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HORIZONS II PRESENTATION

ENERGY

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It is essential to consider energy matters in an overview of the critical issues facing the state. Although this now appears obvious, it is surprising how long the role of energy supplies was ignored.

Energy considerations infuse virtually everything we do, so much so that energy supplies long were taken for granted. This same infusion means that tightening energy supplies have implications for virtually every aspect of public policymaking.

My purpose today is to tell you what we know about Minnesota's energy sources and uses, the outlook for the future, and some of the issues we see now and arising in the near future.

The energy position of a state can be conceptualized as a relatively simple formula with energy sources on one side and energy uses on the other side. In the past, the sources exceeded the uses and there was no problem.

In fact, one way to describe the energy problem is that the assumptions that we made about the past that energy was abundant and cheap are no longer valid. Energy is growing scarcer and more expensive.

On the supply side of the equation, Minnesota relies on fuels in a manner that closely resembles the national pattern. The sources are:

	Minnesota Percent	United States Percent
Petroleum	43%	45%
Natural Gas	28%	30%
Coal	20%	18%
Nuclear and Hydro	9%	7%
Total	1,174 trillion Btu	72,900 trillion Btu

As this comparison shows, Minnesota is almost a microcosm of United States in terms of its energy supplies. This pattern is common to the Midwest. New England is more reliant on petroleum than the national average. The southern states are more dependent on natural gas. The western states more reliant on coal. This gives Minnesota an interest in national policies affecting all fuel types and a point-of-view fairly national in scope.

The figures also show that Minnesota consumed 1.6% of the nation's energy, while we have 1.9% of the population. Despite our cold winters and the energy used for space heating, we are less energy intensive than the national average.

On the use side of the equation, there are more differences between Minnesota and the United States. The percentages are:

	Minnesota	United States
Transportation	32%	30%
Residential and Commercial	28%	21%
Electric Generation	21%	27%
Industrial	19%	22%

The comparison shows we use slightly higher percentage of our energy for transportation, considerably more for residential and commercial purposes primarily for space heating, and less for electric generation and industrial processes.

The significant difference here - the higher energy use for space heating - is a direct result of our geographical location and cold winters.

PETROLEUM

The petroleum supply outlook for Minnesota is directly related to the cutoff of Canadian crude imports into the state. This supply of crude oil began dropping off sharply last year and is scheduled to be cut off completely by 1981.

There are at this time, however, three pipeline proposals to bring additional crude oil to the state. These are the Williams Brothers line from the south, the Minnesota Pipe line from Patoka, Illinois, and the Kitimat line to bring Alaskan crude across Canada.

If all three of these lines are built, the state would enjoy a significant increase in crude oil imports by 1985 despite the Canadian cutoff.

However, these pipelines will not necessarily solve all our petroleum supply problems. National policy toward oil pricing and oil imports could still significantly affect our supplies.

National policy is difficult to anticipate since up to this point we have been saying one thing and doing another, that is - talking of energy independence and growing increasingly dependent on imports.

FEA projections show domestic production - even with price incentives - will not change greatly in the 1980s. it appears likely that there will be growing pressure to hold down rising imports for both balance of payments and national security reasons. If this occurs, imports would remain fairly steady at about half the U.S. consumption throughout the 1980s.

If Minnesota's petroleum situation is determined by such national trends, then our consumption should climb to about 300,000 barrels a day around 1980 and stay at that level through the 1980s.

However, Minnesota's petroleum supply situation could actually be somewhat better than the rest of the country - if the Kitimat pipeline is built. This pipeline would bring Alaskan and Pacific area crude into the Upper Midwest - thus making the state less reliant on foreign imports than some other areas of the United States.

NATURAL GAS

The natural gas supply outlook for Minnesota for 1985 and beyond is not as good as that for petroleum. Instead, the picture shows a steadily deteriorating supply of natural gas through the 1980s.

Minnesota receives its natural gas from two sources - Canada, and the Northern Natural Gas Company. Northern Natural Gas supplies about 90% of our gas.

Traditional supplies of natural gas will decline at 6% per year. However, some new supplies will begin to enter the state beginning in 1977.

The first of these new sources is that from new off-shore wells in the Gulf of Mexico. Other new supplies may be the Alaskan gas.

This slide shows two possible supply lines of Alaskan gas. The lower line is the minimum amount that Northern predicts will be available. The upper line is the maximum amount available.

The significant information here is that even with these new supplies, the supply of natural gas will decline throughout the 1980s.

For Minnesota, this means curtailments for the lower-priority users - including electrical generating facilities, the taconite industry, and other industrial and large-volume users. The important policy problem here is to protect existing home users and those critical industries which require natural

gas in their processes and thus protect the jobs available in these industries.

This analysis assumes that there will be no Canadian curtailments of natural gas exports. It also excludes any development of synthetic gas from coal or peat. While development of the synthetic fuel is possible and necessary, it is not probable that it will contribute significantly to our gas supply in the next several years.

COAL - ELECTRICITY

The decline in natural gas supplies means that more and more users will turn to other fuels. The energy agency predicts that of the fuels substituted for natural gas, 48% will be coal (mainly for electric generation), 44% will be residual fuel oil, and 8% will be distillate fuel oil.

Electricity may be used to supplement natural gas in the residential home heating market as more and more areas of the state are cut off from new natural gas hook-ups.

In predicting electrical demand by 1990, the agency staff has also assumed that the residential growth rate for electricity (exclusive of substitution) will continue to decline as it has since the early 70s.

The net result is that staff projections indicate that electrical consumption will increase to 44,500 KWH by 1985. The electrical utilities in the state predict even larger increases. In either case, the increased use of electricity due to substitution will increase considerably the demand

for coal by 1990. Natural gas will no longer be used in electric generation. Fuel oil will be used only in peaking units. Nuclear and hydro-electric generating capacity are expected to stay the same.

Fortunately, coal supplies in the western states are plentiful. However, the environmental impacts of burning coal for electrical generation are far ranging.

Problems in locating plants and transmission lines, of protecting air and water quality and of transporting and storing such hugh quantities of coal have to be dealt with and solved.

A significant question here is how much we can reduce the need for more electric generating capacity through energy conservation and the reduction of peak demand. Any conservation or pricing measure that would cut the demand at peak hours would directly reduce the need for additional generating capacity.

Petroleum, natural gas, coal - these are our basic fuels. In addition, we use nuclear and hyro-power for electricity generation, although no significant increase in the use of these fuels is expected through the 1980s.

The picture as a whole shows our total energy supply increasing from 1,150 trillion Btu in 1975 to almost 1,800 Btu by 1990, an increase of 64%.

This total assumes that natural gas supplies will decrease as predicted, and that petroleum supplies will increase

freely. But, it is entirely possible that the supply of petroleum will be constrained by a national policy to reduce foreign imports. In this case, the supply of petroleum would be less.

Newcomers in the supply picture are the alternative energy sources: sun, wind, timber, agricultural and solid wastes, and peat.

By 1990, these alternatives are expected to supply only 2% of our total energy. But these sources should become much more significant in the 1990s to the year 2000 time frame.

A look at the map of Minnesota shows large areas for application of alternative technologies. Throughout the state solar radiation is plentiful. With the development of more economical collectors and conversion methods, solar energy could become an important supplemental source of energy for the state.

Similarly, the state has vast timber lands, peat deposits and agricultural lands that could supply fuels for direct burning, for making synthetic gas or for use in electrical generation. In the metropolitan area solid wastes can be burned, and wind can provide a supplemental source of electricity in many areas of the state.

Development of alternative sources of energy is more important than the 2% figure by 1990 would imply. These alternative resources are in most cases renewable. They will

not be used up as will our supplies of fossil fuels. Thus, in the long range, we must depend more and more on alternative technologies or sacrifice our quality of life.

We have discussed in some detail the supply-and-demand outlook for energy in the state. In each case, we have assumed a moderately optimistic view of what the future will bring. For example, we have assumed we will get some natural gas from Alaska - but not the maximum amount projected by Northern Natural Gas.

The supply curve would shift if we changed our assumptions. What if the new petroleum pipelines were not built, if the Alaskan gas pipeline was not built, and new electrical generating plants were delayed one or two years.

The result would be a much smaller supply of energy to the state. Demand would need to be cut back - either through increased conservation or through decreased economic development - or both.

To insure that we will be able to maintain our present quality of life in this state, we must increase energy conservation. Conservation remains our cheapest source of energy.

Home heating costs are already high in the state - as much as seven to eight hundred dollars per year on the Iron Range for homes heated with LPG or electricity.

Conservation of energy can help keep these costs down.

Conservation of electricity during peak demand periods can reduce the need for new electrical capacity - and thus

reduce the environmental and social problems caused by building more power lines, power plants, and burning more coal.

Residential and commercial conservation of natural gas will help reduce curtailments to critical industries that require natural gas in their processes.

And, finally, conservation of scarce fossil fuels will give us more time to develop alternative sources of energy for the state.

When energy projections are made, there is the danger that they may be interpreted as immutable determinants of the future. They are not, of course. Minnesota has a fairly wide choice of different energy futures. The direction taken rests on the goals of the people of the state as interpreted by those elected to represent them.