent of being adversely affected by Energy Agency staff turnover and/or changing priorities in the activities of the agency.

Two of the projects assigned to the division are of special concern to the Commission. The first is that of establishing an emergency energy plan. This project was completed toward the end of calendar year 1974 after extensive public hearings had been held throughout the state. Printing of the final plan is, however, being held up until specific emergency powers are granted by the Legislature. The 1974 legislation that established the Energy Agency mandated that an emergency energy plan be developed. Proposed legislation (H.F. 1836) resulting from this mandate was

introduced two days before the close of the 1975 session of the Legislature. The result is that as of June 1, 1975, Minnesota does not really have an emergency energy plan beyond the minimum requirements established by federal allocation guidelines. The disruptions Minnesota is projected to experience due to reduced imports of natural gas and Canadian crude oil (Section 1 of this report) make a strong case for stand-by emergency powers of even greater strength than are likely to be needed in other parts of the nation.

The second project that has given the Commission concern is that of public education. This seems largely to have been construed to mean public speaking. Public speaking has been given "top" priority by the Conservation Division and is so extensive that significant amounts of staff time are devoted to speaking engagements. One staff member accepted more than 25 speaking opportunities during January alone. These engagements ranged from talks before small informal groups to participation in large seminars. There is no quarrel with the need for public education or with the concept that it is the duty of the Energy Agency to provide some of this service, but the assignment of "top" priority to this project is deemed inappropriate.

Perhaps it is best to list some of the projects that are not included in this division's workload which might have been included had there been fewer other obligations. These projects are believed by the Commission to be of greater importance than extensive public speaking and should probably be considered as having "high" or "top" priority:

1. Establishment of procedures and guidelines to be used in developing a plan for the management of Minnesota's energy future.

2. Procedures and guidelines for establishing agency priorities to be used in evaluating proposed agency projects and the determination of necessary resources and the resulting public benefit. This is known as the feasibility study method.

3. A program to evaluate alternative designs and prepare cost estimates for the installation of solar space and water heating systems in residences and commercial establishments in Minnesota.

4. An economic projection to some future year (possibly 1985) of space heating costs using various fuels and supply technologies under varying heat-loss characteristics in Minnesota residences and commercial establishments.

This section of the report is concluded with the Commission's recommendation that the agency's leadership do the following:

1. Keep work projects in all divisions in short, well-defined frames. Do not allow people who are basically doing project work to become entrenched in long, on-going assignments.

2. Establish a means for assessing the worth and priority of any project. At no time has the Commission been advised of the use of feasibility studies of the type that are commonly used elsewhere to evaluate the benefits, risks, and resources required to make an idea work.

3. Develop an energy "supply and demand" game plan. Section 2 of this report is such a game plan. The Commission's plan need not be accepted by the agency -- it is just one of a great many possible plans. The agency's game plan should be developed on the

basis of what the limited information available today is telling us, and updates should come each time new data becomes available in sufficient quantity and quality as to make a contribution. The game plan is long overdue and should be given "super top priority."

It is difficult to envision an effective public education program that does not communicate the semblance of some kind of game plan. At some point in time, the most recent version of the game plan (simply a supply and demand strategy Minnesota should employ) should be subjected to public hearings. Setting the stage for those hearings should begin now.

4. Consider placing the planning role elsewhere within the organizational structure. It seems left out of the mainstream of work effort in the agency while its function is being carried out by the division that is also responsible for conservation.

Generally speaking, planning within any organization occurs at the highest levels of authority. Perhaps the planning role should be responsible directly to the Deputy Director or even the Director. This role would not be unlike the function of the administrative assistant in a corporation's executive office with whom the responsibility often lies for the development and maintenance of long-range business strategies.

SECTION 5

THE LEGISLATIVE COMMISSION ON ENERGY

Minnesota Statutes 1974, Chapter 116H.04 indicates that among the duties of the Legislative Commission on Energy (LCE) are the following: 1) to oversee the establishment, staffing, and operation of the Minnesota Energy Agency (MEA); 2) to assess Minnesota's energy situation and prepare recommendations for the governor and the Legislature; 3) to review and evaluate policies adopted by the Agency; and 4) to assess the opinions of interested parties and assist in the preparation of an overall plan for state energy policy.

To date, the LCE has had limited impact on the staffing and operation of the MEA. Serious constraints on the time Commission members could devote to energy matters plus limited funding for staff have precluded the in-depth studies and extensive public hearings that the development of a truly comprehensive energy policy would require.

The Commission experienced difficulty in establishing its role concerning the staffing and operation of the Agency. Likewise, it appears that the Energy Agency was unsure of its relationship with and obligation for reporting to the LCE. One significant achievement of the LCE and its subcommittees was the preparation of a package of energy legislation. In light of the apparently worsening picture for energy in Minnesota's future, it is strongly recommended that the proposed legislation be favorably acted upon by the 1975 or 1976 session of the Legislature.

There are several courses of action that would resolve the difficulties experienced by the LCE: 1) allow the LCE to expire without replacement and depend on the MEA for the functions which the LCE was charged to perform, 2) retain and strengthen the LCE by establishing clear lines of authority and communication, 3) establish a citizen advisory committee reporting to the governor and the Legislature, 4) create an alternative structure such as an independent board of commissioners which might carry out the following functions:

- A. Act as a board of directors for the MEA with power to hire and fire the director of the Agency.
- B. Carry out studies of the long-range implications of the changing energy situation and make recommendations to the Legislature, the governor, and the public as to methods which will lead to a stable energy economy.
- C. Promote a program of grants for energy research and development.
- D. Hold hearings at which public groups, business, industry, state agencies, and private citizens can voice their interests, desires, and opinions about state energy policy.
- E. Grant certificates of need for large energy facilities and review energy impact statements for all major developments.

and 5) that the appropriate standing committees of the Legislature monitor the Agency's activities in the same manner that activities and programs of other departments and agencies are monitored.

In a highly technological society such as ours, energy is one of the most pervasive and controlling factors that can be identified. More than ninety-five percent of the energy on which our whole system depends comes from fossil fuels. As the supplies of these fuels become more scarce and costly, there are bound to be serious dislocations and conflicts between the most basic social goals and aspirations. Balancing disparate values and attempting to assess their impacts before conflict occurs seems to be a more sensitive role than most state agencies are asked to assume.

Ultimately, value judgments will have to be made by the people through the legislature. It may be valuable to have an intermediate policy body between the information gathering function of the Agency and the decisions of the Legislature. Section 2 of this report presents a tentative short-term and long-term energy policy plan for the state. But which body will continue to study, adapt, and improve the plan? What will happen to our state if our fuel supplies continue to dwindle without some contingency plan? This report, along with the legislative concepts approved by the Commission in January, constitute the sole long-range public energy policy plan developed at the state level to date. The continuing crisis demands more.

APPENDIX I

SUMMARY OF MEETINGS OF THE LEGISLATIVE COMMISSION ON ENERGY
AND THE SUBCOMMITTEES ON CONSERVATION MEASURES AND
REPORT DRAFTING

MEETINGS OF THE LEGISLATIVE COMMISSION ON ENERGY

1974

- May 15 - Organizational
- May 29 - Election of officers
Reports from Agency
- July 17 - Reports from Agency
- August 21 - Report from Agency on Emergency Plan
Report from Mike Murphy, Upper Midwest
Council
- September 18 - Report from Agency on public hearings
about Emergency Plan
- October 16 - Speakers on the energy situation in
Minnesota:
A. Edward Hunter, State Planning
Agency
Dr. John Haaland, Pillsbury Company
Rolly Comstock, Northern States Power
Company
- November 13 - Presentation by Dr. Dean Abrahamson,
University of Minnesota
Suggestions on work program from Herman
and Rankin
- November 22 - Appointment of Subcommittee on Conserva-
tion Measures
Report from Agency
Presentation of "laundry list" of possible
conservation measures - staff
- December 4 - Expansion of Subcommittee on Conservation
measures by addition of two Energy
Agency people
Presentation by Rankin and Herman of an
analysis of impacts and consequences of
various conservation measures
- December 18 - First report of Subcommittee on Conserva-
tion Measures to Commission

1975

- January 6 - Testimony by various state agencies and departments on possible duplication of effort in energy matters
- January 27 - Presentation of final report of Subcommittee on Conservation Measures
Adoption of resolutions on minimum deposit legislation and importing energy produced under unacceptable conditions
- March 26 - Speakers on Minnesota's energy situation:
Roland Comstock, Northern State Power Company
Tom Jetton, Northern Natural Gas Company
R. J. Piculell, Northwestern Refining Company
Mike Murphy, Upper Midwest Council
John McKay, Director, Minnesota Energy Agency
- April 22 - Conclusion of the Agency report on Minnesota's short and mid-range energy future
Distribution of preliminary drafts of report by Subcommittee on Report Drafting
- June 10 - Discussion on adoption of report to the Governor and the Legislature
Interviewing of candidates for the position of Director of the Minnesota Energy Agency

MEETINGS OF THE SUBCOMMITTEE ON REPORT DRAFTING

LEGISLATIVE COMMISSION ON ENERGY

1975

- January 22 - Organizational, establishment of priorities for contents of the Report
- January 30 - Establishment of a work-flow plan for writing the Report. Drafting of questions to be communicated to Agency.
- February 6 - Evaluation of responses received to date from the Energy Agency. Extended discussion on the nature and scope of energy policies that Minnesota should adopt
- May 29 - Final subcommittee review of draft of the Report

MEETINGS OF THE SUBCOMMITTEE ON CONSERVATION MEASURES

LEGISLATIVE COMMISSION ON ENERGY

1974

- November 26 - Organizational, discussion of Subcommittee work program
- December 9 - Addition to Subcommittee of two staff persons from the Minnesota Energy Agency. Establishment of criteria by which to evaluate conservation measures. Assignment of "housekeeping" legislative proposals to the Energy Agency
- December 10 - Discussion of numerous potential conservation measures
- December 16 - Discussion of potential conservation measures

1975

- January 8 - Refinement of conservation measures approved for further consideration by the Commission
- January 15 - Testimony by interested persons on conservation measures under consideration
- January 22 - Preparation of recommendations of Subcommittee to the Commission

APPENDIX II

LETTERS FROM THE COMMISSION TO THE DIRECTOR OF
THE ENERGY AGENCY

January 28, 1975

Mr. John C. McKay, Director
Minnesota Energy Agency
740 American Center Building
160 East Kellogg Boulevard
St. Paul, Minnesota 55101

Dear Mr. McKay:

As you are well aware, one of the mandates to the Legislative Commission on Energy is to evaluate the policies and accomplishments of the Energy Agency and report the findings to the Legislature and the Governor. Chairman Willard Munger has appointed a Subcommittee on Report Drafting (consisting of myself, Bill Cunningham, and Senator Skip Humphrey) to begin work on the Commission's report.

Because of our rather limited knowledge of the actual workings, programs, policies, and plans of the Agency, I wish to ask your response to certain questions. Hopefully, your replies will give us a feel for the manner in which the Agency is fulfilling its charge.

I would appreciate your reply at the earliest date convenient to you, but certainly no later than February 4, 1975. I suggest that the text of your response be no more than ten to twenty pages. You may deliver the comments requested to our research analyst, Sam Rankin.

The questions we would like to ask fall into the following categories:

- 1) Who are the present Agency personnel and what are their qualifications for the duties they are performing?
- 2) What have been the Agency's accomplishments?
- 3) What are the Agency's present jobs (projects)?
- 4) What are the Agency's "policies" relative to energy supply, transportation, conservation, and non-conventional alternatives?

- 5) What are the Agency's anticipated goals and programs?
- 6) What continuing contacts does the Agency have with other agencies, consumer groups, etc.?
- 7) What are the Agency's major problems?
- 8) What have been the monies expended by the Agency to date and for what programs have they been expended?

Sincerely yours,

Alan K. Greene, Chairman
Subcommittee on Report
Drafting of the Legislative
Commission on Energy

AKG/bh

January 31, 1975

Mr. John C. McKay, Director
Minnesota Energy Agency
740 American Center Building
160 East Kellogg Boulevard
St. Paul, Minnesota 55101

Dear Mr. McKay:

The Subcommittee on Report Drafting (consisting of myself, Dr. Cunningham, and Senator Skip Humphrey) of the Legislative Commission on Energy wishes the Energy Agency to provide us with some additional information. In light of the Agency's rather extensive work in developing policies and plans, we would like you to share some comments with us so that they can be considered in our deliberations. In talks between Sam Rankin and your staff, it seems that most of the material we would like is currently at hand and presenting it for our use should not be too time-consuming or difficult.

The information we would like you to supply falls into the following three categories:

- 1) Background information on the supply and consumption of energy in Minnesota (and possibly in the U.S.).
- 2) The scope of the present energy shortage in Minnesota.
- 3) Your view of the long-term energy problems Minnesota must face in the years ahead.

We well realize that your staff is very busy and their time is most precious, yet we request that you communicate your responses to these questions for use at the next meeting of the Subcommittee on the evening of February 6, 1975. Your continued cooperation is greatly appreciated.

Very sincerely yours,



Alan K. Greene
Chairman
Subcommittee on Report Drafting

February 15, 1975

To: Philip W. Getts, Deputy Director
Minnesota Energy Agency

From: Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

Alan
rk

Tr: Attached information requests of the Agency

Following our telephone conversation of the 13th in which we discussed the informational requests by our Subcommittee dated January 28th and 31st, along with your reply dated February 6th, the attached memos are addressed to specific questions which still remain with our Subcommittee.

I am sure that we will have even more questions -- our work is far from over. Our next Subcommittee meeting will be on or about Thursday, February 20. We would appreciate some or all answers by that time, if at all possible.

Please call upon myself or Sam Rankin if any of these requests need further explanation.

Thank you very much for your continuing cooperation with our Subcommittee.

February 15, 1975

To: Philip W. Getts, Deputy Director
Minnesota Energy Agency

From: Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

Re: Action taken by the Agency on Minnesota Statutes 1974,
Chapter 116H.07(g).

Please specify for our Commission's review, actions that have been taken by the Agency in fulfillment of Chapter 116H.07(g) which directs the Agency to evaluate policies on rates and prices for energy.

Copies or summaries of correspondence, testimony, etc., will suffice for our needs -- if they should prove convenient to your reply.

I thank you for your cooperation.

February 15, 1975

To: Jim Carter, Director
Research Division
Minnesota Energy Agency

From: Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

Re: Action taken on Minnesota Statutes 1974, Chapter 116H.07(k)
by the agency to promote energy R & D projects.

Please indicate for Commission review the activities that have been undertaken by the Agency that would serve in any way to encourage, coordinate, fund, and promote energy research and demonstration projects.

Copies or summaries of correspondence, project listings and indexes, applications for grants, and other such relevant material that would bear on our request and Minnesota's status of involvement in energy R & D -- both now and proposed -- will be helpful.

I thank you sincerely for your cooperation.

February 15, 1975

To: John D. Peterson, Director
Division of Conservation and Planning
Minnesota Energy Agency

From: Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

Re: Coordination of energy policy with other states and the
federal government

Please list for our Commission's review the past and planned activities of the Agency designed to seek and develop means of coordinating Minnesota's energy policies with those of other states, with multi-state regions, with the federal government, and with energy suppliers and energy consumers.

Your reply may take the form of a list of contacts by name, the approximate date, and a brief sentence denoting the nature and purpose of the contact.

I thank you sincerely for your cooperation.

February 15, 1975

To: John D. Peterson, Director
Division of Conservation and Planning
Minnesota Energy Agency

From: Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

Re: Energy Conservation programs of the Division of Conservation and Planning

Please outline for our Commission's review the several conservation programs, including the status of each, your division has developed and/or participated in since the Agency's inception. Indicate also, if you will, what changes or additions to these programs you envision for 1975-76.

Again, I thank you for your cooperation.

February 15, 1975

To: Rosalie Butler, Assistant Director
Division of Conservation and Planning
Minnesota Energy Agency

From: Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

Re: Action taken on Minnesota Statutes 1974, Chapter 116H.07(j)
by the Agency to inform and educate the public on energy
matters.

Please list for Commission review those activities engaged in by the Agency that have in some way informed and educated the public on energy matters as required by the 1974 legislation.

Copies or summaries of correspondence, press releases, speeches (including time, place, and audience), and relevant project schedules will be helpful. Samplings of distributed educational materials will be appreciated.

I know that a great deal has been done in this area, Rosalie, so please don't load me down with all of it -- just a listing and some highlight examples.

I thank you sincerely for your cooperation.

April 14, 1975

Mr. John C. McKay, Director
Minnesota Energy Agency
740 American Center Building
160 East Kellogg Boulevard
St. Paul, Minnesota 55101

Dear Mr. McKay:

Let me take this opportunity to express my sincere appreciation for the report you and your staff prepared for the meeting of the Commission on March 26, 1975. "Minnesota's Energy Situation to 1985" describes in understandable terms, both verbal and visual, the magnitude of potential energy shortages in our state. The projections contained in your report are quite similar to those calculated by our staff.

In light of both your calculations and the testimony of persons involved in the energy delivery industry, it is important that we take inventory of the energy conservation and supply programs that are being implemented currently and those that are being planned for the future.

At the Commission meeting on April 22, 1975, the Subcommittee on Report Drafting will present a proposed draft of the report to the legislature and the governor. We need to know the specific programs and their implementation priorities that you and your staff recommend to assure that Minnesota's energy supplies and demands will be balanced in the years ahead. It would be helpful if your response would include such specifics as:

- * What are your programs to interact with other governmental bodies -- what has been done to date -- what additional steps need to be taken?
- * What programs have been implemented to date to encourage the development and utilization of new energy sources, conservation techniques, car-pooling, and other requirements mandated by shortfall projections to 1985 -- what additional steps need to be taken?
- * It would be helpful for us to know what program development guidelines, formal or informal, your office uses to evaluate the effectiveness of alternative programs and strategies and the assignment of priority.
- * Recognizing that programs and priorities are people-dependent, please indicate what your current policies and mechanisms are in establishing job descriptions, organizational

Mr. John C. McKay
April 14, 1975
Page Two

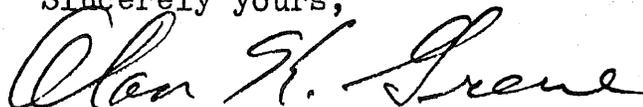
structure, and hiring practices to achieve previously stated goals. Has the 1985 projection changed your internal strategies for personnel and structure? Does your organizational plan allow for flexibility in the future?

- * What is your program, current and planned, to develop legislative recommendations and supportive testimony?
- * What have you done to develop programs beyond the minimal requirements of the Agency's enabling legislation that are necessary to balance energy supply and demand?
- * Do you have a program to determine new directions or roles that the Agency may need to undertake in the future? Do you perceive the need for strengthening or expanding present authority?

We would very much appreciate your reply by early afternoon on April 18 so that we may be better prepared for our Commission meeting on the 22nd.

Thank you for your continued assistance.

Sincerely yours,



Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

AKG:sr

CC: Bill Cunningham
Senator "Skip" Humphrey
Representative Willard Munger

APPENDIX III

SELECTED EXCERPTS FROM THE RESPONSES AND DOCUMENTATION
PROVIDED BY THE DIRECTOR OF THE ENERGY AGENCY IN
REPLY TO LETTERS FROM THE COMMISSION

DEPARTMENT ENERGY AGENCY

Office Memorandum

TO : Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

DATE: Feb. 19, 1975

FROM : Rosalie Butler, Assistant Director
Energy Conservation and Planning

SUBJECT:

In response to your request, please find the following review of the Energy Agency activities that relate to informing and educating the public on energy matters.

One of the most important and meaningful activities in which we are involved relates to our efforts to form an energy education non-profit organization. In the terms of educating the public, we arrived at an early inescapable conclusion: that for the short term goal, careful planning and positive conservation are vital; however, long term solutions to the energy situation lie with an educated, knowledgeable public and only with the cooperation of the State Department of Education could the Energy Agency accomplish the goal of a public fully educated in the basic skills of survival which will be necessary for future energy decisions because this kind of education must start at an early age and continue and kindergarten through 12th grade is the most obvious place to start. The Energy Agency approached the Department of Education in October 1974, with a view to working together to begin energy education in the school system. The concern and cooperation from Dr. Ray Peterson and his staff at the Department of Education was positive and committed. Out of this October meeting, it was agreed that the Energy Agency and Department of Education would jointly sponsor a 2-day workshop on December 4 and 5, 1974, bringing 35 people representing industry, educators, environmentalists, labor and government together to consider the development of comprehensive energy education curriculum for kindergarten through 12th grade for the public school system in Minnesota. (List of participants at December 4 and 5 workshop marked Item #1.)

By bringing the various segments together in a working session the attitude of cooperation and confidence has been established that will provide the comprehensive approaches to energy education including environmental and economic impacts that will allow future generations to decide energy issues through wisdom and knowledge and begin to narrow the public's ignorance about energy.

From this workshop, an energy education planning committee with representation from the various segments was appointed. The planning committee met a week later in a 1-day session and adopted two resolutions which in essence say that there is a need to draw together the resources of education, government and industry to achieve comprehensive energy education, and to achieve these goals

Alan K. Greene
Feb. 19, 1975
Page 2

a non-profit organization would be formed with a Board of Directors to make decisions. A telephone survey of the members of the large group indicated almost unanimous support for this approach. A nominating committee and a committee to draft a statement of purpose and by-laws and to provide an operational structure for the non-profit organization were selected.

It was felt that by going the non-profit organization way, it would be easier to raise money from the private sector to finance the cost of development of energy education units and necessary teacher training to implement these units in the statewide school system.

On January 27, 1975, the full committee met at Minnesota Mining and Manufacturing Company in a full day session and approved the proposals of the planning committee. (See minutes of this meeting marked Item #2.)

We are now in the process of preparing a slate of candidates for a mail ballot to be voted on by the entire committee. A Board of Directors of 30 people will be chosen. (The list of people that have agreed to serve on the Board of Directors of this non-profit organization is marked Item #3.) This mail ballot will be completed in two weeks.

It must be noted here that while the participants at the 2-day workshop and the members of the planning committee brought positive forceful ideas and concepts to the workshop, all agreed that it was essential to develop education units that would allow all views without trying to influence the pupil so that a judgment on energy alternatives could be made after knowing all the facts.

Public Appearances and Public Information

Our goal is adult education to inform and educate the public on the complex, far-reaching ramifications of energy uses and energy shortages. This includes radio, television, speeches and seminars, etc. A number of appearances and major speeches have been scheduled for the coming months and we anticipate requests for many more. This is important for the Agency and helps make the public energy aware.

There are several people at the Agency involved in this activity:

John C. McKay - In addition to the many speeches and seminars in which he participates, Mr. McKay also appears weekly on WCCO radio on the Howard Viken Friday radio show from 7:40 to 8:00 a.m.

Phil Getts - Makes appearances as requested to speak on energy matters.

Alan K. Greene
Feb. 19, 1975
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Dixie Diehl, Fuel Allocation Director - Working through the statewide network of fuel allocators in each community, information is relayed through a newsletter (sample marked Item #4), also, speeches and seminars for jobbers, retail service station operators, and fuel coordinators. In the next three or four weeks the Fuel Allocation Division will sponsor five or six meetings statewide which will deal primarily with the fuel allocation program, however, a representative of the Conservation Division will make a presentation on conservation. The Allocation Division has also distributed newsletters to fuel coordinators and other public officials.

John D. Peterson - (See memos from John Peterson, Items #5 and #6.)

Rosalie Butler - The following:

14 public meetings speaking on energy education through the state of Minnesota. (These were the Emergency Allocation Plan hearings conducted by John D. Peterson.)

October 22, 1974 - Administrative Management Society of Southern Minnesota, Holiday House, St. Peter, Minn. Energy Agency goals and energy conservation was the topic of my speech.

November 26, 1974 - Lecture and seminar on the "Legislative Charge and Goals of the State Energy Agency." This was an undergraduate seminar at the University of Minnesota and is part of a series of seminars on food and energy arranged by Professor Russell S. Adams.

November 13, 1974 - Northwest Petroleum training seminar on Minneapolis energy problems.

December, 1974 - Twin City Women's Traffic Club, Minneapolis, Minn. (Women in management in transportation field.)

January 14, 1975 - Fifty-Fourth Annual Convention, Minnesota School Board Association, Minneapolis Auditorium (copy of speech marked Item #7). This is a basic speech used many times but modified or adapted to fit the occasion.

January 30, 1975 - Annual Banquet of Wadena Chamber of Commerce, Pine Cove Inn, Wadena, Minnesota.

February 5, 1975 - Rotary Club, South St. Paul, "Lessons in Energy Survival."

April 23, 1975 - National Secretaries Association, Holiday Inn, Minneapolis. Topic will be energy conservation and energy use and planning.

Sam Stewart - Has given talks at the following:

Minnesota Department of Welfare, August 7, 1974.

Minnesota Chief Engineers, August 15, 1974.

Arrowhead Builders Association, September 19, 1974.

Minnesota Chief Engineers, October, 1974.

Minnesota NAHRO Midwestern Conference, December 6, 1974.

Nineteenth Annual Institute of Building Officials, January 7, 1975.

In addition, "Energy Management for Commercial Buildings" has been prepared by Sam Stewart for public distribution. (See Item #8.)

Research Division (under Dr. James Carter) activities related to public information and education:

The Research Division distributed 1500 copies of "Minnesota Energy Supply and Use - 1972" and "Minnesota Energy Summary 1973 vs. 1972" to all libraries, colleges, high schools, county fuel coordinators, most newspapers, radio and TV stations, and all energy suppliers in the state. The division has also prepared a report on "Minnesota Energy Use - 1970 to 1974" which was distributed primarily through the media, and a draft report on "Energy Consumption in Manufacturing and the Minnesota Economy" which has been given limited distribution for review and will be available for general distribution in about two months. (These items are marked #9, #10, #11, 12.)

The Research Division, in cooperation with the Minnesota Educational Computing Consortium, has developed an "interactive" educational computer program for analyzing household energy consumption. A writeup of this program, HOUS, is available from MECC or from our office. The complete report on energy consumption in households will be available for general distribution in about three months.

The cooperative venture with MECC was very exciting and rewarding. Our work on Energy Use in Households is available today to over 500 users through the MECC system, even prior to the publication of our final report.

Dr. Carter feels it is essential to maintain this direct link between research and education. MECC has proposed to the Research Division a joint effort to make computer models on energy use in commerce, transportation, mining, construction, government, and manufacturing, available to all educational institutions across the state.

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Feb. 19, 1975
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Also, find attached news releases (Item #13), general correspondence and miscellaneous information relating to the Energy Agency activities in public information and education (Item #14), and a schedule of a timetable on activities (Item #15).

I hope this is enough of the type of information you requested. If I can furnish additional information or more detailed information, please advise.

RLB:vs

Attachments



MINNESOTA ENERGY AGENCY

740 American Center Building, 160 East Kellogg Boulevard
St. Paul, Minnesota 55101 612-296-5120

February 6, 1975

Mr. Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy
Room 118, State Capitol
St. Paul, Minnesota 55155

Dear Mr. Greene:

In your letters of January 28, 1975, and January 31, 1975, you posed several questions concerning the Minnesota Energy Agency and the energy problems faced by the State of Minnesota in the years ahead. I will endeavor to answer your questions in serial order beginning with your first letter.

1). Present Agency Personnel. A complete list of agency personnel is attached showing name, classification, and salary. In assembling the agency staff, I felt the primary consideration was the individual's ability to think straight, work hard, and learn fast. At the time the agency was created, there were very few "energy experts" and I felt generalists with the foregoing aptitudes would be more valuable than energy experts without these attributes. The only exception to this rule is in the area of research and information management, where I felt that specific experience in information management was desirable.

With the foregoing in mind, I retained Philip Getts as the Deputy Director because of his previous experience in government as a member of the Attorney General's staff. John Peterson was hired as Director of the Division of Conservation because of his demonstrated ability to communicate with business men and because of his extensive knowledge of the state of Minnesota and its industries and people. James Carter was retained as Director of the Division of Research because he had done extensive work in the area of energy information management while on the staff of the Division of Civil Defense of the Department of Public Safety.

Having made these appointments, I left the hiring of additional staff to the division directors. In the Research Division, we have been fortunate to secure the services of a very talented econometrician (Dr. Ernesto C. Venegas), and have recently added a senior system analyst (Ronald D. Visness). Our two energy research analysts (Dan Quillin and Rudy Brynolfson) were hired because of previous work experience in areas of energy information and computer programming, respectively.

The only direction I gave to John Peterson for his staff was that the individuals hired have an aptitude for learning and hard work. Mr. Peterson's first appointment was Sam Stewart, a mechanical engineer from IDS Properties, who came highly recommended and whose subsequent work has more than justified Mr. Peterson's choice. Weston Fisher was hired as the agency's chief policy analyst on the basis of his work in energy at the Pollution Control Agency. Jay Lujan perhaps typifies my direction that agency employees need no previous energy background, but that they demonstrate above-average intelligence and ability to learn rapidly. Rosalie Butler, who presently serves as assistant director of Conservation and Planning, demonstrates similar abilities and she has the added assets of an extensive knowledge of local government and a great enthusiasm and ability to communicate.

The staff of the Fuel Allocation section was transferred as a unit from the Emergency Services Division of the Department of Civil Defense. Experience in this complex field is perhaps the most important criteria.

In general, our staff has been learning as it goes, for energy planning and research are new areas in which few trails have been blazed. However, I anticipate that future personnel additions will require a high level of expertise, as the availability of energy-wise persons increases.

2). Major Agency Accomplishments. Perhaps the most important accomplishment of the Agency has been the successful management of its own birth. The Agency was created on April 1, 1974; the Legislative Advisory Committee approved partial staffing on May 1, 1974; and full staffing was approved by the L.A.C. on June 27, 1974. Thus we have had slightly over seven months to organize the agency, hire personnel, secure office space, and begin development of the numerous programs imposed upon us by our enabling legislation. As of this date, we have moved to permanent quarters, we have hired virtually all of the personnel authorized to us by the Legislative Advisory Committee, and most of the programs set forth in the statute are at least in early development stages.

Despite this newness, the agency has several tangible accomplishments on its record. The tentative emergency allocation plan was published on July 27, 1974 and a final draft is awaiting amendatory legislation concerning implementation powers. The Research Division has published two major reports on energy use in Minnesota and has published a number of draft papers concerning its information systems and economic modeling activities.

The Division of Conservation, in addition to completing work on the tentative allocation plan, has initiated many programs concerning home insulation, energy audits with various commercial and industrial establishments, an extensive energy program for elementary and secondary grades, studies of state purchasing, extensive revisions of state building code to make energy conservation an intricate part of the new code, and many similar projects. The Agency study of utility rate structure is about to be concluded, and I anticipate making a public statement on this matter in a short time.

In addition, the Agency has been able to serve as an advocate for the regional and local interests of Minnesota, particularly concerning the threatened shut-off of Canadian crude oil. I have appeared before a subcommittee of the United States senate to explain the state's unique problems, and I have been able, with the assistance of my staff, to provide much valuable information and suggestions to the Minnesota congressional delegation in their dealings with federal agencies.

In sum, the Energy Agency has been organized, it has been given life, and it is taking its first few steps. Its most important accomplishment to date has been the institution of program development rather than specific products. I am confident that given enough time and appropriate resources, these programs will bear much fruit.

3). Current Agency Projects. The Agency's current projects consist primarily of those items mentioned in the preceding paragraph. Very few of the programs instituted during our first 7½ months existence have been completed. We are therefore pursuing the items mentioned above, together with a program to secure forecasts of energy supply and demand from various energy suppliers, implementation of the regional energy information system, and development of a certificate of need program for large energy facilities.

4). Major Agency Policies. Presently, it cannot be accurately said that the Agency has developed any "policy" concerning energy supply, transportation, conservation and non-conventional alternatives. Aside from the non-controversial endorsement of energy conservation as both a short-term and long-term solution to our energy problems, the Agency has not had the opportunity to evaluate and develop in an orderly fashion policies concerning long-term energy supply, transportation needs, and non-conventional energy sources. While this lack of policy development may be viewed as a short-coming of the Agency, I feel that our first priority was establishment of the Agency and institution of the specific programs mandated by statute. Our budget request for the coming biennium requests additional personnel to carry on these short term studies so that our more experienced staff members can devote their time to long range policy planning in these important and complex areas. Moreover, I believe that sophisticated policy planning must await a development of reliable and complete energy data- something which we now lack. I anticipate that a great deal of our work in energy data management will be completed by the end of the current fiscal year and that we can begin to develop policies about which you have inquired. I feel that by waiting until the information is at hand and by waiting until some more distracting tasks have been completed, we can develop policies that are more suitable for Minnesota and are based upon a sounder knowledge of their impact on the state and its economy.

5). Agency's Goals and Programs. The answer to your preceding question in a sense, anticipated your question concerning the agency's goals and programs. As reflected in our budget proposals as submitted to the legislature, our goals for the coming biennium consist primarily of completing development of present programs and maintaining these programs at an operational level. For example, we are in the process of hiring two engineers to work with Sam Stewart to assist

him in his commercial and industrial energy audits, the home insulation program, and similar programs. We are also adding personnel to permit completion of our economic forecasting capability. In essence, our immediate goal is to move our program development stage to a program operation stage. Assuming a moderately sympathetic legislature, this transition should take place during the coming biennium.

I should point out that our budget does not propose any new programs (save implementation of the certificate for need program which is mandated by the statute). Staff expansions are required to carry out the legislative mandate in what I consider to be an acceptable fashion.

Despite the fact that the agency itself will initiate no new programs, I think it is reasonable to expect that some new programs will be thrust upon the Agency through legislation introduced by other interested parties during the coming session. Some possible candidates are administration of appliances or automobile labeling program, supervision of a Minnesota energy research fund, and coordination of an intensive energy conservation campaign for state government.

6). Agency Contacts with Other Agencies and Special Interest Groups. The agency attempts to maintain regular contact with all sectors of Minnesota's economy ranging from large energy producers such as the electrical utilities to various consumer and retailer groups. The contact with these groups has happened largely by chance. With specific projects, such as energy education, efforts have been made to secure comment and reaction and participation from a broad spectrum of special interests. I feel that it is in the agency's - and in the state's - interest to actively work with the business community and with the special interest groups in solving our energy problems.

The agency maintains liaison with other agencies of the state government primarily through my participation as a member of the Environmental Quality Council and by Mr. Getts' membership on the Environmental Quality Council Technical Committee and on the state's Water Resources Council. In addition, we have a representative on the Copper-Nickel Task Force, and I have recently appointed a steering committee of representatives of various agencies to guide development of the Regional Energy Information System.

These contacts to date have demonstrated that there is surprisingly little duplication and overlap in energy planning functions in state government. The pervasiveness of energy as a resource makes inevitable the involvement of many agencies in energy-related matters. However, I am unable to find any example of two agencies performing the same function, or another agency performing a function committed to the Energy Agency. Generally speaking, those agencies such as the Planning Agency and the Pollution Control Agency, which had formerly been active in energy planning, have gracefully relinquished their role to us and have provided us much assistance in getting started. Similarly, I feel it appropriate that the Pollution Control Agency be concerned with the energy consequences of its environmental decisions, and that the Department of Natural Resources be concerned with the energy consequences of its conservation decisions. Indeed, we will have failed in our charge if we do not make all of the agencies energy conscious in this fashion.

7). Major Agency Problems. The agency's principal problem is a lack of human resources. When the agency was created no one could say for certain how much it would cost to implement the program set before us in the Energy Act. With seven months of operating experience behind us, I feel that our budget request for the coming biennium (approximately 1.9 million dollars) represents a fair price for the activities requested by the legislature. Thus, the \$320,000 appropriated to us for the first fiscal year of our existence is clearly inadequate. I feel that the staff has made a great many sacrifices and has performed well given the lack of adequate resources. The agency could be much further down the road towards implementing some of its programs had it been given a sufficient appropriation when it was created.

The second major problem faced by the agency is the difficulty of communicating the nature of its work to legislators and to the public at large. I have on several occasions facetiously "apologized" for failing to solve the energy crises in eight months; nevertheless, a surprising number of people do not take that remark facetiously. Given the developmental stage of our growth, and given the complexity of our energy problems, it is sometimes difficult to convince people that the agency is a worthwhile expenditure of public funds.

It has been correctly pointed out that some of this misunderstanding could have been avoided had the agency been able to maintain a higher profile in carrying out its activities. Again, the lack of adequate personnel resources prevented us from carrying out any systematic program of "energy public relations" or energy education. We were forced to rely upon hit-or-miss speaking engagements, a sporadic supply of press releases, and little else in making the public realize that the agency was working on their behalf. This situation is now beginning to change, but I feel that additional resources are needed to adequately get the energy message across to the populace as a whole.

8). Expenditures to Date. The Department of Finance does not keep track of agency expenditures on a program by program basis. Therefore, I have attached a budget which we submitted to the Legislative Advisory Commission in July. I am also attaching a summary of our 1975 budget by programs which was submitted as part of our biennium budget material. In general, the agency was appropriated \$325,000 from the general fund for fiscal year 1975. In addition, we have secured a grant from the Upper Great Lakes Regional Commission in the amount of \$270,000. In addition, the agency has secured additional funding from the Federal Energy Administration, approximately \$100,000 of which has been budgeted for the Federal Fuel Allocation Program and approximately \$81,000 of which will reimburse the general fund for expenditures made from the original appropriation.

I will now turn to the questions raised in your letter of January 31st, 1975. Rather than discuss the background information on supply and consumption of energy in Minnesota, I am enclosing two recent publications by the agency's Division of Research which I think set forth the best data presently available. I would observe, however, that this data is very gross (statewide only) and that it is our goal to present similar data in a more articulated fashion, hopefully on a county or regional basis.

February 6, 1975

The scope of the energy shortage in Minnesota cannot be adequately assessed, beyond making the statement that unchecked demand will rapidly out-pace our supplies. Specific short falls can be anticipated, such as reduction in the supply of natural gas and the shut-off of Canadian crude oil. However, it is impossible to estimate the impact of these reductions on Minnesota economy at the present time. The forecasting work carried on by Dr. Venegas and other members of the Research staff will provide more meaningful answers to your questions in the near future. I feel that one of the over riding duties of the agency is to assess the scope of the present energy shortage and to formulate acceptable plans for dealing with it.

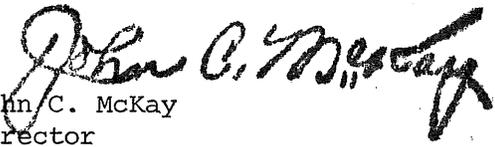
In the years ahead, Minnesota faces the same primary energy problems faced by all 50 states, that is, securing enough energy to meet demand. Since Minnesota imports virtually all of its energy, the state is necessarily dependent upon decisions made in many other jurisdictions over energy supplies. One notable example is whether and to what extent western states will permit the exploitation of their vast coal reserves. At present, Minnesota has no control over such decisions, but I believe it is an appropriate role for this agency to seek regional cooperation so that such decisions are not made in isolation.

Similarly, Minnesota cannot by itself conserve energy and materially improve its supply/demand outlook. Obviously, if Minnesota saves energy without similar conservation measures being adopted by neighboring states, the savings of Minnesota citizens will be spent by residents of nearby states. In conservation, as well as in resource development, this agency must lead the way to foster regional cooperation.

The state faces important secondary problems resulting from our energy problems. This state lies astride the major transportation routes for the energy reserves of the west and northwest (primarily coal and crude oil). In the years ahead, great pressure will be put on this state to permit the construction of transmission lines and pipelines. In addition, Minnesota's vast water resources will be desirable for the gasification of coal. Thus, even optimistically assuming that our supply problems can be solved, Minnesota faces some extremely difficult decisions in allocation of its land and water resources in the transmission of energy. Hopefully, programs that are beginning development today, such as the certificate of need program and the Agency's economic forecasting studies, will permit imaginative solutions to these very difficult problems. We have begun work on these problems, but so far as I can see today, we have produced no miracles.

I hope these comments have been helpful to you, and if I or any member of my staff can assist you further, do not hesitate to call upon us.

Very truly yours,


John C. McKay
Director

JCM:ml

Encl.



MINNESOTA ENERGY AGENCY

740 American Center Building, 160 East Kellogg Boulevard
St. Paul, Minnesota 55101 612-296-5120

April 18, 1975

Mr. Alan K. Greene
Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy
State Capitol
St. Paul, Minnesota 55155

Dear Mr. Greene:

I am writing in response to your letter of April 14, 1975, which asks several additional questions about the programs and the priorities of the Minnesota Energy Agency. As in our previous responses to your letters, I will answer your questions in serial order.

1. Intergovernmental Programs.

The Agency has followed a consistent policy of developing and maintaining extensive contacts with government officials in other states and in various areas of the Federal bureaucracy, including the Federal Energy Administration, the National Bureau of Standards, and the National Science Foundation. Specifically, we have participated actively as a member of the Energy Task Force of the Midwestern Governors' Conference. Our staff is in regular daily contact with the FEA Regional Office in Chicago. As you know, we are cooperating with the states of Wisconsin and Michigan on a Regional Energy Information System project, which is funded by the Upper Great Lakes Regional Commission. We have also managed to develop contacts with a great many of the other fifty states concerning various aspects of our and their energy programs.

I believe that the Agency should play a vigorous role in promoting interstate cooperation. To this end, we are hosting the April meeting of the state representatives in FEA Region V (Indiana, Ohio, Illinois, Michigan, Wisconsin, and Minnesota). At this meeting, we will be explaining in great detail a number of the programs which this Agency has initiated in the past year. We hope to assist these other states in implementing similar programs. Such conferences, of course, are only a beginning. All states must work together to ensure coordinated planning so that our energy resources are used for the greatest common good. We

cannot afford to have consuming and supplying states form separate organizations to protect their own selfish interests. The Energy Agency has consistently favored interstate cooperation as a necessary tool in fighting our energy problems.

2. Development and Implementation of New Energy Sources and Programs.

As you know, this Agency was given no funds with which to undertake a study of alternative energy sources, such as solar and geothermal energy. Such research will become possible only if the Legislature sees fit to appropriate a significant amount of money for this purpose.

On the other hand, we have been able to initiate a number of new conservation techniques at a relative minimal dollar cost. Primary examples of these are the commuter van program, energy audits for commercial and industrial buildings, infrared thermography and similar programs presently being carried out by the Agency's Conservation division. It is not possible to predict whether such programs by themselves will alleviate projected 1985 shortfalls; it seems clear, however, that without such programs, those shortfalls will become much worse.

You also have asked about additional steps that should be taken to solve our energy problems. Perhaps the most important step would be to achieve a general awareness that our energy problems have not disappeared with the end of the Arab oil embargo. And I could easily enumerate a great many programs, including energy education, conservation techniques, new energy research, and similar items that would be useful in meeting our projected shortages. However, such a list is pointless without a commitment on the part of the people of Minnesota and its Legislature to support such efforts with the necessary financial and personnel resources. Our initial goal must be the securing of this commitment--through a general awareness of our energy dilemma--rather than the planning of a number of programs which cannot be carried out for lack of resources. Once this commitment is made, the resources generated thereby can be used to develop and to implement the programs necessary to alleviate our energy shortages.

3. Program Development Guidelines.

The Agency has not yet formalized any standards by which it judges proposed programs. However, we have operated on the basis of a number of implicit and informal guidelines. Our principal criterion has been the potential impact of a given program: how much energy can be saved by the program. Our second criterion is, quite naturally, the cost and feasibility of the proposed program. By weighing these factors together we have applied a rudimentary cost/benefit analysis in establishing priorities and in implementing various programs. For example, intervention in the NSP rate case will be expensive, but its impact may be profound.

4. Organization and Personnel Policies.

Any personnel policy or organizational policy must begin with the immediate disclaimer that such policies are heavily influenced by the vagaries of the biennial appropriation process. Contrary to private enterprise, a state agency cannot forecast its potential "revenue" (i.e., appropriation) more than two years in advance and it cannot therefore make concrete plans more than two years in the future. Moreover, the implementation of any plan, even if the appropriation is known, is subject to many rules and regulations imposed by the state personnel system.

Within the limits imposed upon us, the Agency has consistently attempted to hire the best qualified people. The primary qualification for employment has been the applicant's intelligence and ability to think rigorously and creatively. We have made no concerted effort to hire so-called "energy experts." (At the time of our creation, there were too few, if any, such experts.) Rather, our staffing policy has focused upon an applicant's native ability, and, of course, formal training, rather than on any substantive expertise. I believe that application of this criterion has permitted us to assemble one of the most thoroughly competent staffs in state government.

We have organized the Agency around the two basic charges in our enabling legislation: (1) to establish energy conservation programs, and (2) to gather and analyze meaningful and reliable energy information. We have attempted to create jobs that interrelated with one another and have tried to avoid creating bureaucratic pigeonholes. For example, we are in the process of implementing a program to assess the need for large energy facilities. Rather than create an entirely new operating division within the Agency, we chose to develop a program that could make the best use of our existing forecasting and planning capabilities. In so doing, we hope to promote orderly planning while at the same time permitting organizational flexibility so that we may respond to changing needs.

You ask whether the projected 1985 shortfall has changed our plans. It has not, for the reason that we have always assumed that unchecked demand would outstrip supply by the middle of the next decade. Therefore, the Agency's primary focus has always been the need to reduce energy demand.

5. Legislative Program.

As you will recall, the Agency was instructed by the Legislative Commission on Energy to assist the Commission in the preparation of a comprehensive energy legislative program. Philip Getts and John Peterson served on the Commission subcommittee to draft such legislation, and our staff has repeatedly offered assistance in this effort. We stand ready to offer substantive evidence and testimony in support of this legislation.

We have also endeavored to respond to specific inquiries from various legislative committees for information concerning various legislation.

I would note that the Agency consciously chose to avoid any proposals for substantial modification of its statutory authority (see Question No. 7 below) simply because we had not had adequate time to test the existing legislation. However, we hope to have a comprehensive set of recommendations, together with supporting evidence, for the next legislative session.

6. Additional Programs.

As you know, our enabling legislation contains many specific legislative directives which we are presently fulfilling. The statute also contains several rather broad directives to conserve energy, to become a central repository for energy information, and to analyze the social and economic impact of energy supply and demand trends. I can assure you, based upon our experience over the last twelve months, that these requirements are anything but "minimal." Rather than attempt an assessment of whether we have "met" or "exceeded" our statutory mandate, I have attached copies of the Agency's 6 Months Progress Reports which detail our programs, their present status, priorities, and contemplated completion date. If, as I infer from your letter, there are some persons who feel that a higher level of effort was required, I urge them to do two things: (1) review carefully the attached reports so that they may understand what we have and are trying to do, and (2) attempt a fair assessment of our first year's performance. I believe that such an assessment will lead to the conclusion that the Energy Agency has justified its creation and continuing existence. Without sufficient resources, not even "minimal" statutory requirements can be satisfied. Such an assessment should also consider the small appropriation given to the Agency for FYR75.

7. New Directions.

It is clear that the Minnesota Energy Agency can only justify its continued existence if it can substantially contribute to softening the impact of our projected energy shortages. Our present conservation programs are vital, but they are only a first step. In the future, the Agency must turn its attention to a comprehensive energy plan for this state. The Agency must devise a way to preserve a reasonable level of economic growth and activity while at the same time limiting our consumption of energy. I do not believe that the first year of our existence was a sufficient time to begin to manage this inordinately complex process. However, now that the Agency's organization has been established, and now that the scope and difficulty of the problems are partly known, I feel that the Agency must begin the development of a long-range energy planning capability.

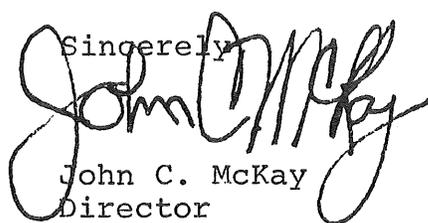
April 18, 1975

In this regard, we perceive a need for expanded legislative authority and expanded staff. To plan requires information; to have reliable and accurate information requires competent personnel and adequate financial resources. Therefore, the Agency's authority must be expanded initially by giving it appropriate resources to accomplish the tasks for which it was created.

As I indicated above, the Agency will be studying and proposing a comprehensive set of recommendations concerning needed changes in our enabling legislation. I am not prepared at this time to offer detailed comment on this matter, but I can indicate several areas where this Agency will need to take an aggressive role in achieving energy conservation. The Agency must, for example, be given the authority to regulate end use by large consumers of natural gas. The supply of this fuel will become critically short in the next five years, and we do not yet understand the complexities of the manner in which it is consumed. This Agency will need similar authority to mandate conservation by regulating building standards, recycling of thermal wastes from industry, hours of operation of public buildings, and the like. However, before such authority is created by the Legislature, its need and application should be thoroughly studied. I am hopeful that such a study can take place over the next year and that the Agency will be in a position to recommend, in its first biennial report to the Legislature on January 1, 1976, the comprehensive energy planning and conservation program that will benefit all of the citizens of this state and will secure their economic future.

I hope that I have answered your questions as candidly as possible and that this information will be helpful to your subcommittee.

Sincerely



John C. McKay
Director

enclosures 3
JCM:mn

DEPARTMENT Energy AgencyOffice Memorandum K

TO : Mr. Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

DATE: 2/18/75

FROM : Jim Carter, Director
Research Division

SUBJECT: Action taken on Minnesota Statutes 1974, Section 116H.07 (k)
by the Agency to promote energy R & D Projects

In response to your memo of February 15, 1975, we have sought continuously to obtain funding from various sources for energy research and demonstration projects. To date, however, The Agency has received no funds for such purposes and therefore funded no such projects.

The Agency has encouraged energy research and demonstration projects in the areas of crop and timber residues, solar energy, peat, solid waste, and livestock wastes. The Agency's role in each case has been to foster the drafting of a proposal by the researchers most actively involved in the subject area of concern in Minnesota. We have also provided assistance by contacting the relevant funding sources in attempting to secure grant funds for Minnesota researchers working in alternative energy sources.

At the present time the most successful work in progress in Minnesota on alternative energy sources is being conducted on solar energy at the U of M and at Honeywell, and in energy from agricultural residues at the U of M. The greatest potential for energy from alternative sources for funding from state sources are in the areas of: energy from cornstalks and other agricultural residues through methanol generation or gasification; energy from wood pulp and wood wastes through methanol production; energy and petrochemical derivatives from peat; and solar energy demonstration projects.

Federal funds from the Energy Research & Development Administration will be made available over the next ten years for large-scale research, development and demonstration projects. In addition, over \$23 million is available for solar energy demonstration projects through the Dept. of Housing & Urban Development under the Solar Energy Research Development Act of 1974. The Energy Agency's capability to stimulate interest in and to seek funds for alternative sources of energy for Minnesota is fairly limited because of the unavailability of seed monies. At present the total resources of the Agency devoted to alternative energy research and demonstration programs is 1/6 of 1 professional person and approximately 20% of 1 secretarial person.

A majority of the funding from the State of Minnesota for alternative energy projects has been handled through the Minnesota Resources Commission and the Minnesota Pollution Control Agency. These projects have initiated work on alternative fuels in Minnesota which have shown great promise and require further exploration.

2/18/75

I would strongly support an effort to provide sufficient funds for the Minnesota Energy Agency to fund directly research and demonstration projects on alternative energy sources.

The research division has been actively involved in seeking funds from the National Science Foundation for work in the area of "Implementation and Evaluation of the Strategic and Tactical Decision Model for Energy Management for state government, energy producing industries, and energy consuming industries." We are also proceeding with the work required of us under the contract which we presently have with the Upper Great Lakes Regional Commission for development of the Regional Energy Information System.

I have attached a list of proposals which have been submitted with the assistance of the Energy Agency. I have also attached carbon copies of correspondence with such groups as the NSF, Koppers Corp, U of M, and various federal agencies in which we have been involved in the development or encouragement of alternative energy proposals.

RB:mw

Funding Proposals which have been submitted with the assistance of the Minnesota Energy Agency:

Research Division

"A Proposal to the Upper Great Lakes Regional Commission" (copy to Dept. of Commerce 7/2/74).

"Assessing Regional Impacts of Energy Constraints," to NSF 6/74, to FEA 7/74, (copy to Dept. of Commerce 7/2/74).

"Project Specification for State of Minnesota Energy Agency" by Maki (copy to Dept. of Commerce 7/2/74).

"Energy and Economic Cost/Benefit Analysis of Energy Conservation Projects which require State Action or Support for Implementation" (to National Science Foundation 11/4/74).

"Development of Fuel Demand Projection Models for Minnesota" (to NSF 8/28/74).

"Interfuel Competition and Solid Waste Conversion: A Decision Model" (to Dept. of Housing & Urban Development 7/19/74).

Prototype Energy Network Model and Information System (to HUD 7/9/74).

Conservation Division

"A Life Cycle Energy Costing Comparison of Three Types of Family Dwelling: The Apartment, the Townhouse, and the Single Family Home" (to FEA 2/11/75).

"Evaluation of Existing Infrared Aerial and Ground Technology for Identifying Excessive Heat Loss from Residential & Commercial Buildings" (to FEA 1/10/75).

"Evaluation of Computerized Energy Programs for Calculating Energy Use in New and Existing Buildings" (to FEA 12/17/74).

Modular Boiler Demonstration Test (funded by HUD for \$38,000).

Proposal in Progress

"Electrical Demand Management" to FEA in conjunction with Minnesota Public Service Commission and NSP.

RB:mw

2/20/75

DEPARTMENT ENERGY AGENCY*Office Memorandum*

TO : Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

DATE: Feb. 18, 1975

FROM : John D. Peterson

SUBJECT:

Phil Getts has asked that I reply to the area of your February 15 memo that deals with planned activities of the Agency designed to seek and develop means of coordinating Minnesota's energy policies with those of other energy suppliers and energy consumers.

We have been fortunate in having from the very inception of our Agency the kinds of relations with the energy suppliers which have resulted in a close working relationship with all of the major energy suppliers and/or distributors and with most of the smaller ones. In the latter instance, contacts have been through associations rather than individually with the smaller independent or municipal operation. With all of them we have coordinated our entire work schedule, when it in any way involves areas of mutual interest or activity, in the broad field of energy conservation. To list the activity would be to list virtually everything we have done that has any relationship to our contacts with energy suppliers or distributors -- hundreds of letters, many hundreds of telephone calls, more than 20 meetings where we have served as resource people to them or they to us, several dozen coordinating conferences involving one or more of the major energy sources. Most of the efforts have been directed toward the general goal of energy conservation, with much of the emphasis, of course, in the area of energy education with energy conservation as a hoped-for result.

Our energy consumer contacts and coordinating work has extended from the major users such as 3M, Honeywell, Control Data, General Mills -- most of the majors of the state -- on down to our work with small industry, small commercial interests, and on to the broad and time consuming residential energy conservation area. More than half of the time of our engineering staff has been involved with coordinating energy conservation measures with these various sectors of the consuming public.

When, in the last paragraph of your memo, you state that "your reply may take the form of a list of contacts by name, the approximate date and a brief sentence denoting the nature and purpose of the contact" you set up a situation where we would probably be compiling the findings of that requirement for about a week because it entails virtually half of the total contacts we have through conferences, telephone calls and correspondence in any average working day. We trust you do not wish us to so delineate our activities.

JDP:vs

DEPARTMENT ENERGY AGENCY

Office Memorandum

TO : Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

DATE: Feb. 18, 1975

FROM : John D. Peterson

SUBJECT:

A review of what could be called educational contacts in which I have engaged since the inception of the Agency, as requested in your memo to Rosalie Butler, includes the following.

July 1 to December 31 --

Radio and TV interviews and talk shows	12
Addresses to service clubs	22
Meetings on the Emergency Allocation Plan	14
Presentations to engineering groups	8
Miscellaneous	4
	—
	60

Meetings During January --

Service clubs	5
Engineering groups	5
Miscellaneous	11
Seminars	2
Radio and TV interviews	2
	—
	25

Most of the addresses or contacts with service clubs, engineering groups and miscellaneous consisted of an outline of the Agency, a review of our program, the showing of a series of slides depicting the energy situation as it presently exists and as it is contemplated out as far as 2250, and a summary of the future prospects as we see

Alan K. Greene
February 18, 1975
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them, followed by a question and answer period. Seminars and radio and TV talk shows followed the pattern required for that particular instance.

I regret to advise that I have ~~no~~ ^{COULDN'T!} scripts to forward on these talks, with a possible exception of a badly worked-over copy for one talk, which, if I can find, I will attach. For the most part I work from a series of notes rather than from a script, mainly because the informal and friendly atmosphere that I can generate under those speaking conditions seem better suited to me to the purpose which we are hoping to attain -- interest, enthusiasm, and excitement about the energy situation and its solution.

JDP:vs



MINNESOTA ENERGY AGENCY

740 American Center Building, 160 East Kellogg Boulevard
St. Paul, Minnesota 55101 612-296-5120

TO: Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

FROM: Philip W. Getts
Deputy Director

A handwritten signature in dark ink, appearing to read "Philip W. Getts", written over the printed name and title.

DATE: February 18, 1975

SUBJ: Coordination of Energy Policy with Other States and the
Federal Government

I have taken the liberty of answering your February 15, 1975, memo to John Peterson concerning the Energy Agency's contacts with other states and the federal government, inasmuch as such contacts are coordinated by myself and John McKay.

It has been the general policy of the Energy Agency to maintain regular contacts with the Federal Energy Administration, particularly the regional office in Chicago, and with a great number of states in the Upper Midwest. Generally speaking, the states with which we have maintained the closest contact are those states included in the Midwestern Governors' Conference, especially Indiana, Ohio, Wisconsin, Michigan, Iowa, Illinois and North and South Dakota. Typically, these contacts take the form of attendance at conferences and meetings, telephone calls, written communication, and, occasionally, face-to-face meetings on specific matters. A more complete description of these relationships is set forth below.

Federal Energy Administration

Despite the Federal Energy Administration's substantial organizational difficulties, the Energy Agency has managed to initiate and maintain a great number of valuable contacts at the staff level. In August of 1974, Wes Fisher and I met with Dr. Maxine Savitz of the FEA concerning possible grant proposals relating to residential energy audits. The contacts with Dr. Savitz and her staff have been maintained by John Peterson and Sam Stewart of the Agency's Division of Conservation and Planning on a regular basis. In addition, Peterson has met and worked closely with Mr. Paul Gilson, Director of Conservation for the FEA Regional Office in Chicago. Gilson has visited the Agency offices, and Peterson and his staff have maintained telephone contact with him on a regular basis.

Mr. Alan K. Greene, LCE
Memo February 18, 1975
Page two

Dr. James Carter spent several days in Washington during the second week of October and visited with representatives of the FEA, National Science Foundation, U. S. Bureau of Mines, National Bureau of Standards, and the Federal Power Commission. These contacts have been maintained by Dr. Carter and by other members of our staff.

The Fuel Allocation Division maintains virtually daily telephone contact with Regional FEA officers in Chicago concerning various cases handled by the state under the Federal Fuel Allocation Program. In addition, the Fuel Allocation Division regularly submits comments to FEA on proposed FEA regulations or operating policies.

In addition, John McKay and I have had the opportunity to meet personally with various members of the Minnesota congressional delegation and with various top officials of the Federal Energy Administration. During the Midwestern Governors' Conference in Minneapolis in July, Mr. McKay hosted a luncheon for then-FEA Administrator John Sawhill, at which time a great many matters of mutual concern were discussed. On November 16, 1974, Mr. McKay testified before a subcommittee of the United States Senate concerning Minnesota's crude oil problems; that same day, Mr. McKay and I were able to meet with Senator Mondale, and Representatives Bergland, Fraser, and Frenzel.

Relations with Other States

It is similarly the policy of this agency to establish and maintain as many contacts as possible with energy officials in other states. These contacts have been made through attendance at conferences, joint projects, and communications concerning specific problems.

We have worked most closely with the states of Wisconsin and Michigan on the Regional Energy Information System being funded by the Upper Great Lakes Regional Commission. Jim Carter and his staff have made frequent contacts and have visited personally with their counterparts from the energy offices of Michigan and Wisconsin on frequent occasions. While these meetings have centered around the information system, these contacts have provided useful channels when other problems need to be discussed. We also maintain regular contact with those states in the Midwestern Governors' Conference through attendance at the monthly Energy Task Force meetings and by attendance at such other functions of the Conference as may be appropriate. For example, John McKay is in Washington this week to attend a meeting of the National Governors' Conference, presumably to meet with energy officials from other states.

Mr. Alan K. Greene, LCE
Memo February 18, 1975
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It has been the policy of this agency to attend as many conferences as our budget permits. For example, in late October, John Peterson, Wes Fisher, and I attended a conference at Orlando, Florida, sponsored by the National Governors' Conference concerning the states' role in a national energy policy. The conference was attended by representatives from all of the 50 states and provided many useful contacts relative to energy conservation matters, certificate of need planning, and general discussions of energy policy. Dixie Diehl and I are this day leaving for an FEA conference in Chicago sponsored by the Regional Office for the Federal Energy Administration involving all of the states in FEA Region V.

I have asked John Peterson to respond to your question about contacts with energy suppliers and consumers.

PWG:mn

DEPARTMENT MINNESOTA ENERGY AGENCY*Office Memorandum*

TO : Alan K. Greene, Chairman
Subcommittee on Report Drafting
Legislative Commission on Energy

DATE: February 20, 1975

FROM : John D. Peterson

SUBJECT: Utility Rates Study

For the last six months the Agency has been conducting an intensive review of utility rate structures as they affect energy conservation. This work has been conducted by Jay Lujan, energy policy analyst, of our staff. In conducting this analysis of utility rate structures, the Agency reviewed the theoretical professional literature on the subject, reviewed the activities of several state and federal agencies, reviewed several major recent decisions by other state Public Service Commissions on utility rate design, and consulted with recognized experts in this area. This investigation also included extensive interviews with energy producers and a broad spectrum of energy consumers to assess the practical economic and social impacts of any suggested changes.

While the Minnesota Energy Agency has the authority to review utility rate practices, we do not set the rates. This is the responsibility of the Public Service Commission. The Minnesota Energy Agency is presently considering intervening before the Commission in a rate case on the question of utility rate design.

The Agency endorses the concept of peak load pricing based on marginal cost. A utility rate of this type charges a customer more to use power on system peak time (4:00-8:00 p.m.) than off system peak. This type of rate structure will discourage the wasteful use of electricity, reduce the rapid growth rate of peak demand for electricity, shift some use off system peak and thus increase electric system load factors and provide greater operating efficiencies for the industry. This type of utility rate structure should encourage energy conservation and have positive environmental and economic impacts.

Attached are two memoranda. The first is a review of actions taken by other state and federal agencies. The second is an overview of the concept of peak load pricing based upon marginal cost. It was prepared as a discussion paper within the Agency. We will be glad to respond to any followup questions on the subject.

JDP:mjk

Attachments

MINNESOTA ENERGY AGENCY

Research Division

6 MONTHS PROGRESS REPORT

July 1, 1974 to December 31, 1974

RESEARCH DIVISION

PROFESSIONAL
STAFF

James E. Carter, Ph. D.
Director

Ernesto C. Venegas, Ph. D.
Senior Forecast Analyst

Ronald D. Visness, M. S.
Senior Systems Analyst

Daniel L. Quillin
Research Analyst

Rudy A. Brynolfson
Research Analyst

UNIVERSITY OF MINNESOTA
STAFF

Wilbur R. Maki, Ph. D.
Professor
Department of Agricultural and Applied
Economics

Norman L. Chervany, Ph. D.
Management Information Systems Research
Center, College of Business Administration

J. David Naumann
Management Information Systems Research
Center, College of Business Administration

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IMPROVING ENERGY MANAGEMENT

Goals of the Research Division Minnesota Energy Agency

The oil embargo of 1973 marked a new era in energy. States like Minnesota with no energy resources of their own found themselves virtually helpless in the face of international oil politics. Even questions that appeared simple remained unanswered, such as:

How much oil is there stored in Minnesota?
How much energy do Minnesotans use for their homes, their businesses, or their farms?
How much energy should we expect to get in the future?
What will be the effect of a shortage of energy?
What will be the long run impact of energy constraints?
Are there fuel sources in Minnesota and what is their potentials?

The Research Division of the Minnesota Energy Agency is responsible for answering these questions and many others.

These questions had not been asked before. The answers had to be accurate, up to date, and in a form usable by decision makers. A key which would unlock the door to energy information was required.

The division surveyed 30 states, many universities, and a number of Federal agencies, and learned of a number of approaches to this problem. We also discovered that many governments have failed to perform. They have failed to perform because they have not used sound business management practices in managing state problems. We vowed we would not make this mistake. We have chosen three tools which will give results for the Agency, for the Legislature, and for the state.

1. Energy Analysis is Our Business

All of us have had to deal with problems of energy, both in our work and as individuals. One of the consistent problems has been one of measurement. We all knew we had an energy problem. What we didn't know was the size of it, the numbers; the probable effects on the economy; the number and locations of people that would be most vulnerable; the multiplier or ripple effects as the energy shortage spread throughout the economy.

To get a handle on the problem, the Governor of the state of Texas put an economic tool to work--the input-output model. This tool has gained national acceptance as one of the keys to unlocking the energy door. What did the Governor of Texas do with this tool?

"I put the input-output model to work predicting the impacts of the energy shortage. As is well known, there were many different estimates emanating from Washington as to the amount of energy that we should anticipate. We were able to reevaluate our potential economic and employment impact within 24 hours after each of the new forecasts arrived. Without the use of modern management tools such as input-output models, such turnaround in information delivery would have been virtually impossible.

"When William Simon came down from Washington, he left Austin with facts and figures on how energy shortages would impact the gross state product, household incomes, employment, and taxes. Projections were made of energy demand and the impacts of alternate energy supply possibilities. This energy-related information was relevant to energy policy decisions in Texas."

The Research Division is working through its Senior Forecaster Dr. Ernesto Venegas, and with Dr. Wilbur Maki of the University of Minnesota, to provide a similar capability for Minnesota. In addition, we will be able to tell allocation officials at the state and national level what sectors of the economy need additional fuel in Minnesota to sustain full employment.

2. Energy Information is Required

When the Legislature was taking testimony on energy supplies in Minnesota, it was discovered that no one seemed to know how much fuel was used in Minnesota and how much was stored in the state. The Research Division has found that no state was able to provide this information in an accurate and timely fashion.

Current data must be gathered. We must be able to tell legislators and the Governor how much fuel is in the state and where it is being used at the present time, not two years ago.

To do this, we have adopted a second management tool--the Management Information System (MIS). Development funds for this tool are being provided by the Upper Great Lakes Regional Commission. Implementation is the responsibility of the state.

This Energy Information System will tell you the answers to questions like:

- Who brings energy into the state?
- How much do they bring in?
- How much is stored in the state?
- Who uses the fuel?
- How much is needed in each county in the state?

The data in this system will be current and it will be accessible.

The Research Division, through its staff members Ronald Visness and Daniel Quillin, in cooperation with University of Minnesota

Management Professor Norman Chervany and Dave Naumann, has designed an excellent Energy Information System. If funded it will serve the needs of our state.

3. Present and Future Energy Needs Must be Understood

The Research Division has analyzed 20 years of energy consumption data for Minnesota. We have prepared annual "energy accountings" for the state. We are involved in forecasting supplies and demand and evaluating alternative fuels. We are also analyzing the ways energy is used so that policy makers can decide where savings can best be made.

We must understand the energy needs of

- Agriculture
- Commerce
- Transportation
- Industry (mining, manufacturing, and construction)
- Households
- Government,

and we must separate the needs from the desires. Because we will have energy for needs but we will not be able to satisfy everyone's desires for energy.

To understand the present and future needs of these sectors, we must analyze how they use energy. We have completed the analysis of households and of manufacturing, and are proceeding, through staff members Rudy Brynolfson and Ernesto Venegas, to carry out these analyses.

We are requestint funds from the Legislature to implement over the next biennium the management tools we have designed.

There are no easy solutions to the energy crisis--only hard choices. I ask your help in providing the tools necessary so that the choices we make are the right ones.

DIVISION: Research

PROJECT: Energy Supply and Use - 1972, 1973, 1974

PURPOSE OF PROJECT: To audit energy consumption for the year in Minnesota to compare with previous years' consumption and provide information on energy use in Minnesota.

PROJECT COORDINATOR: Rudy Brynolfson ASSISTANT COORDINATOR: None

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: The 1972 energy analysis has been completed and is being published. The information for 1973 is presently available and is being prepared for publication.

PROJECT SUMMARY:

Minnesota Energy Summary
1973 vs 1972

	1972		1973		% Change
	Amount	% Total BTU	Amount	% Total BTU	
SUPPLY					
Fuel					
Natural gas	344 billion ft ³	32.2	355 bln. ft ³	32.2	+3.2
Gasoline	2017 million gal	23.6	2108 mln gal	23.9	+4.5
Fuel oil & kerosene	1423 million gal	18.8	1466 mln gal	18.7	+3.0
Coal	8.6 million tons	17.2	9.2 mln tons	17.6	+7.0
Liquefied petroleum gas	438 million gal	3.8	412 mln gal	3.4	-5.9
Nuclear power	3.6 billion kwh	3.7	3.3 bln kwh	3.3	-8.1
Hydroelectricity	0.86 billion kwh	0.9	0.87 bln kwh	0.9	+1.2

	1972		1973		% Change
	Trillion BTU	% of Net	Trillion BTU	% Net	
USE					
Sector					
Residential & commercial	356.4	40	344.8	37	-3.3
Transportation	290.6	33	304.4	33	+4.8
Industrial	245.1	27	275.7	30	+12.5
Total Net Use	892.1	100	924.9	100	+3.7
Elec. generation losses	176.8		178.5		+1.0
Total Gross Energy	1068.8		1103.4		+3.2

Sources: U. S. Bureau of Mines (fossil fuels exc. gasoline)
Federal Highway Administration (gasoline)
Edison Electric Institute (electricity)

FUTURE ACTIONS PLANNED OR NEEDED: (1) Publish 1973 figures in comparison to 1972; (2) Collect 1974 data and analyze.

COMPLETION DATE: (1) February 1975; (2) July 1975.

PRIORITY: High.

DIVISION: Research

PROJECT: Minnesota Energy Information System

PURPOSE OF PROJECT: To design and implement a system for the acquisition of current statistics on energy supply, storage, and use in Minnesota in order to understand the energy supply system in Minnesota.

PROJECT COORDINATOR: Norman L. Chervany ASSISTANT COORDINATORS: Ron Visness, Dan Quillin, Dave Naumann

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: The Energy Information System has been conceptualized and designed. A three-county demonstration has been implemented for evaluation purposes.

PROJECT SUMMARY: Decision makers in public and private positions must have effective and timely access to information on our energy resources and on our systems for energy processing, distribution, and consumption. These are the goals of the Minnesota Energy Information System:

- ...To develop a comprehensive database of energy information
- ...To develop an accurate analog of the physical energy system
- ...To answer questions such as
 - Who brings energy into the state?
 - How much do they bring in?
 - How much is stored in the state?
 - Who uses the fuel?
 - How much is used in each county in the state?
- ...To provide accurate information on energy in emergencies.

FUTURE ACTIONS PLANNED OR NEEDED: Additional user evaluation (February 1); Specification of computer methods (April 1); Cost analysis (April 1); Specification of data collection procedures (June 1); Specifications of macro design (July 1); Implementation (January 1, 1976).

COMPLETION DATE: Continuous program.

PRIORITY: Top.

DIVISION: Research

PROJECT: Forecast energy demand and facility requirements for Minnesota from 1975 to 2000

PURPOSE OF PROJECT: To simulate the Minnesota energy demands, population patterns, economic activity, and capital requirements.

PROJECT COORDINATOR: Ernesto C. Venegas, Ph. D.

ASSISTANT COORDINATOR: Two part-time students

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: An Input-Output Economic Model of the state has been constructed.

A demographic model of the state has been constructed.

Energy coefficients of all sectors of the Minnesota economy have been computed.

PROJECT SUMMARY: The Minnesota energy model simulates energy requirements, industrial sector output, population, employment, unemployment, capital structure and gross investment, personal incomes, consumption-savings and taxes, energy facilities and natural resource use. It is designed for use in planning future production and consumption activities, procurement of resources, investments in infrastructures and employment of labor force. A computer model of the state's economy is manipulated by varying input variables and model parameters. A list of variables and parameters may be prepared in their order of influence on output, employment, and quality of life goals and targets in order to show critical areas for public policy.

Output of the Minnesota Energy Model

1. Energy requirements/supply by fuel type
2. Employment by producing sector
3. Capacity of plant and equipment including energy facilities
4. Gross investment in private and public infrastructure
5. Gross state product by expenditure categories
6. Labor force and unemployment rate
7. Population and net migration rates
8. Personal income received from business
9. Government tax collections
10. Unallocated value-added
11. Waste emissions from production and consumption.

FUTURE ACTION PLANNED OR NEEDED:

1. Complete projections of statewide energy requirements
2. Develop recommendations on energy supply and consumption strategies
3. Apply model to economic development regions of the state.

COMPLETION DATE: September 1975

PRIORITY: Top.

DIVISION: Research

PROJECT: Forecasting Minnesota Energy Supplies

PURPOSE OF PROJECT: To acquire from Minnesota's energy suppliers forecasts of energy supplies for 5, 10 and 20 years and to check these forecasts for accuracy.

PROJECT COORDINATOR: Dan Quillin ASSISTANT: Full time assistant to be hired July 1, 1975

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Electric utility forecasting and current statistics requirements have been completed; the reporting manual has also been completed; hearings are being scheduled.

Natural gas transmission line and utility forecasting and current statistics requirements have been completed; the reporting manual has been drafted; hearings are being scheduled.

Oil company forecasting and current statistic reporting requirements are being drafted; hearings will be scheduled in March.

Coal company forecasting and current statistic reporting requirements are being drafted; hearings will be scheduled in March.

PROJECT SUMMARY: The Minnesota Energy Agency is required to receive forecasts of 5, 10 and 20 year demand and supply from energy companies serving Minnesota. There are 29 suppliers and 1044 distributors of petroleum in Minnesota; 7 natural gas pipelines and 30 utilities providing natural gas; 202 electric distributors and suppliers; and 3 major coal suppliers. The agency has reviewed the reports presently made by these companies to federal and other state agencies in order to integrate the information for the state forecast. The agency reviewed projection methodologies and reporting systems of federal agencies, private concerns, and state agencies, and has prepared a set of forecasting and current statistics requests which will tell the Governor and the legislature

1. How much energy is stored in the state
2. How much energy will be supplied to the state
3. How many energy facilities and of what types the state will have in the future
4. The 5, 10 and 20 year forecasts of supply and demand of fuel for the state, by county.

The date for beginning collection of this information has been set for July 1 to coincide with the Minnesota Energy Information System design completion.

FUTURE ACTION PLANNED OR NEEDED: Electric utility and natural gas hearings in February; oil and coal hearings in March; reports due by July 1975. Compilation of statistics by January 1976.

COMPLETION DATE: January 1976

PRIORITY: Top

DIVISION: Research

PROJECT: Forecasting Energy Requirements of the State.

PURPOSE OF PROJECT: To compute present and future energy consumption in Minnesota. Projections will be made in seven categories:

- ...Households
- ...Commercial
- ...Transportation
- ...Industrial (manufacturing, mining, construction)
- ...Utilities and Refineries
- ...Government (including schools)
- ...Agriculture

PROJECT COORDINATOR: Ernesto C. Venegas

ASSISTANT COORDINATOR: Rudy Brynolfson and full-time assistant forecaster to be hired July 1, 1975

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Manufacturing and Households completed. Design for other sectors completed.

PROJECT SUMMARY: A procedure for analyzing and projecting energy requirements in Minnesota has been developed. This procedure has been applied to the household and the manufacturing sectors, and generated excellent results. The procedure is now being applied to the other sectors. A separate project analysis is provided for each program.

FUTURE ACTION PLANNED OR NEEDED:

Complete analysis of Commercial, Transportation, Industrial, Utilities and Refineries, Government (including schools)

Forecast energy requirements of each sector

Generate statewide energy requirement forecast by meshing energy requirements by sector and by fuel type

Integrate energy demand forecasts with demographic-based simulation model of state economy.

COMPLETION DATE: January 1976

PRIORITY: High

DIVISION: Research

PROJECT: Manufacturing energy consumption--present and projected

PURPOSE OF PROJECT: To compute present and future energy consumption by manufacturing in Minnesota by type of manufacturer and by type of fuel.

PROJECT COORDINATOR: Ernesto C. Venegas ASSISTANT: None

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Completed

PROJECT SUMMARY: Manufacturing uses 10% of the energy consumed in the state, while employing 19% of the labor force and contributing 24% of the total earnings. Natural gas constitutes 50% of the energy used, electricity and fuel oil contribute 15% each, and coal 10%. Over half of the natural gas is purchased on interruptible contract.

These are a few of the results of the manufacturing energy use model:

- ...Estimated 1974 primary fuel use--121 trillion BTU
- ...Estimated 1980 primary fuel needs for full employment--
148 trillion BTU without conservation
167 trillion BTU with conservation
- ...Potential energy shortage by 1980--385 million gallons of oil equivalent
- ...Critical problem--90% of natural gas purchased by food and kindred products is on interruptible contract. This is 45% of all energy used by this sector. Conversion to oil will at minimum raise costs considerably.

FUTURE ACTION PLANNED OR NEEDED:

1. Publication of paper--"Energy Consumption in Manufacturing and the Minnesota Economy;"
2. Linking of computer simulation/projection model of manufacturing to other demand models.

COMPLETION DATE:

1. January 1975
2. January 1976

PRIORITY: High

DIVISION: Research

PROJECT: Forecasting energy requirements in state;
Energy consumption in petroleum refining and construction

PURPOSE OF PROJECT: To determine the energy requirements of petroleum refining, coke production, and construction in Minnesota.

PROJECT COORDINATOR: Ernesto C. Venegas

ASSISTANT COORDINATOR: Part-time person

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Analytical models constructed, data being acquired.

PROJECT SUMMARY:

Refineries

Minnesota's three refineries have a capacity of 190,000 barrels per day of oil, 90% received from Canada, 10% from North Dakota. These refineries consumed approximately 38 trillion BTU's of energy in refining about 64 million barrels of oil in 1972. Energy consumption by refineries is about 3.4% of Minnesota's total energy consumption.

The outputs of these 3 refineries are essential to Minnesota's energy supply, representing the equivalent of 37% of Minnesota's energy supply.

Present plans to curtail Canadian crude supplies to these refineries will reduce energy available to this state by about 25% unless either a different crude oil supply is provided or additional refined product is shipped into the state.

Construction

Construction projects may use as much as 7% of the energy in the state under normal circumstances. Analysis of this sector is not yet complete.

FUTURE ACTION PLANNED OR NEEDED:

1. Complete analysis of energy consumption by process and type of fuel for construction and refining.
2. Project both energy requirements and output of both sectors.
3. Link the energy requirements of these sectors to the projections of supply.

COMPLETION DATE: September 1975

PRIORITY: Moderate.

DIVISION: Research

PROJECT: Forecasting energy requirements in the state (industrial) (3)
Energy consumption in taconite mining and processing

PURPOSE OF PROJECT: To project the energy requirements of the taconite industry.

PROJECT COORDINATOR: Ernesto C. Venegas ASSISTANT: None

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Analysis of present energy requirements completed.
Projections being prepared.

PROJECT SUMMARY: Minnesota supplies 80% of U. S. iron ore, 8% of world iron ore production. This is the estimated energy consumption by taconite in 1972:

<u>Fuel type</u>	<u>Quantity</u>	<u>% of Minnesota Consumption</u>
Natural gas	37.1 billion cubic feet	10.8
Propane	2.7 million gallons	.6
Gasoline	2.6 million gallons	.1
Diesel	23 million gallons	8.7
Distillate	55 million gallons	6.7
Electric	4.6 billion kilowatt hours	19.9
<hr/>		
All fuels	64 trillion BTU's	6%

Energy consumption is being related to production of ore and projections of energy requirements developed.

FUTURE ACTION PLANNED OR NEEDED:

1. Projections of energy requirements for taconite production and processing.
2. Linking of Mining Model to other computer models in order to simulate project total energy consumption in state.

COMPLETION DATE:

1. March 1975
2. September 1975

PRIORITY: High.

DIVISION: Research

PROJECT: Forecasting energy requirements of the state.
A computer simulation of residential energy consumption.

PURPOSE OF PROJECT: To analyze energy consumption in residences; forecast energy consumption by residences.

PROJECT COORDINATOR: Ernesto C. Venegas

ASSISTANT COORDINATOR: Rydy Brynolfson

PROJECT SUPERVISOR: James E. Carter

PROJECT SUMMARY: Minnesotans consumed 250 trillion BTU's in their residences, 20% of the total energy consumed in the state. These were the energy uses:

- ...Space heat (50%)
- ...Water heating (13%)
- ...Appliances (11%)
- ...Energy waste in generating electricity for use in households (26%)

By 1995 Minnesotans will use 348 trillion BTU's in their homes unless the state and the people begin to take conservation measures.

The Residential Model simulates energy consumption in residences on a computer program based on

- ...Temperature
- ...Population growth
- ...Appliance efficiency
- ...Household efficiency

FUTURE ACTION PLANNED OR NEEDED:

1. Publication of paper on present and future energy consumption in residences;
2. Linking of residential energy use computer model with other energy use models to project total energy requirements in Minnesota.

COMPLETION DATE:

1. January 1975
2. September 1975

PRIORITY: High

DIVISION: Research

PROJECT: Forecasting energy requirements in the state.
Energy consumption in transportation--present and projected.

PURPOSE OF PROJECT: To determine the energy requirements for transportation in Minnesota.

PROJECT COORDINATOR: Rudy Brynolfson

ASSISTANT COORDINATOR: Dave Wolfson

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Total consumption computed.
Analytical model written.
Computer program partially completed.

PROJECT SUMMARY:

Minnesota consumed 310 trillion BTU's for transportation in 1972, 28.5% of state energy use. All of this fuel was petroleum based. Substantial savings are available through more efficient vehicles, fewer trips, less distance traveled per trip. Minnesota automobiles average 13 miles per gallon today. If the average were 18 miles per gallon by 1980, Minnesotans could travel 40% more miles and yet use no more gas than they are using today.

An analytical model has been designed which allows the Agency to compute the energy savings of different transportation scenarios in broad terms for policy purposes.

FUTURE ACTION PLANNED OR NEEDED: Implementation of transportation model for use in studying energy requirements of alternative transportation scenarios.

COMPLETION DATE: September 1975

PRIORITY: Moderate.

DIVISION: Research

PROJECT: Forecasting energy requirements of state.
Commercial energy consumption--present and future.

PURPOSE OF PROJECT: To develop a projection of energy requirements of all commercial space, government, including schools, and utilities.

PROJECT COORDINATOR: Rudy Brynolfson

PROJECT ASSISTANT COORDINATOR: Request for part-time help not yet approved.

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Analytical model developed
Computer programming partially completed
Data partially acquired.

PROJECT SUMMARY:

Energy consumption by commercial, government and utility facilities constituted 155 trillion BTU's in 1972, 14% of total Minnesota energy consumption. Commercial buildings used this energy for heating, cooling, and lighting, and some processing. These are the breakdowns by facility:*

	<u>Trillion BTU's</u>	<u>Per Cent of State Consumption</u>
Educational	26	2.4
Health Care	13	1.2
Correctional	1.2	0.1
Water Treatment	2.2	0.2
All Others	111.4	10.3

The analysis of energy consumption of "all others" has not been completed, nor have projections of requirements for heating, cooling, and lighting been completed.

*Minnesota Energy Project, 1974.

FUTURE ACTION PLANNED OR NEEDED: Complete the analysis of energy consumption by type of commercial activity, by type of fuel, and by use (heating, cooling, lighting, water treatment, etc.) and project these requirements.

COMPLETION DATE: September 1975

PRIORITY: High.

DIVISION: Research

PROJECT: Forecast Minnesota energy requirements:
Energy consumption in agriculture--present and future.

PURPOSE OF PROJECT: To determine the amount and types of energy required
for agricultural production and to project these energy requirements.

PROJECT COORDINATOR: Ernesto C. Venegas

ASSISTANT COORDINATOR: Part-time person.

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: Analytical model constructed.
Data collected (through Minnesota Energy Project).
Computer programs partially complete.

PROJECT SUMMARY: Farming employs almost 8% of all Minnesotans directly
and contributed 6% to the gross state product. The energy requirements
of agriculture will be forecast under different assumptions of crops,
acreage, and different field conditions.

FUTURE ACTION PLANNED OR NEEDED: Current data available on agricultural
energy consumption will be fitted into the analytic projection frame-
work so that present and future energy requirements by type of fuel
can be determined.

COMPLETION DATE: September 1975

PRIORITY: High.

DIVISION: Research

PROJECT: Economic Impact Analysis

PURPOSE OF PROJECT: To develop a procedure for determining economic impact of future energy constraints; to apply this procedure to the Arrowhead Region.

PROJECT COORDINATOR: Wilbur R. Maki

ASSISTANT COORDINATOR: Ernesto C. Venegas; U of M assistants

PROJECT SUPERVISOR: James E. Carter

PROGRESS TO DATE: The following tasks have been completed for the Arrowhead Region:

- I. Energy concerns have been determined:
 - A. Anticipated fuel shortages: when and where?
 - B. Economic impacts: what sectors and how much?
 - C. Documenting shortages and impacts: policy directions and priority setting.

- II. Industry surveys have been completed:
 - A. Energy utilization: recent trends in natural gas consumption; outlook for energy costs and shifts in fuel utilization.
 - B. Capital expenditures: report plans approach \$5 billion in study area.

- III. Impact analysis is being completed:
 - A. Energy use intensities: household expenditures for energy-using equipment and facilities, industrial, commercial, and transportation requirements for energy.
 - B. Production relationships: energy use lands and trends among industry (i.e., non-household) sectors; energy supply and facility constraints on population and industry expansion.
 - C. Direct and indirect effects: changes in industrial and commercial activity as measured by employment, unemployment, gross regional product, personal income, specific services.

- IV. Minnesota SIMLAB is being constructed:

SIMLAB (adapted to regional energy impact analysis)--The Minnesota Simulation Laboratory (SIMLAB) provides a computer interactive model for planners. Computable models of a regional economy are manipulated by varying input variables and model parameters. Results are noted in terms of changes in critical regional output and quality of life goals and targets.

FUTURE ACTION PLANNED OR NEEDED: Impact values are being inserted; user training sessions are essential; this system should be implemented for each region of the state and for the state as a whole.

COMPLETION DATE: July 1975

PRIORITY: High

ENERGY MANAGEMENT FOR MINNESOTA

PUBLICATIONS

The State of Minnesota is developing a procedure to guide public and private actions in the allocation and conservation of energy resources. This procedure will allow the director of the agency to set an objective and to assess the energy requirements to achieve this objective. The tools being developed are a combination of linear programming techniques tied to a simulation model of the state economy, with a transaction matrix (input-output) model at the core of the simulation model.

The simulation model will relate the implicit energy requirements of seven aggregate sectors (households, agriculture, manufacturing, except utilities, utilities and refineries, transportation, government, commercial and miscellaneous) to the explicit production outputs of the interindustry transaction model. This model will forecast Minnesota's energy requirements as the population changes, as the industry makeup of the state changes, and as prices change. One critical output of this analysis will be the energy requirements for full employment in Minnesota from 1975 to 2000.

The following papers have been completed during the first six months (July 1, 1974 to December 31, 1974):

"Development of Fuel Demand Projection Models for Minnesota,"
E. C. Venegas

"Energy and Minnesota Manufacturing--1975-1980," E. C. Venegas
and J. E. Carter

"An Input-Output Analysis of the Minnesota Economy," E. C.
Venegas, J. E. Carter, Wilbur R. Maki

"Forecasting Minnesota's Energy Requirements," E. C. Venegas

"Minnesota Energy Supply and Use - 1972," Rudy Brynolfson,
J. E. Carter

"A Regional Energy Information System Master Plan," July,
1974, Peter C. Knobloch

"Design Consideration for the Regional Energy Information
System," J. David Naumann, Norman L. Chervany, Peter C.
Knobloch

"The Minnesota Energy Information System--Final Report on
Design" (in press), J. David Naumann, Norman L. Chervany.

The following papers will be completed during the six months from January 1, 1975 to June 30, 1975:

"Energy Consumption in Minnesota Mining 1970-2000"

"Energy Consumption in Minnesota Households 1970-2000"

"Energy Requirements of the Minnesota Economy 1967-2000"

"Minnesota Energy Supply and Use - 1973."

The following analyses will be underway during the six months between January 1, 1975 and June 30, 1975, with completion scheduled for January 1, 1976:

"Energy Consumption Minnesota Agriculture, 1970-2000"

"Energy Consumption in Minnesota Transportation, 1970-2000"

"Energy Consumption in Minnesota Commercial Enterprises, 1970-2000"

"A Simulation of the Energy Requirements of the Minnesota Economy, 1967-2000"

"Forecasts of Minnesota Energy Supplies, 1974-1995"

"Optimal Allocation of Available Energy Supplies for the Minnesota Economy."

MINNESOTA ENERGY AGENCY
Fuel Allocation Division

SUMMARY REPORT

FUEL ALLOCATION DIVISION

Professional Staff

Dixie Lee Diehl
Allocation Coordinator

Randi Alcott
Allocation Caseworker

Edward Baem
Allocation Caseworker

Julie Close
Allocation Caseworker

Thomas A. Moore
Allocation Caseworker

The Fuel Allocation Division of the Minnesota Energy Agency was transferred from the Civil Defense Division of the Dept. of Public Safety on July 1, 1974. A total of five employees were transferred from the fuel staff of approximately 14 employees and plus extra secretarial help that administered the program under the Civil Defense Division. To date, the Minnesota Energy Agency Fuel Allocation Division consists of five staff; with Dixie Lee Diehl as the Allocation Coordinator and four allocation officers, Randi Alcott, Tom Moore, Julie Close, and Edward Baem, and one secretary, Janet Renfrow, making six employees in the Division.

On November 27, 1973 the Congress enacted the Emergency Petroleum Allocation Act of 1973 which requested all Governors to establish within their states an Office of Fuels and Conservation. Governor Wendell Anderson designated, at that time, the Civil Defense Division with that responsibility. The Federal Energy Administration Act of 1974 reiterates the need for a State Office to administer certain programs within the states.

The Minnesota Energy Agency Allocation Division is certified, upon the Governor's request, with the Federal Energy Administration to carry out the state responsibilities governed by this new Act.

The main responsibility is to administer the state set-aside program which, under the Federal Mandatory Allocation Program is designed to alleviate temporary hardships on a monthly basis to consumers of motor gasoline, heating oils, other middle distillates, propane and residual fuel oils.

A total of 7134 emergency and hardship state set-aside cases or an average of 509 cases per month, have been granted since the enactment of the program. Over 58,000,000 gallons of petroleum product have

been distributed from the state set-aside to date.

The Minnesota Energy Agency Fuel Allocation Division has the assistance of County and Municipal Fuel Coordinators throughout the 87 counties and most municipalities. The counties and municipalities were asked to appoint or reappoint coordinators after the transfer of the allocation office to the Minnesota Energy Agency on July 1, 1974, so as not to infringe upon the duties of those coordinators within the Civil Defense operations.

These fuel coordinators make the initial contact with anyone undergoing a fuel problem out-state and within the metropolitan area. They assist with filling out forms and make an initial investigation of the circumstances if need be. They, also, assist the State Office, when needed, with surveys or information necessary concerning State or Federal inquiries on energy problems within their jurisdictions.

The Fuel Allocation Division has put an emphasis on assisting those cases which are in need of permanent relief, may it be assignment of suppliers or adjustments (increases) to base period volumes. The goals of the office are to alleviate inequities of supply in those areas undergoing shortages, and assist individual problems in acquiring final resolutions with the Federal Energy Administration. The State Office requires that those cases projecting future problems with their allocations to pursue the procedures necessary which are then explained by the Office and followed up to the maximum extent possible. Pending resolution from the FEA, the State Office gives aid to those in need on an immediate basis.

The Federal Energy Administration is constantly proposing new rules and regulations, which the States and general public have access for input, in the form of recommendations to the proposals. The State Fuel Allocation Office has taken advantage of this process in several areas as it believes

the State of Minnesota has an obligation to it's citizenry to look out for their best interests as affected by these proposals.

The State Fuel Allocation Division must also respond to requests by the Federal Energy Administration to engage in contingency studies of Minnesota for developing National and Regional Energy Policy. The areas of study have been in natural gas curtailment, coal availability, service station closings, utilities' fuel problems, and others.

Top priority is now being given to a "market share study" which will enable the State to chart changes in marketing of petroleum by the major oil companies in order to insure continued adequate supplies in all areas of the State.

The following are a small sampling of the cases we have handled:

Moose Lake State Hospital, Moose Lake, Minnesota

Problem converting heating equipment required grants of 147,000 gallons of #2 heating oil.

Jones Industries, Two Harbors, Minnesota

New industry, creating 87 jobs required #2 heating oil to heat building. Minnesota Energy Agency found willing suppliers and the Minnesota Energy Agency engineer inspected the building to verify need to Federal Energy Administration. The FEA approval was required before financing was approved.

Frank Bros Elevator, Blue Earth, Minnesota

Acquired fertilizer plant in Guckeen which required supply of LP Gas. Several citizens in area wanted LP Service but could find no supplier. The Minnesota Energy Agency ran interference with the LP company, Frank Bros., and FEA. Until FEA approval was given assistance was provided from state set-aside.

Anderson-Gilyard, Inc., Becker, Minnesota

Had increased demand due to the construction at the NSP Becker power plants. Pending an FEA adjustments, which had Minnesota Energy Agency assistance, the company received 183,267 gallons of diesel from the state set-aside.

Franklin Manufacturing, St. Cloud, Minnesota

A plant of 800 employees which needed a supplier of compressor oil for their refrigerator-freezer units, due to the discontinuance of oil charged compressors by their Italian supplier. Minnesota Energy Agency made the necessary liasons with Federal Energy Administration in

Washington, D. C. and the concerned oil companies to resolve the situation.

Sleepy Eye Utilities, Sleepy Eye, Minnesota

While the coal generators were being repaired, the Minnesota Energy Agency assisted the utility with 79,000 gallons of diesel fuel.

Airports

Several airports received assistance in acquiring Federal Energy Administration relief for aviation gasoline. There is no state set-aside for this product, so the assistance was in the form of liaison work through FEA or three oil companies. This product was used for agricultural crop-spraying and emergency services by state and county agencies.

School Districts

Many schools throughout the state have received assistance via the state set-aside for more product or advisory help as to compliance with the Federal Mandatory Petroleum Allocation Program.

Cedar-Riverside Apartments

Received assistance from the Minnesota Energy Agency in acquiring suppliers for new buildings.

Airline Courtesies, Inc.

Received substantial assistance via the state set-aside, pending FEA resolution. This company provides limousine and freight service to and from the airport to various hotels and businesses.

Highway Department

Various state and county facilities have received advisory assistance and product via the state set-aside.

Carlson-Drobnick, Virginia, Minnesota

During the last year numerous grants from set-aside have been made to support the expansion of the taconite industry in northeastern Minnesota.

Although some grants are made directly to construction companies, most grants have been awarded through local bulk agents notably Carlson-Drobnick in Virginia, Best Oil & Gas in Gilbert, Rapids Tire in Grand Rapids, Nosan Oil in Chisholm, etc. The fuel is used for the construction of the plants and heating new homes of those people moving into the area. The fuel allocation staff has also assisted petroleum dealers in obtaining larger allocations to handle the increased need.

MINNESOTA ENERGY AGENCY
Conservation and Planning Division

6 MONTHS PROGRESS REPORT

July 1, 1974 to December 31, 1974

CONSERVATION AND PLANNING DIVISION

Professional Staff

John D. Peterson
Director

Rosalie Butler
Assistant Director

Sam Stewart
Chief Energy Technical Analyst

Weston Fisher
Chief Energy Policy Analyst

Jay Lujan
Energy Policy Analyst

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DIVISION: Conservation and Planning

PROJECT: Creation of an Energy Emergency Conservation and Allocation Plan

PURPOSE OF PROJECT: The creation of an emergency Plan to handle the situation within the state arising from a drastic shortage of one or more of the six basic energy sources -- natural gas, fuel oil, electricity, propane, coal and gasoline.

PROJECT COORDINATOR: John D. Peterson ASSISTANT COORDINATOR: Wes Fisher

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: In accordance with the law, a tentative emergency allocation Plan was prepared by July 27, 1974, printed and disseminated to those persons specified in the law and other interested persons and agencies; exposed to public comment at 14 public meetings throughout the state in September. The comments from the energy industry, energy users, legislators, other interested persons in the general public have been reviewed, evaluated and, where appropriate, incorporated into the final Plan completed in December.

Printing of the final Plan is being held up until determination has been made as to how to handle the emergency authorization or authority required to implement the measures required for execution of the Plan.

FUTURE ACTION PLANNED OR NEEDED: It is anticipated that the emergency powers, presently missing in any state legislation and without which the Plan cannot be adequately implemented, will be reviewed and acted upon in the upcoming legislative session.

COMPLETION DATE: The final complete Plan will be printed and distributed as soon as determination has been made of what emergency powers may or will be legislated. The Plan itself will be subject, of course, to automatic review as prescribed in the law and will doubtless be under almost continuous review by the Agency until it has reached the highest possible level of efficiency and equitable application.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Public education and information through public appearances, speaking engagements, TV and radio interviews, participation in seminars, response to correspondence, participation in question and answer situations at various meetings, other public contacts as required.

PURPOSE OF PROJECT: Education at all levels of adult and secondary school levels to inform and educate the public on the complex, far-reaching ramifications of energy uses and energy shortages. Stressed in this particular project is the face-to-face contact established in a broad range of public speaking and public informational contacts.

PROJECT SUPERVISOR: This is a staff function carried on by a number of members of the Agency including the Director, the Deputy Director, the Directors of the both the Conservation and Planning Division and the Research Division, and various staff members within those two divisions.

PROGRESS TO DATE: In addition to the 14 public meetings which were held in connection with the "taking to the public" the Tentative Energy Emergency Conservation and Allocation Plan during the month of September, the Agency staff has engaged in a total of more than 65 public appearances including radio and TV interviews in 8 different cities throughout the state, appearances before Chambers of Commerce, industrial development corporations, service clubs, engineering associations, League of Women Voters, seminars at the University of Minnesota, the Minnesota School Boards Association Annual Convention, traffic clubs and other miscellaneous groups where the audience had an interest in energy and its conservation and where members of the Agency had an opportunity to discuss energy, its problems, its future and its relationship to Minnesota.

The subject of the various presentations has varied as the needs of the audience, or its interest, dictated, and as the specialties of the people engaged in the speaking situation were required.

FUTURE ACTION PLANNED OR NEEDED: Obviously this is a continuing program and it is planned that personnel of the Agency will continue to use the public forum in whatever circumstance or situation the opportunity presents itself. Experience indicates that this face-to-face communication pattern, together with graphic audio-visual aids, is one of the more effective methods of attaining our goal of broad and comprehensive understanding and knowledge about the energy situation as it pertains to Minnesota.

COMPLETION DATE: None. As above, this is a continuing program.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Building design and construction standards

PURPOSE OF PROJECT: To provide building design and construction standards consistent with the most efficient use of energy.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: MEA and the Building Codes Division have developed an initial draft of Design and Evaluation Criteria for Energy Conservation in Buildings. On December 4, 1974, representatives from the National Bureau of Standards and the Federal Energy Administration at our request, met with MEA, the Building Codes Division and the Governor's Heat Loss Technical Committee to present their informal remarks on the initial draft. We have incorporated many of the NBS and FEA recommendations in our final draft which is now ready for reproduction and distribution.

Section 10 of Minnesota's proposed code modification outlines a procedure for calculating annual energy consumption using computer program/programs endorsed by the Minnesota Energy Agency. We have drafted and submitted a formal "Research Proposal" to FEA which includes a 6 month study to evaluate 7 different computerized energy programs in a variety of Minnesota buildings. The study, if funded, will be performed under our direction by a local consulting engineer with substantial voluntary engineering support from selected Minnesota industries.

FUTURE ACTION PLANNED OR NEEDED: The Building Codes Division will distribute the final draft of our building code standards to interested parties before the scheduled January 15, 1975 public hearing. MEA will participate in the hearing and in the modification of the energy document based on comments received in the public hearing. We believe the state building code will require periodic modifications during the next several years to reflect changes in energy policy.

COMPLETION DATE: New code must be completed by April 1, 1975. Updating will be required periodically for several years.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Examination of Energy Prices and Utility Rate Structures

PURPOSE OF PROJECT: To assess the impact of utility rate structures on energy conservation and make recommendations for changes.

PROJECT COORDINATOR: Jay C. Lujan ASSISTANT COORDINATOR: Rosalie Butler

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: The Minnesota Energy Agency staff has begun an extensive study of the implications of existing rate structures upon energy conservation; reviewed the activities of several state and federal agencies; reviewed several important decisions by other state Public Service Commissions in the recent past on utility rate structure design, as well as examined the theoretical basis for such decisions. This investigation includes extensive interviews with energy producers and broad spectrum of energy users to assess the practical economic and social impacts of these suggested changes.

FUTURE ACTIONS PLANNED OR NEEDED: The Minnesota Energy Agency is continuing to investigate this question and should develop its first proposals in the near future, by no later than July 1, 1975.

COMPLETION DATE: This is a continuing program, one of the Agency's top responsibilities, because of its potential for energy conservation and no specific completion date is contemplated.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Investigation of Promotional Practices

PURPOSE OF PROJECT: To determine the need to promulgate regulations to limit promotional practices.

PROJECT COORDINATOR: Rosalie Butler ASSISTANT COORDINATOR: Wes Fisher

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: Section 12, Sub. 2 of Chapter 307, Laws of Minnesota 1974, states, "The director of the Energy Agency may investigate promotional practices of energy suppliers and may promulgate regulations to limit such practices in order to reduce the rate of growth of energy demand." In order to comply with this provision of the law, we have met with and questioned many of the energy suppliers in Minnesota. These interviews will continue and we are watching the promotional practices of energy suppliers very carefully. Several states have outlawed promotional practices altogether through their Public Service Commissions and we are investigating this as to its effect on energy conservation. My role in this activity is arranging for the interviews with energy suppliers, doing the interviewing and writing reports, contacting other states regarding their activities, and talking to state legislators as to their views on promotional practices.

FUTURE ACTIONS PLANNED OR NEEDED: Additional interviews with smaller out-state energy suppliers to determine the nature of their promotional practices. Letters have gone out asking for the amount spent on advertising, copies of ads and all information on cooperative advertising, arrangements with builders and others on promotional rates, etc.

COMPLETION DATE: 1 year, then a continued overview as to the nature of promotional practices of energy suppliers.

PRIORITY RATING: Moderate.

DIVISION: Conservation and Planning

PROJECT: Energy Education in kindergarten through 12th grades in public schools.

PURPOSE OF PROJECT:

PROJECT COORDINATOR: Rosalie Butler ASSISTANT COORDINATOR: Wes Fisher

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: The Minnesota Energy Agency and the Minnesota Department of Education jointly sponsored a 2 day workshop bringing 35 people representing industry, educators, environmentalists, labor and government together to consider the development of comprehensive energy education curriculum for kindergarten through 12th grade for the public school system in Minnesota.

By bringing the various segments together in a working session the attitude of cooperation and confidence has been established that will provide the comprehensive approaches to energy education including environmental and economic impact that will allow future generations to decide energy issues through wisdom and knowledge and begin to narrow the public's ignorance about energy.

From this workshop an energy education planning committee with representation from the various segments was appointed which has met in a 1 day planning session with future meetings scheduled. It is our goal to develop guidelines, secure funding both from industry, private funds and public funds to permit a basic energy education program to be developed by school year 1975-76. This will include development of energy education units around the conceptual statements adopted by the planning committee and approved by the full group, a non-profit organization to solicit and dispense funds for energy education and teacher training programs on the maximum use of the energy education units which will be developed.

FUTURE ACTION PLANNED OR NEEDED: The planning committee determined that the best way to proceed to keep all interests actively involved (business, labor, education, government) and working together would be to form a non-profit organization to solicit and receive funds for the development of energy education units, teacher training and public education. The next meeting of the full committee is planned for January 20, 1975 to hear the recommendations of the nominating committee on the selection of a Board of Directors for the non-profit organization and the draft statement of the purpose and by-laws of the non-profit organization and provide an operational structure for the non-profit organization. A nominating committee and a subcommittee from the membership of the larger committee has been selected.

COMPLETION DATE: This program is ongoing and a completion date cannot be contemplated at this point.

PRIORITY: High.

DIVISION: Conservation and Planning

PROJECT: Technical Committees

PURPOSE OF PROJECT: Support from industry to supplement the technical capability of the Agency.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: MEA has formed a commercial building technical committee made up of technical representatives from industry. The committee has been reviewing technical handouts and programs developed by MEA for all types of commercial buildings.

FUTURE ACTION PLANNED OR NEEDED: We will soon be contacting individuals from industrial and agricultural segments to serve on technical committees for their specific areas of energy use.

COMPLETION DATE: Committees completed by May 1, 1975. Their work will be ongoing from then on.

PRIORITY: Moderate to high.

DIVISION: Conservation and Planning

PROJECT: Educational and information programs for residential, commercial and industrial building owners and managers.

PURPOSE OF PROJECT: Energy conservation via educational and information programs.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: We have maintained continuous contact with FEA to insure that MEA and FEA conservation programs are compatible and complementary.

We have developed ceiling reinsulation guidelines for residential construction.

We have developed a list of conservation measures for commercial buildings.

We have participated in the implementation of a future vocational-technical course on energy conservation using Epic 115 and MEA conservation guidelines as text materials.

We have participated in the formulation of a variety of seminars on energy conservation that have been and will be conducted throughout the state.

We have participated as speakers at energy meetings and seminars conducted by a variety of organizations.

We are working closely with our Research Division to be sure that the energy parameters used in the computer models are accurate and can be documented as average appliance consumptions in the state of Minnesota.

FUTURE ACTION PLANNED OR NEEDED: Expansion to cover all energy users.

COMPLETION DATE: None. Continuing long-range program.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Conservation Programs - Industrial Buildings

PURPOSE OF PROJECT: Implementation of specific programs and measures that encourage energy conservation in industrial buildings.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: MEA and the Minneapolis and St. Paul Chambers have initiated an "industrial building energy survey" program for the purpose of developing case histories which document energy savings in industrial buildings. The energy survey team has completed inspections of Rausch Manufacturing, Malmberg Machine, Process Potato Company, and the Flour City Brush Company. The Minneapolis and St. Paul Chambers, in conjunction with the Agency, intend to use the case histories as part of an energy conservation seminar scheduled for the first part of February 1975.

FUTURE ACTION PLANNED OR NEEDED: Expansion of program to include all "industrial" energy using equipment and systems.

COMPLETION DATE: None, continuing long-range program.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Conservation Programs - Commercial Buildings

PURPOSE OF PROJECT: Implementation of specific programs and measures that encourage energy conservation in commercial buildings.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: MEA has developed a comprehensive list of commercial building conservation measures. Our voluntary technical building committee has reviewed the list and this document is ready for reproduction and distribution.

The Building Owners and Managers Association in Minneapolis, St. Paul, Duluth and Rochester, have collected energy data on approximately 100 buildings and reported on MEA energy forms. The information obtained from this data will be the first step in determining an energy budget for an average or typical office building and for identifying those buildings that are using more than the average energy use. This program will be expanded to cover apartment buildings, schools, hospitals, and HUD buildings located in the State of Minnesota.

MEA has developed and presented to the Department of Administration a proposed state of Minnesota "building" conservation program. We have also initiated and participated in an energy survey of Normandale Community College in Bloomington, Minnesota. It appears, based on the results of this survey, that the electric energy usage in this college can be reduced 25-40% without any adverse effect on the students or the faculty. This program will be carried out in similar state school situations as time and staff allow.

We have calculated annual heating requirements for a proposed manufacturing facility at Two Harbors, Minnesota.

We are investigating the possibility of central heating plants providing steam service for both downtown St. Paul and Minneapolis. We are hopeful about the possibility of modifying NSP's abandoned southeast heat plant so that steam generated can be distributed to the University of Minnesota, Cedar-Riverside and the lower loop area of downtown Minneapolis.

We have drafted and submitted to the Governor's office a proposed car pooling and van program for those Minnesota businesses having 300 or more employees.

FUTURE ACTION PLANNED OR NEEDED: Expansion of program to include all "commercial" energy using equipment and systems.

COMPLETION DATE: None. Continuing program.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Conservation Programs - Residential Buildings

PURPOSE OF PROJECT: Implementation of specific programs and measures that encourage energy conservation.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: We have drafted a proposed residential thermal improvement program that includes three conservation measures that can greatly improve the thermal efficiency of most Minnesota homes; recommended that ceiling reinsulation, caulking and weatherstripping, and the addition or replacement of storm windows and storm doors be promoted aggressively as primary measures for saving heating and cooling energy in existing homes; suggested that one or more of the following programs be initiated to help expedite energy savings in the residential sector: strong promotion campaign, low interest loans, and mandatory-at-point-of-sale. We have submitted this program to the Governor's office and to the Legislative Energy Commission.

Minneapolis, as one of five cities selected by FEA to implement conservation measures, has formed a Button-Up task force. Stewart is presently serving on this task force as chairman of the technical committee.

We have initiated an investigation that will evaluate the feasibility of using infra-red photos as a means of identifying those residential buildings that have higher than average heat losses and heat gains.

We are continuing to document energy saved through reinsulation of existing homes in Minnesota. Minnegasco has furnished us with valuable information indicating a typical home with 6 inches of insulation added in the attic will save approximately 31 million Btu's per year. With this information and through other research, we have developed a "reinsulation homeowners guide" that is simple and easy for the average homeowner to understand.

We have had meetings with Minnesota window manufacturers regarding their existing "self-certification" air leakage test programs. We have recommended that the window manufacturers associations establish an air leakage test program whereby windows are selected on a random basis and tested by an independent laboratory.

MEA is continuing to investigate a home building modification consisting of 2" x 6" studs 24" on center currently being evaluated by the Owens Corning Company. Our preliminary information indicates that the trade-off of fewer studs and smaller heating and cooling equipment may offset the additional cost of more insulation in both the walls and the ceilings.

FUTURE ACTION PLANNED OR NEEDED: Expansion of program to include all "residential" energy using equipment and systems.

COMPLETION DATE: None.

PRIORITY: Top.

DIVISION: Conservation and Planning

PROJECT: Computerized Traffic Flow System

PURPOSE OF PROJECT: To study the feasibility of implementing a computer coordinated traffic flow system within the state in order to increase the efficiency of the current traffic system.

PROJECT COORDINATOR: Jay C. Lujan ASSISTANT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: The Minnesota Energy Agency staff has been cooperating with the Minnesota Department of Highways and the City of Minneapolis in an ongoing review of the I-35W Computerized Access Demonstration Program and the city's Computerized Traffic Light Control System program. These two programs jointly satisfy the need for a study of the feasibility of a computer coordinated traffic system to increase traffic flow efficiency. The I-35W project, which costs nearly \$6 million, will be completed by June 1975. Preliminary results from the City of Minneapolis' traffic flow project will be available no later than June 1975 as well.

FUTURE ACTIONS PLANNED OR NEEDED: The Minnesota Energy Agency in cooperation with the Minnesota Department of Highways and the City of Minneapolis will review the findings of both of these projects in late 1975 and assess the feasibility of implementing such a program on a metropolitan-wide basis.

COMPLETION DATE: Late 1975 to mid-1976. Possible continued involvement, depending on result of studies.

PRIORITY: Low.

DIVISION: Conservation and Planning

PROJECT: Monitoring of test programs studying appliance and system efficiencies.

PURPOSE OF PROJECT: Evaluation of energy efficiency of specific equipment and systems.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: MEA has initiated a test program whereby modular boilers with primary and secondary pumping and separate domestic hot water heating will be compared against existing systems to determine annual energy savings. This test, funded by HUD for approximately \$38,000, will provide documentation of actual energy savings using the modular boiler concept.

We have participated in the Department of Administration advisory standards committee meetings to help them select energy efficient equipment for state buildings.

We have evaluated the operating efficiency of existing central steam plants and steam distribution systems for the towns of Keewatin and Buhl, Minnesota.

We have contacted the National Bureau of Standards on a regular basis to stay abreast of efficiency tests they are conducting on equipment and systems.

We are maintaining contact with local companies that are testing appliances and systems that are designed to save energy.

We are cataloging literature received from manufacturers and distributors of conservation equipment and systems to facilitate easy access and dissemination.

We are monitoring a test program presently being conducted by Jack E. Mayer, a Minnesota resident, on the operating efficiency of his modified oil burner. Furnace and home improvements are being evaluated against actual energy savings.

FUTURE ACTION PLANNED OR NEEDED: Continuing program.

COMPLETION DATE: None, continuing program.

PRIORITY: Moderate to high.

DIVISION: Conservation and Planning

PROJECT: Grant Proposals

PURPOSE OF PROJECT: Research studies related to energy conservation.

PROJECT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: MEA and the City of Mankato are currently drafting a research grant proposal that includes a thorough study of the potential benefits of using infra-red photos as a means of identifying residential buildings wasting energy. FEA and HUD have expressed their interest in funding this type of project.

MEA and the University of Minnesota are currently drafting a grant proposal to FEA that includes a thorough study of the total life cycle energy cost for an apartment vs. a townhouse vs. a single family home.

MEA has drafted and submitted a research grant proposal to FEA that evaluates existing computerized energy programs.

FUTURE ACTION PLANNED OR NEEDED: Continuing program.

COMPLETION DATE: None, continuing program.

PRIORITY: High.

DIVISION: Conservation and Planning

PROJECT: Expanding the state telecommunication system to reduce travel between all state departments and agencies.

PURPOSE OF PROJECT: To conserve energy by reducing travel requirements of state government.

PROJECT COORDINATOR: Wes Fisher

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: The Telecommunications Division of the Department of Administration reported to the Department on November 25, 1974 those activities of the past year which they believe did or could reduce travel among agencies. The Division staff have indicated that they will give full consideration to the energy conservation potential of expanding the use of state telecommunication in all present and future planning.

FUTURE ACTION PLANNED OR NEEDED: Continuing assessment of the state telecommunications system.

COMPLETION DATE: None. As noted above, a continuing assessment.

PRIORITY: Moderate.

DIVISION: Conservation and Planning

PROJECT: Organization of Agency library

PURPOSE OF PROJECT: To provide the Minnesota Energy Agency and the public with a central repository for energy information.

PROJECT COORDINATOR: Wes Fisher

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: The Agency's collection of state and national energy reports and documents have now been organized by subject in the Agency library. A subject index file has been developed on the existing collection, and a procedure established for cataloging and shelving new incoming materials. A monthly scan of available new publications is also performed, and a procedure has been developed for obtaining copies for the Minnesota Energy Agency library.

FUTURE ACTION PLANNED OR NEEDED: A half-time librarian is needed for this project.

COMPLETION DATE: None. This is a continuing project.

PRIORITY: High.

DIVISION: Conservation and Planning

PROJECT: State Purchasing

PURPOSE OF PROJECT: To study the state's purchase and use of supplies, automobiles and equipment having a significant impact on energy use in order to determine the potential for energy conservation.

PROJECT COORDINATOR: Wes Fisher

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: An initial meeting was held with the Department of Administration to discuss state purchasing activities on August 20, 1974. Subsequently interviews were held with Procurement personnel in the Department of Highways on September 16, 1974, the Department of Natural Resources on September 26, 1974, the University of Minnesota Transportation Services and Heavy Equipment Pool on October 18, 1974. Administration, Highways, and Natural Resources have provided summaries of procurement activities in 1974 which conserved energy. Each department has also been asked to outline future activities. While the University of Minnesota apparently is not subject to Chapter 307, Laws of Minnesota 1974, we are asking for their voluntary cooperation.

The Division of Procurement, Department of Administration, has established an Advisory Standards Committee with Energy Agency participation to review current procurement standards. A major function of the committee is to promote standards which meet the needs of the Department of Administration while also including minimum energy use requirements in state specifications. On November 14, 1974, Department of Administration personnel met with Energy Agency staff to discuss revision of state procurement specifications to minimize energy consumption. Most of the discussion centered on energy efficient specifications for state automobiles. Checking the first low bid purchases for 1975 automobiles indicates that all purchases to date meet an efficiency standard of 17 mpg or better for highway driving according to the 1975 EPA - Fuel Economy Derby tests. City driving efficiencies for these new vehicles range from 11 to 18 mpg.

The Department of Administration has also provided the Agency with their list of specification titles which will aid the Energy Agency in identifying those materials and products which may require energy use specifications.

FUTURE ACTION PLANNED OR NEEDED: Energy efficient specifications are anticipated by the Energy Agency for those materials and equipment purchased by the state government which consume significant quantities of energy. Review of purchasing practices is in progress.

PRIORITY: In view of the progress being made by the Department of Administration the priority rating on this project is moderate.

COMPLETION DATE: None. This is a continuing responsibility.

DIVISION: Conservation and Planning

PROJECT: Liaison with local units of government.

PURPOSE OF PROJECT: See below.

PROJECT COORDINATOR: Rosalie Butler

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: Local units of government are directly and significantly involved in and affected by the energy situation, particularly in the areas of conservation programs and we feel the Energy Agency can be of assistance to local units of government. Our goal is to encourage local units of government to establish energy conservation committees to cooperate with the Energy Agency for the mutual benefit of developing programs of practical energy conservation, energy efficiency concern in purchasing supplies and equipment, construction and maintenance of buildings and primarily our desire to establish the flow of information from local units of government to the Energy Agency so that in the planning of energy conservation programs, proper attention to the needs of local government is taken into consideration.

Contacts have been made with St. Cloud energy conservation committee, Minneapolis and St. Paul energy conservation committee. This activity was suspended somewhat until after the November elections and the new county board members were determined. Now that they have been elected and sworn in, this activity will encourage all units of government statewide to appoint a conservation committee.

FUTURE ACTIONS PLANNED OR NEEDED: This will be a permanent liaison effort by the Energy Agency and will increase in importance and activity.

COMPLETION DATE: None. This is a continuing responsibility.

PRIORITY: High.

DIVISION: Conservation and Planning

PROJECT: Lighting Efficiency Standards

PURPOSE OF PROJECT: To assist the Commissioner of Highways to promulgate regulations establishing maximum energy use standards for street, highway and parking lot lighting.

PROJECT COORDINATOR: Jay C. Lujan ASSISTANT COORDINATOR: Sam Stewart

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: The Minnesota Energy Agency staff has been cooperating with the Minnesota Department of Highways by participating on a committee established to draw up proposed regulations for maximum energy use standards for highway lighting. Membership on this committee includes Minnesota Department of Highway personnel, City of Minneapolis and City of St. Paul representatives, and a representative from Hennepin County. To date substantial progress has been made on the drafting of proposed standards. These standards should be brought to public hearing no later than February 15, 1975.

FUTURE ACTIONS PLANNED OR NEEDED: Additional work must be done in order to draft lighting standards for street and parking lot lighting. This will be done through continuing participation by MEA staff people on the above Department of Highways committee. It is expected that additional standards for street and parking lot lighting will be adopted through public hearing no later than June 1975.

COMPLETION DATE: June 1975.

PRIORITY: Moderate.

DIVISION: Conservation and Planning

PROJECT: Governor's Report on the Environment

PURPOSE OF PROJECT: To prepare a statement on energy use in Minnesota for inclusion in the Governor's annual Report on the Environment to the Legislature.

PROJECT COORDINATOR: Jay C. Lujan

PROJECT SUPERVISOR: John D. Peterson

PROGRESS TO DATE: The Minnesota Energy Agency staff has prepared a brief statement of energy use in Minnesota. This report attempts to lay out some of the significant trends of energy use in the state for the near future and assess the possible environmental consequences of these trends. The report emphasizes the need for continued energy conservation in Minnesota to reduce harmful impacts upon the environment commensurate with continuing economic growth.

FUTURE ACTION PLANNED OR NEEDED: None on this year's report. Possible updating, as per Governor's request, in future.

COMPLETION DATE: January 1975.

PRIORITY: High.

APPENDIX IV

SELECTED TESTIMONY PRESENTED BEFORE THE COMMISSION
AND ITS SUBCOMMITTEES

Presentation to Legislative Commission on Energy

March 26, 1975

Michael J. Murphy, Project Manager, Future Choices: Energy,
Upper Midwest Council, Minneapolis, MN

Thank you for inviting me to contribute to this discussion. It is both timely and critical for us and for the State and its people.

What I want to do this evening is to draw out some of the implications of both supply and price problems for our basic fuels, some of the interrelationships among these fuels and some of the critical time dimensions affecting them in the immediate future (now to 1978); and the longer-term (to 1985 and beyond). Also, I want to pass along some thoughts regarding the role of the State in energy planning and management.

I think it important for all of us to understand first, that we are being asked to do something we've always found extremely difficult to do. That is, to make difficult, tough decisions about our immediate future - decisions which must be decisive, yet flexible enough so that we do not foreclose future options. The difficulty we face in making these short-term decisions is caused largely by the fact that we've few if any long-term goals. Or, if we have them, they often are in conflict. A good example of this is a widespread, concerted effort to arbitrarily hold down energy costs. Yet, at the same time, we want to move the nation into the use of renewable resources or, at least, into new energy sources such as gasified coal. We won't get to these new energy sources with low prices.

Between now and 1978, our natural gas problems will peak and Canadian oil supplies will fall below our current need for them. Our other major energy source, electric power from either coal or nuclear fuels, is limited today due to the long lead times for construction of conversion facilities.

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We must solve the immediate problem of reduced Canadian oil supplies through priority allocation to ensure that our three Minnesota refineries and other U.S. refineries dependent upon Canadian oil get the crude volumes they need to operate and to supply their markets. While the ultimate decision must be made at the federal level, the state can act as a focal point for influence.

We have permanent alternatives to consider for after 1978. I won't get into them in detail now, but I will be happy to discuss them later, if you wish. What we need today is a full and accurate assessment of these alternatives to determine their various costs and benefits before we support one over another.

Any way we go in the short-term, the state will experience some problems due to higher petroleum prices and natural gas shortages.

We need to know - NOW - the net result of decreased or discontinued local refinery production. Also, we need to study shortage conditions for our various petroleum based fuels to determine appropriate contingency plans for the state. Which of our consuming sectors are most critical in terms of both supply and price??? What are their alternative fuels.

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Higher oil prices also have created greater demands for natural gas, a supply which is starting to decline significantly. Our propane supply is declining and also is more costly since 60 percent of it comes from natural gas.

Today, in Minnesota, a large number of natural gas users who have been told they will be curtailed are scrambling to find alternative energy supplies. No one seems totally willing to take them on with firm fuel oil supplies; and, it is a bit scary locking a plant into fuel oil not knowing the future of either supply or price or availability of emergency supplies.

I sense two distinct feelings among these large users. One, they don't know what to do because there is no policy being developed to ensure energy supplies for them. Two, some of them are doubtful as to the reality or gravity of the situation and expect it will all go away in time. If nothing else, we must clear away these doubts as to the facts of life.

I think we should ask the question whether new natural gas customers should be continually added, regardless of size, while, at the same time, we are curtailing existing customers. Should the state move to allocate the end-use of natural gas? Does the state have the authority? We should find that out right away and, if necessary, develop the authority.

Also, where does the curtailed natural gas go? Is it actually saved, or is it merely sold to someone else, without recognition of priority or other available fuels?

These questions are critical during the interim period of 1977 through 1981 or 1982 when we, optimistically, could receive natural gas from Alaska and the McKenzie Valley in Canada; and synthetic gas from coal sometime after that.

Energy conservation in the natural gas sector can be a supply strategy. If we can develop significant natural gas conservation and appropriate end-use priorities, the volumes saved can help meet the needs of those users who cannot obtain other fuels or cannot convert to other fuels.

Where does the taconite industry fit into all of this? It is my understanding they will be curtailed to some large extent, even though most all of the 110 million cubic feet that industry consumes each day - over 10 percent of the state's total demand - is under firm contract. How do we plan for meeting the large needs of this major industry and employer???

We have nearly 200 municipal power suppliers who will be taken off natural gas within the next two years. They now consume about 40 billion cubic feet per year, an amount equivalent to about 300 million gallons of crude oil.

We also have some fixed demand areas where conservation is impossible in process operations and where conversion to other fuels is equally impossible or, at best, extremely costly.

These include some activities in agriculture, related agri-business and food processing, to name but a few. And, we've yet to calculate additional energy needs during the next few years given that agricultural production will increase.

Industries which can switch to other fuels - coal or oil - given supplies are available and the burning equipment is too, will switch. Those which cannot will have to shut down and/or relocate.

It is not unrealistic to see this scenario come to life next winter. The task we face is to determine what, if anything, can be done to avert this crunch. Solutions are, I feel, a function of how quickly government can mobilize to develop alternative policies or, in the absence of government initiative, how quickly business, industry and the public at large mobilize to impact on government, thus forcing solutions.

What about coal? There are vast quantities to the west of us, low-sulphur for the most part. Our state's major utilities have done a good job in developing these supplies.

There are problems in getting this fuel, however. As demands for western coal increase, so do the impacts, mainly in the coal-producing regions. There are land and water use problems, economic disruptions, increased demands for public services for growing populations, land reclamation problems and, equally important, major impacts on lifestyles --- all caused by rapidly increased demands for coal from a part of the country not quite ready for this kind of onslaught.

These western states' residents are asking, and appropriately so, whether they should be forced to alter their lifestyles merely to allow people in other states to continue to maintain theirs.

We know one thing, for sure. The price of that coal will continue to rise and our utility bills will increase. I think we can expect increased pressures from the coal-producing states, pressure forcing the demand states to burn the coal close to home, not out west. There are complex issues and the tradeoffs are numerous; but they must be faced realistically.

We are conducting an analysis of this subject at the Council, focusing on alternative uses of western coal and the siting of conversion facilities in various locations in the upper midwest region.

It is not inconceivable that, if the taconite industry needs and wants a synthetic natural gas facility using western coal, that facility will have to be located in northeastern Minnesota - close to a large water supply. And, we all know where the largest supply of water is.

We will need strong and sensitive systems to analyze these questions and decisive decision making to handle a potential undertaking as large as this kind of facility.

There is nothing wrong with coal and gas from coal. If we meet the environmental protection standards and ensure that the impacts of these facilities are adequately covered within the price of the energy produced, coal can be a plentiful, long-term fuel for Minnesota. We should recognize, however, that the use of coal for energy is a long-term investment, requiring huge sums of money and taking up large amounts of land area. We should not enter into this lightly or accidentally. It should come only after we have thoroughly studied the impacts and developed rational policies to deal with them. And, I should stress, our policies should be developed as much in advance of the emergence of the impacts as we can in order to minimize citizen disruption and adversary proceedings.

If we don't use coal, nuclear is our next available option. However, its current high cost and long lead times have made it less attractive. These shifts run in cycles, however; and one could expect nuclear development to increase again. If we keep the cost of energy down, we may not see much nuclear power for some time. We won't see anything else but coal, however.

Solar energy is a most attractive technology. And, we should move quickly to develop it for economical, commercial application. While moving right now into a solar-based energy system is attractive in an environmental sense, it would be very costly and, without adequate transition time to adjust to the higher cost, we could have serious inflationary problems, job disruptions and economic dislocations. To jump ahead into a new, more costly energy source, without a smooth economic and social transition, could be self-defeating. First, we must make sure our energy consuming activities have reached a high level of efficiency, through removal of waste activities and employment of more sophisticated equipment and methods.

Looming over all of this is the world oil situation - a case of a supply glut and high prices. Here in Minnesota, the entitlements or price equalization program is not working and our refineries are cutting production to minimize their losses. And, I might add, priority allocation will not work within the present FEA supply system without the entitlements program.

Right now, the state's self-interest lies in the self-interest of our refiners who must have both equalized prices and priority access to Canadian crude oil during the next three years .

We must recognize that decisions we make or influence today relating to either price or supply of energy will have long-term effects . If we foreclose some supply options such as nuclear or coal, we may create false scarcity and artificially high prices . If we arbitrarily hold prices down, we risk insufficient supplies in the future .

In the immediate future, the next three years, the U.S. can do little else but continue to import high-priced oil. We cannot avoid this, except through conservation; and, with the conomy the way it is, it will be difficult, and perhaps undesirable, to greatly reduce total energy consumption. We know little, for instance, what additional energy needs we will need to raise the economy back up to previous production and employment levels .

While Minnesota cannot institute separate, unilateral energy policies, it can analyze the tradeoffs available to us within the national situation and develop plans which will protect our residents . We must be careful, however, to ensure that our immediate decisions do not create longer-term even larger problems and that our policies do not place our people at either an economic or social disadvantage .

I am heartened by several things, however. The state is moving to develop better electric pricing mechanisms. But, what about natural gas rates? We will have a certificate of need program for major energy facilities. I would caution, however, that certificate of need take into consideration the fact that increased needs create impacts which cross state lines. Certificate of need should relate only to energy demands and should take into consideration the differing impacts caused by either importing coal, for instance, or importing electric power produced from coal. We could, I am sure, make it difficult to site plants in this state. But, where would we put them - in North Dakota or Wisconsin or Montana? I am sure those states have a different view of this.

It is in our best interest to develop strong working relationships with the states around us, particularly those who give us our coal from out west and others who, like us, are dependent upon Canadian oil. Multi-state planning is critical if we are to develop appropriate decision-making systems for choosing our energy sources, and for siting of conversion facilities and transmission or transportation systems.

Energy policy activities for the State of Minnesota should key on cooperative decision making among the various public and private interests, particularly in those areas where policies are currently not in concert.

Our short and medium-term policies should remain highly flexible and should be designed to work with a reasonable base of knowledge which can carry us through this 10-year transition period with the least amount of social and economic disruption. The state's most effective role lies in identification of the impacts of various shifts in supply, demand and price to determine the effects on the people.

First, we need to identify problems, consider consequences, analyze options and alternatives and then develop plans --- plans which are implementable and flexible at the state level.

Second, the state SHOULD be in a position to test alternative assumptions regarding both energy policy and real price and supply situations to determine impacts locally, at both primary and secondary levels.

Third, the state should continually analyze how the objectives of other state and federal policies affecting energy supply relate to actual energy policy and objectives. We should realistically determine where the various efforts are in concert or where they are actually or potentially counter-productive.

The Minnesota Energy Agency, on its own and through other state agencies, should act as the springboard for continuing study and discussion and debate of energy alternatives to further the state's self-interest and the role of the state in the national interest.

Energy policy does not merely happen. It evolves from decisions made in such issues areas as economic growth, quality of life, land and water use, transportation, the environment and the like. Often, what we perceive to be economically and politically attractive can, if not assessed properly, become an even larger problem. We MUST, and I stress, MUST, analyze the consequences of our actions well in advance of implementation. Too long, we've bet on the future, something we know little about, look forward to and don't recognize until it hits us on the head.

For example, the development of plans to control urban sprawl and migration of people runs counter to our basic American ideals about freedom of choice and personal mobility.

I recognize that there are energy and resource efficiencies in controlling sprawl and in regulating development of urban areas. I also recognize that such controls could result in significant social disruption.

I would argue that there are many other areas of our society within which we can achieve similar efficiencies without creating broad social dislocations. There is, in my mind, a middle ground which can accommodate both efficiency and freedom if we lay out the broad range of choices our people have. We had better find these things out before our planning gears are in motion one way or the other.

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This state, and the nation, is at the turning point, both in terms of our physical future and our philosophy on how to approach the future. While we must move quickly to rectify our energy problems, wrong decisions cannot easily be rectified.

To use a couple well-worn phrases, it is time to fish or cut bait. But, before we do either, we must look before we leap.

Thank you. I will be happy to answer any questions you may have.

MR. CHAIRMAN, MEMBERS OF THE COMMITTEE, LADIES AND GENTLEMEN:

IT IS MY PURPOSE TO GIVE YOU A VIEW OF THE NATURAL GAS SUPPLY PICTURE, AND TO FOCUS SPECIFICALLY ON THE CRITICAL ISSUES FACING NORTHERN TODAY. THESE ISSUES AFFECT EACH AND EVERYONE OF US IN ONE WAY OR ANOTHER. IN THE NEXT FEW MINUTES I PLAN TO COVER THE FOLLOWING.

FIRST, THE GAS INDUSTRY AND NORTHERN ARE IN SERIOUS TROUBLE CONCERNING ITS GAS SUPPLY. DOMESTIC NATURAL GAS PRODUCTION HAS PEAKED OUT AND WILL BE DECLINING FOR THE INDEFINITE FUTURE. IT IS NO LONGER SIMPLY A MATTER OF GAS SUPPLY FAILING TO MEET INCREASING REQUIREMENTS. IT MEANS THAT THERE WILL BE LESS NATURAL GAS AVAILABLE FOR SALE EACH YEAR THAN WAS SOLD THE PRIOR YEAR.

SECOND, NORTHERN WILL BE DOING EVERYTHING IT CAN TO ENSURE CONTINUED RELIABLE SERVICE TO ITS FIRM AND SMALL VOLUME MARKETS. THIS WILL MEAN INCREASING CURTAILMENTS TO LARGE VOLUME CUSTOMERS AND INCREASED RELIANCE ON STORAGE.

THIRD - TO REDUCE THE ECONOMIC BURDEN PLACED ON THE CONSUMER, WE MUST ALL WORK TOGETHER TO SECURE ADDITIONAL SUPPLIES OF NATURAL GAS. TO DO THIS ALL GAS TRANSMISSION COMPANIES, NO MATTER WHICH STATES THEY SERVE, MUST BE ALLOWED TO COMPETE ON AN EQUAL BASIS FOR AVAILABLE SUPPLIES, AND TO PAY A PRICE WHICH WILL STIMULATE EXPLORATION FOR ADDITIONAL SUPPLIES.

LET'S HAVE A LOOK AT WHERE WE STAND WITH RESPECT TO THE NATURAL GAS SUPPLY-DEMAND SITUATION.

PRODUCTION OF NATURAL GAS IN THE UNITED STATES GREW FROM 5.6 TRILLION CUBIC FEET IN 1947 TO 22.4 TRILLION CUBIC FEET IN 1974. THIS REFLECTS A FOUR-FOLD INCREASE IN 27 YEARS. IN 1947, ANNUAL PRODUCTION WAS ABOUT 3% OF THE TOTAL GAS RESERVES AVAILABLE AT THAT TIME BUT BY 1974, PRODUCTION AMOUNTED TO OVER 10% OF ALL AVAILABLE GAS RESERVES IN THE LOWER 48 STATES. THIS MEANS A DECREASE IN THE NATION'S NATURAL GAS INVENTORY FROM A 29 YEAR SUPPLY TO A 10 YEAR SUPPLY.

REMARKS OF THOMAS JETTON, NORTHERN NATURAL GAS COMPANY, 2223 DODGE STREET, OMAHA, NEBRASKA, BEFORE THE LEGISLATIVE ADVISORY COMMITTEE, MINNESOTA ENERGY AGENCY, MARCH 26, 1975.

NATURAL GAS HAS MOVED FROM A POSITION OF SUPPLYING 13% OF THE NATION'S TOTAL ENERGY CONSUMPTION IN 1945 TO 32% TODAY. DURING THE PAST TEN YEARS ALONE, THE DEMAND FOR NATURAL GAS HAS DOUBLED. TODAY, NATURAL GAS IS VITAL TO OUR ECONOMY AND THE DOMINANT SOURCE OF DOMESTIC ENERGY - PROVIDING 1/3 OF OUR NATION'S TOTAL ENERGY REQUIREMENTS AND NEARLY 50% OF THE ENERGY NEEDS OF U.S. INDUSTRY.

PRIOR TO 1968 THE ADDITIONS TO NATURAL GAS RESERVES IN EACH INDIVIDUAL CALENDAR YEAR WERE REPLACING OVER 90% OF THE GAS PRODUCED. HOWEVER, EACH YEAR SINCE 1968 WE HAVE PRODUCED ABOUT TWICE AS MUCH GAS AS WE HAVE FOUND, THAT IS, WE HAVE REPLACED WITH NEW RESERVES LESS THAN HALF OF THE GAS RESERVES WE USED UP. AS A COMPARISON WITH OTHER KINDS OF BUSINESSES, THE GAS INDUSTRY HAS BEEN MAKING SALES OUT OF ITS WAREHOUSE INVENTORY AND ONLY REPLACING HALF OF THE PRODUCT SOLD. OBVIOUSLY THIS SITUATION CANNOT CONTINUE INDEFINITELY.

WHAT HAS CAUSED THE DECREASE IN OUR NATURAL GAS RESERVES? THE BASIC CAUSE HAS BEEN A FEDERALLY CONTROLLED PRICING SYSTEM WHICH HAS HELD NATURAL GAS PRICES UNREALISTICALLY LOW. IN 1954 THE SUPREME COURT ISSUED A DECISION RULING THAT THE FEDERAL POWER COMMISSION COULD SET THE PRICE OF NATURAL GAS AT THE WELLHEAD WHERE IT IS SOLD TO INTERSTATE BUYERS, IN MOST CASES INTERSTATE PIPELINE COMPANIES LIKE NORTHERN. ONLY INTERSTATE BUYERS WERE MADE SUBJECT TO THESE RESTRICTIONS. INTRASTATE BUYERS, THOSE WHICH OPERATE ENTIRELY WITHIN THE BORDERS OF A GIVEN STATE, BUYING AND SELLING GAS ONLY WITHIN THAT STATE, ARE NOT SUBJECT TO THE WELLHEAD PRICING POLICIES OF THE FPC. THESE COMPANIES ARE FREE TO PAY WHATEVER IS NECESSARY TO OBTAIN GAS FROM THE PRODUCERS. WITH THE ARAB OIL EMBARGO OF 1973, OIL INCREASED IN PRICE DRAMATICALLY. SINCE GAS IS READILY SUBSTITUTABLE FOR OIL, INTRASTATE BUYERS BEGAN BIDDING UP THE PRICE - HIGHER THAN INTERSTATE BUYERS COULD PAY. SOON LITTLE GAS WAS BEING PURCHASED BY INTERSTATE BUYERS LIKE NORTHERN. OTHER CAUSES FOR THE DECREASE IN NATURAL RESERVES STEM FROM THE FACT THAT GAS BECAME THE PREFERRED FUEL FOR INDUSTRY BECAUSE OF ITS ENVIRONMENTALLY ACCEPTABLE CHARACTERISTICS: IT IS CLEAN BURNING, NON-POLLUTING AND LEAVES NO RESIDUE. FURTHERMORE, THE RISE IN OIL AND COAL PRICES DURING THE 1950'S AND 60'S

CAUSED MANY LARGE VOLUME ENERGY USERS TO SWITCH TO NATURAL GAS, SINCE IT WAS UNDERPRICED COMPARED TO OTHER FUELS. THUS, THE DEMAND FOR GAS SIMPLY OUTSTRIPPED OUR ABILITY TO PRODUCE IT. ALSO, THE 1960'S BROUGHT DRAMATIC INCREASES IN THE PETROCHEMICAL, PLASTICS, AND FERTILIZER INDUSTRIES, WHERE NATURAL GAS PROVED TO BE A VITAL FEEDSTOCK.

I HAVE SAID THAT GAS RESERVES ARE DECLINING - LET'S EXAMINE WHERE WE ARE TODAY, NORTHERN'S RESERVE PICTURE AND THE EFFECT OF INTRASTATE PIPELINE COMPETITION. THE AMERICAN GAS ASSOCIATION ESTIMATED PROVED RESERVES IN THE U.S. OF 237 TRILLION CUBIC FEET ON DECEMBER 31, 1974. PROVED RESERVES ARE THOSE COMMERCIALY PRODUCTIVE IN FLOW TESTING. "POTENTIAL" GAS SUPPLY IN THE U.S. IS STILL SUBSTANTIAL AND CAN BE DEFINED AS THAT GAS YET TO BE FOUND OR ADDED, EXCLUSIVE OF PROVED RESERVES. EXPLORATION AND DRILLING NECESSARY FOR THE DISCOVERY AND DEVELOPMENT OF "POTENTIAL" GAS SUPPLIES DEPENDS ON A NUMBER OF FACTORS, BUT IN ANY CASE WILL REQUIRE LARGE AMOUNTS OF MONEY AND EFFORT. WE ARE UNFORTUNATELY, NOT MAKING THAT EFFORT IN THE UNITED STATES BECAUSE DRILLING COMPANIES HAVE NOT HAD THE NECESSARY INCENTIVES TO DRILL.

NORTHERN'S RESERVE EXPERIENCE HAS BEEN SOMEWHAT BETTER THAN THE NATIONAL INDUSTRY AVERAGE. ALTHOUGH HIGHER THAN THE NATIONAL INDUSTRY AVERAGE, NORTHERN'S RESERVE LIFE INDEX HAS GENERALLY FOLLOWED THE NATIONAL TREND SINCE 1966.

NORTHERN, ALONG WITH THE REST OF THE GAS INDUSTRY SUFFERED A SHARP DECLINE IN RESERVE ACQUISITION IN 1968 AND 1969, WHEN WE ACQUIRED ONLY ABOUT 2/3 OF OUR PRODUCTION. IN 1970 AND 1971 WE DID MUCH BETTER, ACQUIRING ABOUT 90% OF OUR PRODUCTION.

DURING 1972, NORTHERN ACQUIRED ABOUT 500 BILLION CUBIC FEET OF NEW GAS RESERVES IN OUR TRADITIONAL SUPPLY AREAS, AND ALSO CONNECTED TO THE SYSTEM AN ADDITIONAL 540 BILLION CUBIC FEET OF NEW RESERVES IN MONTANA. TOTAL PRODUCTION DURING THAT YEAR WAS 941 BILLION CUBIC FEET. IN 1973, WE ACQUIRED ABOUT 452 BILLION CUBIC FEET OF NEW GAS RESERVES IN OUR TRADITIONAL SUPPLY AREAS, INCLUDING MONTANA, AND WE PRODUCED 962 BILLION CUBIC FEET. LAST YEAR WE ACQUIRED ONLY 317 BILLION CUBIC

FEET OF NEW GAS RESERVES AND PRODUCED 935 BILLION CUBIC FEET. LAST YEAR MARKED THE FIRST DECREASE IN SALES BUT CERTAINLY NOT THE LAST.

MUCH GREATER INCENTIVES IN THE FORM OF HIGHER WELLHEAD PRICES FOR GAS WILL BE REQUIRED TO ENCOURAGE THE PRODUCING COMPANIES TO EXPAND THEIR EXPLORATION PROGRAMS TO THE LEVEL NEEDED TO MAINTAIN OR INCREASE DISCOVERY RATE. BUT EVEN WITH THE INCREASED WELLHEAD PRICES, A TURNAROUND IN THE SUPPLY SITUATION WOULD TAKE SEVERAL YEARS. THREE TO FIVE YEARS LEAD TIME IS REQUIRED TO MAKE SEISMIC SURVEYS, ACQUIRE LEASES, OBTAIN DRILLING RIGS, DRILL EXPLORATORY AND DEVELOPMENT WELLS, AND CONSTRUCT THE GATHERING AND TREATING FACILITIES NEEDED TO MOVE NEW GAS INTO INTERSTATE PIPELINE SYSTEMS.

FINDING NEW RESERVES MEANS DRILLING MUCH MUCH DEEPER, MORE EXPENSIVE WELLS - THE SHALLOWER RESERVES HAVE ALREADY BEEN FOUND. IN THE EARLY YEARS OF GAS EXPLORATION, THE GAS WAS FOUND IN RELATIVELY SHALLOW RESERVOIRS. FROM THE YEAR 1900 THROUGH 1930 PRACTICALLY ALL NEW GAS DISCOVERIES WERE MADE AT DEPTHS OF LESS THAN 5000 FEET, BUT AS DRILLING CONTINUED, IT WAS NECESSARY TO DRILL DEEPER TO FIND GAS SUPPLIES. FROM 1931 TO 1950, APPROXIMATELY 2/3 OF THE GAS WAS FOUND AT 5 - 10,000 FEET DEPTHS AND ABOUT ONE SIXTH AT 10 - 15,000 FEET. THE RATIOS CONTINUED TO CHANGE BETWEEN 1951 AND 1968. NOW, LITTLE GAS REMAINS IN THESE SHALLOWER RESERVOIRS. LOOKING AT WHAT REMAINS, 75% OF THE NEW RESERVES IN OUR TRADITIONAL AREAS ARE ESTIMATED TO BE BELOW THE 15,000 FOOT DEPTH.

THE DEPTH OF GAS BEARING RESERVOIRS HAS A MARKED EFFECT ON THE COST OF DRILLING. AS AN EXAMPLE, IN THE HUGOTON-ANADARKO FIELD, A WELL 8,000 FEET DEEP, WHETHER PRODUCTIVE OR NOT, TODAY COSTS APPROXIMATELY \$200,000. AT 19,000 FT. THE COST IS \$1.2 MILLION DOLLARS AND THE AVERAGE COST FOR 25,000 FT. WELLS IS BETWEEN 2-1/2 AND 3-1/2 MILLION DOLLARS PER WELL. DRILLING IS A COSTLY HIGH RISK BUSINESS AND IT SHOULD BE NOTED THAT ONLY ONE WELL OUT OF EVERY EIGHT THAT ARE DRILLED PRODUCES ANYTHING.

WHILE RECENT ACTIONS BY THE FEDERAL POWER COMMISSION HAVE RAISED THE WELLHEAD PRICE OF NEW GAS FROM ABOUT 25¢ PER THOUSAND CUBIC FEET TO 51¢ PER THOUSAND CUBIC FEET, THIS HAD DONE LITTLE TO STIMULATE EXPLORATION OR INITIATE A TURNAROUND IN THE GAS SUPPLY SITUATION. THROUGH THE 1960'S, THE PRICING POLICIES OF THE FEDERAL POWER COMMISSION, WHICH HELD DOWN THE PRICE OF GAS AT THE WELLHEAD, MERELY LIMITED THE AMOUNT OF NEW GAS DISCOVERED. BUT IN THE EARLY 1970'S, THE INTRASTATE BIDDERS BEGAN PAYING MORE FOR NEW GAS, FROM ABOUT 26¢ PER MCF IN 1971 TO 40¢ PER MCF BY 1972 TO 75¢ AND 85¢ PER MCF IN 1973. THE GOING PRICE HAD RISEN TO \$1.00 BY EARLY 1974 AND TO \$1.50 PER MCF BY THE END OF LAST YEAR. INTRASTATE PURCHASE PRICES CONTINUE TO RISE AS INTRASTATE PURCHASERS LAY NEW PIPELINES INTO MORE AND MORE AREAS TRADITIONALLY DOMINATED BY INTERSTATE PIPELINES.

EXAMINING THE DISPOSITION OF THE NATURAL GAS RESERVES ADDED IN THE LOWER 48 STATES FROM 1966 TO 1972, WE SEE THE EFFECT OF INTRASTATE PIPELINE COMPETITION WITH INTERSTATE PIPELINES NATIONWIDE. THE INTRASTATE SHARE OF RESERVES ADDED HAS BEEN STEADILY INCREASING WHILE THE INTERSTATE COMPANIES ARE EXPERIENCING A CONTINUING DECLINE IN PURCHASED RESERVES. UNDER CURRENT REGULATED PRICING INTERSTATE PIPELINES ARE OUTBID FOR AVAILABLE SUPPLIES BY A FACTOR OF NEARLY THREE TIMES. THIS EFFECT IS SEEN BY COMPARING THE RESERVES BID ON BY NORTHERN AND SUBSEQUENTLY PURCHASED TO THE RESERVES LOST TO INTRASTATE PIPELINE COMPANIES IN RECENT YEARS. THE MOST SIGNIFICANT ELEMENT IN THIS GRAPH IS THE INCREASING SHARE OF NEW GAS LOST TO INTRASTATE COMPANIES, RISING FROM 37.2% IN 1972 TO 59.0% IN 1973. THIS TREND CONTINUED THROUGH 1974, INCREASING TO AN ESTIMATED 80 TO 90% OF THE SHARE OF NEW GAS RESERVES LOST TO INTRASTATE PURCHASERS.

BASED ON THE INCREASING DIFFICULTY OF ACQUIRING RESERVES, WE SHOULD LOOK AT NORTHERN'S PROJECTED GAS ACQUISITION RATE. LAST YEAR, WE, LIKE MOST OF THE OTHER INTERSTATE PIPELINES, REPLACED FAR LESS GAS THAN WE PRODUCED AND USED; AND OUR PROJECTIONS OF GAS ACQUISITIONS IN THE FUTURE SHOW THE SITUATION GETTING PROGRESSIVELY WORSE IN TERMS OF NEW GAS FROM OUR TRADITIONAL SUPPLY AREAS - ABSENT A SUBSTANTIAL TURNABOUT IN EXPLORATION ACTIVITY.

UNTIL THE TIME WHEN SUBSTANTIAL NEW GAS SUPPLIES ARE DISCOVERED AND FLOW INTO OUR PIPELINES, IT IS CRITICAL THAT NORTHERN TAKE THE NECESSARY STEPS TO PROTECT SERVICE TO ITS FIRM NATURAL GAS CUSTOMERS. THESE CUSTOMERS ARE PRIMARILY RESIDENTIAL, COMMERCIAL, AND SMALL VOLUME INDUSTRIAL USERS WHO HAVE NO CAPABILITIES FOR ALTERNATIVE FUELS.

PROTECTING THESE CUSTOMERS WILL REQUIRE INCREASING CURTAILMENT OF NATURAL GAS DELIVERY TO LARGE VOLUME INTERRUPTIBLE AND ELECTRICAL GENERATION CUSTOMERS. SALE OF NATURAL GAS FOR ELECTRICAL GENERATION IS EXPECTED TO CEASE DURING 1976 AND DELIVERIES TO OTHER INTERRUPTIBLE LARGE VOLUME (OVER 200 MCF PER DAY) CUSTOMERS ARE EXPECTED TO DECLINE EACH YEAR UNTIL COMPLETELY PHASED OUT DURING 1978.

ULTIMATELY, A SUBSTANTIAL PORTION OF THE GAS FOR OUR WINTERTIME FIRM REQUIREMENTS WILL COME FROM VARIOUS STORAGE OPERATIONS: UNDERGROUND STORAGE, BOTH IN THE MARKET TERRITORY SUCH AS REDFIELD, IOWA, AND IN THE SOUTH END SUPPLY AREAS, LIQUIFIED NATURAL GAS AND LEASED STORAGE FROM OTHER PIPELINE COMPANIES. THESE STORAGE FACILITIES WILL BE FILLED WITH OFF-PEAK GAS THAT PREVIOUSLY WAS DELIVERED TO INTERRUPTIBLE CUSTOMERS. BY 1979, MORE THAN 25% OF OUR TOTAL VOLUMES DELIVERED IN JANUARY WILL COME FROM THESE VARIOUS STORAGE PROJECTS AND MORE THAN 35% OF OUR PEAK DAY CAPACITY WILL BE DELIVERED FROM STORAGE. BY 1979, MORE THAN 40% OF TOTAL SUPPLY INPUT IN JULY WILL BE NEEDED TO MEET STORAGE INJECTION REQUIREMENTS. THE DECLINE IN PEAK DAY DELIVERABILITY OF OUR EXISTING SUPPLY SOURCES COUPLED WITH THE DEVELOPMENT OF NEW STORAGE FACILITIES TO PROVIDE THE NECESSARY PEAK DAY CAPABILITY FOR OUR FIRM CUSTOMERS IN THE WINTER WILL ALSO MEAN ADDITIONAL CURTAILMENT OF LARGE VOLUME INTERRUPTIBLE CUSTOMERS DURING THE PERIODS OF THE YEAR WHEN THE STORAGE FACILITIES ARE BEING FILLED.

IN THE SHORT TERM WE SEE THE NEXT TWO OR THREE YEARS WITH TOO LITTLE IN THE WAY OF NEW SUPPLIES, DECLINING DELIVERABILITY FROM OLD SOURCES, AND INCREASED CURTAILMENT OF LARGE VOLUME INTERRUPTIBLE CONSUMERS IN ORDER TO MEET FIRM REQUIREMENTS.

LONG-TERM THE GAS SUPPLY PICTURE LOOKS A LITTLE BRIGHTER TO US. BY THE LONG-TERM I MEAN THE PERIOD STARTING IN 1980 OR SHORTLY THEREAFTER. BY 1980, WE ASSUME THE DOWNWARD TREND IN DOMESTIC EXPLORATION WILL BE REVERSED AND SUBSTANTIAL NEW QUANTITIES OF GAS WILL BE ADDED TO THE INTERSTATE MARKET. BY 1980, MANY OF THE SUPPLEMENTAL SOURCES OF GAS NOW BEING RESEARCHED SHOULD BE APPROACHING REALITY. NORTHERN HAS EXCELLENT GROUND FLOOR POSITIONS ESTABLISHED IN SEVERAL AREAS. WE HAVE RECENTLY COMPLETED NEGOTIATIONS FOR THE RIGHT TO PURCHASE 25% OF EXXON'S PRUDHOE BAY PRODUCTION ESTIMATED AT 8.7 TCF. THIS 2.2 TCF WHEN ADDED TO OUR EXISTING OPTIONS TO PURCHASE UP TO 3 TCF OF GAS FROM B. P. ALASKA IN THIS AREA BRINGS OUR HOLDINGS TO MORE THAN 5 TCF IN THE ALASKAN NORTH SLOPE AREA. WE ARE HOPEFUL THAT ALASKAN GAS WILL BE MOVING INTO OUR SYSTEM IN THE EARLY 1980'S IN VOLUMES UP TO 480 MILLION CUBIC FEET PER DAY.

WE ALSO HAVE EXPLORATION AGREEMENTS WITH THREE SEPARATE CANADIAN COMPANIES WHICH ENABLES US TO PARTICIPATE IN THE EXPLORATION OF TERRITORY IN THE CANADIAN ARTIC. OVER 80 MILLION ACRES OF ARTIC ISLAND LAND ARE COVERED BY THESE PROJECTS.

NORTHERN HAS ALSO MOVED OFFSHORE INTO THE GULF OF MEXICO. IN A SECOND PART OF THE EXXON AGREEMENTS NORTHERN ACQUIRED RIGHTS TO PURCHASE 30 PERCENT OF ANTICIPATED PRODUCTION FROM OVER 35,000 ACRES OF OFFSHORE LEASES TO BE DEVELOPED BY EXXON.

WE WERE SUCCESSFUL IN A JOINT BID MADE ON 6 TRACTS OF TEXAS OFFSHORE OIL AND GAS LEASES AMOUNTING TO 46,000 ACRES AND NORTHERN IN COOPERATION WITH TWO OTHER COMPANIES HOLDS RIGHTS TO ANOTHER 15 OFFSHORE TRACTS IN TEXAS STATE WATER. THESE LEASES COVER MORE THAN 15,000 ACRES. ALTOGETHER WE HOLD RIGHTS TO NEARLY 100,000 ACRES OFFSHORE.

DRILLING ON THESE OFFSHORE TRACTS IS EXPECTED TO BEGIN IN 1975 AND CONTINUE INTO 1976. AND IF GAS IS FOUND, IT COULD, UNDER OPTIMUM CONDITIONS, COMMENCE FLOWING INTO NORTHERN'S SYSTEM IN 1977 OR 1978.

NORTHERN IS ALSO INVOLVED IN A FEASIBILITY STUDY OF A COAL GASIFICATION PROJECT IN THE POWDER RIVER BASIN OF MONTANA AND WYOMING. TOGETHER WITH CITIES SERVICE WE HAVE A DEDICATION AGREEMENT WITH PEABODY COAL COMPANY FOR 500 MILLION

TONS. COAL RESERVES OF ONE BILLION TONS WOULD CONVERT TO APPROXIMATELY 10 TRILLION CUBIC FEET OF NATURAL GAS EQUIVALENT - A SUBSTANTIAL ADDITION TO OUR CURRENT RESERVES OF ABOUT 11.5 TRILLION CUBIC FEET.

IMMEDIATELY, HOWEVER, WE CAN DRAW THE FOLLOWING CONCLUSIONS ABOUT THE NATURAL GAS SUPPLY PROBLEM:

1. NATURAL GAS, A PRIMARY ENERGY FORM UPON WHICH INDUSTRY HAS BECOME DEPENDENT, IS IN SHORT SUPPLY. THIS SHORTAGE WILL HAVE A SERIOUS IMPACT ON THE ECONOMIC FUTURE OF OUR REGION.
2. THE SUPPLY SITUATION WILL CONTINUE TO GET WORSE UNLESS WE TAKE THE STEPS NECESSARY TO ENCOURAGE EXPLORATION TO FIND ADDITIONAL SUPPLIES OF NATURAL GAS.
3. WE IN THE NON-GAS PRODUCING STATES CANNOT COMPETE FOR AND PURCHASE THAT GAS WHICH IS BEING DISCOVERED OR WHICH MAY BE DISCOVERED IN THE FUTURE BECAUSE OF PRICING LIMITATIONS IMPOSED BY THE FEDERAL POWER COMMISSION UNDER THE PROVISIONS OF THE NATURAL GAS ACT.

