OUTLOOK FOR ALTERNATIVE ENERGY SOURCES

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President Carter has made the solution to our present energy problem the Nation's highest lasting priority. It really is the "moral equivalent of war," because without a steady flow of energy our country cannot survive. It will be a long war, lasting through this decade, through the 1990's, and into the next century. There will be no instant cures, no magic breakthroughs to save us at the last minute. There isn't going to be any sudden let-up in energy costs, no long drop in gas prices at the pump. And there won't be any guarantee against future energy shortages either. In fact, we can almost guarantee there will be energy shortages in the future. We just hope they won't be too serious or last too long. To win this long energy seige - this moral equivalent of war - we're going to have to become a nation committed to working together to conserve energy. Let's not duck that word - Conserve in the true sense doesn't mean going without. It means using our resources wisely, efficiently, with as little waste as possible.

We have to accept the reality of our energy problem: our dependence on foreign oil. The facts are clear:

- Fact #1. Much of our imported oil comes from the most unstable part of the world. The Iranian revolution and the holding of U.S. hostages is only the latest trouble. In the last 30 years the Middle East has been the scene of half a dozen wars, a dozen revolutions, and nobody knows how many assassinations.

- Fact #2. The oil output of the OPEC nations during the 1980's may stay at today's level, about 30 million barrels a day. But it may drop. Meanwhile, demand for oil is still growing, which pushes prices up. Between December 1978 and March 1980, a span of 15 months, the price of imported oil went from $13 to $32 a barrel. We spend about $10 million every hour, every day of every week, for imported oil. That's about $90 billion it will cost us this year, assuming prices don't go any higher.

- Fact #3. Increases in non-OPEC oil production will not be enough to meet the increases in demand, in all likelihood.

- Fact #4. Our own oil production, in spite of all the exploratory drilling we're doing, will probably fall about a million barrels a day by the mid 1980's. There are more than 2600 drilling rigs active in the U.S. today, more than at any time in the last 25 years. But the most optimistic outlook sees domestic oil production only staying level. We have 16 percent of the world's oil

production, but 29 percent of the world's oil consumption, and only 9 percent of the world's oil reserves.

It's a discouraging picture. After the 1973-74 oil embargo, our energy situation deteriorated. Even with some conservation and some reduction in demand, domestic energy consumption increased because both our population and the economy grew. But domestic energy production has been steady for a decade. Our big discovery of oil in Alaska has only meant that domestic production hasn't fallen yet.

It was not until last year that we reduced our oil imports, by about 2 percent. For the first time since 1975, total energy consumption decreased in 1979 - from 78.4 to 78.2 quads. Not much of a decrease, but a decrease neverthelsss. Why so small a drop? Because we haven't yet really decided that we have to conserve - to do away with waste, to increase our efficiency, to use our energy resources wisely. Study after study - for example, the recent Harvard Business School Report "Energy Future" - shows that we still waste 30 to 40 percent of the energy we use. We throw it out like uneaten food. We let it escape throuch cracks under doors. We waste it out the tailpipes of untuned automobile engines.

We still depend on oil and gas for most of our energy. We use coal, our most plentiful resource, for only 19 percent of our energy. We use oil and gas for 70 percent, and 46 percent comes from oil. Nearly half of that, almost 20 percent of our total energy consumption, comes from imported oil. The net rate, last year, of imports was 7.7 million barrels a day, and 5.5 million of those imported barrels a day comes from OPEC nations. What are the costs of our dependence on foreign oil?

- We have an inflation rate of over 13 percent, much of it due to the high cost of imported oil.

- Our balance of trade last year was a $31 billion deficit. That's more than our total exports for any year before 1966.

- In 1971 we paid $3.5 billion for foreign oil. This year, in 1980, the cost will reach $90 billion - more than 20 times as much in one short decade.

- Gasoline prices are up almost 300 percent since 1973. Home heating oil prices have nearly doubled since last winter.

Our first priority is to reduce oil imports. Last year the President pledged that our oil imports would never rise above 8.5 million barrels a day. He set the limit for 1979 at 8.2 million barrels and this January, in his State of the Union Address to Congress, he again set the limit at 8.2 million barrels a day for 1980. Our oil import goals are as follows:

- To reduce imports by half by 1990.

- To diversify our oil sources so we aren't so dependent on Middle East oil (2.1 million barrels a day of our OPEC oil comes from there).

For decades we built our economy as though energy costs didn't count, as though oil and gas were as cheap as dirt. They were, so now our houses, offices, factories, and automobiles are all designed to run on cheap oil and gas. Now we must change our wasteful energy habits and really begin to conserve, to use energy wisely. "We" means everyone. Conservation is not up to the Government or to Washington bureaucrats, or to industry. Conservation is up to everyone; it's up to you.

Industry has already demonstrated that productivity can increase at a much faster rate than energy consumption. Traditionally, energy consumption in this country has grown at about the same rate as the gross National product. That "lockstep" pattern has now been broken. From 1973 through 1979, while the GNP was increasing 16.5 percent, National energy consumption increased only 4.8 percent, and energy consumption by industry remained almost unchanged. This turnaround shows reduced energy consumption doesn't necessarily mean the end of growth. Interestingly, most of industry's energy savings up to now have been simply the result of improved "housekeeping" practices - of which there are many more still to be taken. Beyond these simple measures lie the capital improvement efforts - improvements that will make American industry inherently energy efficient.

Last November the President signed an appropriations act that provides $2.208 billion to the Secretary of Energy to "expedite the domestic development and production of alternative fuels...at maximum levels at the earliest time practicable..." These funds were immediately available in several categories:

- $100 million per project development feasibility studies, to accelerate critical path efforts leading to commercial site development and plant construction.

- $100 million for cooperative agreements to support commercialscale development of alternative fuel facilities, targeted to projects in an advanced development stage.

- $1.5 billion for the purchase or production by way of purchase commitments or price guarantees of alternative fuels, to ease downside risks for alternative fuels that aren't likely to be price competitive in the near future.

- $500 million in loan guarantees, for technologies that should be economically viable once in production but face construction and start-up uncertainties.

These awards will be made for coal liquids, high-Btu gasification, lowand medium-Btu gasification, oil shale, tar sands, unconventional gas, peat, biomass, and municipal and industrial waste.

Capitalizing these alternative fuel facilities at commercial scale is not easy, even with Government help. Banks are limited by law as to how much they can lend for individual projects, and even consortia of banks have their limit. Even the largest insurance companies cannot easily come up with all the money that will be needed over the next decade to get these alternative energy plants on line. To build a coal liquefaction plant, for example, the kind that has been built in South Africa, requires $3 to $5 billion. When the plant is on line it will produce some 50 000 barrels of synthetic oil a day. What can we expect from these alternative fuels? Our goal is some 1.5 to 2.5 million barrels a day by the mid 1980's.

Of concern to this symposium is the impact of the DOE alternative fuels program on aviation fuels. In the near term, now until 1985, there is unlikely to be any major change in the fuels used. In the midterm, 1985 to 2000, there will be limited transition to non-petroleum fuels based primarily on shale-oil-derived liquids and indirect coal liquefaction, depending on production levels. The President has established a goal for shale liquids production of 400 000 barrels a day by 1990, although some published estimates think 100 000 to 300 000 may be more likely. A recent study by Exxon for DOE rated shale oil liquids with the lowest cost rating, coal-derived liquids second and liquid hydrogen being the most expensive. Therefore, the future outlook for aircraft fuels is that for the near term, there possibly will be no major fuel changes, but minor specification changes may be possible if supplies decrease. In the midterm, a broad cut fuel may be used if current NASA development efforts are successful. As synfuel production levels increase beyond the 1990's there may be some mixtures of petroleum-based and synfuel products with the possibility of some shale distillate and indirect coal liquefaction products near the year 2000. Other than the NASA work on broadened-specification fuels, there is no isolated National research and development activity for aviation fuels.

In closing, there is an element of risk in any great venture, and energy policy is no exception. But the risks taken by private investors and corporations can be greater than the risks taken by the Government. The private sector has been too insistent on being presented with a sure thing before risking investment in energy projects. We in Government do not wish private investors to be reckless; merely responsive. Private investment and its concomitant risks will be absolutely essential to reducing dependence on imported oil. The greatest risk will lie in doing nothing at all. The Government for its part will provide the insurance that energy problems will not totally disrupt the country, that no one sector of society will suffer unduly or unfairly from energy shortages. That is what Government does best.

Domestically we must bring together the many factions that stand in the way of energy technology development in all forms. We must improve the siting process for construction of new energy facilities, so that each proposed

new facility, be it a pipeline, a nuclear plant, or a synfuel plant, does not fall to the onslaught of a vocal minority. We are a nation with a strong tradition for protecting the rights of minorities while respecting the will of the majority.

To be realistic however is not to be pessimistic or defeatist. America is not energy poor. In our coal deposits, unconventional gas and oil deposits, and most particularly in the innovative talents of our scientists and industrial entrepreneurs, we have all the wealth we need to achieve energy independence. So far we've lacked the will to develop our own vast energy resources. That's now changing. But we must guard against raising false hopes; we must discourage dreams of a scientific "breakthrough" that will spare us the trouble of developing a variety of new energy sources. After all, it took the United States 30 years to get into the hole we are in; it may take us that long to get out of it.

We are in danger. The whole free world is in danger. But over the years the energy crisis can also present us with unlimited opportunities - to strengthen our alliances, to improve our technologies, and to find alternative energy sources that will again restore us to energy independence. But we must prepare for the long haul. We must force a coalition that will last among all components of society - Government, industry, labor, the scientific community, and the general public. With that kind of a coalition, we can move confidently and smoothly through the transition from dependence on imported oil to diversified domestic sources.