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Statement of
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Director, Energy and Minerals Division
Before the
Subcommittee on Aerospace
Technology and National Needs
Committee on Aeronautical and Space Sciences
United States Senate
on
[Alternative Fuels for Aviation]
(H. R. 12112)

Mr. Chairman and Members of the Committee:

Our recent report, which was submitted to the Congress on August 24, 1976, presented our evaluation of proposed Federal assistance for financing commercialization of emerging energy technologies. In addition, over the past several months, we have testified before the House Committee on Science and Technology; Subcommittees of the Senate Committee on Banking, Housing, and Urban Affairs, House Committee on Banking, Currency and Housing; and House Committee on Interstate and Foreign Commerce, on developing and commercializing energy technologies. In testimony before the House Committee on Science and Technology on August 30, 1976, we stated that our evaluation of (1) the status of feasible technologies which appear to have impediments to full commercialization and (2) the most appropriate incentives or other actions for encouraging their development led us to the position that pursuit of alternative technologies is inextricably intertwined in overall national energy strategies, including strategies for implementing energy conservation actions.

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As discussed with the Committee staff, our report does not deal specifically with aviation fuels. However, I would point out that nothing in our report would in any way suggest delay of development of necessary domestic capability to produce both natural and synthetic fuels for aviation use.

We have previously been asked to testify on our report in the light of H.R. 12112, the Synthetic Fuels Demonstration Plants Bill. As we pointed out at that time, the only thing in that legislation that is designed to increase liquid fuels is a small program to develop modular sized non-commercial oil shale plants, possibly followed by larger scale plants in the future. The primary purpose of H.R. 12112 is to promote commercialization of synthetic gas, not liquids. The Administration has not yet proposed a synthetic liquid fuels from coal commercialization program.

In short, we believe our analysis allows wide latitude for the timely development of requisite domestic fuels for aviation use. How the nation goes about making such choices among emerging energy technologies and developing domestic capabilities is at the heart of our report.

FRAMEWORK FOR CHOOSING APPROPRIATE
ENERGY TECHNOLOGIES AND
FINANCING MECHANISMS

In our judgment, making the right choices among energy technologies, requires consideration of three factors.

- The contribution that each technology can make in meeting the Nation's energy needs within a specified time frame either through reducing demand or increasing energy supply.
- The total cost of making the technology commercial including costs of plant construction, costs of alleviating adverse socio-economic impacts caused by the energy development, and the costs of price supports or further subsidies which may be required.
- The price at which energy produced by the technology would have to be sold and the means by which the price would be assimilated by our economic system.

We believe that making the right choice among financing mechanisms requires interrelated analysis of at least three factors.

- The technology's state of development. Is the technology developed to the extent that it can be deployed on a broad basis?
- The technology's economic feasibility. Will the energy produced as a result of deploying the technology be economically competitive with competing energy sources?

--The target groups whose actions will be influenced. Are they large industrial firms or diverse and widely dispersed groups of homeowners?

The recent slowdown in the rate of growth in demand for energy is a sharp reminder of the importance of the demand side of the energy equation, and of conservation in particular. This fact, and the wide differences of opinion on the sources of energy supplies to meet that demand, suggest that the Nation should carefully explore all supply sources as well as conservation alternatives before embarking on a program to commercialize synthetic fuels.

Serious questions exist regarding any national commitment at the present time to uneconomic, high-cost supply technologies which substantially exceed the cost of imported oil. Certainly, larger commitments to building complex, highly capital intensive energy sources will result in less incentive in future years to develop alternative lower cost energy sources. In addition, technologies producing energy that costs more than energy from imported oil would put exporting countries in a position to increase energy prices.

Based on our analysis of the various energy options available to this Nation, we concluded that:

--Certain conservation measures are by far the most effective way to "produce" energy and, therefore, should have top priority for Government financial assistance.

Areas offering the greatest opportunity for conservation include insulation and other measures that conserve energy in all buildings; less wasteful uses of energy by industry; and improved management of electrical demand.

Many of the actions we believe are desirable to encourage conservation are authorized by the recently passed

Energy Conservation and Production Act.

--Among the energy supply-increasing technologies considered, we found several that are cost effective throughout the country or in particular geographical areas. These technologies are hydrothermal energy, municipal waste combustion systems, solar hot water and space heating, and tertiary oil recovery. Not only may the ultimate supply of energy to be captured from these sources be larger than the ultimate potential of other supply technologies such as synthetic fuels, but also they appear more cost effective.

In our judgement the cost effective technologies should be given priority in Government Assistance for commercial development. This assistance will ensure their maximum contribution between now and 2000 and give the Nation time to consider the potentially larger supply sources and develop them as appropriate. These latter sources include synthetic fuels as well as fusion, solar photovoltaic cells, thermal gradients, and breeder reactors.

--Estimates vary over the amount of synthetic fuels that will be needed in the future. ERDA's 1975 "National Plan for Energy, Research, Development, and Demonstration"--contains an idealistic scenario which calls for the simultaneous commercialization of all new energy technologies. This scenario, which we used in our report to illustrate the potential energy supplies which may be available from new technologies, shows that, by the year 2000, gas from coal may supply 3.5 quads (about the equivalent of 1.8 million barrels of oil per day), liquids from coal 10.5 quads (about 5 million barrels of oil per day), oil shale 8.0 quads (about 4 million barrels of oil per day). These totals compare fairly closely with ERDA's current estimates that the equivalent of 10 million barrels of oil from synthetic fuels will be needed in 2000.

ERDA's estimates are based on the Synfuel Interagency Task Force report which shows that synthetic gas from coal, which appears to be the most advanced of the synthetic fuel technologies, is expected to provide the equivalent of 5.5 million barrels of oil a day by 2000. The Task Force report also shows that another 3.3 million barrels a day by 2000 may be provided by oil shale. However, the commercialization of oil shale has been stalled since 1974 and industry has recently been allowed to suspend their lease bonus payments for tracts of Federal oil-shale-bearing lands.

The Task Force report also shows coal liquefaction might provide about 1.3 million barrels a day in 2000. Coal liquefaction appears to be the least developed of the synthetic fuel technologies as attested to by the fact that ERDA does not have plans for a commercial scale coal liquefaction plant in the currently proposed synthetic fuels commercial demonstration programs.

--In our judgment, Government financial assistance for commercial development of synthetic fuels should not be provided at this time. Synthetic fuels production is not cost effective in that the total cost of output is not price competitive with foreign oil. Nor does it look attractive on the basis of present knowledge when compared to other technologies on an actual, or incremental, price basis.

Two basic concerns underlie the stated need for Federal loan guarantees to finance synthetic fuels technology:

(1) concern that the product produced will not be economically competitive, particularly since the existing world market for oil could always be manipulated to substantially undercut the price of synthetic fuels and

(2) concern that technological advances in other energy areas or within synthetic fuels technology will make "first" generation synthetic fuels plants obsolete even before they operate.

Research and development on "second generation" synthetic gas technologies is expected to reduce costs by about 15 percent.

While we do not favor providing Government assistance for commercial development of synthetic fuels at this time, we do not advocate that this option be foreclosed. We would like to strongly emphasize our conclusion that the Government should place a high priority in furthering this option. Such priority should be in the area of Government research, development, and demonstration.

ERDA emphasized the need to acquire the socio-economic, environmental, and regulatory information associated with the construction of synthetic fuel plants. It appears to us that the Government can acquire much of the necessary information by constructing and operating--either itself or with a contractor--smaller synthetic fuels plants.

Assuming synfuels demonstration plants are successful and prove feasible and capable of regulated, environmentally safe operation, the demonstration plants could be sold to private firms. At that time--when synfuels have been proven viable--if it is considered desirable and inducements are required to stimulate private firms to enter commercial

operations of synfuels, consideration could be given to offering some sort of financial assistance to private firms. Options in addition to loan guarantees need to be carefully considered.

In the meantime, the Congress could maintain oversight of the plants through the yearly authorization and appropriation process. This yearly monitoring of plant progress offers enhanced potential for building smaller, less costly plants while still maintaining maximum information capability. Should the plant not prove to be feasible, yearly oversight would enable project termination at the earliest possible date and may allow minimizing the financial loss related to the project.

Another alternative way of commercializing technologies such as synthetic fuels where the economic competitiveness of the product produced is in question is the so-called "commercial pull" approach. Using this approach, the Government could announce that it would purchase a set amount of synthetic oil or gas at some future point in time and request bids from industry. The Government then could select the lowest bid that appeared technically feasible. This method may prove to be a less cumbersome and perhaps less costly way of stimulating the construction and operation of a desired number of synthetic fuel plants.

MATTERS FOR CONSIDERATION
BY THE CONGRESS

Mr. Chairman, in closing we hope the Congress will:

--Continue to place the highest priority on energy conservation actions, requiring improved information on major

conservation opportunities which will provide the basis for the development and funding of specific programs which can be tailored to take maximum advantage of the opportunities.

- Maintain close oversight of the several new programs to encourage energy conservation, evaluate the effectiveness of incentives offered, and consider such further actions as may be necessary, including the greater use of mandatory energy efficiency standards. The GAO will continue its efforts to aid the Congress in this regard.
- Continue to encourage the installation of solar heating technologies, targeting the financial incentives to the users as described in the report.
- Maintain close oversight of FEA's actions to increase incentives for tertiary recovery of oil and authorize further incentives if the need and possibility to increase tertiary oil recovery becomes apparent in light of other energy developments.
- Consider whether it is advisable to enact legislation which would at this time authorize Federal loan guarantees to builders of synthetic fuel plants, and consider instead directing ERDA to continue and expand its research and development to improve the technology and; in addition,

construct and operate smaller plants of a size sufficient to meet its stated goal of obtaining socio-economic, environmental, and regulatory information in a timely fashion.

--Consider further actions, including the provision of loan guarantee authority, to encourage municipal waste cumbustion.

This concludes my prepared statement. We will be glad to respond to questions.