

SYNTHETIC FUEL PRODUCTION IN THE UNITED STATES:
A PRELIMINARY OVERVIEW OF THE MAJOR LEGISLATIVE ISSUES

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The intense interest in reducing U.S. dependence on imported oil has generated a number of proposals to create a domestic synthetic fuel industry. The various proposals are linked to funding from a trust fund created with the revenues from a windfall profits tax on the income accruing to oil companies from the decontrol of domestic oil prices. The critical budgetary, macroeconomic, and energy issues arising from these proposals are examined in this preliminary review.

POTENTIAL TAX REVENUES FROM DECONTROL AND MACRO-
ECONOMIC EFFECTS

Tax Revenues

The decontrol of domestic oil prices will generate a huge increase in the revenues of domestic oil producers, and a windfall **profits** tax would channel a portion of these revenues to the federal government. The amount of **producer** revenues generated over the next five years depends primarily on the future level of OPEC prices, while the potential federal tax revenues

TABLE 1. ADDITIONAL PRODUCER REVENUES FROM OIL PRICE DECONTROL AND TAX REVENUES FROM ALTERNATIVE WINDFALL TAX PLANS UNDER TWO ASSUMPTIONS ABOUT OPEC OIL PRICES: IN BILLIONS OF CURRENT DOLLARS

Calendar Year	<u>Producer Revenues</u>		<u>Tax Revenues President's Proposal</u>		<u>Tax Revenues House Bill</u>	
	Likely Price <u>a/</u>	High Price <u>b/</u>	Likely Price <u>a/</u>	High Price <u>b/</u>	Likely Price <u>a/</u>	High Price <u>b/</u>
1980	7.6	11.0	4.6	7.0	5.6	8.7
1981	19.3	28.8	10.3	15.4	12.2	18.9
1982	25.2	37.9	13.4	20.4	16.0	25.1
1983	26.4	40.7	13.6	21.5	16.6	27.1
1984	27.6	43.9	14.5	23.4	17.2	29.2
1985	<u>28.3</u>	<u>46.4</u>	<u>15.3</u>	<u>25.3</u>	<u>18.1</u>	<u>31.7</u>
Total	135.4	209.7	71.8	113.1	85.7	140.7

a/ Assumes a current world oil price of \$20.12 per barrel and a 1.5 percent real price increase per year.

b/ Assumes a current world oil price of \$23.50 per barrel and a 3.0 percent real price increase per year.

depend not only on future OPEC prices but also on the tax rate eventually enacted by the Congress. Since both future world oil prices and Congressional action on taxes are uncertain, CBO has estimated tax revenues under both the **President's** original proposal and the recently passed House bill, based on two different assumptions about future world price (see Table 1).

The first assumption is a current OPEC price of \$20.12 per barrel through 1979, increasing at an annual rate of 1.5 percent faster than the rate of inflation between 1980 and 1985. CBO believes that this is the most likely scenario. With this price assumption, producer revenues over this period would be about \$135 billion in current dollars. If this price prevails, the windfall tax liability incurred over the 1980-1985 period would be about \$72 billion under the **President's** original proposal and about \$86 billion under the House bill. Over the period 1980-1990, the President's proposal would generate \$153 billion in current dollar tax revenues, while the House bill would generate \$186 billion.

Since higher prices are also possible, CBO's second assumption is that, by the end of 1979, the current OPEC price will rise to \$23.50 per barrel, which is the ceiling allowed under the June 26 OPEC agreement, and will then increase at 3.0 percent a year in real terms. With this higher price, about \$210 billion in additional producer revenues would be generated over the 1980-1985 period. In this case, the windfall tax liabilities over the 1980-

1985 period would be about \$113 billion under the **President's** original proposal and about \$141 billion under the House bill. Over the 1980-1990 period, the President's proposal would generate \$113 billion in current dollar tax revenues while the House bill would generate \$338 billion.

Macroeconomic Effects

Over the next five years, the **macroeconomic** effects of the **President's** windfall profits tax and synthetic fuel production program might be contractionary. The revenues from the windfall profits tax would begin to accumulate fairly rapidly over the next five years, whereas the stream of investment spending on synthetic fuels would increase slowly and would probably peak **in** about ten years. For example, by 1985, depending on the OPEC price of oil, revenues from the windfall profits tax could be as much as two or three times larger than the expenditures on synthetic fuel production. This net accumulation of revenues would act as a brake on the economy, which could be offset either by cutting taxes, such as personal income taxes or social security taxes, or by increasing government expenditures.

In the longer run, the synthetic production program could be inflationary. Programs with a goal of 3 million barrels a day by 1990 call for an investment of more than \$120 billion over ten years. The actual figures

could conceivably be much larger. Even by conservative estimates, the size of the capital investment by the late 1980s could create bottlenecks in certain sectors of the economy and shortages of materials and skilled labor. This type of demand-induced inflation could be counteracted by supply-enhancing policies. For example, investment tax credits and funding for research and development could encourage the spending on plant and equipment necessary to forestall potential bottlenecks, and job skills programs directed at **synfuel** production could ensure the needed supply of skilled workers.

THE ADVANTAGES AND DISADVANTAGES OF ALTERNATIVE FINANCING MECHANISMS

The private sector has not yet been willing to invest the approximately \$2 billion necessary to build a synfuel plant of sufficient **size** to take advantage of the economies of scale common to such processes. The various risks are just too high. First, while it is almost certain that synthetic fuels can be produced, specific processes have not been demonstrated on a sufficiently large scale to offer businessmen the level of certainty that they traditionally desire regarding cost and technology. Second, regulatory uncertainties complicate both the cost and the technological problems. For example, synfuel plants quite commonly require 25,000 tons of coal per day

for feedstock; consequently, a change in surface mining regulations or in Interstate Commerce Commission transportation rates could create havoc with the financial viability of a synthetic fuel project. Finally, it is possible that future world oil prices will not increase as rapidly as they have in the last few years or that they may, in fact, fall in real terms, thus increasing the relative cost of **synfuels**.

In developing a synfuels program, the federal government should choose the financing mechanism that would allow the government to absorb the risk that future OPEC prices will not be as high as currently anticipated. Since the nation as a whole benefits from lower OPEC prices, the government should be willing to absorb that risk. On the other hand, the technological and cost risks should be absorbed by the private sector, which traditionally **accepts** these **risks** in making investment decisions. Such a separation of risks would maintain the incentives within the private sector to construct and operate synthetic fuel plants efficiently. In addition to the goal of efficiency, the financing mechanism chosen should **have** a predictable impact on the budget and should be considered in the normal budget process.

The financing mechanisms available to the federal government include loans, loan guarantees, purchase agreements, and actual government construction of the plants.

Given the size of the investment required for these plants, as well as the overall risk, it is very doubtful that federal government loans, even at subsidized rates, would provide sufficient stimulus for the private sector to construct the plants. Alternatively, if the federal government itself were to build these plants, it would then absorb all the **risks—that** is, the technological and cost risks, as well as the risk associated with any future changes in OPEC prices. This would give contractors less incentive to build the most cost-effective plants, since no private sector money would be at risk. Overall efficiency would, therefore, be reduced.

Similarly, loan guarantees would shift much of the cost and technological risk of building plants from the private sector to the government and thus reduce the incentives for efficiency. From a budgetary standpoint, loan guarantees for large-scale projects are undesirable since they tend to obligate the federal government to a potential future outlay (from a default) that is considerably above the initial appropriation. Furthermore, the unpredictable nature of loan guarantees for large projects also makes their inclusion in budget resolutions difficult. Loan guarantees are more **appropriately** used for programs such as housing, in which the risk is spread over a large number of small projects, and the default rates can be predicted with a reasonable degree of accuracy.

Purchase **agreements**, whereby the federal government contracts to buy a given amount of synthetic fuel production, have a distinct advantage over alternative funding mechanisms in that the private sector absorbs the technological and cost risk and, therefore, maintains a strong incentive to build cost-effective plants. The federal government, on the other hand, absorbs the risk that OPEC prices will fall in real terms or not increase as fast as expected. From a budgetary standpoint, purchase agreements also have the advantage of being included in the budget resolutions, and the outlays are more predictable over time since at least the maximum cost is known.

TRUST FUND FINANCING AND AN OFF-BUDGET AGENCY

Trust Fund Financing

In April, the President called for the creation of an Energy Security Trust Fund to receive the revenues from a windfall profits tax. He proposed that three major initiatives should be financed by this fund: rebates to low-income households to offset higher energy prices, investments to increase domestic energy production, and extended programs for public transportation. These programs were selected so that the revenues of the windfall profits tax would help to ease the hardships that rising oil prices would

impose on low-income individuals, and would diminish U.S. dependence on foreign oil through new domestic energy production and conservation.

The primary advantage of trust funds as a financing mechanism is that they provide a built-in, self-adjusting device for channeling the revenues of a special tax into programs that are closely related to that tax. If the revenue source is steady, they also provide funding security for programs that require a lead time for state and local planning. Other funding mechanisms, such as advance appropriations, also provide similar security without some of the disadvantages of trust funds.

A trust fund device may be less desirable when uncertainty regarding the amount of revenues that will enter a fund in future years inhibits careful planning and results in program inefficiency. This problem is potentially serious for the Energy Security Trust Fund since its revenues are extremely sensitive to future OPEC prices which are very difficult to project. This fact was illuminated by the recent OPEC price increase, which almost doubled the estimates of trust fund revenues that prevailed only a few months ago. Earmarking such an unpredictable source of revenues for programs in energy and **transportation--areas** in which long-term investments are often needed before programs yield **results--could** hinder Congressional decisionmaking.

The Energy Security Trust Fund proposed by President Carter would be subject to the normal authorizing and appropriating processes. In principle, this would permit the Congress to adjust expenditures from the fund to fit with fiscal policy, other government programs, changing needs, and evolving legislative priorities. By earmarking the revenues that enter the trust fund for specified program purposes, however, the Congress would reduce its flexibility to redirect revenues toward changing priorities. The **Congress'** decision about yearly expenditures might possibly be based on the amount of revenues available in the trust fund.

Another disadvantage of the trust fund device is that expenditures for transportation and energy programs from a new trust fund would pose coordination problems for the Congress and for the executive agencies. The reason for this is that many current energy and transportation programs are funded through direct appropriations. Coordinating programs that are funded through several financing mechanisms is difficult and causes program inefficiency.

Off-Budget Agency

The President has also proposed the creation of the Energy Security Corporation, an off-budget agency, to oversee the development of a U.S.

synthetic fuel industry. Its activities would be financed with revenues from the Energy Security Trust Fund. As an off-budget agency, the Energy Security Corporation would be isolated somewhat from Congressional oversight and from the normal budget process. While the actual appropriation from the trust fund to the corporation would be on-budget and would be included in the normal budget resolutions, the corporation, as proposed by the President, would have \$88 billion in borrowing authority—an initial \$22 billion and three increments of \$22 billion over the next 54 months. There appears to be no Congressional control over this \$88 billion in borrowing authority. Since the corporation would most likely not obligate more than \$22 billion over the first several years, Congressional control could be increased by requiring that the three additional increments totaling \$66 billion of borrowing authority require appropriation action by the Congress. Alternatively, Congressional control could be increased by placing the entire corporation on budget, thus subjecting it to normal budget resolutions and appropriation action.

APPROPRIATE GOALS FOR SYNTHETIC FUEL PRODUCTION

Most of the synthetic fuel bills that are under active consideration by the Congress have production goals between 500,000 and 5 million barrels of

oil equivalent per day by 1985 or 1990. The appropriate production goal depends upon whether the program objective is to develop an information base for evaluating potential alternative technologies and resources or to reduce oil imports significantly.

Information Goal

A certain production threshold is necessary to develop the critical technical, environmental, and economic information needed to choose the most efficient technologies and resources that should be developed over the long run. Although this threshold is difficult to estimate, it most probably falls **between** 200,000 and 400,000 barrels of oil equivalent per day. This represents four to eight **commercial-size** plants of alternative technologies and resources. A strong case can be made to set a program at this level on the grounds that the United States will eventually have to change to alternative fuels and that such a base of knowledge will help in choosing those resources and technologies that will allow an efficient transition.

Oil Import Reduction Goal

Whether or not the production goal for synthetic fuels should be set above the information threshold of **200,000-400,000** barrels per day depends

on two factors: first, how additional synfuel production compares with alternative programs in terms of oil import reductions per dollar; and second, the overall oil import level that the United States considers acceptable in terms of economic and national security risks.

Assuming oil price decontrol and a continuation of current policy, oil imports will be approximately 12 million barrels per day by 1990. If the United States wants to lower this dependence by about 4 million barrels per day to approximately 8 million, there are a number of alternative programs that would be more effective than additional synthetic fuel production in terms of oil import savings per dollar. These include an aggressive residential and even commercial insulation **program**, accelerated retirement of oil and gas boilers in both utilities and industry, production of unconventional gas and heavy oils, and expanded solar hot water and space heating and cooling. For example, approximately 21 million housing units still have substandard insulation. If such dwellings could be made more energy-efficient, even through direct federal grants, savings of at least 400,000 barrels per day would be possible just in the residential sector alone.

The industrial sector currently consumes nearly 4 million barrels per day of oil and gas equivalent, half in steam boilers. Since solid coal is nearly cost competitive with oil and natural gas for most boilers, tax incentives or direct subsidies on the order of \$5 per barrel could accelerate

the replacement of oil and gas boilers with coal for a potential oil import saving of 500,000 barrels per day. Similar incentives for the replacement of nonboiler oil and gas use with coal could bring the total potential saving in the industrial sector close to 800,000 barrels per day by 1990. In the utilities industry, accelerated replacement of oil and gas boilers with coal could add almost 1 million barrels per day in potential oil and gas savings by 1990 through a similar tax incentive or subsidy of **about** \$5 per barrel. Together with a **200,000-400,000** barrels per day synthetic fuel program and additional incentives for solar energy in residential and commercial use, commercial insulation programs, and unconventional gas and heavy oils, these coal replacement programs could provide close to 4 million barrels per day of oil import reductions that appear more cost-effective than additional synthetic fuel production.

If the United States wants to reduce oil imports below 8 million barrels per day as the President has recently announced, then additional synthetic fuel production would begin to become cost-effective on a per dollar basis. Whether or not the import goal should be lower than 8 million barrels per day depends on the economic and national security risks that the nation would run with a dependence of that **level** relative to the eventual cost of synthetic fuel production. Even if synthetic fuel production substantially above the information threshold of 200,000-400,000 barrels per day is required to reduce total import dependence, there would be advantages in a two-stage program: first, a modest program of four to eight

commercial-scale plants designed to generate information; then, in three to five years, a more ambitious production-oriented program. Cost, technological, and environmental information would undoubtedly become available throughout the design and early construction stages of the ~~plants--information~~ that would be very helpful in developing the larger production program. Reducing those unknowns would reduce the risks to both the private sector and the government in initiating such a program.

COMPETITION

Although the potential impact of these proposals on competition in the synthetic fuel industry is very difficult to predict, it is probably correct to assume that the effect would not be significant unless the government explicitly attempted to increase competition through contract negotiations. Because of the large capital requirements in excess of \$2 billion per plant (the level necessary to achieve the economies of scale) as well as the fact that only a handful of companies currently have the necessary technological and engineering knowledge, no more than 10 to 20 companies would bid to produce synthetic fuels. This would include possible consortia of electric utility, pipeline, and oil companies. If the government wants to increase competition, it would ~~have~~ to be willing to increase the subsidy per barrel to

entice smaller companies into bidding—companies that currently do not have the required capital or engineering expertise. On the other hand, it is doubtful that a government subsidy program would decrease competition below the level that would normally occur through general market forces.