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Statement of
Phillip S. Hughes
Assistant Comptroller General *etc. 00015*
of the United States
on GAO's report
"An Evaluation of Proposed Federal Assistance
for Financing Commercialization
of Emerging Energy Technologies",
(August 24, 1976)

Statement was presented twice, to the Subcommittee on Energy and
C1 Power of the House Interstate and Foreign Commerce Committee, HSI 02503
C2 and to the House Science and Technology Committee. HSI 03500

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Mr. Chairman and Members of the Committee:

Our interest and involvement in the issues surrounding the commercialization of synthetic fuel technologies has been quite extensive over the past year. In a report dated March 19, 1976, we commented on the Administration's proposed synthetic fuels commercialization program and suggested that the Congress await completion of further analyses before considering legislation authorizing a commercial synthetic fuel demonstration program. In another report dated May 5, 1976, we presented our evaluation of the status and obstacles to commercialization of coal liquefaction and gasification. 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.

Before each of these Committees we stated that we were continuing our work on the status of feasible technologies which appear to have impediments to full commercialization, and, that we would complete this work by this summer. In addition, we indicated that this work would include an assessment of the priorities attached to the various technological options, and our views on the most appropriate incentives or other actions for encouraging their development. As our study of the matter progressed, it became evident that pursuit

of alternative technologies is inextricably intertwined in overall national energy strategies, including strategies for implementing energy conservation actions.

On August 24, 1976, as you know, we submitted to the Congress a report presenting our evaluation of proposed Federal assistance for financing commercialization of emerging energy technologies. The balance of my statement presents the highlights from our report.

In recent months a number of bills have been introduced in the Congress which would provide various forms of Federal assistance to encourage private sector use, or implementation of, a variety of energy technologies. One such bill, H.R. 12112, would provide Federal loan guarantees to accelerate the commercialization of synthetic fuels--gas from coal, oil from coal, and/or oil from shale.

Individual bills before the Congress cover a wide range of objectives and financing techniques. However, no one bill focuses on all emerging energy technologies, considers all costs associated with development, or more importantly, attempts to focus on targets of proposed actions on some consistent priority basis.

The major thrust of our evaluation is aimed at setting forth a framework and perspective for considering (1) energy actions which could contribute to solving energy problems in the next 10 to 25 years and (2) the role of the Federal Government in encouraging activity in each of the areas. Without such a framework and perspective, we run the risk of piecemeal decisionmaking on our energy

options without fully considering the implications for overall energy policy of the choices we make.

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.

Making the right choice among financing mechanisms requires, in our view, 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 group 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.

The pricing yardstick used in evaluating emerging technologies needs to be considered very carefully. An incremental cost standard

is the only realistic one for making sound economic judgments which treat all emerging technologies equally. The alternative is average, or "rolled-in" pricing. This means that the real cost of new supply sources are averaged with far larger volume of lower priced energy.

The rolled-in yardstick favors synthetic and other fuels susceptible to rolling in treatment. Incremental cost, on the other hand, would apply the same test to all energy options, including conservation. Decisions made on this basis would allow a consistent and rational process of choice on a cost effective basis.

CONCLUSIONS

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

--Certain conservation measures are by far the most cost effective way to "produce" energy and, therefore, should have the 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 legislative extension of the Federal Energy Administration.

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--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. The ultimate supply of energy to be captured from these sources may be smaller than the ultimate potential of other supply technologies such as synthetic fuels, but they appear more cost effective.

In our judgment 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.

--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.

The large investments required to build synthetic fuel plants would direct Federal incentives primarily to the large industries which have access to capital.

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 before they ever 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 has 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. 66

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 combustion.

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