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Mr. Chairman:

I appreciate the opportunity to appear before this committee to discuss the financing of energy production and conservation over the next two decades. In my remarks today, I will focus on three major questions:

- What is the distinction between the federal government's role in basic research and development of energy technologies and its role in demonstration and commercialization of those technologies?
- What are the appropriate criteria to be used by the Congress in deciding whether or not to provide financial assistance to energy production and conservation?
- Once a decision is made to provide assistance, what is the proper type of assistance--subsidies or loan guarantees?

DISTINCTION OF THE FEDERAL ROLE, AND THE PRODUCTION OF SYNFUELS

Currently, the federal government provides funds for research, development, demonstration, and commercialization (R,D,D&C) of energy production and conservation. It is useful to think of the R,D,D&C process as a series of activities characterized by the development of information of increasing amount and changing character: first scientific, then technical, economic, and finally institutional information is needed to buttress--or

encourage--an entrepreneur's decision to use a new technology in a commercial environment.

The bulk of the federal involvement is in the more fundamental and generally less expensive research and development phases. Such an approach highlights the federal government's role as a creator and disseminator of basic knowledge. The more costly demonstration and commercialization phases--which involve the actual construction of plants--are usually left to the private sector. There is no technical reason, however, why the federal government should not be involved in demonstration and commercialization.

This R&D versus D&C distinction is raised because, although most federal assistance to energy is now in the area of research and development, most proposals for future federal involvement have been for assistance in the area of commercialization. Several of the most controversial proposals involve synthetic fuels, generally known as synfuels--oil and gas produced from coal, oil shale, urban waste, or other organic materials. In recent years, the Congress has also debated proposals for commercialization assistance to uranium enrichment and solar energy. Since new programs for federal assistance for commercialization of synthetic fuels are known to be under active consideration within the Administration, I will focus my remarks on that issue.

In this discussion, it would be useful to keep in mind two points.

First, gasification and liquefaction of coal shale and urban wastes are not new processes. Some technologies have been proven and available for several decades. Currently, only the Republic of South Africa produces significant amounts of synfuels, primarily liquids. Although it may be possible to lower the costs of production by some technological innovation, the high cost of producing synthetic fuels is the key stumbling block. Estimates range upward from $20 a barrel. This contrasts with the current price of $14 a barrel for imported oil.

Second, commercial-scale plants for most prospective synfuel projects are very large. For example, the commercial scale of a coal liquefaction plant is in the order of 50,000 barrels a day or more. Estimates of the capital outlays for such a plant range upward from $500 million.

DECISION CRITERIA

The decision about whether or not to provide federal support to stimulate the production of synfuels by private industry in the near future depends on the answers to two questions: (1) Will synthetic fuel production be needed by the mid 1980s? And (2) does private industry require government incentives to produce synfuels in that time frame?

Is Synthetic Fuel Production Needed? Justifying the need for synthetic fuel production by the mid 1980s depends on a variety of factors. Among the quantifiable economic benefits of such production are: a degree of protection from an oil embargo, and the possibility that the cost of future synfuels production would be reduced because of the longer development period.

In April 1977 the President, drawing heavily on a Central Intelligence Agency (CIA) analysis of world oil demand, spoke of oil becoming scarce and expensive in the mid-1980s. Since then, new studies have emerged which suggest that the United States may have somewhat more time to make the transition from oil. As a headline in the Washington Post for July 23, 1978, put it, "Array of Experts Agree Oil 'Crisis' Not Likely Until 1990's." In fact, the energy outlook contains a great many imponderables, including political, technological, and geological items--matters about which there is pitifully little information. Nonetheless, there have been a number of changes in the world energy situation which, from the U.S. standpoint, tend to a more sanguine view than that expressed by the President a year and a half ago. Among these factors are:

- Increasing energy conservation, as evidenced by a decline in U.S. energy consumption per dollar of Gross National Product (GNP) within the past two to three years;

- o The likelihood of lower world economic growth over the next few years than was assumed in the earlier Administration forecasts;

- o The improved supply outlook for oil, especially outside the Arab members of the Organization of Petroleum Exporting Countries (OPEC). Noteworthy here are higher expected production levels in the Soviet Union and Mexico than were assumed in the CIA forecast.

Unless world oil prices rise substantially above their current levels, the economic costs of synfuel production are likely to exceed the costs of natural fuels for some time to come. Noneconomic considerations, however, could favor production in the near term. The capability to produce synfuels could provide a form of insurance against large increases in world oil prices and might influence OPEC nations to restrain price increases. Further, near-term production might provide additional information to the government about the environmental and health impacts of producing synfuels and could reduce some of the current uncertainty about the capital and operating costs of synfuels plants. Finally, a range of national security arguments have also been made in support of near-term production of synfuels.

Will Private Industry Proceed Without Federal Intervention? In the context of the current oil outlook, it is highly unlikely that private industry will produce significant quantities of synthetic fuels before 1985-1990 without government support. Among the reasons for this unlikelihood are lack of profitability, technological and economic risk, difficulty in raising

capital, and constraints imposed by the government. It is clear that most synfuel production would be unprofitable at current oil and gas prices. If profitability were achieved through use of government incentives, the remaining factors might still discourage investment.

WHAT IS THE PROPER TYPE OF FEDERAL ASSISTANCE?

The federal government could aid in the financing of energy production and conservation in two basic ways. The first, consists of price subsidies, tax expenditures, or below-market direct loans, which would affect the federal budget and be costly to the taxpayer. The second is loan guarantees, which might never appear in the federal budget and would have the potential of being costless to the taxpayer. One should not be deceived by this potential, however, because in practice the costs of many loan guarantee programs are ultimately borne by the taxpayer.

The particular incentives used by the federal government to encourage the production of synfuels depend primarily on how the problem is interpreted. In general, if energy prices are too low to make an investment profitable--because of either domestic price regulation or actual world prices--then price supports or production subsidies (including tax expenditures) are the appropriate mechanism. On the other hand, if the production costs are known and the project is potentially profitable at current or

expected prices, but there are major risks associated with the large scale of the plant, then loan guarantees are the appropriate mechanism.

Once a decision is made that federal involvement is called for, and that price supports or production subsidies are the appropriate mechanisms, additional questions remain. If the federal government is going to pay, for example, $6 a barrel, how many barrels should it buy? One plant producing 50,000 barrels a day would result in federal outlays of about $100 million dollars a year; two plants, about $200 million a year; and so on. Another question is whether these costs should be borne directly by the taxpayer or whether they should be averaged in with all oil purchases so that consumers pay the costs directly. For example, one recent proposal involved "rolling in" averaging high-cost synfuels with already flowing (and regulated) oil. Such an approach, which might be infeasible for want of price-controlled oil by the time synfuels production came on line, would effectively pass on to the oil consumer the high cost of synfuels production. Such a decision would represent a clear decision to have oil consumers subsidize production of synfuels.

When risks associated with the large scale of a project are the principal factors inhibiting otherwise profitable private investment, then loan guarantees would probably not result in federal outlays, and they may thus represent a costless way to stimulate the private market toward

socially desirable decisions. Zero federal outlays would be expected because it is assumed that the project in question is potentially profitable--only the project's large size is deterring private investment. Although joint ventures or syndications might, in principle, obviate the need for loan guarantees, either legal or institutional difficulties might make them most difficult to assemble. Of course, in the case of synfuels, there is serious question about the potential profitability of the project.

If loan guarantees are the appropriate mechanisms additional questions also remain. Most traditional loan guarantees have been for large pools of small loans for which it is possible to make actuarial estimates of expected losses and subsequent federal outlays. Those expected outlays are then entered in the appropriate agency's budget, and the programs are handled in relatively routine fashion.

In the case of large, unique projects--such as producing synthetic fuels--such treatment is not possible. The number of projects is not large enough to permit statistical treatment, nor is there a long history of experience from which to draw. Thus, from a budgetary standpoint, this type of loan guarantee causes problems in terms of planning and controlling federal outlays.

Another point regarding loan guarantees is that the budgetary costs could be reduced and the operating efficiencies improved by the proper design of the program. I would call your attention to a recent Congressional Budget Office report, "Loan Guarantees: Current Concerns and Alternatives for Control, which discusses some mechanisms for protecting the public interest by building into loan guarantee programs self-policing elements such as coinsurance by lenders and equity participation by private investors. Such procedures would encourage both borrowers and lenders to place greater emphasis on private sector standards when assessing a project's probability of success.

A final problem in the use of loan guarantees is that they may have significant impact on private capital markets by crowding out higher-risk private paper in favor of low-risk government-backed securities. Thus, the higher-risk private ventures not federally guaranteed--for example, small business loans--would be less able to attract financing. Depending on the nature of the investment displaced, this credit reallocation implicit in the loan guarantees could have a positive or a negative effect on the long-term growth of the economy.

CONCLUSION

The energy outlook for the next two decades is critical to any discussion of federal financial assistance in the energy sector. If physical

shortages of oil or rapid price hikes are seriously expected over the next few years, then the Congress might consider throwing traditional economics to the wind and just getting on with the job of producing synfuels. Precedents for such an approach can be found, for example, in the decision to put a man on the moon.

If such a crisis atmosphere does not prevail, however, the Congress should employ more broadly based decision criteria.

The decision to aid private production of synfuels at this time depends on the Congressional evaluation of the oil outlook and on the ability of the private sector to produce the synfuels. A conclusion that the federal government should play a role raises the question of "what role?"

If the world price of oil is expected to reach that of synfuels over the next decade, and if the remaining issue is simply that the sheer size of the project is hindering financing, then loan guarantees should be stressed. If the price of naturally occurring fuels is not expected to rise that rapidly, however, subsidies seem more appropriate for the major emphasis.

Mr. Chairman, I would be happy to answer any questions.