

# **SPECIAL OIL TAXES**

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**HEARINGS**  
BEFORE THE  
**SUBCOMMITTEE ON TAXATION AND  
DEBT MANAGEMENT GENERALLY**  
OF THE  
**COMMITTEE ON FINANCE**  
**UNITED STATES SENATE**  
NINETY-SIXTH CONGRESS  
SECOND SESSION

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NOVEMBER 11, DECEMBER 1 AND 12, 1980

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# SPECIAL OIL TAXES

TUESDAY, NOVEMBER 11, 1980

U.S. SENATE,  
COMMITTEE ON FINANCE,  
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT,  
*Washington, D.C.*

The subcommittee met, pursuant to call, at 9:15 a.m., in room 2221, Dirksen Senate Office Building, Hon. Bill Bradley presiding.  
Present: Senator Bradley.

[The press releases announcing this hearing follow:]

[Press Release of the Committee on Finance]

## FINANCE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT ANNOUNCES HEARINGS ON SPECIAL OIL TAXES

Senator Harry F. Byrd, Jr. (I-Va.), Chairman of the Senate Subcommittee on Taxation and Debt Management of the Committee on Finance announced today that the Subcommittee will hold a series of hearings on special oil taxes.

The hearings will be held on Tuesday, November 11 and Wednesday, November 12 in Room 2221 of the Dirksen Senate Office Building, and will begin at 9:00 a.m. each day.

Senator Byrd said that the hearings will examine whether emergency taxes or tariffs on crude oil and products can reduce the short-term damage to the United States and the international economy stemming from major oil disruptions. Senator Byrd also said that Senator Bill Bradley (D-N.J.) would be participating in the hearings because of his deep interest in the subjects to be explored.

Senator Bradley said, "In my judgment, reducing our economic vulnerability to supply disruptions is one of the most pressing and urgent issues on our national economic, security, and energy policy agendas."

Witnesses: Senator Bradley noted that a series of witnesses, each an expert in his or her field, have been invited to testify.

Invited to testify on November 11 are: Henry S. Rowen, Graduate School of Business, Stanford University; William Nordhaus, Department of Economics, Yale University; Alice Rivlin, Director, Congressional Budget Office; and George Eades, Council of Economic Advisors.

Invited to testify on November 12 are: Milton Russell, Resources for the Future, Washington, D.C.; Philip Verleger, School of Organization and Management, Yale University; and Emil Sunley, Deputy Assistant Secretary for Tax Analysis, U.S. Department of Treasury.

Written Testimony: The Chairman stated that the Subcommittee would be pleased to receive written testimony from those persons or organizations who wish to submit statements for the record. Statements submitted for inclusion in the record should be mailed with five (5) copies by December 15, 1980, to Michael Stern, Staff Director, Committee on Finance, Room 2227 Dirksen Senate Office Building, Washington, D.C. 20510.

[Press Release of the Committee on Finance]

## FINANCE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT MOVES UP DATE FOR HEARINGS ON SPECIAL OIL TAXES

Senator Harry F. Byrd, Jr. (I, Va), Chairman of the Senate Subcommittee on Taxation and Debt Management of the Committee on Finance announced today that the Subcommittee's hearing on special oil taxes, originally scheduled for Wednesday, November 12 (Press Release No. H-57, October 23, 1980), will be held instead



on Tuesday, November 11, beginning at 2:00 p.m. in Room 2221 of the Dirksen Senate Office Building. The hearing originally scheduled for November 11 will begin at 9:00 a.m. in Room 2221 of the Dirksen Senate Office Building as previously announced.

[Subsequent to these hearings Senator Bradley submitted the following report:]

REPORT OF SENATOR BILL BRADLEY ON THE FINANCE COMMITTEE HEARINGS ON  
SPECIAL OIL TAX AND TAX REDUCTION MEASURES

I. INTRODUCTION

In view of the need to reduce U.S. vulnerability to oil supply disruptions in both the short and long run, the Subcommittee on Taxation and Debt Management Generally of the Senate Committee on Finance held four hearings between November 11 and December 5, 1980. The hearings focused primarily on market-oriented, tax-based approaches to managing oil supply emergencies and encouraging import reduction to determine if they could be more efficient and equitable than the existing policies.

The most immediate reason for the hearings was the outbreak of war between Iran and Iraq in September, 1980, and concern that the conflict could go on for many months, causing substantial foreign oil price increases and supply restrictions.

The hearings also were designed to complement a 1980 Senate Energy Committee study on the "Geopolitics of Oil" that examined world-wide political, social, military and economic factors which will determine the price and availability of oil through the rest of this century. That study concluded that an energy policy aimed mainly at reducing oil imports could not adequately protect the United States in the years ahead. It recommended highest priority for: Building ample national petroleum reserves; developing alternatives to oil price control and allocation systems for ensuring the efficient distribution of supplies and equitable burden-sharing during a disruption; and developing better plans and capabilities, in concert with allies and trading partners, to prepare for energy emergencies.

Furthermore, the Finance Committee hearings responded to recommendations in the 1980 Report of the Majority Leader's Economic Task Force that, in addition to rapidly filling the Strategic Petroleum Reserve (SPR), the United States should develop effective alternatives to gasoline rationing in order to manage oil import disruptions and stop the huge outflow of dollars from American consumers to foreign oil producers that occurs when production is curtailed and prices skyrocket.

Other members of Congress have voiced similar concerns and made similar recommendations. Last September, the day after the Iran-Iraq war began, Senator Percy (R.-Ill.) held hearings on emergency preparedness in the Senate Government Affairs Committee. Testimony from senior Administration witnesses before that Committee made clear how ill-prepared we are to prevent oil price increases and manage supply disruptions. Senator Percy called upon the Administration to prepare new proposals for international agreements to restrain foreign oil price increases in a disruption and to develop non-regulatory alternatives to rationing to conserve and allocate supplies during an emergency. And as recently as this January, in Senate Energy Committee hearings chaired by Senator McClure (R.-Idaho) on the 1981 world petroleum supply outlook, witnesses from government and industry warned us that, unless the war winds down soon, we should expect further price increases due to a much more protracted loss of oil supply from Iran and Iraq.

Finally, the hearings anticipated expiration this September of the stand-by authorities contained in the Emergency Petroleum Allocation Act (EPAA). Congress must shortly decide whether to renew these authorities; rely exclusively on market forces to balance supply and demand during an emergency; or adopt tax-based, market-oriented alternatives to gasoline rationing and oil price controls to allocate scarce supplies and reduce the economically depressing effects of petroleum disruptions.

II. BACKGROUND

Soon after Iran and Iraq went to war, it became clear that both sides were unprepared to compromise their military objectives and unable to force a swift end to the hostilities. By the beginning of 1981, the war had reduced world oil production by more than 300 million barrels and induced a \$3 per barrel boost in the world oil price. And with each passing day, the world market was losing another 1 to 2 million barrels of oil as a result of the war. At that rate, the cumulative production losses due to the war could exceed 500 million barrels of oil by summer and approach 1 billion barrels by next winter.

Given these circumstances, world oil prices are likely to rise another \$5 to \$10 per barrel in 1981 unless we are prepared to prevent excess demand later this year or to

allow world oil stocks to fall toward the dangerously low levels of April, 1979. For every \$5 per barrel increase in the world price of oil, another \$10-\$12 billion U.S. dollars goes to foreign producers each year.

It also was apparent by early 1981 that the United States probably could not do much to terminate the war or limit the physical damage. The belligerents and their supporters were focusing only on their own survival, security and success—with little regard for the damage that their military operations were inflicting on the international economy. Moreover, Iranian forces seemed to be concentrating their attacks on oil production, processing and distribution facilities—presumably to increase their own oil export earnings and minimize Iraq's.

The previous Administration responded to the Iran-Iraq war by encouraging refiners to draw down stocks and by pressing unsuccessfully for oil import ceilings which would be binding on all members of the International Energy Agency (IEA).

This reliance on stock drawdowns to moderate price increases due to the war has discounted the likelihood of much longer or successive oil supply disruptions before stocks could be replenished. This policy leaves us more exposed to grave risks while doing nothing to prevent the loss of U.S. revenues to foreign oil producers.

### III. CONCLUSIONS

It is imperative for the 97th Congress, the new Administration, and cooperative allies to rapidly develop emergency preparedness measures that will moderate future world oil price increases and reduce American payments to OPEC during disruptions, while still maintaining sufficient stocks to buffer the economy against longer or successive oil supply interruptions.

Until the United States and other western countries have ample petroleum stockpiles and coordinated strategies for using them, the best mechanisms for achieving these objectives are probably an emergency tariff on foreign oil, or a tax on the refining of oil, paired with the simultaneous return of revenues to American consumers through tax reductions and transfer payments.

An emergency oil tax or tariff would moderate world oil price increases and reduce payments to foreign oil producers by inserting a wedge between the domestic sales price of oil and the OPEC price. This wedge would raise domestic oil prices, thereby lowering oil consumption and the demand for foreign crude. This in turn would reduce the price that OPEC can charge without cutting back production. The reason is that if producers try to raise prices without reducing output, their revenues would fall as buyers avoided overpriced supplies.

An emergency oil tax, or tariff, would enable us to raise the domestic oil price independently of the OPEC price. This means that much more of the revenues from higher oil prices would remain in the United States instead of flowing to OPEC. Moreover, because higher oil prices would reduce consumption, the net increase in the domestic sales price would be somewhat less than the world price plus the emergency oil tax or tariff. If other major importing countries adopted equivalent measures, world prices would be reduced even further.

To cushion the economy against higher crude prices, the revenues from the emergency oil tax or tariff, as well as from existing oil taxes, should be returned to consumers through reduced withholding on income and payroll taxes. Low income individuals and families who pay little or no taxes should be compensated through increases in entitlements and other transfer payments. To avoid undue burdens on any one sector, income group, or region, the tax reduction and transfer payment mechanisms should be designed to compensate those who are most adversely affected and least capable of absorbing higher oil prices. This means that we need to devise a transfer payment formula to compensate states that bear a disproportionate share of the burden of higher oil prices due to supply disruptions.

These mechanisms must all be in place prior to the imposition of an emergency oil tax or tariff so that there is no net increase in the tax burden borne by the American public.

### IV. RECOMMENDATIONS

1. National policies for managing energy emergencies must give much higher priority to moderating world oil price increases and preventing large windfall gains to foreign oil producers during supply disruptions.

2. Oil stockpiles offer the best protection in emergencies and we must speed up filling the Strategic Petroleum Reserve.

3. Because our strategic stockpile is still so small, and because the Iran-Iraq war probably will continue through summer and flare up again in subsequent years, we should not encourage the depletion of private petroleum inventories much further toward the dangerously low levels of April, 1979.

4. To ensure adequate petroleum reserves, it is now essential that we be prepared to supplement stock drawdown policies with an emergency oil tax or tariff and

compensatory tax reduction and transfer payments. Such action would also help to moderate oil price increases, minimize the transfer of additional income from domestic consumers to foreign producers, and allocate petroleum supplies as efficiently and equitably as possible. Without such measures, OPEC could raise prices another \$5 to \$10 a barrel, costing the United States and additional \$10 to \$25 billion a year.

5. Congress must cushion the economy against the impact of higher oil prices. To do that, Congress should pass legislation providing that revenues from emergency oil taxes or tariffs, as well as the additional receipts from the Windfall Profits Tax, will be rapidly returned to the American public through tax cuts and transfer payments. Such legislation must be adopted before any emergency oil tax or tariff is imposed.

6. The Administration, therefore, should prepare appropriate legislation for Congress immediate consideration. The proposal should be submitted to Congress no later than April 30, 1981.

7. An emergency oil tax or tariff would be most effective if other major oil-importing countries adopted equivalent measures to restrain their demand for foreign crude. Hence, the Administration should immediately initiate high level consultations with other OECD countries on the need for collective action and report to the Congress on the progress of these consultations this spring.

8. Major foreign oil producers should be persuaded to accept these measures as necessary to protecting their own long term security.

9. Even if the Iran-Iraq war winds down soon, Congress must shortly decide what stand-by authorities should replace the Emergency Petroleum Allocation Act. Mechanisms for an emergency oil tax or tariff and compensatory tax relief and transfer payment are likely to enable the oil market to work more equitably and efficiently than price control, supply allocation and rationing measures. Accordingly, Congress should consider tax-based approaches as alternatives to regulatory programs.

## V. SUMMARY OF THE HEARINGS

### 1. Issues and organization

The hearings were divided into two parts, one dealing with oil supply disruptions, the other with long run oil import reduction. However, there was necessarily substantial overlap. One reason is that Iran and Iraq are unlikely to reach a permanent solution to the present conflict easily or quickly. Thus, they could wage war intermittently over the next several years, putting the world oil market in a state of more or less continuous disruption. In this case, the distinctions between disrupted and non-disrupted markets and emergency and non-emergency states would become quite blurred. Another reason is that many long range, highly capital intensive import reduction and substitution programs adopted after the 1973-74 embargo have been justified on the grounds that they enhance our national security by reducing both the costs and risks of further supply interruptions. The hearings were intended to evaluate this argument and to determine whether there are not more cost-effective approaches to reducing vulnerability in both the short and long run. A third reason for the overlap is that actions taken to promote long run oil import substitution can interfere with policies for dealing with emergencies, in particular petroleum stockpiling.

The witnesses were all economists or other experts with extensive government or private sector experience in the areas of the Subcommittee's inquiry. In order to define a common framework for the hearings, the witnesses were asked to consider the following questions in preparing their testimony, although they were not requested to provide specific answers nor limit their discussion to these issues:

(a) *Disruptions.*—Given the limited strategic reserves and private stocks of oil that would be available if a major disruption occurred within the next few years, what measures would be needed to protect the United States and the international economy against the depressing effects of foreign oil price increases, domestic shortages, and massive new outflows of funds to foreign producers?

How effectively and efficiently would a \$10, \$20, or \$30 per barrel emergency surcharge imposed on all crude oil acquired by United States refiners restrain domestic demand and foreign procurement prices for crude oil?

Would import fees, tariffs, or quotas be more or less effective and efficient?

Could an emergency oil surcharge be adequately and equitably offset by some combination of reduced withholding of payroll, income, or other taxes?

What are the practical problems with implementing this approach? How should imports and exports of petroleum and petrochemical products be treated?

For an emergency surcharge to reduce the outflow of funds to producers, how important would it be for the United States to act in concert with other major importing nations? What are the advantages, costs, and risks of unilateral action by the United States?

On balance, how does the desirability of such an emergency oil surcharge and tax

relief program relate to the actual as well as expected depth, duration, and permanent price effect of an oil supply disruption? For example, would the program's relative effectiveness depend on whether the supply loss to the United States were one, two or three million barrels a day? How is it affected by very large uncertainties as to the duration of the loss?

(b) *Long-run import reduction.*—Would an oil fee or tariff be the most efficient means of reducing demand for insecure foreign oil? Why?

How large a fee or tariff is needed to be effective?

Should such a fee or tariff be imposed on petroleum and petrochemical products as well as crude oil? Should it be rebated to exporters of petroleum and petrochemical products?

What would be the effect of a gasoline tax on the U.S. automobile industry?

What would be such a fee's or tariff's macroeconomic and distributional effects?

Could these effects be adequately offset by tax relief or other fiscal measures?

How should this be done and what significant practical and administrative problems would be involved?

To what extent would the benefits of a tariff be enhanced by securing the cooperation of other major oil importers?

What do you have to assume about producing country responses in order for the tariff to yield a net benefit and how realistic are those assumptions?

Is there a potential conflict between import reduction and stockpiling? If so, which should take priority? Why?

Is there a potential conflict between using a tariff to moderate world oil price increases and fostering large scale investment in capital intensive and technically risky alternative energy projects? If so, how could that conflict be resolved?

## 2. Testimony

The witnesses did not agree on all the issues. Nor did the Subcommittee seek to forge a consensus. However, there was broad agreement on the following:

(a) *Disruptions.*—There is a significant probability of recurrent oil supply disruptions for the remainder of this century. Supply disruptions cause oil price increases. In the short run, higher prices depress the economy by reducing aggregate demand, redistributing income from oil consumers to producers, stimulating inflation, and exacerbating unemployment. In addition, higher world oil prices transfer more real income from oil importing to exporting countries.

Once supplies are disrupted, higher prices are virtually inevitable. The important question is: Who gets the oil revenues, the United States and other importing nations or the foreign producers?

Given the limited ability of oil exporters to recycle much greater revenues rapidly enough to avoid depressing the international economy, it is all the more imperative that oil importing countries control the windfalls from higher oil prices.

Thus, one of the main goals of an effective emergency preparedness program is to limit windfall gains to foreign producers. Other goals are minimizing losses in real income and output; preventing panic; and offsetting the most adverse effects of higher prices on income distribution. In addition, the emergency management program should not unduly distort private incentives for efficient oil conservation and substitution, nor should it impede the economy's adjustment to higher long-term prices if the supply cut turns out to be more or less permanent.

The witnesses unanimously agreed that past strategies based on price controls and allocations under the EPAA have failed to achieve these goals. These regulations were judged inefficient, inequitable, and counterproductive. They create a highly inefficient allocation of petroleum products; they exacerbate the reductions in real GNP because of inefficiencies; they require a large regulatory bureaucracy for their implementation; they tend to favor those with special access to the political process; and while they may be less inflationary in the short run, this advantage is largely offset by the inconvenience costs of waiting in lines and reduced availability of supplies and in the long run, the economy becomes less dynamic. All but two of the witnesses felt that we should not rely on controls and allocations to manage future disruptions and that the EPAA should not be extended beyond the September expiration date.

All the witnesses agreed that oil stockpiling, whether public, private, or some combination, is our first line of defense and our best protection against disruptions. It should be the mainstay of our planning for supply emergencies.

Several witnesses argued that, especially in view of our very small Strategic Petroleum Reserve (SPR), building up buffer stocks is two to three times more valuable in terms of enhancing our energy security than import reduction. The government should therefore accelerate the SPR fill rate and expand existing storage capacity. Industry should be encouraged to maintain higher inventory levels than were considered adequate in the past and disincentives for private stockpiling like price controls and allocations should be avoided. Some witnesses testified that tax credits for oil acquisition or storage construction should be offered to encourage

the build up of private inventories. Others argued that the best way to sustain high private inventory levels is to promote speculative investment in oil stocks. If industry were persuaded that the government would not reimpose price or allocation controls or tax away inventory profits in the event of a disruption, it would have a powerful incentive to hold large inventories, notwithstanding high carrying costs.

Even with aggressive support for expanding buffer stocks, it will be several years before we can rely on stockpiles alone to cushion the economy against the depressing effects of supply disruptions. To complement petroleum reserves and to substitute for stand-by rationing, price control and supply allocation programs, consideration should immediately be given to an emergency oil tax or tariff and compensatory tax relief measures. The following emergency tax/rebate schemes were identified as the most promising options: Decontrol plus the existing windfall profits tax, essentially a "do nothing" approach; an ad valorem tax on foreign and domestic crude imposed at the refinery level with an equivalent tariff on imported products; a gasoline tax; and an ad valorem tariff on imported crude and products.

The size of the emergency tax or tariff would depend on the magnitude and duration of the supply interruption and its impact on world oil prices. In all but relatively small disruptions, the tax or tariff receipts must be returned to consumers concurrently with the imposition of the levy by adjusting income and payroll tax withholding rates and increasing payments under existing entitlements programs. In the case of a small disruption and a correspondingly small world oil price increase, the emergency tax or tariff revenues could be returned to consumers through a general tax cut and an increase in transfer payments.

This recycling is necessary to ameliorate the economically depressing and inflationary effects of higher oil prices and to ensure equitable burden sharing by compensating those who incur the greatest income loss from the oil price increases. While some witnesses worried about abuses and questioned whether the adjustments could be made quickly enough to avoid further depressing the economy, others felt that rapid recycling would be possible and that abuses at least would be no greater than with coupon rationing or other regulatory options. Questions were also raised about the government's ability to handle the huge sums that would be collected in a very large disruption. It was generally agreed that these administrative issues would not be resolved until the appropriate government agencies developed concrete emergency oil tax and transfer payment programs that had specifically anticipated these problems.

Of these four emergency tax options, most witnesses favored the import tariff or the refinery tax because these are the only mechanisms that would significantly reduce the transfer of domestic revenues to foreign oil producers. Moreover, a tax or tariff on crude oil was generally considered to be much more efficient and equitable than a tax on a specific product like gasoline.

An import tariff is a fee on imported crude oil. It would be paid by all importers of oil or oil products. If it were set at the right level, and a couple of witnesses questioned whether this could in fact be done in an emergency situation, its effect would be to restrain demand and restore world oil prices—and hence the prices received by foreign producers—to their predisruption level. This would mean that higher prices due to the disruption would not accrue to foreign oil producers but would instead be captured by importing nations to be returned to consumers through tax relief and transfer payments. In the absence of controls on domestic oil, domestic crude prices would also rise. Because of the demand reduction from higher prices, the increase would be somewhat less than the tariff. Moreover, most of the incremental domestic revenues would be captured by the corporate income tax and the windfall profit tax. If equivalent measures were adopted by other major importing countries, they would further depress the world oil price and limit the transfer of income from domestic consumers to foreign producers. However, while the advantages of a tariff would be enhanced by multinational action, most witnesses believed that a tariff could yield a net benefit to the United States even if it were imposed unilaterally.

A crude oil refining tax is a fee collected from refiners for each barrel of foreign or domestic oil processed. The tax would raise the consumer price of oil above the world price while keeping the price received by domestic and foreign producers close to the level that existed prior to the disruption. An equivalent tax on imported products would also be imposed to prevent a shift in demand from domestic to foreign refineries. Revenues from the tax would be returned to consumers. As with the tariff, the benefits of a refinery tax would be enhanced if other oil importing countries adopted equivalent measures.

As between an emergency import tariff and a refinery tax, those who preferred the former did so on the grounds that it would maximize incentives for domestic production and private stockpiling by letting domestic prices rise above the world

price. And, if it were imposed in conjunction with equivalent measures by other key importing countries, it would be the most effective means of reducing real income transfers to foreign producers. Those witnesses who favored the refinery tax did so primarily on the grounds that it would limit the transfer of income from domestic consumers to domestic as well as foreign producers. And, because it would not be aimed solely at imports, it would be less likely to provoke retaliatory producer price increases and supply restrictions than the tariff. This view assumes that foreign producers would accept a domestically imposed tax intended to promote conservation and efficiency but would retaliate against an emergency tariff designed to protect the domestic and international economies from the depressing effects of higher oil prices due to a supply interruption. An alternative view is that producers would be unlikely to retaliate regardless of how the tax or tariff is structured, particularly if the event causing the disruption also threatened their own security, as is the case with Kuwait and Saudi Arabia in the Iraq-Iran war.

One problem common to all these approaches is that any emergency fee on crude or product shows up in the Consumer Price Index (CPI), whereas the economic costs of rationing (e.g., the productivity and efficiency losses from time spent in gasoline lines and government intervention in the market) do not. Some witnesses suggested handling this problem by changing the way the CPI is constructed to avoid triggering increases in entitlements programs and wage contracts tied to the CPI.

Others argued that we should simply live with the temporary increase in the CPI caused by the emergency tax or tariff. The reason is that although the tariff would raise the CPI in the short run, it would also prevent increases in the long run OPEC oil price that would otherwise show up as a permanent jump in the CPI. In other words, when the tariff is lifted, both the price of crude and the CPI should fall. On the other hand, a CPI increase caused by OPEC's raising the world oil price would be permanent.

There was also some discussion of using a quota/auction scheme as an alternative to emergency taxes or tariffs. The quota/auction would work as follows: in a disruption, the government would set a ceiling on the amount of oil and oil products that could be imported into the United States. This ceiling would be determined by the size of the supply shortfall and the historic petroleum import or consumption levels of the United States and other foreign oil dependent nations. The government would then auction licenses to import the crude volumes allowed under the quota. The revenues from the auction would be returned to consumers through tax reduction and transfer payments.

Although some witnesses believed it would be easier to negotiate quotas with other importing countries, others maintained a quota is inferior to a tax or tariff in managing a disruption. According to this view, not only is a quota less flexible than a tax or tariff, but it also risks setting a production target for foreign producers that might induce them to cut output or provide disincentives to expand production, particularly in non-OPEC areas. The point was also made that where the producers have significant market power, a binding quota fixes a country's demand for imports and enables producers to raise prices without reducing their market share, at least below the point where the quota binds. This enables producers both to increase prices and to capture all of the additional revenues from the higher prices.

Whichever method is adopted, the revenues the government collects must be returned to consumers, at least when the disruption is large or protracted. Most witnesses believed that the rebate could and should utilize existing mechanisms, that is, adjusting withholding on income and payroll taxes and increasing social security and other transfer payments. However, legislation giving the Executive Branch broad authority to design and implement emergency adjustments would be required, and even then, it would apparently take the Executive agencies 60 to 90 days to implement the adjustments. Several witnesses were concerned that Congress would be reluctant to grant such authority and that, in its absence, prolonged Congressional debate over how to distribute the revenues would prevent their being recycled quickly enough to avoid major adverse effects on the economy. These potential difficulties highlight the need to have the mechanism for returning the emergency tax or tariff revenues to the public ready and in place prior to imposing the levy.

Finally, several witnesses testified that in a large or protracted disruption it would be necessary to supplement stock drawdowns and emergency oil taxes with supply side measures, in particular increased use of coal, gas and nuclear fueled facilities, and with emergency conservation measures.

(3) *Long-run import reduction.*—Even if the world oil market is not disrupted in the next two decades, prices are unlikely to decline. Moreover, the United States and other Western nations are likely to remain significantly dependent on OPEC well into the twenty-first century. Despite these trends, efficient oil import reduc-

tion policies, particularly if the United States acts in concert with other major importers, could yield substantial economic benefits. These benefits derive primarily from the impact of reduced demand on both short and long run world oil prices and increased incentives for energy efficiency and import substitution.

According to one witness, a phased program of import reductions by the United States and its allies, building up to 20 million barrels a day in 2020, could result in oil price levels at least 30 percent lower than they would otherwise be.

Lowering oil prices would in turn reduce the inflationary drag of high crude costs on long run economic growth. And it would also decrease the amount of national income spent on foreign petroleum. Finally, cutting petroleum consumption would reduce the short run costs to the economy should a disruption occur simply because we would need less oil.

The witnesses agreed that by far the most efficient approach to reducing imports is not subsidizing domestic alternatives to imported petroleum but a shift in the tax policy. One witness suggested that instead of heavily taxing the two things we "like"—capital formation and labor supply—we should instead be taxing what we don't like (but have nonetheless until recently, indirectly, subsidized through price controls, namely imported oil. This testimony also raises the possibility of achieving greater consistency between tax, economic and energy security policies and should be further explored by both the Legislative and Executive branches.

Most witnesses suggested a \$10 per barrel import tariff, which would raise between \$40 and \$45 billion a year. Of this, \$20 to \$25 billion would be direct revenues from the fee. ( $6\text{mmb/d} \times 365 \times \$10 = \$22\text{ billion}$ ). In addition, approximately \$20 billion would be raised by income and excise taxes due to higher domestic crude prices. However, even in the absence of a tariff, substantially higher foreign oil prices would also increase domestic prices and thereby also raise oil income and excise tax receipts. Thus, the first year's incremental revenues directly and indirectly attributable to the \$10 per barrel tariff could range around \$30 and \$40 billion, depending on how effectively it limits foreign prices. To the extent the tariff and higher prices reduce import levels more in subsequent years, these revenues could diminish somewhat over time. Nonetheless, such sums would be sufficient to finance a substantial reduction in corporate and personal income tax and compensatory increases in transfer payments without increasing the Federal deficit.

There was considerable discussion over whether imposing an oil import tariff would provoke foreign producers to cut production, thereby defeating the tariff's purpose. Several witnesses felt that retaliation was unlikely. They reasoned that other oil importing countries have adopted tariffs, taxes and quotas without provoking retaliation and that, to be effective, a retaliatory cut would have to be made by Saudi Arabia. The witnesses argued that the Saudis cannot afford to focus exclusively or even primarily on maximizing oil revenues in the near term. They must also worry about preserving internal stability; maintaining peace and harmony with other Arab states; ensuring U.S. protection against external aggression and subversion; and preserving minimal stability and price unity within OPEC. Given the precarious situation of the Saudis in trying to reconcile these disparate objectives, they probably would not wish to add to internal or OPEC instabilities by initiating a crusade against a \$10 per barrel tariff. Other witnesses felt that even if there is a significant risk of retaliation, it could be lessened by structuring the fee as a domestic tax or presenting it as a "security surcharge" to finance some of the additional defense expenditures necessary to protect the Persian Gulf region.

There would be some short run adverse macroeconomic effects from the tariff. This is because higher oil prices aggravate unemployment, transfer income from consumers to producers, and tend to reinforce the inflationary spiral. However, these effects could be substantially ameliorated by recycling the revenues through tax cuts or by phasing the tariff in gradually. In the long run, there would be substantial net economic benefits from the tariff because of reduced demand for petroleum, lower world oil prices, reduced payments for foreign crude, and a favorable environment for the production of domestic energy sources and fuel-efficient automobiles. In the short run, however, higher oil prices, whether due to foreign price or domestic tax increases, could further depress the domestic auto industry by stimulating greater demand for more fuel-efficient foreign cars.

### 3. Conclusions

On balance, the testimony presented in these hearings provides strong evidence for the following propositions:

(a) *Disruptions*.—The likelihood of further price increases and supply restrictions this summer due to the Iran-Iraq war requires that we give urgent consideration to new policies for moderating world oil prices and preventing the transfer of oil revenues from domestic consumers to foreign producers.



Stockpiles are the best protection against oil supply disruptions and priority should be given to acquiring ample public and private petroleum reserves.

Market-oriented, tax-based approaches are likely to be much more efficient and no less equitable than price controls, rationing and allocations in managing energy emergencies.

An essential component of the tax-based approach to handling supply disruptions is legislating authority to rapidly recycle the revenues to consumers prior to the imposition of the fee or tariff.

Another important, though not necessarily essential, component is persuading other major oil importers to adopt equivalent measures. Foreign producers might also need to be dissuaded from acting on possible threats to retaliate by cutting output.

(b) *Long-run import reduction.*—Reducing oil imports over the long run would yield substantial economic and national security benefits to importing nations.

The most efficient means of reducing imports appears to be a tariff on foreign oil.

An import tariff would reduce the demand for foreign oil by lowering consumption, by encouraging energy efficiency, particularly in the transportation sector, and by stimulating the development of alternative fuels and technologies.

(c) *Recommendations.*—Conditions in the Middle East and the world oil market pose a grave danger to the United States and the international economy. If the war continues, the Administration might well determine that an emergency oil tax or tariff is necessary to protect our economic security. If this happens, Congress must be prepared to cushion the economy against the effects of higher oil prices by legislating, before the tax is imposed, that the revenues will be rapidly returned to the American public through tax cuts and transfer payments.

Even if we are lucky and the war winds down soon, Congress must shortly decide what kinds of authorities should replace the EPAA. Market-oriented, tax-based alternatives to emergency regulatory programs should be part of those deliberations.

But before Congress can act on the emergency tax or tariff and tax reduction and transfer payment measures examined in these hearings, several issues require prompt investigation and clarification by the Executive Branch:

From an administrative standpoint, how rapidly could emergency oil tax revenues be recycled to consumers? Could administrative delay be reduced by authorizing emergency procedures for the agencies responsible for recycling?

How substantial are the risks of gross over or under compensation and abuses of the emergency tax rebate system?

How essential and how feasible is it to secure the cooperation of other key importers?

How significant is the risk of retaliatory action by major producers?

In terms of softening the impact of higher oil prices from disruptions on the domestic economy, what are the relative advantages and disadvantages of a refinery tax versus an import tariff?

Do we need greater incentives for private stockpiling and if so, would tax credits, direct subsidies, or more market oriented investment in inventories, be the most cost effective approach?

These issues will not be resolved unless and until the Executive Branch examines the various options in detail and works through the problems each raises. Since critical choices must be made this summer at the latest, the Administration should submit specific legislative proposals to Congress by April 30, 1981 to allow further hearings this spring.

**Senator BRADLEY.** The committee will come to order.

This is the first of three hearings on emergency oil taxes. For those who are here today, you are aware that we had planned to have a hearing tomorrow morning. That has been canceled, and the hearing for tomorrow morning will be this afternoon at 2 o'clock. So this is a full day of emergency oil tax hearings.

For those of you who have managed to get into the building today, I think it shows a real interest on your part, and I appreciate that. This is what is known as the degree of difficulty in obtaining entrance to the hearing. It is probably related to its sensitivity, although these are not classified hearings.

The war between Iran and Iraq is a compelling reminder that the United States, along with other industrialized as well as devel-



oping countries, depends on a politically volatile and militarily insecure source of imported oil—the Persian Gulf.

Our dependence on the Persian Gulf, which long continued to grow despite recurrent threats of the insecurity of our imported oil, means that we are highly vulnerable to foreign manipulation and disruption of our petroleum supplies. Reducing that vulnerability is the most urgent task on our energy policy agenda.

To date, our energy policy has focused too narrowly on programs aimed at the remote objective of energy independence. It is high time that we address emergency preparedness measures that will anticipate and minimize the consequences of a major interruption in crude oil supplies.

Today's hearing is an important contribution to this goal. The witnesses, all of whom are recognized authorities on energy economics, have been asked to advise the committee on alternative approaches to rationing to manage supply interruptions.

In particular, the witnesses will discuss whether emergency tariffs or taxes on crude oil and products can reduce the short-term damage to the United States and the international economy stemming from major oil supply disruptions. Moreover, because existing legislation authorizing standby allocation and other emergency programs expires in September 1981, these questions will be among the key issues for the 97th Congress.

In examining this issue it is essential that we recognize at the outset that we are talking about emergencies. None of the measures proposed for managing supply disruptions can entirely avoid damage to the economy and hardship to the individual consumers. Past plans have tended to shy away from this recognition. As a result, they have contained many complicated exceptions and other special interest provisions that have raised serious questions about their workability and caused us to delay their implementation.

In today's hearing I want us to deal with reality, which is quite a charge. A major oil supply disruption presents us and other consuming nations with a terrible problem which even the best of emergency response plan can only hope to mitigate.

We are delighted to have as our witnesses this morning Henry Rowen of Stanford University, George Eads of the Council of Economic Advisers, Alice Rivlin of the Congressional Budget Office, and William Nordhaus of Yale University.

I would like Ms. Rivlin to start, followed by Mr. Nordhaus, then Mr. Rowen, and Mr. Eads. I would encourage any of the four of you who desire to have a staff member at the table, or desire to have another individual in your party speak at the hearings, that you should be encouraged to do that.

What we are going to do is try to make each person's initial statement 10 minutes long, and then we will have a discussion about this issue, and try to get behind the surfaces.

Ms. Rivlin.

**STATEMENT OF ALICE M. RIVLIN, DIRECTOR, CONGRESSIONAL  
BUDGET OFFICE**

Ms. RIVLIN. Thank you, Mr. Chairman.

Encouraged by your invitation, I have asked Ray Scheppach, who is the assistant director in charge of this subject at CBO to join us at this table.

Mr. Chairman, I am pleased to appear before this subcommittee to discuss alternative policies that could be adopted to minimize the negative economic consequences of an oil import curtailment. In my remarks today, I will address the following topics very briefly:

The economic effects of various types of oil supply interruptions;

The goals to pursue in developing a policy to mitigate the negative impacts of such an interruption; and

Alternative policy responses and their relative advantages and disadvantages.

Oil import reductions would have several impacts that might require a Federal Government response. An oil shortage would increase the international price of the remaining petroleum traded on the world market.

If the price of domestic oil had been completely decontrolled, as is scheduled to happen at the expiration of the Energy Policy and Conservation Act on September 30, 1981, then domestic oil prices would also rise to the higher international level.

These price increases would cause a shift in real income from domestic consumers of petroleum products to producers, both foreign and domestic. This shift in real income would, in turn, decrease overall aggregate demand and, therefore, real output.

In addition to the loss resulting from the price increases, there would be a short-run reduction in output because petroleum products would not be available in certain regions or to certain industries. The losses in output and real income, due to both the physical shortage of oil products and their increased prices, would create unemployment and accelerate inflation.

The policy responses to such events should depend on several key characteristics:

The expected size and duration of the curtailment;

The expected behavior of prices during and after the curtailment; and

The expected response of other consumer nations, particularly those belonging to the International Energy Agreement.

The size of the disruption, obviously, could be of various dimensions. Closing the Straits of Hormuz, for example, would reduce world oil supplies by between 13 and 18 million barrels per day, depending on the eventual level of Iranian and Iraqi exports. That could reduce U.S. imports by as much as 5 million barrels per day and, if continued for a year, could reduce real GNP by as much as 10 percent.

A total disruption of Saudi Arabian production could eliminate 9.5 million barrels per day from world supplies. The U.S. share of this shortfall would be about 3 million barrels a day, which could reduce real GNP by up to 5.5 percent after 1 year.

The destruction of Iranian and Iraqi capabilities would reduce world supply by about 5 million barrels per day and, if shared by the Western World, would reduce the U.S. supply by about 1.75 million barrels a day, and cause a real GNP loss of around 3 percent.

Part of the disruption could be offset by drawing upon inventories and by the excess capacity of the remaining producing countries. In this decade, however, only a few major producers will have significant excess capacity—notably, Saudi Arabia, Kuwait, and the United Arab Emirates. Drawing upon private inventories would be difficult to carry out smoothly because of uncertainty about how long the oil curtailment would last.

Another concern is whether the disruption would be temporary or permanent. This might determine whether prices would continue at the new higher level indefinitely or return to some lower level close to their preshortfall level after the disruption ended.

The policy response to a permanent disruption caused, for example, by the destruction of producing facilities or changes in political regimes, might be limited to minimizing short-run panic buying and attempting to accommodate higher long-term prices, presumably through macroeconomic policies and transfer payments.

During a temporary disruption, however, the value of price signals would be decreased. While prices would allocate oil among consumers, they would also produce changes in profits by industry that might be inequitable, and at the same time not provide for the most efficient long-run allocation of resources. Consequently, tax and rationing options may have more appeal during a temporary curtailment, particularly if oil prices decrease substantially after the shortfall.

Policy choices would also depend on the response adopted by the Western signatories of the International Energy Agreement. The importance of multilateral cooperation is best brought out by the responses of the major consuming nations during the shortfall associated with the 1979 Iranian Revolution.

Fearing exclusion from uncertain future supplies, many OECD governments directed their national oil firms into the spot market, where they competed against each other and drove spot prices upward. The spot price then became an indicator for higher contract prices for all consumers.

To prevent this from happening in a new emergency, restraints would have to be universally accepted by major consuming nations. If IEA countries could also agree to share the existing oil supply via quotas, or to impose an oil import fee multilaterally. Both policies might be appropriate for certain levels of shortfalls, but only if imposed multilaterally.

Policies to manage the effects of an oil interruption must be evaluated in relation to the goals to be achieved. The aim would be: To minimize real output and income losses; to mitigate the negative effects on income distribution; to reduce panic and public perceptions of inequity; and to select policies that can be efficiently administered.

The most important goal would be to protect domestic output and real income, and thus minimize resulting unemployment. Of secondary importance, but partly linked to the protection of output, is that consumers should not suffer undue losses in income or purchasing power.

Yet, there may be a limit to which a policy of redistributing income can be pursued without unduly hampering the efficient allocation of petroleum products within the economy. Avoiding

panic is also an important goal, but most policies that are designed to minimize real output losses and to mitigate the effects on income redistribution would serve to allay panic.

The issue of whether or not a policy concerned with oil disruption would be within the administrative competence of the Government is most often raised in conjunction with gasoline rationing. Yet, it is relevant to other proposed policies as well.

All policies depend on information and allocation procedures to be effective. Policies that tax petroleum products and rebate revenues require that the Government be able to estimate at least approximately the extent of upward price pressure, as well as to rebate the tax revenues to the proper recipients rapidly enough to maintain real income levels and equitably enough to allay panic.

A number of policy responses to an oil disruption are possible. The appropriate response might well depend on the nature of the disruption. Some of the advantages and disadvantages of the various policy responses follow.

The first possibility would be for the Federal Government not to initiate any new policy, but to rely totally on the free market to allocate all crude oil and petroleum products during the shortfall.

The windfall profits tax would be applied to increases in domestic crude oil revenues. Increased Government expenditures on existing transfer programs, such as unemployment insurance and food stamps, would help to stabilize the economy. Tax receipts other than the windfall profits tax might decrease.

There are major advantages in using current policies to address oil shortfalls. Not only are they simple and familiar but, more importantly, they would enable an efficient allocation of petroleum products. Existing transfer programs go into effect automatically without the delay and administrative effort needed to implement a new rebating program.

On the other hand, if a disruption in the oil supply grew to significant size, the effect on income distribution might be so large that existing transfer programs would be insufficient to counteract the resulting shift in real income from consumers to producers.

If the shortfall is small and permanent, continuing current policies might be appropriate. If the disruption is temporary, and if world oil prices levels decrease after the curtailment, then such a policy might not provide the best long-run price signals to the economy even though the immediate short-run price signals are correct.

Another possibility is the crude oil refining fee. Under this option, a crude oil refining fee would be collected from refiners for each barrel of oil they process. Such a fee would apply to both foreign and domestic oil. Ideally, it would raise the consumer price of oil to the world price, while keeping the producer price close to that which existed before the disruption.

If the fee were set too low, and price controls were not in place, there would be windfall profits to domestic and foreign producers. If it were set too high, it would likely decrease the profit margin of refiners and oil producers.

In order to decrease the loss of consumer real income, all the revenues from the fee would be rebated to consumers through an immediate reduction in Federal income tax withholding and via

other transfer payments. An equivalent tax on imports of foreign refined products would be necessary to avoid a sizable shift from domestic to foreign refineries.

A crude oil refining fee would have the advantages of being simple to administer and of capturing some portion of the windfall profits created by the disruption and rebating them to consumers. The fee on refiners would also reduce the need for refinery mix controls, since no special incentives or disincentives to change the mix would be created. It might, however, still require some allocation to be made among refiners if small and independent refiners were to maintain their access to crude oil.

The administrative simplicity of a crude oil refining fee suggests that it could be best applied to a small disruption. For a larger shortfall, the rebating of tax revenues would create significant administrative problems. Moreover, as the revenues to be rebated increased, agreement on who should receive the rebates might become more difficult.

An import tariff, which is another possibility, would be most effective if imposed multilaterally by the major consuming nations, but might also be effective if imposed by only one major importer, such as us. The tariff could be paid by all importers of oil or oil products.

A tariff set at the "correct" level would restore producer prices to their predisruption level, and the premium created by the disruption would not accrue to foreign oil producers, but would remain with the consuming nations. If controls were not also imposed on domestic oil, however, its price would rise to the international price of oil, including the tax.

A major advantage of an import tariff, if imposed multilaterally, would be to decrease the transfer of income from domestic consumers to foreign oil producers. On the other hand, sizable tax revenues resulting from a large shortfall might be difficult to rebate equitably.

Another disadvantage of a multilateral tariff is the difficulty that would be experienced in setting and amending the fee. The requirement of international consensus on the fee would reduce its flexibility significantly. This disadvantage might be moderated by the use of other policy options in conjunction with the fee. Thus, if the oil price continued to rise after the tariff was put into effect, other options might be employed to achieve marginal reductions in demand.

A possible third disadvantage is that domestic oil producers would gain by the amount of the tariff under such a program, but part of this gain would be recaptured by the windfall profits tax and corporate profits tax. The reimposition of crude oil price controls could prevent this rise in profits.

An additional potential disadvantage of an import tariff might lie in the response of the producer nations. Many of the price "hawks" within OPEC might view an organized response from the consumer nations as a direct attack on OPEC's control over the oil market, only because it would be.

If this view prevailed, OPEC might retaliate with production cutbacks. Thus, the response of the OPEC nations to a multilateral

import fee, and to any other policy option, must be weighed in assessing costs and benefits.

As to a gasoline tax, the burden of a disruption in oil supplies could be directed to the consumer of gasoline through a higher Federal gasoline tax. Most gasoline is purchased by individual consumers, and only a small percentage is purchased by businesses. Concentrating the effects of a disruption on gasoline consumers might thus partially insulate the economy from an across-the-board inflationary surge, since higher gasoline prices would not affect the input costs of business as strongly as higher prices in general. If it is assumed that higher business costs are translated into long-run higher prices, this could be an important consideration.

A higher gasoline tax would require some Federal authority to regulate the refinery mix in order to insure adequate supplies of gasoline, otherwise the tax might reduce refiners' incentives to produce gasoline. It is assumed that receipts would be rebated to consumers through a rebate plan based on motor vehicle registrations.

Since gasoline demand has historically been less responsive to taxes than the average of demand for all petroleum products, the size of the tax required might be larger than under the other options above. The gasoline tax might, therefore, produce a larger volume of funds to be rebated through the Federal withholding system than would the other alternatives, with corresponding administrative and equity problems.

This option might be limited to a relatively small disruption. Gasoline constitutes only about two-fifths of total oil consumption. A 2-million-barrel a day disruption would reduce gasoline consumption by approximately 30 percent, although it would reduce total oil use by hardly more than 10 percent. Therefore, the ability of a gasoline tax to absorb the effects of an oil shortfall is perhaps limited even at this level.

The relative advantages and disadvantages of the gasoline tax also suggest that it might best be applied to a temporary disruption. Under such circumstances of a relatively small, temporary shortfall, a gasoline tax might serve to insulate the economy from temporary price increases.

Finally, coupon rationing. The Government could restrict purchases of gasoline to those holding coupons issued by Federal authorities. It is assumed that coupon holders would be allowed to sell surplus coupons in a "white" market.

Again, the burden of the disruption would be placed entirely on gasoline purchasers, raising the necessity of imposing controls on refinery mix and oil product prices. Refinery mix controls might be more important under rationing, since gasoline in excess of rationing coupons would be legally marketable. This would greatly reduce incentives to make gasoline. The coupon rationing system could also be extended to other petroleum products, including home heating fuel and residual oil.

Rationing would have several advantages. First, it might minimize the consequences of a very large shortfall on real GNP. Also, the existence of a white market for coupons would allow the transfer of income between consumers, thereby helping to maintain real incomes. Moreover, rationing is a strong deterrent to hoarding, and

might promote public perception that the burden of reduced supplies was being fairly shared.

Rationing does have a number of major disadvantages, however. For a small disruption, the allocations and price controls necessitated by rationing would create an inefficient allocation of petroleum products and thus might exacerbate the reductions in real GNP through inefficiency.

Rationing also requires a bureaucracy to prepare the program and to carry it out. Moreover, a rationing program might be easily undermined by mistakes. Public faith in the rationing might erode quickly if motorists with coupons approach gasoline stations only to find that no gasoline was available.

Moreover, while rationing has real advantages over other options in reducing inflationary pressure on prices, it substitutes for higher prices time spent in line and reduced availability of supply.

In conclusion, Mr. Chairman, it appears that some of the tax options might be appropriate for a small disruption in oil supplies, particularly one that promises to be temporary. Additional analysis and study will, however, be required to determine how effective any specific option would be, and under what circumstances it would be most appropriate.

Thank you.

[Statement follows:]

STATEMENT OF ALICE M. RIVLIN, DIRECTOR, CONGRESSIONAL BUDGET OFFICE

Mr. Chairman, I am pleased to appear before this Subcommittee to discuss alternative policies that could be adopted to minimize the negative economic consequences of an oil import curtailment. In my remarks today, I will address the following topics: The economic effects of various types of oil supply interruptions; the goals to pursue in developing a policy to mitigate the negative impacts of such an interruption; and alternative policy responses and their relative advantages and disadvantages.

THE ECONOMIC EFFECTS

Oil import reductions would have several impacts that might require a federal government response. An oil shortage would increase the international price of the remaining petroleum traded on the world market. If the price of domestic oil had been completely decontrolled—as is scheduled to happen at the expiration of the Energy Policy and Conservation Act (EPCA) on September 30, 1981—then domestic oil prices would also rise to the higher international level. These price increases would cause a shift in real income from domestic consumers of petroleum products to producers, both foreign and domestic. This shift in real income would in turn decrease overall aggregate demand and therefore real output. In addition to the loss resulting from the price increases, there would be a short-run reduction in output because petroleum products would not be available in certain regions or to certain industries. The losses in output and real income, due to both the physical shortage of oil products and their increased prices, would create unemployment and accelerate inflation.

The policy response to such events should depend on several key characteristics: The expected size and duration of the curtailment; the expected behavior of prices during and after the curtailment; and the expected response of other consumer nations, particularly those belonging to the International Energy Agreement (IEA).

The size of the disruption could be of various dimensions. Closing the Strait of Hormuz, for example, would reduce world oil supplies by between 13 and 18 million barrels per day, depending on the eventual level of Iranian and Iraqi exports. That could reduce U.S. imports by as much as 5 million barrels per day and, if continued for a year, could reduce real GNP by as much as 10 percent. A total disruption of Saudi Arabian production could eliminate 9.5 million barrels per day from world supplies. The U.S. share of this shortfall would be 3 million barrels per day, which could reduce real GNP by up to 5.5 percent after one year. The destruction of Iranian and Iraqi capabilities would reduce world supply by about 5 million barrels per day and, if shared by the Western world, would reduce the U.S. supply by about

1.75 million barrels per day, causing a real GNP loss of 3 percent. Part of the disruption could be offset by drawing upon inventories and by the excess capacity of the remaining producing countries. In this decade, however, only a few major producers will have significant excess capacity—notably, Saudi Arabia, Kuwait, and the United Arab Emirates. Drawing upon private inventories would be difficult to carry out smoothly because of uncertainty about how long the oil curtailment would last.

Another concern is whether the disruption would be temporary or permanent. This might determine whether prices would continue at the new higher level indefinitely or return to some lower level close to their preshortfall level after the disruption ended. The policy response to a permanent disruption—caused, for example, by the destruction of producing facilities or changes in political regimes—might be limited to minimizing short-run panic buying and attempting to accommodate higher long-term prices, presumably through macroeconomic policies and transfer payments. During a temporary disruption, however, the value of price signals would be decreased. While prices would allocate oil among consumers, they would also produce changes in profits by industry that might be inequitable and at the same time not provide for the most efficient long-run allocation of resources. Consequently, tax or rationing options may have more appeal during a temporary curtailment, particularly if oil prices decrease substantially after the shortfall.

Policy choices would also depend on the response adopted by the Western signatories of the International Energy Agreement. The importance of multilateral cooperation is best brought out by the response of the major consuming nations during the shortfall associated with the 1979 Iranian Revolution. Fearing exclusion from uncertain future supplies, many OECD governments directed their national oil firms into the spot market, where they competed against each other and drove spot prices upward. The spot price then became an indicator for higher contract prices for all consumers. To prevent this happening in a new emergency, restraints would have to be universally accepted by major consuming nations. The IEA countries could also agree to share the existing oil supply via quotas, or to impose an oil import fee multilaterally. Both policies might be appropriate for certain levels of shortfalls, but only if imposed multilaterally.

#### POLICY GOALS

Policies to manage the effects of an oil interruption must be evaluated in relation to the goals to be achieved. The aim would be: To minimize real output and income losses; to mitigate the negative effects on income distribution; to reduce panic and public perceptions of inequity; and to select policies that can be efficiently administered.

The most important goal would be to protect domestic output and real income, and thus minimize the resulting unemployment. Of secondary importance, but partly linked to the protection of output, is that consumers should not suffer undue losses in income or purchasing power. Yet, there may be a limit to which a policy of redistributing income can be pursued without unduly hampering the efficient allocation of petroleum products within the economy. Avoiding panic is also an important goal, but most policies that are designed to minimize real output losses and to mitigate the effects on income redistribution would serve to allay panic.

The issue of whether or not a policy concerned with oil disruptions would be within the administrative competence of the government is most often raised in conjunction with gasoline rationing. Yet, it is relevant to other proposed policies as well. All policies depend on information and allocation procedures to be effective. Policies that tax petroleum products and rebate revenues require that the government be able to estimate at least approximately correctly the extent of upward price pressure, as well as to rebate the tax revenues to the proper recipients rapidly enough to maintain real income levels and equitably enough to allay panic.

#### ALTERNATIVE POLICIES

A number of policy responses to an oil disruption are possible; the appropriate response might well depend on the nature of the disruption. Some of the advantages of various tax and non-tax policy responses follow.

*Continuation of Present Policies.*—One option would be for the federal government not to initiate any new policy, but to rely totally on the free market to allocate all crude oil and petroleum products during the shortfall. The windfall profits tax would be applied to increases in domestic crude oil revenues. Increased government expenditures on existing transfer programs, such as unemployment insurance and food stamps, would help to stabilize the economy. Tax receipts other than the windfall profits tax might decrease.



There are major advantages in using current policies to address oil shortfalls. Not only are they simple and familiar but, more importantly, they would enable an efficient allocation of petroleum products. Existing transfer programs go into effect automatically without the delay and administrative effort needed to implement a new rebating program. On the other hand, if a disruption in the oil supply grew to significant size, the effect on income distribution might be so large that existing transfer programs would be insufficient to counteract the resulting shift in real income from consumers to producers. If the shortfall is small and permanent, continuing current policies might be appropriate. If the disruption is temporary, and if world oil price levels decrease after the curtailment, then such a policy might not provide the best long-run price signals to the economy even though the immediate short-run price signals are correct.

*Crude Oil Refining Fee.*—Under this option, a crude oil refining fee would be collected from refiners for each barrel of oil they process. Such a fee would apply to both foreign and domestic oil. Ideally, it would raise the consumer price of oil to the world price, while keeping the producer price close to that which existed before the disruption. If the fee were set too low, and price controls were not in place, there would be windfall profits to domestic and foreign producers; if it were set too high, it would likely decrease the profit margins of refiners and oil producers.

In order to decrease the loss of consumer real income, all the revenues from the fee would be rebated to consumers through an immediate reduction in federal income tax withholding and via other transfer payments. An equivalent tax on imports of foreign refined products would be necessary to avoid a sizable shift from domestic to foreign refineries.

A crude oil refining fee would have the advantages of being simple to administer and of capturing some portion of the windfall profits created by the disruption and rebating them to consumers. A fee on refiners would also reduce the need for refinery mix controls, since no special incentives or disincentives to change the mix would be created. It might, however, still require some allocations to be made among refiners, if small and independent refineries were to maintain their access to crude oil.

The administrative simplicity of a crude oil refining fee suggests that it could be best applied to a small disruption. For a larger shortfall, the rebating of tax revenues could create significant administrative problems. Moreover, as the revenues to be rebated increased, agreement on who should receive the rebates might become more difficult.

*Import Tariff.*—An import tariff would be most effective if imposed multilaterally by the major consuming nations, but might also be effective if imposed by only one major importer, such as us. The tariff could be paid by all importers of oil or oil products. A tariff set at the "correct" level would restore producer prices to their pre-disruption level, and the premium created by the disruption would not accrue to foreign oil producers but would remain with the consuming nations. If controls were not also imposed on domestic oil, however, its price would rise to the international price of oil, including the tax.

A major advantage of an import tariff, if imposed multilaterally, would be to decrease the transfer of income from domestic consumers to foreign oil producers. On the other hand, sizable tax revenues resulting from a large shortfall might be difficult to rebate equitably. Another disadvantage of a multilateral tariff is the difficulty that would be experienced in setting and amending the fee. The requirement of international consensus on the fee would reduce its flexibility significantly. This disadvantage might be moderated by the use of other policy options in conjunction with the fee. Thus, if oil prices continued to rise after the tariff was put into effect, other options might be employed to achieve marginal reductions in demand. A possible third disadvantage is that domestic oil producers would gain by the amount of the tariff under such a program, but part of this gain would be recaptured by the windfall profits tax and corporate profits tax. The re-imposition of crude oil price controls could prevent this rise in profits.

An additional potential disadvantage of an import tariff might lie in the response of the producer nations. Many of the price "hawks" within OPEC might review an organized response from the consumer nations as a direct attack on OPEC's control over the oil market. If this view prevailed, OPEC might retaliate with production cutbacks. Thus, the response of the OPEC nations to a multilateral import fee, and to any other policy option, must be weighed in assessing costs and benefits.

*Gasoline Tax.*—The burden of a disruption in oil supplies could be directed to consumers of gasoline through a higher federal gasoline tax. Most gasoline is purchased by individual consumers; only a small percentage is purchased by businesses. Concentrating the effects of a disruption on gasoline consumers might thus partially insulate the economy from an across-the-board inflationary surge, since

higher gasoline prices would not affect the input costs of business as strongly as higher oil prices in general would. If it is assumed that higher business costs are translated into long-run higher prices, this could be an important consideration.

A higher gasoline tax would require some federal authority to regulate the refinery mix in order to ensure adequate supplies of gasoline. Otherwise, the tax might reduce refiners' incentives to produce gasoline. It is assumed that receipts would be rebated to consumers through a "prebate" plan based on motor vehicle registrations. Since gasoline demand has historically been less responsive to taxes than the average of demand for all petroleum products, the size of the tax required might be larger than under the other options mentioned above. The gasoline tax might therefore produce a larger volume of funds to be rebated through the federal withholding system than would the other alternatives, with corresponding administrative and equity problems.

This option might be limited to a relatively small disruption. Gasoline constitutes only about two-fifths of total oil consumption. A 2-million-barrel-per-day disruption would reduce gasoline consumption by approximately 30 percent, although it would reduce total oil use by hardly more than 10 percent. Therefore, the ability of a gasoline tax to absorb the effects of an oil shortfall is perhaps limited even at this level. The relative advantages and disadvantages of the gasoline tax also suggest that it might best be applied in a temporary disruption. Under such circumstances of a relatively small, temporary shortfall, a gasoline tax might serve to insulate the economy from temporary price increases.

*Coupon Rationing.*—The government could restrict purchases of gasoline to those holding coupons issued by federal authorities. (It is assumed that coupon-holders would be allowed to sell surplus coupons in some sort of a "white" market.) Again, the burden of the disruption would be placed entirely on gasoline purchasers, raising the necessity of imposing controls on refinery mix and oil product prices. Refinery mix controls might be more important under rationing, since gasoline in excess of rationing coupons would be legally unmarketable. This would greatly reduce incentives to make gasoline. The coupon rationing system could also be extended to other petroleum products, including home heating fuel and residual oil.

Rationing would have several advantages. First, it might minimize the consequences of a very large shortfall on real GNP. Also, the existence of a white market for coupons would allow the transfer of income between consumers, thereby helping to maintain real incomes. Moreover, rationing is a strong deterrent to hoarding, and might promote public perception that the burden of reduced supplies was being fairly shared.

Rationing does have a number of major disadvantages however. For a small disruption, the allocations and price controls necessitated by rationing would create an inefficient allocation of petroleum products and thus might exacerbate the reductions in real GNP through inefficiency. Rationing also requires a bureaucracy to prepare the program and to carry it out. Moreover, a rationing program might be easily undermined by mistakes: public faith in rationing might erode quickly if motorists with coupons approached gasoline stations only to find no gasoline was available. Moreover, while rationing has real advantages over other options in reducing inflationary pressure on prices, it substitutes for higher prices time spent in lines and a reduced availability of supplies.

In conclusion, Mr. Chairman, it appears that some of the tax options might be appropriate for a small interruption in oil supplies, particularly one that promises to be temporary. Additional analysis and study will, however, be required to determine how effective any specific option would be, and under what circumstances it would be most appropriate.

## POLICY OPTIONS TO MITIGATE THE NEGATIVE IMPACTS OF OIL IMPORT REDUCTIONS

### SECTION I. INTRODUCTION

On September 30, 1981, the President's authority to invoke emergency powers to deal with a disruption in U.S. oil supplies expires. This authority derives from the Emergency Petroleum Allocation Act (EPAA) of 1973, as amended by the Energy Policy and Conservation Act (EPCA) of 1975. These acts allow the President to control the prices of domestic crude oil, the price mark-ups or margins on refinery operations, and the allocation of crude oil and refined products. The Iran-Iraq conflict highlights U.S. vulnerability to supply shortfalls and emphasizes the need for Congressional decision in this area. The major issues facing the Congress are the extent of which the current authority should be extended, and whether or not the President should have additional standby authority to use during future curtailments of oil imports. Alternative policies run the spectrum from options calling for

taxes on oil import, crude oil, or gasoline, through rationing through odd/even days and minimum purchase plans to more extreme coupon rationing schemes for gasoline or even all petroleum products.

This paper presents a preliminary framework for analyzing various alternative emergency policies and presents some tentative simulation results of the effects of alternative options. A more detailed study on these issues will be published within a few months.

The next section specifies the characteristics of a disruption that are important in determining policy responses, while the subsequent section discusses the various alternative policy options and their major advantages and disadvantages in minimizing the economic effects of an oil import curtailment. The final section presents some tentative results of the various policy options, based on some preliminary simulations with the Wharton Econometric Model.

## SECTION II. CHARACTERISTICS OF POTENTIAL OIL SUPPLY DISRUPTIONS

The desirability of the various policies for dealing with supply disruptions depend considerably on the characteristics of the event they are intended to address. In this section, the salient characteristics of potential disruptions are discussed, with particular regard to how the nature of the disruption might affect the specific goals towards which each policy is directed. These characteristics are as follows: The size and duration of the disruption; the behavior of prices during and after the curtailment; and the response of consumer nations, particularly the nature of the International Energy Agreement (IEA).

### *Size and duration*

The magnitude of a potential disruption could vary considerably. Closing the Strait of Hormuz would reduce supplies by between 13 and 18 million barrels per day, depending on one's assumption concerning Iranian and Iraqi exports. (In addition to production from these two nations, about 13 million barrels per day from other nations transit the Strait.) Such an event could reduce U.S. supplies by approximately 5 million barrels per day and, if continued for a year, would lower U.S. real GNP by 10 percent.<sup>1</sup> A total disruption of Saudi Arabian production could eliminate 9.5 million barrels per day from world supplies. The U.S. share of this shortfall would equal 3 million barrels per day, and this would reduce U.S. real GNP by about 5.5 percent after one year. Saudi Arabian production could be cut by as much as 5 million barrels per day if a regime dedicated to conservation took power. Destruction of Iranian and Iraqi capabilities would have an equal effect. The U.S. share of such a curtailment under these situations would equal 1.75 million barrels per day, resulting in a real GNP loss of approximately 3 percent. While these GNP estimates may not be exact, they do convey the magnitudes of the losses the economy would face should oil supplies be interrupted.

The impact of disruption is likely to be affected by the extent to which market slack, either through using existing stocks or excess producing capacity, exists or can be solicited. In this decade, significant excess capacity will be limited to a few major producers, notably Saudi Arabia, Kuwait, and the United Arab Emirates. Iraq may have such capacity after rebuilding the facilities destroyed in the current hostilities; Mexico may be able to bring new capacity on-line quickly. The excess capacity of some nations that have traditionally replaced oil lost to world markets by disruptions—Venezuela and Nigeria—may decline. Thus, long-term excess capacity will probably be configured as it is now—centered in Saudi Arabia, and dependent on the special United States-Saudi relationship. Moreover, most nations with spare capacity are generally those assumed to be involved in by hypothesized disruptions. Thus, the mitigating role of spare capacity is limited. In addition, when it is available, the costs of obtaining this spare capacity production through diplomatic or economic concession must be weighed against the costs of enduring shortfalls, mitigated with other policy tools.

Stocks suggest one avenue of relief. Stock levels are theoretically easy to translate into numbers of days of consumption at alternate rates. In reality, stock depletion is rarely so orderly because of the uncertainty concerning how long the oil import curtailment would last. It is certainly true that larger aggregate stocks would result in more moderate price increases when supply is cut, however. When the Strategic Petroleum Reserve is complete, the critical importance of choosing the proper policy would be reduced. The reserve will not be large enough to alleviate a supply disruption until 1985, however.

<sup>1</sup> See Congressional Budget Office, "An Evaluation of the Strategic Petroleum Reserve" (June 1980).

### *The behavior of prices during and after a curtailment*

A concern as important as the size of the disruption is whether the disruption is transient or permanent. This might affect whether or not prices would continue at the new, higher level, indefinitely or return to some level close to their pre-shortfall level after the disruption ends. Permanent disruption, exemplified by destruction of producing facilities or changes in regimes, would limit the policy response to one of minimizing short-run panic buying, and attempting to accommodate higher long-term prices, presumably through macroeconomic policies and transfer payments. During transient disruptions, however, the value of price signals would be decreased. In such a situation, prices would operate as an allocative device for consumers, and would do so through lowered real incomes. The nation might, however, not want prices to carry out their larger function of determining profits and the subsequent character of investment and growth if they were at temporary, and illusory, levels. Thus, policies that are intended to insulate the economy from higher energy prices might be appropriate in a transient situation, but inappropriate in a permanent one.

In fact, it is possible that future disruptions would not result in price increases as large as those experienced in the past. Put in other terms, the elasticity of demand may be increasing. A consensus is emerging that oil prices might have risen substantially in the 1970s even without the catalyst of the OPEC oil embargo. This could mean that, despite the continued presence of OPEC price-setting, the oil market may function more like a competitive market in the future than it has in the past decade. Therefore, if an oil import curtailment is only temporary, oil prices might in fact fall when production is restored.

### *The response of consumer nations*

The choice of a U.S. policy option will also be influenced by the adoption or rejection of a common policy response by the Western nations of the International Energy Agreement (IEA). The importance of multilateral cooperation is best exemplified by the demand responses of the major consuming nations in 1979. Fearing exclusion from uncertain future supplies, many of the major industrialized nations directed their national oil firms into the spot market. By competing against each other, these governments drove spot prices upwards. The spot price then became a premise for higher contract prices for all consumers. To be effective, restraints on this type of behavior must be universal among the major consuming nations. If a "consumers' cartel" were formed, each nation would have to restrain their temptation to buy, at lower than market prices, some of the excess supplies created by the cartel's behavior.

The IEA mandates oil sharing in the event any of the signatory nations faces a shortfall of 7 percent of consumption. An event that withdrew approximately 3.0 million barrels or more from world markets would probably satisfy this criterion. Although no IEA members seem eager to test the cohesiveness of the agreement under stress, the existence of the IEA provides a device through which policy options that call for a multilateral response could be implemented.

## SECTION III. GOALS FOR DISRUPTION POLICIES

Policies to manage the effects of oil interruptions must be evaluated through the goals defined for them. There are five possible policy goals: Minimizing real output and income losses; mitigating the negative effects on income distribution; promoting the efficient use of available energy; allaying panic buying and perceptions of inequity; and ensuring administrative efficiency and flexibility.

### *Minimizing income losses*

The impact of an oil disruption on real income and output comes from two sources. Immediate reduction occurs as the reduced availability of oil and other fuels induces lower output and, subsequently, "bottlenecks" (scarcities of goods used as inputs in the production of other goods) develop. As production is constrained by these scarcities, unemployment rises, and, when coupled with the real income effects of higher oil prices, aggregate demand is lowered. This secondary effect compounds the real output loss. Moreover, oil price increases during a transient disruption can trigger additional reductions in output, initially in energy-dependent sectors such as auto, rubber, and steel, because of perceptions of even higher future prices and reduced availability.

The bottleneck effect perpetuates inflation through scarcity of inputs and intermediate goods. The income effects of higher oil prices could be partially addressed through taxing oil products and rebating the proceeds to consumers. Rebates would, however, exacerbate the oil price rise. Thus, attempts to restore real income through rebates would probably have an inflationary bias.

*Mitigating negative effects on income distribution*

Price increases during oil disruptions result in transfers of billions of dollars in income from consumers to producers. This would be particularly important if disruptions, and the resulting price increases, were temporary. Temporary price increases under such a situation would transfer large amounts of income while not providing the long-term signals that induce structural changes in the economy since most individuals would recognize the temporary nature of the problem. Thus, under a transient shortage, price increases would serve to allocate goods, but would not induce long-term reactions. It is unclear whether the large transfers of income inherent in such a short-term allocation are necessary or desirable. The Congress has addressed this issue for the long term, through the conventional corporate income tax and its passage of the windfall profits tax. Under a transient disruption, the problem of additional windfall revenue would once again be relevant for the short term.

Moreover, the effects of higher oil prices may be distributed unequally across income classes, within income classes, and across regions. As a proportion of income, poorer families spend more on heating fuels and gasoline. In addition, such comparisons overlook the tremendous variations within income classes. For example, in the lowest quintile of the income distribution, only a fraction use heating oil (or kerosene) as a fuel or own an automobile. Similarly, the Northeast and rural areas are disproportionately dependent on oil products.

*Promoting efficient use of energy*

An additional goal of policy is to promote the efficient use of available energy during and after a disruption. Efficiency is a concern in the substitute of non-oil energy for oil, the refining of oil into needed products, and the flexibility of consumers in buying and using energy.

The potential short-term supply response to higher oil prices is limited—the U.S. industry does not have significant excess capacity. Some acceleration of production from existing properties could be expected if prices rise. Yet price increases during a disruption might be sudden and unpredictable. Uncertainty about future price increases might create a strong speculative component in the supply decision and induce hoarding by producers. To the extent that policy eliminates price uncertainty, it might promote an efficient, if crude, supply response.

A different efficiency consideration is the refinery mix. Options that concentrate the shortfall on gasoline use, or involve price controls, might create incentives for refiners that result in undesirable changes in the mix. Moreover, some degree of aggregate product mix planning might be considered necessary (as was the case in the decision to build heating oil inventories for the 1979-1980 winter in the face of the Iranian Revolution) if policies that affect refinery incentives are implemented.

Efficiency considerations exist for the demand response as well. Household and freight transportation demands are relatively inflexible in the short term, and might be exacerbated by consumer hoarding. This would reduce the efficiency of the demand response. Restrictions such as odd/even days or prohibitions on downtown driving might reduce consumption by limiting the kinds of uses autos might fill, but alone cannot accommodate significant shortfalls. Transferring excess generating capacity and load management might allow some flexibility on electric utilities' oil use. Environmental restrictions on coal burning and restrictions on natural gas hook-ups might be waived to allow greater flexibility in use of available energy in industry.

*Allaying panic buying and perceptions of inequity*

As disruptions grow in size, panic would presumably increase. Such panic leads to hoarding and increased attempts to circumvent the intents of allocations and controls implemented as part of policy. At high levels of disruption, the social cohesion of the nation would presumably be tested. Thus, allaying panic becomes an important goal of policies designed to address oil disruption.

Implementation of an oil disruption policy would create a situation analogous to an incomes policy. In both cases, changes in the distribution of real income are brought into the political process in a formal and visible manner. Thus, the appearance of equity becomes important in its own right, both to reduce panic purchases and to promote compliance with allocation regulations should they be put into effect.

*Ensuring administrative efficiency and flexibility*

The issue of whether or not a policy concerned with oil disruptions is within the administrative competence of the government is most often raised in conjunction with gasoline rationing. Yet all policies require accurate information and allocation procedures to be effective. Policies that tax oil imports, all oil, or gasoline would

require enough knowledge to estimate correctly the extent of upward price pressure. A similar information base might be necessary for any of the alternative rebate schemes.

The inherent uncertainty in any disruption makes flexibility an important characteristic of any policy. Changes in both the size and duration of a shortfall would affect the relative advantages and disadvantages of the policy options. Flexibility is essential in order to rectify losses incurred through improper policy and to respond quickly, if the situation changes and forces a reevaluation of policy choice.

#### SECTION IV. POLICY OPTIONS AND EVALUATION

Possible responses to an oil disruption include the following policy options: Continue present policy, that is, permit decontrol and collect windfall profits taxes, but impose no special rebate of increased tax revenues; impose a crude oil refining fee and rebate scheme; impose an import tariff in conjunction with other major consuming nations; impose a gasoline tax and rebate scheme; and establish a rationing plan.

This section describes and discusses their major apparent advantages and disadvantages. Macroeconomic results were obtained from the Wharton Econometric Model and are considered tentative. Detailed macroeconomic results will be presented in a larger CBO publication on this subject in several months.

##### *Continue present policies*

One option is for the federal government to take a *laissez-faire* approach, that is, not to initiate any new policy but to rely totally on the market to allocate all crude oil and petroleum products during the shortfall. With the expiration of EPCA on September 30, 1981, the government will lose all authority to control crude oil and product prices and to allocate crude oil among refiners. The windfall profits tax would be applied to higher domestic crude oil revenues. Automatic stabilizers, such as unemployment insurance, food stamps, and income taxes, would raise government expenditures while receipts other than the windfall profits tax might decrease.

The major advantages of using current policies to address oil shortfalls are their simplicity and the established treatment for windfall profits received by producers. Existing transfer programs, such as unemployment compensation and food stamps, go into effect automatically without the delay and administrative effort needed to implement a new rebating program. On the other hand, once disruptions grow to significant sizes, their effects on income distribution may be so large that existing transfer programs may be insufficient to counteract the resulting inequities.

The major disadvantage of existing policies is their inability to address the large macroeconomics losses associated with major disruptions. Moreover, current policies would allow large income transfers from consumers to producers despite the existence of the windfall profits tax and other transfer programs. This disadvantage would be exacerbated if the disruption was temporary and the transfers of income were the product of a transient price surge.

Current policies must also be construed to include existing fiscal and monetary policy tools. Real income losses could be reduced through existing mechanisms such as tax reductions or expansions of the money supply. Under current policy, however, income would be redistributed from one income class to another rather than collecting the revenues generated by the disruption from producers and rebating them to all consumers.

These relative advantages and disadvantages suggest that current policies might be most appropriate in cases in which the disruption was small (and presumed not to increase) and permanent. The price signals sent out during a permanent disruption would more accurately reflect new realities in the oil market, and the United States might choose to convey these signals to consumers and producers to speed adjustment to higher long-term oil prices. If disruptions were temporary, then price signals would serve to transfer large amounts of income, creating possible equity problems and reducing consumer real income and, in turn, real GNP. Thus, temporary oil interruptions tend to bring out the relative disadvantages of continuing current policies.

##### *Crude oil refining fee*

Under this option, a crude oil refining fee would be collected from refiners for each barrel of oil they process. Thus, such a fee would affect both foreign and domestic oil. Ideally, such a fee would raise the price of oil to the world price, while restraining producers' per barrel revenue to the price that existed before the disruption. If such a fee were set at this "correct" level, it would effectively function like price controls. If the fee were to be set at too high or low a level, the cost of the incorrect level would have to be weighed against the administrative and efficiency

cost of price controls. In order to decrease the loss of consumer real income, all the revenues would be rebated to consumers through the immediate reduction in federal income tax withholding. An equivalent tax on foreign refined products would be necessary to avoid a sizable shift from domestic to foreign refineries.

A crude oil refining fee has the advantages of being simple to administer and capturing some portion of the windfalls created by a disruption for rebating to consumers. A fee on refiners would also reduce the need for refinery mix controls, since no special incentives or disincentives would be created, but it would still require some allocation controls among refiners, if small and independent refineries were to continue operations. It should be noted, however, that the problem of small and independent refiners exist under all cases in which crude availability declines greatly.

The administrative simplicity of the crude oil refining fee suggests that it might be best applied in situations in which disruptions were small and might decrease. As the size of the shortfall increased, the sheer size of the tax revenues to be rebated might cause equity problems regarding who should receive the rebates. The ability of the government to rebate the revenues fast enough not to have a negative impact on aggregate demand would also be strained at high shortfall levels. The apparent inability of the rebated fee to entirely restore real GNP would be less of a disadvantage when disruptions were small. Furthermore, the relative ease with which it could be amended suggests that it could be phased down or eliminated quickly, should disruptions decrease or cease.

#### *Import tariff*

An import tariff would be most effective if it were imposed multilaterally by the major consuming nations. The tariff could be paid by importers of oil or oil products when they were brought into the United States. A "correct" level of the tariff would restore producer prices to their level prior to the disruption, and the premium created by the disruption would remain in the hands of the consuming nations. As was the case in the discussion of the crude oil fee, the costs of a tariff set incorrectly would have to be compared to the costs of price controls. The presumption of price controls made here does not reflect any comparison of these costs. As with the crude oil refining fee, all the revenues are assumed to be rebated through reductions in federal income tax withholding.

A multilateral import tariff has several advantages. First, it would be relatively strong in restraining declines in real income and GNP, although no policy option is capable of avoiding recession. Moreover, tariffs would convey international benefits, by restraining international competition for scarce crude oil and avoiding a "demand side" push on oil prices as a result of that competition.

The particular disadvantage of the multilateral tariff is the likely difficulty that would be experienced in setting and amending the fee. The requirement of international consensus on the fee would reduce its flexibility significantly. This disadvantage might be moderated by the use of other policy options in conjunction with the fee. Thus, if oil prices continued to rise after the fee was set and implemented, other options might be employed to achieve marginal reductions in demand. Another disadvantage might be that domestic crude oil prices would increase to the international level (including the fee) and, therefore, there would be a sizable transfer of income from consumers to producers. This windfall could be eliminated by price controls, but this would cause other inequities.

An additional potential disadvantage of the fee might lie in the response of the producer nations. Many of the price "hawks" within OPEC might view an organized response from the consumer nations as a direct attack on OPEC's control over the oil market. Production cutbacks might result in those nations if this view prevailed. Thus, the response of the OPEC nations to a multilateral import fee, and to any other policy option, must be weighed in assessing costs and benefits.

The advantages and disadvantages of a multilateral tariff suggest that it might best be applied when disruptions were moderate in size—perhaps up to 2.5 million barrels per day—and were temporary. Once disruption size increased beyond such a level, the advantage of the tariff at reducing real GNP losses would start to decrease, and the control of panic and social divisiveness might become more important policy goals. The tariff has no special advantage at ameliorating panic. Moreover, at levels of disruption approaching 2.5 million barrels per day, the amounts of revenues to be rebated might be so large that a political consensus as to who should receive them would be difficult to achieve. This problem, however, would be common to all policy options. If disruptions were permanent, tariffs would have the advantage of presenting the correct prices to consumers, but of restricting prices to producers. This might sacrifice some production response. Exceptions for synthetic fuels or other new energy sources, however, would reduce this disadvantage to a significant degree.

### *Gasoline taxes*

The burden of the shortfall could be directed to gasoline prices and availability through increased federal gas taxes. Concentrating the disruption in this fashion would serve partially to insulate the economy from an across-the-board inflationary surge, since gasoline is predominantly a final demand. Higher gasoline prices do not affect the input costs of business as strongly as higher oil prices in general. If it is assumed that higher business costs are translated into higher prices that are inflexible downward, this might be a significant effect.

Gasoline taxes would require some federal authority to influence the refinery mix. This might be necessary in order to ensure adequate supplies of gasoline, since incentives for refiners to produce gasoline might be reduced. Rebating of receipts is also assumed, through the Administration's "prebate" plan, based on motor vehicle registrations. Since gasoline demand is less responsive to taxes than the average of all petroleum products, the size of the tax required might be larger. Gasoline taxes would, therefore, also produce a larger volume of funds to be rebated through the federal withholding system than other alternatives which might cause administrative and equity problems.

Another disadvantage is that gasoline taxes might require price and allocation controls on refiners, and would require a ready mechanism for rebating revenues, if the "prebate" plan was put into effect. Moreover, the range of disruption sizes over which the gasoline tax could be applied is limited, since gasoline comprises approximately two-fifths of total oil consumption. Thus, a 2 million barrel per day disruption would reduce gasoline consumption by approximately 30 percent, while it would reduce total oil use by slightly over 10 percent. Therefore, the ability of gasoline taxes to absorb oil shortfalls is perhaps limited even at this level and beyond.

The relative advantages and disadvantages of the gasoline tax suggest that it might best be applied in temporary disruptions that fall within the sizes that this tax could accommodate. Under such circumstances, gasoline taxes might offer some insulation for the economy from temporary price ratchets, and allow for income transfers. It should be noted that the multilateral import fee would convey many of these advantages in similar situations.

### *Coupon rationing*

The government could restrict purchases of gasoline to those holding coupons issued by federal authorities. Again, the burden of the disruption would be placed entirely on gasoline purchases, raising the necessity of imposing controls on refinery mix and oil product prices. Refinery mix controls might be less important under rationing, since gasoline in excess of rationing coupons would be legally unmarketable. This would greatly reduce incentives to make gasoline. Under this arrangement, the windfalls created by the disruption would be transferred to consumers through price controls rather than being related through the income tax system. The coupon rationing system could also be extended to other petroleum products including home heating fuel, residual oil, and so forth.

Coupon rationing conveys two major advantages. Rationing would most likely minimize recessionary pressures, at large levels (approaching 4 million barrels per day) of shortfall. Moreover, rationing would be a strong restraint on hoarding, and might promote perceptions of an equitable bearing of the burden of reduced supplies.

Rationing has disadvantages as well, notably, the significant bureaucratic effort that would be required to prepare a rationing program so that it could be implemented in a timely fashion. Moreover, a rationing program might be easily undermined by mistakes: public faith in rationing might be eroded quickly if motorists approached gasoline stations with coupons only to find no gasoline available. Moreover, while rationing has realistic advantages in reducing inflationary pressure when compared to other options, the definition of inflation is called to question under a system in which physical allocations replace a market system. Rationing translates inflationary pressure into time spent on lines and reduced availability, concealing the true impact of inflation.

Rationing's advantages and disadvantages suggest that it would be best applied when disruptions were large—perhaps 3 million barrels per day—and the goal of promoting stability and social cohesion became more important. As disruptions increased in size, corresponding to events such as a cessation of Saudi production or a closing of the Strait of Hormuz, the pressures on social stability would, presumably, increase. Rationing might be the best available response to this pressure. Yet at levels above 3 million barrels a day, it might be necessary to consider rationing of all petroleum products, not just gasoline.



This advantage might apply to situations in which the disruption was either permanent or temporary. If disruptions were temporary, rationing would provide a method of allocating a shortfall while minimizing inevitable GNP losses. Yet even if disruptions were permanent, rationing might be the only tool available to promote economic, equity, and stability goals while a transition policy to an era of greatly increased energy prices was assembled.

#### SECTION V. MATCHING POLICY RESPONSES TO DISRUPTION SITUATIONS

The preceding preliminary results indicate that there is no best policy for all scenarios, but in fact, for each type of shortfall there may be one or two preferred policy responses. These policy responses will depend primarily on the size of the shortfall, whether or not it is expected to be temporary or permanent (that is, whether oil prices will fall substantially after the shortfall or remain at new, higher levels), and whether multilateral cooperation can be achieved. To a lesser extent, the policy response will depend on the overall strength and inflation of the domestic economy prior to the oil import curtailment. For example, if the economy is under extreme inflationary pressures, then a policy which minimizes inflationary pressures, but sacrifices real GNP might be preferred to a policy which has the opposite effect.

Since the magnitude and duration of a disruption will be uncertain when it begins, policies should be viewed as a continuum. For example, if temporary disruptions are limited to under 1 million barrels per day, current policies, coupled with automobile restrictions such as odd/even day rationing, might be effective and available. As disruptions reach the 1 million barrel per day level, gasoline taxes and multilateral tariffs would begin to demonstrate relative advantages. As disruptions grow in size, gasoline taxes would begin to lose some of their effectiveness, while multilateral tariffs would retain many of their advantages. As disruption size increases beyond 3 million barrels per day, and reducing panic becomes a priority, rationing would become a viable option. Thus, policy choices must be made in recognition of the characteristics of the disruption they seek to address and the likely direction of error in estimating the size and duration of the event.

Consider the cases in which disruptions are permanent. Current policies would retain their advantages at low levels, yet as shortfalls grow, these advantages decrease. Multilateral tariffs might be used as part of a transition to inevitably higher oil prices, although they might force a confrontation with producing nations if the disruption is seen as permanent. Once disruption levels reach 3 million barrels per day or more, rationing, once again, would retain strong advantages.

In summary, the spectrum of possible disruption circumstances suggests that a wide variety of policy approaches will be appropriate under a variety of conditions. Given the uncertainties associated with the nature of future disruptions, policy-makers may opt for greater flexibility in policy response, rather than the selection of a single "appropriate" policy choice.

Senator BRADLEY. Thank you very much, Ms. Rivlin.  
Now, let us go to Mr. Nordhaus.

#### STATEMENT OF WILLIAM NORDHAUS, YALE UNIVERSITY

Mr. NORDHAUS. Thank you very much, Mr. Chairman.

I have some copies of a prepared statement here.

Senator BRADLEY. That will be placed in the record in full.

Mr. NORDHAUS. Thank you.

If you would like, I will probably walk through this, and if it would help to follow my remarks, you are welcome to go with me.

I would like to say at the outset, I find thinking about emergency planning for petroleum shortages one of the hardest questions around. I would like to discuss the issue in three separate sections.

First, I would like to discuss a couple of background issues that I think we must recognize in planning for emergency preparedness. Second, I have some concrete suggestions on how to think about ways of improving our economic resiliency in the face of oil shocks, and third, I have some comments about the emergency tax and tariff suggestions.

Starting with the background on emergency planning, there are five remarks that I think might be worth making here.

First, the United States today has no serious means or policy for dealing with oil emergencies outside of the marketplace, and the marketplace itself is riddled with allocations and price controls. I would say that if you take the combination of price controls and rationing, at best these are self-canceling. We might be better off without them. I will come back to that in a second.

The central point is, 7 years, 1 month and 1 week after the first embargo, we still don't have a serious policy.

Second, I regard it as one of the lessons of history that we cannot set up emergency plans after the event. They have to be set up ahead of time. Our political system—I don't want to tell you about our political system, Mr. Chairman, but for the record, our political system is too slow to set up these programs afterwards.

We are now in the middle of our third supply interruption in 7 years. During the first one we acted perversely. In the second two we had the wisdom to sit on our hands. I don't see any reason to think that we will act more wisely in the future.

The third general point I would make is that the chief difficulty in dealing with shortages is uncertainty. We just don't know much at all about what kind of shortage we will have, how big it will be, how long it will last, what our inventory situation will be, what the makeup of Congress will be, what the relations between the branches of Government will be.

This uncertainty can be put technically as saying, we don't know how high prices will have to rise to clear the market. We don't know how long they will have to stay high. This, again, exacerbates the problem of designing an appropriate policy response.

Fourth, is a remark that is not in the prepared statement, but occurred to me as I was coming up on the plane as I read hearings you attended last year with Doug Robinson. I think that we may have been planning for the wrong contingency.

We have been thinking that we were going to get our heads sliced off in an oil curtailment, but I think that it is more accurate to say that we are going to die death by a thousand cuts.

That is to say, we are going to be hurt a little here, and hurt a little there, and at the end of the decade we may find that our oil supplies are down 10 million barrels a day from little tiny things that it is very difficult to respond to.

It is not that we should not plan for 10 million barrels a day emergencies, but I think it is more likely we will have a lot of small curtailments, such as the current one, and those are the ones that we should design our institutions for.

Senator BRADLEY. Do you have a definition of small and large?

Mr. NORDHAUS. I guess small is one that I would define as being able to be handled by a combination of price system plus taxes, without the necessity to invoke emergency rationing schemes. I would guess that a curtailment of more than 20 percent of our total supply, which is a very, very big curtailment, would definitely be an emergency or large situation.

I, again, find it much more likely that we are going to have to deal with rising prices in the context of a lot of small cuts.

Finally, a very controversial point, I think in dealing with this problem, we have to take into account the comparative advantages of the different institutions in the United States. It is somewhat like when we play tennis, we have to take into account whether we are left handed, or right handed.

I think that it is a fact of life, particularly in this area, that private institutions find it easier to deal with shortages, stockpiles, and allocations than do public institutions. I think the quality, not of the people, but of the actual decisions that have been made by the Federal Government over the last 7 years is extremely poor, and has actually exacerbated the problem.

If this is correct, I think it means that we should probably lean toward the private sector as a place for our reaction wherever that is possible.

Given these background remarks, let me now make four remarks on actual planning in the concrete suggestions for planning about oil emergencies.

It is absolutely necessary to distinguish the long run from the short run. The needs, if you actually look at what people have to do in the long run and the short run, they are very different kinds of things.

In the long run, our need is to reduce oil imports and lower pressure on prices in world markets. The best way to do this is by changing the kind of capital stock we own; and the best way to do that, in my view, is through a combination of either import tariffs on petroleum products, or taxes on domestic consumption.

The short run is a very different kind of animal——

Senator BRADLEY. You say that this would change the capital stock?

Mr. NORDHAUS. To give you an example. If we put a \$1 or a \$2 tax on gasoline that would certainly change the capital stock in the form of the kind of car we drove, away from large gas guzzlers toward covered lawnmowers, golf carts, and things like that. [Laughter.]

In the short run the problem is different because we cannot change our capital stock. Our capital stock is given. In fact, I think that it is fair to say that living patterns, our lifestyles are also very difficult to change. What this suggests, in the short run, is a rather different strategy, and that is, first, to build stockpiles in advance for release when there are shortages; second, to induce emergency short-run conservation. I think that when people think about it, these are two fairly obvious points, but I think they are often overlooked in design.

Again, to be concrete, if we think about the time horizons involved, in the long run we want to tax gasoline to induce consumers to buy fuel efficient cars. In the short run we have to raise prices to induce to carpools, or to stay home, or to induce producers to release oil stocks.

Looking backward, so to speak, we need to allow producers today to feel confident the prices will rise in the future so that they will build stocks today to release them when the prices rise in the future.

In my own experience, and George Eads might comment on this as well, in looking at how we have dealt with problems in this

economy, if petroleum is one of the models of how not to behave, I think we have models of good behavior, so to speak. I would point to the way we have handled grain policy as close to a model of success as we have in our economy.

It is interesting to note that if you go back and look at grains, corn, wheat, and so on, that we have had during 3 years in this decade production shocks of the same order of magnitude as the production shocks that we had for oil.

In each of those, of course, there was a lot of grumbling, and I grumbled, and the prices shot up. But, somehow, we managed them, and there were not lines in the grocery stores to buy loaves of bread, the way there were at the gas stations.

Senator BRADLEY. Not in New Haven.

Mr. NORDHAUS. I cannot speak of other places. There were lines in 1973 when there were price controls on bread, but after 1973 there were none that I know of, but I could be wrong. [Laughter.]

Mr. NORDHAUS. I think there are two basic points. First, the stockpile decisions were made basically in the private sector on the basis of calculations of private profitability.

It is very interesting, if you look at the behavior in grains, when prices went up after a bad harvest, people ran down stockpiles, which is a sensible kind of thing to do. But the absolutely amazing thing, if you look at oil, is that every time there is an emergency, people don't release stocks, they build stocks.

I think that one of the important lessons of the first oil embargo was that at the end of the embargo the United States had more stocks of petroleum than at the beginning. That, I dare say, is a perverse way to behave.

The point about building stocks is to release them in times of emergency, to release them in times of high prices, as a way of preventing the kind of runup and shortages, and lines that we have seen.

This suggests, then, two general principles that in my view we should build into any emergency program. The first is, and this will make many people gag, but I think that it is a reality and you called for realities, Mr. Chairman.

I think we have to encourage, rather than discourage, the speculative holding of oil stocks throughout our economy. We must encourage people to buy cheap and sell dear, because that kind of behavior is price stabilizing. It is in the economic interest of the Nation.

It is a simple economic fact that we have seen in grain and other markets where stockpile behavior is important, that by encouraging speculative behavior we build up stocks expected to be released when there are production curtailments and prices are high.

I think, as a corollary to this, we might consider whether we want to export from the grain market into the oil market some of our programs to encourage stock holding in the private sector. I will not go into this now, but there are a couple of ideas in the statement.

Finally, let me say that I think the final issue in emergency preparedness is the question of price controls. My own view on this is that decontrol of oil prices is the absolute precondition for rational behavior during emergencies.

There can be no gain to speculators if prices at which speculators' stocks are sold are not allowed to rise sharply in times of shortage. Any plan for encouragement of private holding of stocks is silly without decontrolled oil prices. I think the way to rationalize the perverse behavior of oil stocks, both in the embargo and the Iranian crisis, was simply that they were perverse because of the presence of price controls.

Finally, let me comment on issues that concern emergency oil tariffs and taxes. The purpose of these plans, as Ms. Rivlin has noted in her remarks, is to raise taxes or tariffs in order to raise prices to consumers, and to prevent excessive income transfers to producers or to speculators. While this is not my first choice of policy, it is not my last, either. It does have problems. There are two strong points about such a tariff or tax scheme.

First, it would provide strong signals to consumers to conserve. Under some proposals the signals would extend only to gasoline, and in others to all products.

A second strong point is that the tax/tariff schemes might siphon off some of the windfall gains from owners of oil and return these to consumers.

There are, however, five fairly serious weak points in the tax/tariff schemes.

Senator BRADLEY. Are you talking about five weak points of all the tax/tariff schemes? Is it a generic problem?

Mr. NORDHAUS. I will try to distinguish as I go along. All points do not apply to all schemes. But I think you will see which do and which don't as we go along.

The first one is that by putting on a tax and tariff, presumably the price that will be received by producers and speculator-stockpilers will be reduced. By reducing the profitability of speculative stockpiling, we will reduce the buildup of speculative stocks.

I personally would rather give up the profits and have the stocks, than take the profits from nonexistent stocks. That is the first point.

The second one is, and this is one that I have a lot of difficulty with, some of the schemes rely on price controls and allocations. I am never very clear on which do. I don't think the people who design these are always clear either.

As I suggested earlier, price controls and allocations may be extremely perverse in their effects on stockpile behavior. Moreover, there are some technical difficulties that arise. For example, there was a recent paper that suggested that if you put coupon rationing in with price and allocations, it may have absolutely no effect on the outcome.

A third point is one that Mr. Eads presented to you in a letter in the last hearings, which is that it is extremely difficult to predict what the tax or tariff that clears the market will be.

The elasticity uncertainty means that it may be difficult to set it. Now, one way of getting around it is to adjust it quite often, but there may be difficulties with that as well. I think it is a technical difficulty, but I think that it is one that we have to keep in mind.

Fourth, I view the limitations of control schemes to gasoline as perhaps the most serious deficiency of any, of either the rationing

plans or the emergency tax as a substitute for coupon rationing plans.

Automotive use is but 40 percent of oil use. After exemptions it will probably be only 30 percent. Raising oil prices, all oil prices, allows the burden of adjustment to be spread over the entire economy rather than impose only on the traveling saleswoman.

Finally, I am a little nervous about the tax flows involved in a huge tax plan. A \$5 per barrel emergency tax will collect \$5 billion in a year. This is approximately the revenues collected by the Federal Government at the present time.

If these funds are impounded because of legal challenge, or they sit waiting for the Congress and Executive to agree on a distribution formula, economic losses may mount very, very quickly, and may become quite sizable.

In summary, Mr. Chairman, I think that I would point to trying to design policies which would encourage private sector reactions as the appropriate way to prepare for oil shocks.

Encouragement of stockpiling seems to me to be the first priority. Dismantling the current system of allocations and price controls is a necessary condition for allowing appropriate conservation and speculative stockpiling behavior.

Finally, capturing the capital gains from speculation on oil stocks, beyond those captured under the current windfall profits tax, corporation taxes and personal income taxes, should be undertaken with extreme caution.

Thank you very much.

[Statement follows:]

#### REMARKS ON PLANNING FOR PETROLEUM SHORTAGES BY WILLIAM NORDHAUS

I find emergency planning for petroleum shortages one of the hardest economic questions around. I would like to organize my prepared remarks around three sets of issues. First, I will address the background in which emergency preparedness takes place. Second, I present some suggestions for how to think about concrete plans to improve our economic resiliency in the face of oil shocks. Third, I will make a few remarks about the emergency tax and tariff suggestion.

What kind of environment must emergency planning operate in? There seem to me four points worth making here:

First, outside a market riddled with allocations and price controls, the U.S. has no serious means or policy for dealing with emergencies today. I regard the existence of price controls and an extremely cumbersome rationing plan as, to be charitable, self-cancelling.

Second, it is impossible to set up emergency plans after the event. Our political system is too slow. We have been through three instances of supply interruptions in seven years. In the first we acted perversely. In the second two we sat on our hands. I see no grounds for thinking that the United States would act more wisely or correctly the next three emergencies than it has the last three.

Third, the chief fact about shortages is uncertainty. We don't know in advance how big an emergency will be; we don't know how frequent it will be; we don't know how long it will last; we don't know in advance what our inventory situation or political response will be. Putting the problem more technically, we don't know what the increase in the social cost (or shadow price) of oil will be, or how long the high shadow price will stay high.

Finally, we must take into account the comparative advantage of different institutions in the United States. It is a fact of life that public sector decisionmaking is of poorer quality than private sector decisionmaking. Just as in playing tennis, we should consider our hand-dominance in deciding in which hand to place the tennis racquet; so in economic policy we must take into account that Federal agencies or legislative bodies act slowly and often perversely. This suggests that we should probably lean toward the private sector as a locus for response wherever possible.

## WHERE SHOULD WE GO FROM HERE

Given these rather downbeat views on the state of preparedness for oil shocks, where should we go from here? I would make four points in regard to future policies.

First, we must absolutely distinguish the long run from the short run. In the long run our need is to reduce our oil imports and thereby lower pressure on prices in world markets. The best way to do this is by import tariffs on petroleum or taxes on domestic consumption of oil products.

To prepare the nation better to weather short run supply shortfalls requires a different strategy. In the short run we cannot change our capital stock or living patterns drastically without high cost. Instead, there are two strategies for getting through periodic crises: building stockpiles and inducing emergency short run conservation. There is little disagreement on the central role of these two aspects of short run damage limitation in periods of supply curtailment; the only difficulty is how to attain them.

Putting the point about time horizons differently, in the long run we have to tax gasoline to induce consumers to buy fuel-efficient cars; in the short run, we must raise prices to induce consumers to carpool or stay home and to induce producers to release oil stocks.

Of course, the short run shades off into the long run at some point that is difficult to know in advance—when did the Iranian revolution become a permanent decline in production? when will the Iran-Iraq war be seen as an indefinitely lower level of output from those countries: This reiterates the point I made above about the central nature of uncertainty in planning for oil curtailments. The nice thing about allowing higher prices in response to shortages is that it gives the appropriate signal to consumers and producers for both the short and long run.

Second, I would like to point to a model of success in coping with production uncertainties in another sector of the U.S. economy: grains. It is interesting to note that we have had shocks in grains of the same order of magnitude in three years during the 1970s. And while there has been grumbling—and occasionally prices have shot up—the grain crises have been managed.

What is the secret to the success in grains? I see two central points. First, stockpile decisions have been made basically in the private sector on the basis of calculation of private profitability, and they have generally been appropriate rather than perverse. That is to say, when there are shortages grain stocks were run down. One of the absolutely amazing points about oil is that during emergencies oil stocks increase rather than decline. This indicates that the institutions we have set up are acting perversely. Second, I regard the Federal grain stockpile program as well designed to encourage useful buildup of grain stocks. We encourage stockpiling when prices are low and draw down when prices are high. Moreover, we have given incentives to farmers and others in the private sector to hold stocks and to dispose of them when profitable—i.e. when prices are high.

Third, there are two general principles we should build into any emergency program:

(a) We must encourage rather than discourage speculation on holding of oil stocks throughout our economy. We must encourage people to buy cheap and sell dear, for such behavior is price-stabilizing and in the economic interests of the nation. I know that such a principle will lead some to gag, but it is a simple economic fact that by encouraging speculative behavior we will build up stocks for profitable release—but for release—when oil shocks and high prices occur.

(b) We might think seriously about whether to encourage private holding of oil stocks rather than public holdings in the strategic reserve. Such a route could be to contract out to the private sector to store, say, 100 to 500 million barrels. The release would be made on a private decision, but might be constrained so that a price rise of no less than 10 percent must first occur.

The encouragement of private rather than public stocks is rationalized easily by looking at the never-ending series of mistakes and debacles in SPR—delays in setting it up, the months when it couldn't be removed, the Saudi veto, and so forth. Using the route of private stocks would avoid many of the pitfalls of the SPR.

Fourth, I would like to offer a modest proposal to effect the principles I have outlined:

(a) We must start with a decontrol of oil prices. There can be no gain to speculators if prices at which speculative stocks are sold are not allowed to rise sharply in times of shortage. Any plan for encouragement of the private holdings of stocks is silly without decontrolled oil prices.

(b) Further, we must be cautious about standby controls on oil prices. These clearly are almost as chilling to speculative behavior as actual price controls. We cannot, like Ulysses, tie ourselves to the mast by writing into the Constitution a

prohibition not to control oil prices: but avoidance of standby controls is a useful signal that speculators will receive the gains from stockpiling.

(c) Any policy we follow must take account of the international context of oil policy and oil economics. Our international obligations may require us to share any oil shortfall. The best way to fold in a policy like the one I am discussing—or rationing and tax plans—is to use an import quota on crude oil and products. This will assure that we meet our international obligations on reducing imports and will allow the stockpile program to keep domestic prices from rising enormously.

(d) Finally we should think carefully about a program to encourage private stocks of petroleum. I mentioned above the idea of contracting out for a certain amount. Another possibility would be to allow a tax credit of, say, one dollar per barrel per year for any private stocks. These suggestions are volleys off the wall and clearly much more thought needs be given before any implementation.

#### COMMENTS ON AN EMERGENCY OIL TARIFF

Given these views, how would I react to the proposal of an emergency oil tax or tariff? Such a plan would raise taxes or tariffs in order to raise prices to consumers and to prevent excessive income transfers to producers or speculators. It is not my first choice, but then again it is not my last choice.

The strong points about the tariff are:

(a) It would provide strong signals to consumers to conserve. Under some proposals the signals would extend only to gasoline; in others to all oil products.

(b) The tax/tariff would siphon some of the "windfall gains" away from owners of oil and return, or allow return, of the incomes to consumers.

There are four fairly serious weak points, however:

(a) first, it takes away some (perhaps all) the profitability of speculative stockpiling, and therefore kills the goose that lays and hoards the golden egg. Put differently, I would rather give up the profits and have the stocks than turn the profits from non-existent stocks over to the Treasury.

(b) Second, there may be technical difficulties of quickly adjusting the tariff or tax to a very volatile world oil price.

(c) Third, I view the limitation of control schemes to gasoline as the most serious deficiency of any of the existing rationing plans and of the emergency tax-as-a-substitute-for—ration—coupon plans. Automotive use is but 40 percent of oil use; after exemptions it will be only 30 percent. Raising oil prices allows the burden of adjustment be spread over the entire economy rather than imposed only on the traveling saleswoman.

(d) I am somewhat nervous about the tax flows involved in a huge tax plan. A \$5 per gallon emergency tax will collect \$500 billion in a year. If the funds are impounded because of legal challenge or sit waiting for the Congress and Executive to agree on a distribution formula, economic losses may mount very quickly.

In summary, I feel we should move sharply toward private sector reactions as the appropriate way to prepare for oil shocks. Encouragement of stockpiling seems to me the first priority; dismantling the current system of allocations and price controls in oil is a necessary condition for allowing appropriate conservation and speculative behavior; capturing capital gains from speculation on oil stocks beyond those captured under current windfall profits taxes, corporation taxes, and personal income taxes should be undertaken with extreme caution.

Senator BRADLEY. Thank you very much, Mr. Nordhaus.

Mr. Rowen?

Mr. ROWEN. To take another example, over the longer term, deregulation of new gas, marginal cost pricing for all gas, and removal of the oil excise tax from new oil and enhanced oil recovery, we estimate and others have estimated, could reduce U.S. oil imports by around a half million barrels a day by 1985.

In short, the place for Congress to begin, whether it is considering emergencies or long-term dependence on Persian Gulf oil, is removing some taxes.

Senator BRADLEY. Are you saying, remove the windfall profits tax?

Mr. ROWEN. Selectively, I think that you ought to be careful in removing the whole tax. It has become an important source of revenue. But the current application of the tax to all of the present



categories covered should be reconsidered. I mentioned two categories, new oil and enhanced oil recovery, where some changes could be made in the tax, and usefully made.

There are other emergency preparations that might be and I think almost certainly would be affected by our tax system, aside from the Strategic Petroleum Reserve. We could encourage private stockpiling of oil, as Mr. Nordhaus has just discussed.

We could use our natural gas storage system as an emergency reserve. We could encourage emergency switching away from oil by the electric utilities, and by industry. The implementation of some of these measures is likely to require tax changes which this committee might consider.

My second point has to do with the importance of avoiding controls. The Reagan administration and the next Congress might begin by eliminating current Presidential authority to control oil prices and to allocate oil, including gasoline rationing, and not grant any new authority of this kind.

The reasons, some of them have already been referred to. The imposition of controls, and the uncertainty created by controls, or the threat of controls, have a very seriously inhibiting effect on the measures we would like to see people adopt with regard to the stockpiling of oil, for example.

Controls create great waste from people standing in line, misallocations, and the like. There are problems of equity. Controls are, of course, imposed in order to try and achieve some kind of equity, but the controls themselves are rapidly perceived as inequitable as it becomes clear that groups with political influence or clout are favored by the control system at the expense of those with less influence.

There is also, I will say, a virtual certainty of corruption in the operation of such a system.

The inefficiencies that are tolerable in a noncrisis period through controls would be very damaging in a crisis. For example, our work suggests, and other people's estimates, I think, are consistent, that a loss of one-half of the Persian Gulf oil, 9 million barrels a day before the recent war, for 1 year would decrease our economic output by a minimum of 5 percent.

Senator BRADLEY. In numbers, what is that?

Mr. ROWEN. That would be about \$180 billion, I suppose.

Senator BRADLEY. \$180 billion if we lost 9 million barrels a day.

Mr. ROWEN. That is worldwide shortfall, and we would get about a third of that ourselves, 35 or 40 percent, and that would be on the order of \$200 billion. That is not including the macroeconomic effects, that is the additional effects caused by unemployment. So this is a minimum estimate really.

In addition, if we have the inefficiencies associated with controls, at that point, given the state of the economy at that stage, it will be very, very serious, indeed.

We have tolerated, obviously, the entitlement program and other controls in a generally noncrisis period, with some costs. But we have to recognize that these get to be much worse when the economy is teetering on the brink.

Finally, under this point, in a major oil crisis, officials in Washington are likely to have much more important things to do, such

as dealing with the conflict in the Middle East, a war we might be involved in ourselves, than trying to decide who should get what oil products here at home. The only sensible thing for them to do is to decentralize these decisions and leave them to the market.

The third point has to do with reducing oil demand in an emergency through new taxes.

Senator BRADLEY. Could we go back just a minute? Decentralize which decisions?

Mr. ROWEN. Decisions on allocation, let the market do it.

Senator BRADLEY. So you would not say, give it to the Governors? [Laughter.]

There are different meanings here.

Mr. ROWEN. That is interesting. That is not the group of folks that I think of first. But it probably would be better than running it out of Washington.

The third category is reducing oil demand in an emergency through new taxes. Assuming that steps have been taken to encourage a supply response, it still may be appropriate to take additional steps to limit losses in an emergency. Without these supply steps, of course, the wealth transfer from the United States and other industrialized countries to the remaining oil producers is huge.

This 9 million barrels a day, which is one-half of the Persian Gulf interruption, this total transfer from the OECD countries is about half a trillion dollars. That is part of the loss that we would all suffer.

Of the options available on the demand side, in addition to the supply side measures, the preferred mechanism should be the imposition of a tariff on imports of crude oil and oil products. The revenues could be rebated in more or less real time through reducing withholding taxes on income and social security payments. I am sure that specialists on taxes could think of a variety of ways of doing this.

Proposals to couple a tariff with an excise tax on domestic oil in order to limit the transfer which would be very large, of course, from consumers to domestic producers, part of which would be captured by the existing windfall profits tax, should be designed and applied discriminately in view of the desirability of encouraging increased oil and gas production at home. This is a point that I made initially.

In general, by the way, emergency quotas and tariffs are most effective for small- and medium-sized interruptions. When you get to the big ones where we are not importing much oil, the cost of decreasing imports even further becomes quite large when one tries to do it through tariffs.

There is, however, at any level of imports an optimum tariff, one which maximizes the savings in wealth transferred to the remaining exporters minus the economic losses from imposing the higher domestic oil price. Of course, the broader the adoption of this tariff or quota among the importing nations, the greater the saving. But a tariff can be of advantage even if we do it unilaterally.

For example, for a 3 million barrel a day 1-year Persian Gulf oil supply interruption, a \$58 per barrel U.S. unilateral tariff would

save about one-fourth of the estimated GNP loss we would suffer in that case, or about \$7 billion out of the \$30 billion loss.

The world price would be reduced, and this is on the assumption that the remaining oil producers held their production constant and that, of course, may not happen. The gains, of course, accrue to everyone in the world who imports oil. There is a big "free rider" effect; all importers benefit from our having taken this action, and most of the gain, in fact, would go to others.

So there is a strong case, because of these large spillovers for cooperative action in imposing tariffs. If all the OECD countries were to impose a \$27 per barrel tariff in a 3 million barrel per day interruption, we could reduce the world price from an estimated \$46 per barrel, which is where, I suppose it is heading the way things are going, to around \$35 per barrel.

The Europeans and the Japanese would save proportional amounts. On this set of assumptions, that is assuming the OECD countries imposing this common tariff, the less developed countries, those that import oil, are the ones that would get the free ride.

My fourth point has to do with the combined effect of supply and demand measures. I think that it would be a serious error for the Government, for the committee, to put too much of a burden on demand limitations through tariffs and quotas, especially for deep interruptions. Supply side measures, in general, have a bigger payoff.

Senator BRADLEY. They have what?

Mr. ROWEN. A bigger payoff. Let me just give you an illustration.

If we have created a 1 billion barrel stockpile in the form of oil and natural gas, and in addition have done better at preparations for fuel switching than we have so far, and our allies have made similar preparations—this is mostly the OECD countries, most of whom are our allies—we can virtually eliminate economic losses from a case of one-half of the Persian Gulf oil being interrupted.

That is, if we have built up such a stock, and the allies have, too, and we also impose a tariff, for a 1-year interruption case, we can pretty well eliminate economic losses.

Senator BRADLEY. Could you go into more detail?

Mr. ROWEN. Yes.

Senator BRADLEY. If we have a billion barrels in storage, and our allies have a billion in storage—

Mr. ROWEN. Proportionately the same amount, which means 3 billion total.

Senator BRADLEY. Three billion total.

Mr. ROWEN. It does not all have to be oil. It has to be like oil. Natural gas, up to a point, is a good substitute for oil, and I would think that a lot of it should be natural gas, not only in the United States but in Europe as well.

Senator BRADLEY. If you had 3 billion in oil, or oil substitute in storage—

Mr. ROWEN. And we also have taken measures to get some increased production in a crisis, both in the United States and abroad; there is some excess capacity both in the United States and abroad—it is not very large inside of a year, but there is some. If,

in addition, we impose a tariff, and I don't have an estimate in my testimony, but I can look it up.

Senator BRADLEY. You don't have a tariff size?

Mr. ROWEN. I don't happen to have that with me. But the bottom line is that we could almost eliminate economic losses. There are uncertainties and the model is too simplistic. It really eliminates the effect of the uncertainty that would be created, and that would be significant. But that simple model suggests that we could eliminate economic losses with this array of measures, which are of course jointly adopted with all the OECD countries.

Without such preparations, we would suffer at least this \$200 billion reduction in GNP loss, and the European and Japanese losses are rather larger, by the way, than our own in this case, without the preparations.

The fifth point has to do with the need for strengthened or new international institutions. There is a large collective interest, obviously, in these measures. But the present arrangements which center on the international energy agency appear inadequate to prevent the runup in prices that would occur in a severe shortage, and the enormous wealth transfer that would result.

The question is how to get collective action. There is more than one approach that could be taken here. A lot could be done bilaterally. I suggest that it may be appropriate to organize a smaller group of countries, centered on major governments, than the one represented in the IEA, which is rather a large set.

A smaller set, including Japan, the United States, the Federal Republic of Germany, France, Italy, and Canada, and I left out the United Kingdom, I see, which should be included, would be one possible smaller set.

Although not all of these countries are now net oil importers, there is an overlap with their security interests generally, including what happens in the Persian Gulf area. A group such as this might consider stronger measures than the IEA is able to consider, including jointly adopted measures beyond the tariff concept and coordinated stocks, to consider a possible international purchase or allocation of oil.

Domestically, we want to use the market. It is not obvious that we should want to let the market work internationally in the event of a major crisis. But in order to interfere productively with the market internationally, there would have to be close cooperation among at least the major importing countries, the big countries.

Finally, the last point has to do with reducing vulnerable dependence over the longer run. Although import reducing measures are less important than emergency preparations, they are important. Here what we should focus on is not so much the domestic supply within the United States, although that is important, but supply outside of the vulnerable Persian Gulf area. There is a lot of the world left over between the United States and the Persian Gulf.

Energy autarchy does not make sense, and tax measures, tariff measures which imply autarchy would seem to me to be wrong. The set here should include reduced taxes on new oil or enhanced oil recovery, which I have mentioned, decontrol, and accelerating

coal and nuclear plant constructions, among other steps, on the supply side.

With regard to a tariff, here because we are speaking now of a longer time period, the tariff could accomplish quite a lot at a much lower level. A \$9 per barrel unilateral U.S. tariff, together with supply measures, might induce a 4 million barrel a day oil import reduction by 1990. We show an example for combined OECD tariff as well, achieving a higher level of import reduction.

I suggest finally that because our objective should not be one of energy autarchy, but reduced dependence on vulnerable Persian Gulf oil, we might want to consider exemptions of countries from the tariff. There would have to be careful monitoring of the national origin of the oil shipments because it would pay to cheat. But it might make sense to admit Mexican, Venezuelan, and possibly other Western Hemisphere free of tariff in order to encourage them to increase oil production.

That is the end of my oral remarks. Thank you.

[Statement follows:]

PREPARED STATEMENT OF HENRY S. ROWEN, STANFORD UNIVERSITY, ON ENERGY VULNERABILITY AND ENERGY TAXES

My remarks today are based on a good deal of work done in the past year at Stanford University and at other institutions including Harvard University and Pan Heuristics. We have been addressing the question of the impact of Persian Gulf supply interruptions, appropriate emergency preparation measures, and, in addition, long term measures to reduce dependence on Persian Gulf oil.

I want to touch briefly on six points.

1. THE DISUTILITY OF SOME CURRENT TAXES

Although the subject of this hearing is the possible utility of special oil taxes in an oil emergency and over the long run, I hope that the Subcommittee will consider the inhibiting effects of some of the present taxes levied on domestic supplies of oil and gas.

For example, work at Stanford suggests that the United States has the physical potential to increase production of oil and gas by 400,000 to 900,000 barrels per day or oil equivalent twelve months from the onset of a major crisis. This increment of energy could help substantially in easing the damage of a crisis. However, our ability to realize this potential would depend on producers having an adequate economic incentive. Price controls on natural gas and the excise tax on oil would be major obstacles to this potential being realized.

Over the longer term, deregulation of new gas, marginal cost pricing for all gas (using an equalization tax so that all consumers see the new gas price) and removal of the oil excise tax from new oil and enhanced oil recovery could reduce U.S. oil imports by around 0.5 MMBD by 1985.

In short, the place for the Congress to begin, whether it is considering emergencies of longer-term dependence on Persian Gulf oil, is removing some taxes.

Moreover, aside from the Strategic Petroleum Reserve, whose buildup has badly lagged, there are other emergency preparations that might be taken including encouraging private stockpiling of oil, using our natural gas storage system as an emergency reserve, and encouraging emergency switching away from oil by the electric utilities and industry. The implementation of some of these measures is likely to require tax changes which this Committee might consider.

2. THE IMPORTANCE OF AVOIDING CONTROLS

Next comes the question of demand-side responses to a major oil emergency. The Reagan Administration and the next Congress might begin by eliminating current Presidential authority to control oil prices and to allocate oil, including gasoline rationing. Certainly no new authority of this kind should be granted.

There are several reasons for taking this action:

As materials prepared for the Subcommittee by staff and the CBO observe, controls create great waste through people standing in line, through oil products being misallocated among users and regions, and through the creation of costly

bureaucracies. Moreover, the results will inevitably be seen as inequitable as it becomes clear that groups with political "clout" are favored by the control system at the expense of those with less influence. There is also the possibility, indeed the virtual certainty, of corruption in the operation of such a system.

Inefficiencies that are tolerable in a non-crisis period would be highly damaging in a crisis. Our work suggests that a loss of 9 MMBD of Persian Gulf production for one year would decrease our economic output by around five percent (without allowing for any macroeconomic effects). In considering the imposition of controls, it is important to recognize the impact of added inefficiencies imposed on an economy that would be in serious trouble.

Moreover, in a major oil crisis, officials in Washington, are likely to have more urgent things to do, such as dealing with a conflict in the Middle East, than trying to decide who should get what oil products here at home. The only sensible thing for them to do is to decentralize these decisions and leave them to the market.

### 3. REDUCING OIL DEMAND IN AN EMERGENCY THROUGH NEW TAXES

Assuming that steps have been taken to encourage a supply response, it still may be appropriate to take additional steps to limit losses in an emergency. For example, for a year-long, 9 MMBD Persian Gulf interruption, the wealth transfer from the OECD countries to the remaining oil producers through higher prices would be around \$500 billion. (This is the estimated wealth transfer without added supply measures for an emergency.)

Of the options available on the demand side to reduce this transfer, the preferred mechanism should be the imposition of a tariff on imports of crude oil and oil products. The revenues could be rebated in more-or-less real time through reducing withholding taxes on income and social security payments. Proposals to couple a tariff with an excise tax on domestic oil should be applied discriminately in view of the desirability of encouraging increased oil and gas production at home.

In general, emergency quotas and tariffs are most effective for small and medium sized interruptions. For deep Persian Gulf cuts, little oil is imported and the cost of decreasing imports even further becomes very large.

However, at any level of imports there is an optimum tariff (or quota) which maximizes the savings in wealth transferred to the exporters minus the economic losses from imposing the higher domestic oil price. The broader the adoption of the tariff (or quota) among the importing nations the greater the saving. Despite this fact, even for the U.S. acting unilaterally, a tariff can be of advantage.

For example, for a 3 MMBD one-year Persian Gulf oil supply interruption, a \$58 per barrel U.S.-only tariff would save about one-fourth of the estimated GNP loss we would suffer without this measure (about \$7 billion out of \$30 billion). The world price would be reduced (assuming the remaining oil producers held their production constant) from \$46 per barrel to \$40 per barrel. However, there would be a significant "free rider" effect from our action; in the aggregate, other importers would benefit more than we would.

Therefore, because of these "spillovers" there is a strong case for cooperative action in imposing tariffs. If all of the OECD countries were to impose a \$27 per barrel tariff in a 3 MMBD interruption we could reduce the world price from an estimated \$46 per barrel to \$35 per barrel. The U.S. would save an estimated \$26 billion (out of \$30 billion that would otherwise be lost) and the Europeans and Japanese would save proportional amounts. The less developed countries, on these assumptions, would get a free ride.

### 4. THE COMBINED EFFECT OF SUPPLY AND DEMAND MEASURES

It would be a serious error for the government to put too much of a burden on demand limitation through a tariff or quota, especially for deep interruptions. Supply side measures, in general, have a bigger payoff. However, the combination of supply and demand measures is more effective than either alone. For example, for a 9 MMBD Persian Gulf interruption in which the U.S. had created a 1,000 MMB oil and natural gas stockpile plus emergency fuel switching, and our allies had made similar emergency supply preparations, the added effect of a tariff is virtually to eliminate economic losses. Without any such preparations we would suffer at least the five percent reduction in GNP referred to above and the Europeans and Japanese would suffer close to ten percent loss in economic output.

### 5. THE NEED FOR STRENGTHENED OR NEW INTERNATIONAL INSTITUTIONS

The large economic losses that would be suffered by the Western nations in the event of a major, prolonged disruption, the large collective interest among the oil importers, and the fact that the major oil importers are all allies, suggests the

utility of an international approach to this subject which goes beyond existing arrangements.

Current arrangements, which center on the International Energy Agency, appear inadequate to prevent the run up in prices that would occur in a severe shortage and the enormous wealth transfer that would result. Collective action on emergency supply measures and on tariffs could have a large payoff. In order to make progress much needs to be done bilaterally with other major governments. It may also be appropriate to organize a smaller group of major governments than the one represented in the IEA. This set might include the U.S., Japan, FRG, France, Italy, and Canada. Although not all of these countries are now net oil importers, this set would be appropriate if their international security interest in the Persian Gulf were explicitly linked to their energy-economy interests.

Although the allocation of oil within the U.S. should be left to the market with possibly some taxes and rebates, internationally there is a case for considering stronger measures to limit the wealth transfer to the remaining producers. Among other steps, a U.S. plus allied system for international purchases or allocations should be considered.

#### 6. REDUCING VULNERABLE DEPENDENCE OVER THE LONGER RUN

Although import reducing measures are less important than emergency preparations, they are important to pursue. The most economical way to achieve these is to reduce existing impediments to supplies from outside of the vulnerable Persian Gulf. This does not necessarily imply production within the United States, however; there is no strong case for energy autarchy. Appropriate actions include reduced taxes on new oil and enhanced oil recovery, decontrol of new gas and marginal cost pricing of gas, more gas imports, and acceleration of coal and nuclear plant construction, among other steps.

In addition to these actions, it may be appropriate to put a tariff on oil imports to assist the shift away from oil use in those applications where there are adequate substitutes. For instance, a \$9 per barrel U.S. unilateral tariff, together with supply measures, might induce a 4 MMBD oil import reduction by 1990. If the OECD countries as a group sought an 8 MMBD saving by 1990, a combined supply program plus a tariff of \$24 per barrel would produce this effect and almost certainly to their net economic benefit. The tariff level, effects on the world oil price, and economic benefits depend on the response of the oil producers; the benefits could take the form of lower dependence on vulnerable Persian Gulf oil or a lower price or a combination of both.

This goal might be implemented by 1985 but it would take much more vigorous supply side actions and higher tariffs.

Finally, because the objective in such a program should not be one of energy autarchy but reduced dependence on vulnerable Persian Gulf oil, oil from some countries might be admitted free of any tariff. Although there would have to be careful monitoring of national origins of their oil shipments, it might make sense to admit Mexican, Venezuelan, and possibly other Western Hemisphere (or even oil from some other sources) free of the tariff in order to encourage them to increase production.

Senator BRADLEY. Thank you, Mr. Rowen.

Mr. Eads, we will now hear from you.

#### STATEMENT OF GEORGE EADS, COUNCIL OF ECONOMIC ADVISERS

Mr. EADS. I will keep my statement brief. My purpose is to discuss largely in a qualitative way some of the major issues that I believe must be dealt with in selecting strategies to reduce the adverse impact on the United States and other oil consuming nations of a major disruption in the world supply of oil. I will not attempt to cover all the issues. I will leave that to the discussion.

I must stress that what I say here today does not constitute a statement of administration policy. I merely intend to describe work that my staff and I, CEA, presently are engaged in that bears on the general issue.

Let me begin by noting that no strategy I have looked at appears to be as useful in offsetting the impact of a supply disruption as

having large stocks, whether these stocks were acquired on purpose or, as in the current situation, largely by accident. One need only compare the relative calm in the world oil market now in response to the Iranian-Iraqi war with the response to the earlier Iranian embargo.

But that statement does not mean all that much. It only says that if we can make supply much more elastic in the very short run, you can offset the impact of a disruption without too much difficulty.

As your letter of invitation noted, for the next several years our strategic stocks are likely to be somewhat lower than we might like, and one aspect of the Iranian-Iraqi war is that it is likely to draw down the level of privately held stocks.

Furthermore, stocks are expensive to acquire and hold. The acquisition cost is more than merely the price paid per barrel for them. The cost of holding them is more than merely their storage charges. Acquiring them results in an incremental demand in the world oil market, and the cost of holding them should take account of the opportunity cost of the capital involved.

Stocks probably should not be our entire policy response to emergencies. So it is appropriate to consider other policies to deal with severe disruptions, either to supplement stocks or to substitute for them.

At present, our strategy for dealing with a severe supply shortfall seems to be to invoke the IEA sharing arrangements in order to try to allocate supplies equitably, then to employ a combination of domestic price and allocation controls and, finally, if the shortage gets bad enough, to use whatever strategic stocks we do have and to institute gasoline rationing.

There is no denying that controls and rationing would be difficult and costly to implement, and seriously prone to error. Further, by attempting to concentrate shortfalls on gasoline, our current plan for rationing invites serious misallocation of scarce petroleum supplies particularly in the event of a major supply disruption.

In view of our past experience with controls, and in view of our growing understanding of the problems of using rationing, it is understandable that people might be attracted to other strategies, particularly strategies which seem to promise increased reliance on the markets.

It is particularly appropriate to examine such strategies in view of the fact that our basic control authorities expire in late 1981. If we are to continue to have even the option of using price and allocation controls, some of these authorities clearly will have to be extended.

In considering strategies to deal with major supply disruptions, we should not be like the businessman who was scheduled to interview two candidates for a job and was so unimpressed with the first that he hired the second sight unseen. Unfortunately, much of the writing I have seen on the subject of rationing versus other strategies has much that flavor.

The author describes at length the difficulties that rationing would encounter; notes the obvious fact that, at least in theory, there exists an alternative market-based mechanism that would



produce better results, and leaps immediately to the conclusion that this alternative scheme should be substituted for rationing.

Far be it from me, as a member of the Council of Economic Advisers, to quarrel with the virtues of using markets wherever possible to allocate scarce commodities. But I must raise certain cautions.

It is possible for me to agree with these authors about the problems of rationing without at the same time necessarily agreeing that rationing should be scrapped as one of our tools for dealing with a severe supply interruption.

The debate that has begun is useful in reminding us that there are alternatives to rationing that deserve very careful scrutiny. But let us, indeed, scrutinize them, not adopt them in a blind leap of faith.

Over the past several months, CEA and other agencies within the administration, have been examining various alternative strategies for dealing with major supply disruptions in ways that identify in as neutral a manner as possible their relative strengths and weaknesses.

Attention has focused on the so-called tax-rebate strategies, but we also have been examining strategies where the market is permitted to operate absent any special tax or rebate scheme. Our knowledge is growing, but it is still by no means sufficiently complete that we feel comfortable in making recommendations.

Our work to date suggests that no system is problem free. In particular, a tax-rebate system, which theoretically would have to be capable of recycling revenues amounting to perhaps several hundreds of billions of dollars at an annual rate, would be extremely complex to set up and to operate, and would, just as coupon rationing, have a significant error rate.

By way of reference, just to keep some numbers in the back of our mind, the 1-cent-a-gallon tax on gasoline at roughly current usage levels generates approximately \$1 billion a year in tax revenues. Neglecting the elasticities, a tax of \$3 a gallon would generate revenues, roughly equivalent in magnitude to total consumer expenditures on food both in the home and away from home.

Senator BRADLEY. What is the number?

Mr. EADS. \$300 billion. Roughly what consumers spend both on food purchases in grocery stores and at restaurants.

Senator BRADLEY. So if you put a \$5 tax?

Mr. EADS. It would be larger than that. It would be \$500 billion. Again, these are neglecting elasticities. But at the current level of gasoline usage, a penny a gallon of tax generates tax revenues amounts to about \$1 billion annual rate.

In order to make such a system viable, Congress likely would have to be willing to grant extremely broad standby authority to the President, authority that would allow him on very short notice—or perhaps even no notice to establish and change tax rates at will, possibly by very substantial amounts, and to dispose of potentially very large volumes of funds totally outside the normal appropriations process.

Further, in designing the broad structure of any tax rebate system—in other words, the broad parameters within which the President would be permitted to operate—the Congress would have

to face issues infinitely more divisive than those it wrestled with in establishing the current system for gasoline coupon distribution.

People sometimes disparage coupon rationing by claiming that it would require the creation of a "second currency." In some circumstances that might be a major virtue.

Senator BRADLEY. Why is that?

Mr. EADS. When you are dealing with white pieces of paper that look like dollar bills, you can possibly pretend things that you cannot if you are dealing with real dollar bills.

Senator BRADLEY. Perceptual problems.

Mr. EADS. The problem of getting people to face the distributional consequences. Having this committee discuss the possibility of a system which would collect and distribute tens or hundreds of billions of dollars a year as a sort of a vague standby authority is something, I think, people would find hard to deal with.

To be able to pretend that it does not happen, or at least be able to separate the distributional consequences from the allocative consequence sometimes is a virtue.

All I am saying, those people who look back on the debate to establish the current rationing system, and who demoan the special boards and the exceptions that were set up are fooling themselves if they think that the Congress would allow a system that mailed out checks, rather than coupons, to somehow ignore distributional issues.

These issues would have to be faced unless Congress would be willing, as you suggested earlier, to declare that the distribution consequences are unimportant.

If you are dealing with the possibility of very major disruptions, you go beyond the levels that we typically dealt with in the economic models. Some of the numbers that are thrown around are probably no better or no worse than others, but they are really outside the range of experience that these models are capable of dealing with.

When you are considering income transfers approximating, let us say, levels that individuals spend on food, or possibly food and housing combined, it is not just an academic exercise to make sure that money arrives in the mail on time so the people can pay their bills.

Finally, there are extremely important informational and administrative barriers to any tax rebate system. Currently we lack mechanisms for discovering precisely what an appropriate tax would be and for adjusting it in a timely fashion. We lack the means of collecting the sums involved, let alone a system of rebating such sums quickly and efficiently.

Those who talk blithely about "using the tax system" to accomplish this redistribution have not seriously considered the problems involved. I imagine that Mr. Sunley will discuss these questions in more detail this afternoon when he is here.

To give you some examples, the following are some of the issues that we would have to deal with: At what stage do you levy a tax if you are going to tax a petroleum product other than gasoline?

Gasoline, it turns out, is very convenient to tax. You can tax it at the refiner, and you have a very nice way of collecting the money. But when you are talking about a product that is distributed in a

different way, you have to face the issue of where precisely you collect the tax, who has the liability, and how is that liability transferred.

Other questions include, how do you get the money in the rebates out to the people fast enough? When we were dealing in the spring of 1979 with the issue of crude oil decontrol, one of the things that was seriously looked at was a negative food tax as a means, to get money back to the right people.

It turns out to be a very difficult problem. It is not to say that would be impossible. I don't want to be interpreted as saying that it would be impossible to establish a tax rebate system, or that it should not be carefully considered, or that it might not on a number of grounds be superior to rationing. But the difficulties should not be underestimated, and anyone who refers to the difficulties as merely "administrative problems" that can be handled, I think, should be questioned closely.

In evaluating alternative strategies to deal with major supply interruptions, I find it helpful to keep in mind that such interruptions have two distinct classes of impact on the economy.

First, since petroleum products are important inputs to the production process, a reduction in their supply reduces the economy's potential output in a manner similar to that of a major crop disaster.

If existing supplies can be allocated to their highest values use, either directly by price or by administrative means, this loss of potential output can be minimized, but it cannot be entirely offset.

Those who cite the virtues of market-oriented approaches seem to be resting their case primarily on the superior allocative properties of these approaches. This is an argument with which I can have little disagreement.

However, any increase in the effective price of petroleum products, either as expressed in terms of the actual price of the products themselves or as a combination of product prices plus the price of freely traded ration coupons, also results in something we at CEA have come to call "fiscal drag." That is, it reduces consumer purchasing power.

By the way, it is this "fiscal drag" that most macroeconomic models use to measure the impact of oil supply disruption on the economy. No one I know has been able to estimate the allocative losses. The individuals using the model somehow assume that the supply constraint is not binding; that in fact demand is more constrained than the supply. This may not be a bad assumption given the relative inelasticity of demand.

Senator BRADLEY. Have you done any detailed work for fiscal drag for a loss of 8 or 9 million barrels a day?

Mr. EADS. We are trying to do that right now. Frankly, it is very tempting to take a standard model such as DRI and crank the numbers through it. The model will produce a result. Unfortunately, when you look into the structure of the model---

Mr. BRADLEY. That is the virtue of those models.

Mr. EADS. That is one of their virtues, and one of their defects. When you look into what that model is assuming, let us say, about offsetting fiscal policy or offsetting monetary policy, you had it making some fairly weird assumptions. When you go into that

model and begin to try to get it to correct for those, you find that you need to override some of the basic properties. That is the basic problem, and that is what we are currently engaged in.

Senator BRADLEY. So the answer is, basically, we don't have a model at the moment that does take into consideration all the variables that would go into a projection about what the fiscal drag of a loss of a certain quantity of oil would be.

Mr. EADS. No. I think the estimates that you have heard this morning, the 5 or 10 percent of the GNP, are probably good as orders of magnitude. But they really should be thought of as really nothing more than orders of magnitude.

We are trying to work with some of the forecasting models we use to see which of their assumptions have to be overridden or changed in order to be able to come up with something that makes sense.

When you have, for example, let us say, a 20, 30, or 40 percent reduction in the supply of gasoline, and you have to track through what that would do to the economy, your macromodels just don't deal with that. They assume that somehow the world takes care of little problems like that, and it is only the reduction in income that you have to deal with.

As I say, it will take some work, and we are trying to develop it. I should tell you that this is a project that is going to continue. It is not something that is going to come to a halt with a change in the administration.

At the same time, any major increase in the price of petroleum products generates important and complicated income transfers, from consumers to oil companies, from the United States to overseas, from one group of consumers to another, and from consumers to the Government.

In theory, many of these income transfers and the fiscal drag itself can be offset through appropriate, whatever that means, monetary and fiscal policies. But what policies are appropriate?

How does the Federal Reserve, in particular, distinguish between general inflation, let us say, which it might well under current policy guidance attempt to deal with by tightening the money supply, versus something happening through fiscal drag, which they should offset by increasing the money supply.

In theory it can be done. One of the things we are trying to discuss now with the Federal Reserve people is how they might distinguish between these two effects, and take the appropriate responses. Because, if you make the wrong response, you just make the situation worse.

Complicating the situation, of course, is the fact that any attempt to offset fiscal drag must take account of the supply effects mentioned earlier if general inflation is not to be stimulated.

As a final complication, I must briefly mention difficulties imposed by indexation. Many wage contracts and entitlement programs are indexed. They are indexed to make certain members of the population whole in the face of general inflation. However, in a situation such as we are discussing, the continued indexing of programs could yield quite perverse results.

So another thing that Congress would have to be willing to face is whether, we were to rely on price mechanisms to allocate petro-

leum supplies during major emergencies, would there be a situation where the President could, by a declaration of national emergency or something like that, break all indexing schemes both in public programs like social security and in private labor contracts?

Again, this is not to say that it is an impossible issue, but it is one of the things that has to be dealt with.

Senator BRADLEY. In your judgment, would it be possible to just take the upward price that was due to the tariff out of the CPI?

Mr. EADS. In theory it could be done, but by law, the CPI-U is the index that index for social security. Most labor contracts are tied to a specific price index.

It might be possible to have such a special index calculated, and to have it available on a standby basis. We have been looking, for example, at whether you could calculate a CPI without a housing component.

I am just saying that this is an issue that someone will have to face if you want to go toward tax-rebate systems, because a lot of contracts are tied to the CPI, and the CPI gives very heavy weight to gasoline and home heating oil purchases.

To sum up, now that we realize that supply disruptions are likely to be something we are going to have to be prepared to deal with, at least for the next decade, if not for a much longer period, it is appropriate that we reexamine our strategies for dealing with them.

It is useful that this examination is going on in a wide variety of fora—the Congress, the administration, and the academic world. I hope that this examination results in a full airing of all the potential virtues and problems of these various strategies. But I must reach the sad conclusion that there is not going to be any magic answer.

[Statement follows:]

#### NOTES FOR BRADLEY APPEARANCE

I will keep my statement brief. My purpose is to discuss largely in a qualitative way some of the major issues that I believe must be dealt with in selecting strategies to reduce the adverse impact on the United States and other oil consuming nations of a major disruption in the world supply of oil. I won't attempt to cover all the issues—leave that to discussion.

I must stress that what I say here does *not* constitute a statement of Administration policy—I will merely describe the work that my staff and I at CEA presently are engaged in.

Let me begin by noting that no strategy I have looked at appears to be as useful in offsetting the impact of a supply disruption as having large stocks whether on purpose or, as is the current situation, largely by accident (e.g., compare response of world oil market to Iran/Iraq war with response to Iranian embargo). But all that means is if you can make supply much more elastic in the very short run, you can offset the impact of a disruption without too much difficulty.

However, as your letter of invitation noted, for the next several years, our strategic stocks are likely to be lower than we might like. Once they are—the Iran/Iraq war is dragging down privately held stock levels. Further, stocks are expensive to acquire and hold; their acquisition cost is more than merely their price per barrel, and the cost of holding them is more than merely their storage charges—stocks probably shouldn't be our entire policy response to emergencies. So it is appropriate to consider other policies to deal with severe disruptions either to supplement stocks or to substitute for them.

At present, our strategy for dealing with a *severe* supply shortfall seems to be to invoke the IEA sharing arrangement (to attempt to allocate supplies equitably), then to employ a combination of domestic price and allocation controls and, finally, if the shortage gets bad enough, to use what strategic stocks we have and to institute gasoline rationing.

No denying that controls and rationing would be difficult and costly to implement, and prone to error. Further, by attempting to concentrate shortfalls on gasoline, our current plan for rationing invites misallocation of scarce petroleum supplies.

In view of our past experience with controls, and in view of our growing understanding of the problems of using rationing, it is understandable that people might be attracted to other strategies—particularly strategies which seem to promise increased reliance on markets. It is particularly appropriate to examine such strategies now in view of the fact that our basic control authorities expire in late 1981. If we are to continue to have even the option of using price and allocation controls, some of these authorities will have to be extended.

In considering strategies to deal with major supply disruptions, we should not be like the businessman who was scheduled to interview two candidates for a job and was so unimpressed with the first that he hired the second sight unseen. Unfortunately, much of the writing I have seen on the subject of rationing versus other strategies has very much that flavor. The author describes at length the difficulties that rationing would encounter; notes the obvious fact that, at least in theory, there exists an alternative market-based scheme that would produce better results, and leaps immediately to the conclusion that this alternative scheme should be substituted for rationing.

Far be it from me as a member of the CEA to quarrel with the virtues of using markets wherever possible to allocate scarce commodities. But I must raise a caution.

It is possible for me to agree with these authors about the problems of rationing without at the same time agreeing that rationing should be scrapped as one of our tools for dealing with a severe supply interruption. The debate that has begun is useful in reminding us that there are alternatives to rationing that deserve very careful scrutiny. But let us indeed scrutinize them—not adopt them in a blind leap of faith.

Over the past several months, CEA, and other agencies within the Administration, have been examining various alternative strategies for dealing with a major supply disruption in ways that attempt to identify in as neutral a manner as possible their relative strengths and weaknesses. Attention has focused on the so-called tax-rebate strategies but we also have been examining strategies where the market is permitted to operate absent any special tax or a rebate scheme. Our understanding is growing, but it is still by no means sufficiently complete that we feel comfortable in making recommendations.

Our work to date suggests that *no* system is problem-free. In particular, a tax-rebate system, which theoretically would have to be capable of recycling revenues amounting to perhaps several hundreds of billions of dollars at an annual rate, would be extremely complex to set up and to operate, and would, just as coupon rationing, have a significant error rate. In order to make such a system viable, Congress likely would have to be willing to grant extremely broad standby authority to the President—authority that would allow him, on very short notice, to establish and change tax rates at will, possibly by very substantial amounts, and to dispose of large volumes of funds in ways having important distributional consequences outside of the normal appropriations process. Further, in designing the broad structure of any tax-rebate system—the broad parameters within which the President would have to operate—the Congress would have to face issues infinitely more devious than those it wrestled with in establishing the current system for gasoline coupon distribution. People sometimes disparage coupon rationing by claiming that it would require the creation of a “second currency.” In some circumstances, that might be a virtue.

Finally, these are extremely important informational and administrative barriers to any tax-rebate system. Currently we lack mechanisms for discovering precisely what an appropriate tax would be and for adjusting it in a timely fashion. We lack the means of collecting the sums involved, let alone a system of rebating such sums quickly and efficiently. (Those who talk blithely about “using the tax system” to accomplish this redistribution haven’t seriously considered the problems involved. For example, where do you levy a tax if you are going to tax a petroleum product other than gasoline? How do you identify is “entitled” to receive profits? How do you insure that the rebate system is working? How do you get money to them rapidly enough? To some these may seem like trivial administrative details. I can assure you that they are not. This is not to say that it would be impossible to establish a tax-rebate system, however, but the difficulties should not be underestimated.

In evaluating alternative strategies to deal with major supply interruptions, I find it helpful to keep in mind that such interruptions have two distinct classes of

impacts on the economy. First, since petroleum products are important inputs to the production process, a reduction in their supply reduces the economy's potential output in a manner (similar to a major crop disaster). If existing supplies can be allocated to their highest value used (either by price or by administrative means), this loss of potential output can be minimized. But it cannot be entirely offset. Those who cite the virtues of market-oriented approaches seem to be resting their case primarily on their superior allocative properties. This is an argument with which I can have little argument.

However, any increase in the effective price of petroleum products—either as expressed in terms of the actual price of the products themselves or as a combination of product price plus the price of freely-traded coupons—also results both in something we at CEA have come to call “fiscal drag”—that is, it reduces consumer purchasing power. At the same time, the increase in the price of petroleum products generated complicated income transfers—from consumers to oil companies, from the United States to overseas, from one group of consumers to another, and from consumers to the government. In theory, many of these income transfers and the fiscal drag itself could be offset through “appropriate” monetary and fiscal policies. But what policies are appropriate? I just briefly mention the difficulties posed by indexed wages and entitlement programs. These programs are designed to make certain members of the population “whole” in the face of general inflation.

To sum up, then: now that we realize that supply disruptions are likely to be something we are going to have to be prepared to deal with—at least for the next decade, if not for a much longer period—it is appropriate that we reexamine our strategies for dealing with them. It is useful that this examination is going on in a wide variety of fora—the Congress, the Administration, and the academic world. I hope that this examination results in a full airing of all the potential virtues and problems of these various strategies.

Senator BRADLEY. That is a bright note to close the prepared comments on, but I think maybe it is a realistic note.

What I would like to do now is have a discussion. I will talk to one or two of you, but all of you may come in when you think that you have something to say. This will make this a little more informal.

I got the clear impression from a number of the comments that you feel that price controls and allocations that have been in effect or used in the last several years have, one, been ineffective; two, had a perverse effect on the intentions of the authors of those price controls and allocations. Is that correct? Does anyone strongly disagree with that?

Ms. RIVLIN. I think if you assemble a group of economists, you are almost guaranteed that answer.

Senator BRADLEY. So everyone is agreed.

I would like to go to the international question here. It seems that Mr. Rowen and Ms. Rivlin in their respective comments seem to disagree as to the advisability that the tariff should be placed on unilaterally or multilaterally, and whether it would be in our interest to put the tariff on unilaterally.

Do you disagree, or agree?

Ms. RIVLIN. I am not sure that we do disagree. A multilateral is better. I was simply saying, and maybe Dr. Rowen does disagree with this, that if we do it unilaterally there are still benefits.

Senator BRADLEY. I am just referring to your statement on page 4 where you talk about the various policies that could be used in the event of a disruption. You say, “Policies might be appropriate for certain levels of shortfalls, but only if proposed multilaterally.”

If what we are talking about is our own people, that is one thing. If you say, don't bother with this unless we can have an agreement on a disruption tariff among our allies that makes it a little more complicated. It doesn't say that we shouldn't do it.

Ms. RIVLIN. I don't think that there is really a major disagreement.

Senator BRADLEY. You say that it would be workable unilaterally?

Mr. ROWEN. Workable in the sense that we would be better off, but not a lot better off. It doesn't do us a lot of good if we impose it unilaterally. The United States is a big factor in the world oil market, but we are not big enough to really dominate it, obviously. So anything that we do unilaterally by reducing our demand in a crisis has some effect, but it is very much less.

The numbers I used to compare the unilateral one with the coordinated tariff have suggested that the coordinated tariff could, in fact, reduce a very substantial portion of the loss, whereas the unilateral is about one-fourth, as I recall, in my example.

Senator BRADLEY. How concerned are you about the free ride that our unilateral action would provide our allies?

Mr. ROWEN. This is a comment more about politics than economics. As part of a package of measures, which very likely would include a major international, political, and possibly military component, for the United States to take a lead, and with others doing other things as well, then it may be a very important element.

I think that it would be wrong to isolate just this one measure, abstracted from a lot of other things that would have to be considered and some of them adopted in the event of a major crisis. This may be a pretty big crisis.

If there is not total cooperation, and we are not going to get total cooperation, it still could make sense for a subset of countries, maybe not the United States alone, but a subset of countries—

Senator BRADLEY. The big eight.

Mr. ROWEN. That is fine.

Senator BRADLEY. How realistic is that?

The first issue I had to deal with in the Finance Committee was the multilateral trade talks, and that was on a series of subjects that are not quite as central as the price of oil to nations.

How realistic do you think that it is to get our allies to agree to a disruption tariff of the size necessary to make any real difference in our leverage?

Mr. ROWEN. People may have other views, but mine is that—

Senator BRADLEY. When I address these questions, I am addressing them to everyone.

Mr. ROWEN. If it is anything like today's international political context, the odds are not good. On the other hand, if it a very different context politically, and perceived as being a rather serious situation, then the odds go up.

Senator BRADLEY. Let's say there is a general consensus that clearly the greatest threat to our national security is an oil supply interruption, and this is one of the measures for countering that. If you were the new administration, what would you do to try to bring this to the fore in the minds of our allies?

Mr. ROWEN. It would have to be a shared general perception that this is so, and perhaps it exists now to some extent, I am not really sure, among the key people.

Clearly a place to begin is to share views, to see if there is a common perception of this danger. If there is, or if as a result of



discussion and analysis, it can be created, then I think some of the basis would be laid for common actions going beyond those actions that have been taken so far, including the possibility of an emergency tariff.

Ms. RIVLIN. I would be a little bit more optimistic, I think. It is different from the multilateral trade talks, because the consuming nations do have a joint interest here. The United States, being something of a producer itself, has some leverage in this.

Senator BRADLEY. I could easily hear, as I have heard, the energy ministers of France and Germany say, "We will begin talking when you get your gasoline tax up \$2 a gallon. Equity would require you to put in a disruption tariff first, at least, before we could trust that you are serious about this."

Mr. EADS. Let me be the pessimistic here. The calculations that Mr. Rowen gave, even as hypothetical calculations, indicate the benefits to an individual country from letting everybody else do this.

Having been tangentially involved in the issues of setting ceiling, or targets, or whatever you want to call them, and getting people to agree that there is a problem; in that they will stay out of the spot market, and that sort of thing, I am fairly pessimistic about people being willing to do this.

We clearly should try, but we should not be too hopeful. We should not, let us say, base our entire strategy on the hope that other countries will share our sense of concern.

The examples that you gave about other countries coming back to us and saying, "Yes, we will agree as soon as you totally decontrol natural gas, and as soon as you get the price of gasoline up \$3 gasoline a gallon that we have had for 20 years, or whatever the period." Those are problems that you are going to face.

If you wait until the disruptions occur, people may then share the perception that there is an emergency, but that is not the time to get an agreement on a disruption tariff.

Mr. NORDHAUS. I would like to maybe address this important question by making some distinctions.

First, when we talk about a disruption tariff, do we mean one that is imposed before or after the disruption?

Senator BRADLEY. Do you mean in defining my terms?

Mr. NORDHAUS. Yes.

Senator BRADLEY. I would say, after.

Mr. NORDHAUS. I think that it is the only sensible way to use that term.

Senator BRADLEY. Thank you.

Mr. NORDHAUS. I thought George's response implied talking about it before.

Senator BRADLEY. Yes.

Mr. NORDHAUS. Second, when we ask it, I think we really have to distinguish between the size of the disruption, in the 1979 disruption, after the Iranian revolution, or the current disruption in the midst of the war. These are small in the sense that they don't trigger the IEA.

I think that the lessons that we have seen from these two cases is that it is extremely unlikely that they will trigger any joint

international action of effective tariffs or quotas. The world may be different the next decade, but we have not seen it yet.

I think an interesting case is, what happens if the IEA is triggered, and countries find that they have import shortfalls above the trigger. The first question is something that I don't have the answer to, will the IEA agreement collapse or not; or will people live up to their commitments.

If they live up to their commitments, that will mean that each country will have some kind of import target. They will have to cut their imports by a certain amount to meet their agreements. There are two basic ways of doing this. One is through a disruption tariff, and the other is through a disruption quota.

I think at this stage you might see differences across countries, but there is something to be said for going the quota route here, rather than the tariff.

Senator BRADLEY. The quota with an auction?

Mr. NORDHAUS. I greatly prefer an auctionable licensed system to an allocation system. The point would be, since you know what you are getting with a quota much better than you do with a tariff, you will probably go that way.

In my summaries of going through these various cases, I would say that it is unlikely that we are going to have anything in a small disruption. In a big disruption, if in fact the IEA Pact holds together, I think that it is much more likely that we will go to disruption quotas. I hope that they would be auctionable quotas rather than allocated, as well.

Senator BRADLEY. What is the consensus of the panel, given all the hesitations you have expressed about the probability of multi-lateral action, should the United States do this unilaterally?

If all of our allies give us the song and dance, "We will not do it until you do X, Y, and Z," should we do it unilaterally, is it that much in our national interest?

Mr. EADS. We should take actions which we think will protect ourselves. We should try to get our allies to share in them.

What I am saying, though, is that we should not have a core strategy which will only work if we get everybody to go along. Any strategy that depends on that is not a strategy that is good for the United States, because you cannot guarantee that everyone will go along.

Just to clarify one point, when I was talking about a disruption tariff, I think we were talking about the same things. You don't impose it in advance, but you have agreed upon the mechanism you will use in advance. You have a situation where it can be imposed almost immediately, otherwise it doesn't work.

One point that Ms. Rivlin made much earlier that I think we have to keep in mind here because it has sort of been lost sight of is that when people talk about disruption scenarios, many of them imply that the size and duration of the disruption will be known.

In fact, as we have seen in every case that we have been involved in, you don't know the size, you don't know the duration, you don't know how much production fill-in there will be from other countries.

So, again, a strategy must be very robust in the presence of very poor information, and conflicting information, where different

countries start, as in the case of Iran and Iraq, with very different supply situations. Not all countries, unless you had a single world organization purchasing all the oil and selling it, would enter any disruption in precisely the same situation, and that puts additional strain on any cohesiveness.

Senator BRADLEY. The CBO study concluded that for different levels of interruptions, the range of policies differed. The ultimate being the rationing from about a 2 up to a 2.5. Do you think that that is true?

You know, you wrote the study, Mr. Scheppach, maybe you can tell us. Do you think that that is true.

Mr. SCHEPPACH. We are, just like George Eads, still doing simulations at what levels do certain policies make more sense.

I guess our attitude is now that we ought to look at them in some kind of a continuum. At very low levels, maybe gasoline taxes work; on increased levels, alternative taxes; and then toward rationing. I would be reluctant to say at this time to say at what levels those are.

I would like to make one other point on the multilateral question. We seem to be looking at it as either all countries agree on a certain level like \$20 a barrel, or we only do it ourselves. I think that there is a lot of room for negotiation in here which may, in fact, help.

In other words, it may be that we impose a \$20 a barrel tax, France imposes an \$8 tax, Germany a \$12 tax, and so on. In all probability that is the type of result if we could get agreement. You have to remember that even though those taxes are not imposed multilaterally, they are an advantage in terms of reducing overall demand.

Senator BRADLEY. I don't quite hear an answer. Should we do this unilaterally, in your judgment, if we have baulking allies?

Ms. RIVLIN. If we can't get agreement, we have got to do something. Then, we are back in the situation of weighing the advantages of somehow raising the price to ourselves, or going to rationing.

Senator BRADLEY. Do any other members of the panel, other than Mr. Nordhaus, have an opinion about whether a tariff or a quota is better; whether we want to have certainty of supply or certainty of price?

Mr. ROWEN. I think his point that in an emergency the certainty of supply with quotas is a good one. Whereas in the long term one would probably want to have a tariff, since it provides flexibility. You cannot adjust quotas all that readily, whereas the tariff, in a sense, has automatic adjustments.

So in a crisis, the bias should probably be towards quotas, and in the longer run to tariffs, if we want to reduce dependency on Persian Gulf oil.

Senator BRADLEY. Going along with what was stated earlier, Mr. Nordhaus, in your view the private sector deals with emergencies better, because it deals with uncertainties better. Do you think that this leads naturally to a quota, where the government sets the quota?

Mr. NORDHAUS. Could I go back to the last point for just a second?

Senator BRADLEY. Yes.

Mr. NORDHAUS. The negotiations question.

I also spent a little time trying to talk to members of Summit Seven about curtailing or reducing demand for oil. My impression was that if you are going to engage in negotiations for sharing shortfalls, it is a lot easier to negotiate quotas or reductions in imports than it is disruption tariffs.

It gets around awkward questions like, what is the level of your tariff now, or what is the level of your taxes now. You just take as the initial conditions what you imported last year, the year before, or whatever, or what you are importing now, and you reduce that.

Again, I think if we want to go the route of multilateral negotiations to reduce demand for oil, aside from the fact that I think quotas allow you to keep your eye on the ball better, they also are a more effective instrument for negotiations, I think.

The only experience we have in oil of a successful, to my recollection, negotiation was at the Tokyo summit where there were the targets. They were not very effective, I think, but at least there was an agreement there.

Senator BRADLEY. Do you think that Government can effectively manage an auction?

Mr. NORDHAUS. There is no doubt in my mind that an import quota with an auctional license is manageable. There is absolutely no doubt in my own mind. It has been run by governments in the past. The British Government has run auctions on import licenses. It is a new thing, and we don't do it now, but it is much, much simpler than, let us say, rationing scheme or these tax schemes. It is much, much simpler.

Senator BRADLEY. Your point is that the private sector can better determine the supply/demand, what they are willing to pay for supplies based on their assessment of what the demand might be, right, rather than have the government set the price through a tariff?

Mr. NORDHAUS. I have a little trouble with that question, to be honest with you, because I stumble over whether in fact these rationing/tariff schemes are going to be in the context of price controls and allocation.

Senator BRADLEY. We are assuming that they are not.

Mr. NORDHAUS. As long as that is the assumption, then I can answer the question.

In the first place, the economic effects of a disruption tariff is to raise the price above the world price level. Presumably we would be going in a disruption with all domestic crude priced at the world level, and then the products above that at an appropriate level.

Then there is a shortfall, and the spot prices rise by \$10 a barrel. Presumably all our crude prices rise by \$10 a barrel, and the products also. Now what we are contemplating is raising prices at home even further above world price levels than they would have gone in the context of decontrol. I think we ought to say that this is what we are contemplating.

If that, in fact, occurs, then that will clearly enhance incentives for stockpiling because stockpilers know that when there is an emergency the prices will really go up, and they can unload the stuff at home at a very enhanced price, and make a very handsome

profit. Therefore, there would be very strong incentives for the private sector to build up stocks, and second, to release stocks in a period of high prices.

I must say that I am a little skeptical, having seen the way governments behave in oil crises, about whether they are willing to raise prices further above world price levels.

Senator BRADLEY. Although you agree that this is an anticipatory action.

Mr. NORDHAUS. OK, I take that, but I just remind you that in 1973, 1974, and in 1979, at just the points where we would have had to do that, those were the times when inflation was in the upper 15 to 20 percent. I think there would have been great reluctance to exacerbate the inflation at those points.

If it had been preprogrammed so that we had to do it, and there was no discretion, then we would have done it. If there is any discretion, as in the Senate bill that I looked at—

Senator BRADLEY. There is no Senate bill that this committee is presently discussing. We are discussing the issue. There was a bill introduced, but that is not what we are discussing.

Mr. NORDHAUS. In the earlier S. 570 there was a discretionary tax. It is hard to see how it could be other than discretionary. Then, I think there are going to be very strong pressures to keep that tax from rising.

Mr. EADS. You have seen me shaking my head. Let's make sure that we don't have a semantic problem here.

I don't understand a disruption tariff as raising the price above the world price. As I understand the theory, it is to put a tariff on which is the difference between what the price would be, given the disruption, and the predisruption price.

To a consumer, this looks like you are raising the price, but what you are actually trying to do is capture rents.

Senator BRADLEY. That is right.

Mr. EADS. That is the whole purpose, to capture rents.

Bill Nordhaus is right that it is hard for somebody who is in the middle of trying to fight inflation to get across to consumers that all you are doing with a disruption tariff is making sure that the U.S. Government gets the money rather than OPEC. That is what you are doing, but it is a very, very hard thing to explain.

I am willing to question as a political matter whether anyone can ever get across the idea that you are really helping people by raising the price of oil \$10, \$20, or \$30 a barrel.

Senator BRADLEY. Do you want to have a rejoinder there?

Mr. NORDHAUS. If you will pardon a little technical aside, I think Mr. Eads was assuming that the supply of oil was absolutely fixed in making the statement he made. That is to say, not only production but inventory were unresponsive to price. Because if there is any response of either production or inventories to price, then putting a tariff on will raise the effective price to consumers. It will not lower the world prices as much as the tariff goes up.

My own personal view is that if the United States goes along, just to pick a number out of a hat, and we put a \$10 per barrel tariff on, I rather think that that is going to raise consumer prices at least \$8 a barrel. I find it extremely implausible to think that

the world price will go down \$10 per barrel the very instant that we put on the \$10 per barrel import fee.

Senator BRADLEY. From the price standpoint, how can you be sure, if you went the quota route and you had an auction, that prices would not skyrocket as high as the tariff?

Mr. NORDHAUS. The reason that you would prefer a quota over a tariff is exactly the reason you would prefer coupon rationing over a gasoline tax. You remember the discussion that you had in the last set of hearings, and Mr. Eads's letter. The reason you prefer quotas is because you have greater relative certainty about the supplies that are available, let us say, to industrial countries in an emergency.

Let's say that there are 32 million barrels a day, or something like that, then what you try to do is to make sure that demands do not exceed 32 million barrels a day, because if they do the spot prices skyrocket, and off we go again.

The problem with imposing a tariff rather than a quota is you don't know what the tariff is that will correspond to the amount of demand that will keep you below what is available on the world market.

So in a world of certainty there would be no difference, but in a world where we are highly uncertain about the response of consumers to prices, a quota is a better instrument for preventing excess demand from world oil markets.

Senator BRADLEY. Let's deal with the fear that is out there, I don't know if you consider it a real fear, but I think you alluded to it, Ms. Rivlin. If we went either the quota/auction or the tariff route, since we have not determined that, the fear that OPEC might retaliate.

Let's say that we put a tariff on of \$5 a barrel. OPEC then says, we will raise the price \$5 a barrel, thereby increasing the world price that much more. Is that something that we should be concerned about, any of you?

Mr. EADS. You might argue that you should not be concerned because all OPEC is doing is reducing your demand by that much more. But in this infamous short run, when everything is trying to sort its way out, before OPEC got the message that they have raised the price too much, there might well be some fairly important financial flows to be concerned about.

One of the problems you have with the tariff strategy is making sure you understand the way that OPEC sets its price, or at least the way some of the members set their prices. The fact that at least currently there does not seem to be something called "OPEC" as a cohesive price setting organization leads me to believe that over the longer run an attempt by OPEC to set what to an economist would consider as too high a price will result in demand falling and, in fact, there would be informal discounting. But while this was sorting its way out, there might well be some real problems.

Mr. ROWEN. I think that much depends on the context. I suppose that there would be a big difference if it appeared that deliberate action by the producers was driving the price up beyond what we or the other importing nations thought was tolerable, and we decid-

ed that we had to act and we chose this as an instrument for counteraction. That is one kind of gain.

Or the other hand, if some disaster occurred in the Persian Gulf of a similar scale to that which has occurred or larger, and we are trying to save what we can, and we are looking for help from wherever we can get it, including the producers, the one thing that they can do to help is producing. We would then be trying to keep the price of oil down to \$100 per barrel.

In that context it seems to me that we would have a better expectation that they would continue to produce. They would still get a good price, although maybe not over \$100 a barrel.

Senator BRADLEY. Mr. Nordhaus?

Mr. NORDHAUS. I will just report that the conventional wisdom among those who engage in these international negotiations is that quotas are more acceptable to the oil producing countries than tariffs. Quotas look as if we are trying to keep our house in order, whereas tariffs look as if we are trying to take away revenues that would otherwise go to the exporting countries. I have been told this.

Senator BRADLEY. So perceptions are on your side?

Mr. NORDHAUS. What side?

Senator BRADLEY. I mean on the quota side.

Mr. NORDHAUS. They are on the side of quotas.

Senator BRADLEY. Yes.

Mr. NORDHAUS. I think the only problem would be, if they were marketed quotas, the difference between a quota and a tariff might begin to dissipate a little bit, and then there might not be that much difference.

Senator BRADLEY. Let's deal with the question of inventories and in particular Mr. Nordhaus's suggestion that we should encourage speculative holding of oil stocks, so that you would have as much in storage as possible in the event of an oil supply interruption.

To what extent do you think an oil futures market might be such an encouragement to speculation? Do you think that it would specifically foster inventory accumulation and, if so, how might we structure that futures market?

Mr. NORDHAUS. I am not an expert on futures markets, Mr. Chairman. My limited reading in that area makes me think that it is not a panacea.

The basic way to encourage speculative stockpiling is to give people the appropriate rewards and penalties that are associated with that. If you put up in a futures market in the context of oil price controls, it probably would not be at all useful. If you have oil prices uncontrolled, it might make some small difference, but probably not that much.

Mr. EADS. Let me take issue with something that Mr. Nordhaus has said, not just now but in his earlier statement, on inventories, because this inventory issue is interesting.

There is no doubt that if companies believe that you are going to impose price controls and allocation, that is a powerful disincentive to hold speculative stocks. So he is right there.

On the other hand, I don't see any evidence that suggest that if there were an absolute, ironclad guarantee that under no circumstances a government would or could impose price and allocation

controls, setting aside whether that guarantee could ever be credible, that private companies would, in fact, for speculative purposes hold just the right level of stocks.

I think that it is entirely appropriate to consider, either as an alternative to government-owned, or as a supplement to government-owned strategic reserves, various forms of incentives to cause private firms to hold excess inventory.

But merely allowing the market to work here would not guarantee that they will hold sufficient contingency stocks, primarily because, as Professor Nordhaus has noted in articles he has written, there are advantages and benefits that accrue to the Nation as a whole that do not accrue to the holders of inventories; benefits that they do not take into account in calculating their value.

So let's keep in mind, then, that if we are relying on private inventories, we have got to find some way of making sure that people can make money on them. We cannot have the situation that whenever the price begins to go up the inventories are going to be "nationalized." But let's also not believe that we can get a free ride from the companies just by guaranteeing in some way that there are no price and allocation controls.

Mr. NORDHAUS. Just for the record, Mr. Chairman, let me say that I did not furnish Mr. Eads a copy of the testimony in advance, so there is no way that he could have known what I wrote. He can only know what I said.

I did not say, either in the paper or in my prepared remarks, that I thought that private holdings of inventories were in any way at the optimal level. In fact, I don't think that. Rather I made two different points.

One is that I think the history of the strategic petroleum reserve is one of never ending series of embarrassment and debacles, from the delay in setting it up, to those few months when we could not get it out, to the period when we were negotiating with our putative friends about whether we can put oil in. It is just a continuing series of embarrassments, I think, to the Federal Government.

I think that there were good reasons. That is something which, when politicized, is very difficult to do, and we have a long history of this that Mr. Eads is aware of in the strategic stockpile, another never ending series of rather counterproductive behavior.

So I think that the first thing is to try to see if we can substitute private for public stocks. I had two specific suggestions about how to go beyond the private behavior. The one I am most fond of is the idea of contracting out to get the private sector to hold, I gave the number, 100 to 500 million barrels of oil under this contract, which would be put out for competitive bidding.

Under this contract, they would only be permitted to release it when the price rose a certain amount, either above last year's price, or above last quarter's price, or whatever. So you would have a nestegg sitting there to be used.

The major point about this is that I think it can be built up much more quickly than the public reserve, and also the release of these will come appropriately. We will not get into a congressional debate. Is now the appropriate time to release the strategic stockpile? Why are we releasing it now? Why don't we wait another year, and so on and so forth.



Senator BRADLEY. Professor Rowen.

Mr. ROWEN. Let me add something.

The fact that there is a credibility problem, which has to be very large at the present time and would still be substantial, I suppose, even if controls were eliminated, together with the fact that there is an externality, a social benefit which exceeds the social benefit, which exceeds the benefit to any holder of oil, suggests the importance of positive action taken by the Government to encourage this. It is partly to recover lost ground, but goes beyond that.

This could take a variety of forms. One of the subjects on the agenda of the committee would be, what forms might this most appropriately take? I don't have a fixed view on this. I notice that various public countries have taken steps to encourage the holding of private stocks.

In Germany they set up a corporation to do this, which has some financial support from the Government. I don't recall the details. Clearly the oil is bankable, so that a lot of the costs would be borne by the market.

Senator BRADLEY. Mr. Scheppach?

Mr SCHEPPACH. I think there is probably a lot of agreement that stocks, be they private or public, give us probably our first line of defense. Our previous work indicates that if you had a billion barrel reserve, we could probably last through a 3-million-barrel-shortfall, which I would suggest is equal to Saudi Arabia completely out for 8 or 9 months, possibly a year, with some conservation. So this is major.

There is, however, a question, I think, with respect to private stocks. That is, at times, under very short shortfalls it could, in fact, be destabilizing rather than stabilizing for the market. The experience indicates that, for example, international oil price jumps \$20 a barrel, and it is at times of great uncertainty that companies may, in fact, not release stocks because they feel that they could gain greater profit by, in fact, holding those stocks if the price increases further.

I don't think that this would happen under a very long shortfall, I think that eventually they would, in fact, release the stocks. But I would like to indicate that it is not a panacea, and that under very small shortfalls, it is possible that private stockholders would be destabilizing rather than be stabilizing to that market.

Senator BRADLEY. Would you feel the same way about Mr. Nordhaus's proposal of having contracted holdings by the private companies, with releases at specified price increases?

Mr. SCHEPPACH. It gets into the whole issue of controls. Is the Federal Government going to control the price at which they release it, or are they going to be able to do it totally themselves.

Senator BRADLEY. As I understood what he said, that is written into the contract.

Mr. EADS. Let's analogize to the grain market for just a second.

Senator BRADLEY. Let me get the answer to that.

Mr. NORDHAUS. This is really modeled on the program for the farmer held reserve grain, in which the farmers decide—

Senator BRADLEY. Is that what you were going to say, Mr. Eads?

Mr. NORDHAUS. Let me just mention the salient point first that the farmer, in this case the oil speculator, would decide whether to

release it. Second, he would receive market prices for it. The only difference between this and what now occurs is that you would say, and this may be the source of confusion, that it can be released only when the price rises a certain amount. So it can't be used for normal trading purposes.

Mr. EADS. But let's look at the farmer-owned reserves for just a second. The way we encourage farmers to put grain in farm owned reserves is, in part, by absorbing storage payments and, in part—again I do not think however long I am in Government I will totally understand the entire grain storage system—by setting the point at which we release the reserve and require repayment the loans that were made against the grain.

Our experience, if I remember right, in farmer owned reserves is that when reserves hit the release point, they generally don't all flow out because, as was suggested, farmers historically have seen that they if they are going to hit the release point they are liable to go up higher.

When they hit the "call point," namely, the point at which the farmers must payoff the loans, and to do so they either have to sell the grain or they have to go to the local bank and say, "I think that I am going to make enough money by continuing to hold these stocks that I think you should loan me money," that is when the grain really flows out.

So if we are going to make do an analogy to the farmer owned reserves, and I think that it is useful to think about this problem. Although the supply elasticity in grain may be greater than oil, let's think about the full analogy. We probably would not only have to have something which locked up the stocks up to some point, but which also provided positive pressure in the way of, let us say, a repayment of deferred storage payments, or something like this, that began to require that that oil got fed into the market, unless people really felt that the price was to go up rapidly.

Senator BRADLEY. There is a major difference between oil and grain. We are the cartel for grain. The cartel for oil is on the other side of the world. Next year you know that there will be another crop, so you have got to fill up the silo again, isn't that a major difference?

Mr. EADS. That is a difference. There are some useful analogies, through. We have been able, through various loan arrangements and tax incentive systems, to encourage a higher level of grain storage than the market would normally encourage. When you are beginning to think about the value of privately owned storage, I think that it is useful to look at the grain experience. It does help to be a net exporter rather than a net importer, and when the market pressures get strong enough, we take other actions in addition to just releasing the reserve—or we have at least in the past. It is a useful analogy, but it is not a total analogy.

Mr. NORDHAUS. There are lots of features about the grain market that are different from the oil market. The point I was making about grains, and the reason that I use that as an analogy is not because we are an exporter rather than an importer, or because of the balance of payments or anything. It was simply to come back to

the key question that this panel is addressing which is, what can we do better to prepare for oil emergencies.

The two points I was making with relation to the grain market were: First, by setting up a subsidy scheme for the private sector, we have encouraged an enormous amount of grain be held by the farmers in the private sector, contrary to what is happening in oil; and, second, and it comes back to the point about stabilization, as we look at the history of what happens in grain markets after bad harvests, the fact of the matter is that almost all the time the behavior of stockpiles has been appropriate rather than perverse.

After the great grain disaster of 1972, after the corn blight of 1975, in both of those occasions grain stocks were run down as price rose. Whereas in the oil embargo of 1973, the stocks went the wrong way, they went up rather than down.

Senator BRADLEY. It is on that last point that I think it makes a difference if you produce the grain and don't produce the oil. You can afford to let stocks flow out in a shortage year because you know next year you are going to have another supply. Whereas if you let stocks flow out in an oil shortfall, you are not certain that you are going to get the oil to put back into the supply.

Mr. NORDHAUS. That is exactly the problem that paralyzes public decisionmaking on when to release stockpiles. There is one more analogy going back to the strategic stockpile. In 1973, we did not want to release copper because we thought that the world was running out of resources.

From a private speculator's point of view the question is, is price going to go down, or is it going to go up. If you are in the middle of an embargo, which you think is going to end, or a war which is going to end in 2 months, the price is probably going to go down, and you release it now, or you should.

I think that those are decisions that the public sector has a great deal of difficulty making.

Senator BRADLEY. This idea of the oil price going down intrigues me, because one of the things that I thought was one of the problems with the world oil market is that disruptions provide the basis for future contract prices, and, in fact, they don't go down as they might in theory. Am I wrong there, and the spot market prices are going down?

Mr. NORDHAUS. Spot market prices went down 30 percent.

Mr. ROWEN. They did go down from 1974 to 1978.

Senator BRADLEY. That is why I have you people here.

Mr. EADS. It is also the important thing to differentiate between the type of disruptions you are talking about. Some people may have thought, for example, that the original Iranian disruption was temporary and we would get that supply back, others may think that it is permanent. So far it has turned out to be a relatively permanent feature of life.

If you are dealing with disruptions, you have to have a system that can distinguish between a situation in which you encourage people to begin to adjust their behavior—to invest capital, to buy automobiles, to buy insulated houses—as though the price of oil is going to be at a certain level permanently, and those that are really designed to alter shortrun behavior.

One of the problems I see with using prices only on a major disruption—especially one which you think may be temporary—is that it may be harder to convey the appropriate longrun signal.

Ms. RIVLIN. It seems to me also that this discussion points up the usefulness of doing a lot of different things. We may well need a better system for encouraging private stocks, and the release of them at appropriate moments, but it does not mean that we don't also need some public stocks in case we guess wrong.

Senator BRADLEY. That is precisely the point. Do any of you disagree with the proposition that we need a number of different strategies, and a number of different actors out there trying to stock?

Mr. ROWEN. I would put it more strongly than that. We are in such a bad position right now, and the situation in the Persian Gulf area is so dangerous looking, that we might try virtually everything that we can think of, and we can think of a lot of bad ideas. After we had sorted out the bad ones, we should go with the reasonable ones and try virtually all of them, particularly on the supply side.

As we know, if we just stick with oil, whether it be private or public holdings, it takes a long time to build a stock and doing so has an effect on the oil price. So this suggests the importance of looking at substitutes for oil, like natural gas.

Senator BRADLEY. Can you tell me where the 400,000 to 900,000 barrels in the short period of time come from? Is that from enhanced recovery?

Mr. ROWEN. No. There is a very long leadtime for that. It is from four or five different categories. On oil, there are about four oil-fields in the United States that have some shut-in capacity that over the course of 12 months could be increased by 100,000 to 200,000 barrels a day, including the North Slope of Alaska, and a couple of major fields in Texas.

I should add by the way, with regard to oil, accelerated work-over of wells, many of them not producing very much, is possible. It may pay to intensify the rate at which the wells are worked over.

There is also surplus capacity for natural gas in the country, which has been at about 500,000 barrels a day equivalent. That is not simply a matter of turning valves open, although that is part of it.

Senator BRADLEY. If we could, I would like to come back to the question of quotas and tariffs.

I would like to ask Mr. Nordhaus, if we had a quota system, and we had an auction, who would benefit from the rents?

One of the aspects of the tariff is that you have a quantity of revenue that is rebatable. Would that be less so under the quota auction system?

Mr. NORDHAUS. In principle, let's say that you wanted to lower U.S. imports to 5 million barrels a day, and you could in principle do that either through a tariff or through a quota. In a regime where oil prices were not controlled or oil supplies allocated, those would lead to a value on the import ticket or license that was exactly the same as the amount of tariff.

In that particular case, where that revenue would go, I presume that it would go into the general fund. But that is, of course, a decision made here.

There is one further point. The one thing, I think I would very much like to see avoided is administering it like the old mandatory oil import program. There the rents were essentially given to domestic refiners and producers because the tickets were not auctioned, but were allocated on a historical basis.

Senator BRADLEY. Given what is the purpose of this hearing, which is to try to think through some emergency preparedness in the areas of tax and allocation, what information do you think we need that we don't have now to be able to make this kind of policy judgment? What do you see as the real choices that will face this Congress in this area?

Mr. EADS. Let me be the first one to try to deal with that question.

I would agree with you completely that we need a range of authorities, or a range of strategies. But one of the key bits of information we crucially need, and what I think the work going on is intended to give us, is some notion of strategies that reinforce each other, and others that are self-canceling.

As Bill Nordhaus pointed out, for example, a strategy which has even standby price and allocation controls operates directly at variance with any strategy that depends heavily on private stock holding. So it is important to understand which of these things work together, and which cancel each other out.

Another thing that is important, and only you gentlemen in the Senate and the House can determine it, is just how willing is the Congress to grant authority to the executive to do the kind of things that would have to be done under price and allocation.

Senator BRADLEY. You made that point earlier.

I want you to finish your statement, or your comment, but I would like other people to react to what you said earlier about the extraordinary discretion that would have to be given to the President to adjust these tariffs.

Mr. EADS. In some sense, you could argue that if we allow our current price control authorities to expire in September 1981, and have no allocation authority and don't plan to put any in, we have, in effect, decided to rely on a tax rebate option of a sort.

The tax in this case is the standard corporate income tax and the windfall profit tax. These taxes do not attempt to capture any of the rents that are going to OPEC, but at least they capture a portion of the domestic rents.

Senator BRADLEY. But isn't that one of the fundamentals?

Mr. EADS. That is one of the things that we would like to do. All I am saying is that we do have a tax system that captures some of the increase in profits. We will have something like rebate system in that our entitlement programs such as social security are indexed and would go up.

Presumably, if you believe any of the simulations, or any of the indications of what will happen, someone would have to begin to decide fairly quickly if it was a major disruption what to do with the money that was coming into the Government because the

combination of increased income taxes and increased windfall profits taxes would raise Government money rather substantially.

So you cannot avoid dealing with the issue of rebating money, even if you decide to let the control authorities expire. My point in my notes or in my statement was, if you are really going to do it right, and you are going to have to be able to use the tax rebate system to deal with, let us say, a shortage of varying amounts, and to capture all of the theoretical benefits in tax-rebate schemes, you may have to allow taxes and rebates to be varied on fairly short notice. Certainly, you would have to allow the structure of taxes and rebates to be set in advance, unless you are willing to let much of the benefit that you otherwise must obtain from tax rebates just go away.

Mr. NORDHAUS. On the question of information, I don't think there is any data that are easily available that we don't have, and that would help us make these choices. I think that it is simply a question of thinking carefully about what we know, and weighing priorities.

I see three choices that have to be made in the next Congress and beyond about the shortrun problem. We are talking about the shortrun problem of coping with energy emergencies.

The first is the issue of price controls, and whether to extend those on a standby basis. The second one is the allocation of scarce Federal resources. I see the question of stockpiles as an extremely important one, whether to continue the route of public stocks, or to go private stocks when there are severe restraints on Federal spending.

The final question, which I think is the one you are most interested in, is the question of what to do in the case of a severe emergency. Here there are subquestions. One is, should you go a rationing route, or a tax route. Second, in either case you will have to allocate the income. Whether it is green paper or white paper, you will have to allocate the income.

The work that I have seen on this indicates that has been very little serious thinking about how those billions, or perhaps hundreds of billions should equitably be allocated among the population. I think that this is a very serious issue and needs also to be addressed.

Ms. RIVLIN. I, too, fail to see what more information could be acquired. It would be awfully nice to know more about elasticities, but it is not obvious how we find out, except by having more disasters.

Also it seems to me that we should distinguish the question of stockpiling from the question of allocation afterward. The stockpiling issues are fairly straightforward. To go back to our earlier discussion, we probably ought to do everything.

On the allocation, as has been pointed out, we don't have a bad system at the moment for dealing with minor disruptions. They could be supplemented by a standby additional rebate system in case of a major price rise, and you have a lot of inflow into the windfall profit tax. We could have a standby system for allocating that more quickly. It doesn't just go out through the normal entitlement programs as rapidly as it would need to.

Unfortunately while that seems attractive to economists, I don't think that it seems very attractive to the general public. There is perception that I think is very widespread that there is something fairer about rationing. I have the feeling that if we have even a moderate disruption, the call for rationing will be loud, rather than the call for letting the price rise.

Senator BRADLEY. One of the things that I continually come across in this literature, when they talk about the costs of rationing versus a tax rebate, is the inconvenience costs imposed by rationing. The cost of waiting in line for gasoline, and how it affects someone whose time is worth more doing something productive.

Ms. RIVLIN. I was thinking of coupon rationing.

Senator BRADLEY. Coupon rationing would be the same problem. There would be the same problem because you would only have a certain number of outlets for supply. Everyone would have their coupons, but they would all be waiting in line trying to buy.

My question is: How do you measure inconvenience costs? How do you put a dollar figure to inconvenience costs, if you are trying to analyze if they are greater or lesser than the tax rebate costs?

Mr. EADS. We have some natural experiments on that. If you note the GNP in the second quarter of 1979 fell at an annual rate close to 4 percent, after having risen several quarters before. That was a very minor supply disruption, where we used rationing by line rather than rationing by coupon.

That was a measure of perception by people that they should reduce their economic activity, which they did. This is the closest thing to a natural experiment we have had in that area that I can think of.

Mr. ROWEN. May I respond to your earlier point?

Senator BRADLEY. I want to finish this inconvenience cost. Is that what you were going to address?

Mr. ROWEN. No, I wasn't.

Senator BRADLEY. Let me ask you about regressivity of an inconvenience cost rationing system versus tax rebates. Is the rationing system more regressive or less regressive than is a tax rebate system?

Mr. EADS. You have to know what your rebate scheme is before you can talk about that.

Senator BRADLEY. Let's say that it is per capita, therefore, you assume that it redistributes more because those who have more money consume more.

Mr. EADS. If your rationing system worked approximately well, there clearly would be some lines. But if it is working approximately well, the number of coupons comes close to approximating the number of gallons of gasoline that are available. You certainly should not have as bad a line problem as you would if you don't try to control the quantity, and if you just let lines form.

If you can deal with the problem of lines reasonably well, the main problem would be people who find it difficult or impossible to curtail their gasoline use to the level of their coupons, and have to go into a market where the price of additional coupons is quite high. How they would go about getting that income?

You would have to know the distribution of gasoline use by "necessity", to use a term I don't like. It is not inconceivable that a lot of the poorer people, who happen for reasons that are unrelated to the shortage situation to be located far away from jobs or who don't have good access to public transportation, might be more inconvenienced than people who can carpool.

It is very hard to know who would be differentially hurt, but you can't assume that one scheme necessarily helps the poor and the other helps the rich.

Mr. ROWEN. You earlier raised the question of what information do we need. It seems to me, picking up the point that Mr. Eads made, that we know a fair amount. Having wrestled with the problem of rationing, probably the only way we will come close to understanding is to have an operational plan devised or a couple of alternatives.

These hearings would seem to be a good basis for having the administration design one or a couple of specific plans. If we were to go with the tax rebate system, this is the way we would run it, and at least a couple of models could be constructed out of this discussion this morning.

I think only if one goes through these steps will these questions get resolved, at least in part.

Senator BRADLEY. That is what we hope will happen from the hearings. One cannot be certain, but at least it is a beginning.

I want to pose a few basic questions on these emergency taxes. Basically, the questions are first what do you tax, crude or particular products. We have answered the question of whether it should be unilateral or multilateral, I think. Then, the question is how to recycle the tax revenues.

Is there general agreement that we should tax oil, or should we tax oil products?

Mr. ROWEN. Do you mean crude oil and oil products?

Senator BRADLEY. Yes; do you put in an oil tariff, or do you put in a gasoline tax?

Mr. ROWEN. The broader the tax, the better.

Senator BRADLEY. Let's give you the range: gasoline tax, tax on oil consumption, tariff or quota on oil imports, tax on oil and natural gas consumption, tax on certain selected petroleum products.

Mr. EADS. The broader you make the tax, and the earlier in the stream you make the tax, the closer toward crude, the better it is in theory, because you are having to control fewer and fewer decisions. It is a principle that most economists would agree with. Whether operationally you can do it is another question, but in theory it is the best way to do it.

Mr. NORDHAUS. I think there are actually two questions.

One is gasoline versus all oil products. I have said what I think on that, and I think other people have said to spread it widely.

Senator BRADLEY. To spread it widely, you mean put it on crude oil?

Mr. NORDHAUS. To spread the burden of adjustment to high prices broadly, not just on the person who drives.

The second question is whether it should be on oil products or on oil imports. If you put it on oil products, presumably you are going



to take away the incentive to raise domestic production. Whereas if you put it on oil imports, you will drive a wedge between oil imports and domestic production, giving incentives to increase production or release stocks.

Senator BRADLEY. Doesn't it go directly to your assumption about the duration of the interruption? If you assume that the duration is going to be short, then you might not need the kind of supply incentive that you would if you expected it to be long.

Let's take the example that a \$5 tariff generates \$500 billion. If you expect this interruption to last for 3 or 6 months, it would not make a lot of sense to try and take the \$500 billion and give it to domestic producers to encourage a supply response.

If you assume that the interruption will last much longer, you might want to take \$300 billion worth for the rebate, and \$200 billion for incentive to the oil industry or the gas industry to increase production.

Do you agree or disagree?

Mr. NORDHAUS. That is a very difficult question. I feel much clearer about products than I do about this one. However, in light of what Mr. Rowen said, and in light of my own feelings about stockpile behavior, I think I disagree. The reason is, because if you put a tax on products only and, therefore, the producer and owner of stockpiles does not see the price going up during the emergency, that person would have no incentive to increase production or to unload stocks.

I have heard numbers, even bigger than the ones Mr. Rowen gives, on the possibilities for increasing production from existing wells, so on and so forth, as well as stockpiles. I think, by and large, I would tend to put a tariff on and, therefore, increase the price of domestic production in the short run as well.

Senator BRADLEY. You put a tariff on, but the question is, What do you do with the revenues from the tariff?

Mr. NORDHAUS. That is a separate issue. This was a question of taxing products versus imports.

Senator BRADLEY. Could you comment on what would you do with the revenues, when you consider the possible supply response?

If you get \$500 billion in revenues, do you rebate all of it? Do you rebate part of it, and divert part of it to trying to get a big supply response?

Mr. NORDHAUS. When the number is \$20, \$30, or \$40 billion, I think you might begin to question whether you want to rebate it automatically or not, if you have a replay of Iran. When the number gets above \$100 billion, I think there is absolutely no question that if you don't want to send the country into a big depression or a deeper depression, you have to rebate it.

The problem is whether it is 100 percent that is rebated, or 90 percent, or 110 percent. This will depend on the state of the economy, and the economic outlook, and what is going on elsewhere.

Senator BRADLEY. Would you say that some of it, though, should be diverted to try to increase supply?

Mr. NORDHAUS. If the price is going up along with world prices, that is incentive enough for supply to increase. You don't need to divert any more revenues to producers to get them to increase their output.

Senator BRADLEY. So you would not, for example, replace the windfall profits tax with this tariff?

Mr. NORDHAUS. No.

Mr. EADS. Assuming that you are going to let the price of domestic oil rise, I assume that what you are suggesting when you make that suggestion is that in addition to the higher price of oil there would be a cash flow problem for the companies. Given that the price is very high, I can't see a cash flow problem constraining exploration, drilling, and reworking, or anything of that sort.

Mr. ROWEN. I think that we need to know more about the numbers there. Some of the activities that I have described I am told are really quite costly, and will not be undertaken unless the return is substantial. This is without numbers at this stage. I was just referring to the physical potential.

Senator BRADLEY. In Ms. Rivlin's testimony, she lays out goals for disruption policies that include minimizing losses in real output and income losses, stopping wealth transfers, managing income redistribution and official use of energy, and preventing panic.

If you look at the possible policy steps that we might take in the area of emergency oil taxes, how would you rate each of those policies in terms of equity, wealth transfer, and energy supply response?

In other words, if we wanted to try to stop the wealth transfer as much as we possibly could, what policy would that argue for? What policy would it argue for if we placed greatest emphasis on equity? What policy would it argue for if we wanted to promote the efficient use of available energy?

Ms. RIVLIN. I am not sure that you can separate it quite that distinctly. To promote the efficient use of available energy is no substitute for the price system—

Senator BRADLEY. Let's approach it this way.

Which do you think is more important from your perspective, to prevent wealth transfers or to achieve equitable income redistribution?

Ms. RIVLIN. I was going to say that you would have to do both. If you are using the price system to ration as efficiently as possible, you still have an income distribution problem, and you can't handle that. They are not mutually exclusive. You can capture some of this rent and redistribute.

Mr. EADS. In some cases, one of the objectives might become almost irrelevant. If you have a very large shortfall, and you are using price to allocate whatever supplies you have efficiently, it is small comfort to say that you have allocated efficiently, if so much money is being drawn out of the consumers' pocket so they can't buy very much. So it is not an either-or situation, as I think Alice said in some earlier comments.

Depending upon the size of the disruption, you may emphasize different goals. If we are talking about relatively small disruptions, up to a million or so barrels a day, or maybe even slightly higher than that, it seems to me that the income distribution effects of that are small enough to allow the market to work.

The importance of allocative efficiency is large enough that you would probably put a pretty heavy premium on proper allocation, and you might be willing to use the price system as much as you

could to avoid using the administrative controls we have used in the past.

As you begin to get the larger and larger disruptions, where you begin to worry about the magnitude of the revenues being siphoned out of the economy due to the price increases. You can't ignore these losses. You might call them distribution effects, but they are more basic.

That is the best answer I can give you.

Ms. RIVLIN. You have to get the money back into the economy somehow. In a sense, you might as well do it in a way that offsets the adverse income distribution effects.

Mr. ROWEN. But it is important to recognize the proposition that if it is a really bad case, then we should be more concerned about efficiency, because we are in deep trouble. At that stage, questions of equity, I think, would be less important than keeping the economy functioning.

Senator BRADLEY. Even if there is not a collective action? Let's say that it is a unilateral action, and if you are interested in the income redistribution or equity questions—

Mr. ROWEN. It is not that you are not interested in them. It is just a matter that the choices are tougher at that point.

If it is a case where we are getting into a deep depression, and at that point what the Government does with regard to these revenues might be perceived to make a difference in terms of how the economy functions. When we are really in deep trouble, then maybe the questions of equity would be judged to be less important than how we kept the economy from going completely to pot.

Equity considerations in a crisis, this is a matter of prediction, and I would predict that they would be less important than they would be in a period when we can be more concerned with them.

Senator BRADLEY. Mr. Nordhaus?

Mr. NORDHAUS. I guess I think there is a fundamental conflict in these goals between policies which raise oil prices a lot, and those which don't. Those which raise oil prices a lot through taxation will generally transfer income from oil producing countries to this country, and probably from consumers to Government and to producers. It will probably also help the efficient use of resources with oil prices higher.

As for the losses from that, I think there may be severe macro-economic losses. We have not mentioned inflation very much today, but clearly one of the major difficulties from a high tax policy is to exacerbate high inflation rates. The other, obviously, is an equity problem, which is that people who are large consumers of oil are badly hurt by high prices.

I don't think that there is any way of resolving that fundamental trade off between high-price and low-price strategies.

Mr. SCHEPPACH. I would like to add one other thing. I think that when we talk about efficient allocation, we have to distinguish a little bit between the short run and the longer run problem.

I don't think there is any question that letting prices go in the very short run is going to give us the most efficient allocation of petroleum and probably maximize our output.

If, however, we were to leave it there for a long period of time, I think what happens is that the profit margins of other corporations begin to get squeezed. They cut their investments, possibly.

You have large amounts of money residing in the producing companies which, although go back through the banking system and recycled, it may not in fact be the best long run signals for investment.

So I think we should keep in mind this separation of efficiency between long run and short run. I think that it is particularly important, when we start talking about short runs of only 3 or 4 months, is that giving the proper long-run signals to companies or not?

Senator BRADLEY. I would like to just ask one or two more questions. We said we would try to conclude by 12.

The question of a tariff or a quota, the President presently has the power to do that. So, assume that we would not be talking about a tariff or a quota, but we are talking only about a rebate, is it possible to design a rebate, an ideal rebate system?

If so, what would that be, so that we in the Congress can only pass a law that will give money back to people, and not one that will tax them. That tariff and quota being a decision that the President will take if the Congress chooses not to veto that decision.

The question is, What is the ideal rebate system—withholding, tax cuts, use your imagination; what would you suggest? Somebody has got to design that rebate system, and it has got to start somewhere.

Mr. EADS. We tried to do it when we were looking at the decontrol. It is hard.

In theory, I think, the ideal rebate system would be something which preserved what economists call the pure "substitution effect," and totally offset what economists call the "income effect."

Senator BRADLEY. What is that?

Mr. EADS. The substitution effect occurs when the price goes higher and you are induced to consume less of that something. The income effect measures the change in real income represented by the expenditure on the commodity whose price has risen. Presumably you like to offset some or all of the income losses, but keep the substitution incentives.

That suggests trying to identify patterns of petroleum use and rebating income in accordance with that. I don't know of any way to do that at this point. I am sure that Emil Sunley will talk in greater detail about it this afternoon.

Doing things like merely reducing withholding is not going to give income back to the people whose incomes are reduced by higher petroleum prices. Earned income tax credits, or anything that relies on the annual filing is much too slow. Anything that even relies on withholding may, in major disruptions, be too slow.

I am not an expert on tax design, but what little work we have tried to do on it, when faced with the issue of how to recycle a certain amount of money, has suggested that there really is not a good way. We looked at doing it through food stamps. We looked at doing it through various forms of entitlement programs. There are

some major congressional problems in touching any of those programs.

So it is not just an economic exercise, it is an important political exercise, too.

Mr. NORDHAUS. Mr. Chairman, I think you are chasing the will-'o-the-wisp if you think this panel is going to give you an ideal rebate scheme. There is no ideal. I think it would be presumptuous of a group of technical experts to give you one. After all, a rebate scheme is one which will be designed to meet certain objectives. The objectives would be things like: Is it a per capita rebate? Is it proportional to income? Does it include illegal immigrants? Is it run only through the tax system, or does it include entitlement programs? Is it simultaneous, or is it lag 3 months, or is it lead 3 months?

I think it is only after you and our other elected representatives tell us the answers to these questions that we can even begin to see if there are institutions that can do that relatively well, or perhaps not at all.

Senator BRADLEY. Let's put the political questions aside, and deal with the efficiency question.

The Federal Government has just collected \$500 billion, how do we get it back to the people? That is somewhat related to what they have had to pay in increased costs from that rise in energy prices.

Mr. NORDHAUS. The best way to get it back is to drop it from a helicopter. You can't get away from the problems I just spoke about. For example, if you wanted to rebate just to taxpayers, you have to ask, is it a function of income and oil use. You have been through all this. I think that you cannot start until you ask what the fundamental design of the rebate is, and what the timing is.

Senator BRADLEY. Ms. Rivlin, do you disagree?

Ms. RIVLIN. I don't disagree that there is no ideal system. I think you just have to recognize that.

It seems to me the objective should be on the average, and only be on the average, to get back to various income groups approximately what they have lost by the rising price of oil. You can only estimate that.

Then, how quickly you get it back. The obvious thing is through the withholding system, which is pretty fast. But not everybody pays taxes, and you have to worry about the ones who don't, and use the other mechanisms, such as social security to get out the rest.

Mr. EADS. The problem with those mechanisms is that they bear absolutely no relationship to the direct or indirect use of petroleum products.

Ms. RIVLIN. It does not matter. You have just got to do the best you can.

Mr. EADS. You are saying that, an arbitrarily chosen rebate mechanism is all right as long as it gets some income to somebody.

Ms. RIVLIN. I am not saying that it is entirely arbitrary. But you have to recognize that it is not going to be perfect, and that the best you can do is this sort of averaging over the income groups.

Mr. ROWEN. I suggest that you should ask a different question, which is: Is there at least one practical scheme that would be not

too bad in terms of being able to work? \$500 billion is a lot of money.

Is there one practical scheme that would sort of be acceptable, one that looked like it could work?

If the answer to that is, yes, under certain assumptions, then that is important to establish. Whether it would meet the political test is another matter, but at least it would be an existence proof that there is one scheme.

Senator BRADLEY. You are posing the question. You don't have the answer?

Is there one scheme?

Mr. ROWEN. I think there is one scheme, and I think the elements of it have been discussed here, the withholding tax, the social security, and entitlement programs. My guess is that the specialists can devise it, but whether it will pass the political test is another question.

Mr. SCHEPPACH. Just one final comment.

I think that the baseline, perhaps, should be relative to your rebate system under rationing, which is essentially how you mail the tickets out. They have made the decision to do that on registered automobiles, rather than drivers. I suspect that if you were to do a system which goes through the income tax and social security, you might get it back slightly more equitably than you would under a rationing plan.

Mr. EADS. Why? At least a rationing plan distributes tickets in a some rough relationship to gasoline use. At least, that is the theory of it.

As I was saying, the question is, How do you get money distributed? The answer is simple. You get money distributed through the tax system, and there is nothing that beats the income taxes working in reverse to get money out.

But if you are asking whether any income distribution system has any relationship to the pattern of income losses, the answer is, only by the sheerest chance.

Mr. SCHEPPACH. I guess that I would comment back that I suspect that miles driven is more highly correlated with income than it is with the number of vehicles that somebody owns.

Senator BRADLEY. I wanted to ask one final question. This is one of these things that I forgot to ask, so it is not the summing up question.

If we went to the tariff route, do you think that it would be possible to exempt oil from Venezuela and Mexico? Do you think that it would be possible, or do we have to bite the apple and say that it is all imports?

Mr. ROWEN. There is a question of whether it would be desirable, and then there is the question of whether it is feasible.

I suggested earlier that it would probably be desirable. We should have nothing against oil from Venezuela. In fact, we should be encouraging oil from Venezuela and other safe places, Mexico, and so on.

This leaves the question of feasibility and monitoring. There are, I am sure, lots of dodges that are possible. On the other hand, oil does move in rather well defined ways, which ought to be within our capacity to monitor. So that I come out tentatively saying we

should seriously consider a scheme, not only for economic reasons but for political reasons, to exempt people that we really should not want to exclude. We should try to encourage them to produce as much as possible, and should provide them an economic incentive for doing that.

Mr. EADS. I just don't understand that argument. Presumably, prior to a disruption, we have gotten rid of our basic control system, the world price of oil and the price of oil in the United States, the price we are paying for it will reflect to some degree the cost of extraction. In some cases there may be some major rents earned.

What I hear Mr. Rowen saying sounds to me to be totally analogous what Mr. —I am drawing a blank.

Mr. ROWEN. While you are recovering from that blank, I was not referring to the emergency case, but the longer term.

Mr. EADS. If you were referring to the emergency, you are making the exact argument as to why you would want to exempt holders of domestic petroleum stocks from price controls. If you say this will encourage them to build spare capacity, then if you can make that argument, fine. It is an argument on encouraging short-run elasticity of supply, and not an argument on encouraging a higher longer run level of investment.

Mr. ROWEN. I hope that I have cleared that up. I was referring to a long-term policy, and not to the emergency.

Mr. NORDHAUS. Mr. Chairman, on this question, I think there is little to be gained, and some to be lost, by differentiating in the application of the tariff. I think there is relatively little to be gained because oil in international trade is extremely fungible. I just would hate to have a whole new apparatus tracking down where molecule No. 1,063 came from as it crosses our border.

There is something to be lost. I remember 3 or 4 years ago, we had the issue because my understanding is that either OPEC countries, or countries that had embargoed the United States cannot get the GSP. You may remember this. There was a big issue that involved, I think, Venezuela in 1977 or 1978 about whether they would have GSP because they were a member of OPEC. It was a very embarrassing diplomatic situation at that point.

So with little to gain, and something to lose, I think that a differential tariff could probably be left out of the proposal.

Senator BRADLEY. Should standby authority for allocation and controls exist after 1981?

Mr. ROWEN. No.

Mr. NORDHAUS. No.

Mr. EADS. Let's see if it is going to be 3 to 1.

Ms. RIVLIN. I guess not.

Mr. EADS. I think that when we look at it, we are probably going to want to keep some emergency control authority there somewhere. I don't like it, but I am saying that after we look at it, we are probably going to want to have some.

Senator BRADLEY. In the absence of any controls or allocation powers, that means that we really have to devise a system of rebates that is perceived to be equitable and can be used in an educational process to convince people that it is equitable and fair, because otherwise the political wave will wash us all out.

Therefore, since there is greater interest in incumbency in certain circles than other circles, it is essential that we try to figure out a mechanism that can do that. That is where the four of you are essential. I don't think that we have any real answers to that. I think we have a lot of trails. I think that is probably an important beginning.

I thank you for your participation, and hope that the Reagan administration will be able to devise such a free market approach to this problem. I will certainly be there to try to help.

We have another hearing this afternoon, if you want to stick around, and one on the first, that will deal with long-run questions, not just short-term.

Thank you very much for your help.

[Whereupon, at 12:05 p.m., the subcommittee adjourned, to reconvene at 2 p.m., the same day.]

#### AFTERNOON SESSION

The subcommittee met, pursuant to call, at 2:15 p.m., in room 2221, Dirksen Senate Office Building, the Hon. Bill Bradley presiding.

Present: Senator Bradley.

Senator BRADLEY. The subcommittee will come to order for the second phase of our hearings on the use of oil taxes for emergency preparedness.

I said today in my opening statement, which I will not read again, that the events in Iraq and Iran only highlight our vulnerability. It is high time that we begin to focus on the question of how we reduce our vulnerability to oil supply interruptions and move away from our preoccupation with energy independence as the central issue of energy policymaking in this country.

What we are talking about here are policies that can counter a real emergency. If we have a real emergency we must assume that some people are going to be hurt. We will not be able to fully cushion everyone, but we are attempting to probe in this hearing mechanisms that could ameliorate a bad situation. We are exploring the question of a disruption tariff or a gasoline tax, and mechanisms for recycling the revenues.

Basically, I would like the panel this afternoon to address those questions, as well as the ones I posed to you in my letter of several weeks back.

We are very fortunate today to have on the panel Stephen McGregor, who is Deputy Assistant Secretary for Oil and Gas Policy at the Department of Energy; Milton Russell of Resources for the Future, Washington, D.C.; and Emil Sunley, Deputy Assistant Secretary for Tax Analysis, the U.S. Treasury.

We know that Mr. Sunley is no stranger to the committee, even though he might become one in the next several months when he returns to the private sector. We welcome him, indeed, in perhaps your farewell appearance before the Finance Committee. If so, I want to express my admiration for you.

Our first speaker will be Stephen McGregor. What I would like to do is try to limit your prepared comments to 10 minutes. I will not rigidly adhere to that, but try to go 10 minutes. Then, we will have a discussion.



**STATEMENT OF STEPHEN MCGREGOR, DEPUTY ASSISTANT SECRETARY FOR OIL AND GAS, DEPARTMENT OF ENERGY**

Mr. MCGREGOR. Thank you, Mr. Chairman.

As your very able staff person has noted, in both Mr. Sunley's and my case, Veterans Day may be a very appropriate occasion for this hearing.

Senator BRADLEY. I am very sorry, Mr. McGregor, that I did not note for the record, indeed, that I admire you, too, and the work that you have done.

Mr. MCGREGOR. Thank you. I did not think that it was that apparent that I was fishing.

I will definitely keep my informal comments down to 10 minutes or less, Mr. Chairman.

I would like to first note the policy context in which the Nation seems to be heading, which I believe bodes well for being able to face imminent or future disruptions. We have set out on a course where we are premising energy policy much more today on market efficiency, and migrating away from a system of very rigid price and allocation controls.

We still have some distance to go as a nation, but I think this development sets up the appropriate signals and the appropriate environment for being able to develop a more comprehensive energy contingency policy which we are all here to discuss today.

Let me just turn briefly to the six or seven questions which you posed in your letter of October 14, and give some summary responses. I am sure we will get into more detail after we have all given our introductory statements.

First of all, on the issue concerning limitations on the size of our strategic petroleum reserve for the next several years, I believe we still have flexibility as far as increasing the size of our strategic reserve beyond the conventional storage capacity now located in the gulf coast area.

Within the Department of Energy's Policy Office, we have been taking a very hard look at an industrial petroleum reserve, and various ways for facilitating such a reserve, primarily looking to cooperative efforts between the industry and the Government in order to bring on above-ground storage over a very rapid period of time.

Another strategic reserve concept, which is still being scrutinized in terms of technical analysis, is the natural gas strategic reserve, where we are trying to make an assessment first of the storage capacity that we have within the United States, as well as the supply potential of Canada and Mexico during an energy emergency.

Obviously, natural gas is quite fungible with petroleum, especially in the utility and the heavy industrial sectors. If there is storage capacity, the transportation infrastructure looks good for delivering the gas to the appropriate markets. And, indeed, on the demand side this fungible capability will exist over the next 10 years, which is the period of vulnerability with which we are most concerned.

Turning to the second question, what would be the petroleum savings of \$10, \$20, or \$30 per barrel emergency surcharges. We have done some preliminary analysis on tariffs of that size, and what the near-term demand response might be. I put a 50-percent

confidence range on each side of the numbers for the \$10, \$20, and \$30 type of tariff, respectively.

We are looking at savings in the very near term, using elasticity assumptions of negative 0.1 or 0.2, of perhaps 450,000 to 500,000 barrels a day for the \$10 tariff; 900,000 to 1,000,000 barrels a day for the \$20 tariff; and in the range of 1,350,000 to 1,400,000 barrels a day for the \$30 tariff. Over time, over a longer period, you get bigger savings as turnovers in capital stock start to take place.

I caution that there are numerous assumptions and variables that have to be taken into account in terms of deriving a savings number, and it is impossible to rule out some element of uncertainty in terms of being able to specifically pinpoint a savings number.

The third question, would import fees, tariffs, or quotas be more or less effective and efficient. It is our belief that the import fee device is probably a more efficient demand suppressant than quotas. But I caution that the net result of either a quota or fee is a higher than market clearing price for petroleum within the consuming country.

There are definitely economic impacts that occur any time you raise the market clearing price. There is definitely also going to be the potential of retaliatory action by foreign producers, and those are the threshold questions which must be addressed in terms of deciding whether you want either a disruption tariff or a quota.

Between the tariff and the quota, however, and I use tariff and fee interchangeably here so that there will be no confusion, the fee is more attractive in the sense that it doesn't set a production target for foreign producers. Once they see a target, they know that there is going to be a limited demand in the world market for petroleum. The producers' rationale response would be to cut back production in order to meet that target, and obviously drive up the price of oil on the world market. A tariff, however, has already established the price effect and thus prevents large wealth transfers to foreign producers.

The next few questions, I think, can be responded to together. Could an emergency oil surcharge be adequately and equitably offset by some combination of reduced withholding, payroll, income or other taxes, and what are the practical problems with implementing such an approach.

Let me just say that we at the Department of Energy have been working closely with the Department of Treasury, with Mr. Sunley's office, and also with the Treasury Economic Policy Office, with the Council of Economic Advisors, and with the Office of Management and Budget in an interagency task force which is taking a very hard look at specifically these types of issues.

I have with me today Bill Taylor, who is the Director of our Office of Oil Supply Security, who, with the Chair's permission, I would like to invite to the table when we get into the questioning period. Mr. Taylor is heading up the interagency review team that is looking into this rebate issue.

The six questions asks about how important would it be for the United States to act in concert with other major importing nations in imposing an emergency surcharge to reduce the outflow of funds to producers.

Our analysis, and this is intuitively obviously, indicates that collective actions by several nations bring significantly greater benefits than unilateral actions by any one nation. It is a world petroleum market and not just a domestic petroleum market in which actions are taken. Unilateral actions by the United States would accrue to the benefit of all nations, and because of that sharing of the benefits, actions taken unilaterally should not be quite as dramatic as collective actions.

Again, I have another office director from our Policy Office, Mr. Lou Pugliaresi, who is Director of the Oil Policy Office, and he has developed quite a bit of expertise in this area. If he could join Mr. Taylor at the table after we conclude our introductory remarks I believe his presence would be most helpful.

The final question, on balance, how does the desirability of such an emergency oil surcharge and tax relief program relate to the actual, as well as expected depth, duration, and permanent price of an oil supply disruption.

I think that it is a good question. I think it underlines the fact that there are numerous variables which have to be taken into account in terms of defining the Nation's strategy and the consuming world's strategy for determining how oil supply disruptions of various magnitudes should be addressed. I am sure that we will get into the details of that shortly. Needless to say, the determination of the depth, duration and price efforts of any emergency disruption will be open to subjective judgement which will make it even more difficult for deciding what actions, including imposition of a surcharge, would be appropriate.

I will conclude with that. Thank you.

Senator BRADLEY. Thank you very much, Mr. McGregor.

Now let's go to Mr. Russell.

#### STATEMENT OF MILTON RUSSELL, RESOURCES FOR THE FUTURE, WASHINGTON, D.C.

Mr. RUSSELL. Thank you, Senator.

Let me state for the record that Resources for the Future, where I work, is a nonprofit, tax-exempt research organization, which takes no position on policy issues. I am here for myself, and only at your invitation.

I don't have a formal statement, but I would like to take this opportunity to talk about a few topics which sometimes get lost or fall in the cracks on some of these issues, rather than try to go over some of the ground which is fairly familiar, and which perhaps was discussed this morning.

The first topic I would like to address is the role of private behavior and of expectations in planning for a disruption, especially in terms of public planning for a disruption.

Sometimes you hear in the perhaps less than most sophisticated arenas of discussion of these issues a presumption that if the Government does not plan for a disruption, then no one plans for a disruption.

That is a correct starting place if you are talking about a military situation where contingency planning got its start, because there if, in fact, the military is not planning for an invasion here or an air strike there, no one in fact does plan for it. But this is not

quite the case as far as the energy situation is concerned. In the energy world, and in the economic world, and in the private sector world, to some extent when Government acts, the private sector finds it less necessary, or less desirable to act. Consequently, we have to keep in mind that any Government programs toward stockpiling or other emergency preparedness actions to some degree lessen the incentives of the private sector to protect itself. In a way it is almost as though it is worthwhile to be naked before the storm. If you don't have any supplies yourself, then perhaps the Government will reallocate someone else's supplies or draw down the strategic stockpile and keep you supplied.

Sometimes the view that Government alone can act carries over into a policy presumption that the private sector can't see through a veil of uncertainty such as that which exists as far as our future oil supplies are concerned, but that Government can. This sometimes leads to paternalistic policies which end up with some distortions in resource allocation.

So the first topic I think we ought to consider is the interaction, if you will, between the public actions of the Government and the private sector response as it reacts not only to the real emergencies or potential emergencies that it sees in the outside world, but also to the actions that have already been taken or not taken by the Federal Government.

The second topic I want to raise comes from my reaction to the Congressional Budget Office document that was circulated to us earlier. It seems to me important to recognize that the prospect of a disruption can bring forth an appropriate, and not an inappropriate—as I found expected in that document—private response. Not enough private response, but certainly an appropriate private response. Let me explain.

The private response to the expectation of a disruption is to act in such a way, of course, as to minimize its cost, or, for some people, to maximize gain from that disruption. In acting in such a way as to do that, private parties can end up reducing the total social disruption costs.

For example, if the private sector knows that in the event of a disruption there will be an increase in the price, parties may well prepare ahead and consequently get ready for that reduction. They will build up stockpiles or build up the potential to reduce use, and therefore lower the social cost of that disruption. On the other hand, if a transitory price increase is thought to be one that will be forestalled in some fashion or another, a policy suggested in the CBO document, in its statement that a transitory price increase in the event of a sudden emergency might not be one that ought to be reflected in market prices, there will be less reason to prepare ahead.

With prospective price controls of one sort or another, the real social cost of the disruption gets paid by lowering GNP more than it ought to be, but the income distribution gets changed clearly enough, and that is one of our goals. Without the expectation of price controls, though, the real cost of the disruption can be lowered by the preparations undertaken in the private sector.

Thus, the expectation of transitory price increases, contrary to the CBO assertion, do play a role beyond allocating the shortage.

They tend to cause investment in storage and alternative fuel capacity, in potential demand restraint, and in other ways and matters of that sort.

Senator BRADLEY. When you said that the actual disruption brings forth the proper private response—

Mr. RUSSELL. The expectation of disruption brings forth the proper private response.

Senator BRADLEY. I thought you said the disruption.

Mr. RUSSELL. In fact, the disruption would bring forth the proper private response, too, in the sense that as prices rise, or as the fuel availability gets less, you will, in the private sector, try to find ways out of the situation in which you find yourself.

Senator BRADLEY. But the experience in past disruptions has been, hasn't it, that individuals or companies, when the disruption occurs, don't immediately sell into the market. They hold longer than they should because they want to sell when the price is the highest possible price.

Mr. RUSSELL. Be careful when you say, "Hold longer than they should." The reason they hold is that they expect the situation to get even worse. And in fact, if you look at the record of the public sector in 1973-74 and 1978-79, we actually used Government policies which generated an increase in inventories during disruption periods.

I am not sure who has the better or who has the worst foresight. It might be very wise to build inventories in the early stages of a disruption. In fact, it probably was wise for the oil companies at the beginning of the Iranian disruption last year to try to build stocks for a while because they had no idea how long that disruption was going to last.

In hindsight, we can always say that it would have been wise to have drawn down stocks at time A or time B. But when you are looking into the future, and you are uncertain as to whether things might get worse, it is very difficult to make the assertion that the private sector always is going to hold stocks too long, and that the Government is always going to know best when to release them.

Senator BRADLEY. We had this question this morning a number of times, and I think that the conclusion was that you cannot really have price and allocation controls and maximize the use of the market for private stockpiling.

Do you agree with that?

Mr. RUSSELL. Yes.

Senator BRADLEY. Do you think that private industry will assume that there will never be any price controls or allocations?

Mr. RUSSELL. No, I don't. I think in this country, and certainly in the rest of the world, the assumption is going to be that there may be some price and allocation controls.

Senator BRADLEY. And you think these expectations will persist whether there is EPCA in October 1981 or not.

Mr. RUSSELL. Certainly. But that does not suggest that because it is a matter of kind that it is also a matter of degree. That is to say, there can be greater or lesser expectations of price or allocation controls.

Senator BRADLEY. Could Government do anything in your view to assure as optimal a functioning of the market as possible, while at

the same time having these standby powers, since the standby powers exist anyway whether they are in the law or not.

Mr. RUSSELL. Yes, but don't misunderstand me. I am not suggesting that there is any way that you can handle the problem of an emergency purely by the private sector. I am not suggesting that there is not a very major role for the Government here.

The main point I was making was to think carefully about the private response in designing that Government role.

If you ask me what method I would suggest that the Government use to minimize the interference with private sector actions, I would say that the best thing to do would be as careful and clear as you could be as to what the Government would do and what the Government would not do.

It is not credible in my mind to assert that the Government is not going to do something toward reallocating income, let us say. It is not credible in my mind to believe that the Government is not going to allocate some energy to some needy sectors.

Senator BRADLEY. You are saying that it is a given fact that the Government will reallocate to needy sectors.

Mr. RUSSELL. Yes, but then what you would need to do is to define carefully which those sectors were, and which those sectors were not.

Senator BRADLEY. How is that different, then, from the EPAA, from all the allocation rules that we have now? That is what the intent of all that was, if there is an interruption we want the farmers, the doctors—

Mr. RUSSELL. The only problem there is, you have got basically what seems to be an overdetermined system. It is just that so much of it is allocated that it is very difficult to believe that the system is, in fact, going to work.

What I am suggesting is that while you are correct, in my view, that there will be some allocation, what you would want to do is to minimize that allocation. But one cannot promise to do none of it because no one is going to believe that such a policy would survive.

So what you would want to do is maximize, I would think, the opportunity to use the market, but maximizing it in a credible way means that you have to recognize that in some areas you are not going to use the market to allocate oil and allocate energy.

Senator BRADLEY. So your general guideline is just clarity.

Mr. RUSSELL. Clarity, minimizing the amount of intervention.

Senator BRADLEY. You would be surprised how many needy people there are.

Mr. RUSSELL. No, I wouldn't, because I have heard of all those needy people at one time or another.

I think if you can ahead of time draw the lines fairly clearly, you might be able to get away—

Senator BRADLEY. A dual system?

Mr. RUSSELL [continuing]. A dual system.

The point I was making was, it is often suggested that the public responds to long-term crises by oil conservation measures and extra supply measures, but that they do not respond to the prospect of price variability in crises.

I think they do respond to prospective variability as well, and therefore it is important that people expect transitory price in-

creases in a period of an emergency because that would make a difference in the way people behave ahead of time.

The third topic that I would like to discuss is the range of impacts that most people are expecting in terms of the size of the disruption and the size of the GNP effect.

The CBO estimates, and others suggest, that with the worst case, that is loss of Persian Gulf completely, we are talking about a 10-percent GNP loss, scaled down in more likely less serious cases to, say a 3- to 5-percent GNP loss. That is a truly massive impact, but it is important to put that impact into perspective.

We are not talking about conditions like the Great Depression. We are not even talking about conditions like the loss of real resources to the domestic economy in World War II. If there were a 3-million-barrel-a-day drop in imports, we are talking about from 2 to 4 years' economic growth, which means, for example, today, in 1980, with a 3- to 5-percent GNP drop, that we would be about as well off as we were in 1977.

The important point in putting in perspective that prospective disruptions are a large problem, but not a world shattering problem, is that it seems to me that many people have been thinking that this issue is so horrible to contemplate that they are refusing to contemplate it.

If we can communicate that the situation is not equivalent to World War II or the Great Depression we can, in a sense, build a backfire against the kind of panic that might drive us to do silly things in the event of an emergency. We can also avoid the kind of paralyzing fear that keeps us from doing anything, because nobody wants to talk about preparing for a disruption because it is too horrible to contemplate.

It is important to keep the size of this potential disruption in some sort of perspective.

Senator BRADLEY. In keeping it in perspective, what do you think is the clearest way of explaining the perspective?

Mr. RUSSELL. I would think that in terms such as the ones I just suggested—percentage change in GNP—how many years' economic growth we might lose, or, what a disruption would mean in terms of the year in which the country last experienced that level of per capita GNP. Most people can think of how well off they were in 1975 or 1976. Many of them can think about or talk about how bad things were in the Great Depression. Measures of this kind are meaningful.

Now experts when they do think seriously about the loss of Persian Gulf oil often think in terms of cataclysmic changes, rather than simply very, very serious ones. I suggest that misunderstanding of the scale of these effects is an important problem.

I think you made an important point earlier today when you said that there is a vast difference between the disruption problem, on the one hand, and the long-term price problem, on the other, and we shouldn't confuse lowering oil imports with the means to solving our disruption problem. I certainly would want to second that point.

I would finally suggest that it is wise to keep in mind that transitory price increases do have a function. Thus it is not, it seems to me, wise social policy to reduce the benefits of private

sector preparation by trying to dampen the impacts in the short run of a transitory difficulty.

Senator BRADLEY. Very good. Thank you, Mr. Russell. Mr. Sunley?

**STATEMENT OF EMIL SUNLEY, DEPUTY ASSISTANT SECRETARY FOR TAX ANALYSIS, DEPARTMENT OF THE TREASURY**

Mr. SUNLEY. Thank you, Mr. Chairman.

What I would like to do in my opening comments is to reflect a little bit on the tax rebate issue.

Senator BRADLEY. Everyone this morning, Mr. Sunley, when we raised the rebate, said, "Mr. Sunley is going to take care of that."

Mr. SUNLEY. I would like to begin by calling to your attention a comment which I believe Mr. Eads made this morning with reference to the current interest in the tax rebate schemes. It is really an outgrowth of people having examined coupon rationing and finding that there are many problems with any type of coupon rationing, particularly one that is going to be in existence for more than a very short period of time.

Many people have quickly jumped to the conclusion that the answer is, therefore, to use a tax rebate scheme instead of coupon rationing.

I believe George said this morning that we should not be like the businessman who was interviewing two candidates for a job, and was so unimpressed by the first that he hired the second sight unseen. Nevertheless, I must say at the outset that a tax rebate scheme clearly can be implemented as long as you don't put too many constraints on what it has to do. The underlying economics are essentially the same between coupon rationing and a tax rebate scheme.

But it is also clear to us who have been examining various alternatives here that it is not possible to implement a tax rebate scheme overnight. Even if we use existing mechanisms such as the withholding on individual income tax, payments to social security beneficiaries, et cetera, we are likely to take 60 to 90 days to implement the system.

I think you will recall that in almost every tax bill that we brought before this committee, we need 45 to 60 days from the date of enactment before employers can reasonably implement the changes in withholding, and only if they are modifying an existing system of withholding.

To put in a new system, obviously, is likely to take longer—

Senator BRADLEY. What are those days again?

Mr. SUNLEY. It is conceivable that you could put in a system in 60 to 90 days, if you are using existing payment mechanisms. If you want to develop a whole new payment mechanism, I think it would take a lot longer than 60 to 90 days.

Senator BRADLEY. You mean, if you wanted to rebate  $x$  amount to consumer  $y$ , and he was a wage earner who had wages withheld, if you simply reduced the withholding by an amount equal to what you wanted his rebate to be, that is a 60- to 90-day proposition?

Mr. SUNLEY. Yes. Adjusting the wage withholding has got to be the centerpiece of the rebate mechanism. But, obviously, not every-



one is subject to wage withholding, so you have to have other mechanisms to reach the other individuals.

Then you have to work out problems of some individuals who might not be reached under any of your mechanisms, and other individuals who might be reached more than once.

Senator BRADLEY. Why in your view is wage withholding the central mechanism of a rebate system?

Mr. SUNLEY. Because it already covers the largest number of individuals, either as wage earners or family members of wage earners.

Senator BRADLEY. Why is that better than just a general reduction in taxes, or a check directly from Treasury?

Forget the second, just take the first, a general reduction in taxes.

Mr. SUNLEY. I think the tax rebate is essentially a general reduction in taxes. The problem that we always run into in this area, and the problem when we looked at something as relatively simple as the \$50 rebate in 1977, is that we wanted to give a rebate to everyone, but only one rebate to each person.

A general across-the-board tax reduction is one possible route to go, but as you know many individuals owe no Federal income tax. If you want to get some benefits to these people, you could reach some by increasing social security benefits. That will cover many of the aged and disabled who may not owe Federal income tax. But then some of those people also pay Federal income tax and they may be getting a double benefit.

Senator BRADLEY. Why is it 60 days? Why does it take 60 days if the system is already there?

Mr. SUNLEY. It usually takes about 15 days just to get the withholding forms printed and ready for distribution. The corporations and business generally want 30 to 45 days to make a change in their withholding, just to do the reprogramming of their computer.

This is particularly true of larger companies which may have the payroll function decentralized and small businesses, that manually use the withholding tables.

Normally with rather straightforward and simple withholding changes, we want to get withholding started as soon as possible. Thus, we make it effective about 45 days after enactment. Inevitably, the Commissioner of Internal Revenue puts out a notice after the target date saying, "If the businesses have made a good faith effort to implement the changes in withholding, and don't get it done for a week or so, we will not enforce the penalties for failure to withhold the proper amount."

A simple change on withholding really needs 45 to 60 days. If you are going to something new that involves some kind of new calculation, then it is likely to take longer.

Senator BRADLEY. OK.

Mr. SUNLEY. When we are looking at a possible scheme of rebating the taxes, there are clearly some tradeoffs between the simplicity of the system and the fairness of the system. These are the very kinds of tradeoffs that face us every time that we look at alternative tax changes.

Some have suggested that the rebate through the tax system might be based just on registered automobiles. In other words, it

would be very similar to coupon rationing in terms of how the coupons are passed out.

Others have suggested that we ought to have a per capita rebate, such as \$80 per month per adult, and \$40 per month per child, or something of that sort, and some kind of limitation on the maximum amount per family. Unless you set a maximum amount per family or per household, you get a lot of complications.

Let's just start with the simplest possible rebate of so much per individual. This system could be implemented through the income tax withholding system, but not immediately because employers have information on how many withholding exemptions, or withholding allowances that I have claimed.

My withholding allowances may reflect taxpayer exemptions, depending exemptions. I may include extra withholding allowances because I have itemized deductions above the assumed standard deduction that is built into the withholding table. I may have extra withholding allowances because as a taxpayer I am blind or aged.

Therefore, the employer does not know how many family members are covered on my tax return, nor should the employer know.

You might be able, in a very short temporary period, to base the rebate scheme on the number of withholding allowances, realizing that it is not a perfect match with the number of family members in a particular taxpayer situation. But it would seem that after a month or two, you would have to require every employee to file a rebate certificate, something like a form WR, which would be very similar to the form W-4, which is the employee's withholding allowance certificate.

You would require each employee to file a certificate with the employer indicating how many individuals are eligible for the rebate in that taxpayer's unit. But I think we have to realize that not all employees will file, and not all employees will file the maximum number they are eligible for.

We have a major problem of overwithholding in the existing system. The Internal Revenue Service has a program to try to get taxpayers to adjust their withholding, to reduce the amount of overwithholding, and yet each year we send refunds of \$40 to \$50 billion mostly reflecting overwithholding during the year, which the taxpayer could avoid by appropriately adjusting his withholding as allowed under current law.

So one problem with any kind of scheme using the tax system to rebate it, is that the taxpayers would have to make an adjustment on his final tax return at the end of the tax year. Uncertainty about the rebate scheme complicates the whole matter.

Senator BRADLEY. Why would they have to file?

Mr. SUNLEY. Assuming that we want to use a scheme which provides so much per member of the household, I am saying that the withholding allowance certificate that I currently have on file with my employer may reflect the fact that I am aged, or I am blind, or that I claim extra withholding allowances because I have excessive itemized deductions. As a result, my employer does not know how many family members are in my household.

It seems to me that if this is a system that is going to be in existence for a period of time, then we are going to want to know, in fact, how many family members are covered by each employee,

and that would require them to file some kind of withholding rebate form with the employer.

Another problem that has to be dealt with, which would be of particular concern to employers, is the source of funds for making the rebate payments. One possibility is that employers would be allowed to reduce their deposit of withheld income and FICA taxes, and use that as a source of funds for paying the rebate.

There are two kinds of problems here. One, employers, rightly or wrongly, view that money, which they have for a period of time before they are required to deposit it in the bank, as their money. When we speed up payment, or turning over of this withheld income and FICA taxes, they view that as taking money away from them. To say that they are supposed to use this money to pay out rebates, and therefore have to use it sooner, would cause some problems with some business firms.

Also, other business firms, if you are talking about a rebate which might be \$200 to \$300 billion per year as in some of the scenarios that people have looked at, would have rebate obligations that exceed the amount of withheld income and FICA taxes, particularly if they hire primarily low income workers.

So it does seem to us that you might have to develop a system which would get Federal moneys to the employers to pay the rebate. The system you would have to develop would be the opposite of the Federal deposit system now. We have a system where the employers are required to deposit moneys with certain banks.

We would have to develop the opposite of that, where the Federal Government, in effect, transfers moneys to the banks a couple of days before payday, and then the business could actually withdraw the money to make the rebate payments.

But, obviously, a system of this sort, to siphon money out from the Federal Government to employers to make payments to employees, would require some time to develop and implement. Any novel system of this sort would have some startup problems.

I have to say that it is possible to use the withholding system to rebate substantial sums of money, if we are willing to modify that withholding system some. But to reach other individuals who are not subject to wage withholding, would require that we: make adjustments in the estimated tax payments; possibly increase social security benefits and SSI benefits; and possibly increase the welfare payments made by States.

At that point, using multiple payment mechanisms, you get into the problem of some people being covered more than once. You either have to live with that problem, which I think would be difficult to do if you are talking about substantial sums of money being rebated; or, you have to in some way reconcile the payments at the end of the year, which possibly could be done on the Federal income tax return. In other words, you would have to have some reconciliation of the payments that you received through reduced withholding, or from increased social security benefits, or increased welfare benefits, or what have you. This, again, I think could be done.

The alternative that some people have suggested, and that the Finance Committee worked on in 1977 with respect to the \$50 rebate, was to have a very complicated computer matching system

to make sure. You take the income tax files, and then you match them against the social security files, and you match those all against the SSI files. Finally, you try to force all the States, some of which are not on computerized systems, to submit information with respect to welfare payments made under general assistance.

Senator BRADLEY. Can you do all of this in a way that will rebate the money quick enough so that you don't have negative macro-economic effects?

Mr. SUNLEY. I suspect that rather than trying to do a very complicated computer matching system, you would do better if you settled up at the end of the year on the Federal income tax return.

Senator BRADLEY. But if you settled up at the end of the year, it would mean that a lot of people would have been socked for the whole year.

Mr. SUNLEY. Some people would have gotten money all year, and would have to pay some of it back. That fact usually causes some problems.

As I said, I think Mr. Eads made a very important point this morning. We have to be very careful not to hire the next potential applicant sight unseen. There are serious problems in any kind of tax rebate scheme.

If you put on additional constraints—such as using the scheme to vary geographically because home heating oil use is greater in New England, whereas motor vehicle driving is greater in southern California—then the whole system breaks down.

At best, we can use the tax system to get the money out there. We can get it out there and achieve some kind of distribution pattern that we want to achieve, but there will be no matching family by family of their increased energy costs and their rebate. That kind of perfection is simply not possible.

I doubt that we can do any better through the rebate system than the transfer you achieve through coupon rationing, when you base the coupons on the number of registered automobiles, or something as simplistic as that.

Senator BRADLEY. Let me make the point here that I think your remarks appear to be addressed to—let me ask you, are they addressed at rebates generally, or a gasoline tax rebate?

Mr. SUNLEY. I think that they are addressed to both. I think it is a very important issue, whether the tax should be simply on gasoline or on all petroleum products, or should it be an import fee.

Even if you do nothing and just let the higher oil prices lead to an increase in revenues through the windfall profits tax, on the macrodemand side of the economy you do have a problem of recycling the increased tax revenues that roll in.

I think almost every scheme, except coupon rationing or price controls, where you have increased Federal revenues, with respect to the macroside you do have to work out some kind of rebate, getting the money back to the individuals.

Senator BRADLEY. If you were to have coupon rationing for all oil, not gasoline, how would that affect the complexity of the program? Wouldn't that make it almost as complicated as the tax rebate scheme?

Mr. SUNLEY. I have no doubt that it would be as complicated.

Senator BRADLEY. Perhaps Mr. McGregor can answer.

Mr. MCGREGOR. With rationing there are problems which transcend the macro- and microeconomic impacts of alternatives, which have to be reviewed carefully.

I am with Emil in saying that there are certainly many problems with rebate schemes, and no one has all the answers yet. Only when those answers are worked out, should a final decision be made as to whether rationing is better or worse.

My personal views about rationing, however, are that there are quite a few problems with that concept. To make rationing work, and the CBO report hit upon it, you have to slap on price and allocation controls. That action throws you back into the turmoil of what we have experienced over the last 7 years, and there are many costs, economic, social and otherwise, that come along with extensive regulations.

If you can swallow that, then perhaps rationing starts to make some sense, but there is a definite tradeoff.

Senator BRADLEY. Do all three of you think that the last 7 years with the price controls and allocations have been a positive experience?

Mr. MCGREGOR. The administration, I think, arrived at a decision in April of 1979 that, no, petroleum price and allocation controls had not been a positive experience and, indeed, endorsed a market oriented policy. In April of 1979, the President ordered the phased decontrol of petroleum.

Mr. RUSSELL. I would agree that the experience we have had with price and allocation controls is not one we would like to repeat. Certainly we have had real problems with them. They have created on the demand side, on the supply side, and on the long-run side, serious difficulties.

Senator BRADLEY. Mr. Sunley, do you agree?

Mr. SUNLEY. I clearly feel that the first step in any sensible energy policy was to decontrol oil prices.

Senator BRADLEY. I have to make a telephone call, so I would like to break for 5 minutes, and come right back.

[Recess.]

Senator BRADLEY. The committee will come to order.

Mr. Sunley, did you want to say anything else about the ideal rebate system?

Mr. SUNLEY. No.

One of the advantages, Senator Bradley, of leaving my Government post is that I will not have to have an opinion on every subject.

Senator BRADLEY. Are all of you in agreement that a disruption tariff or a quota should be on oil versus on a product?

Mr. RUSSELL. I will start. Yes; to the extent that you try to isolate a particular product with a disruption tariff, or a quota, or a rationing device of any sort, enormous problems are created because you have to go out there and decide how much of that product is going to be consumed. You have to allocate it in some fashion. You have to worry, for example, about refinery runs and refinery mix. You have to make sure that the mix of products is appropriate to their demand.

Consequently, this approach requires an enormous amount of information which normally is supplied by the operations of the market.

Getting that information would be costly, and knowledgeable people would be absorbed in operating the system. I think we would want to economize on Government energy and effort going into doing things like that, leaving more resources for dealing with the fundamental problems facing the country in the event of a disruption.

Mr. SUNLEY. I would agree with much of what Milt just said. It appears to me that too often in the discussions of energy policy, we have assumed that gasoline is some kind of luxury good that we can tax, and that other petroleum uses, especially home heating oil, are some kind of necessity.

It is not at all clear that at the margin I cannot economize as much on my heating oil by holding down my thermostat, as I can economize on unnecessary driving. To achieve a particular adjustment in reduced consumption of petroleum, I have no doubt that you get greater inefficiencies if you put the whole adjustment on gasoline.

In addition, to put it all on one product such as gasoline, requires reimposition of price controls and allocations to hold down the price of the home heating oil. So you are back to domestic controls of crude oil, and all the kinds of allocations we have had under the control system we have had in effect for the last 7 years.

Senator BRADLEY. Mr. McGregor.

Mr. MCGREGOR. I think Mr. Russell and Mr. Sunley have summarized all the significant drawbacks of going that way. Let me just make an observation that the motivation for trying to pinpoint gasoline is that it is the politically attractive choice, or at least it has been until now.

Unfortunately, with a lot of our contingency planning strategies, we have been paying too much attention to what is politically attractive, rather than to what is substantively necessary.

Senator BRADLEY. There are a lot of people who argue that a tax on oil would be most neutral from a regional standpoint. If you thought that what was politically most palatable was neutrality, then a tax on oil would be that, because a tax on gasoline would hit certain parts of the country more than it would other parts of the country.

Mr. MCGREGOR. Personally, I agree with that. Either a tariff, which is a form of tax on oil, or a refinery type tax as raised in the CBO study make sense. Such a tax would be flowed through to consumers of all petroleum products depending on the premium, or the elasticity of demand, that consumers place on those products.

Senator BRADLEY. Do you agree with that, having been through the energy tax wars, that oil rather than gasoline is more neutral regionally?

Mr. SUNLEY. I have seen some studies that would suggest that the regions of the country which are heavy users of heating oil, use less gasoline, and that areas of the country which are heavy users of gasoline, use less heating oil. You may, in fact, get a better regional balance by taxing all petroleum products, than taxing simply gasoline.

Senator BRADLEY. When you say, at the margin you can cut heating oil, what do you mean?

Mr. SUNLEY. One thing I can do is hold down the temperature at which I heat my home.

Senator BRADLEY. When you say, at the margin, you mean that it is possible to reduce the use of heating oil without creating the disaster scenario that is frequently painted?

Mr. SUNLEY. That is true. If I am required as a family to save on energy, I may find that I can maximize my own welfare by saving on home heating oil, and continuing to drive my own automobile. Another family may find it easier to do it the other way.

If you, in effect, tax all petroleum products through a refinery tax, or a tariff, then you allow every family to essentially make that decision, which is the better way to economize on the use of energy.

Senator BRADLEY. How would you draw a distinction between those two taxes on oil, at the refinery and an import tariff?

Mr. SUNLEY. If you impose an import tariff, then the domestic price of crude oil will rise to the world market price plus the tariff. Part of that price increase of domestically produced crude will be taxed away by the windfall profits tax and the regular income tax, but you don't get a 100-percent tax.

Whereas if I levy a refinery tax, then I can get the same revenue per barrel with respect to imports, and, in effect, get the same amount of tax per barrel with respect to domestic production also.

So that, in effect, I have a heavier tax burden on domestic production if I go the refinery tax, than if I go just the import tariff, relying on the windfall profits tax and the regular income tax, and the tax on domestic production.

Senator BRADLEY. If you went the tariff route, you would actually end up with a slight incentive for domestic production of oil?

Mr. SUNLEY. That is true.

Senator BRADLEY. Because they would have much more left over.

Mr. SUNLEY. Yes.

Mr. MCGREGOR. You should note that at the same time, with either the tariff or the refinery tax, what you are going to get are incentives for additional production of natural gas, coal, and electricity from nuclear and other substitute fuels, as well as the additional conservation response as people are faced with the higher prices.

So, I think that we should recognize that oil is part of a whole family of fuels, and conservation of oil implies also the possibility of substituting some of these other fuels for oil.

Mr. SUNLEY. May I add one footnote. If you are only concerned with maximizing the supply response, you would not want any tax on domestic production. What we found in the windfall profit debate is that there is again a tradeoff between wanting to maximize the supply response, and some of the equity considerations, and income transfer considerations of what happens when you have massive transfers from consumers to the oil companies.

Mr. MCGREGOR. Turning just briefly to the tariff as your taxation measure, and extrapolating from Milt Russell's comment. If you put a tariff only on petroleum, then you have given a premium to exporters of other energy commodities into the United States,

and we do import a fairly healthy volume of natural gas from Canada, and in the not too distant future from Mexico, also, in addition to some limited quantities of liquefied natural gas from other sources.

Senator BRADLEY. Is that bad?

Mr. MCGREGOR. It is not necessarily bad at all.

Senator BRADLEY. The premise of this is that we have to reduce our dependence on insecure sources of oil. The Canadian and Mexican gas is not exactly what I would call insecure oil.

Mr. MCGREGOR. There are some fairly persuasive arguments which indicate that we should be willing to pay a premium for certain commodities of energy which come into this country just because of their security value.

Mr. RUSSELL. The important point here, though, would be that you would increase the demand for natural gas because of the higher oil price, which would make room for additional Canadian gas. Keep in mind that the gas markets would be clearing, or would be under a decontrol scenario, which means that unless you have the additional demand, the price of Canadian gas or Mexican would not automatically rise.

So, while a moment ago I talked about the substitution among energy sources, keep in mind there is some restrictiveness in terms of substitution among energy.

Senator BRADLEY. Mr. Russell, I am sorry, I don't know whether I asked you this. Do you think that the quota or tariff is the best way to go?

Mr. RUSSELL. I would say that there are arguments in both directions, but I think a tariff is the appropriate way to move simply because I think it is important to maintain some flexibility as far as the domestic response.

As you know, with a quota in the period either of a disruption or for the longer run, you have a fixed quantity but a variable price. You don't know what the price is going to be. On the other hand, with a tariff, you have a fixed price or a fixed increment of price, but you don't know what the quantity is going to be.

The question it seems to me is, Where do you want the flexibility? Where is it important that there be some flexibility?

With the quota, you don't have any flexibility on the side of the actual physical commodity. You don't have any room to adjust later on if it turns out you set the wrong level. On the other hand, suppose you use the tariff. If you misjudge and end up importing more than you would have hoped to have done, that is not a serious problem, or it is not as serious a problem, because you have other mechanisms. Dollars are more fungible than oil.

Senator BRADLEY. One of the things that puzzles me is, if you go the quota route, the argument is the certainty of supply. How do you have certainty of supply?

If you say that everyone is going to reduce their consumption, and you have a multilateral agreement that every country is going to reduce its consumption, it still assumes a certain supply. How are we assured that that supply is going to be there.

There is an element of this discussion that is like angels on the head of a pin when you look at the real world.



Mr. RUSSELL. I think the confusion comes in terms of which direction the certainty is. The quota gives you a certainty on the upside, and not on the downside. It does not tell you there is going to be that much oil. It tells you that you are not going to consume any more than that.

With either the tariff or the quota, you still have to worry about what the response of the producers abroad is going to be. I have seen no studies on this, although I know there are some, but I believe that a tariff is likely to elicit the preferable response.

With a quota, you know if you are the producer abroad that you are going to be unable to sell more than  $x$  amount in the United States because the U.S. Government would prevent it. Under those conditions there is not much reason for you to increase production in order to get a bigger share of the U.S. market, or to lower price, because you know that you are not going to sell more into that market anyway. The U.S. Government is going to keep foreign oil out with a quota.

Whereas, when there is a tariff, what oil producers see is that what is keeping them from selling more is the fact that they are priced out of the market. This means that if they cut the price a little bit, with the tariff, it is more worthwhile for U.S. consumers to buy oil from abroad.

So, in effect, you have more elasticity of demand facing the producer abroad when you have a tariff than when you have a quota. There are some tradeoffs, but that seems to be the case.

Senator BRADLEY. This morning I asked the panel which they thought was easier to have our allies accept, and they were unanimous that the quota was more acceptable.

Mr. RUSSELL. That may be right, because with a quota you know what everybody's share of the sacrifice is going to be, and you can monitor it and you can see who is cheating and who is not cheating. With a tariff, it becomes more iffy because different countries have different demand elasticities, and you simply could not require that everybody put on the same number of dollar-per-barrel tariff because you would not end up with similar results.

So, I would think that the people this morning were probably correct that it would be easier to put on a quota rather than a tariff in terms of its superficial acceptability.

Senator BRADLEY. But you think that substantively the tariff is better?

Mr. RUSSELL. Yes, and I am not sure that it is beyond the ken of man to find a way in international agreements to work through a flexible system with tariff-like characteristics, and convince at least the important countries to go along.

Keep in mind that the United States does deal with roughly one third of the oil supply coming out of OPEC countries. If you add two or three other major countries and they coordinate their tariff policies with those of the United States, you have effectively taken care of the question. You don't need to have a tariff coordinated with 140 countries; only a relatively small number are needed.

Senator BRADLEY. You need about seven.

Mr. MCGREGOR. Mr. Chairman, I think it is important to keep in mind a distinction that is being made in the international arena, and especially among the IEA members, and that is the distinction

between the concept of import ceilings or import targets, and the mechanisms for achieving those import ceilings or import targets, i.e., tariffs, quotas, taxes, and what-have-you.

The dialog to date has really targeted on the former, the concept of an import ceiling. President Carter's statements in 1979 and 1980 about an import ceiling of 8.2 million barrels a day embody such concepts. The negotiations among IEA members have not advanced to the point where any sort of binding mechanisms have been adopted in a collective sense.

I think, however, there is momentum in the direction of the import tariff for all the reasons that we have been talking about this afternoon versus the volumetric quota.

Senator BRADLEY. I would like to shift just briefly. I would like to pick up some things you said earlier in your testimony. You have Mr. Taylor there who is your person on this.

The above-ground storage, how much above ground storage is there today, and how long will it take to get 2 million barrels, or 100 million barrels, 500 million barrels, and what would be the cost?

Mr. TAYLOR. We have a look at several different ways of increasing above-ground storage. Three options come to mind fairly quickly. There is authority in legislation right now that the Government could require refiners and importers to hold up to 3 percent of their throughput last year, or their product imports of the previous year, command and control oriented that way.

An alternative would be to provide a subsidy to somehow offset the cost of private firms, be they refiners or be they utilities, or be they endusers holding oil, for above-ground storage in this configuration. Steel tanks would probably cost significantly more than below-ground storage in salt domes. Salt domes is on the order of \$3 to \$4 a barrel, where steel tanks you may be talking around \$10 to \$12 a barrel. The steel industry estimates are that within 3 to 4 years they could have as much as 350 million barrels of new capacity, given the right kind of incentives.

Senator BRADLEY. A subsidy.

Mr. TAYLOR. Yes.

That kind of approach would get to the kinds of things we were talking about earlier. If there is a disincentive on the part of anyone who might hold oil right now because the Government may always come in and price control, or indeed, worse than that, take oil from one refiner who has stockpiled and give it to some other refiner who has not, then one direct approach to this externality, if you will, is to subsidize the desired activity. That could be done, as I said, from the end use all the way up to primary stocks.

Senator BRADLEY. 350 million barrels in how long?

Mr. TAYLOR. The estimates are 3 to 4 years. If we are talking about—I think Mr. McGregor mentioned this period of vulnerability, we may want to focus the emphasis on the speed with which we can increase our stocks, rather than purely focus on the cost.

Senator BRADLEY. Assume that there is a commitment to subsidize, the question, then, is, how long does it take to get them built?

The second question is, in what form is the subsidy? I would like to have Mr. Sunley address the question of whether tax credits for

the building of above-ground storage capacity make any sense, or what other forms of subsidy make sense.

Mr. TAYLOR. The estimates are that by 1985 the steel industry could have 350 million barrels. That is the quantity and the time. The constraints, of course, are that there would be environmental considerations that would have to be addressed. There may also be pollution constraints. When you are putting in steel tanks into an area, emissions are a consideration.

There may also be short-term constraints on the number of welders, and this kind of thing, not major constraints, certainly not hurdles to increasing our stocks.

Senator BRADLEY. This is the first time I have heard this one, that there are environmental constraints. How serious are the environmental constraints?

Mr. MCGREGOR. Mr. Chairman, I am sure you are familiar with the so-called Sohio Pac-Tex project, which was initially proposed in the 1974-75 timeframe.

Senator BRADLEY. I was not here then, but I have heard of it.

Mr. MCGREGOR. There was a surplus of crude oil that was forecast for the west coast based on the level of deliveries from Alaska. It was primarily environmental concerns over the air quality in the Los Angeles air basin and the emissions from the tanks that would hold that oil at the loading terminal adjacent to the pipeline, which delayed the permitting and authorizing of that project for more than 4 years, and ultimately, to quote the Sohio sponsors, made it marginally uneconomic. So there are problems.

Senator BRADLEY. What is the size of a normal above-ground storage tank? We have them in a number of places in New Jersey, and they are under construction now. I fly over in the helicopter and I see 10 or 15 under construction.

What is the capacity of the normal above-ground storage tank? If you don't know, you don't know.

Mr. PUGLIARESI. I think that most of them are around 2 million barrels, they don't get much bigger than that.

Senator BRADLEY. 2 million barrels?

Mr. PUGLIARESI. That is quite large.

Senator BRADLEY. So you are going to need quite a few, then.

Mr. PUGLIARESI. There is a great deal of work underway now in the Department of Energy looking at not just the question of subsidy, but what kinds of institutions we ought to have to accelerate our rate of stockpiles in the very near term. We may not necessarily need that large a subsidy, depending upon---

Senator BRADLEY. You mean the \$7.

Mr. PUGLIARESI. All we may need to do is reduce the cost of the construction somewhat. It is quite possible that the subsidy necessary for the holding of the oil, if the economic climate is not---

Although we can never eliminate the chance of price controls, but if the expectations are that that is significantly reduced, a relatively modest subsidy may elicit a significant stockpiling in the private sector.

In addition, we may want to completely rethink the kind of institution we have to have stockpiling in the private sector. Careful examination of the German model similar to the EPV is under-

way, and that has a lot of promise, and appears equitable to the industrial sector.

Senator BRADLEY. Mr. Sunley, do you want to talk about tax credits?

Mr. SUNLEY. Yes, Senator Bradley.

I think the first issue, if we are going to have above-ground storage, or industrial storage of oil, is whether we have a requirement that firms store a certain amount of oil. If firms are required to store a certain amount of oil, then any kind of subsidy, tax or otherwise, is really not an incentive to store more oil because they are already going to be required by law to have a certain amount stored.

If every refinery is required by law to maintain a certain stock stored above ground, then it really becomes a question of who should pay for this cost. Should the general taxpayer pay for it either through some kind of direct spending program, some kind of tax subsidy program, or should the users of petroleum products pay for it by having the cost of refined oil reflect the additional storage costs that refiners must bear.

Let's assume that we have decided that we want the general taxpayer to bear it, and that you want to do it through the tax system for some reason, rather than a spending program—

It does seem to me, just as an aside, that if we are dealing with refineries, there are not that many companies out there, and a direct spending program to pay a subsidy and let the Department of Energy write the checks is easier than having 20 tax returns reflect some specialized tax credit.

Senator BRADLEY. You say that the Energy checks would be easier?

Mr. SUNLEY. I would be a little bothered to have a line on the corporate tax return that is going to apply to 20 taxpayers out of 1,700,000 returns. If we are dealing with refiners, there are not that many, but maybe more than 20.

Mr. MCGREGOR. There are 200.

Mr. SUNLEY. There are 200 taxpayers out there. It would seem that a direct spending program, particularly when you are talking about that kind of program, almost certainly the Energy Department would be out there certifying the tanks meet certain requirements and that they had, in fact, filled them up with oil, therefore, they are qualified for the tax subsidy.

Once they have done all that certification, it seems to me that it is easier to let them mail the check than have IRS get involved at that point.

Nonetheless, we don't like to have things show up on the tax expenditure side of the budget, I understand, and often we want to do it as a reduction in revenues, then a tax credit is as good a way as any, and it is a lot better than tax-exempt bonds, and some of the other things that are often proposed. But some kind of tax credit, or faster writeoff of the depreciable capital, would be the usual routes that would be looked at.

Senator BRADLEY. Are there any tax provisions that you think now adversely affect the holding of inventories?

Mr. SUNLEY. Not generally speaking. In fact, the tax treatment of inventories is quite liberal with the LIFO method, where you

basically get to assume the last in is the first out, which in a kind of indexing of inventories which is not available with respect to depreciable capital.

There are disadvantages sometimes in the use of LIFO, when stocks are being drawn down, and maybe some adjustments or special rules could be provided there. Let me illustrate it this way. If you have an LIFO accounting system, and you have got layers of inventory, during a supply disruption you have to bring down your stocks so that you work down to the lower price of the first in additions to the inventory.

You might want to develop a special rule that would allow some kind of an adjustment if those stocks are restored in a year or two to eliminate the adverse effects of LIFO when you have drawn down your stocks, and are working to the earlier layers.

I think that some kind of rule of that sort could be worked out. But in general the LIFO inventory accounting method is very favorable.

Senator BRADLEY. Mr. Russell.

Mr. RUSSELL. Let me underline what Emil said a moment ago. If the private sector is forced to store in some way that increases the private sector costs, that is going to increase the cost to the consumers. This has some other benefits, if you will, if we think that oil is presently underpriced as far as the American consumer is concerned. It would also tend to increase domestic production.

Senator BRADLEY. How do we increase the price to the consumer?

Mr. RUSSELL. You do that by requiring the holding of certain quantities of inventory by the private sector, which increases its costs.

Senator BRADLEY. The private sector then has to assume those costs, which they pass on to the consumer.

Mr. RUSSELL. Yes, they would pass them on to the consumer, which would tend, again, to reinforce the conservation drive, and also reinforce the switching out of oil toward other more plentiful, or at least more secure, fuels.

In terms of how to encourage the private sector storage, I think that Mr. Taylor has already suggested that you can use the command and control mechanism or you can use the incentive mechanism.

I think Mr. Pugliaresi may be right in his suggestion of a moment ago that one of the problems is the uncertainty—not about the worthwhileness of holding oil because oil seems to be a pretty good deal since the general expectation is that the price is going to rise—but about whether oil storage facilities themselves might turn out to be redundant and hence without value.

As he suggested, you might want to subsidize the capital facilities if you were going to, in fact, subsidize anything to get more storage. You could get more leverage that way than by subsidizing the acquisition of the oil itself.

Mr. MCGREGOR. I think it is important to point out, Mr. Chairman, that while there are no tax disincentives for the building up or the holding of inventories, there have been disincentives as a result of our regulatory system.

Through various regulatory programs, but primarily our buy/sell program, and I will not go through the details of it, we have built

up a disincentive for the generally larger and more efficient companies to try to maximize their inventories.

We have told them that it might not be in their interest to do that, because once they do have that crude, access to that oil will be made available to other competitors who may be less efficient.

So as we are defining new policies, again it is this historical experience that we have to keep in mind.

Senator BRADLEY. Yes.

Mr. RUSSELL. We might want to recognize that that historical experience goes a long way back. The beneficiaries of much of this buy/sell are the refineries that were established in the 1950's, many of them. They were established as a result of the oil import quota program. They got built-in subsidies through the quota program, and they were kept alive through the later programs.

Now, of course, we are seeing, with the potential expiration of controls, a new effort on the part of otherwise inefficient refineries to get further subsidies to stay in business even further into the future. It is a long history, and it has been built on control after control after control.

Senator BRADLEY. I would like to go back, if possible, to this rebate question, Mr. Sunley. Before the break, you talked about how you get the money back to people. Automobile registration is one way. You talked about the complexities of the per capita approach.

What do you know about the plan that President Ford put forward in 1975 to provide income tax cuts up to \$20,000 in income to take account for a rebate scheme.

Mr. Russell, if you would like to comment on that, too, if you know about it.

Mr. SUNLEY. Actually, Senator Bradley, I was at the Treasury Department at that time, and I had forgotten that I had helped design that one.

It is true, I can devise income cuts which roughly, on average, compensate for the increased energy costs by income level for those taxpayers who pay income tax. The major problem becomes, how do I reach the rest, the other low income families which do not pay tax.

Senator BRADLEY. What percent of the total population pays income tax?

Mr. SUNLEY. I think it is 160 million individuals are covered by income tax returns that have final tax liability.

Senator BRADLEY. What we are talking about here with this rebate, we are not in a perfect world, we are in an emergency. There has been an interruption of 8 to 10 million barrels a day threatening the democratic institutions of the Western World.

There is war in the streets. We are not going to worry about whether you got 20 cents more than the guy next door. We are worried about survival of our economy. So you are trying to look for the mechanism that has the greatest probability of accomplishing the maximum number of objectives of getting the money back to people so they can pay the higher energy costs, and doing it the quickest way and the most efficient way.

Mr. SUNLEY. I share your concern, and I would not counsel perfection in designing an income tax reduction. My fear is that we

want to legislate a potential tax reduction to take place sometime in the future when this emergency condition arises. We are going to have lots of time to debate just how that system is going to work, and whether Aunt Tilly is going to get her rebate or not.

I can recall a week that I spent before this committee listening, as we tried to work out the low income assistance portion of the windfall profit tax bill. We can develop billions of dollars of windfall profit tax increases in a couple of hours, but when it comes to spreading out the money between various States the debate bogs down.

If you gave the Treasury Department, or the executive branch, broad discretion to put in an immediate tax reduction, then I think it can be done. If you want to have it already legislated, then everyone is going to want to know if this is some potential tax cut that is going to be made and go into effect sometime in the future, then I think everyone is going to strive for perfection. Then it will really get bogged down.

Senator BRADLEY. We are going to try to wrap this up pretty soon, but I want to get to this question and ask all of you to pretend that there is no Congress, and pretend that you have absolute powers in the United States.

Tonight there is an interruption and the world loses 15 million barrels, and we lose 3 to 4 million barrels a day. What would you do, and why? How is your action changed by your judgment as to the length of the interruption? Would your action be considerably different if it was 1 million and 10 million barrels instead of 15 and 3. We can make that one of the parting shots.

You are a brave soul, Mr. McGregor.

Mr. MCGREGOR. I became much braver in the course of the last week. [Laughter.]

First of all, I would drive toward a policy that went in the direction of market efficiency. I would keep in mind that there is at least a minimal strategic reserve that is available, and that there are also record high stocks being held within the private sector. Utilizing available stocks to satisfy demand would be part of my formula based on my expectations of the future.

Taking your first scenario, a very large disruption, I would first immediately decontrol the remaining volumes of crude oil produced in this country which are subject to price controls, assuming the disruption occurs prior to October 1981. If my authority were as broad as you have described, I would also immediately decontrol all domestic natural gas production. While all our analysis is not in yet, I believe I would be compelled to throw on a disruption tariff which attempts to maximize the benefits of that measure in terms of preventing wealth transfers out of the country.

Senator BRADLEY. How much would that tariff be?

Mr. MCGREGOR. It is difficult for me to say. I assume it would be somewhere in that \$30 a barrel range that you are talking about. It would be a large tariff.

Again, all the analysis is not in. I would turn to the economists and ask what the macroeconomic and microeconomic impacts of a tariff of that size would be, and this would give me some objective criteria for determining what I should do. A rebate plan to cushion

the impact of higher prices on the economy and consumers would also have to be implemented.

Again, as I have indicated, I would also move directly into a draw-down of existing reserves, hopefully; doing it in a cooperative manner with the industry.

Then, there is an international dimension to this situation. Obviously, it is incumbent on the consuming world as a whole, and the industrialized nations specifically to try and drive toward collective strategies that will minimize the worldwide impact of a disruption of that size.

Taking the most modest scenario that you hypothesized, I think we have evidence right now that we can absorb a 1-million-barrel-a-day disruption without further action. We are probably absorbing a disruption that is perhaps twice as high as that right now, or almost twice as high as that.

Depending on the view of the duration of that disruption, and the possibility that it might grow, I think you would have to start giving very serious consideration, and indeed that is going on right now, to both inventory management and pricing policies that would attempt to minimize the impact of a growing disruption.

Senator BRADLEY. Pricing policies meaning controls?

Mr. MCGREGOR. No. Pricing policies looking toward the market, such as tariff, taxes, what-have-you, that we have been discussing today. I would counsel very strongly that the regulatory control route be avoided because of all the inefficiencies that are built into that option.

Senator BRADLEY. You said that because you thought the regulatory route would automatically bring controls?

Mr. MCGREGOR. That is true. I think it is unavoidable. If you are going to attempt to ration a commodity, if it means anything, you really have to resurrect the whole price and allocation system.

Senator BRADLEY. Mr. Russell.

Mr. RUSSELL. Taking your scenario means that it happens tonight, so we don't have any time to prepare and do all of the good things that we have said today we ought to do.

I think many of the things Steve said I would go along with. First of all, I would go for immediate decontrol and let prices go. I certainly would bring about a tariff. I doubt very much that I would have nerve enough to go as high as a \$30 per barrel tariff, especially because we don't know how long this disruption is going to last. Thirty dollars might prove somewhat too high.

If you don't go with a tariff, you understand, what you would do is simply drive the domestic producer price higher and the world price higher.

Senator BRADLEY. If you do go with a tariff?

Mr. RUSSELL. The purpose of the tariff would be to hold the world price down, and prevent the wealth transfer. I would be concerned by the potential for overkill which would lead to unnecessary welfare loss, but I certainly would impose a disruption tariff at a reasonable level.

I would use all the chips that I had to get an international agreement for other nations to do likewise, because of the benefits of collective action, and because of the very high cost to the Ameri-



can people if we go it alone. Consequently, I would certainly use those chips in terms of coordinated policy.

In turn, I do think that given the high stocks that we have right now, and given the consumer prices that would result from both the tariff and from the higher domestic prices, you would dampen import demand fairly rapidly.

In the short run, meaning the next several months, even with a 3-million-barrel-a-day loss to the United States, I would not be tempted to dip into the strategic reserve at all. But I would hold use of the reserve open by announcing the policy that anybody who wanted to pay \$2, \$3, or something like that, above the world price could have oil out of the strategic reserves.

That is to say, I would not intend to use the strategic reserve, and I would keep perhaps half of it for a crisis. But I would achieve this goal by changing the release price, not by edict. I would not hold this strategic reserve forever, but hope to hold it forever because I would put a price on it that people would choose not to pay. In using this device, consumers would know that they could get oil. Consequently, we might prevent panic buying and panic inventory accumulation during a period of difficulty such as that which you have described.

Then I would depend on Emil's good judgment to develop the rebate scheme, because under all circumstances I would try to avoid the coupon rationing.

Senator BRADLEY. Mr. McGregor said that coupon rationing would inevitably lead to price controls. Is that what you said?

Mr. MCGREGOR. Right.

Senator BRADLEY. Do you agree with that?

Mr. RUSSELL. Yes.

I think under the conditions you describe, with the tensions in this society that you describe, there would be great difficulty in establishing in effect a new currency—not only do you have to decide who to send how much to, but you have to create a new mechanism for distributing a new currency; namely, these coupons. There are going to be more important things for the Government to do, and more concerns for people to have, than to operate a new currency, and figure out how to distribute it and protect it, and get it through the mails. So I would move with a rebate scheme.

Finally, taking the other scenario where the United States loses a million barrels a day, I think in a decontrolled world I would do very little. I would assume that the surge capacity in the private sector would handle the transitory price increases that would follow. The wealth transfers within the private sector would not be so large as to be intolerable, given the fact that the windfall profits tax is already in place.

Senator BRADLEY. Thank you.

Mr. Sunley.

Mr. SUNLEY. I need to defer to Steve and Milt in terms of the size of the disruption that would make me want to take action. I really have no expertise in that area.

Assuming that it is a major disruption, it would seem to me that first I would want to try to increase the understanding among the American people of the effect of the supply disruption. It is like a

crop failure. It really does reduce our real income, and someone is going to have to pay for it.

Then at the same time, I would try to counter the macrodemand effects in the economy. This means that I must rebate the revenue that I will be getting from the tariff, or from the windfall profits tax, in some way.

I could put it in quickly. I would probably not pay a lot of attention to refining the distributional effects on the ground that we would take care of this later down the road.

Senator BRADLEY. What would you do?

Mr. SUNLEY. I would increase social security benefits for the aged, the SSI benefits for those eligible for SSI. I would cut the social security tax, and probably the income tax. Then, of course, I can easily put some general revenues into the trust funds, since I am a dictator and I don't have to face that straight on.

I would get the money distributed to families, and to the extent possible to lower income people to make sure that I have them well protected.

Senator BRADLEY. You would give them a bigger tax cut?

Mr. SUNLEY. As necessary, yes.

I think one point that has not been mentioned, I would also immediately announce a change in how the CPI index is constructed, so that we don't have some of the ripple effects through all the indexing that we have on private wage contracts.

The fundamental issue you have to face, when you have this huge increase in energy prices, is that someone's real income must fall. We have a lot of indexed contracts out there which guarantee that no one's real income falls. This makes it very hard to do. I would redefine the index, and take that energy price increase out of it, to try to avoid some of the ripple effects that would otherwise occur.

Senator BRADLEY. You could take the energy price out of the CPI?

Mr. SUNLEY. Yes.

Senator BRADLEY. It would be a simple move?

Mr. SUNLEY. As long as I am dictator. [Laughter.]

I think you could define what you mean by that, so that through a statistical adjustment you could do it.

Senator BRADLEY. Would any of you, just nod your head, also get on the phone to Pierre Trudeau and our Mexican friends, and say: "Let's not place the price of gas to where the price of oil is going, because of our actions."

Mr. SUNLEY. I would assume that you would want to coordinate with all of our allies to the north and to the south.

Senator BRADLEY. I am sorry that this cannot go on, but I have an airplane to catch. Therefore we are going to have to close.

I want to say, as you get into this, I don't think there are many issues much more complex frankly, nor more important. Everyone who has testified today has come through loud and clear about the inefficiencies of the allocation system.

Therefore, what we have to do is to develop an alternative to the allocation system that can be explained to people in a way that they can understand, and around which one might try to build a consensus. That is not going to be easy.

But I am sure that someone is going to go on TV to explain that. I am sure that President Reagan, being experienced in TV, will be able to explain it effectively to the American public.

We look forward to continuing conversations on this with you. I want to thank you very much for the testimony and the thought that went into it. I hope we will be in continual touch in the months ahead.

Thank you very much.

[Whereupon, at 4:10 p.m., the subcommittee adjourned, subject to the call of the Chair.]

[By direction of the chairman the following communications were made a part of the hearing record:]

SOUTHERN CALIFORNIA EDISON CO.,  
Rosemead, Calif., December 12, 1980.

Mr. MICHAEL STERN,  
Staff Director, Committee on Finance,  
Dirksen Senate Office Building, Washington, D.C.

DEAR MR. STERN: Southern California Edison Company ("Edison") welcomes the opportunity to file comments concerning the issue of "special oil taxes" which was brought before the Senate Finance Subcommittee on Taxation and Debt Management on November 11, 1980. We support the objectives of the President's proposed national energy program and intend to use our best efforts to advance its implementation. However, we are not of the opinion that emergency taxes or tariffs on crude oil and products is efficacious in light of Edison's requirements.

Edison is a major investor-owned electric utility providing essential electrical service to nearly eight million people in central and southern California covering an area of 50,000 square miles, including services to defense installations, hospitals, food processing concerns and other essential industries. The installed Edison-owned generating capacity at the end of 1979 was 13,263 megawatts of which 79 percent is composed of oil- and gas-fired generating units. Edison's interest in coal-fired generating units accounts for another 12 percent, and 6 percent is in hydroelectric plants. Edison's nuclear plant accounts for the remaining 3 percent. In addition, Edison had 1,670 megawatts of purchased capacity under contract from other utility sources at the end of 1979. In 1980, Edison anticipates that it will consume approximately 30 million barrels of low sulfur fuel oil and 31 million equivalent barrels of natural gas to meet the needs of its customers. Edison is one of the Nation's largest consumers of low sulfur fuel oil.

In developing procedures for implementation of special oil tax objectives, there are certain facts about the oil supply and demand situation on the West Coast, and in particular about the requirements of the electric utilities located there, which must be considered by Congress and accommodated in any program.

The oil- and gas-fired electric generating plants located in the southern California area are subject to some of the most stringent air quality control regulations in the country. These regulations require that the fuel oil burned contain no more than 0.25 percent sulfur by weight. There is no spot market on the West Coast for this compliance fuel. Therefore, in order to reliably provide for an adequate supply, Edison has entered into long term contracts for this compliance fuel, principally with domestic refiners. However, the refining capacity in California, and other areas of the country generally, is not capable of producing the large quantities of low sulfur compliance fuel oil required in the southern California area from domestic crude oil. Such domestic crude oil cannot be refined into low sulfur compliance fuel oil due to the unavailability of domestic low sulfur crude oil and adequate hydrodesulfurization refining capacity. Very low sulfur crude oils must be employed in the refining process, and such oils are only available from foreign sources and must be imported at high cost.

The retrofitting of existing refineries or the construction of new facilities in order to obtain sufficient capacity capable of producing acceptable quality fuel oil from domestic high sulfur crude oils, such as those available from the Alaskan North Slope or from California, is severely constrained by federal and state regulations which govern new or modified air emission sources. It could not be done with less than three to five years lead time, if at all. Furthermore, undertaking such a long term development project to produce petroleum fuels for electric utility use may be in conflict with emerging national energy policy.

Edison is, therefore, indirectly dependent upon low sulfur crude oil imported by domestic refiners for their use in manufacturing such low sulfur compliance fuel oil. In addition, in order to augment the supplies of low sulfur compliance fuel oil available from domestic refiners and to optimize its procurement program, Edison purchases foreign residual low sulfur fuel oil for direct importation. From Pertamina, the National Oil Company of Indonesia, Edison has developed an extensive oil receiving, storage and pipeline distribution system for this purpose including off-shore tankship terminals and dockside facilities.

Because of these facts, and because alternatives to the continued use of significant quantities of petroleum will not become feasible before late in the 1980's, Edison has no alternative for the near term but to continue to rely upon imported crude oil and petroleum products if it is to continue to provide essential electric service and comply with air quality restrictions.

Edison's annual fuel oil costs for 1972 was \$126 million and for 1980 is projected to be \$1.254 billion. Over the past eight years, our average customers' rates have increased by 130 percent for medium use customers to nearly 320 percent for very high use customers. Because we have no control over these increasingly and enormously inflationary costs, coupled with the fact that Edison must acquire this fuel in order to maintain system reliability irrespective of price, our major cost control efforts remain in the area of increasing operating efficiencies and assisting our customers in utilizing electricity more efficiently.

In terms of impact to Edison and its ratepayers, should emergency taxes or tariffs on crude oil and products be levied on imported low sulfur fuel oil utilized for electrical utility generation, Edison's fuel costs would additionally increase, thereby adding to the growing economic burden on our ratepayers. In addition, emergency taxes or tariffs on crude oil and products will have little or no effect upon Edison's need for imported oil to meet its necessary fuel requirements in compliance with federal, state and local air quality regulations. Accordingly, Edison believes that such laws and tariffs should not be adopted. In the alternative, at the very minimum, Edison and other electric utilities similarly situated should be exempted from any system of emergency taxes or tariffs on crude oil and petroleum products needed to meet such requirements.

In terms of whether emergency taxes or tariffs on crude oil and products can reduce the short term damage to the United States and the international economy stemming from major oil disruptions, the following may be argued. First, the imposition of an emergency import tariff by the U.S. would (1) raise the domestic price of energy and energy-intensive products still higher thereby further aggravating our inflation problem, and (2) reduce the domestic availability of imported oil still further. Thus, the cost of the shortage in terms of lost economic production would be compounded by such a policy.

Second, this proposed tax would generate more dollars in the U.S. Treasury. That money should be set aside and utilized for energy development projects thereby providing funds for increased oil and gas exploration, synthetic fuels development, and renewable energy resources such hydro, geothermal, and solar.

Third, another effect of the emergency import tariff can be expected. Specifically some income will be redistributed away from oil exporting countries.

The redistribution away from oil exporting countries will not be large since other oil importing countries will simply move in to take up the slack in the U.S. demand. In addition, history shows that OPEC may react adversely to passage of a tax by increasing its price by the amount of the tax, further increasing the cost of oil.

If a more general emergency tax were placed on all crude oil or products some similar and some dissimilar effects would occur. As in the case of the import tariff, the domestic price of energy and energy-intensive products would be driven still higher and the domestic availability of oil would be reduced. Unlike under the import tariff, both domestic production and imports would be reduced. As in the case of the import tariff, the cost of the shortage in terms of lost economic production would be compounded by the emergency tax.

A fourth and final policy consideration would seem to be the use of differential taxes to allocate refined products. Thus, for instance, a relatively high tax could be placed on gasoline or diesel fuel to reallocate resources towards heating oil. The first thing to realize is that such taxes will increase the cost of the shortage in terms of dollar value of lost production. However, they may still be deemed desirable for political purposes since they can redistribute the burden of the shortage. The main policy competitor for such an emergency tax scheme, and consequently the standard against which it should be measured, would seem to be mandatory quantitative directives governing the allocation of refined products. While a system of taxes and tariffs might be appropriate for achieving long-term political objectives, quantitative directives certainly seem to be the preferable way to achieve political

objectives under short-run emergencies. Information regarding the operation of the economy is simply not sufficiently detailed to accurately anticipate the short-run allocative effects of taxes and subsidies.

Import tariffs and energy consumption taxes have been discussed as arguably beneficial components of a long-term national energy policy. The benefits of such measures lie in the presumed energy security gained through long-term reduced reliance on foreign oil imports. However, this reduced reliance is achieved at considerable economic cost and hardship. Most observers have been of the opinion that there are less expensive ways to achieve comparable security through stockpiling and shut-in emergency capacity. The key issue is that import tariffs and oil taxes are properly considered as long-term responses—not short-run emergency policies.

In summary, Edison does not believe that levying of emergency taxes or tariffs on crude oil and products is in the best interest of the Company, its ratepayers, or the nation as a whole. The consequence of emergency taxes or tariffs placed upon crude oil would only add to the economic hardship of Edison's ratepayers. In terms of the nation, imposition of an emergency tariff by the U.S. would not only raise the domestic price of energy and energy intensive products still higher but would also further reduce the domestic availability of imported oil. This would compound the cost of the shortage in terms of lost economic production. For these reasons together with those previously stated, Edison cannot support the concept of special oil taxes imposed upon crude oil and products. At a minimum, if such rules are adopted, low sulfur oil imported to comply with air quality standards should be exempted.

Very truly yours,

WILLIAM H. SEAMAN,  
*Vice President.*

# SPECIAL OIL TAXES

MONDAY, DECEMBER 1, 1980

U.S. SENATE,  
COMMITTEE ON FINANCE,  
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT,  
Washington, D.C.

The subcommittee met, pursuant to notice, at 1 p.m., in room 2221, Dirksen Senate Office Building, Hon. Bill Bradley presiding. [The press release announcing this hearing follows:]

[Press Release, Nov. 21, 1980]

## FINANCE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT ANNOUNCES HEARING ON SPECIAL OIL TAXES

Senator Harry F. Byrd, Jr. (I-Va.), Chairman of the Senate Subcommittee on Taxation and Debt Management of the Committee on Finance announced today that the Subcommittee will hold the third in a series of hearings on special oil taxes in which Senator Bradley will participate.

The hearing will be held on Monday, December 1 in Room 2221 of the Dirksen Senate Office Building, and will begin at 9:00 a.m.

*Witnesses.*—Senator Bradley noted that a series of witnesses, each an expert in his or her field, have been invited to testify.

### *Invited to testify are:*

James Sweeny, Terman Engineering Center, Stanford University.

Robert Williams, Center for Energy and Environmental Studies, Princeton University.

Alice Rivlin, Director, Congressional Budget Office.

*Written testimony.*—The Chairman stated that the Subcommittee would be pleased to receive written testimony from those persons or organizations who wish to submit statements for the record. Statements submitted for inclusion in the record should be mailed with five (5) copies by December 15, 1980, to Michael Stern, Staff Director, Committee on Finance, Room 2227 Dirksen Senate Office Building, Washington, D.C. 20510.

**Present:** Senator Bill Bradley.

Senator BRADLEY. The subcommittee will come to order.

This afternoon's hearing is the third in the Finance Committee's series on special oil taxes. The first two hearings examined whether various types of taxes and tariffs could reduce the damage to the United States and the international economy of a major oil supply disruption. These were the so-called emergency tariffs.

Today's hearings will explore whether oil taxes or tariffs can reduce the longrun demand for imported petroleum, and whether they can do so more equitably and more efficiently than other approaches to oil import reduction.

Our witnesses, in order of their appearance—we have three here so far: Raymond Scheppach, assistant director, natural resources, Congressional Budget Office; Robert Williams, Center for Energy and Environmental Studies, Princeton University; James Plummer, director, energy analysis department, Electric Power Research

Institute and the president of the International Association of Energy Economists.

And we are waiting for James Sweeney of the Energy Modeling Forum, Stanford University.

I would like to welcome the three of you who are prepared to testify. I hope you would each take about 10 or 15 minutes for your opening remarks. And then what I would like to do is have a panel discussion, a kind of freewheeling discussion between and among all of us.

I think this is an area in which we can benefit from a maximum of irreverence and critical capacity. So why don't we begin with Mr. Scheppach.

**STATEMENT OF RAYMOND C. SCHEPPACH, ASSISTANT DIRECTOR,  
NATURAL RESOURCES, CONGRESSIONAL BUDGET OFFICE**

Mr. SCHEPPACH. Mr. Chairman, I am pleased to appear before this subcommittee to discuss the use of oil import tariffs as a policy to reduce the longrun demand for imported oil. In my remarks I will discuss the following issues:

The economic benefits of an oil import tariff;

The economic cost imposed by a tariff;

The factors which influence the relationship between benefits and costs;

The effectiveness of oil import tariffs relative to other oil import reduction policies; and

The appropriate tariff level.

An oil import tariff on both crude oil and refined products would lower oil consumption in the short run in two principal ways:

First, industrial and individual consumers would reduce their demands for petroleum products because of the higher prices—for example, individuals would drive fewer miles per year.

Second, to the extent that higher oil prices made other energy sources economic, some substitution of natural gas and coal and, to a lesser degree, renewable resources for oil would occur.

While the demand response to higher oil prices is limited in the short run, in the longer term there would be significant opportunities to improve both the efficiency of oil-using equipment and the ability of the economy to substitute other forms of energy for oil.

The primary benefit of both shortrun and longrun oil import reductions is that they reduce the upward pressure on longrun oil prices by lowering the worldwide demand for oil. This in turn reduces the magnitude of the inflationary drag of high oil prices on longrun economic growth.

Additionally, the tax would allow the United States to decrease the amount of national income that is diverted to pay for foreign oil. Alternatively stated, some of the funds that would normally go to OPEC oil producers through higher world prices would be recouped by the tax and used to maintain demand for domestic goods and services.

There would also be a number of other less important benefits, including a short-term improvement in the balance of trade and a decrease in U.S. vulnerability to oil supply disruptions. Further-

more, a significant reduction in oil dependence might afford the United States more freedom in its relationships with other nations.

Because it would raise the price of oil in the United States, an oil import tariff would, however, also impose some major costs on the U.S. economy. Aggregate output would decrease, and some sectors would be severely affected, notably the steel and automobile industries.

Furthermore, a tariff would create shifts in income between producers and consumers and among consumers, and ultimately might not improve the U.S. balance of trade. Some of these costs could be ameliorated through additional policies, but some might have to be accepted in order to obtain the benefits of reduced oil imports.

Output and aggregate income. Higher oil prices result in short-term unemployment and lower economic growth in the longer term by reducing the amount of goods and services that can be profitably produced, thus restricting their supply.

In the shorter run, higher oil prices also transfer income from the users of oil to oil producers or to the Government, who may not quickly recycle this income into increased purchases of goods and services or into tax reductions. Consequently, demand falls, reducing, in turn, income and employment.

Furthermore, higher oil prices increase the demand for money to pay for the oil, and, unless the Federal Reserve allows the money supply to accommodate this demand, this can lead to tighter credit and higher interest rates, restraining both consumption and investment.

Oil price increases also tend to reinforce the inflationary spiral. Energy price increases trigger high claims on income as people attempt, with varying success, to shift the loss of real income to others. Fiscal and monetary policies cannot deal with this increased inflationary pressure without exacerbating the shortrun demand problems described above. Thus, higher energy prices tend to entrench stagflation in the economy.

The dampening effects of an oil import tariff on economic growth would not be distributed evenly across all sectors of the economy. Automobile sales would be severely affected by higher gasoline prices. Although the U.S. automobile industry is shifting to production of smaller, more fuel-efficient cars, its capacity to produce smaller engines and auto bodies will be limited in the next several years. Thus, imposing an oil import tariff in the near future would reduce domestic auto sales as consumers bought the more fuel-efficient foreign vehicles.

An import tariff of \$20, equivalent to a per gallon levy of 50 cents, could reduce U.S. auto sales by 1 million units, or 10 percent of projected production, in the first year after its imposition, and by 6 percent during each of the following 2 years, and by 200,000 units per year, or 2 percent of projected production, in the fourth through seventh years.

In addition, the reduced national income and higher interest rates induced by a tariff cut would cut into auto sales. Thus, the effects of a tariff on the automobile and related industries would be sizable.



Other industries would be affected as well. Energy comprises 15 to 20 percent of the final costs of steel production, for example, and the higher energy costs caused by an oil import tariff might be more than the steel industry could pass on to consumers, thus squeezing profits, and, presumably, investment in that industry. Other energy-intensive industries that could be similarly affected include paper, chemicals, refining, cement, and aluminum.

Of particular importance is the petrochemical industry, which relies heavily on oil as a feedstock for production of its final product. In recent years, U.S. petrochemicals have been exported successfully, to a large extent because of the subsidy afforded this industry by domestic oil and gas price controls.

By adding to the cost of petrochemical feedstocks, an oil import tariff might place this industry in an untenable position in international competition, particularly when oil price decontrol is completed and if natural gas deregulation takes place. Whether or not some exception for the petrochemical industry might be in order if an oil import tariff is implemented would have to be considered.

The sizable effects of an oil import tariff on specific industries, particularly automobiles, suggest that such a tariff might best be phased in in accordance with these industries' abilities to accommodate its effects. By announcing its intention to raise oil prices over time in a series of steps, the Government could create an expectation of higher prices that would induce these industries to begin an adjustment in their products and processes before the higher prices were implemented. This would also mitigate many of the adjustment effects across the economy.

The imposition of an oil import tariff would lead to severe significant income transfers.

First, tariff collections, presuming a \$20 tariff level, would amount to approximately \$50 billion per year accruing to the Federal Government. This amount could be rebated to households through payroll collections and transfer payments, although it would be difficult to devise a rebate system to reach every household.

Second, the imposition of an oil import tariff would raise the price of domestically produced oil and oil substitutes, such as natural gas and coal, leading to higher revenues for domestic energy producers. Unless some form of taxation was placed on all domestic energy products or price controls for energy products were instituted, an income transfer larger than \$50 billion per year would result.

It should be noted, however, that the windfall profits and corporate income taxes would collect approximately half of the windfalls realized by domestic oil producers for potential recycling to consumers. A far smaller portion of the windfall realized by natural gas and coal producers would be recycled in this fashion.

An oil import tariff would have mixed effects on the balance of trade. Certainly, the imposition of a tariff would reduce the outflow of dollars in payment for oil, and would therefore strengthen the dollar. This advantage would be partially mitigated, however, by reduced purchases of U.S. goods and services by the oil-producing countries.

An import tariff could have another negative effect on U.S. exports. By subjecting U.S. industries to higher energy costs than their foreign competitors, a tariff might reduce their competitiveness in world markets. Although a tax credit could be devised to offset increased energy cost for firms producing exports, it would be extremely difficult to administer equitably and efficiently.

Given the uncertainty surrounding the effect of higher energy prices on the competitive position of U.S. exports, it is unclear whether an oil import tariff would improve the U.S. balance of trade.

As my discussion has indicated, an oil import tariff would allow us to reduce oil imports, but only by imposing economic costs. Yet no long-term reduction in our import level can be achieved without paying some price. The size of the cost, however, might be affected by several factors, among them the efficiency with which the economy responds to an oil import tariff, the reaction of producing nations, and whether or not the tariff is multilaterally imposed.

With respect to economic responsiveness, the same inefficiencies impede the responsiveness of the economy to higher energy prices, whether they result from an oil import tariff or other causes. These inefficiencies include natural gas price controls, regulatory biases that induce electric utilities to retain oil- and gas-fired units, and lack of consumer action on conservation measures induced by the rapid turnover in residences and commercial structures. Inasmuch as such imperfections are corrected, the responsiveness to any oil price increase improves, and the relative advantages of an oil import tariff are substantially increased.

To the extent that world oil prices fall in response to the imposition of an oil import tariff and resulting U.S. import reductions, the benefits of a tariff would increase. Should producers curtail output sufficiently to maintain the world market price of oil, then the entire tariff would be borne by U.S. consumers, and prices would increase by an amount equal to the tariff. If, however, producing nations were unwilling to cut back output that far, a glutted market could result, and prices would fall somewhat.

Reducing the world price through the tariff would redistribute income significantly from foreign producers to domestic consumers, since the dollar outflow for oil would be reduced, and Government tariff receipts could be recycled into the economy. Thus, the relative benefits of an import tariff would increase to the extent that producers moderate any production cutbacks.

The benefits of a tariff to the United States would also be increased if it were imposed multilaterally. Joint imposition by the major consuming nations would increase the tariff's downward pressure on world oil prices, by creating a larger oil market surplus. In addition, a multilateral tariff could eliminate the competitive disadvantage for U.S. exports created by a unilateral tax. Thus, the benefits of an oil import tariff would be magnified if all the major consuming nations imposed one.

Whether or not oil import fees are an appropriate policy depends, therefore, in part on how OPEC responds, whether the tariff is multilaterally imposed, and the extent to which some of the current market inefficiencies are corrected. If OPEC does not take retaliatory action and there is international cooperation among

consuming nations, then oil import fees clearly run high as a longrun policy option.

We would, however, point out that, by completely or partially deregulating natural gas and eliminating the current regulatory bias against new coal-fired capacity in electric utilities, oil imports could be reduced by up to 3 million barrels per day without major costs to the economy. Consequently, these policies, taken together, would rank higher than oil import tariffs in overall effectiveness, although joint implementation would result in greater import relief than would be obtained from either option alone.

Although there are other tax options, such as taxing gasoline or all transportation fuel, they appear to rank lower than oil import fees on both efficiency and administrative grounds. Directing the entire burden to gasoline would preempt any other responses in the use of oil. By decreasing the efficiency with which higher oil prices force conservation and substitution of other fuels, a gasoline tax would result in a more difficult adjustment to higher oil prices than is necessary.

It should also be noted that the imposition of an oil import tariff might act to accelerate the production of unconventional sources of energy. Synthetic liquid fuels and renewable resources are particularly promising. By raising the price that the consumer pays for energy, an oil import tariff would make both of these types of energy more economic.

By allowing the higher price created by the tariff to accrue to producers of synthetic fuels, an oil import tariff could act like a price guarantee for such energy production. If a tariff raised the price of energy to the point at which synthetic liquid energy became competitive, the tariff should be viewed as an effective substitute for many of the financial subsidies now being considered for the synthetic fuels industry.

The choice of an appropriate tariff level depends, in part, on how we view such a tariff and what we expect it to accomplish. In a previous CBO report, dependency on imported oil was viewed as conveying several risks to the United States:

First, the risk of future macroeconomic losses as oil prices rise;

Second, the risk of future disruptions of foreign oil;

Third, the risk of deterioration in the balance of payments;

And, last, the risk of imposing constraints in our relations with other nations.

Each of these risks represents some cost that the United States may have to pay as a product of its import dependence. Calculation of these costs, however, requires knowledge of future events and of the complex relationship between oil prices, macroeconomic outcomes, and the dollar. Cost estimates by various researchers using a similar framework have suggested a range of \$5 to \$70 per barrel of imported oil, most likely centering around \$10 to \$30 per barrel.

In conclusion, Mr. Chairman, an oil import tariff would provide a number of economic benefits by reducing the longrun price of oil, which would in turn reduce the inflationary drag on economic growth. It might also provide some other benefits, including decreased vulnerability to oil supply interruptions and a strengthened U.S. dollar. Such a tax would, however, also impose costs in

terms of reduced domestic output and hardship on the automobile, steel, and petrochemical industries.

If OPEC did not respond with retaliatory production cutbacks, some other consuming countries also imposed a similar tax, and it was both phased in to minimize the costs of adjustment and rebated, then such a tax would rank high in overall effectiveness. Although CBO believes that the elimination of the regulatory bias in electric utilities and deregulation of natural gas would be more effective in reducing oil imports when contrasted to the tax alone, maximum benefits could be attained if these policies were implemented simultaneously.

[The prepared statement of Raymond C. Scheppach follows:]

STATEMENT OF RAYMOND C. SCHEPPACH, ASSISTANT DIRECTOR, CONGRESSIONAL BUDGET OFFICE

Mr. Chairman, I am pleased to appear before this Subcommittee to discuss the use of oil import tariffs as a policy to reduce the long-run demand for imported oil. In my remarks I will discuss the following issues: The economic benefits of an oil import tariff; The economic costs imposed by a tariff; The factors which influence the relationship between benefits and costs; The effectiveness of oil import tariffs relative to other oil import reduction policies; and The appropriate tariff level.

An oil import tariff on both crude oil and refined products would lower oil consumption in the short run in two principal ways. First, industrial and individuals consumers would reduce their demands for petroleum products because of the higher prices—for example, individuals would drive fewer miles per year. Second, to the extent that higher oil prices made other energy sources economic, some substitution of natural gas and coal and, to a lesser degree, renewable resources for oil would occur. While the demand response to higher oil prices is limited in the short run, in the longer term there would be significant opportunities to improve both the efficiency of oil-using equipment and the ability of the economy to substitute other forms of energy for oil.

The primary benefit of both short-run and long-run oil import reductions is that they reduce the upward pressure on long-run oil prices by lowering the worldwide demand for oil. This in turn reduces the magnitude of the inflationary drag of high oil prices on long-run economic growth. Additionally, the tax would allow the United States to decrease the amount of national income that is diverted to pay for foreign oil. Alternatively stated, some of the funds that would normally go to OPEC oil producers though higher world prices would be recouped by the tax and used to maintain demand for domestic goods and services. There would also be a number of other less important benefits, including a short-term improvement in the balance of trade and a decrease in U.S. vulnerability to oil supply disruptions. Furthermore, a significant reduction in oil dependence might afford the United States more freedom in its relationships with other nations.

Because it would raise the price of oil in the United States, an oil import tariff would, however, also impose some major costs on the U.S. economy. Aggregate output would decrease, and some sectors would be severely affected, notably the steel and automobile industries. Furthermore, a tariff would create shifts in income between producers and consumers and among consumers, and ultimately might not improve the U.S. balance of trade. Some of these costs could be ameliorated through additional policies, but some might have to be accepted in order to obtain the benefits of reduced oil imports.

Higher oil prices result in short-term unemployment and lower economic growth in the longer term by reducing the amount of goods and services that can be profitably produced, thus restricting their supply. In the shorter run, higher oil prices also transfer income from the users of oil to oil producers or to the government, who may not quickly "recycle" this income into increased purchases of goods and services or into tax reductions. Consequently, demand falls, reducing, in turn, income and employment. Furthermore, higher oil prices increase the demand for money to pay for the oil, and, unless the Federal Reserve allows the money supply to accommodate this demand, this can lead to tighter credit and higher interest rates, restraining both consumption and investment. Oil price increases also tend to reinforce the inflationary spiral. Energy price increases trigger higher claims on income as people attempt, with varying success, to shift the loss of real income to others. Fiscal and monetary policies cannot deal with this increased inflationary

pressure without exacerbating the short-run demand problems described above. Thus, higher energy prices tend to entrench stagflation in the economy.

The dampening effects of an oil import tariff on economic growth would not be distributed evenly across all sectors of the economy. Automobile sales would be severely affected by higher gasoline prices. Although the U.S. automobile industry is shifting to production of smaller, more fuel-efficient cars, its capacity to produce smaller engines and auto bodies will be limited in the next several years. Thus, imposing an oil import tariff in the near future would reduce domestic auto sales as consumers bought the more fuel-efficient foreign vehicles. An import tariff of \$20.00, equivalent to a per gallon levy of 50 cents, could reduce U.S. auto sales by 1.0 million units, or 10 percent of projected production, in the first year after its imposition, and by 6 percent during each of the following two years, and by 200,000 units per year, or 2 percent of projected production, in the fourth through seventh years. In addition, the reduced national income and higher interest rates induced by a tariff would cut into auto sales. Thus, the effects of a tariff on the automobile and related industries would be sizable.

Other industries would be affected as well. Energy comprises 15 to 20 percent of the final costs of steel production, for example, and the higher energy costs caused by an oil import tariff might be more than the steel industry could pass on to consumers, thus squeezing profits, and, presumably, investment in that industry. Other energy-intensive industries that could be similarly affected include paper, chemicals, refining, cement, and aluminum.

Of particular importance is the petrochemical industry, which relies heavily on oil as a feedstock for production of its final product. In recent years, U.S. petrochemicals have been exported successfully, to a large extent because of the subsidy afforded this industry by domestic oil and gas price controls. By adding to the cost of petrochemical feedstocks, an oil import tariff might place this industry in an untenable position in international competition, particularly when oil price decontrol is completed and if natural gas deregulation takes place. Whether or not some exception for the petrochemical industry might be in order if an oil import tariff is implemented would have to be considered.

The sizable effects of an oil import tariff on specific industries, particularly automobiles, suggest that such a tariff might best be "phased in" in accordance with these industries' abilities to accommodate its effects. By announcing its intention to raise oil prices over time in a series of steps, the government could create an expectation of higher prices that would induce these industries to begin an adjustment in their products and process before the higher prices were implemented. This would also mitigate many of the adjustment effects across the economy.

The imposition of an oil import tariff would lead to several significant income transfers. First, tariff collections, presuming a \$20.00 tariff level, would amount to approximately \$50 billion per year accruing to the federal government. This amount could be rebated to households through payroll collections and transfer payments, although it would be difficult to devise a rebate system to reach every household. Second, the imposition of an oil import tariff would raise the price of domestically produced oil and oil substitutes, such as natural gas and coal, leading to higher revenues for domestic energy producers. Unless some form of taxation was placed on all domestic energy products or price controls for energy products were instituted, an income transfer larger than \$50 billion per year would result. It should be noted, however, that the windfall profits and corporate income taxes would collect approximately half of the windfalls realized by domestic oil producers for potential recycling to consumers. A far smaller portion of the windfall realized by natural gas and coal producers would be recycled in this fashion.

An oil import tariff would have mixed effects on the balance of trade. Certainly, the imposition of a tariff would reduce the outflow of dollars in payment for oil, and would therefore strengthen the dollar. This advantage would be partially mitigated, however, by reduced purchases of U.S. goods and services by the oil-producing countries. An import tariff could have another negative effect on U.S. exports. By subjecting U.S. industries to higher energy costs than their foreign competitors, a tariff might reduce their competitiveness in world markets. Although a tax credit could be devised to offset increased energy costs for firms producing exports, it would be extremely difficult to administer equitably and efficiently. Given the uncertainty surrounding the effect of higher energy prices on the competitive position of U.S. exports, it is unclear whether an oil import tariff would improve the U.S. balance of trade.

As my discussion has indicated, an oil import tariff would allow us to reduce oil imports, but only by imposing economic costs. Yet no long-term reduction in our import level can be achieved without paying some price. The size of the cost, however, might be affected by several factors, among them, the efficiency with

which the economy responds to an oil import tariff, the reaction of producing nations, and whether or not the tariff is multilaterally imposed.

With respect to economic responsiveness, the same inefficiencies impede the responsiveness of the economy to higher energy prices, whether they result from an oil import tariff or other causes. These inefficiencies include natural gas price controls, regulatory biases that induce electric utilities to retain oil- and gas-fired units, and lack of consumer action on conservation measures induced by the rapid turnover in residences and commercial structures. Inasmuch as such imperfections are corrected, the responsiveness to any oil price increase improves, and the relative advantages of an oil import tariff are substantially increased.

To the extent that world oil prices fall in response to the imposition of an oil import tariff and resulting U.S. import reductions, the benefits of a tariff would increase. Should producers curtail output sufficiently to maintain the world market price of oil, then the entire tariff would be borne by U.S. consumers, and prices would increase by an amount equal to the tariff. If, however, producing nations were unwilling to cut back output that far, a glutted market could result, and prices would fall somewhat. Reducing the world price through the tariff would redistribute income significantly from foreign producers to domestic consumers, since the dollar outflow for oil would be reduced, and government tariff receipts could be recycled into the economy. Thus, the relative benefits of an import tariff would increase to the extent that producers moderate any production cutbacks.

The benefits of a tariff to the United States would also be increased if it were imposed multilaterally. Joint imposition by the major consuming nations would increase the tariff's downward pressure on world oil prices, by creating a larger oil market surplus. In addition, a multilateral tariff could eliminate the competitive disadvantage for U.S. exports created by a unilateral tax. Thus, the benefits of an oil import tariff would be magnified if all the major consuming nations imposed one.

Whether or not oil import fees are an appropriate policy depends, therefore, in part on how OPEC responds, whether the tariff is multilaterally imposed, and the extent to which some of the current market inefficiencies are corrected. If OPEC does not take retaliatory action and there is international cooperation among consuming nations, then oil import fees clearly rank high as a long-run policy option. We would, however, point out that, by completely or partially deregulating natural gas and eliminating the current regulatory bias against new coal-fired capacity in electric utilities, oil imports could be reduced by up to 3 million barrels per day without major costs to the economy. Consequently, these policies, taken together, would rank higher than oil import tariffs in overall effectiveness, although joint implementation would result in greater import relief than would be obtained from either option alone.

Although there are other tax options, such as taxing gasoline or all transportation fuel, they appear to rank lower than oil import fees on both efficiency and administrative grounds. Directing the entire burden to gasoline would preempt any other responses in the use of oil. By decreasing the efficiency with which higher oil prices force conservation and substitution of other fuels, a gasoline tax would result in a more difficult adjustment to higher oil prices than is necessary.

It should also be noted that the imposition of an oil import tariff might act to accelerate the production of unconventional sources of energy. Synthetic liquid fuels and renewable resources are particularly promising. By raising the price that the consumer pays for energy, an oil import tariff would make both of these types of energy more economic. By allowing the higher price created by the tariff to accrue to producers of synthetic fuels, an oil import tariff could act like a price guarantee for such energy production. If a tariff raised the price of energy to the point at which synthetic liquid energy became competitive, the tariff should be viewed as an effective substitute for many of the financial subsidies now being considered for the synthetic fuels industry.

The choice of an appropriate tariff level depends, in part, on how we view such a tariff and what we expect it to accomplish. In a previous CBO report, dependency on imported oil was viewed as conveying several risks to the United States: First, the risk of future macroeconomic losses as oil prices rise; second, the risk of future disruptions of foreign oil; third, the risk of deterioration in the balance of payments, and lastly, the risk of imposing constraints in our relations with other nations. Each of these risks represents some cost that the United States may have to pay as a product of its import dependence. Calculation of these costs, however, requires knowledge of future events and of the complex relationship between oil prices, macroeconomic outcomes, and the dollar. Cost estimates by various researchers using a similar framework have suggested a range of \$5 to \$70 per barrel of imported oil, most likely centering around \$10 to \$30 per barrel.

In conclusion, Mr. Chairman, an oil import tariff would provide a number of economic benefits by reducing the long-run price of oil which would, in turn, reduce the inflationary drag on economic growth. It might also provide some other benefits, including decreased vulnerability to oil supply interruptions and a strengthened U.S. dollar. Such a tax would, however, also impose costs in terms of reduced domestic output and hardship on the automobile, steel, and petrochemical industries. If OPEC did not respond with retaliatory production cutbacks, some other consuming countries also imposed a similar tax, and it was both phased in to minimize the costs of adjustment and rebated, then such a tax would rank high in overall effectiveness. Although CBO believes that the elimination of the regulatory bias in electric utilities and deregulation of natural gas would be more effective in reducing oil imports when contrasted to the tax alone, maximum benefits could be attained if these policies were implemented simultaneously.

Senator BRADLEY. Thank you very much.

I see Mr. Sweeney has joined us, so why don't we go to him. And our order will be Sweeney, Williams, and Plummer.

Mr. SWEENEY. Thank you, Mr. Chairman.

Senator BRADLEY. The plan is to take 10 to 15 minutes to make your statement, and then we will have a panel discussion.

**STATEMENT OF JAMES L. SWEENEY, DIRECTOR, ENERGY MODELING FORUM, TERMAN ENGINEERING CENTER, ENGINEERING-ECONOMIC SYSTEMS DEPARTMENT, STANFORD UNIVERSITY**

Mr. SWEENEY. Thank you, Mr. Chairman.

I would like to make several basic points in my testimony today. These are all related to the expected future world oil market conditions and the influence of deliberate policy actions on those conditions.

There is a high degree of uncertainty about the future world prices of oil. This uncertainty stems from our inability to predict a number of major factors: Economic growth rates throughout the world; decisions by the oil-producing nations whether to develop additional oil production capacity; the degree to which oil conservation programs or other import reductions programs will be implemented; reductions of world oil supply because of wars, revolutions, or further projection of Soviet military power; the development of alternatives to oil, such as nuclear energy, coal, and so forth. These factors all create uncertainties in forecasting the future of the world oil situation. In fact, with the ongoing Irani-Iraqi war, we cannot say with any degree of confidence that we will not have world oil prices two or three times the current level before this time next year.

However, the uncertainty concerns not whether real oil prices will increase or decrease, but rather how rapidly these prices can be expected to increase.

This point can be illustrated through results emerging from "World Oil," the current study of the Energy Modeling Forum, on whose senior advisory panel you now serve, Mr. Chairman. For this study, virtually all of the major models for forecasting world oil prices have been run over a range of scenarios.

While the EMF working group members were not able to agree upon which scenarios were most likely, the various assumptions were chosen to include the range of views held by working group members knowledgeable in the specific areas. Thus I believe that the results encompass the range of likely future oil prices and quantities.

Across all of these models and scenarios we see one commonality: the world prices of oil in real U.S. dollars can be expected to rise, either modestly or precipitously, depending upon the scenario and the representation of the world oil market dynamics.

The future oil price projections can be illustrated through the first attached figure. Figure 1 graphs the projections of world oil prices using the various models for the reference case. All prices are given in 1979 dollars. By the year 2010, projected prices range from a low of \$50 per barrel to a high of \$110 per barrel.

Senator BRADLEY. Mr. Sweeney, help me with this graph. Who has the low?

Mr. SWEENEY. The lowest is the Gately-Kyle model. This model represents some of the rule-of-thumb behavior patterns of the OPEC nations.

Senator BRADLEY. And the highest is Oiltank?

Mr. SWEENEY. Yes. This was developed in Norway at the Chr. Michelsen Institute. It is a systems dynamics model that the Norwegians are using for planning and making decisions concerning their oil-shipping industry.

Senator BRADLEY. What are the other models?

Mr. SWEENEY. The I represents the international energy evaluation system/oil market simulation (IEES/OMS) model used by the Energy Information Administration in the Department of Energy.

C represents a model called international petroleum exchange (IPE) model, developed by Nazli Choucri, a political scientist at MIT.

S is the salant/ICF model, which was developed by ICF, Inc., and used in the policy office of the Department of Energy.

ETA-MACRO(A) developed by Alan Manne at Stanford University, represents market-clearing phenomena in all of the OECD oil markets simultaneously.

WOIL(W) is a systems dynamics model used by the policy office of the Department of Energy for much of their forecasting and analysis.

The Kennedy/Nehring (K) model was developed by Michael Kennedy and Richard Nehring at Rand Corp.

Opeconomics(B) is used by British Petroleum for their internal forecasting. But either as a result of this study or their own internal evaluations, they are trying to now decide whether they should update the model.

OILMAR(O) is a model developed and utilized through Frank Potter on the House Energy and Power Subcommittee staff.

So that is the range of models. This covers most of the models that do attempt to forecast the world oil prices.

Senator BRADLEY. But in none of these models—the highest price by 1990 is about \$60?

Mr. SWEENEY. Yes; \$55 or \$60 by 1990.

Senator BRADLEY. And the contract price now is about \$32 or \$33?

Mr. SWEENEY. Yes; this is in 1979 dollars. This is abstracting away from any inflation.

Let me continue on with the caveat about these numbers. Even these figures are based upon an explicit assumption that the Iranian-Iraqi war will be quickly settled and that there will be no lasting



oil supply reductions stemming from this war—a questionable assumption at best. Therefore, any repercussions of this war would in fact be expected to lead to higher prices, even in this scenario.

Figure 2 shows the optimistic scenario. It posits the most favorable conditions for all oil consumers that one could possibly imagine, including adoption throughout the OECD of very major energy conservation programs amounting to 20 million barrels per day by the year 2020, massive quantities of synthetic fuels and other back-stop technologies, and increased OPEC production capacity. The results again indicate increasing real world oil prices, although at a much slower rate.

Figure 3, on a more pessimistic note, shows the results from the disruption/low elasticity scenario. This represents the possible effects of a sudden and continuing 10 million barrel per day disruption in the OPEC production capacity, under an assumed low price elasticity of demand for oil.

Senator BRADLEY. Have you seen his testimony, the other people on the panel? Let's see if you can see. This is the pessimistic version. Are you able to see?

I wish you would pass that around, because I think that should be framed as a testament to econometric models of forecasting. [Laughter.]

Mr. SWEENEY. May I point out a couple of things about this graph? We have displayed the range of results from almost all of the existing models. Usually when such a graph is presented, there are nice, clean projections from one model. That gives us a heightened sense of security about our information base, a sense which is unjustified by the current state of the art.

But if you look at each one of the price paths, the patterns of price response to a disruption in 1985 are very different. Yet virtually all of the models predict prices rising over \$100 a barrel, many rising to prices over \$200 a barrel, in response to a 10 million barrel per day cutoff in the world supply of oil.

Senator BRADLEY. Wait a minute. They all assume that if there is 10 million barrels lost. For what period of time?

Mr. SWEENEY. In this specific scenario, this is a continuing reduction. But they all have very quick responses. So in the first year, if you have a 1-year disruption, oil prices will be in the range of \$150 to \$200 a barrel.

Whether such a disruption happens, we don't know. That would be consistent with, say, Saudi Arabia production halting or a possible escalation of the current war. Again, in this scenario we see much uncertainty about the future; what the prices will be in response to a disruption, with models predicting very different time patterns of response.

There are some models which have fairly small price impacts of the disruptions. However, analysis of the particular limitations of these models for examining short-run disruptions has caused me personally to discount all low post-disruption price responses.

Now, while the three graphs suggest a great deal of uncertainty associated with the future world oil prices, one message is unmistakable: We should expect an overall pattern of increasing world oil price. Whether that pattern will be one of smooth price adjustment and continuous upward trends or one of sudden increases and

gradual declines, we cannot say. But the longrun trend of world oil prices can be expected to be upward.

A third point is that, contrary to some current opinions, the era of oil is neither over nor about to be over. Figure 4 illustrates the various reference case oil consumption projections for the world outside the Communist areas, herein referred to as WOCA. WOCA oil consumption is not expected to begin declining within the next 40 years, although neither is it expected to continue to grow at its historical rates. Level OPEC production, some increases from conventional sources, coupled with growth in unconventional sources, including synthetic fuels, will lead to slowly increasing oil supply and consumption.

In addition, and more importantly, is the fourth point: We can also expect the massive dependence by the U.S. and other OECD countries upon OPEC oil exports to continue well into the 21st century. Since I expect that no vast new source of oil will be discovered and developed within OECD during the next several decades, I expect OECD oil production to decline. With nearly constant or slightly declining OECD oil consumption, the current dependence of the oil importing nations upon OPEC oil will continue unabated.

The fifth major conclusion is that oil import reduction policies instituted by the United States alone or in cooperation with our allies can have a significant effect upon oil prices. For example, a phased program of oil import reductions building up to 20 million barrels per day in 2020 could lead to price levels 20 to 40 percent lower than those occurring in its absence. If the demand elasticity were lower than the reference case assumption, such programs could have even greater price effects. Thus, import reduction policies could significantly and beneficially affect the future world oil situation and the well-being of the oil importing nations.

The ability of the U.S. and its allies to encourage world oil price reductions by reducing oil imports can be expressed quantitatively as a component of the so-called import premium. This import premium is the economic benefit associated with the unit reduction in oil imports. The monopsony component of this premium is the benefit associated with world oil price decreases. This component, measured on a per-barrel basis, can also be interpreted as the economic cost, over and above the world oil price, of importing 1 more barrel of oil.

There is a second component of the import premium—that associated with reduced cost of disruptions. Longrun import reduction programs can reduce the shortrun costs to the economy if a disruption occurs. The expected reduction in disruption costs associated with a unit reduction in imports is referred to as the security component of the import premium.

Table 1 shows two components of the import premium, estimated using data from the Energy Modeling Forum study. Here we have results from each of the models that participated in this study. In calculating the security premium, I have assumed a 10-percent probability of a large disruption occurring in a given year.

Senator BRADLEY. "Large" meaning?

Mr. SWEENEY. 10 million barrels per day capacity reduction.

The more likely oil supply disruptions, the higher will be the import premium.

The magnitude of the import premium, and hence the extent of economically justifiable import reduction, depends upon how we count benefits and costs. If we count only those benefits accruing directly to the United States, and if we are unable to gain cooperative agreements with our allies for reducing oil imports, then the U.S. import premium calculations are the most appropriate. In all but one model, the U.S. import premium exceeds \$6 benefit per barrel for the United States alone, above and beyond the price of oil. If we are willing to count benefits and costs accruing to our oil-importing allies, or if cooperative import reduction programs can be developed among all of the OECD nations, then higher premiums are obtained. In all but one model, the premium applicable for the entire OECD is \$24 per barrel or higher. These figures, it must be remembered, are over and above the world price of oil.

Now, the behavior of oil-producing nations in response to an import reduction program will influence the magnitude of the benefits. This was a point made in the last testimony. If the oil-exporting nations respond by cutting production, then only a small price change will result from import reductions. Therefore, there will be only a small monopsony premium.

However, in this case, oil import reductions lead to increases in the spare production capacity of the oil-exporting countries. This additional spare capacity implies less costly disruptions. Thus, the greater the OPEC oil production cutback in response to an import reduction program, the lower the monopsony premium, but the greater will be the security premium.

These import reduction measures could be implemented through a variety of measures. However, one particularly attractive approach is a tax shift policy. Currently, in the United States we tax heavily two things that we like: labor supply and capital formation. Yet, we do not tax, in fact, we have subsidized, what we don't like, oil imports. We could begin to modify this unhappy state of affairs by imposing taxes on the use of all oil. A tax of \$10 per barrel on all oil use could raise revenues of about \$60 billion per year. This could allow us to cut corporate and personal income taxes by 20 percent, without affecting the Federal deficit.

A 30-percent tax on crude oil, roughly \$10 per barrel, would reduce oil consumption by only 1 to 2 percent in the first year of its operation. However, over a longer period, such a tax could reduce consumption on the order of 15 percent, if world oil prices were not reduced in response. However, because we could expect world oil prices to be reduced by \$1 to \$3 per barrel, consumers would face a price increase of \$7 to \$9 per barrel in response to the \$10 per barrel tax. Actual consumption would be reduced by a smaller amount than the 15 percent and the United States would obtain economic benefits from the price reduction.

In summary, if the current generation of models correctly portrays the workings of the world oil market, then during the next 40 years we can expect the real price of oil to rise significantly, the oil importing nations to continue to depend on OPEC for their supplies of oil, the era of oil to continue, and oil import reduction initiatives, if taken, to significantly influence world oil prices.

Thank you.

[The prepared statement of James L. Sweeney follows:]

**TESTIMONY OF JAMES L. SWEENEY, DIRECTOR, ENERGY MODELING FORUM,  
PROFESSOR, ENGINEERING-ECONOMIC SYSTEMS DEPARTMENT, STANFORD UNIVERSITY**

There is a high degree of uncertainty about the future world prices of oil. This uncertainty stems from our inability to predict a number of major factors: economic growth rates through the world; decisions by the oil-producing nations whether to develop additional oil production capacity; the degree to which oil conservation programs or other import reductions programs will be implemented; reductions of world oil supply because of wars, revolutions, or further projection of Soviet military power; the development of alternatives to oil such as nuclear energy, coal and so forth.

This point can be illustrated through results emerging from the current Energy Modeling Forum study, World Oil, on whose senior advisory panel you now serve, Mr. Chairman. For this study, virtually all of the major models for forecasting world oil prices have been run over a range of scenarios. While the EMF working group members were not able to agree upon which scenarios were most likely, the various assumptions were chosen to include the range of views held by working group members knowledgeable in the specific areas. Thus I believe that the results encompass the range of likely future oil prices and quantities.

Across all of these models and scenarios we see one commonality: the world prices of oil in real U.S. dollars can be expected to rise, either modestly or precipitously, depending upon the scenario and the representation of the world oil market dynamics.

The future oil price projections can be illustrated through the first attached figure. This figure graphs the projections of world oil price using the various models for the Reference Case. All prices are given in 1979 dollars. By the year 2010, projected prices range from a low of \$50 per barrel to a high of \$100 per barrel. In 1990, price projections range between \$25 and \$55 per barrel. But even these figures are based upon an explicit assumption that the Iran-Iraqi war will be quickly settled and that there will be no lasting oil supply reductions stemming from this war—a questionable assumption at best. After this initial period, the trend of prices is unanimously projected to be upward.

The optimistic scenario posits the most favorable conditions for oil consumers that one might plausibly imagine, including adoption throughout the OECD of major energy conservation programs, massive quantities of synthetic fuels and other back-stop technologies, and increased OPEC production capacity. The results, shown in the second figure, again indicate increasing real world oil prices, although at a much slower rate. By the year 2000, projected prices range between \$35 and \$55 per barrel.

On a more pessimistic note, the Disruption/Low Elasticity Scenario represents the effect of a sudden and continuing 10 MMB/D disruption in the OPEC production capacity, under an assumed low price elasticity of demand for oil. The third figure displays the price projections resulting from the various models. Many project prices exceeding \$150 per barrel for at least five years after the initial disruption and some project staggering prices to continue beyond that point. In fact, I personally have discounted all the low post-disruption price projections based upon my analysis of the particular model limitations for addressing short-run oil pricing issues.

These three graphs suggest a great deal of uncertainty associated with the future world oil prices. However, even with all this uncertainty, one message is unmistakable: we should expect an overall pattern of increasing real world oil price. Whether that pattern will be one of smooth price adjustment and continuous upward trends or one of sudden increases and gradual declines, we cannot say. But the long-run trend of world oil prices can be expected to be upward.

A third point is, that, contrary to some current opinion, the era of oil is neither over nor about to be over. The fourth figure illustrates the various Reference Case oil consumption projections for the world outside communist areas (WOCA). This graph shows that the WOCA oil consumption rate is not expected to begin declining within the next forty years although neither is it expected to grow at its historical rates. Level OPEC production, some increases from conventional sources, coupled with growth of unconventional sources (including synthetic fuels), will lead to slowly increasing oil supply and consumption.

A fourth point is that we can also expect the massive dependence by the U.S. and other OECD countries upon OPEC oil exports to continue well into the twenty-first century. Since I expect that no vast new source of oil will be discovered and developed within the OECD during the next several decades, I expect OECD oil

production to decline. With nearly constant or slightly declining OECD oil consumption, the current dependence of the oil importing nations upon OPEC oil will continue unabated.

The fifth major conclusion is that oil import reduction policies instituted by the U.S. alone or in cooperation with our allies can have significant effects on oil prices. For example, a phased program of oil import reductions building up to 20 MMB/D in 2020 could lead to price levels 30 percent lower than those occurring in its absence. If the demand elasticity were lower than the Reference Case assumption, such programs could have even greater price effects. Thus, import reduction policies pursued by the oil importing countries individually or collectively could significantly affect the future world oil situation and the well being of these nations.

The ability of the U.S. and its allies to encourage world oil price reductions by reducing oil imports can be expressed quantitatively as a component of the so-called import premium. This import premium is the economic benefit associated with a unit reduction in oil imports. The monopsony component of this premium is the benefit associated with world oil price decreases. This component, measured on a per barrel basis, can also be interpreted as the economic cost, over-and-above the world oil price, of importing one more barrel of oil.

There is another component of the import premium—that associated with reduced cost of disruptions. Long-run import reduction programs can reduce the short-run costs to the economy if a disruption occurs. The expected reduction in disruption costs associated with a unit reduction in imports is referred to as the security component of the import premium.

Table 1 shows two components of the import premium, estimated using data from the Energy Modeling Forum study. In calculating the security premium, I have assumed a 10 percent probability of a large disruption occurring in a given year. The more likely are oil supply disruptions, the higher the import premium.

The magnitude of the import premium, and hence the extent of economically justifiable import reduction, depends upon how we count benefits and costs. If we count only those benefits accruing directly to the United States and if we are unable to gain cooperative agreements with our allies for reducing oil imports, then the U.S. import premium calculations are the most appropriate. In all but one model, the U.S. import premium exceeds \$6.00 benefit per barrel for the U.S. alone. If we are willing to count benefits and costs accruing to our oil importing allies or if cooperative import reduction programs can be developed among all the OECD nations, then higher premia are obtained. In all but one model, the OECD premia are \$24 per barrel or higher. These figures, it must be remembered, are over and above the world price of oil.

The behavior of the oil producing nations in response to an import reduction program will influence the magnitude of the benefits. If the oil exporting nations respond by cutting production, then only a small price change will result from import reductions. Therefore, there will be only a small monopsony premium. However, in this case, oil import reductions lead to increases in the spare productive capacity of the oil exporting countries. This additional spare capacity implies less costly disruptions. Thus, the greater the oil production cut-back in response to an import reduction program, the lower the monopsony premium but the greater the security premium.

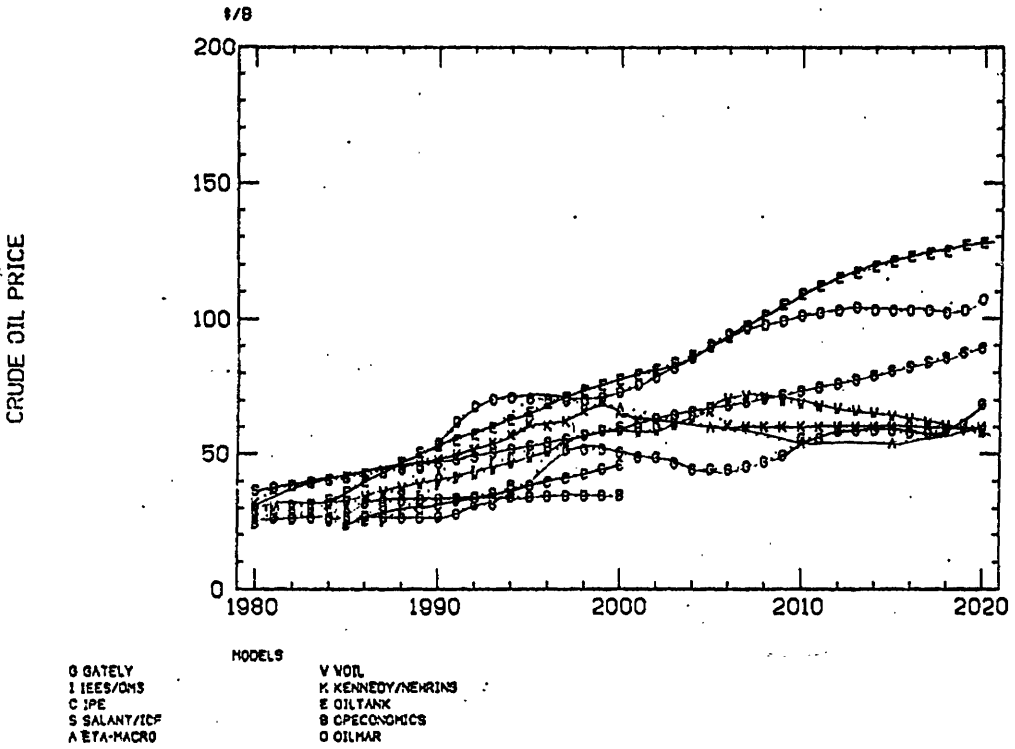
These import reduction measures could be implemented through a variety of measures. However, one particularly attractive approach is a tax shift policy. Currently, in the United States we heavily tax two things that we like—labor supply and capital formation. Yet we do not tax, in fact have subsidized, what we don't like—oil imports. We could begin to modify this unhappy state of affairs by imposing taxes on the use of all oil. A tax of \$10 per barrel on oil use would raise revenues of about \$60 billion per year. Federal budget receipts from corporate and individual income taxes amount to about \$300 billion per year. A \$10 per barrel tax on all oil could allow us to cut corporate and personal income taxes by 20 percent without affecting the Federal deficit.

A 30 percent tax on crude oil (roughly \$10 per barrel) would reduce oil consumption by only about two percent in the first year of its operation. However, over a longer period, such a tax could be expected to reduce consumption by about 15 percent, if world oil prices were not pushed down in response. However, because such a response could be expected, actual consumption would be reduced by a smaller amount and the U.S. would obtain economic benefits from the price reduction.

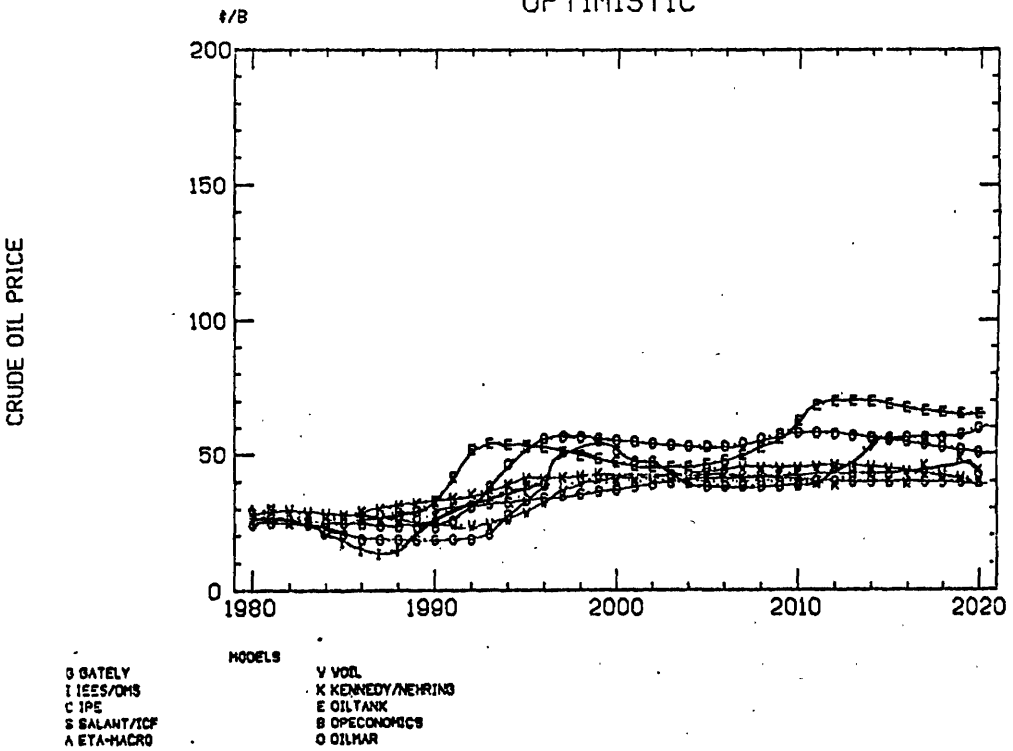
In summary, if the current generation of models correctly portrays the workings

of the world oil market, then during the next forty years we can expect the real price of oil to rise significantly, the oil importing nations to continue to depend upon OPEC for supplies of oil, the era of oil to continue, and oil import reduction initiatives, if taken, to significantly influence world oil prices.

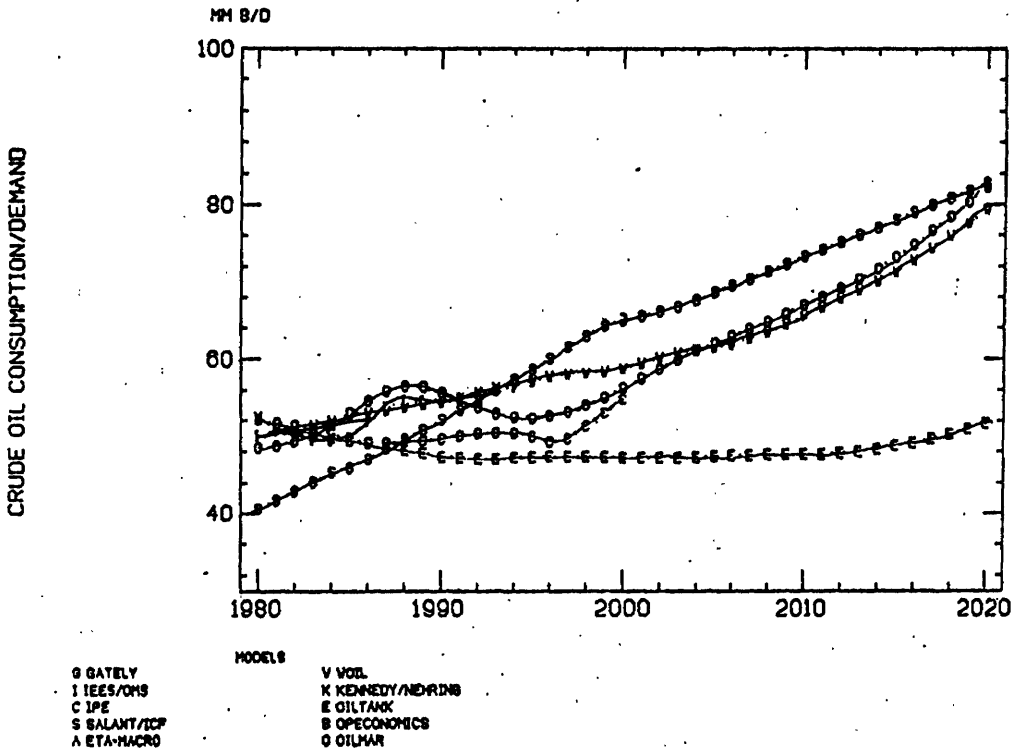
OIL PRICE PROJECTIONS  
REFERENCE



OIL PRICE PROJECTIONS  
OPTIMISTIC



CRUDE OIL CONSUMPTION PROJECTIONS (NOCA TOTAL)  
REFERENCE



OIL PRICE PROJECTIONS  
DISRUPTION/LOW ELASTICITY

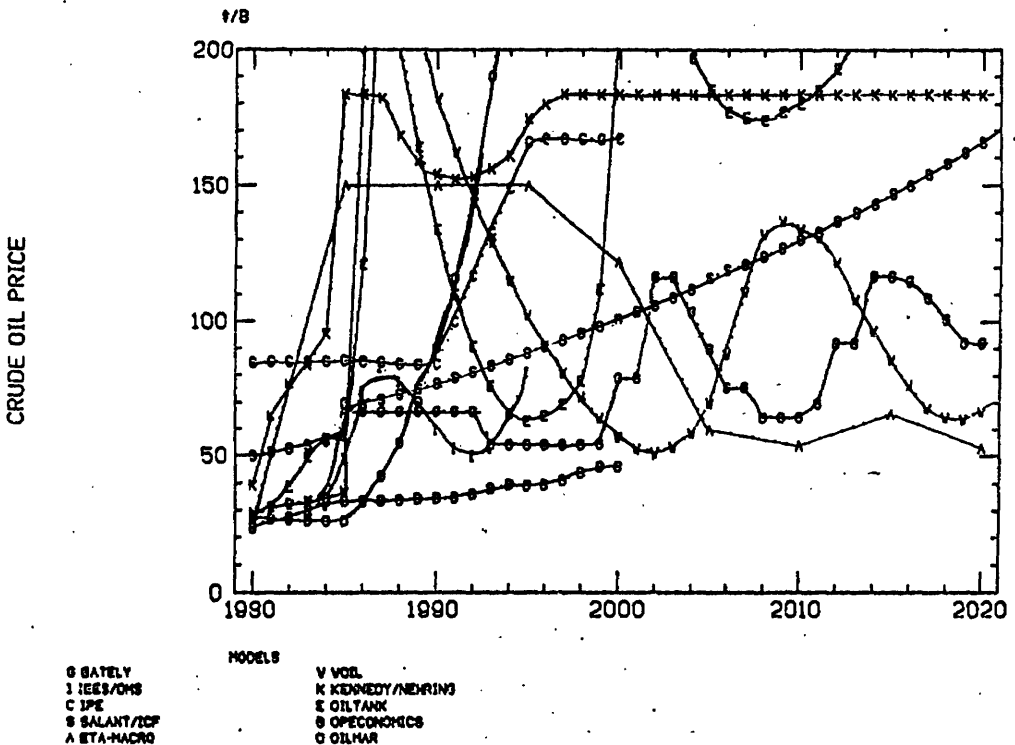




TABLE 1.—COMBINED MONOPSONY AND SECURITY PREMIUM <sup>1</sup>

Model	U.S. Premium			OECD Premium		
	Monopsony	Security <sup>2</sup>	Total	Monopsony	Security	Total
Gately.....	2.87	0.69	3.56	9.52	2.30	11.82
IEES.....	7.67	2.94	10.61	25.94	9.81	35.75
IPE.....	6.76			19.17		
Salant.....	6.01	0.71	6.72	22.34	2.36	24.70
ETA-MACRO.....	5.87	10.74	16.62	19.58	35.83	55.41
WOIL.....	2.64	13.02	15.66	8.80	43.39	52.20
Kennedy.....	3.09	4.00	7.09	11.27	13.32	24.58
OILTANK.....	5.41	3.89	9.30	20.25	12.96	33.24
OILMAR.....	8.39	8.56	16.95	27.97	28.54	56.52

<sup>1</sup> Security premium values assume a ten percent probability of disruption occurring in any given year. This implies a 65 percent probability of such a disruption occurring at least one in ten years.

<sup>2</sup> U.S. Security premium estimated by taking 30 percent of OECD Security Premium.

Senator BRADLEY. Thank you very much, Mr. Sweeney.

I have to go vote. So let's break right now. I will go vote and come right back.

[Recess.]

Senator BRADLEY. The subcommittee will come to order.

And we begin again with the testimony of Mr. Williams. Welcome to the committee.

Mr. WILLIAMS. Thank you, Mr. Chairman.

#### STATEMENT OF ROBERT H. WILLIAMS, CENTER FOR ENERGY AND ENVIRONMENTAL STUDIES, PRINCETON UNIVERSITY

Mr. WILLIAMS. In this testimony, I shall argue that the levy of a rebated excise tax on gasoline can be key to securing a continuing major role in our transportation system for the personal, liquid-fueled automobile, a technology unmatched in providing high performance and mobility at reasonable cost.

The argument I shall put forth could be broadened into a rationale for a tax on all petroleum products or an oil import fee. However, I shall not discuss the relative merits of a gasoline tax and these alternatives. Instead, I shall focus on a gasoline tax to illustrate not only how such a tax could be immediately effective in reducing U.S. dependence on insecure sources of foreign oil and in reducing the flow of U.S. dollars to foreign oil producers, but also how it could spur dramatic innovations in automobile and automotive fuel technologies that are appropriate for the postpetroleum era.

The rationale for a gasoline tax involves the following elements:

First, the present emphasis in oil policy on the design of emergency measures aimed at reducing the adverse impacts of oil supply disruption addresses only part of the near-term oil problem. Even if there were no more political upheavals in the Middle East, we face a virtually certain prospect of significantly reduced secure oil supplies over the next decade.

Second, efforts aimed at bringing forth new domestic energy supply alternatives will not have a significant impact on the oil problem before the 1990's.

Third, the oil crisis is primarily a crisis in the supply of high quality liquid fuels. Among the consumers of high quality liquid

fuels, the automobile is particularly vulnerable to the prospect of reduced petroleum supplies over the next decade.

Fourth, a rebated gasoline tax can be an immediately effective response to the prospect of upward price movement that would be associated with a tightening of oil supplies: The tax would reduce petroleum demand, and the rebate would direct revenues to the American people that would otherwise flow to foreign producers. Also, a rebate system designed to reward light users and penalize heavy users would be especially effective in reducing demand and would in general not be a burden on the poor.

Fifth, besides these near-term benefits, a gasoline tax with an appropriately fashioned rebate scheme could powerfully hasten a transition to an automotive fleet with high fuel economy.

And finally, a gasoline tax could be used to promote a shift in our highway fuels from petroleum to methanol, a synthetic fuel that is especially attractive from the perspectives of cost, automotive performance, national security, and the environment. A goal of fueling a major fraction of our cars with methanol by the turn of the century is not an unrealistic target, if the cars have high fuel economy.

I now wish to briefly discuss each of these points.

First, the oil supply situation. U.S. crude oil production in the lower 48 States has fallen steadily by more than 20 percent from the 1970 peak of 11.1 million barrels per day to 8.7 million barrels per day in the first half of 1980—see figure 1 attached to my written testimony. This decline has been masked, however, by Alaskan North Slope production, which now contributes about 1.6 million barrels per day.

All major government and industry forecasts envision that, despite the decontrol of oil prices, there will be a continuing net reduction of U.S. oil production in the near-term future. The simple average of eight major recent projections of which I am aware and which are appended to my testimony is that production will fall 15 percent—1.5 million barrels per day—by 1985 and by 22 percent—2.3 million barrels per day by 1990.

The most recent of these projections, the October 1980 projection by the Office of Technology Assessment, OTA, is the most disquieting of all: a 17 to 30 percent—1.7 to 3.1 million barrels per day—reduction by 1985 and a 24 to 51 percent—2.7 to 5.0 million barrels per day—reduction by 1990.

While making oil supply predictions is a very risky business, the more pessimistic domestic oil supply projections cannot be dismissed lightly. The more optimistic supply forecasts involve price-driven supply estimates that do not take adequate account of such factors as the recent disappointing drilling experience and the technical problems that will limit production via tertiary recovery techniques.

The OTA report points out that despite a dramatic increase in the price of domestic oil since 1973, there have been only modest increases in petroleum reserves associated with new discoveries. A major fraction of recent reserve additions is due instead to extensions of known oil reservoirs—extensions which can be expected to decrease as U.S. fields reach a more mature state of development.

While there are enormous remaining oil resources that could be made available using advanced tertiary recovery techniques, the OTA forecasts that, largely because of technical problems associated with the development of CO<sub>2</sub>-enhanced recovery technology, oil production via tertiary recovery will increase only relatively modestly—from .4 million barrels per day in 1979, to 0.5 to 0.9 million barrels per day in 1985, and 1.5 to 2.5 million barrels per day by 2000.

As far as imports are concerned, there has been a dramatic reduction recently, but the availability of oil on the world market will probably be less in the future. One factor involved is OPEC's stated intention to cut back on oil production to conserve its finite oil resources. Another is the expectation that OPEC internal oil consumption will increase dramatically over the next decade as a consequence of rising incomes and astonishingly low oil prices.

What is particularly troublesome is that oil supplies available for export from major non-Arab OPEC sources are not likely to increase over the next decade and may well decrease. Table 1 attached to my written testimony shows that in the first half of 1980 nearly 40 percent of our oil imports came from relatively secure sources—Canada, Mexico, Nigeria, Venezuela, and Indonesia. The increased oil that will probably be available from Mexico in the future could well be more than offset by reduced oil availability from the other countries in this group.

Now I would like to turn to the prospects for domestically produced synthetic fuels. The major supply initiative that has been taken to offset the prospect of diminished petroleum availability is the passage of the National Energy Security Act of 1980, which contains provisions for stimulating synthetic fuels production. This act established a federally owned Synthetic Fuels Corporation that would provide industry with \$20 billion in immediate subsidies and up to \$68 million in additional future subsidies in the form of purchase agreements, price guarantees, loans, loan guarantees, and government-industry partnerships.

This act targets the production of synthetic fuels in the amounts 0.5 million barrels of oil equivalent per day by 1987 and 2 million barrels per day by 1992. Many analysts believe that these targets are upper bounds on what is practically achievable by 1990; even if these targets could be achieved, however, synfuels production would probably fall far short of closing the oil demand/supply gap that is likely to develop over the next 5 to 10 years.

In addressing our oil supply problem it is important to recognize that our petroleum crisis is primarily a supply crisis for high quality liquids—mainly gasolines, distillates, and liquefied petroleum gases.

Among end uses, the transportation sector, which accounts for about 70 percent of the total demand for high quality liquids, is particularly troublesome because of the limited opportunities for fuel substitution. And in the transport sector automobiles and light trucks are dominant, accounting for nearly 75 percent of the high quality liquids consumed in transportation.

Because of the central role of the automobile in our petroleum problem, Congress took action in 1975 to curb automotive fuel demand with the automotive fuel economy standards established in

the Energy Policy and Conservation Act of 1975, EPCA. The EPCA mandated that the average fleet fuel economy for new cars rise to double the 1975 level by 1985.

However, because it takes time to turn over the automobile fleet, because of the rising number of cars, and because the on-the-road performance is not as good as the fuel economy in the mandated EPA test, the actual average fuel economy for all autos and light trucks is expected to be only 18 mpg in 1990, and light vehicle fuel use in 1990 is expected to be only 200,000 barrels per day less in 1990 than in 1980.

Thus, the major effect of the 1975 fuel economy standards will be to keep automotive fuel requirements from rising. The automobile will remain particularly vulnerable to the prospect of sharply diminished petroleum supplies that are likely over the next 5 to 10 years.

One of the major attractions of a gasoline tax is that it could be immediately effective in reducing gasoline demand. Consumers would respond to the tax by cutting back on unnecessary automobile use, by carpooling or vanpooling, by using buses more, and when buying new cars, by choosing more fuel-efficient models.

Since the purpose of an added gasoline tax is to curb the demand for gasoline—not generate increased revenues—the gasoline tax revenues should be returned to consumers. There are a wide range of possibilities for doing this. I will not discuss the merits of the various alternative approaches here. But among the many considerations that should bear upon the selection of an appropriate rebate scheme two are especially important: first, the effect of the rebate on petroleum demand; and second, the fairness of the rebate.

Since the purpose of a long-term tax is to bring about a smooth transition to a long-run situation where gasoline demand is considerably lower than today, the rebate should be designed to encourage new transportation habits consistent with this shift. For a given level of taxation, a rebate that increases with the capacity to consume gasoline would be less efficient in changing habits than one that is independent of this capacity.

Thus, for example, while a rebate to owners of registered vehicles might be effective in minimizing dislocations in an emergency supply disruption, such a rebate would encourage consumers to hold onto a number of old clunkers. A tax rebated equally among adults, on the other hand, would be relatively efficient in fostering gasoline conserving habits.

In practice, a rebate should be designed to achieve a balance between efficiency in promoting a change of habits and fairness.

In general, there would be no conflict in the design of a rebate between the goals of efficiency in promoting gasoline conserving habits and fairness to the poor, simply because a typical poor household consumes less gasoline than the average household. Because nearly half of poor households have no cars and because those that do typically drive only about half as much as the average household, poor households would generally benefit from a tax that is rebated on a per adult basis.

But what about those groups and individuals especially dependent on the automobile? Even with a rebate, the gasoline tax would

of course be harsh for these people, but the impact could be cushioned by phasing in the tax. If it is decided, for example, that the tax should be as high as \$2 a gallon, the tax might be phased in over, say, a 4-year period, with increments of 25 cents a gallon every 6 months. An announced preliminary schedule of phased tax increments would enable consumers to anticipate and plan for eventual very high gasoline prices.

Aside from the problems of special groups, a gasoline tax rebated equally among adults would be fair in the broader sense that the system would offer broad opportunities for beating the tax. To illustrate this feature of the tax-rebate system, it is useful to introduce the concept of the effective price of gasoline, which I define as the total net expenditure for gasoline—the actual expenditure minus the rebate—divided by total gasoline consumption.

Now, suppose that the gasoline tax is raised to \$2 a gallon. By introducing the tax/rebate system, the pump price of gasoline would increase from \$1.10 to \$3 a gallon, but the effective price would be less and would depend on the level of consumption. I have estimated that the rebate would amount to about \$730 per adult in the first year after a tax of this magnitude is levied.

Figure 5 attached to my written testimony shows the effective price with this rebate for two-adult households at different consumption levels: the typical poor, carowning household would pay an effective price less than the pretax price—that is, the rebate would be greater than the amount paid in taxes. The typical lower middle-income carowning household would pay an effective price about equal to the pretax price. But the average carowning household would have to reduce consumption 25 percent to reduce the effective price to the pretax level—that is, to beat the tax.

This reduction could be achieved either by driving less or using a more fuel efficient car. The average household, driving 14,000 miles per year, could beat the tax with a fuel economy of 19 miles per gallon or more, while a poor household, driving 8,000 miles a year, could beat the tax with a fuel economy of 10 miles per gallon or more.

Clearly, no tax-rebate scheme will be perfectly fair. But a tax/rebate scheme decided by consensus in the U.S. political process is infinitely more fair than continuing tax increases by OPEC, for which the revenues cannot be rebated.

Because the question of fairness is key to the political acceptability of a gasoline tax, the rebate scheme should be worked out and perhaps legislation specifying how the gasoline tax revenues would be refunded should be passed before setting the level of the gasoline tax.

How large should the gasoline tax be? The level of tax depends on the desired level of oil demand reduction and how effective price will be in suppressing demand. If a demand reduction on the order of 1½ to 2 million barrels of gasoline per day is sought by the mid to late 1980's, then a tax in the range of \$1 to \$2 a gallon appears to be needed.

Unfortunately, economists do not know with precision how consumers will respond to higher prices. With a phased in tax, this uncertainty could be dealt with in practice by adjusting the levels of successive tax increments up or down from the originally pro-

posed schedule in light of experience with various increments, so as to keep the oil import reduction goal on target.

The question of how large a demand reduction we should be seeking is much tougher to deal with. There is general agreement that domestic oil production will fall, but there is uncertainty about how much. The world oil supply situation is even cloudier.

I believe there is no purely analytical answer to the question of whether our imports should be reduced by 1 or 2 or 3 million barrels per day over the next several years. In the final analysis, the import reduction goal and the associated tax should be set in the political process, taking into account both quantifiable and unquantifiable costs and values relating to our energy system.

Clearly one of our goals should be to reduce our vulnerability to oil supply disruption. A related political consideration is that the levy of a stiff tax would enable the United States to demonstrate the seriousness of its commitment to dealing with the world oil crisis to its allies, many of whom already have stiff gasoline taxes. As of July 1980, the tax on regular gasoline was \$1.23 a gallon in West Germany, \$1.68 a gallon in France, and \$2.16 a gallon in Italy, compared to 14 cents a gallon in the United States.

Also, the decisionmaking process should take into account long-range as well as short-range issues in setting an import reduction target and in determining the appropriate tax level. A stiff excise tax on gasoline could powerfully influence the future course of automotive transportation.

When buying a new car, the typical consumer would respond to a gasoline tax by buying a model with high fuel economy. The consumer who responds to a \$2 a gallon tax by trading in his 14 mile per gallon gas guzzler for a new car with a 45 mile per gallon fuel economy would pay no more per mile for gasoline taxed at \$2 a gallon than he paid for pre-taxed gasoline to run his old car. But can the average car buyer purchase such a car?

The VW Rabbit Diesel, with an interior volume only 20 percent smaller than that of the average U.S. car, has an on-the-road fuel economy of 42 miles per gallon. Numerous studies have concluded that it is technically and economically feasible to raise the average on-the-road fuel economy of all new cars in the United States to 40 or 50 miles per gallon in the 1990's.

And it is feasible to go much further than this. Volkswagen is developing a four-passenger car with a small three-cylinder supercharged diesel engine which shuts off under coasting or idle conditions and is expected to have an EPA composite fuel economy of over 65 miles per gallon.

Thus, if there were a market for high fuel economy cars they could be produced. Some combination of fuel economy standards and a gasoline tax could bring about this shift to cars with high fuel economy.

New post-1985 fuel economy standards are desirable to spur the development and introduction of truly high fuel economy cars—40 to 80 miles per gallon—while a complementary tax would aid Detroit by reducing the uncertainty in the future demand for fuel efficient cars. A legitimate fear in the auto industry is that higher fuel economy standards by themselves may reduce sales, because

many consumers would hold onto their old gas guzzlers longer than they otherwise would.

But a tax rebated to adults would mean instead increased total car sales and an accelerated transition to cars with high fuel economy. This effect can be seen in figure 6, attached to my written testimony, showing the effective gasoline price as a function of automotive fuel economy in the first year after raising the gasoline tax to \$2 a gallon.

Note that for a two-adult household driving the average amount at a fuel economy of 45 miles per gallon, the effective gasoline price is minus \$1.50 a gallon—that is, the rebate is much greater than the total amount paid for gasoline. As more and more people shift to fuel efficient cars, this incentive would diminish, because the amount of the rebate would decline. Thus a gasoline tax rebated to adults would accelerate a transition to fuel efficient cars because it would powerfully reward those who first shift to fuel efficient cars.

The logic of using a gasoline tax to foster a transition to fuel efficient cars, while at the same time boosting auto sales, has not been lost to the leadership of the automobile industry, as indicated by Henry Ford's proposal for a 50-cent-a-gallon tax. A major question that should be addressed is whether Detroit could meet this challenge without some form of economic assistance to enable them to make the necessary investments.

If automotive fuel economy is not improved beyond the 1985 level mandated by Congress in 1975, then fuel consumption by automobiles and light trucks in 2000 would be only slightly less than in 1980 (see table 3 attached to my written testimony) doubling (tripling) of the fuel economy of new cars between 1985 and 1995 would lead to fuel savings of 2.6 (3.4) million barrels per day by the year 2000. Clearly, a policy to foster a twofold to threefold increase in automotive fuel economy would be an effective response to the prospect of declining oil supplies.

A gasoline tax could also be used to bring about a transition to methanol as a major fuel for automotive transportation. Methanol is particularly attractive as a synthetic automotive fuel for a number of reasons:

Methanol is the fuel of choice in automotive racing, because it would be safer in a car crash than gasoline, and because of the increased power obtainable from the same engine compared to gasoline. Use of methanol in today's automotive engine can result in an energy efficiency improvement of 25 percent or more—largely because the fuel/air mixture can be leaner and because the methanol can be used at a higher compression ratio. While the toxicity of methanol is roughly comparable to that of gasoline, there would be net air quality gains in shifting automobiles from gasoline to methanol.

Methanol will probably be used as an automotive fuel first in fleets. At present, there is considerable fleet testing of methanol cars in the United States. GM has announced that it could be ready to market straight methanol-fueled cars that use gasoline for starting in as soon as 5 years. To facilitate wider use of methanol, automobiles capable of operating on methanol or gasoline or diesel fuel could be brought to market in a few years.

Methanol can be produced from a variety of feedstocks. Present methanol production in the United States is based almost entirely on natural gas as a feedstock, because of its low cost, low sulfur content, and ease of handling. However, fully developed, commercially available technology can be deployed to produce methanol from coal. In fact, coal was used as a feedstock for methanol before being displaced by low-cost natural gas. Moreover, methanol can also be made from urban refuse and from biomass feedstocks.

Because of the dramatic increase in the world oil price over the last year or so, the production cost of methanol derived from coal, without the benefit of subsidies, is 60 to 100 percent of its value as an alternative to unleaded gasoline produced today, and this cost/value ratio will fall to 50 to 75 percent by the time oil prices are fully decontrolled in late 1981—even if there are no more real increases in the world oil price (see table 4 attached to my written testimony).

Thus, a coal-to-methanol industry is ready to take off. A gasoline tax would accelerate the development of this industry.

Biomass has some important advantages over coal as a feedstock. It is renewable; it has a low sulfur content; it can be produced in many different areas where fossil fuels are scarce—from wood, crop residues, or grasses; and, perhaps most importantly in the long run, methanol derived from renewable biomass sources would lead to no net increase in atmospheric CO<sub>2</sub>.

Today, methanol can be derived from wood using commercially available technology, at a cost which is competitive with the alternative of gasoline derived from imported oil (see table 5 attached to my written testimony) but which is higher than the cost of methanol derived from coal (compare tables 4 and 5).

But commercially available technology for making methanol out of biomass feedstocks is modified coal technology, and is not optimized to exploit the unique characteristics of the biomass feedstock, which suggests significant opportunities for cost reduction.

It is unclear whether coal or biomass would win in the long run, as production technology evolves. A gasoline tax would enable biomass-based methanol to enter the market as a strong competitor to gasoline; the competition with coal, on the other hand, would spur innovations in biomass-based technologies.

A gasoline tax would have the effect of stimulating the creation of a highly competitive methanol industry that would bring downward pressure on gasoline prices. The methanol industry would involve a diversity of producers—perhaps oil, gas and coal companies for coal and natural gas feedstocks; forest products companies for wood feedstocks; farmers cooperatives for grass and crop residue feedstocks; and municipalities for urban refuse.

One very important environmental advantage of a methanol economy in the long run is that if it becomes necessary to shift from fossil to biomass fuels because of the CO<sub>2</sub> problem, the transition would be much easier with methanol than with most other synthetic liquid fuels, because the production of methanol is an especially attractive way of utilizing both fossil fuel and biomass feedstocks. A transition to biomass could be brought about without disrupting the distribution and end-use systems, perhaps by intro-



ducing a CO<sub>2</sub> tax at a time in the future when the CO<sub>2</sub> risk becomes more clearly defined.

How large a role could methanol play in our energy economy over the next 10 to 20 years? It is difficult to make projections. However, it is clear that methanol could meet a major fraction of automotive fuel requirements by the year 2000, if our cars had high fuel economy.

A methanol production level of 2 million barrels per day (gasoline equivalent) by 2000 is not an unreasonable target. At this level of production, methanol could meet two-thirds or more of the fuel requirements of automobiles and light trucks in the year 2000, if the average gasoline-equivalent fuel economy of new cars were greater than or equal to about 45 miles per gallon by 1995 (table 3 attached to my written testimony).

In conclusion, substantial adjustments will have to be made in our energy economy to accommodate the prospect of rapidly decreasing oil supplies. While the central role of the automobile in our transportation system is particularly vulnerable in this bleak petroleum supply situation, the combination of substantially improved fuel economy of automobiles and a shift to methanol as an automotive fuel would assure a sustainable future for the liquid-fueled, personal automobile.

But a transition to this more hopeful future will be slow and painful as long as we desperately cling to the past and fail to take bold initiatives. An especially attractive feature of a gasoline tax—or more generally, a petroleum tax—for dealing with our chronic oil problem is that with this approach the Government would not have to decide in advance what are the most promising technologies or become an entrepreneur. Rather, a tax/rebate policy would hasten the transition to the post-petroleum era by creating an economic climate conducive to a broad range of private sector initiatives.

[The prepared statement of Robert H. Williams follows:]

STATEMENT OF ROBERT H. WILLIAMS, CENTER FOR ENERGY & ENVIRONMENTAL STUDIES, PRINCETON UNIVERSITY

SAVING THE AMERICAN AUTOMOBILE WITH A REBATED GASOLINE TAX

In this testimony I shall argue, to the contrary, that the levy of a rebated excise tax on gasoline can be key to securing a continuing major role in our transportation system for the personal, liquid-fueled automobile, a technology unmatched in providing high performance and mobility at reasonable cost. The arguments I shall put forth could be broadened into a rationale for a tax on all petroleum products. However, I shall not discuss the relative merits of a gasoline tax and a general petroleum tax. Instead I shall focus on a gasoline tax to illustrate not only how such a tax could be immediately effective in reducing U.S. dependence on insecure sources of foreign oil and in reducing the flow of U.S. dollars to foreign oil producers but also how it could spur dramatic innovations in automobile and automotive fuel technologies that are appropriate for the post-petroleum era.

The rationale for a gasoline tax involves the following elements:

First, the present emphasis in oil policy on the design of emergency measures aimed at reducing the adverse impacts of oil supply disruption addresses only part of the near term oil problem. Even if there were no more political upheavals in the Middle East, we face a virtually certain prospect of significantly reduced secure oil supplies over the next decade.

Second, efforts aimed at bringing forth new domestic energy supply alternatives will not have a significant impact on the oil problem before the 1990's.

Third, the oil crisis is primarily a crisis in the supply of high quality liquid fuels. Among the consumers of high quality liquid fuels, the automobile is particularly vulnerable to the prospect of reduced petroleum supplies over the next decade.

Fourth, a rebated gasoline tax can be an immediately effective response to the prospect of upward price movement that would be associated with a tightening of oil supplies:

1. The tax would reduce petroleum demand, and the rebate would direct revenues to the American people that would otherwise flow to foreign producers, and a rebate system designed to reward light users and penalize heavy users would be especially effective in reducing demand and would in general not be a burden on the poor.

Fifth, besides these near-term benefits a gasoline tax with an appropriately fashioned rebate scheme could powerfully hasten a transition to an automotive fleet with high fuel economy.

Finally, also a gasoline tax could be used to promote a shift in our highway fuels from petroleum to methanol, a synthetic fuel that is especially attractive from the perspectives of cost, automotive performance, national security, and the environment. A goal of fueling most if not all our cars with methanol by the turn of the century is not an unrealistic target, if the cars have high fuel economy.

I now wish to briefly discuss each of these points.

1. *The oil supply situation.*—U.S. crude oil production in the lower 48 states has fallen steadily by more than 20 percent from the 1970 peak of 11.1 million barrels per day to 8.7 million barrels per day in the first half of 1980 (see Figure 1). This decline has been masked, however, by Alaskan North slope production, which now contributes about 1.6 million barrels per day. All major government and industry forecasts envision that despite the decontrol of oil prices there will be a continuing net reduction of U.S. oil production in the near term future. The simple average of 8 major recent projections of which I am aware, and which are appended to my testimony, is that production will fall 15 percent (1.5 million barrels per day) by 1985 and by 22 percent (2.3 million barrels per day) by 1990 (1). The most recent of these projections, the October 1980 projections by the Office of Technology Assessment (OTA), is the most disquieting of all: a 17-30 percent (1.7-3.1 million barrels per day) reduction by 1985 and a 24-51 percent (2.7-5.0 million barrels per day) reduction by 1990 (2).

While making oil supply predictions is a very risky business, the more pessimistic domestic oil supply projections cannot be dismissed lightly. The more optimistic supply forecasts involve price-driven supply estimates that do not take adequate account of such factors as the recent disappointing drilling experience and the technical problems that will limit production via tertiary recovery techniques.

The OTA report points out that despite a dramatic increase in the price of domestic oil since 1973 there have been only modest increases in petroleum reserves associated with new discoveries. A major fraction of recent reserve additions is due instead to extensions of old reservoirs—extensions which can be expected to decrease as U.S. fields reach a more mature state of development.

While there are enormous remaining oil resources that could be made available using advance tertiary recovery techniques, the OTA forecasts that, largely because of technical problems associated with development of CO<sub>2</sub>-enhanced recovery technology, oil production via tertiary recovery will increase only relatively modestly, from 0.4 million barrels per day in 1979, to 0.5-0.9 million barrels per day in 1985 and 1.5-2.5 million barrels per day by 2000 (2).

One factor involved is OPEC's stated intention to cut back on oil production to conserve its finite oil resources (4). Another is the expectation that OPEC internal oil consumption will increase dramatically over the next decade as a consequence of rising incomes and astonishingly low oil prices (see Figure 3) (5).

What is particularly troublesome is that oil supplies available for export from major non-Arab OPEC sources are not likely to increase over the next decade and may well decrease. Table 1 shows that in the first half of 1980 nearly 40 percent of our oil imports came from relatively secure sources—Canada, Mexico, Nigeria, Venezuela, and Indonesia. The increased oil that will probably be available from Mexico in the future could well be more than offset by reduced oil availability from the other countries in this group.

The major supply initiative that has been taken to offset the prospect of diminished petroleum availability is the passage of the National Energy Security Act of 1980, which contains provisions for stimulating synthetic fuels production. This act established a federally owned Synthetic Fuels Corporation that would provide industry with \$20 billion in immediate subsidies and up to \$68 million in additional future subsidies in the form of purchase agreements, price guarantees, loans, loan guarantees, and government-industry partnerships. This Act targets the production of synthetic fuels in the amounts 0.5 million barrels of oil equivalent per day by 1987 and 2 million barrels/day by 1992. Many analysts believe that these targets are upper bounds on what is practically achievable by 1990; even if these targets could

be achieved, however, synfuels production would probably fall far short of closing the oil demand/supply gap that is likely to develop over the next 5-10 years.

2. *The future demand for high quality liquid fuels.*—Our petroleum crisis is primarily a supply crisis for high quality liquids—mainly gasolines, distillates, and liquefied petroleum gases. Among end uses the transportation sector, which accounts for about 70 percent of the total demand for high quality liquids, is particularly troublesome because of the limited opportunities for fuel substitution. And in the transport sector automobiles and light trucks are dominant, accounting for nearly 75 percent of the high quality liquids consumed in transportation.

Because of the central role of the automobile in our petroleum problem, Congress took action in 1975 to curb automotive fuel demand with the automotive fuel economy standards established in the Energy Policy and Conservation Act of 1975 (EPCA). The EPCA mandated that the average fleet fuel economy for new cars rise to double the 1975 level by 1985. However, because it takes time to "turn over" the automobile fleet, because of the rising number of cars, and because the on-the-road performance is not as good as the fuel economy in the mandated EPA test, the actual average fuel economy for all autos and light trucks is expected to be only 18 mpg in 1990, and light vehicle fuel use in 1990 is expected to be only 200,000 barrels per day less in 1990 than in 1980 (10). Thus the major effect of the 1975 fuel economy standards will be to keep automotive fuel requirements from rising. The automobile will remain particularly vulnerable to the prospect of sharply diminished petroleum supplies that are likely over the next 5-10 years.

3. *A Gasoline Tax in the Near Term.*—A gasoline tax could be immediately effective in reducing gasoline demand. Consumers would respond to the tax by cutting back on the unnecessary automobile use, by carpooling or vanpooling, by using buses more, and, when buying new cars, by choosing more fuel efficient models.

Since the purpose of an added gasoling tax is to curb the demand for gasoline—not generate increased revenues—the gasoline tax revenues should be returned to consumers. There are a wide range possibilities for doing this.

Since the purpose of a long term tax is to bring about a smooth transition to a long run situation where gasoline demand is considerably lower than today, the rebate should be designed to encourage new transportation habits consistent with this shift. For a given level of taxation, a rebate that increases with the capacity to consume gasoline would be less efficient in changing habits than one that is independent of this capacity. Thus, for example, while a rebate to owners of registered vehicles might be effective in minimizing dislocations in an emergency supply disruption, such a rebate would encourage consumers to hold onto a number of old clunkers. A tax rebated equally among adults, on the other hand, would be relatively efficient in fostering gasoline conserving habits.

In practice a rebate should be designed to achieve a balance between efficiency in promoting a change of habits and fairness.

In general there would be no conflict in the design of a rebate between the goals of efficiency in promoting gasoline conserving habits and fairness to the poor, simply because a typical poor household consumes less gasoline than the average household. Because nearly half of poor households have no cars and because those that do drive only about half as much as the average household, poor households would generally benefit from a tax that is rebated on a per adult basis.

But what about those groups and individuals especially dependent on the automobile? Even with a rebate the gasoline tax would of course be harsh for these people, but the impact could be cushioned by phasing in the tax. If it is decided, for example, that the tax should be as high as \$2 a gallon, the tax might be phased in over, say, a 4 year period, with increments of \$0.25 a gallon every 6 months. An announced preliminary schedule of phased tax increments would enable consumers to anticipate and plan for eventual very high gasoline prices.

Aside from the problems of special groups, a gasoline tax rebated equally among adults would be "fair" in the broader sense that the system would offer broad opportunities for "beating the tax." To illustrate this feature of the tax/rebate system, it is useful to introduce the concept of the "effective price" of gasoline, which I define as the total net expenditure for gasoline (the actual expenditure minus the rebate) divided by total gasoline consumption. Now suppose that the gasoline tax is raised to \$2 a gallon. By introducing the tax/rebate system the pump price of gasoline would increase from \$1.10 to \$3.00 a gallon, but the effective price would be less and would depend on the level of consumption. I have estimated that the rebate would amount to about \$730 per adult in the first year after a tax of this magnitude is levied (16). Figure 5 shows the effective price with this rebate for 2-adult households at different consumption levels: the typical poor, car-owning household would pay an effective price less than the pretax price (i.e., the rebate would be

greater than the amount paid in taxes); the typical lower middle income car-owning household would pay an effective price about equal to the pretax price.

Clearly no tax/rebate scheme will be perfectly fair. But a tax/rebate scheme decided by consensus in the U.S. political process is infinitely more fair than continuing "tax increases" by OPEC, for which the revenues cannot be rebated.

Because the question of fairness is key to the political acceptability of a gasoline tax, the rebate scheme should be worked out and perhaps legislation specifying how the gasoline tax revenues would be refunded should be passed before setting the level of the gasoline tax.

How large should the gasoline tax be? The level of tax depends on the desired level of oil demand reduction and how effective price will be in suppressing demand. If a demand reduction on the order of 1½ to 2 million barrels of gasoline per day is sought by the mid to late 1980's, then a tax in the range \$1 to \$2 a gallon appears to be needed. Unfortunately, economists do not know with precision how consumers will respond to higher prices. With a phased-in tax this uncertainty could be dealt with in practice by adjusting the levels of successive tax increments up or down from the originally proposed schedule in light of experience with previous increments, so as to keep the oil import reduction goal "on target."

The question of how large a demand reduction we should be seeking is much tougher to deal with. There is general agreement that domestic oil production will fall, but there is uncertainty about how much. The world oil supply situation is even cloudier.

I believe there is no purely analytical answer to the question of whether our imports should be reduced by 1 or 2 or 3 million barrels per day over the next several years. In the final analysis the import reduction goal and the associated tax should be set in the political process, taking into account both quantifiable and unquantifiable costs and values relating to our energy system. An important political consideration is that the levy of a stiff tax would enable the U.S. to demonstrate the seriousness of its commitment to dealing with the world oil crisis to its allies, many of whom already have stiff gasoline taxes: as of July 1980 the tax on regular gasoline was \$1.23 a gallon in West Germany, \$1.68 a gallon in France, and \$2.16 a gallon in Italy, compared to \$0.14 a gallon in the U.S. Also the decision-making process should take into account long range as well as short range issues in setting an import reduction target and in determining the appropriate tax level. A stiff excise tax on gasoline could powerfully influence the future course of automotive transportation.

When buying a new car the typical consumer will respond to the gasoline tax by buying a model with high fuel economy. The consumer who responds to a \$2 a gallon tax by trading in his 14 mpg gas guzzler for a new car with a 45 mpg fuel economy would pay no more per mile for gasoline taxed at \$2 a gallon than he paid for pre-taxed gasoline to run his old car. But can the average car buyer purchase such a car?

The VW Rabbit Diesel, with an interior volume only 20 percent smaller than that of the average U.S. car, has an on-the-road fuel economy of 42 mpg. Numerous studies have concluded that it is technically and economically feasible to raise the average on-the-road fuel economy of all new cars in the U.S. to 40-50 mpg in the 1990's (19). And it is feasible to go much further than this. Volkswagen is developing a four passenger car with a small three cylinder supercharged diesel engine which shuts off under coasting or idle conditions and is expected to have an EPA composite fuel economy of over 65 mpg (20).

Thus if there were a market for high fuel economy cars they could be produced. Some combination of fuel economy standards and a gasoline tax could bring about this shift to cars with high fuel economy. New post-1985 fuel economy standards are desirable to spur the development and introduction of truly high fuel economy cars (40-80 mpg), while a complementary tax would aid Detroit by reducing the uncertainty in the future demand for fuel efficient cars. A legitimate fear in the auto industry is that higher fuel economy standards by themselves may reduce sales, because many consumers may hold onto their old gas guzzlers longer than they otherwise would.

But a tax rebated to adults would mean instead increased sales and an accelerated transition to cars with high fuel economy. This effect can be seen in the graph (Figure 6) showing the effective gasoline price as a function of automotive fuel economy in the first year after raising the gasoline tax to \$2 a gallon. Note that for a two adult household driving the average amount at a fuel economy of 45 mpg, the effective gasoline price is minus \$1.50 a gallon—i.e., the rebate is much greater than the total amount paid for gasoline. As more and more people shift to fuel efficient cars, this incentive would diminish, because the amount of the rebate would decline.

Thus a gasoline tax rebated to adults would accelerate a transition to fuel efficient cars because it would powerfully reward those who first shift to fuel efficient cars.

The logic of using a gasoline tax to foster a transition to fuel efficient cars, while at the same time boosting domestic auto sales has not been lost to the leadership of the automobile industry, as indicated by Henry Ford's proposal for a \$.50 a gallon tax (21). A major question that should be addressed is whether Detroit could meet this challenge without some form of economic assistance to enable them to make the necessary investments.

If automotive fuel economy is not improved beyond the 1985 level mandated by Congress in 1975, then fuel consumption by automobiles and light trucks in 2000 would be only slightly less than in 1980 (see Table 3). But a doubling (tripling) of the fuel economy of new cars between 1985 and 1995 would lead to fuel savings of 2.6 (3.4) million barrels per day by the year 2000. Clearly a policy to foster a 2-3 fold increase in automotive fuel economy would be an effective response to the prospect of declining oil supplies.

4. *Toward a methanol economy.*—A gasoline tax could also be used to bring about a transition to methanol as a major fuel for automotive transportation. Methanol is particularly attractive as a synthetic automotive fuel for a number of reasons.

a. *Methanol use.*—Methanol is the fuel of choice in automotive racing, because it would be safer in a car crash than gasoline, and because of the increased power obtainable from the same engine compared to gasoline. Use of methanol in today's automotive engines can result in an energy efficiency improvement of 25 percent or more—largely because the fuel/air mixture can be leaner and because the methanol can be used at a higher compression ratio. While the toxicity of methanol is roughly comparable to that of gasoline, there would be net air quality gains in shifting automobiles from gasoline to methanol.

Methanol will probably be used as an automotive fuel first in fleets; at present there is considerable fleet testing of methanol cars in the U.S. (22). GM has announced that it could be ready to market straight methanol-fueled cars that use gasoline for starting in as soon as 5 years (23). To facilitate wider use of methanol, automobiles capable of operating on methanol or gasoline or diesel fuel could be brought to market in a few years (24).

b. *Methanol Production.*—Methanol can be produced from a variety of feedstocks. Present methanol production in the U.S. is based almost entirely on natural gas as a feedstock, because of its low cost, low sulfur content, and ease of handling. However, fully developed, commercially available technology can be deployed to produce methanol from coal. (In fact, coal was used as a feedstock for methanol before being displaced by low cost natural gas) (25). Moreover, methanol can also be made from urban refuse (26) and from biomass feedstocks (27).

Because of the dramatic increase in the world oil price over the last year or so, the production cost of methanol derived from coal, without the benefit of subsidies, is 60-100 percent of its value as an alternative to unleaded gasoline produced today, and this cost/value ratio will fall to 50-75 percent by the time oil prices are fully controlled in late 1981—even if there are no more real increases in the world oil price (see Table 4). Thus a coal-to-methanol industry is ready "to take off." A gasoline tax would accelerate the development of this industry.

Biomass has some important advantages over coal as a feedstock. It is renewable; it has a low sulfur content; it can be produced in many different areas where fossil fuels are scarce—from wood, crop residues, or grasses; and, perhaps most importantly in the long run, methanol derived from renewable biomass sources would lead to no net increase in atmospheric CO<sub>2</sub>. Today methanol can be derived from wood using commercially available technology, at a cost which is competitive with the alternative of gasoline derived from imported oil (see Table 5), but which is higher than the cost of methanol derived from coal (compare Tables 4 and 5). But commercially available technology for making methanol out of biomass feedstocks is modified coal technology, and is not optimized to exploit the unique characteristics of the biomass feedstock, which suggest significant opportunities for cost reduction (28). It is unclear whether coal or biomass would "win" in the long run, as production technology evolves. A gasoline tax would enable biomass based methanol to enter the market as a strong competitor to gasoline; the competition with coal, on the other hand, would spur innovations in biomass-based technologies.

A gasoline tax would have the effect of stimulating the creation of a highly competitive methanol industry that would bring downward pressure on gasoline prices. The methanol industry would involve a diversity of producers—perhaps oil, gas, and coal companies for coal and natural gas feedstocks; forest products companies for wood feedstocks; farmers cooperatives for grass and crop residue feedstocks; and municipalities for urban refuse.

One very important environmental advantage of a methanol economy in the long run is that if it becomes necessary to shift from fossil to biomass fuels because of the CO<sub>2</sub> problem, the transition would be much easier with methanol than with most other synthetic liquid fuels, because the production of methanol is an especially attractive way of utilizing both fossil fuel and biomass feedstocks. A transition to biomass could be brought about without disrupting the distribution and end use systems, perhaps by introducing a "CO<sub>2</sub> tax" at a time in the future when the CO<sub>2</sub> risk becomes more clearly defined.

How large a role could methanol play in our energy economy over the next 10-20 years? It is difficult to make projections. However, it is clear that methanol could meet a major fraction of automotive fuel requirements by the year 2000, if our cars had high fuel economy. A methanol production level of 2 million barrels per day (gasoline equivalent) by 2000 is not an unreasonable target; at this level of production methanol could meet two-thirds or more of the fuel requirements of automobiles and light trucks in the year 2000, if the average gasoline-equivalent fuel economy of new cars were greater than or equal to about 45 mpg by 1995 (see Table 3).

In conclusion substantial adjustments will have to be made in our energy economy to accommodate the prospect of rapidly decreasing oil supplies. While the central role of the automobile in our transportation system is particularly vulnerable in this bleak petroleum supply situation, the combination of substantially improved fuel economy of automobiles and a shift to methanol as an automotive fuel would assure a sustainable future for the liquid-fueled, personal automobile. But a transition to this more hopeful future will be slow and painful as long as we desperately cling to the past and fail to take bold initiatives. An especially attractive feature of a gasoline tax (or more generally a petroleum tax) for dealing with our chronic oil problem is that with this approach the government would not have to decide in advance what are the most promising technologies or become an entrepreneur. Rather a tax/rebate policy would hasten the transition to the post-petroleum era by creating an economic climate conducive to a broad range of private sector initiatives.

References

1. Domestic Oil Production (crude oil equivalent, including natural gas liquids):  
 First Half of 1980 (Actual) <sup>(a)</sup> (million barrels per day)  
 10.3

Projections	<u>1985</u>	<u>1990</u>
Office of Technology Assessment (October 1980) <sup>(b)</sup>	7.2-8.6	5.3-7.6
General Accounting Office (Dec. 1979) <sup>(c)</sup>	8.9	8.0
Congressional Budget Office (May 1980) <sup>(d)</sup>	9.4	8.6
Energy Information Administration (May 1980) <sup>(e)</sup>	9.1-9.3	9.3
Exxon (Dec. 1979) <sup>(f)</sup>	7.9	6.1
Shell (June 1980) <sup>(g)</sup>	8.5	8.4
Scallop Corporation (July 1980) <sup>(h)</sup>	9.2-9.7	8.0-8.5
Petroleum Industry Research Foundation (May 1980) <sup>(i)</sup>	<u>9.4</u>	<u>9.0</u>
SIMPLE AVERAGE	8.8	8.0

Notes

- (a) "Monthly Energy Review," September 1980
- (b) Office of Technology Assessment, World Petroleum Availability 1980-2000, a Technical Memorandum, October 1980.
- (c) Report by the Controller General to the Congress of the United States, "Analysis of Current Trends in U.S. Petroleum and Natural Gas Production," United States General Accounting Office, December 7, 1979.
- (d) Congressional Budget Office, "The World Oil Market in the 1980's: Implications for the United States," May 1980.
- (e) Energy Information Administration, Annual Report to Congress 1979.
- (f) Exxon Company, "U.S.A.'s Energy Outlook, 1980-2000," December 1979.
- (g) "Shell: U.S. Oil Use to Hit 17.2 - Million - B/D Plateau in '80's," Oil and Gas Journal, June 9, 1980.
- (h) Scallop Corporation, "World Oil Outlook," July 1980.
- (i) Petroleum Industry Research Foundation, Inc., "Oil in the U.S. Energy Perspective - a Forecast to 1990," May 1980.

2. Reference 1(b).
3. American Petroleum Institute, Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas in the United States and Canada, vol. 32, p. 10 and vol. 33, p. 10.
4. OPEC Secretary-General Rene Ortiz has warned that regardless of the world oil price OPEC will begin cutting back its oil production because of concerns about the gradual depletion of its reserves (OPEC Bulletin, p.47 May 1980). The U.S. Energy Information Administration projects in its midprice scenario that OPEC production will fall from 30.5 million barrels per day in 1978 to 26.3 million barrels per day by 1990 (Annual Report to Congress 1979, Volume 3).
5. A recent OPEC analysis projects that OPEC oil consumption will rise from 2.2 million barrels per day in 1978 to 6.3 million barrels per day by 1990 ("Domestic Energy Requirements in OPEC Member Countries," OPEC Papers, vol. 1, no. 1, August 1980). The implied annual growth rate (9.4% per year) is somewhat less than the growth rate for the decade 1968-1978 (12.0% per year). Very low oil prices are an important factor in driving up demand. As of July, 1979, regular gasoline prices were 13¢ a gallon in Venezuela and 19¢ a gallon in Saudi Arabia (Energy Information Administration, International Petroleum Annual 1978). If the OPEC consumption projection is adjusted so that there is no net increase in consumption between 1980 and 1990 for Iran and Iraq, the 1990 level becomes instead 5.0 million barrels per day, which is, coincidentally, the level projected by the U.S. Energy Information Administration (Annual Report to Congress 1979, Volume 3).
6. Energy Information Administration, International Petroleum Annual 1978, April 11, 1980.
7. A recent OPEC publication ("Domestic Energy Requirements in OPEC Member Countries" - see note 5) makes the following projections for oil exports, in millions of barrels per day:



	1980			1990		
	Production Plateau	Consumption	Exports	Production Plateau	Consumption	Exports
Nigeria	2.20	0.17	2.03	2.20	0.42	1.78
Indonesia	1.65	0.39	1.26	1.65	0.91	0.74
Venezuela	<u>2.40</u>	<u>0.32</u>	<u>2.08</u>	<u>2.05</u>	<u>0.79</u>	<u>1.26</u>
Totals	6.25	0.88	5.37	5.90	2.12	3.78

8. Robert H. Williams, "Removing Regulatory Barriers to Cogeneration," testimony before the Subcommittee on Energy Development and Applications of the House Committee on Science and Technology, July 22, 1980.
9. It has been estimated that for an investment of \$18 billion U.S. refineries could be upgraded over a 4-10 year period to reduce residual fuel production by 1.6 million barrels per day and to increase gasoline and diesel fuel production by 0.5 and 0.6 million barrels per day respectively. A byproduct of this upgrading would be the annual production of 0.5 Quads of low Btu gas. See An Analysis of Potential of Potential for Upgrading Domestic Refining Capacity, report prepared by Pervin and Getz, Inc. for the American Gas Association, 1980.
10. "Light Duty Vehicle Fuel Consumption Model: Recent Modification in the Input Data and Methodology and Resulting Changes in Estimates of Fuel Demand," Office of Policy and Evaluation, U.S. Department of Energy, April 19, 1979.
11. John B. Andersen, "For a Tax of 50 Cents On Gas," The New York Times, Op Ed Column, August 28, 1979.
12. Senator Bennett Johnston's proposal of an emergency gasoline tax as an alternative to coupon rationing is set forth in the draft bill S.2570, the Emergency Motor Fuel Demand Rationing Act of 1980. See The Congressional Record, pp. S3760-S3767, April 16, 1980.
13. Clark Bullard's proposal is described in the paper, W.V. Chandler and H. L. Gwin, "Gasoline Consumption in an Era of Confrontation," in ref. 14.

14. The Dependence Dilemma: Gasoline Consumption and America's Security, Daniel Yergin, ed., Harvard University Center for International Affairs, 1980.
15. Carmen Difiglio, "Economic Allocation of Gasoline Shortages," paper prepared for the National Energy Users Conference for Transportation, Transportation Research Board, San Antonio, Texas, April 13-16, 1980.
16. R.H. Williams, "A \$2 a Gallon Political Opportunity," in ref. 14.
17. David L. Greene, "An Investigation of the Variability of Gasoline Consumption Among States," ORNL-5391, April 1978.
18. The following data on cars, drivers, residential location, and car mileage by income class (1972-73) are obtained from D.K. Newman and D. Day, The American Energy Consumer, report to the Ford Foundation's Energy Policy Project, Ballinger, Cambridge, 1975:

Cars, drivers, location, and mileage	Poor	Lower middle	Upper middle	Well off
All households	100	100	100	100
Cars				
No car	47	16	4	1
1	37	52	35	21
2	14	25	51	58
3 or more	2	7	10	21
Drivers				
None	34	12	2	1
1	43	39	33	7
2 or more	23	50	85	92
Drivers all households w/cars				
None	2	1	<sup>a</sup>	1
1	57	41	11	7
2 or more	41	58	89	92
Residential location				
Inside metro area	56	68	71	82
Central city	39	39	24	24
Ring	17	29	47	58
Outside metro area	44	32	29	18
Miles driven in past year <sup>b</sup>				
Less than 10,000	64	39	15	12
10,000-14,999	17	27	18	15
15,000 or over	20	35	67	72
		Median miles		
Miles driven in past year	8,000	12,000	18,000	20,000

<sup>a</sup>Less than 0.5 percent.

<sup>b</sup>For all cars owned 12 months or more and for which mileage was reported.

19. See, e.g., Frank von Hippel, "Forty Miles a Gallon by 1995 at the Very Least: Why the U.S. Needs a New Automotive Fuel Economy Goal," in The Dependence Dilemma: Gasoline Consumption and America's Security, Daniel Yergin, ed., Center for International Affairs, Harvard University, 1980.
20. U. Seiffert, P. Walzer, and H. Oetting (representing Research and Development, Volkswagenwerk AG, Wolfsburg, Germany), "Improvements in Automotive Fuel Economy," paper presented at the First International Fuel Economy Research Conference, October 30-November 1, 1979, Washington, D.C.
21. "Henry Ford Joins Gasoline Tax Advocates," The SocioEconomic Newsletter, vol. V, No. 8, published by The Institute for Socioeconomic Studies, White Plains, New York August 1980.
22. Most notably the Bank of America is road-testing methanol as a fuel for its 1500 car courier fleet in California.
23. This statement was made recently by Nicholas Gallopoulos, Assistant Head of GM Laboratories fuels and lubrications department. See "GM Sees Major Methanol Use, But Prefers Shale/Coal-Based Hydrocarbons," Alcohol Week, pp. 6-7, October 20, 1980.
24. An engine that is compatible with a wide range of fuels without major modification or adjustment is the White/Texaco Controlled-Combustion System (TCCS) stratified-charge design. This engine, which is essentially a spark-ignited diesel engine, has a fuel economy roughly comparable to that of a conventional diesel engine. Recently a TCCS engine installed in a 2800 lb 1977 Gremlin X was tested on a variety of fuels, including methanol, for fuel economy and emissions, by the Bartlesville Energy Technology Center of the U.S. Department of Energy (R. N. Ware, "Performance Evaluation of a Stratified-Charge Engine Powered Automobile," September 23, 1980). For this test ignition and injection timing settings were the same as recommended for gasoline. No changes were made in the fuel metering system to compensate for the decreased energy content of methanol. The urban fuel economy for operation on methanol (as measured in the EPA test procedure) was determined to be 15.2 mpg - or a

gasoline-equivalent fuel economy of 32 mpg. Hydro-carbon emissions were slightly less per mile and CO emissions were about 70% less with methanol than with gasoline.

25. A. W. Scaratt, "The Carburation of Alcohol," Society of Automotive Engineers Transactions, 1921.
26. Mathematical Sciences Northwest, Inc., "Feasibility Study: Conversion of Solid Waste to Methanol or Ammonia," MSNW No. 74-243-1, prepared for the City of Seattle, September 6, 1974.
27. The Office of Technology Assessment, Energy From Biological Processes, 1980.
28. J. R. Moreira and R. H. Williams, "The Long Term Prospects for Alcohol Fuels," draft report prepared for the Solar Energy Research Institute, fall 1980.
29. Frank von Hippel, "Future Energy Demand in U.S. Transportation," draft report to the Solar Energy Research Institute, fall 1980.

Table 1. U.S. Petroleum Imports by Source, First Half of 1980

	(million B/D)
Arab OPEC	2.78
Nigeria	0.95
Venezuela	0.44
Indonesia	0.37
Other OPEC	0.07
SUBTOTAL OPEC	<u>4.61</u>
Canada	0.46
Mexico	0.53
Other non-OPEC	1.71
SUBTOTAL NON-OPEC	<u>2.70</u>
TOTAL IMPORTS	7.31

Source: Energy Information Administration, Monthly Energy Review, September 1980.

Table 2 Distribution of Petroleum Use in the U.S. Economy in 1978 (1)<sup>(a,b)</sup>

	<u>Transportation</u>	<u>Residential and Commercial</u>	<u>Industrial</u>	<u>Electric Utilities</u>	<u>TOTALS</u>
<u>High Quality Liquids</u> (c)					
Motor Gasoline	36.69 (52.83)	0.29 (0.42)	0.45(0.65)	-	37.42 (53.88)
Distillate Fuel Oil	6.87 ( 9.89)	8.19(11.79)	3.03(4.36)	1.11 (1.60)	19.23 (27.69)
Jet Fuel	5.61 ( 8.08)	-	-	0.08 (0.12)	5.69 ( 8.19)
Liquefied Gases	0.08 ( 0.12)	3.32 (4.78)	2.05(2.95)	-	5.45 ( 7.85)
Kerosene	-	0.66 (0.95)	0.29(0.42)	-	0.95 ( 1.37)
Special Naphthas	-	-	0.53(0.76)	-	0.53 ( 0.76)
Aviation Gasoline	<u>0.18 ( 0.26)</u>	-	-	-	<u>0.18 ( 0.26)</u>
SUBTOTALS	49.4 (71.2)	12.5 (17.9)	6.4 (9.1)	1.2 (1.7)	69.5 (100)
<u>Byproducts and Special Products</u>					
Residual Fuel Oil	2.90 ( 9.51)	2.71 (8.88)	3.82(12.52)	8.82 (28.91)	18.28 (59.91)
Petrochemical Feedstocks	-	-	3.21(10.52)	-	3.21 (10.52)
Still Gas	-	-	3.16(10.36)	-	3.16 (10.36)
Asphalt	-	3.00 (9.83)	-	-	3.00 ( 9.83)
Petroleum Coke	-	-	1.45( 4.75)	0.03 ( 0.08)	1.47 ( 4.82)
Lubricants	0.47 ( 1.55)	-	0.53( 1.73)	-	1.00 ( 3.28)
Waxes	-	-	0.08( 0.26)	-	0.08 ( 0.26)
Seed Oils	-	0.05 (0.16)	-	-	0.05 ( 0.16)
Misc. Products	-	-	<u>0.26( 0.86)</u>	-	<u>0.26 ( 0.86)</u>
SUBTOTALS	3.4 (11.1)	5.8 (18.9)	12.5 (41.0)	8.8 (29.0)	30.5 (100)
TOTALS	52.8	18.3	18.9	10.0	100

Notes

- (a) The first number shown for each entry is the percentage of total U.S. petroleum use associated with the fuel form(s) and end use sector(s) indicated.
- (b) Source: Energy Information Administration, Annual Report to Congress 1979, vol. 2.
- (c) The second number shown for each entry (in parenthesis) is the percentage of total high quality petroleum liquids consumption associated with the fuel form(s) and end use sector(s) indicated.
- (d) The second number shown for each entry (in parenthesis) is the percentage of total byproducts and special products consumption associated with the fuel form(s) and end use sector(s) indicated.

Table 3. The Impact of Improved Fuel Economy on Future Light Vehicle Fuel Requirements(a)

Average New Car Fuel Economy for 1995 (mpg) (b)	Projected Fuel Consumption of Autos and Light Trucks in the Year 2000(c) (million barrels per day of gasoline equivalent)
21	5.8
42	3.2
63	2.4

Notes

- (a) If the number of autos and light trucks per adult were to increase 20% between 1979 and the turn of the century there would be about 185 million of these light vehicles in the U.S. by the year 2000. Assuming that each is driven  $10^4$  miles per year on the average this corresponds to  $1.85 \times 10^{12}$  vehicle miles.
- (b) Congress in 1975 mandated that the corporate average fuel economy (CAFE) of new cars, as measured by a prescribed EPA testing procedure, must be 27.5 mpg by 1985. However, actual on-the-road performance is generally not as good as the EPA test result. Also the "light truck loophole" in the CAFE standard lowers the average performance of the auto/light truck fleet. As a result, the actual average fuel economy of new vehicles is expected to be only 21 mpg in 1985. If the new car fuel economy did not subsequently change then the on-the-road fuel economy of all cars would be 21 mpg in 2000. If, however, the CAFE of new cars were to double (triple) between 1985 and 1995 the result would be an average on-the-road fuel economy of 38 mpg (51 mpg) for all cars and light trucks in 2000. For details see ref. (29).
- (c) For comparison gasoline and diesel fuel consumption by automobiles and light trucks is estimated to be 6.4 million barrels per day in 1980. See Office of Conservation Policy and Evaluation, Department of Energy, "Summary of Post-1985 Automobile Fuel Economy Technology and CAFE Impacts - Preliminary Analysis," April 30, 1980.

Table 4a Production Cost Estimates for Methanol from Coal  
(1979 cents per gallon)

Gas Research Institute <sup>(a)</sup>	38 - 57
Office of Technology Assessment <sup>(b)</sup>	35 - 56
Energy Transition Company <sup>(c)</sup>	35 - 40

Table 4b Value of Methanol (1979 cents per gallon) as an Alternative to Unleaded Gasoline (d) Derived From:

	<u>Domestic Oil</u> <sup>(e)</sup>	<u>Imported Oil</u> <sup>(e)</sup>	<u>Composite</u> <sup>(e)</sup>
1976	25	38	31
1977	25	39	32
1978	26	36	31
1979	32	49	40
May 1980	50	72	58

Notes

(a) B.S. Lee, "Synthetic Fuels and the Total Cost of Oil Imports," A.G.A. Monthly, October 1980.

(b) Office of Technology Assessment, Energy from Biological Processes, Fall 1980. (See Table 9: Estimated Costs in 1979 Dollars of Alternative Liquid Fuels, p. 103.)

(c) This is the estimated production cost for a 5000 tons per day fuel-grade methanol plant that might be built in northwest Colorado by the W.R. Grace and Company. The feasibility study for the project is being carried out by Energy Transition Company (ETCO). The estimated cost is based on strip-mined coal @ \$0.50 per million Btu and 75/25 percent debt/equity financing. The Grace-ETCO methanol project would use high temperature, atmospheric pressure coal gasifiers, commercially available from Koppers Co. in Pittsburgh. See Richard Myers, "Grace Announces Coal-to-Methanol Project," The Energy Daily, Friday, February 8, 1980.

(d) This is the value of methanol at the methanol production plant gate, based on a comparison with the refiners' price for unleaded gasoline. In 1979 the refiners' price for unleaded gasoline was 67.5¢ per gallon of unleaded gasoline, or 1.6 times the average refiners' crude oil acquisition cost (42.2¢ per gallon of crude oil). Methanol (at 55,700 Btu/gallon, lower heating value) is today worth at least 25% more than gasoline (at 117,000 Btu/gallon, lower heating value) as an automotive fuel than a comparison based on Btu content would indicate, because with methanol fuel today's automotive engines can be operated at a higher compression ratio and with a leaner fuel/air mixture. Thus it is assumed here that the value of methanol is given by

$$\text{Value of methanol, in c/gallon} = 1.25 \times \frac{55,700}{117,000} \times 1.6 \times (\text{refiners' acquisition cost of crude oil, in c/gallon})$$

(e) From Energy Information Administration, Monthly Energy Review, August 1980, the following crude oil acquisition costs (in 1979 cents per gallon) are obtained:

	1976	1977	1978	1979	May 1980
Domestic	26.0	26.6	27.8	34.0	52.0
Imported	39.7	40.4	37.7	51.6	75.6
Composite	32.1	33.3	32.3	42.2	61.3

(Here the GNP deflator has been used to convert prices in current \$ to 1979 \$.)

Table 5 Cost for Methanol Production from Wood in the U.S. (a)

Cost of Wood (\$/10 <sup>6</sup> Btu)	1	2	3	4
Components of Methanol Production Cost (1979 ¢/gallon)				
Wood <sup>(b)</sup>	13.0	26.0	39.0	52.0
Labor, water, chemicals	2.6	2.6	2.6	2.6
Electricity	15.2	15.2	15.2	15.2
Fixed Investment <sup>(c)</sup>	23.1	23.1	23.1	23.1
Working Capital <sup>(d)</sup>	<u>1.9</u>	<u>1.9</u>	<u>1.9</u>	<u>1.9</u>
TOTAL COST (¢/gallon)	55.8	68.8	81.8	94.8
TOTAL COST (\$/10 <sup>6</sup> Btu) <sup>(e)</sup>	10.0	12.40	14.70	17.00

#### Notes

(a) Unless otherwise indicated, the cost estimates presented here are based on an OTA analysis of methanol production from wood using oxygen gasification for a plant with a capacity to produce 122,000 gallons of methanol per day, operated 330 days per year. See Table 46 in Chapter II ("Thermochemical Conversion") of volume II of Energy from Biological Processes, Office of Technology Assessment of the Congress of the United States, 1980.

(b) The technology described in ref. (a) converts wood into methanol with a conversion efficiency of 42.5%.

(c) The plant described in ref. (a) requires a fixed investment of \$80 million. For a 20 year plant life, 50/50 debt equity/financing (costing, after correcting for inflation, 3% per year and 10% per year for debt and equity respectively), double declining balance depreciation, a 10% investment tax credit, and a property tax rate of 2%, the annual capital charge rate is 0.116.

(d) As in ref. (a) working capital is assumed to be 10% of the fixed capital. It is treated as a non-depreciating asset so that with 50/50 debt/equity financing the annual capital charge rate is 0.097.

(e) For methanol with a lower heating value of 55,700 Btu/gallon.



FIGURE 1

U.S. DOMESTIC OIL PRODUCTION

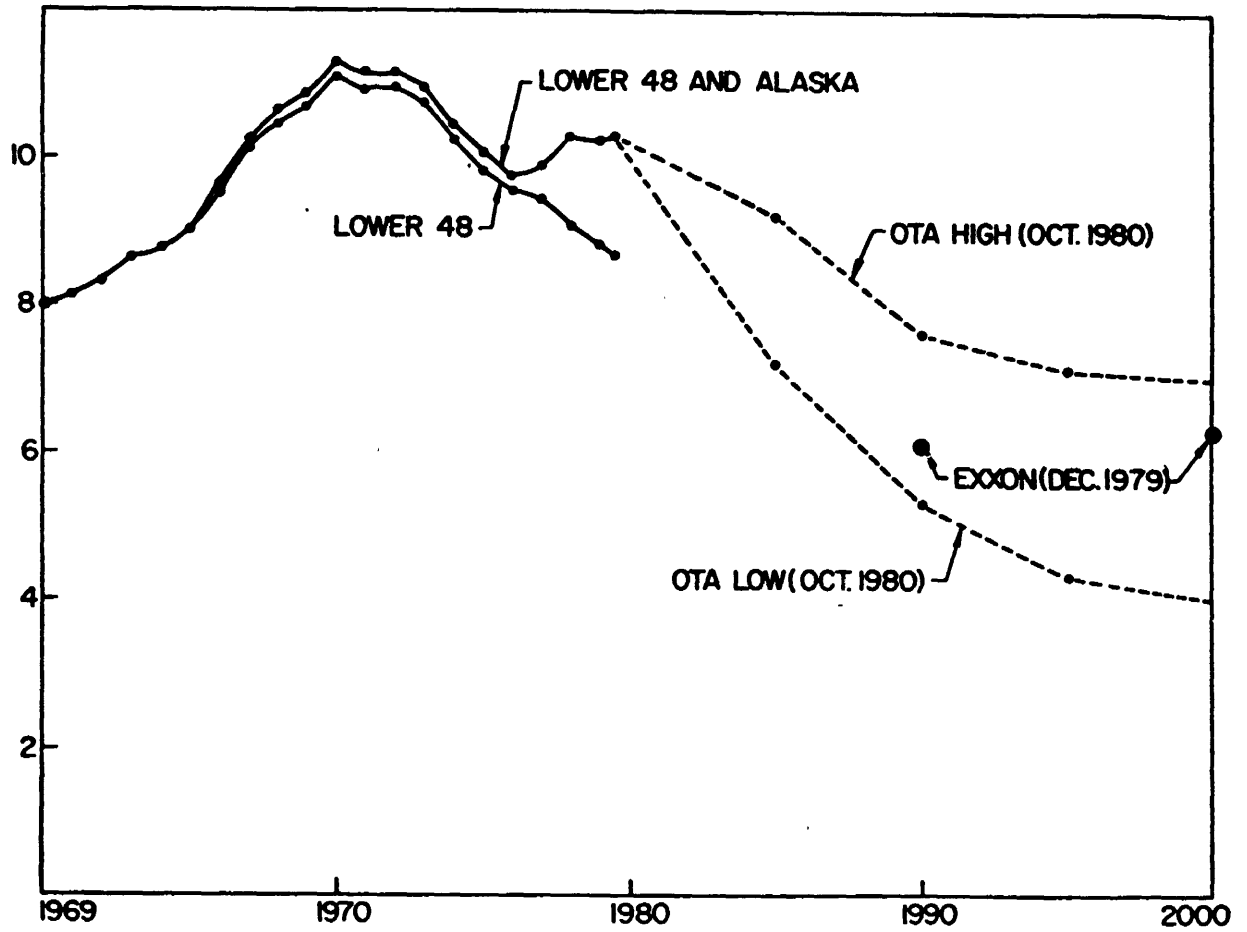


FIGURE 2

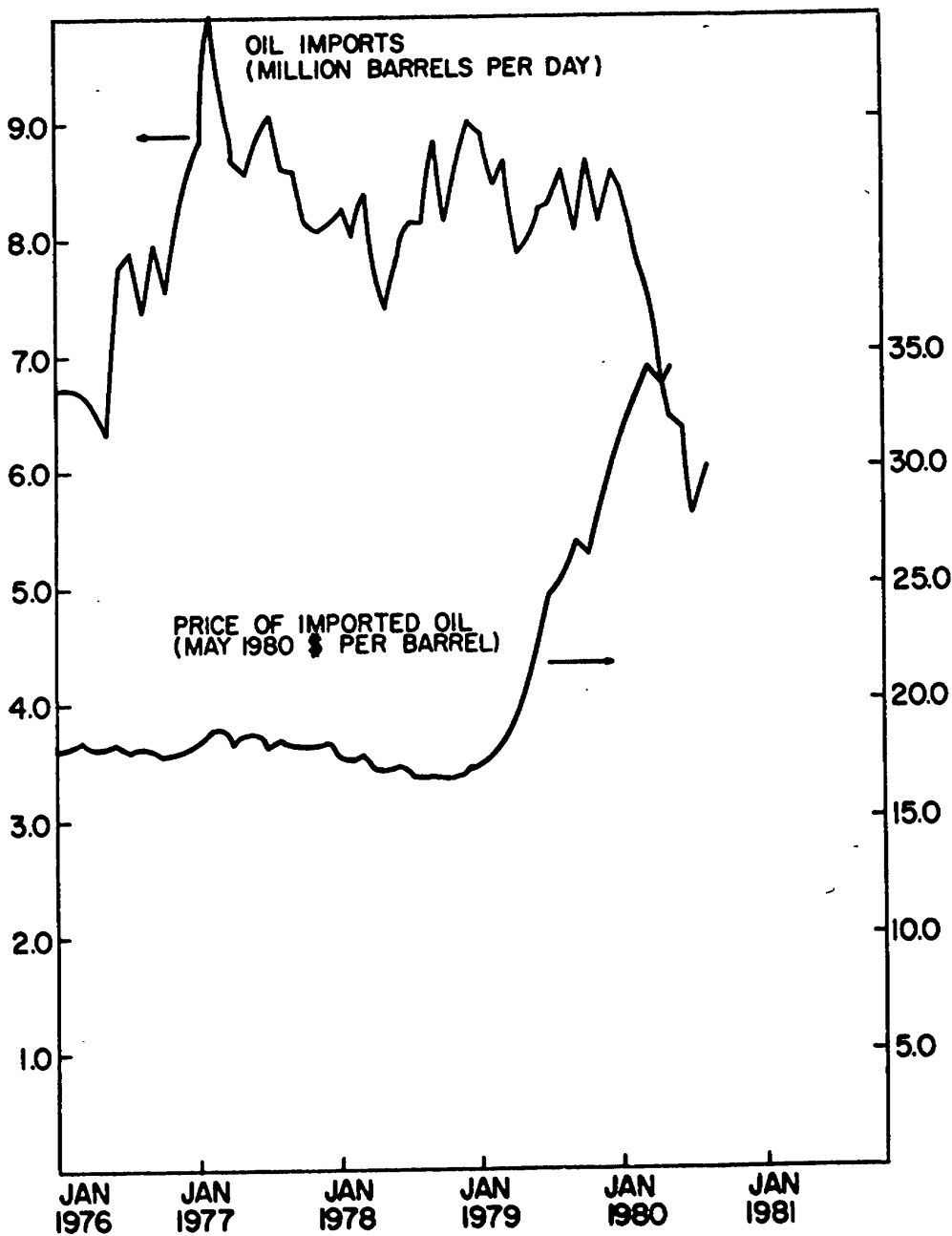
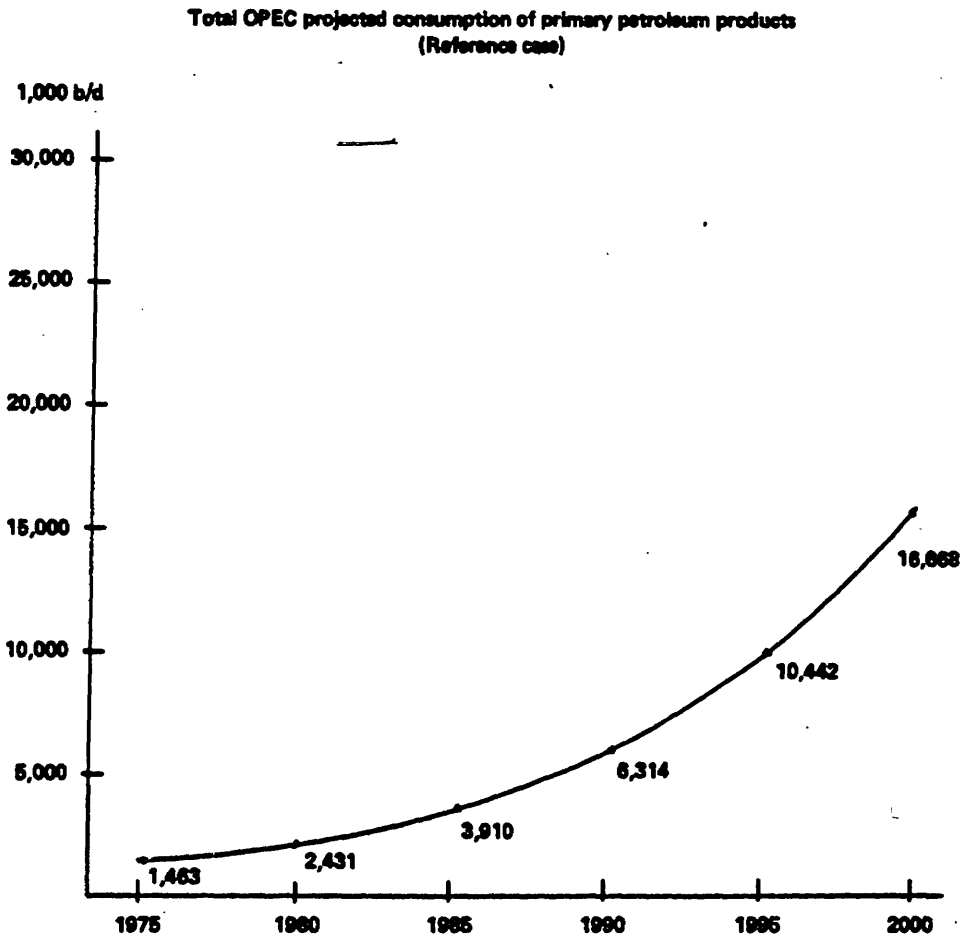


Figure 3



Source: "Domestic Energy Requirements in OPEC Member Countries," OPEC Papers, vol. 1, no. 1, August 1980

FIGURE 4

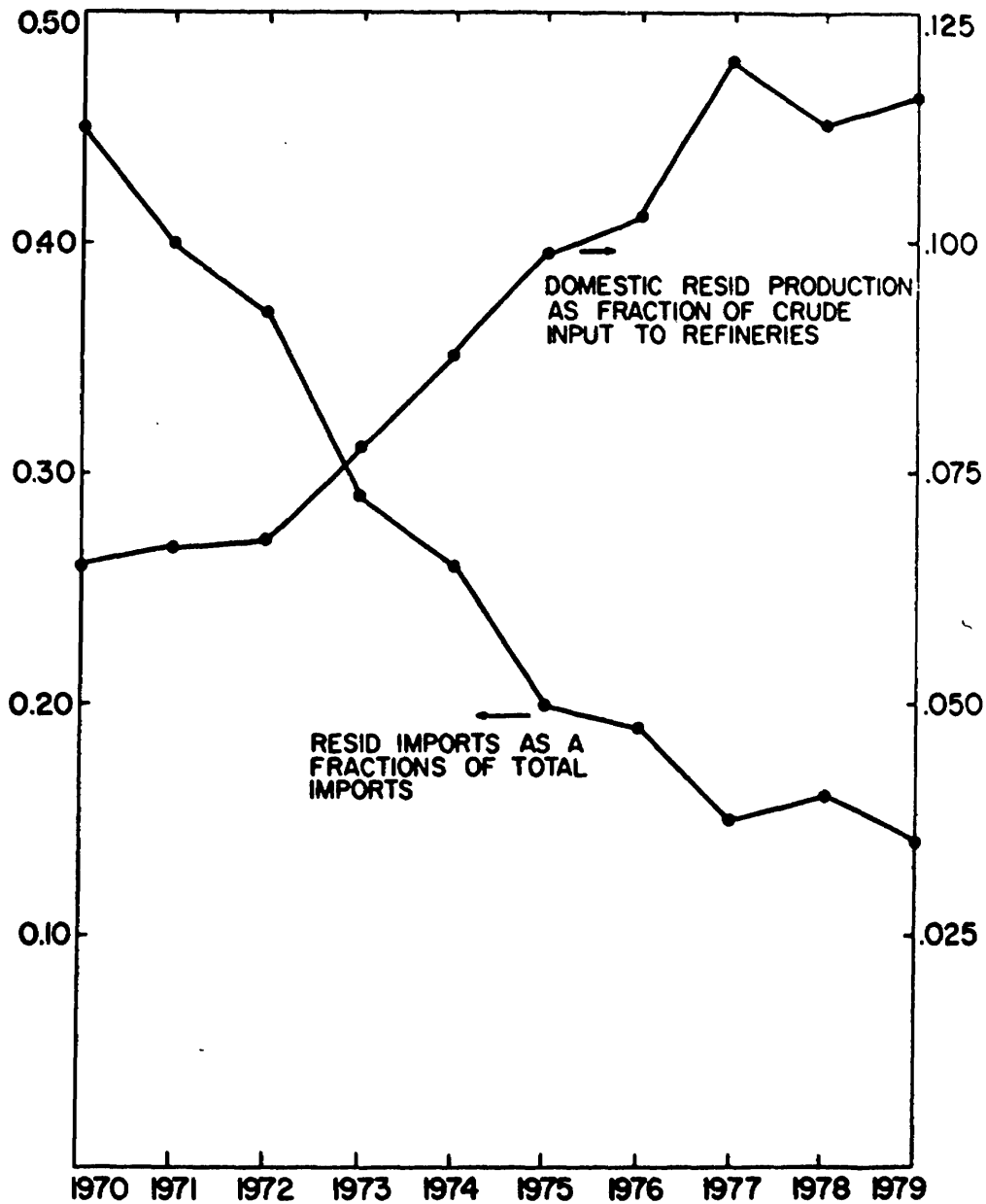
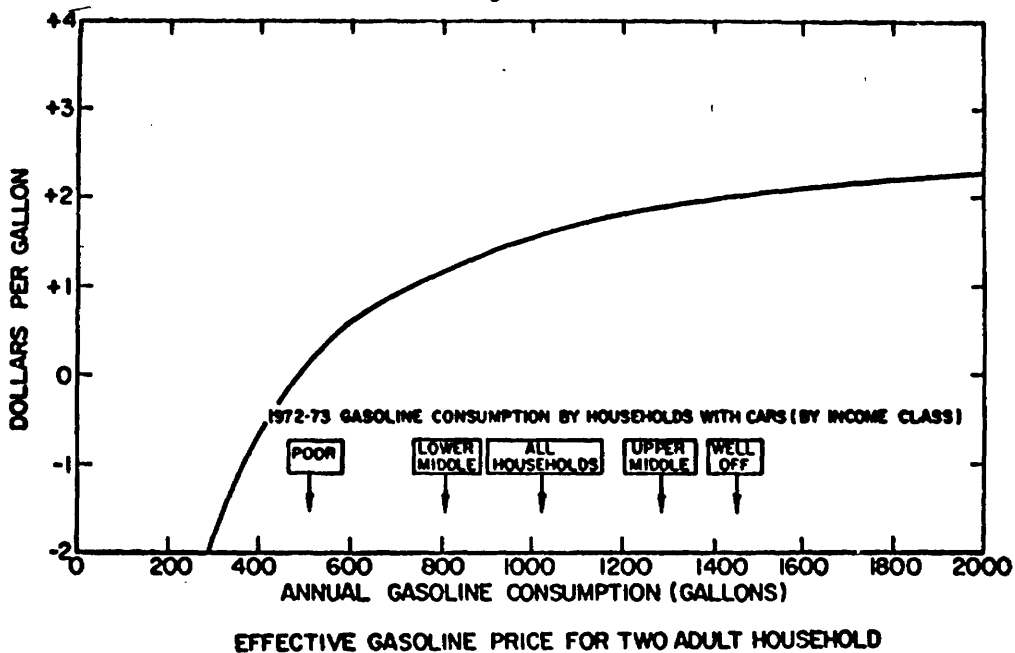
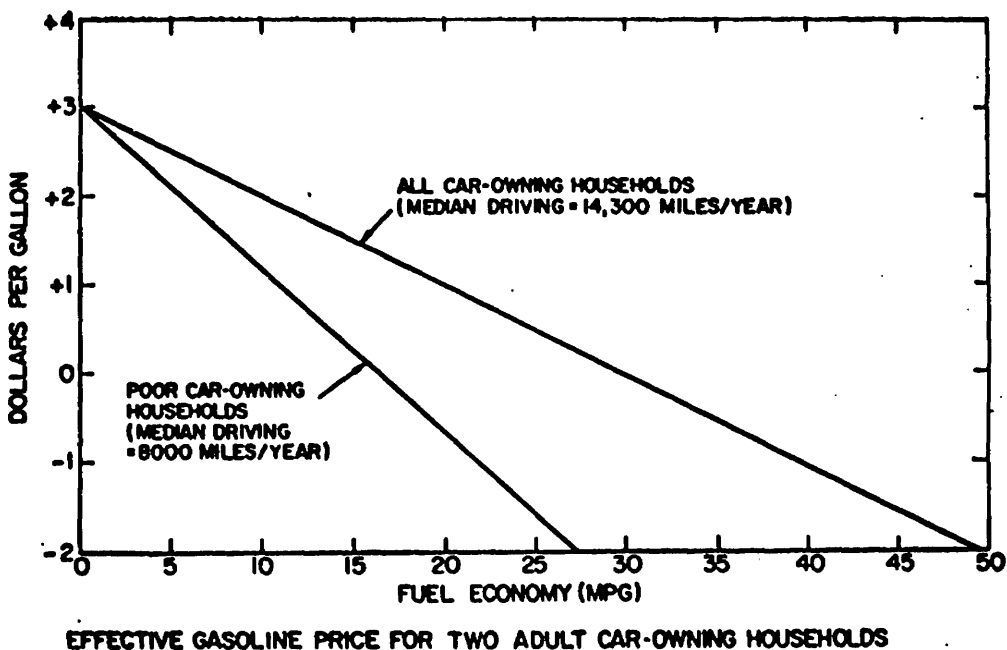


Figure 5



Source: Ref. 16

Figure 6



Source: ref. 16

Senator BRADLEY. Thank you, Mr. Williams.  
Mr. Plummer.

**STATEMENT OF JAMES L. PLUMMER, DIRECTOR, ENERGY ANALYSIS DEPARTMENT, ELECTRIC POWER RESEARCH INSTITUTE**

Mr. PLUMMER. This prepared statement draws partly upon the policy analysis contained in a forthcoming book called "Energy Vulnerability," which is the product of a year-long research effort by myself and nine coauthors. Policy conclusions are summarized here in outline form, without the supporting analysis contained in the book.

Moreover, this statement includes some policy areas not covered in the book, and thus my coauthors should not be associated with the opinions here expressed. I should emphasize that the opinions I am stating here today are my own and do not represent positions by the Electric Power Research Institute or the electric utility industry.

The term "energy vulnerability" refers to the near-term problems of world oil supply disruptions and overdependence on oil imports, as opposed to the long-term energy problems of resource depletion and transition to new technologies.

Let me first address the subject of tariffs versus oil stockpiling. Stockpiling is much more important and urgent than oil import reduction. Our modeling indicates that the economic premium for adding a barrel of oil to the stockpile is in the range of \$20 to \$80 per barrel, whereas the premium for oil import reduction is in the range of \$10 to \$30 per barrel.

In rough terms, it could be said that stockpiling is now about three times more valuable than oil import reduction. This ratio will go down as the United States is able, if it is able, to build up the size of its stockpile.

Senator BRADLEY. What size do you advocate?

Mr. PLUMMER. For which?

Senator BRADLEY. For the U.S. stockpile.

Mr. PLUMMER. Our results indicate an optimal stockpile on the order of 2 billion barrels.

Senator BRADLEY. Two billion barrels?

Mr. PLUMMER. As opposed to the present goal of 750 million barrels and the present reality of 92 million barrels.

Senator BRADLEY. A long way to go.

Mr. PLUMMER. And moreover, because we have not included all of the categories of costs, I would say that the optimal stockpile size is probably in excess of 2 billion barrels.

A tariff is mainly relevant to oil import reduction, although it will also have a small effect in reducing disruption losses by lowering the import level at the start of a disruption. Adding a barrel of oil to the oil stockpile and having it available during a disruption has 8 to 12 times greater impact in reducing expected disruption losses than having one barrel lower import level at the start of a disruption.

Senator BRADLEY. Why is it 8 to 12 times greater? Could you amplify that a little bit?

Mr. PLUMMER. Because disruption losses are more a function of the level of consumption of oil than the level of import of oil. For instance, if one achieves oil import reduction totally by increasing production rather than reducing consumption, you really haven't helped yourself very much in terms of reducing potential disruption losses.

So stockpiling is a much more efficient instrument in reducing disruption losses than oil import reduction.

Senator BRADLEY. All right.

Mr. PLUMMER. A high stockpile fill rate has some of the same beneficial effects as a tariff, plus other advantages. A higher fill rate adds to the demand for imported oil during nondisruption years, and thus has some impact in raising the world oil price and the domestic price.

The higher price to consumers of petroleum products stimulates conservation in the same way as a tariff. Also, because the fill rate should drop to zero at the onset of a disruption, this snapback of the import demand function also represents a cushion against disruption losses which is additive to the cushioning effect of the stockpile drawdown rate. Thus, in a world of more frequent disruptions, the fill rate can serve as an automatic stabilizer.

A disruption tariff would be a partial substitute for stockpiling, if it weren't macroeconomically undesirable. If a disruption tariff was legislated before the disruption occurred, and went into effect automatically, the demand-reducing impacts of the disruption tariff would obviate the need for as much stockpile drawdown.

Unfortunately, it may not be possible to design a macroeconomically acceptable disruption tariff, with or without rebate features. The microeconomic losses from world oil supply disruptions derive from the sudden runups in oil prices. These large oil price increases cause a frantic scramble to substitute other fuels and other nonenergy resources for oil throughout the economy.

Because only limited substitution is possible in the short term, real output declines. The direct microeconomic losses are multiplied by indirect macroeconomic losses. Downward wage rigidity, anti-inflation reactions by the Federal Reserve Board, and increases in transactions demand for money all add to the loss of real output.

Our analysis indicates that indirect macroeconomic losses are probably 1.5 to 3 times greater than the direct microeconomic loss. In this context, the last thing in the world that the economy can stand during a disruption is a further increase in oil prices from a disruption tariff on top of the increases in world oil market prices.

Schemes for rebating disruption tariff revenues to taxpayers in general will probably not sufficiently limit the direct and indirect losses of output in those sectors most adversely impacted by the sharp oil price increases.

I should add that this is a conclusion that we did not expect when we started our research, and we almost regret it because it doesn't leave us with very many instruments to use.

Senator BRADLEY. How did you determine the microeconomic losses? That's at the firm level, the disruption of oil causes the firm not to be able to function as many days or have a higher price for

energy, and therefore less money to spend on other aspects of the production process? Is that what the microeconomic loss is?

Mr. PLUMMER. That's correct. As the price of energy inputs rises relative to other inputs, the reaction is to lower output.

Senator BRADLEY. You say you didn't expect that result? Was the microeconomic aspect of it the startling thing or the macroeconomic?

Mr. PLUMMER. It was the macroeconomic that was the startling thing. The micro losses have been dealt with.

Senator BRADLEY. What is the level of interruption? Is this true for all levels? Is it 2 million, 3 million, 12 million? Is it less so for 3 million than for 10 million?

Mr. PLUMMER. Yes; it is a nonlinear function, definitely. So the 10-million-barrel-per-day disruption is more than three times worse than a 3½-million-barrel-per-day disruption.

Senator BRADLEY. But your analysis of the macroeconomic drag, basically, on the economy is relevant for a 3 million barrel loss? A disruption tariff in this analysis won't help at the 3 million barrel interruption level?

Mr. PLUMMER. I want to qualify that a bit. In the situation that we are in right now, with almost no stockpile to rely upon, if we have a more or less permanent disruption at the 3-million-barrel-per-day level, which is what we may well face in the circumstances in the next few months, use of a disruption tariff at a limited level is better than no action at all.

Senator BRADLEY. But stockpiling, even at the 3-million-barrel-a-day level, is better than a disruption tariff?

Mr. PLUMMER. As a preparatory policy, it is much better. But if you are hit by a 3-million-barrel-a-day disruption when you have no stockpile and you have no other instruments to use, a disruption tariff is more effective than, for instance, a gasoline tax.

Senator BRADLEY. All right.

Mr. PLUMMER. In place of a disruption tariff an emergency excess profits tax for gasoline would have many of the same advantages, without the same macroeconomic distortions. Whereas the Government would take the blame for the rise in oil prices via a disruption tariff, an emergency excess profits tax for gasoline allows the Government to take the credit for capturing windfall profits that external events have generated.

An emergency excess profits tax for gasoline combined with rebates to all automobile owners or to all households would not have the same kind or level of macroeconomic costs as a disruption tariff, whether that disruption tariff has rebate features or not.

Senator BRADLEY. Given the level of the present disruption, would you advocate an import fee now? And if so, what amount? You said yes?

Mr. PLUMMER. Yes.

Senator BRADLEY. What amount?

Mr. PLUMMER. I would say on the order of \$10 a barrel.

Senator BRADLEY. \$10 a barrel? OK.

Mr. PLUMMER. Perhaps phasing it in over a 2-year period to lessen the macroeconomic feedback effects. But again, only because we have gotten ourselves into a situation of not having a stockpile, which is the more efficient instrument to use.



Senator BRADLEY. Why, again, is the windfall profits gasoline tax better than the disruption tariff?

Mr. PLUMMER. Because essentially it doesn't add any more to the pump price than what OPEC or what the world situation is going to cause anyway. All it does is make sure that you don't have gasoline lines and you don't have price controls and you don't have unacceptable macroeconomic effects.

Senator BRADLEY. The Congress imposes the gasoline windfall profits tax and the station owner automatically raises his prices?

Mr. PLUMMER. No; he shouldn't. Prices should be no higher than if no action were taken by Congress at all, if there were no price controls. All the windfall profits tax on gasoline would do would be to capture the excess profits earned by the oil companies and the gas station owners because of the runup in the world oil price. They are just capturing rents, not further raising the price.

[The prepared statement of James L. Plummer follows:]

#### STATEMENT OF JAMES L. PLUMMER<sup>1</sup>

##### A COMPARISON OF OIL TAXES AND OTHER OPTIONS FOR REDUCING ENERGY VULNERABILITY

This prepared statement draws partly upon the policy analysis contained in a forthcoming book called "Energy Vulnerability," which is the product of a year-long research effort by myself and nine co-authors.<sup>2</sup> Policy conclusions are summarized here in outline form without the supporting analysis contained in the book. Moreover, this statement includes some policy areas not covered in the book. Thus, my co-authors should not be associated with the opinions here expressed.

The term "energy vulnerability" refers to the near-term problems of world oil supply disruptions and overdependence on oil imports, as opposed to the longer term energy problems of resource depletion and transition to new technologies.

#### I. TARIFFS VS. OIL STOCKPILING

A. Stockpiling is much more important and urgent than oil import reduction. Our modeling indicates that the economic "premium" from adding a barrel of oil to the stockpile is in the range of \$20 to \$80 per barrel, whereas the premium from oil import reduction is in the range of \$10 to \$30 per barrel. In rough terms, it could be said that stockpiling is now about three times more valuable than oil import reduction.<sup>3</sup> This ratio will go down as the U.S. is able to build up the size of its stockpile.

B. A tariff is mainly relevant to oil import reduction, although it will also have a small effect in reducing disruption losses by lowering the import level at the start of a disruption. Adding a barrel of oil to the oil stockpile and having it available during a disruption has 8-12 times greater impact in reducing expected disruption losses than having a one barrel lower import level at the start of a disruption.

C. A high stockpile fill rate has some of the same beneficial effects as a tariff, plus other advantages. A higher fill rate adds to the demand for imported oil during non-disruption years, and thus has some impact in raising the world price and the domestic price.

The higher price to consumers of petroleum products stimulates conservation in the same way as a tariff. Also, because the fill rate should drop to zero at the onset of a disruption, this "snap back" of the import demand function also represents a cushion against disruption losses which is additive to the cushioning effect of the

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<sup>3</sup> For a technical discussion of the elements making up these premiums, see James L. Plummer, "The Oil Import Reduction Premium and Oil Stockpile Premium," Presidential Address to the International Association of Energy Economists, October 6, 1980; forthcoming in the January 1981 issue of *The Energy Journal*.

stockpile drawdown rate. Thus, in a world of more frequent disruptions, the fill rate can serve as an "automatic stabilizer."

D. A disruption tariff would be a partial substitute for stockpiling, if it weren't macroeconomically undesirable. If a disruption tariff was legislated before the disruption occurred, and went into effect automatically, the demand-reducing impacts of the disruption tariff would obviate the need for as much stockpile drawdown.

E. Unfortunately, it may not be possible to design a macroeconomically acceptable disruption tariff, with or without rebate features. The microeconomic losses from world oil supply disruptions derive from the sudden run-ups in oil prices. These large oil price increases cause a frantic scramble to substitute other fuels and other non-energy resources for oil throughout the economy. Because only limited substitution is possible in the short-term, real output declines. The direct microeconomic losses are multiplied by indirect macroeconomic losses. Downward wage rigidity, anti-inflation reactions by the Federal Reserve Board, and increases in transactions demand for money all add to the loss of real output. Our analysis indicates that indirect macroeconomic losses are probably 1.5 to 3 times greater than the direct microeconomic loss. In this context, the last thing in the world that the economy can stand during a disruption is a further increase in oil prices from a disruption tariff on top of the increases in world oil market prices. Schemes for rebating disruption tariff revenues to taxpayers in general will probably not sufficiently limit the direct and indirect losses of output in those sectors most adversely impacted by the sharp oil price increases.

F. In place of a disruption tariff, an emergency excess profits tax for gasoline would have many of the same advantages, without the same macroeconomic distortions. Whereas the government would take the blame for the rise in oil prices via a disruption tariff, an emergency excess profits tax for gasoline allows the government to take the credit for capturing windfall profits that external events have generated. An emergency excess profits tax for gasoline combined with rebates to all automobile owners or to all households would not have the same kind or level of macroeconomic costs as a disruption tariff (with or without rebates).

## II. IF THE OBJECTIVE IS OIL IMPORT REDUCTION DURING NONDISRUPTION YEARS, A REGULAR TARIFF IS A SUPERIOR POLICY INSTRUMENT TO ENERGY USE TAXES OR SUBSIDIES TO SYNFUELS

A. In terms of efficiency in reducing oil imports, a regular tariff is best; then energy use taxes (including gasoline taxes); and production subsidies are in last place. A tariff is a much more efficient policy instrument than the other two alternatives because it operates simultaneously to decrease demand and increase supply. Alfred Marshall once said that supply and demand were like two blades of a pair of scissors in jointly determining prices. In this context, it is easy to see that it is a lot easier to reduce imports via a tariff because both blades are working at the same time. Either an energy use tax alone or a production subsidy alone is much less effective.

B. A U.S. import oil should not be thought of as contrary to the interests of U.S. consumers, or as a barrier to overall trade liberalization. As stated above, our modeling research indicates that there is a net economic gain to the U.S. in imposing an oil import tariff in the \$10 to \$30 per barrel range. Since world oil prices have been driven up partly as the result of non-competitive actions by OPEC, it should not be considered an act of protectionism or autarky to use a tariff as one instrument to try to contain world oil prices from the buyer's side.

If an oil import tariff is used, it should be as broad as possible. The tariff should apply to crude oil and all categories of refined products. Any attempt to exempt home heating oil would just create windfall profits for foreign refiners, windfall losses for domestic refiners, and little or no gain for home heating oil users.

Subsidies to either synfuels or conservation must to some extent take away federal funding for oil stockpiling.

Subsidies to synfuels will not achieve significant production increases and thus import reductions until the 1990's.

Even when synfuel production increases do happen, they will not significantly reduce disruption losses, because disruption losses are a function of the level of oil consumption rather than the level of oil imports.

There are ways of softening the economic and political impacts of a regular tariff, but using them also requires a lot of political discipline in the legislative process:

If one abstracts momentarily from the legislative process, it would be very advantageous to link a regular oil tariff to general tax reduction. A tariff of \$10 per barrel would bring in about \$25 billion in revenue per year. That would certainly make it easier to achieve both general tax reduction and a smaller federal deficit. It would

also soften or eliminate the indirect macroeconomic costs of imposing a tariff. A "national energy dividend" to taxpayers would greatly improve the political salability of an oil import tariff.

If this kind of linkage were used, care would have to be taken to insure that individual and corporate tax rates would not change if future oil import volumes fluctuated. The linkage would have to be strong enough to help sell the tariff politically, yet not so strong as to bind the future pattern of tax rates to the vicissitudes of the world oil market.

Although "rebating" is good in the economic abstract, the realities of the legislative process can turn it into very wasteful forms of "earmarking." The final version of the Windfall Profits Tax illustrates how a "Christmas tree" of tax credits and earmarked expenditures can result. To avoid this may require a larger degree of legislative discipline than we can reasonably expect on energy issues.

If there does not exist enough legislative discipline to avoid inefficient earmarkings, then an alternative is a regular tariff which has no rebates but is phased in over several years. This approach would be a substitute for rebating in the sense of reducing the indirect macroeconomic impacts of a tariff. Phase-in might also help soften political impacts, although there is also the danger of incomplete phase-in if the political pressures cumulate with each additional increase in the tariff rate.

Other oil-importing countries have changed their tariffs, quotas, and use taxes without provoking retaliation. It is part of the "Washington syndrome" to think that the whole world is focused on U.S. actions and reacts more strongly to them than to similar actions by other countries.

If one is to consider scenarios of retaliation to U.S. unilateral tariffs, the retaliation would be by the Saudis and their close neighbors rather than by OPEC or OPAEC, in general. Within OPEC, Ecuador, Gabon, Indonesia, Nigeria, Algeria, and Venezuela ordinarily play a price-follower role. Although Iran, Iraq, and Libya have on rare occasions restricted output to raise prices, it has almost always been during disruptions when it was in their economic self-interest to do so. At other times, they have often been the "price chisellers" of OPEC. If one is considering a scenario in which a group of OPEC countries react to a U.S. tariff enacted in a non-disruption year, then the price leader in such a scenario would have to be Saudi Arabia, followed by the United Arab Emirates, Qatar, and Kuwait.

Statements by the Saudis as to how they would hypothetically react to a tariff or higher stockpile filling cannot be taken as true indications of their actual reactions. The Saudis know that tariffs and stockpiling are the most effective instruments that can be used by oil-importing countries to contain further increases in world oil prices. They use the same consultants as the U.S. government. Knowing that, it is in their interest to discourage us as much as possible from using those instruments. They also know that the use of these instruments will make life more politically complicated for them within Saudi Arabia and within OPEC. We don't have to ask them whether they wouldn't like it, and we shouldn't ask them.

A better indication of their probable actions is given by looking at their recent history and the difficult political and economic tradeoffs they face. The Saudis face very scary tradeoffs among the following objectives: (1) preserving internal ability and unity, which implies saving oil for younger and future generations of Saudis, (2) maintaining minimal peace and harmony with neighboring Arab states, (3) maintaining U.S. and other protections against communist aggression and subversion, (4) preserving minimal stability and price unity within OPEC, and (5) making a high economic return from their oil resources in the near term. Given the precarious situation of the Saudis in trying to reconcile these disparate objectives, they would probably not wish to add to internal or OPEC instabilities by initiating a crusade against a \$10-\$20 per barrel U.S. tariff. It simply would not be worth the potential risks in terms of potential destabilization.

Even if there were a retaliation to a U.S. tariff, it would only indicate that there existed underutilized price-raising power within OPEC, which would have been exercised during the next disruption. Nobody knows at any one time what is the market-clearing price that corresponds to a given level of Saudi oil liftings. The Saudis grope their way from one period to the next, taking signals from each change in consumption levels, non-OPEC supply, and Rotterdam spot prices. If they overdo it in price increases, their own lifting levels take almost all of the downward swing for all of OPEC. This has not been a threat since 1978 because of continual disruptions, but it is the situation facing the Saudis during non-disruption periods (when a regular U.S. tariff would presumably be imposed). If the Saudis did retaliate to a U.S. tariff it would probably be because they felt that there was enough upward price pressure in the market to sustain such a price increase without their experiencing too much of a decline in their liftings. That means that we would have experienced that same price increase during the next tight market or disruption

anyway. Putting off the imposition of a U.S. tariff because of an exaggerated fear of Saudi retaliation brings to mind the line from Shakespeare's Julius Caesar—"Cowards die many times before their deaths; the valiant never taste of death but once." We have already died many times since 1973 and not had the will to take stronger action. Because nobody can prove there would not be a Saudi retaliation to a tariff, it has been used as a convenient excuse for inaction. Retaliation is unlikely, and not so bad if it did happen.

There are some international tax and financial options that should be considered:

A common tariff of a given level adopted by all IEA countries together would have about three times more economic benefit than the same level tariff imposed by the U.S. alone. However, it would be meaningless for the U.S. to even discuss such a possibility seriously with other IEA countries until after the U.S. can demonstrate that it has the internal political will to impose any level of tariff at any time.

Increased World Bank financing of oil exploration in developing countries has a high "indirect rate of return" for all oil-importing countries. If oil exploration in these countries were increased enough to put one million barrels per day of additional oil production on the world market in the 1990's, that would probably be worth about \$10 to \$30 billion per year to all oil-importing countries in terms of marginally lower world oil prices. Given the historical oil finding rates in these countries, and the oil exploration investment required, this would be a high "indirect rate of return" investment for oil-importing countries, even if the capital were provided in interest-free grants. The U.S. should take the lead in sponsoring a new "energy facility" affiliate for the World Bank.

An appealing strategy for the Windfall Profits Tax would be to phase out its gross revenue over five years, but immediately eliminate its earmarked expenditures and credits.

The estimated revenue from the tax is \$14.7 billion in fiscal year 1981, \$18.9 billion in fiscal year 1982, \$20.2 billion in fiscal year 1983, \$21.3 billion in fiscal year 1984, \$22.3 billion in fiscal year 1985, and \$22.9 billion for fiscal year 1986, for a total of \$120.3 billion.

If the various rates within the Windfall Profits Tax were scaled back gradually between October 1, 1981 and September 30, 1986, much of the revenue would still be available in fiscal year 1981, fiscal year 1982, and fiscal year 1983 for general tax reduction or deficit reduction.

Immediate elimination of the earmarked uses of the Windfall Profits Tax would take away some of the most wasteful features of recent U.S. energy policy, and allow a rethinking of that policy. If some of these programs were deserving of continued federal funding, then they would presumably be able to compete for funds in the regular federal budgetary process rather than having a protected status.

The difference between gradual reduction in Windfall Profit Tax rates and a oneshot elimination of the tax would not imply a significant loss of U.S. oil exploration or production. The 1979-80 jumps in world oil prices, as well as the prospect of oil price decontrol in October 1981, have both produced a spurt in both exploration and production activity which have a strong forward momentum over the next several years. It will take the industry a few years to "catch up" so that it has the capacity to operate at as high a level as it now wants to operate. The difference between gradual and sudden phaseout of the Windfall Profits Tax would not matter much during that catchup period.

Senator BRADLEY. Let me ask each of the other members, would they advocate the immediate imposition of an import fee, and if so what level?

Mr. SCHEPPACH. I will comment on that first. If I remember my numbers correctly, I think we have lost about 2.7 million barrels worth of production. We are drawing down inventories of about 0.5 million barrels a day. So I think at that level we can wait a while, particularly if the Iraqi pipeline does come back on today, which I think is in the neighborhood of 600,000 to 700,000 barrels a day. If it does come on line, I think we are back to an equilibrium solution, unless the recovery continues on up and puts additional pressure on the world market.

My own personal opinion at this time would be, no, I would wait a while.

Senator BRADLEY. Is there a trigger level? Let's say the Iraqis put oil through the pipeline and reduce the production loss to 2 million

barrels net loss, but Kuwait decided to cut back another half million, would you then advocate a fee? Is there a point at which you think there should be an import fee? What is the trigger level?

Mr. SCHEPPACH. World supplies are in such a surplus still that we are not in any major danger for another 3 to 4 months. Now, if other people started to cut back and we got into the situation where we were 2 to 3 million barrels a day short, then I would suggest a tax. But I don't think we are going to be there for another 3 to 4 months.

Mr. SWEENEY. I would certainly not put on a gasoline tax, because—

Senator BRADLEY. We are talking about an oil import fee.

Mr. SWEENEY. I want to separate the two things that are being talked about. We want a tax that tends to reduce the world price of oil, not simply redistribute the wealth within the United States. I certainly feel that we should impose a tax in the order of magnitude of these import premia that I talked about.

Ten dollars a barrel is a reasonable number. I would advocate doing that whether or not the current Irani-Iraqi war continues as a longrun policy instrument that we should be pursuing.

Senator BRADLEY. Why should it be a longrun policy instrument?

Mr. SWEENEY. An instrument, such as a tax on the use of all oil, not just the importation of oil, can have significant effects in reducing the world oil price from what it would have been otherwise, and therefore giving significant economic gains to the United States from the lower prices.

Senator BRADLEY. You say you want a tax on all oil?

Mr. SWEENEY. Not just imports, the use of all oil. There are two ways we can do it. We can impose the tax on imports or on use.

If we impose it on just imports, then the oil companies obtain a greater share of profits, which are then partially recaptured through the windfall profits tax. The Government gains one fraction of the revenues that way.

If you impose the tax on all use of oil, then the domestic sales price of oil, the price obtained by the oil companies, doesn't go up, and the Government captures a greater share of the revenue, which then can be redistributed to the population.

Which way you go depends on what you believe is the appropriate distribution.

Senator BRADLEY. Where is the tax placed? At the refinery level?

Mr. SWEENEY. Yes, at the refinery level. That would effectively give you a tax on the use of all oil.

Senator BRADLEY. You say the price wouldn't go up?

Mr. SWEENEY. The price would go up to the consumers, reducing the demand for oil and therefore reducing the world oil price by an amount smaller than the tax. So the \$10 tax may reduce the world oil price by, say, \$3 which means the consumers would face a \$7 increase in price.

Revenues would be generated. The policy can't be taken alone, but should be linked to some other tax cuts. What taxes should be cut is a matter of preference. My preference is to reduce corporate and personal income taxes, but different people have different preferences.

Senator BRADLEY. And it would reduce the world oil price by reducing the consumption?

Mr. SWEENEY. Yes. Anything that reduces consumption overall would push down the world oil price, and therefore causing economic benefits.

Senator BRADLEY. What happens if the producers cut back production?

Mr. SWEENEY. Let's take the extreme case. If producers cut back production on a 1-for-1 basis and there is no price reduction, there is no monopsony gain. But, there will be a lot more spare capacity in the world. The next time a disruption occurs, we wouldn't get hit nearly as hard.

Senator BRADLEY. Doesn't that depend on the nature of the disruption? If Saudi Arabia had 3 million barrels spare production capacity and Iraq expands the war, what difference does that make?

Mr. SWEENEY. If all the capacity were cut back in Saudi Arabia, you would then be starting from a lower level of consumption. If you had the tax on for a longer period of time, you would have motivated people to get a much more efficient capital stock of energy-using equipment (automobiles, insulation, industrial processes). You would be starting the disruption from a much lower level of imports, even if the OPEC nations do cut back on a 1-for-1 basis.

In the case in which OPEC cuts back on a 1-for-1 basis, you would obtain gains through a much smaller disruption impact the next time a disruption occurs. However, there would be no price impact before the disruption.

I think OPEC cutting back production on a 1-for-1 basis is a very low probability event even though I expect to hear such threats from OPEC leaders. If the U.S. Government were willing to take dramatic action, such as a \$10 tax, I believe you would find some major threats as to what the Saudi Arabian Government and other OPEC nations would do. And you might find the threats implemented over short periods of time. However, after a couple of years, I believe the production rate will be near what it would have been, without the tax. I believe what you postulate is a fairly low probability event.

Senator BRADLEY. Let's hear Mr. Williams.

Mr. WILLIAMS. As you can guess from my testimony, I would favor a tax, a phased in tax that is either rebated in some way or used as has been suggested, to offset some existing taxes.

But I think, however the taxes are returned, it should be in some way that is as independent as possible from the capacity to consume.

Senator BRADLEY. Would you favor an oil import tariff as opposed to a gasoline tax?

Mr. WILLIAMS. I have no clear bias among the types, but there should be some sort of phased in tax that starts at something on the order of \$10 a barrel.

Senator BRADLEY. Yes, sir?

Mr. SCHEPPACH. We are mixing up long run and short run. The question initially came on what was perceived to be a temporary

shortfall, and many of the answers seem to talk about the implementation of a longrun policy.

I might support a longrun oil import fee, but I might be against a short run, because a tax at this time, when there is no real shortage in the market, has economic costs in terms of reduced output, employment, and so forth. So I think you have to differentiate between the two.

Senator BRADLEY. Let's make it explicit. Raise your hands. Which of you would favor a \$10 import fee in the short term as a result of the present interruption, and, in your judgment, of the prospective interruption?

One and a half?

Mr. SWEENEY. If it avoided gasoline rationing, definitely.

Senator BRADLEY. How many of you would like an import fee if it were for the longer term?

[All hands raised.]

Senator BRADLEY. All right. Let me ask you: What is your judgment about when short run becomes longrun? When do expectations enter the picture so that shortrun conditions begin to influence the longterm?

Mr. PLUMMER. A major point of our research is that for the next decade you may not ever be able to tell the difference. We will always be living with one type of disruption or the aftereffects of the last disruption.

Senator BRADLEY. So this is a nice academic exercise, but it is meaningless so far as policy goes? What's the difference?

Mr. SWEENEY. One policy would be to put it on right now and not argue whether it is for longrun or shortrun goals. I would advocate putting on the tax now, and it is not just—and keeping it on without the disruption.

Senator BRADLEY. Let me make the point. What is a shortrun disruption and price runup now might end up being a permanent price. You can't assume there would be downward pressure. The history of the last 6 years is that the disruption increase has become the contract price for the next round. Right?

Mr. PLUMMER. Before proceeding with my prepared statement, let me comment on the point which Jim Sweeney also touched upon. Our research also indicates the same sort of proportion that Jim mentioned. That is, if you put on a disruption tariff, about two-thirds of it—he said 70 percent—does become a higher oil price, and 30 percent, or one-third of it, is put back on OPEC. So one-third of the burden is on OPEC. The other is translated into a higher domestic oil price. That seems to be fairly independent of the level of the tariff that one tests.

The second area that I wish to talk about is that of comparing a regular tariff during nondisruption years to other energy use taxes or subsidies to synfuels. If the objective is oil import reduction, then the tariff is a superior policy instrument to the other two. In fact, a tariff ranks first, then energy use taxes, including gasoline taxes; and in last place is the production subsidy, either to synfuels or any other kind of production subsidies.

A tariff is a much more efficient policy instrument than the other two alternatives, because it operates simultaneously to decrease demand and increase supply.

Alfred Marshall once said that supply and demand were like two blades of a pair of scissors in jointly determining prices. In this context, it is easy to see that it is a lot easier to reduce imports via a tariff because both blades are working at the same time. Either an energy use tax alone, such as a gasoline tax, or a production subsidy alone, is much less effective.

A U.S. oil import tariff should not be thought of as contrary to the interests of U.S. consumers, or as a barrier to overall trade liberalization. As stated above, our modeling research indicates that there is a net economic gain to the United States in imposing an oil import tariff on the order of \$10 to \$30 per barrel.

Since world oil prices have been driven up partly as the result of noncompetitive actions by OPEC, it should not be considered an act of protectionism or autarchy to use a tariff as one instrument to try to contain world oil prices from the buyer's side.

If an oil import tariff is used, it should be as broad as possible. The tariff should apply to crude oil and all categories of refined products. Any attempt to exempt home heating oil would just create windfall profits for foreign refiners, windfall losses for domestic refiners, and little or no gain for home heating oil users.

Senator BRADLEY. Why do you say no gain to heating oil users?

Mr. PLUMMER. Because the price will be largely established by the price at which the Caribbean refiners sell oil to the United States, and that won't be much affected by whether home heating oil is exempted from the tariff or not. There will be some effect.

Senator BRADLEY. You are saying if you exempt heating oil from the tariff, that the heating oil will still be sold at world price, and that could be as high or higher than the price of oil with the tariff?

Mr. PLUMMER. That's correct.

Likewise, the system proposed last spring for loading a tariff entirely on gasoline is merely a disguised gasoline tax and would create its own bureaucratic empires and regulatory distortions. Since the entitlements program is now winding down to oblivion on September 30, 1981, it would be foolish to create a new entitlements program for gasoline.

Senator BRADLEY. Let me ask you: When I suggested that we impose a tariff to a number of the oil producing countries, they were extremely negative, but they were not so negative on a gasoline tax. In your argument here, you take the position that since they are operating as a cartel, we should just go ahead and act to protect ourselves against the actions of the cartel. Is that view held by everyone?

You are not the politicians, but take some license. [Laughter.]

Would you then go so far as to say that if you had a tariff, you would exempt non-Persian Gulf oil? Is there a rationale for exempting non-Persian Gulf oil? Is it politically defensible, economically defensible?

Mr. PLUMMER. No. I think that would create essentially a black market situation, with some windfall gains within the world oil market.

Senator BRADLEY. Why would it create a black market? Because oil is fungible? You can move it around and not tell where it is coming from?



Mr. SCHEPPACH. You would have to put back an entitlements system again in terms of different prices or crude, plus you would potentially have a black market, like you do in the United States now with old and new oil. I think administratively—

Senator BRADLEY. There is a black market with old and new oil in the United States. Is any member of the press here? [Laughter.] We made news finally. [Laughter.]

Mr. SWEENEY. There is another phenomenon that may be more destructive than if we do that. In the United States, importers would start moving away from the OPEC oil. But there is only so much oil produced in the world. That means we are pushing the OPEC oil, the less dependable oil, toward our allies. This may not be perceived as a very friendly thing in Japan, Germany, and England.

Furthermore, under the sharing arrangements of the International Energy Agency, when the disruption occurred it wouldn't make any difference who had OPEC oil contracts. We would still be required to share available supplies, under the assumption that we are going to follow the terms of that treaty. If we follow the terms of the International Energy Agency agreement, it wouldn't matter whether we were importing the vulnerable oil or the nonvulnerable oil. We would only have been fooling ourselves about a reduction in vulnerability if we impose such a policy.

Senator BRADLEY. All right.

Mr. PLUMMER. A third area I wish to talk about is: Subsidies to either synfuels or conservation are also less desirable in relation to the oil disruption policy. Subsidies to either synfuels or conservation must to some extent take away Federal funding for oil stockpiling.

Subsidies to synfuels will not achieve significant production increases and thus import reductions until the 1990's. Even when synfuel production increases do happen, they will not significantly reduce disruption losses, because disruption losses are a function of the level of oil consumption rather than the level of oil imports. That's the point we were at previously.

There are ways of softening the economic and political impacts of a regular tariff, but using them also requires a lot of political discipline in the legislation process. If one abstracts momentarily from the legislative process, it would be very advantageous to link a regular oil tariff to general tax reduction.

A tariff of \$10 per barrel would bring in about \$25 billion in revenue per year. That would certainly make it easier to achieve both general tax reduction and a smaller Federal deficit. It would also soften or eliminate the indirect macroeconomic cost of imposing a tariff. A national energy dividend to taxpayers would greatly improve the political salability of an oil import tariff.

If this kind of linkage were used, care would have to be taken to insure that individual and corporate tax rates would not change if future oil import volumes fluctuated. The linkage would have to be strong enough to help sell the tariff politically, yet not so strong as to bind the future pattern of tax rates to the vicissitudes of the world oil market.

Although rebating is good in the economic abstract, the realities of the legislative process can turn it into very wasteful forms of

earmarking. The final version of the windfall profits tax illustrates how a "Christmas tree" of tax credits and earmarked expenditures can result. To avoid this may require a larger degree of legislative discipline than we can reasonably expect on energy issues.

If there does not exist enough legislative discipline to avoid inefficient earmarks, then an alternative is a regular tariff which has no rebates, but is phased in over several years. This has been suggested by some of my colleagues on the panel.

This approach would be a substitute for rebating in the sense of reducing the indirect macroeconomic impacts of a tariff. Phase in might also help soften political impacts, although there is also the danger of incomplete phase in if the political pressures cumulate with each additional increase in the tariff rate.

Senator BRADLEY. So you are saying there are three options on the rebate: One is to try to devise some form of rebate, 20 cents to California, 90 cents to Indiana; and the other is to just cut taxes, general tax rates, corporate and individual; and the third is not to rebate at all, but to phase the tax in over a couple of years.

Mr. PLUMMER. The fifth area has already been mentioned in the discussion today. Both the probability and consequences of Saudi retaliation to a U.S. tariff are often overstated.

Other oil-importing countries have changed their tariffs, quotas, and use taxes without provoking retaliation. It is part of the Washington syndrome to think that the whole world is focused on U.S. actions and reacts more strongly to them than to similar actions by other countries.

If one is to consider scenarios of retaliation to U.S. unilateral tariffs, the retaliation would be by the Saudis and their close neighbors rather than by OPEC or OAPEC in general. Within OPEC, Ecuador, Gabon, Indonesia, Nigeria, Algeria, and Venezuela ordinarily play a price-follower role.

Although Iran, Iraq, and Libya have on rare occasions restricted output to raise prices, it has almost always been during disruptions when it was in their economic self-interest to do so. At other times, they have often been the price chiselers of OPEC.

If one is considering a scenario in which a group of OPEC countries react to a U.S. tariff enacted in a nondisruption year, then the price leader in such a scenario would have to be Saudi Arabia, followed by the United Arab Emirates, Qatar, and Kuwait.

Senator BRADLEY. That is because of their excess capacity.

Mr. PLUMMER. Yes, and their reserves of money as well.

Statements by the Saudis as to how they would hypothetically react to a tariff or higher stockpile filling cannot be taken as true indications of their actual reactions. Here I am reinforcing what Jim Sweeney said a few moments ago.

The Saudis know that tariffs and stockpiling are the most effective instruments that can be used by oil-importing countries to contain further increases in world oil prices. They use the same consultants as the U.S. Government. Knowing that, it is in their interests to discourage us as much as possible from using those instruments.

They also know that the use of these instruments will make life more politically complicated for them within Saudi Arabia and

within OPEC. We don't have to ask them whether they wouldn't like it, and we shouldn't ask them.

A better indication of their probable actions is given by looking at their recent history and the difficult political and economic tradeoffs they face. The Saudis face very scary tradeoffs among the following objectives:

One, preserving internal stability and unity, which implies saving oil for younger and future generations of Saudis;

Two, maintaining minimal peace and harmony with neighboring Arab States;

Three maintaining U.S. and other protections against Communist aggression and subversion;

Four, preserving minimal stability and price unity within OPEC;

And five, making a high economic return from their oil resources in the near term.

Given the precarious situation of the Saudis in trying to reconcile these disparate objectives, they would probably not wish to add to internal or OPEC instabilities by initiating a crusade against a \$10 to \$20 per barrel U.S. tariff. It simply would not be worth the potential risks in terms of potential destabilization.

In my own personal acquaintances with the Saudis, I have always been struck with the great importance of stability to them. I think that is where their emphasis lies.

Even if there were a retaliation to a U.S. tariff, it would only indicate that there existed underutilized price-raising power within OPEC, which would have been exercised during the next disruption. Nobody knows at any one time what is the market-clearing price that corresponds to a given level of Saudi oil liftings. The Saudis grope their way from one period to the next, taking signals from each change in consumption levels, non-OPEC supply, and Rotterdam spot prices.

If they overdo it in price increases, their own lifting levels take almost all of the downward swing for all of OPEC. This has not been a threat since 1978 because of continual disruptions, but it is the situation facing the Saudis during nondisruption periods, when a regular U.S. tariff would presumably be imposed.

If the Saudis did retaliate to a U.S. tariff, it would probably be because they felt that there was enough upward price pressure in the market to sustain such a price increase without their experiencing too much of a decline in their liftings. That means that we would have experienced that same price increase during the next tight market or disruption anyway.

Putting off the imposition of a U.S. tariff because of an exaggerated fear of Saudi retaliation brings to mind the line from Shakespeare's "Julius Caesar": "Cowards die many times before their deaths; the valiant never taste of death but once." We have already died many times since 1973 and not had the will to take stronger action.

Because nobody can prove there would not be a Saudi retaliation to a tariff, it has been used as a convenient excuse for inaction. Retaliation is unlikely, and not so bad if it did happen.

I think the whole subject has to be addressed head on in separate hearings, Mr. Chairman, because it is often tossed around very casually.

There are some international tax and financial options that should be considered: A common tariff of a given level adopted by all IEA countries together would have about three times more economic benefit than the same level tariff imposed by the United States alone. However, it would be meaningless for the United States to even discuss such a possibility seriously with other IEA countries until after the United States can demonstrate that it has the internal political will to impose any level of tariff at any time.

Increased World Bank financing of oil exploration in developing countries has a high indirect rate of return for all oil-importing countries. If oil exploration in these countries were increased enough to put 1 million barrels per day of additional oil production on the world market in the 1990's, that would probably be worth about \$10 to \$30 billion per year to all oil-importing countries in terms of marginally lower world oil prices.

Senator BRADLEY. At that point, Mr. Williams, did you calculate this in your world production figures, the potential from non-OPEC Third World countries?

Mr. WILLIAMS. Not an increase beyond what has been projected with existing projections. The only non-OPEC country that I considered explicitly in my numbers was Mexico.

Senator BRADLEY. I think Mr. Plummer makes the point that, given another 1- to 2-million-barrel potential in non-OPEC Third World countries, that if there is the capital and the means to get it, the oil is there.

Go ahead, Mr. Plummer.

Mr. PLUMMER. Correct.

Given the historical oil finding rates in these countries, and the oil exploration investment required, this would be a high indirect rate of return investment for oil-importing countries, even if the capital were provided in interest-free grants. The United States should take the lead in sponsoring a new energy facility for the World Bank, which would be focused on oil exploration and lending.

An appealing strategy for the windfall profits tax would be to phase out its gross revenue over 5 years, but immediately eliminate its earmarked expenditures and credits. The estimated revenue from the tax is \$14.7 billion in fiscal year 1981, \$18.9 billion in fiscal year 1982, \$20.2 billion in fiscal year 1983, \$21.3 billion in fiscal year 1984, \$22.3 billion in fiscal year 1985, and \$22.9 billion for fiscal year 1986, for a total of \$120.3 billion.

Senator BRADLEY. That assumes \$30 a barrel?

Mr. PLUMMER. Yes, and escalating at 2 percent above inflation in years after that. So we know that figure is low now.

If the various rates within the windfall profits tax were scaled back gradually between October 1, 1981, and September 30, 1986, much of the revenue would still be available in fiscal year 1981, fiscal year 1982, and fiscal year 1983 for general tax reduction or deficit reduction.

Immediate elimination of the earmarked uses of the windfall profits tax would take away some of the most wasteful features of recent U.S. energy policy, and allow a rethinking of that policy. If some of these programs were deserving of continued Federal funding, then they would presumably be able to compete for funds in

the regular Federal budgetary process rather than having a protected status.

Senator BRADLEY. What are some of those? Do any of them come to mind?

Mr. PLUMMER. There are literally dozens of them.

Senator BRADLEY. So you stop all of the expenditures in the windfall profits tax: the 40-percent solar tax credit, the conservation tax credit?

Mr. PLUMMER. All of these. And I am not claiming that they should all be eliminated completely, but I think it is far preferable for them to compete for budgetary funds in the ordinary way, rather than having a protected status.

Senator BRADLEY. And you say that on the grounds—why are they wasteful?

Mr. PLUMMER. Not all of them are wasteful. But many of them are, and because relative priorities among them and other energy programs will change over the years, having them wired in is a mistake rather than having them compete each year in the regular legislative and Federal budgetary process.

Senator BRADLEY. All right.

Mr. PLUMMER. The difference between gradual reduction in windfall profit tax rates and a one-shot elimination of the tax would not imply a significant loss of U.S. oil exploration or production. The 1979-80 jumps in world oil prices, as well as the prospect of oil price decontrol in October 1981, have both produced a spurt in both exploration and production activity which have a strong forward momentum over the next several years.

It will take the industry a few years to catch up, so that it has the capacity to operate at as high a level as it now wants to operate. The difference between gradual and sudden phaseout of the windfall profits tax would not matter much during that catch-up period.

Mr. PLUMMER. One final comment is, if one wishes to reduce the tax rate on new discoveries within the windfall profits tax faster than the other rates, that would probably make sense on efficiency grounds.

Thank you, Mr. Chairman.

Senator BRADLEY. Thank you very much. I would like to thank all of the panel for their statements. I think that they are excellent. They will be a part of the permanent record.

And I think that the picture that you portray here is not a happy one. You have said that there is a real probability of an interruption, that within the next 5 years the price of oil could be \$150 a barrel, that there is an efficient way to rebate a massive tariff or tax, and none of those are very pleasant facts.

We have to try to sort through these issues here. I would like you to bear with me and help us see if some kind of tax or tariff makes sense on the question of longer-term import reduction. I suppose that the place to start is with Mr. Sweeney, with the monopsony and security premiums, and ask if you draw a distinction between the policies that we have to follow to reduce our dependence on insecure supply sources versus policies that we have to follow to reduce our vulnerability to oil supply interruptions, and whether they conflict?

Mr. SWEENEY. I do not see them as conflicting, but rather different types of policies that we would want to pursue simultaneously in order to meet those various goals. Clearly, we should develop a strategic petroleum reserve. However, there is no need to limit it to the public sector. We can create incentives for private sector withholding of reserves. This is really a very important short-run measure to deal with short-run disruptions.

I believe the above mentioned taxes, strong conservation measures, or other measures to increase the supply of oil can have a significant long-run effect without necessarily making vulnerability worse.

We have done some things in the name of energy conservation and import reductions that have increased our vulnerability in some ways. Let me give you an example of what I mean. When disruption occurs, we start searching for ways to reduce our oil usage. One way we can do it is to turn down the thermostats, drive less, and so forth. These can be done in the time frame of a disruption.

However, if we have through deliberate policy actions, tried to cause everybody to drive less, turn down thermostats, and so forth before the disruption, then those options that could be undertaken at the time of the disruption are no longer available. We will have preempted our options.

Alternatively, if we have incentives that can be phased in over a longer period of time, that is, more efficient automobiles, better insulated homes, better industrial processes, we can reduce the vulnerability to import reductions and reduce the world oil price in the long run. How much these incentives reduce the world oil price versus how much they reduce the vulnerability, of course, depends on the OPEC reaction.

Senator BRADLEY. How does import reduction through long-term conservation measures reduce vulnerability to an oil supply interruption?

Mr. SWEENEY. I'm glad you asked that question. It gives me an opportunity to correct a misstatement I made earlier. Let's go back to the situation where OPEC cuts back production, for example, the Saudis. If we reduce our imports by 3 million barrels a day and the Saudis cut back production by 3 million barrels per day prices don't change. Now assume a disruption occurs, such as a revolution in Saudi Arabia or terrorist activity, and all of the production is shut down. The reduction in world production is now 7 million barrels per day. Oil production has gone from 7 million barrels per day to zero. Without the conservation program, the reduction in world production was from 10 million barrels per day to zero. That is the same physical event. However, it has a much smaller impact on the world oil market if the Saudis initially were producing at the lower rate.

Thus, if the OPEC nations responded to the conservation reductions by simply reducing their production, there will be more spare capacity in the world and the disruptions would be less harmful.

Senator BRADLEY. Not to belabor the point, but if they did reduce in response to a cut in consumption the question is then what percent of the total world production did the 10 million barrels of

Saudi oil represent versus what the 7 million would be? Wouldn't the loss have the same effect if it was relatively the same percent?

Mr. SWEENEY. First, it wouldn't be relatively the same percentage. Consumption is about 52 million barrels in the non-Communist world. So that would be 10 out of 52, as opposed to 7 out of 49. There is a fairly significant percentage difference between those two cutbacks.

Senator BRADLEY. Let me get the panel's thought here. Let's assume that you had \$20 billion to spend and you saw the range of energy options. How would you spend it? Would you spend it on import reduction? Would you spend it on supply enhancement? Would you spend it on stockpiling?

How would you structure that \$20 billion?

Mr. SCHEPPACH. I think, first off, you would stockpile. Now, the billion barrels that was initially authorized would cost, in terms of construction costs, about \$7 or \$8 billion. Now, you are talking about an additional \$50 billion to fill it, but you would get back the revenues at that time.

Our analysis—and most people here on the panel who looked at the disruption policy would say that the stockpile has got to be the first in terms of effectiveness. And if you do that, then you take a little bit. You can get by with a lower long-run tax because you essentially have already taken care of that premium for disruption.

The other money, personally, I would use to get utilities to back off oil and gas. I think the opportunity for 3 million barrels a day there, that is cost effective in the long run, just makes a lot of sense. If we were to do that, we would have our import levels down from the 6 to about 3 million barrels a day.

Senator BRADLEY. Do you disagree with Bob Williams that the problem is not really oil as much as it is high-quality oil? Helping utilities get off doesn't help the problem he has defined.

Mr. SCHEPPACH. You can take crude oil and make anything out of it. It just costs a little bit more. You go through the normal distillation process, and then you have to go through hydrocracking at an additional cost for gasoline. But you have almost 100 percent flexibility in the refining process at varying levels of cost.

That is also true of synthetic fuels. You can take any solid and make a gas and make a liquid. It is just how much do you want to pay for it.

Senator BRADLEY. Bob, do you want to say anything?

Mr. WILLIAMS. I would spend the money three ways: One would be targeting conservation retrofits in oil-heated houses. And this has an interesting benefit. Right now typical large oil tanks are about 500 gallons in a house, and typical oil use for space heating in the winter is about 1,000 gallons. You need two fills per winter.

With an investment on the order of \$1,500 per house, you can reduce that consumption in half. With an investment on the order of \$3,000, you can reduce that to maybe one-third of what it is today. And you have got, in the case of an individual house, a reserve capacity. A filled oil tank for a tightly retrofitted house would last not half of the heating season, but 1½ heating seasons, on that order.

Second, I think there should be some kind of incentive given to Detroit to retool much more rapidly to the production of high fuel economy cars, to go far beyond the targets for 1985.

And the third use would be for the strategic petroleum reserve. But for the strategic petroleum reserve to be very significant, you have to have much higher filling rates than at present. Even at 300,000 barrels per day, you are talking about 8 years required to build up a stockpile of 1 billion barrels.

Senator BRADLEY. Do all of you agree with the point that I think Mr. Plummer made, about the stockpile being an automatic stabilizer? Do you want to make that point again?

Mr. PLUMMER. The stockpile fill rate acts as an automatic stabilizer, because at the onset of the disruption if you stop filling the reserve, the oil import level goes down and you take off some of the pressure on oil prices.

Senator BRADLEY. Do you agree with that, it has the same effect as a tariff, yet it is an automatic stabilizer? You take what Bob Williams says, and you take 1 million barrels out of the market and put it into the reserve, the results will be higher prices, the same thing as there would be with a tariff, and therefore reduced consumption.

Good, I'm glad you are shaking your head. You would have reduced consumption, and then when the interruption came, because you would be using imports to fill the reserve, the 1 million barrels, you would immediately cut back on the imports, because you would not be filling the reserve any more, but you would be using the reserve.

Mr. SWEENEY. Most of that is correct. It is an automatic stabilizer, in that when you are filling it up it increases the world oil prices, and during the time of disruption, if you have the political nerve to actually take oil out of the reserve, then you reduce world oil prices.

But this is not to say that the effects are the same as a tax. If a domestic tax increases oil prices for the U.S. citizens, those revenues obtained by the U.S. Treasury can be used to reduce other taxes. The increase in the world oil price associated with the importation of additional oil gives more revenues to the OPEC treasuries, and none of that gets rebated to the U.S. consumers in the same way.

Senator BRADLEY. We have had two answers to the \$20 billion question. How would you spend it? You would spend 50-50, 50 percent on stockpile, 50 percent on backout?

Mr. SCHEPPACH. All you need is about \$8 billion to construct the remaining reserve up to 1 billion barrels. I don't know if you want to include the purchase of oil, since you are going to pay it back or not. I would not.

I would use the \$8 billion for stockpile and the other \$12 billion—

Senator BRADLEY. How would you break it down?

Mr. WILLIAMS. I don't want to speculate on that.

Mr. PLUMMER. If it were \$20 billion per year, I would use 80 percent of it for stockpiling and other disruption contingency planning for the foreseeable future and only scale that back once the stockpile was at a reasonable level.



Senator BRADLEY. Eighty percent?

Mr. PLUMMER. Eighty percent.

Mr. SWEENEY. I am not sure what percentages, but the vast bulk of it is for stockpiling of oil and gas. Gas can also be stockpiled. The rest of the money should be used to deal with some of the very severe income distributional impacts that will be associated with the oil price increases. Particularly, I am thinking about low-income families that either have oil-fired or gas-fired heating facilities in their homes.

I would like to see that distributional issue addressed and the rest of the money spent on a stockpile.

Senator BRADLEY. I wouldn't assume that you have, but have you looked at the numbers enough to say that you could get sufficient revenues from the windfall profits tax to take care of those distributional questions if the world price went up because you were filling those reserves and that meant that the domestic price would also go up?

Mr. SWEENEY. I wasn't simply thinking of the world price increase because of filling the reserves. I think as part of the balance, one of the first priorities is getting rid of the oil and gas price controls. With this action there would be some important distributional consequences, and I think that we have to deal justly with those.

Mr. WILLIAMS. Since the vote came out strongly in favor of stockpiling, even though I don't have any numbers, I would like to indicate that I feel the numbers should be balanced the other way around. The bulk of the effort should be on the conservation side.

I would like to also comment on what Mr. Sweeney—

Senator BRADLEY. Would you tell Mr. Reagan that?

Mr. WILLIAMS. I would like to also indicate that, as far as assistance to low-income households is concerned, I feel strongly that it should be targeted toward investments rather than fuel payment support.

Senator BRADLEY. Investments?

Mr. WILLIAMS. Conservation investment subsidies instead of subsidies to support fuel purchases.

Mr. SWEENEY. Sure.

Senator BRADLEY. Something Ray said earlier leads into the next area, and that is, when you think of an import premium, we have talked about the security component and the monopsony component, there is also an inflation component and a balance of payment component.

I would like to focus on the inflation component, and one of the things Ray said earlier, if you are going to put a tariff on and that raises the price, that increases the rate of inflation, the general rate of inflation. If such a tariff was to be placed on the price of oil, do you think it would make sense to alter the Consumer Price Index so that it didn't reflect that tax?

Mr. SCHEPPACH. The reason that you might want to do that, of course, is that many Federal programs are indexed to the CPI, and consequently you are building in a bias. The negative is I think there is very strict legislation on that index and it would take—

Senator BRADLEY. Of course there would be legislative remedy.

Mr. SCHEPPACH. I think there is a reluctance in general to start changing that index, which I think is more for, you might say, political reasons. In terms of indexing programs, it might be better to leave the index as it was, but to change the legislation on the various entitlement programs which are linked to it.

Senator BRADLEY. Let me ask, does anyone else have any thought on the inflation component of this import premium?

Mr. SWEENEY. The testimony given a moment ago depends upon one theory of inflation. However, there are lots of theories of inflation. If you take a monetarist's view, you would not have nearly the impact of inflation suggested from that testimony. I think the monetarist view is becoming more dominant in the economic profession.

Mr. PLUMMER. That is not completely so. In fact, the model that we used to calculate those macroeconomic impacts is a monetarist model. It is possible to combine monetarist theories of inflation with other theories of microeconomic feedback to higher energy prices.

Senator BRADLEY. Let me put out a hypothesis. Let's say that we're going to put on a tariff, the result of which is going to be an increase in inflation.

Now, it is possible, in the best of all possible worlds, through various transfer mechanisms and other actions of Government, to lighten the impact of that inflation on the consumer. Do you think that that is the only thing that you have to look at when you consider the import premium, the inflation effect? Or should I also look at the rate of change of prices over time?

In other words, if you were able to redistribute initially, what guarantee is there that oil prices won't continue to increase at a kind of historical rate? The vulnerability would be not significantly less, would it, or would it be less?

Mr. PLUMMER. Let me comment on that. I think you brought up a very important point, and that is that in terms of these macroeconomic feedback effects, it is not really the level of oil prices or energy prices that is damaging, but the rate of change of those prices.

So if you have, for instance, a tariff that is phased in gradually, the macroeconomic feedbacks can be reduced to an acceptable level. It is the spurts in energy prices, oil prices, that are damaging, rather than the absolute levels.

Let me also add another related point. The \$10 to \$30 per barrel oil import reduction premium that I have mentioned does not include either a foreign exchange rate wedge concept, which might add anywhere from zero to \$20 per barrel, or a Persian Gulf-related military expenditure wedge, which easily adds \$5 and perhaps as much as \$15 per barrel.

So if anything, I think the oil import reduction premium numbers we have been talking about here today are probably on the low side. They don't include estimates of the other components that are even more difficult to estimate than the ones we have talked about.

Mr. SCHEPPACH. I think inflation is very, very important, and you have to be concerned with the implication that in fact the tax will set off reverberations to the economy.

It might be of interest, in some of our work on reindustrialization and policy, we are becoming more and more convinced that the whole Western World decrease in productivity is very, very closely linked to the oil shocks of 1973-74 and also 1979. Essentially what we have is a whole Western economy that is having difficulty sort of adjusting to such shocks, and it has implications in terms of productivity change, increases in real growth, and so on.

I do think you have not only the short-term impact of the tax, but also a potential longrun inflationary problem.

Senator BRADLEY. Does anyone else want to comment about the inflation component? What about the balance of payment component? Would the existence of a tariff create an atmosphere where there would be less speculation in a country's currency?

For example, in theory, you know, the OPEC surplus is reinvested in consuming countries. But the fact is it is reinvested unevenly into the countries that have the stronger currencies, leaving other countries with less strong currencies in very deep trouble, and with the dollar—creating a major force to depreciate the dollar, thereby exacerbating our own inflationary problems and acting as a catalyst for another round of price increases.

So where, when you figure the import premium, do you put the balance-of-payments component?

Mr. PLUMMER. You encouraged us to disagree with each other, so let me disagree with part of Ray Scheppach's testimony in which he seemed to imply that the balance-of-payments impacts are very uncertain, which they are, but that on balance the disbenefits to exporters of petrochemical products and other products might offset the positive balance-of-payments effects on the other side.

I don't think anyone who has taken a serious look at the numbers thinks that the balance-of-payments effect is as likely to be negative as positive. It is positive. But the magnitude is very uncertain.

Senator BRADLEY. Does anyone want to take a crack at the balance of payments?

Mr. SCHEPPACH. First off, I think our relationship on the balance of payments depends on whether it is multilaterally imposed. If we impose it ourselves, then of course we are raising our costs relative to the rest of the world, and in fact it may be negative in the long run, even though you have a shortrun positive gain.

If it is done multilaterally, with some overall level, then I would agree with Jim that it is probably a positive effect. In either event, I don't think the balance of payments is a large portion of the total premium.

Mr. SWEENEY. I would like to disagree with that last comment, those last comments. When you impose the oil tax, it is true that you increase the cost to those companies that are using a lot of oil. But if at the same time you reduce other taxes in the economy, the corporate income taxes and you do it in such a way that the net Government deficit is unchanged, you have simply modified the cost structure of industries, but on balance it is not going to increase the average costs.

Some industries will have some cost increases and others will have decreases. Therefore, I would have to say that that effect is

apt to be positive, because on top of that you have the reduction in the importation of oil. Whether or not this is going to be a large effect, I do think there will be beneficial effects based upon that tax.

While we still have a lot of uncertainty, we do have one answer. All of the studies are looking at import tariffs in the order of \$5, \$10, \$15 or more. Now what we are doing is arguing about how much more. But this certainly can justify taxes in the order of \$10 if we know that the import premium is something higher than that, but just don't know how much higher.

Senator BRADLEY. That is a rather esoteric subject if we really got into it. So let's leave that aside and go to the more practical aspect. And again, I would like to have each of your opinions.

Do you think that contract prices for 1981 are being and will be influenced by expectations about the duration of the Iranian-Iraqi war?

Mr. PLUMMER. I think that is a fairly easy yes. I doubt if there would be too much disagreement about that.

Senator BRADLEY. How would it vary? In other words, if they thought the war would be over in 3 months versus 6 months or 9 months? At what point does the cumulative loss of 3 million barrels a day create expectations of higher prices and how do these expectations affect future contract prices? In the next 3 months some countries will be determining what their contract prices are going to be. They have to make a judgment about how long they think the 3-million-barrel-a-day production cut will last.

So the question is, If you were advising Sheik Yamani or Abdul Karim, what would you tell them? Where would you tell them to place their contract price, and why?

Mr. SCHEPPACH. Let me make one point. I think one thing they are very reluctant to do is to in fact cut contract prices in the future. In other words, contract prices do follow stock prices.

Senator BRADLEY. That would argue for a more conservative approach.

Mr. SCHEPPACH. That's right. I think what you have seen in some countries already is a couple of dollars of premium. You may see it in that order of magnitude. But I think they are scared of running the contract price up to \$38 a barrel, having Iran and Iraq come back at 3 or 4 million barrels and having them cut the contract price.

Senator BRADLEY. Do you think they are going through this process of analysis in order to set the contract price, or is it much more haphazard?

Mr. PLUMMER. Their historical process is to test the water. Inventory levels are still very high, but there is now a shortfall of roughly 2 million barrels per day on the world oil market. So inventories are going down by that rate.

The only reason why the shortfall isn't higher is that Saudi Arabia is producing 10.5 million barrels per day, instead of 8.5 that they profess to want to lift. Added to that, Kuwait is producing about a half million barrels per day higher than they say they want to produce at, and Mexico is producing at a small amount higher than it says it wishes to produce at.

So this is a very precarious situation. I don't think those countries in fact have to do much analysis to know that they can get away with quite a bit of increase in their contract price in the next few months. And I for one wouldn't be very optimistic at all. I think substantial increases in contract prices are quite possible.

Senator BRADLEY. So it is the unanimous view of the panel that, yes indeed, contract prices will be influenced by the level of supply, the expected level of supply. And now let's flip it over.

Will these contract prices also be influenced by the level of expected demand? And if they will be influenced by the level of expected demand, might there be a downward price effect from an import tariff? Or if not downward, you wouldn't increase it as much, because you see the West getting their act together?

Mr. SWEENEY. That is precisely the major thrust of a major part of my testimony. So I clearly agree.

Senator BRADLEY. I thought I heard it somewhere.

Mr. SCHEPPACH. I would agree, Mr. Chairman.

Mr. WILLIAMS. Yes.

Mr. PLUMMER. Yes.

Senator BRADLEY. There are just a few other questions I would like to get into. One of them has to do with the gasoline tax and the automobile industry, and the question is how you gage the short-term versus the long-term effect.

If you put a gasoline tax on, in the short term you would have clearly reduced consumption. And you might make the assumption also, which I think is correct, that people would want to get more fuel efficient autos. Where do you draw the line whether that means the extinction of the automobile industry in this country? And wouldn't that be a force for protectionism, and wouldn't that sort of negate some of the other policy issues?

How do you make that judgment between the short-term loss and the long-term benefit from the gasoline tax with respect to fuel-efficient cars?

Mr. WILLIAMS. The problem you are putting your finger on here is one of the major reasons why you have a gasoline tax that should be phased in. It is important to have the expectations that the tax will be high at some later date, and it should be phased in in relatively small steps.

I think what is going to be very important is to ascertain the extent to which Detroit, in the face of an anticipated schedule of tax increases, could make the appropriate investments to keep up with the demand for the fuel-efficient automobiles, the extent to which they need support for the required capital investments.

Mr. PLUMMER. I would disagree that they would have any trouble keeping up with the demand for those cars. They look awfully small and awfully expensive.

I think if we are going to put on gasoline taxes to encourage them to buy those cars, we might also have to give them direct subsidies for purchasing those cars. I think we are moving very quickly in terms of reducing the size and performance of automobiles. We may in fact be moving faster than is economically feasible.

I don't think the American consumer looks forward as much as Bob Williams does to the 60-mile-per-gallon automobile.

Senator BRADLEY. Let me ask you this: Is there an electric car in the future?

Mr. PLUMMER. We are studying it at the Electric Power Institute. It is definitely in the future. [Laughter.]

Senator BRADLEY. That's too bad, that it's so far in the future.

Mr. SCHEPPACH. We have just completed a fairly major study of the automobile industry. Our sense is that if you are talking about any major tax before 1984 or 1985—I mean anything above 25 to 30 cents a gallon—you are in for significant problems with respect to the auto industry. The only people who are going to be able to produce those automobiles at that time are going to be the Japanese.

In looking at the capital requirements for this industry, to go up to an automobile of about 40 miles per gallon by 1995 you are talking in excess of \$11 billion a year over the 1985 to 1990 period in constant 1979 dollars, to make that kind of a retooling situation.

Senator BRADLEY. This assumes the internal combustion engine in the vehicle.

Mr. SCHEPPACH. Yes, that's right. Such things as supercharged diesels and so on, but basically the same kind of engine.

Senator BRADLEY. \$11 billion a year for the next 15 years?

Mr. SCHEPPACH. I am talking about between 1985 and 1990. They are going to hit 27.5 or even a little bit better by 1985.

It is also important that a tax is a very sensible thing, because executives in Detroit—and I believe them—are worried whether the real price of oil may fall in 1985 or 1986. They are making decisions with respect to that now, and I think by coming forward with setting some tax at this time it gives them certainty that it will go up and they will push on to make the smaller cars.

Senator BRADLEY. Do you know for a fact that they are worried about the drop in the price of oil in 1985?

Mr. SCHEPPACH. You have to remember, between 1974 and 1979 we had a drop in the real price of oil. And so I think they are concerned about it.

Senator BRADLEY. Your researchers have been out talking to them and they have actually said that?

Mr. SCHEPPACH. Yes. We spent 4 days out with all of the executives in Detroit.

Senator BRADLEY. That raises a more general question. What if our tariff works beyond all of our wildest expectations and the price of oil drops? Then we have our friends in Detroit that we have to bail out for another reason, because they did the right thing, not the wrong thing.

Does that trouble any of you? Not about Detroit, but—just think about that. Bob, do you want to respond?

Mr. WILLIAMS. I want to comment on the investment. To double the new car fuel economy between 1985 and 1995 would result by the year 2000 in a savings of some 2½ million barrels per day of gasoline. The required investment, which has been estimated to be on the order of \$100 billion over 10 years, should be considered in the light of those savings.

Senator BRADLEY. Are you familiar with the study done by the National Academy of Sciences on the automobile industry? The numbers that I got from there said that, for an investment in the

range of \$20 billion, you could increase the mileage of the average car on the road from 15 to about 30 to 33.

Mr. SCHEPPACH. I'm not sure I disagree with that. We are talking about going from the 27.5 in 1985, which is the mileage standard, to 40.

Senator BRADLEY. That's fleet average?

Mr. SCHEPPACH. Yes, that's fleet average. You have to remember that the easiest way to get fuel efficiency is downsizing, weight reduction, front-end axle. And many of these things will have in fact been done to a large extent by 1985.

So what you are talking about is going from 27.5 to 40 miles per gallon by 1995, which is a lot more expensive on the margin.

Senator BRADLEY. I have found this very interesting.

Mr. WILLIAMS. One more comment. Even if an investment on the order of \$100 billion is necessary to double the new car fuel economy between 1985 and 1995, the resulting oil savings would be some 2½ million barrels per day by the turn of the century. That corresponds to a cost of saved oil of approximately \$10 per barrel.

Senator BRADLEY. If oil were \$40 a barrel, it would be a larger justifiable cost; is that right, Bob?

Mr. WILLIAMS. Yes.

Senator BRADLEY. I want to thank all four of you for your testimony and your questions and answers. This is a real problem area, not the least of which is thinking it through. I think politics may be not quite as difficult, but not easy.

And I think your help here on the substantive issues has been very important today, and I want to thank you very much. And although no other Senator attended, I think we will benefit from your words if we can formulate a policy.

Thank you very much.

[Whereupon, at 3:38 p.m., the hearing was adjourned.]

# SPECIAL OIL TAXES

FRIDAY, DECEMBER 12, 1980

U.S. SENATE,  
SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT,  
COMMITTEE ON FINANCE,  
Washington, D.C.

The subcommittee met at 9 a.m. in room 2221, Dirksen Senate Office Building, Senator Bill Bradley presiding.  
[The press release announcing this hearing follows:]

[Press Release No. H-66]

## FINANCE SUBCOMMITTEE ON TAXATION AND DEBT MANAGEMENT ANNOUNCES HEARING ON SPECIAL OIL TAXES

Senator Harry F. Byrd, Jr. (I-VA.), Chairman of the Senate Subcommittee on Taxation and Debt Management of the Committee on Finance announced today that the Subcommittee will hold the fourth in a series of hearings on special oil taxes in which Senator Bradley will participate.

The hearing will be held on Friday, December 12 in Room 2221 of the Dirksen Senate Office Building, and will begin at 9 a.m.

*Witnesses.*—Senator Bradley noted that a series of witnesses, each an expert in his field, has been invited to testify.

### *Invited to testify are:*

Henry Jacoby, Sloan School of Management, Massachusetts Institute of Technology

William Hogan, John F. Kennedy School of Government, Harvard University  
Philip Verleger, Yale University

Alvin Alm, John F. Kennedy School of Government, Harvard University

*Written testimony.*—The Chairman stated that the Subcommittee would be pleased to receive written testimony from those persons or organizations who wish to submit statements for the record. Statements submitted for inclusion in the record should be mailed with five (5) copies by December 15, 1980, to Michael Stern, Staff Director, Committee on Finance, Room 2227 Dirksen Senate Office Building, Washington, D.C. 20510.

## OPENING STATEMENT OF SENATOR BILL BRADLEY

Senator BRADLEY. Welcome to the fourth hearing in our series on special oil taxes. This is the last hearing we'll hold this year on the subject of market-oriented, tax-based approaches to reducing demand for imported petroleum and managing supply disruptions.

But I fully expect the Congress to continue its inquiry next year, and for interest to heighten as we approach the time when existing standby allocation and price control legislation expires.

Today's hearing will focus on supply disruptions. But I'd also like to discuss long-term demand reduction as well and to use this opportunity to clarify a few issues that were not resolved in earlier sessions.

Finally, since we will be preparing a report of these hearings, I'd like to try and draw some conclusions and make some recommen-



dations to facilitate further study of these issues by Congress and the incoming administration.

Our witnesses today are all experts on this subject. William Hogan, of Harvard, has written lucidly and provocatively on import premiums and tariffs. Alvin Alm, former Assistant Secretary for Policy and Evaluation at DOE, brings firsthand experience in dealing with supply disruptions through his involvement in managing the Iranian crisis in 1979. And Philip Verleger, of Yale, has done some thoughtful and illuminating analyses of allocations and price controls and how they appear to make a bad situation worse.

We will follow the same format that we have used in other hearings which is to have each of you make a 10-minute statement and then to have a discussion. Everyone should feel free to interrupt the other parties and clarify the points that the other parties have failed to make lucidly as you would like them to. So, why don't we begin with Mr. Alm.

**STATEMENT OF ALVIN ALM, JOHN F. KENNEDY SCHOOL OF GOVERNMENT, HARVARD UNIVERSITY**

Mr. ALM. Thank you, gentlemen.

I will say in the introduction you talked about my two colleagues' lucid intellectual work and complemented me on the management of the 1979 Iranian crisis, which is a somewhat uneven introduction.

I am delighted to be here. I have prepared testimony for the record but will go over briefly the various kinds of policies and how they are aimed at different policy objectives. There is often confusion when people discuss special taxes, because what they do not specify what kinds of objective they are aiming at.

The first question is what kinds of activities might one undertake to deal with the cost of oil imports, which add pressures on world oil prices. These pressures, in turn, can lead to inflation, recession, and other economic problems. A number of analysts have calculated these damages, Bill Hogan in particular, and he will speak about this. The calculation of these damages is called an oil premium. It is an amount from which one can either subsidize import reduction programs or justify increased domestic prices.

Now what does one do in a steady state situation with economic measures to reduce imports? There are two possibilities that are often suggested. One is the tariff, a steady state tariff, for example, of \$10 a barrel which can be justified on the basis of the oil import premium. The other approach will be the use of a quantitative quota, which would establish import targets for each year. The question is how does one manage a quota? One can manage a quota through a regulatory program, which I think is something we would all like to avoid, through a tariff or through marketable auctions. Under the auction option, tickets to import oil would be periodically sold by the Government. If the quota were binding, auction tickets would be valuable. In turn, product prices would be increased, reducing demand and allocating the available supplies to the highest value uses.

Moving on to the area of supply disruptions, and I would like to cover a series of market options to Government allocations. One

thing is clear with any energy supply interruption and that is governmental allocations make the problem considerably worse. You tend to telescope a small problem. For example, in the Iranian crisis a 4-percent reduction in oil supplies was telescoped into over an 8-percent reduction in gasoline supplies. By the time the allocation system did its magic, individual stations in urban areas were often 15 to 20 percent short.

The first thing that can be done obviously is decontrol of crude oil and product prices. As prices rise, rebates to consumers could deal both with equity concerns and with potential macroeconomic dislocations.

A second possibility in terms of escalation would be to combine decontrol of crude and product prices with a temporary gasoline tax to reduce demand even before shortages even appear. For example, over the period of January to May 1979 our gasoline demand was higher than the previous year. It would have made great sense at that point to have had in place some way to reduce that demand. A gasoline tax could have prevented much of the havoc during the summer of 1979.

The third possibility would be the use of a disruption tariff. A disruption tariff could be levied on the basis of some percentage of the interruption. In other words, if there were 3 million barrels per day interruption, a predetermined tariff would go into effect. The tariff would be even more effective if other OECD or IEA nations jointly imposed such a tariff.

Now the advantage of a tariff is obvious. It would allow the consuming nations to raise prices and clear the market, rather than allowing OPEC to be in a sense our banker for raising prices and collecting the economic rents. The transfer of massive amounts of wealth to OPEC represents a very substantial amount of the losses to the domestic U.S. economy.

Now Bill Hogan will talk about some of the problems in implementing a tariff in terms of retaliation. But, one need not shrink from the tariff merely because retaliation is a possibility for a number of reasons. First, obviously it depends on the kinds of situation whether you would have massive retaliation. If you are talking about a politically inspired embargo, there is no doubt that you would have retaliation. If you are talking about an upheaval, turmoil in the Middle East, producing countries may or may not have a desire to retaliate, depending on their security position and policy on OPEC pricing.

Moreover, there are ways of imposing a tariff that are not as politically provocative. For example, it could be labeled as a domestic tax. There would be various ways to engineer a tariff which would achieve roughly the same kinds of benefits.

A tariff by all OECD nations has at least twice the value of a tariff only within the United States.

Senator BRADLEY. Did you say twice the value?

Mr. ALM. At least twice the value because if all the OECD nations impose the tariff, then the total amount of world oil reduction would be more than twice as great. Moreover you run into some competitive problems if only the United States imposes the tariff. That is, the energy going into the products we export will require increasing the prices of our export products. You can deal

with this problem by relating the extra costs for energy used in exports that have a substantial energy component. And you can also tax the energy content of imports. But these measures would be very complicated. It is obviously preferable to get agreement among the IEA nations to uniformly impose a tariff if that is possible.

Let me make one other comment. A tariff has one significant advantage in the sense that it would create both incentives for building up stocks and would create incentives for drawing them down. If the domestic price of oil went up \$10 a barrel during an interruption, oil companies holding stocks would have an incentive to withdraw them. Without such a tariff the incentive might be to hold the stocks until the world price went up and then discharge them later. Knowing that domestic oil prices would be higher than the world oil price would create incentives to build stocks in the first place.

Imposing a disruption tariff will be controversial; it will take some time to gain political consensus on such a measure. But it is difficult to even debate the question sensibly since we have not yet developed basic machinery for providing rebates within the U.S. Government.

Senator BRADLEY. You say we have not?

Mr. ALM. Right. Which means that any schemes that I have talked about, decontrol with rebates, quota auctions with rebates or the tariff with rebates are really somewhat academic from a practical point of view until the Government has developed a rebate system.

Development of a rebate system will take time. The extent to which Congress can push ahead the process of developing a market allocation scheme, including a method of rebating funds, the more realistic and possible will be the opportunities to use market allocation methods of dealing with supply interruptions.

I suggest that Congress mandate the development of a rebate system, just as it mandated the development of a standby gasoline rationing plan. Then, at the time of the next interruption, the executive branch and Congress could choose between a market system and a regulatory system. Today, there is no choice. Unless we are willing to suffer some macroeconomic problems and if we are willing to walk away from equity concerns, allowing large amounts of money to accrue to oil companies at the expense of consumers, we have no choice but to rely on Government allocations.

I appreciate this opportunity. I will be happy to answer any questions you may have and cavil at the comments of my colleagues.

[The formal statement of Mr. Alm for the record follows:]

PREPARED STATEMENT OF ALVIN L. ALM, HARVARD UNIVERSITY

Mr. Chairman, members of the committee, I appreciate the opportunity to testify before the Subcommittee on Taxation and Debt Management of the Senate Finance Committee on measures to minimize the impacts from supply interruptions.

Striking similarities appear between conditions today and those existing when Iranian production fell in 1979. In both cases, the world oil market was glutted with excess OPEC production when the production cut-offs occurred. In both cases, other OPEC countries hiked production to relieve the shortage, although that increase was twice as large during the earlier Iranian shortage. In both cases, the net world

shortfall was in the range of 4 to 5 percent; in fact, the supply shortfall is somewhat more severe today. In both cases, the U.S. strategic petroleum reserve was less than one-tenth filled, no gasoline rationing system existed and emergency preparedness tools were in a rudimentary state.

But there is one significant difference. Brimming stockpiles in the U.S. and abroad are at all time highs. U.S. stocks of over 1.35 billion barrels are almost 10 percent higher today than a year ago. Japanese stocks rose by 17 percent from June 1979 to June 1980, up to the current level of 466 million barrels. European stocks increased by 10 percent during 1979, up to 1.2 billion barrels, and are even higher today.

Nevertheless, continuation of the war into the next year could lead to a repeat of the conditions of the summer of 1979. A prolonged interruption of supplies from this war or even a perception that shortages are imminent could panic buyers in the world oil market. Once underway, it could lead individual countries to bid for available supplies and to stockpile oil. Such competition would not only lead to higher spot prices, but also to an enlargement of the spot market and subsequent official price hikes and market turmoil. It could ultimately lead to another round of nerve-racking gasoline lines, inflation and recession.

In discussing price measures to cope with supply interruptions, one must be specific about what goals are to be achieved. One goal is to minimize the dislocations that almost inevitably arise from use of regulatory measures, such as gasoline allocations. A separate goal is to drive down demand in order to lower pressures on world oil prices.

The first goal can be attained by relying on the market to allocate supplies, rather than on allocations and rationing. Decontrol of crude oil prices would result in a 15-percent increase in prices now. And more important, as shortages began to crop up, higher prices would reduce demand and allocate supplies efficiently. Since 75 percent of revenues arising from decontrol would be collected by the Federal Government through the windfall profits tax and the corporate income tax, ample revenues would be available for rebates to consumers. Indeed, with a small oil surcharge, consumers as a class need not be worse off than if prices remained controlled.

If the goal, however, is to ease pressures on the world oil price, then the domestic prices must rise above the world oil price prevailing at the time of the interruption. Instead of waiting for OPEC to raise prices to clear the market, the consuming nations could beat it to the punch. If all OECD nations agreed to impose a disruption tariff—triggered at some percentage of the world oil shortage—world oil prices could theoretically be held in check. By consciously increasing domestic prices to soak up excess demand, price pressures could be minimized. If the United States acted alone, the value of the disruption tariff would be more than cut in half.

The letter of invitation specifically asked what effects various levels of tariffs might have on the world oil price. Although differences abound on how to calculate the proper short term response of demand to price, a reasonable estimate is that every 10 percent price increase reduces demand by 1 percent. Using this measure of elasticity, and ignoring panic stockpiling and other real world phenomena, a \$10 a barrel tariff on imports would cut imports by 500,000 barrels of oil per day. That reduction of United States demand would ease the price increases from a 3 million barrel per day worldwide cutback from \$20 to \$17 a barrel. A \$30 a barrel U.S. tariff would reduce consumption by 1.5 million barrels of oil per day, cutting the world oil price increase from \$20 a barrel to \$10 a barrel. If all OECD nations participated in the tariff, the \$10 tariff would reduce the world oil price increase to about \$13 a barrel and the \$30 tariff would wipe it out altogether.

A tariff would also create a strong incentive for the private sector to build up stocks before an interruption and withdraw them during the disrupted period. By raising domestic prices during an oil cut-off, oil companies that previously build up stocks would have a powerful economic incentive to withdraw them. And the promise of high profits from stock withdrawal would encourage their being built up in the first place.

A tariff is not without problems. OPEC might retaliate against a tariff by raising prices or cutting production. If "low absorbing" countries such as Saudi Arabia took the lead, such action could well be painful to the West. While this argument is clearly valid for a politically-motivated embargo, it may be less valid when the disruption is precipitated by war or revolution that indirectly affects the security of OPEC nations.

The revenues to be rebated would be very large—\$70 million a day for the \$10 tariff and \$210 million a day for the \$30 tariff. If not rebated quickly and efficiently, the tariff could cause adverse macroeconomic impacts and personal hardships. Any country opting out of the agreement would gain "free rider" benefits by selling their

products cheaper in international markets. Finally, many would conclude that the Government, by imposing a tariff, was adding to the problem, not helping it. Despite these problems, a disruption tariff could have large economic benefits, and if pursued with our allies, could represent a large step forward in reducing economic vulnerability.

If a tariff is not politically feasible, we can at least take steps to minimize the impacts of domestic shortages. A first step would be to decontrol crude oil prices and resist the temptation to re-impose them during interruptions. A rebate of increased taxes collected from the windfall profits tax, the corporate income tax and perhaps a small surcharge on domestic oil could reduce consumer hardships and macroeconomic dislocations. An emergency gasoline tax, although less effective than a tariff on all products, does have the advantage of not raising international competitive problems if applied domestically. These two steps, as well as the use of a tariff, would represent a massive improvement over where we are today, and could well create a political understanding of the need to use the marketplace—not insulate ourselves from it—in coping with oil supply interruptions.

**Senator BRADLEY.** Mr. Hogan.

**STATEMENT OF WILLIAM HOGAN, JOHN F. KENNEDY SCHOOL  
OF GOVERNMENT, HARVARD UNIVERSITY**

**Mr. HOGAN.** Thank you, Mr. Chairman. I also appreciate the opportunity to appear before this committee. I have prepared remarks which I will submit for the record.

**Senator BRADLEY.** They will be in the record in full.

**Mr. HOGAN.** Let me just summarize the main points that I made and then we can turn to the general discussion after we finish the presentations.

As you know, oil supply interruptions are at the core of energy problems in this country and the rest of the world. This threat deserves the attention this committee is giving to the subject. We need all the attention of our government and other governments in order to design programs to mitigate the damages that we face and that we are surely going to incur with oil supply interruptions likely to come in the near future.

The full program to meet oil emergencies is going to be much more complex and involve many more steps than we are able to discuss today at these hearings. There are at least two major reports recently which summarize some of the programs that might be included. We have other reports such as the Senate Energy Committee's study on the "Geopolitics of Oil" that established the context of the problem internationally. The two reports on programs are the Department of Energy study on Reducing U.S. Oil Vulnerability, and the report of the Harvard energy project, Energy and Security, released yesterday. The details of the programs cited in those respective documents and elsewhere are many; let me just summarize the main points.

The first and most important is the strategic petroleum reserve. In a situation such as we have today, where there is a significant probability of a major worsening of the world oil market and where there is a very low strategic petroleum reserve, the wisest thing to do is to increase the rate of fill. We have a 100,000 barrels per day minimum legislated in the Energy Security Act; recently Congress directed the President to seek to increase that to 300,000 barrels per day. This fill must be supplemented by increases in capacity to store the oil. Otherwise, we will have to decrease the rate of fill. The development of market allocation programs in order to efficiently allocate the available supplies during an interruption is

another major item that should be included in any emergency package. My colleague, Al Alm, has mentioned this need. We have the experience of the Government worsening the situation in the past, trying to handle the essentially impossible task of detailed allocation of supplies to every consumer in the country. A market system would be much more effective. A system of rebates associated with it would help us solve the equity problems.

Surge production and fuel switching offer opportunities on the supply side for quickly increasing some supplies to substitute for losses in import oil. The details are many. Natural gas reserves that are now held for seasonal purposes might be extremely valuable for use in case of oil interruption. If we could violate the traditional engineering rules with oil wells and exceed maximum efficient rates of production, the loss in ultimate recovery might be justified by the value we receive by having the oil available during an interruption.

We should improve the electric power intertie system, so that we can wheel power. We don't have much excess capacity now but we could change this condition in the not too many years.

Finally there is a vast array of conservation programs that have been suggested and examined in the past and ought to be perfected for future use. Certainly if we are talking about oil supply interruptions where prices could be as high as \$100 or more a barrel, many options which we would not think of normally, van pooling and various extraordinary conservation options, would become attractive.

That leads us to the question of special oil taxes, the issue that is of particular concern in these hearings. There is no question that oil taxes have to be an important part of our longer run energy policy and any program for meeting oil emergencies.

We can do many things to decrease oil demand and increase oil supply. Some of the programs I have already mentioned. In theory, if we were extremely effective and used all the options available, Government could improve upon its record and accomplish all these demand reductions and supply expansions without any significant delay. Then we might avoid the price increases that are inevitably going to take place in our own market and world market. But I doubt that we will ever succeed with such effective import management. Therefore, higher oil prices will be an essential, unavoidable feature of any oil supply interruption.

That leaves us only with the choice of who will receive the revenue. Obviously it is preferable for the revenue to be kept in the oil importing countries rather than using OPEC as our tax collector. We need a tax policy that captures the revenues by raising prices to domestic producers without relying on an increase in imported oil prices as a way to raise those prices.

Of course the first step is not to tax but to remove any subsidy, that is, to remove the subsidy by decontrolling oil prices. I favor completing the decontrol process as soon as possible. I did not read the papers this morning, so I don't know if the decision was made yesterday. But I would not be disappointed if we had instant decontrol, partly to remove the price subsidy but more importantly to remove the necessity for imposing an allocation system if we have a major shortage.

Going beyond decontrol, we enter the realm of taxes. It is easy to justify having a significant tax on imported oil. We have many externalities associated with oil use: inflation effects, balance of payments impacts, the cost of oil supply interruptions. There has been a great deal of study of these externalities and how much of a premium they suggest for imported oil. My own calculations indicate that this longrun import tax or tariff to cover these externalities could be somewhere in the neighborhood of 30 percent of the market price.

This would be now around \$10 a barrel. It is important to describe this as an ad valorem tax to simplify the implementation of the tax and also provide a better set of incentives for oil producers. The other point I should emphasize is that the 30-percent tax or tariff would be justified over the long run.

Senator BRADLEY. Say that again.

Mr. HOGAN. The 30-percent figure would be justified over the long run, to reduce oil imports for many reasons, including the problems of oil supply interruption. A quite different figure would apply during an oil supply interruption. Over the long run we have great flexibility. There are many things we can do to substitute for imports, so we don't need the same size tax in order to get a particular demand reduction. And over the long run we are never quite sure when an interruption will come, so we have to discount for the probability that it will happen in any particular year.

When an interruption actually comes, our flexibility is less and the uncertainty is removed. The same calculation would suggest a much larger tariff would be appropriate during interruption. The precise figure is hard to specify in advance because it depends on the size of the interruption and the character of that interruption. But it is easy to conceive of tariffs or taxes in excess of 100 percent of the market price of oil that would be appropriate for quick application in order to mitigate the effects of a major supply interruption.

If we adopt this premium and apply it through a tariff, we will face another serious problem: potential retaliation on the part of the oil producers. The retaliation potential is different over the long run than over the short run. It may be that during an interruption, depending on the nature of the interruption, we could have a tariff and if it was not perceived as a political weapon, we would have no retaliation by the major oil producers. But it is hard to imagine over the long run if we impose a 30-percent tariff we won't face the danger that oil producers view the tariff as a confirmation of the high value of oil and raise their price with the argument that they, not the oil importing countries, should be receiving that wealth.

There are many theories about oil producer behavior which suggest that retaliation is possible. There are also theories which suggest that retaliation is not in their own interests. I do not pretend to know the answer as to which of these theories is the best descriptor of oil producer behavior. But it is not necessary to select among the theories to recognize that the danger of retaliation is significant and we should consider it in designing our tax policy.

I would not forgo the substance of a tariff. We need a 30-percent tariff for the long run and the authority for a larger disruption tariff. But we should consider ways to design the form of the tariff so that we don't risk an unnecessary confrontation with the oil producers and provoke them to some form of retaliation.

For example, we could achieve the same end with an oil security import fee to finance the strategic petroleum reserve. Taxes on oil products are somewhat less focused on oil imports. They are inferior from the economic efficiency point of view, but the small cost in efficiency may be worth the large political gain in mollifying the sensibilities of the oil producers.

There are other combinations of such programs that we might consider. Unlike most situations, where I value the virtues of simplicity, it may be that in designing taxes on oil a little complexity is in our interest. Such complexity would not be in the interest of this committee, that must endure the process of designing the tax, but it might be in our national interest to provide the political opportunity for the oil producers to accept the tariff without any kind of retaliation.

The retaliation danger is real and should not be ignored. On the other hand, it should not be incapacitating. We should consider the concerns of the producers in determining the form of the taxes, but not the substance.

As to the equity question, I favor the use of income rebates. We have had the sad experience of changing the structure and incentives of the entire oil market, for everyone in the country, in order to solve the problems, the legitimate problems, of a loss of income and a drop in living standard for the few. We have recognized the failure of that policy. Through the decontrol of our oil prices we are eliminating that policy. In the windfall profit tax legislation we included provisions for rebates to the poor. This establishes the principle that we have used elsewhere in our economy and should be applied to oil as well.

We should preserve the price incentives in the marketplace for the many and we should send money to the few in order to solve the equity problem. I don't think situation changes over the long run or the short run. If we have a large tariff or tax over the long run, in order to reduce oil imports, we may wish to rebate some of it to the poor. If we have a sudden increase in that tax or tariff during an oil supply disruption, we should rebate funds to the poor to solve immediate equity problems. We should not use price controls again as we have in the past.

Finally, let me say a brief word about two other items, the questions of quotas and cooperation. Often we hear the suggestion that we impose import quotas as a way of controlling the size or the quantity of oil imports and thereby avoid the necessity for the onerous taxes that we would like to avoid. Unfortunately quotas are not equivalent to taxes in a market where the producers have significant market power.

If we impose quotas which don't bind, they have no substantive effect although they may have some symbolic or political effect.

But if we fix a quota that binds, it sets demand for the oil that producers face. They can raise their prices and they lose no market share. The import quantity is fixed by the quota, so they can raise



their prices until the quota no longer binds. What this does, in effect, is to allow the producers to raise their price and collect the tax for us. We end up in the worst of both worlds. We have the higher prices; we have the same quantity of production; but we don't have the revenue flowing to our Government. The higher revenues flow to the governments of the oil producing countries.

Quotas in the present oil market would be counterproductive.

On the other hand, international cooperation can be valuable. As Alm mentioned, the externalities that exist in the oil market apply to the international context just as they do domestically. Any tax that we can justify when acting alone could be doubled or more if we could orchestrate the comprehensive response of oil importing countries to have a tax of similar size. If we can't, there will be free riders in the world market.

This has been a sticking point for much of the discussion about the strategic petroleum reserve, oil tax policies, and other emergency programs; many have concern about the free riders in the world market.

My view on cooperation is that it is so difficult to fashion a truly comprehensive international cooperative tax policy, that despite the value of that outcome we don't want it to let it distract us from the steps we can take now by ourselves. Certainly any tax that we could fashion internationally, if it were designed optimally, would be larger than the tax we design if we act alone. So the first step would be to design our own tax. If we can fashion cooperative measures in addition we could increase the tax later.

Much as with the debate we had during the middle 1970's, about the ultimate size of the strategic petroleum reserve, we delayed the first purchases even though the ultimate size of the strategic petroleum reserve should have had no effect on the early purchase rate.

So this is true in the design of cooperative taxes. We don't need international cooperation in order to take unilateral action. We should not forgo the benefits to us because of envy of the good fortune of free riders in the market if we impose the tax on ourselves.

In summary I think the taxes under consideration by this committee and many more that could be designed are an essential feature of any program to meet supply interruptions. I would favor a 30-percent excise tax on refined oil products with standby authority for emergency taxes of 100 percent or more to meet the problems of oil disruptions. Authority for a rebate system to solve the equity problem and changes in the windfall profit tax in order to preserve the incentives for domestic producers should follow close behind.

Thank you.

[The prepared statement of Mr. Hogan for the record follows:]

PREPARED STATEMENT OF WILLIAM W. HOGAN, HARVARD UNIVERSITY—OIL TAXES  
AND OIL EMERGENCIES

I appreciate the opportunity to appear before this committee.

The high cost of a major disruption in the world supply of oil warrants the consideration of every possible means for coping with oil emergencies. Special oil taxes, the subject of these hearings, represent particularly attractive tools under the control of governments. Some form of oil tax should be an integral part of any program to meet on oil supply interruption.

## MEETING OIL EMERGENCIES

A large oil supply interruption creates a direct imbalance between supply and demand and precipitates indirect events which accelerate inflation and raise unemployment. Measures to meet an oil emergency must efficiently and quickly decrease demand for oil, increase alternative sources of supply and dampen the large secondary effects on the economy.

Two recent reports take a broad view of the range of programs needed to meet oil emergencies.<sup>1</sup> Given the urgency of the problem, new proposals appear almost daily in the press. The details of these many programs are beyond our scope today, but among the most important recommendations are:

*Strategic Petroleum Reserves.*—A large Strategic Petroleum Reserve (SPR), supplemented by private oil inventories, would be the best cushion against a sudden loss of oil supplies. Congress took action earlier this year in the Energy Security Act requiring the immediate filling of the SPR at a minimum rate of 100,000 barrels per day. Even in the present market, with all the uncertainties surrounding the war between Iran and Iraq, we would increase this rate of fill. With a small reserve and a probability of an even larger disruption over the horizon, the sensible thing to do is to build inventories now.

*Market Allocation.*—A major supply interruption will dramatically alter the patterns of oil use. The millions of individual decision makers in the oil market will be far more effective in adapting to these changes than could a small number of central planners in Washington. In the past, government allocations have aggravated the problems of oil emergencies. We can help soften the blow in future emergencies by avoiding government involvement in the details of supply allocation. Last year President Carter set us on the path of gradual decontrol of oil prices. We should accelerate that process by immediately eliminating the last vestiges of price controls and standby allocation systems. We can use the market to allocate supplies and design a system of income transfers to meet our concerns for equity across individuals.

*Surge Production and Fuel Switching.*—Our inventories of natural gas, held in reserve to meet extremes in weather conditions, could be a substitute for imported oil during a supply interruption. This supplement to the oil reserve is available in limited quantities now. It should be expanded. Furthermore, nearly every oil well is capable of a short-term surge in production, at the expense of some loss in ultimate recovery. During a major supply interruption, producers could justify this future cost if they received some of the benefit of the extraordinary increase in the value of additional oil produced during the interruption. We need to consider modification of the windfall profits tax in order to create the proper incentives for surge production. Finally, we have opportunities for power wheeling to exploit our large stocks of coal.

*Conservation.*—There is a vast array of individually small but collectively important conservation steps that could be used in an oil emergency. Van pooling, lower thermostat settings, speed limit enforcement, and many other options have been considered before and should be perfected for future use. Options judged unattractive in the past, when oil prices were under twenty dollars a barrel, may be cost-effective in a major oil supply disruption when the price of oil could be over a hundred dollars a barrel.

## OIL TAXES

To the extent we succeed in quickly increasing supply and decreasing demand, we can soften the increase in price that will accompany any oil supply disruption. A rapid increase in the world oil price creates an enormous shock for the economies of oil-importing countries. The wealth transfer causes major secondary problems of inflation and unemployment in the short run. To the extent that the higher prices during the disruption lead to higher long-term prices, the supply interruption imposes a continuing drain on our standard of living.

Higher prices are a natural response of a market suddenly faced with an excess of demand over supply. Higher prices provide the incentive for emergency conservation and rapid supply enhancements. In theory, it would be possible to achieve all the needed demand reductions and supply expansions without an increase in price. But in practice we do not come close to this ideal. So higher prices are an essential feature of any major supply disruption.

<sup>1</sup> Department of Energy, "Reducing U.S. Oil Vulnerability," Office of Policy and Evaluation, Washington, D.C., Nov. 10, 1980; D. A. Deese and J. S. Nye (editors), "Energy and Security," Ballinger Publishing Co., Cambridge, Mass., 1981.

The only choice left is selecting the beneficiary of the enormous revenue generated by the higher prices. In the past, by default, we elected to make foreign oil producers the primary recipients of the higher revenues. We even managed to increase these revenues through our price controls and the complex entitlements system.

There were two primary reasons for this policy of using foreign oil producers as our tax collectors. First, we softened the average price impact on the domestic consumer (but not the marginal price for the economy as a whole). Second, we prevented a collateral transfer of wealth to domestic oil producers. On balance these benefits were not worth the cost.

With the final decontrol of oil prices we will abandon the worst elements of this failed policy. The U.S. market will now see the true signals from the world market. This is an essential first step in strengthening our ability to meet oil emergencies.

The issue before this committee is whether to add additional taxes to further suppress the demand for imported oil. The economic answer is straightforward in principle. We can justify taxes as necessary to correct market prices to reflect externalities, effects of oil use which are not captured in the price to consumers.

In the past few years, we have assembled an impressive list of externalities associated with the use of imported oil. Higher oil imports exacerbate the effects of oil price inflation. Higher oil imports worsen the balance of trade, thereby affecting the price of oil for every consumer; hence, the last barrel imported costs much more than the market price. And finally, higher imports make us more exposed to the short-run cost of oil supply disruptions.

Debates will range for years over the precise measurement of these externalities, but the broad conclusions are not in doubt. Over the long run, imported oil costs us more than the market price. Year in and year out we will import too much oil if consumers do not bear the costs of these externalities. We need a permanent ad valorem oil tax in order to provide the domestic market with the correct signal about the true cost of oil imports.

My own calculations suggest that this long-run import tax (tariff) should be somewhere in the neighborhood of 30 percent of the market price. The higher price will be unwelcome, but it will reflect the true cost of oil imports. Society as a whole is paying the cost now and subsidizing the consumer.

This relatively modest tax for normal times should be increased during a supply interruption. Over a period of many years we will have substantial flexibility to adjust the use of imported oil, and the precise timing of an interruption is uncertain. Hence, a 30-percent tax can have a large impact and reflect the expected costs of an interruption. When the supply interruption comes, however, the uncertainty is removed and there is less flexibility in oil use. We need a much larger emergency tax, standing by for quick application when the disruption occurs. Otherwise, the gap between supply and demand will drive up prices in the world market, once again making the foreign oil producers our tax collectors. A large enough emergency tax could avoid some or all of this world price increase while passing the necessary conservation and production signals on to the domestic market.

The precise size of this emergency tax will depend upon the depth and nature of the disruption, which cannot be predicted in advance. However, the correct tax could easily be 100 percent, or more, of the market price.

#### RETALIATION

In narrow economic terms, the most efficient form of an oil tax would be a tariff on oil imports. Imports are the source of the externalities, so imports should bear the burden of the tax. There would be no reason to penalize other forms of energy or other sources of oil.

Unfortunately, an oil tax is a political as well as an economic weapon. The more visible the tax, and the more immediate the link to oil imports, the more likely that we will provoke the oil producers. For many reasons, producers might view a blatant tariff as final confirmation of the high value of oil, value that they, as the owners of the oil, should receive. For instance, producers might be uncertain about the true value of their oil, and the tariff would remove the uncertainty. Their current pricing policy may be a political response to U.S. entreaties for low prices, and the tariff would remove this putative benefit. Or producers may simply lash out at the confrontational policy epitomized by a high oil import tariff.

Lacking a definitive theory of producer behavior, we do not know what would happen. But it is easy to believe that a clumsy tariff policy would produce sharp retaliation through reduced production and higher world prices. Such retaliation could negate the benefits of the tariff.

Although there can be no guarantee that an oil tax will not precipitate producer retaliation, we should not let the threat prevent us from using this important tool.

We should increase prices to domestic consumers, but we can design the tax to minimize the political confrontation with producers.

This rules out a straight tariff. But many options remain. For example, there is ample justification for an oil import security fee to finance the SPR. Imposing taxes on refiners, wholesalers, and retailers would increase indirectly the cost of oil products. Even a direct excise tax on all oil products would be less of a challenge to the oil producers. (At the same time we could adjust the windfall profits tax to restore the incentives for domestic producers.) We might even justify the agony of legislating a complex combination of such taxes in order to cover our tracks in creating a tariff without a tariff.

Of course, no oil producer seeking a confrontation with consumers would be unmindful of even the most obscure tax program. In the end, the higher price would be evident at the pump. But such a determined foe probably doesn't need provocation to raise prices. And a carefully presented set of taxes may be acceptable to the leading producers who have long called on the U.S. to match the conservation in the rest of the world. We should be able to raise our domestic prices to the level found in most other major oil-importing countries.

The retaliation danger is real, but it should not be incapacitating. We need permanent taxes to reduce long-run import demand and standby taxes to meet oil emergencies. We should consider the sensibilities of producers in determining the form of the taxes, but not the substance.

#### EQUITY

Higher prices through taxes will create the correct incentives in the domestic market. We need these incentives to bring our oil imports into balance. Unhappily we cannot limit these higher prices to the marginal consumption decisions. Consumers will pay the increased price on each purchase. Left alone, the result will be an unacceptable redistribution of wealth, especially reducing the living standards of the poor.

Inequities in income distribution caused by changes in prices are not a new problem or unique to oil. What has been unique about oil has been the attempt, through price controls, to alter the price incentives for the many in order to slow the unwanted drop in living standards for the few. Finally, in the windfall profits tax legislation, we settled on a sensible policy that directly attacks the problem of income distribution: Preserve the price incentives for the many and send money to the few.

During a supply interruption, critical income transfer problems will demand action by government. But except for scale, there should be nothing exceptional about the solution. The best of a bad situation will be to preserve the price incentives for the many and send money to the few. Since speed of response will be essential during the early stage of an interruption (for macroeconomic management as well as equity reasons), some use of existing institutions through a combination of reduced withholding and increased welfare payments may be the best avenue for large rebates.

Whatever mechanism we use, just announcing the rebates will have an immediate effect. It won't be the first time consumers spend their money before their checks arrive. Such rebates must be superior to the proposed gasoline rationing system where we are sure to disrupt the market while we distribute the coupons.

The need for speed also suggests a decoupling of the tax collections and the rebates. The existing windfall profits tax will produce large new revenues for the government. If we are concerned about the short-term profits a supply interruption will bestow on downstream holders of product inventories, we may want a supplemental emergency windfall profits tax. But the income transfers to the poor are a separate matter. There is no reason to link the timing or magnitude of the revenue flows.

The details of any rebate program will be important. There must be a close connection with the fiscal and monetary response to mitigate the real costs of inflation and unemployment. It may be that these goals complement rather than conflict: a rapid rebate will lessen any problems of fiscal drag due to higher oil prices. In any event, logic and experience point to transfers of money as the most efficient and effective means of redressing an unacceptable income distribution.

#### QUOTAS AND COOPERATION

At least two other issues surface in any discussion of limiting imports through oil taxes. The first concerns the use of quotas as a more direct means of controlling oil imports. The second is the necessity for cooperation with other oil-importing coun-

tries. These are subjects worthy of lengthy investigation, but given the present state of our oil policy the central conclusions are clear.

Quotas are not equivalent to taxes. In a world where oil producers have market power, quotas remove an important incentive to moderate world prices. If the quota binds, it fixes the demand. Higher world prices produce higher revenues for producers but no decrease in import demand. The natural response of producers would be to raise prices until the quota no longer binds. This would defeat the purpose of the quota and, once more, make foreign oil producers our tax collectors. This is not the answer.

By contrast, international cooperation can be very valuable. Conservation in any country can reduce prices for all countries. The externalities of oil apply to the international market as much as the domestic. Acting together, the oil-importing countries can justify a much larger tax, and reap much larger benefits, than can each country acting alone.

Unfortunately, it is no easy task to fashion a cooperative international tax policy. In the interim, we should not let the lure of this attractive goal distract us from capturing the benefits of unilateral action. Cooperation can only increase the size of the appropriate tax. So we should make the first move alone. A tax in the U.S. will create windfalls for free-riders in the world oil market. But we should not forgo the benefits to us because of envy of their good fortune.

#### SUMMARY

Oil emergencies are the core of the energy problem. The fundamental change in the nature of the world oil market has been enormously costly to us, and we may never again see the benign conditions of a decade ago. But there are many steps we can take now to lessen the costs of supply interruptions. Oil taxes will facilitate and reinforce nearly all of these actions. Having adopted a policy of removing U.S. oil price subsidies, we should now turn to the use of oil taxes. A 30-percent excise tax on all refined products with standby authority for emergency taxes of over 100 percent would be a good start. Authority for rebates and changes in the windfall profits tax should follow close behind.

Senator BRADLEY. Mr. Verleger?

#### STATEMENT OF PHILIP K. VERLEGER, JR., YALE UNIVERSITY

Mr. VERLEGER. I also submitted testimony for the record. I will just summarize it here.

Let me start by saying that I think this is probably one of the more important domestic policy matters faced by the United States today, particularly in terms of facing short-term disruptions such as we experience with Iran and Iraq in the Iranian-Iraqi war today. In my testimony I have attempted to address the seven questions you submitted to me by your letter and I will here give you a summary of my answers.

Let me start by first describing the domestic oil market as I see it. It is something we have only begun to understand over the last few years. For instance, after the Iranian crisis it was argued by many that we should increase our inventory, that we should fill our strategic petroleum reserve and that perhaps the United States should implement requirements in the Energy Policy and Conservation Act which required oil companies to build their inventories or hold the industrial reserve up to 250 million barrels.

The proponents of increased inventories argue that precautionary stocks represent the surest form of protection against increased oil prices. Stocks, they claim, will discourage oil companies and consumers from running to the spot market at the first sign of trouble and causing further escalation of oil prices.

In recent weeks we have seen this view does not quite hold. Stocks may be high today. We entered the Iranian-Iraqi war with very high stocks. What we have seen is consumers who have lost supplies from Iraq have once again turned to the spot market.

They don't want to run down their stocks. As a result, the world could be faced with a likelihood of further escalation of world oil prices of perhaps 30 to 60 percent. Such an increase will not doubt increase further macroeconomic distortions, inflation, unemployment similar to the distortions faced in 1973, 1974, 1979. In my view the explanation for this behavior in terms of stock is explained by the profits that can be made on inventories.

There is a large economic literature on the demand for inventories. Very little of it focuses on oil. What one finds is usually determinants of demands for inventories and final demands for output. If you read the works of Feldstein and Auerbach or Lovell or any other economists, there is very little examination of the speculative element. In the case of oil and certain other commodities there is clearly a speculative element.

If one examines three sets of data, crude oil prices, price of petroleum products sold on the spot market, and oil inventories, one can notice a very close relationship. Specifically prices quoted on the various markets, particularly Rotterdam, are a leading indicator of future crude prices. As I show in an analysis, which is appended to my testimony, spot prices explain 99 percent of the variance in official posted prices by OPEC countries with a lag of between 3 months and up to 1½ years.

There is a dynamic relationship. This relationship is very stable and an oil trader could come within 40 to 50 cents in predicting next quarter's official OPEC price during most of the hiatus between 1975 and 1980.

One may also quote the cyclical behavior of inventory is correlated to movement in prices of products and cost of crude oil. If spot prices increase while crude prices remain constant, inventories tend to increase, particularly if we are operating under a regime of product price controls such as administered by EPAA. If spot prices remain constant while crude prices increase, inventories tend to fall.

Senator BRADLEY. Say that again.

Mr. VERLEGER. If spot prices remain constant when crude oil prices increase, inventories tend to fall. Obviously the profit goes down. I demonstrate this relationship on figure 1 and figure 2. On figure 1, I compare the marginal cost of a barrel of crude oil to an average U.S. refiner with revenues realizable from the sale of product derived from that crude on the gulf coast market. This is what is called realization. It is a weighted average of the prices of the various products where you take a barrel that produces 30 percent gasoline, 20 percent heating oil and maybe 50 percent residual fuel oil. You can compute realization for cracking refineries or hydro skimming refineries. If you look at Ratt's Oil Price service on Monday or Tuesday, they do a neat calculation with respect to Rotterdam. More weight is given to residual fuel oil and heating oil and very little to gasoline.

Senator BRADLEY. Is that a realistic—

Mr. VERLEGER. It is the number that for years has been used by the exporting countries to determine the value of their crude oil. If I offer to sell you a barrel of crude oil, you would not want to buy it because it won't do anything in your car, but we could compute

the value of the crude oil by looking at the products that could be derived from it.

One uses a hydro skimming refinery slate, emphasizing residual fuel oil, to determine the value of crude oil rather than hydro cracking on the theory that the downstream facilities earn a rent or a profit which is a rate of return on those facilities so that the higher values from the hydrocracking refinery result from further investment in the refining process. The basic value of the barrel of crude oil is determined from the mix of products you get out of the distillation process. What you do is you compare the difference between the realization on the spot market with the cost of crude oil, I will call this difference a profit. With the fluctuation in inventories one finds that when profits decline inventories are liquidated. When profits increase inventories increase.

I apologize, the data are not seasonally adjusted. You can note that the inventory reduction in late 1977 and early 1978 which was widely criticized by groups such as Energy Action resulted from a low profit from holding a barrel of oil that occurred in early 1977 and indeed the quotation that I included in my testimony from "The Economist" which appeared in the September 27, 1980 issue criticized the oil industry for selling inventory and bidding up the demand for inventory when prices are high, they find it is unprofitable to hold a barrel of oil.

With 20 percent prime interest they are spending something like \$6 a barrel per year just to hold, that is the time cost of holding that barrel of oil pretax.

So what you can see from this analysis is if the spot market starts to rise, the profit maximizing behavior is to go acquire oil and increase inventories.

Senator BRADLEY. Say that again.

Mr. VERLEGER. If the spot market prices in Rotterdam begins to rise or on the gulf coast or in New York harbor begins to go up as it would if panic buying took place there becomes then at least a strong argument and an incentive to increase inventories. There is a relationship back to the crude oil market. A company can infer that the cost of crude is going to go up and they can profit by acquiring the oil at spot today, crude oil, holding back crude oil and not moving it through to the market because there will be inventory windfalls to be made. I think Bill Nordhaus noted this on November 12 when he testified here.

If you already hold inventories as many countries did this year, the rational action is to keep them when the spot prices begin to rise. One of the things which has been noted in the Wall Street Journal and Business Week and the trade press is that we have had a hard time causing companies to reduce their inventories during the Iranian-Iraqi war. I believe that in recent meetings of the IEA early this week there was an emphasis on forcing or encouraging countries to liquidate inventories.

Now given the structural relationship let me address the seven questions you asked. The first is: Given the limited strategic reserves and private stocks of oil that would be available if a major disruption occurred within the next few years, what measures would be needed to protect the United States and the international economy against the depressing effects of foreign oil price in-

creases, domestic shortages, and massive new outflows of funds to foreign producers?

My basic answer is that we should keep our stocks high. I would note that the potential for private stocks is much less limited than might be imagined and suggested by your question. For instance if you refer back to figure 2, one can note that the range in private stocks, and I have excluded the strategic petroleum reserve stocks in this analysis, is from a low of a billion barrels in 1976 to a high of 1.35 billion barrels this last summer. That swing is about 350 million barrels and is equivalent to something on the order of a year's supply of oil in case of a 2-million-barrel-a-day world reduction where we absorb half of it.

The trick is to create incentives which cause the companies to keep these stocks high. The second trick, is to encourage them to build capacity to hold more stocks. What I would note is that we should recognize that it is probably not in the public interest to allow spot market prices of product to fall to the point where it is unprofitable to hold inventories. There are two ways of doing that. One would be tax incentive. I served in the U.S. Department of Treasury from June of 1977 to July 1979 and I am aware that getting the U.S. Treasury to create any sort of tax incentive such as this is nigh on to impossible. It does not matter who the Secretary of the Treasury is.

Senator BRADLEY. What kind of tax incentives?

Mr. VERLEGER. Tax credits for holding inventories have been the most obvious alternative, on the order of a dollar a barrel per year for every barrel held. I think the alternative and a much better solution, also suggested by my colleague at Yale, Bill Nordhaus, would be a price support for oil. The United States should agree to acquire oil at a price following a program such as that set up by the USDA and for other products.

I know this flies absolutely in the face of the wisdom in Washington for the last 7 or 8 years but in fact what you are talking about is sopping up as a sponge this extra oil.

With respect to inventory capacity, I can think of two approaches. The simple way would be a tax incentive which would be either a higher tax credit for building capacity or rapid depreciation such as the 10-5-3 depreciation scheme suggested in the Kemp-Roth bill. Alternatively DOE might establish storage capacity goals which a refiner would be required to meet in order to qualify for access to the strategic petroleum reserve.

In other words, if the refiner did not build storage capacity up to a certain limit he would be left to the tender mercy of the marketplace. Optionally refiners could avoid this penalty by developing their own sources of crude oil supply.

My general view is that regulation has not worked. I have looked in detail at EPAA and I prefer some sort of tax incentive to any form of added regulation.

Let me turn to the question of using these stocks during the disruption. Your second question was: How effectively and efficiently would \$10, \$20, or \$30 per barrel emergency surcharge imposed on all crude oil acquired by the U.S. refiners restrain domestic demand and foreign procurement prices for crude oil?



In the short term in the first quarter after disruption imposing a tax could reduce consumption by 200,000 to 700,000 barrels a day. Over a year it might be 3 million barrels a day. But I think it is a bad idea because it is going to reduce the speculative incentive to hold stocks so the threat of this tax would reduce the amount of inventories held by companies and so might lead to actually larger increases in spot market prices, offsetting any benefit in the tax you lose on inventory.

A tariff of \$10, \$20, or \$30 on imports would be much more efficient especially if imposed for a short term because what it would do is offer the firms that build inventories the opportunity to make windfall profits on their inventories and those windfall profits are useful especially if the tax is imposed for a short period of time for an interruption such as we have experienced in the 1970's.

What would happen is firms would have to sell during the disruption to capture those windfalls. But selling with this import fee at \$10 to \$20 a barrel they would put more oil on the market, would drive down spot prices back toward the cost of crude oil, and would dampen the effect on the spot market and dampen the increase in OPEC crude prices.

You are not going to repeal the law of gravity. The world price will go to that which equilibrates the supply and demand. The \$10, \$20, \$30 fee is a good idea on imported crude and product. The \$10, \$20, \$30 fee or consumption tax I think is a bad idea, at least for shorter disruptions. In terms of long-term disruptions it may be entirely different.

Your fourth question was: Could an emergency surcharge be adequately and equitably offset by some combination of reduced withholding of payroll, income or other taxes?

The answer is yes. Seven years ago Henk Houthakker and I published the first study of the effect of the gasoline tax in 1973 during the embargo. The answer is at least in aggregate you can fully offset the effect except for the inflationary effect. There are going to be problems though. You have a definite equity problem. The driver in California and the driver in Texas will pay more as will the people in New England. Those who heat with gas in Cleveland and don't drive much will win. Also it will be administratively impossible to make sure every individual receives one rebate and no individual receives two.

My experience suggests we will spend an awful lot of time trying to design a system which assures we get money to everybody, nobody is missed and nobody benefits twice.

I think that this is a mistake and remind you of the debate over the ill-fated gasoline rebate tax in NEP. I think it is unfortunate to waste time on a microelement like this because the cost of overlooking a small number of individuals is probably infinitesimal when compared to the direct and indirect cost incurred when we use alternative approaches, rationing and regulation.

What are the practical problems with implementing this approach? How should imports and exports of petroleum and petrochemical products be treated?

The answer is on implementing it there is not much problem at all. One legislates ahead of time for reduction in withholding

schedules. That can be done through the IRS without much trouble. We collect taxes already. We have the windfall profits tax. The tax revenues from it would go up under a fee because domestic crude oil prices would rise. So essentially there would not be many problems.

Concerning petrochemicals, my answer would be exports and imports of other items. My preference would be to take no action. If you were imposing a fee such as that suggested by Bill Hogan one might have to look seriously at a value added tax on petrochemicals. Under GATT a value added tax can be rebated when we export something. It is imposed on imports. You can set it based on the petrochemical content in the imports without disturbing any of our trade relations or tariffs.

For an emergency surcharge to reduce the outflow of funds to producers, how important would it be for the United States to act in concert with other major importing nations? What are the advantages, costs, and risks of unilateral action by the United States?

Here the answers vary. It makes no sense for the United States in my view to adopt a tariff on imports which has the effect of encouraging U.S. oil companies to reduce inventories and hold down spot prices while France is acting to increase inventories. Indeed if that happened the effect would be to remove oil from tanks in the United States to tanks in France and the spot price would be higher. It would be still higher if we took no action and increased inventories. It is something that has to be done in concert one way or another.

How one does it is a dicey proposition that one has to leave for the experts in the State Department.

On balance, how does the desirability of such an emergency oil surcharge and tax relief program relate to the actual as well as expected depth, duration, and permanent price effect of an oil supply disruption? For example, would the program's relative effectiveness depend on whether the supply loss to the United States were 1, 2, or 3 million barrels a day? How is it affected by very large uncertainties as to the duration of the loss?

I think it is better for almost all sizes of disruption. We have seen a small disruption in 1973 and relatively small disruption in 1979 when it gets into the gentle hands of the Emergency Petroleum Allocation Act and Economic Regulatory Administration creates nothing but trouble. I would far prefer the marketplace left to the fees, tax rebates and rebating the money. The question really is how much does one want the price to go up and with a permanent disruption one knows that in the long run the price of oil has got to rise and one should not try to hold the price down below that long run equilibrium price. One should keep the spot prices from rising too far above it because the world price will tend to overshoot.

Finally, to trigger the thing, we have seen in the past that we have had problems deciding whether there was an interruption. It took us 2 or 3 months in 1979 to decide whether there was a problem. There was a great deal of hemming and hawing. You cannot tell very well what has happened to the volume of oil shipments from the Persian Gulf. I guess the CIA could put some-

one in the Straits of Hormuz and he could measure the waterline of the ships leaving but that would not be effective.

It is far better to use the marketplace, see what happens on the spot market or hopefully in the months to come a better futures market for oil and create some discretion for an administrator like the discretion given to the Federal Reserve Board to watch those markets and to essentially prevent the system from falling apart; if the price begins to rise rapidly in the spot market, to take action.

[The prepared statement of Mr. Verleger for the record follows:]

PREPARED STATEMENT OF PHILIP K. VERLEGER, JR., SENIOR RESEARCH SCHOLAR AND LECTURER, SCHOOL OF ORGANIZATION AND MANAGEMENT, YALE UNIVERSITY—TAX POLICIES TO PREPARE FOR A DISRUPTION IN OIL IMPORTS

First let me state that I believe that the issue of preparing for a disruption in oil imports is one of the most important domestic policy matters faced by the United States today. We have had two warnings. If we fail to heed them, all Americans may pay dearly in the future. Thus I welcome this opportunity to testify.

Second, I will state at the outset that I adamantly oppose most, if not all, federal intervention in the oil market. I think the record of performance of the U.S. government since 1958, when the first mandatory import quota program was imposed, is so awful that one can now conclude that the U.S. citizen is certain to be better off if his destiny is left in the hands of the market place than in the hands of a regulator.

Third, in the interest of being responsive, I will attempt to answer each of the seven questions posed in the letter of November 25, 1980. Before addressing these, however, let me set out a few remarks about the structure of the oil market.

OIL MARKET STRUCTURE

The increase in world petroleum prices which accompanied the 1978-79 commotion in Iran sparked increased interest on the part of consuming countries in developing precautionary oil inventories, both public and private. Members of the United States Congress, the public and even candidates for president have called for rapid filling of the strategic petroleum reserve, and officials at the Department of Energy have again questioned the adequacy of private inventories, suggesting that the U.S. should adopt a program of industrial reserves similar to those established in Japan and Western Europe.

Proponents of increased inventories argue that precautionary stocks represent the surest form of protection against increased oil prices. Stocks, they claim, will discourage oil companies and consumers from running to the spot market at the first sign of trouble, bidding up spot prices and causing further escalation in world oil prices.<sup>1</sup>

In recent weeks, however, it has become apparent that stocks may be less effective than predicted in dampening price increase, because, come a crisis, oil companies, consumers and consuming nations are unwilling to use their stocks. Today consumers who have lost supplies from Iraq seem to have turned once again to the spot market rather than dipping into their inventories.<sup>2</sup> As a result, the world appears to be faced with the likelihood of a further escalation in world oil prices of perhaps thirty to sixty percent. Such an increase will no doubt create further macro-economic distortions, inflation and unemployment similar to the distortions experienced after the 1973-74 and 1979 price increases.

<sup>1</sup> This Process has been most eloquently described by the editors of *The Economist*:

"Western oil companies are expert at accumulating their stocks in the most disruptive way. They buy when shortage threatens, thereby raising prices and increasing the shortage. They run down these stocks when panic is over and the cost of holding them becomes a burden. Come the glut, the companies increase it, plunge real prices down and strengthen OPEC's determination to cash in next time. Come the shortage, they dash for excess stocks (and for large expected profits from stock appreciations)." *The Economist*, Sept. 27, 1980 (Vol. 277, No. 7152) p. 13.

<sup>2</sup> Recently *Business Week* noted:

"The problem is that the huge crude stockpiles built up in all the consuming countries are proving to be ineffective in combating the 2.5 million barrel a day reduction in supplies caused by the war. 'You can't use stocks if you don't think you can get them replenished,' says one London oil analyst. 'The Western governments are finding the weapon they built can't be used.'"

"Oil companies are at least as anxious to remain well-stocked as their governments are. Some analysts hoped that the high cost of storage would keep oil companies from continuing to build stocks, but that has not happened." *Business Week*, Dec. 1, 1980 (No. 2665) p. 51.

The unwillingness of firms to use inventories may be explained by a psychological factor such as anxiety, or by a more measurable phenomenon, profit motivation. My analysis suggests it is the latter. If one examines three sets of data, crude oil prices, prices of petroleum products sold on the spot market and oil inventories, one can note a very close relationship. Specifically, prices quoted on the various product markets (particularly Rotterdam) are a good leading indicator of future crude prices. As I show in an analysis which is appended to this testimony, spot prices as leading indicators explain 99 percent of the variance in crude prices. Further, an oil trader could come within 40 to 50¢ of predicting next quarter's crude prices during most of the hiatus between 1975 and 1980.

One may also note that the cyclical behavior of inventories is strongly correlated to movements in the prices of products and the cost of crude oil. If spot product prices increase while crude prices remain constant, inventories tend to increase. If spot prices remain constant while crude prices increase, inventories tend to fall. This second relationship is demonstrated on Figures 1 and 2. On Figure 1 I have compared the marginal cost of a barrel of crude oil to an average U.S. refiner with the revenue realizable from the sale of that crude as products on the Gulf Coast Market. On Figure 2 I compare the difference between the cost of crude and the revenue realized from the sale of product (a rough estimate of the profit from holding a barrel of oil) with movements in private inventories of crude and product. From Figure 2 one may note that when profits decline, inventories are liquidated; while when profits increase, inventories are increased. (I will note parenthetically that the inventory reduction in late 1977 and early 1978 which has been widely cited by groups such as Energy Action as a cause of the problems in late 1978 and early 1979 corresponds to a period of decline in profits.)

Figure 1  
Spot Market Value of Products  
From a Barrel of Crude on Gulf Coast Markets  
Compared to the Post Entitlement Refiner Acquisition Cost of Crude

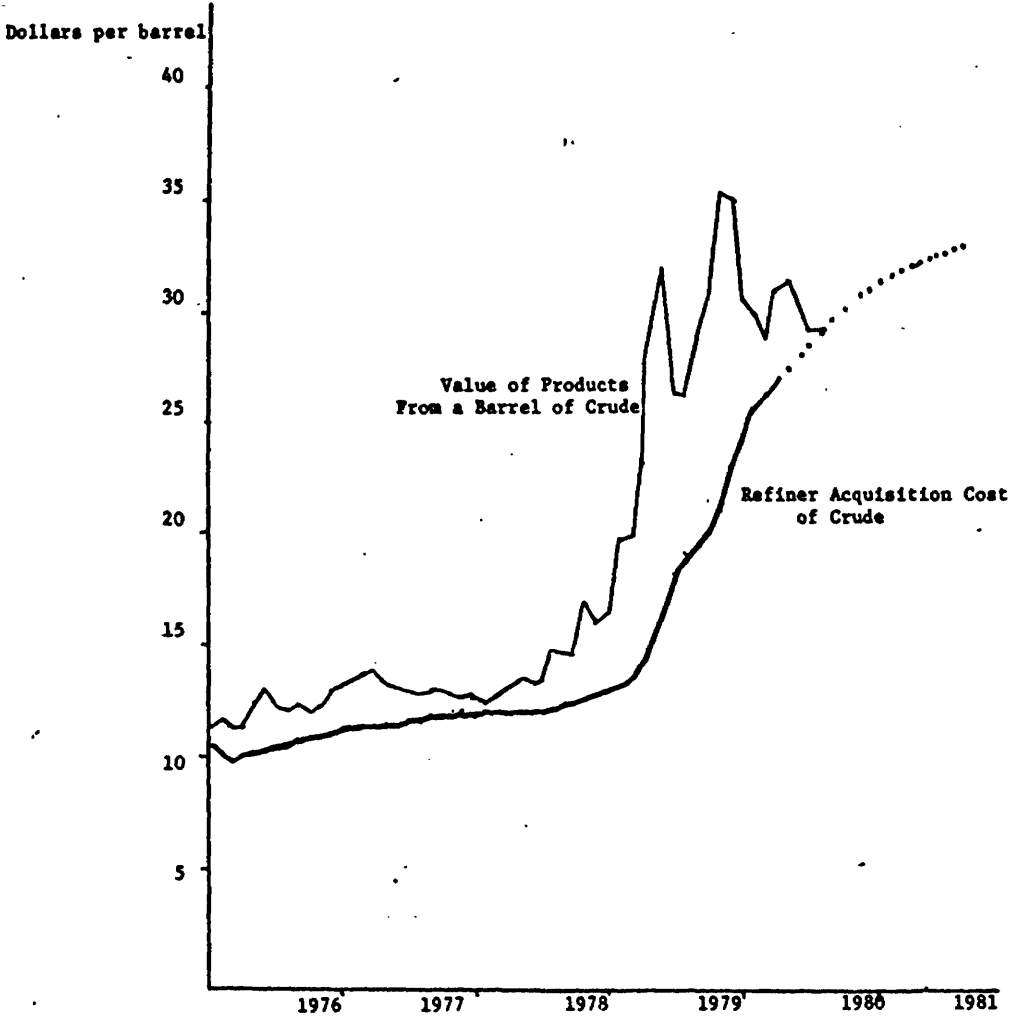
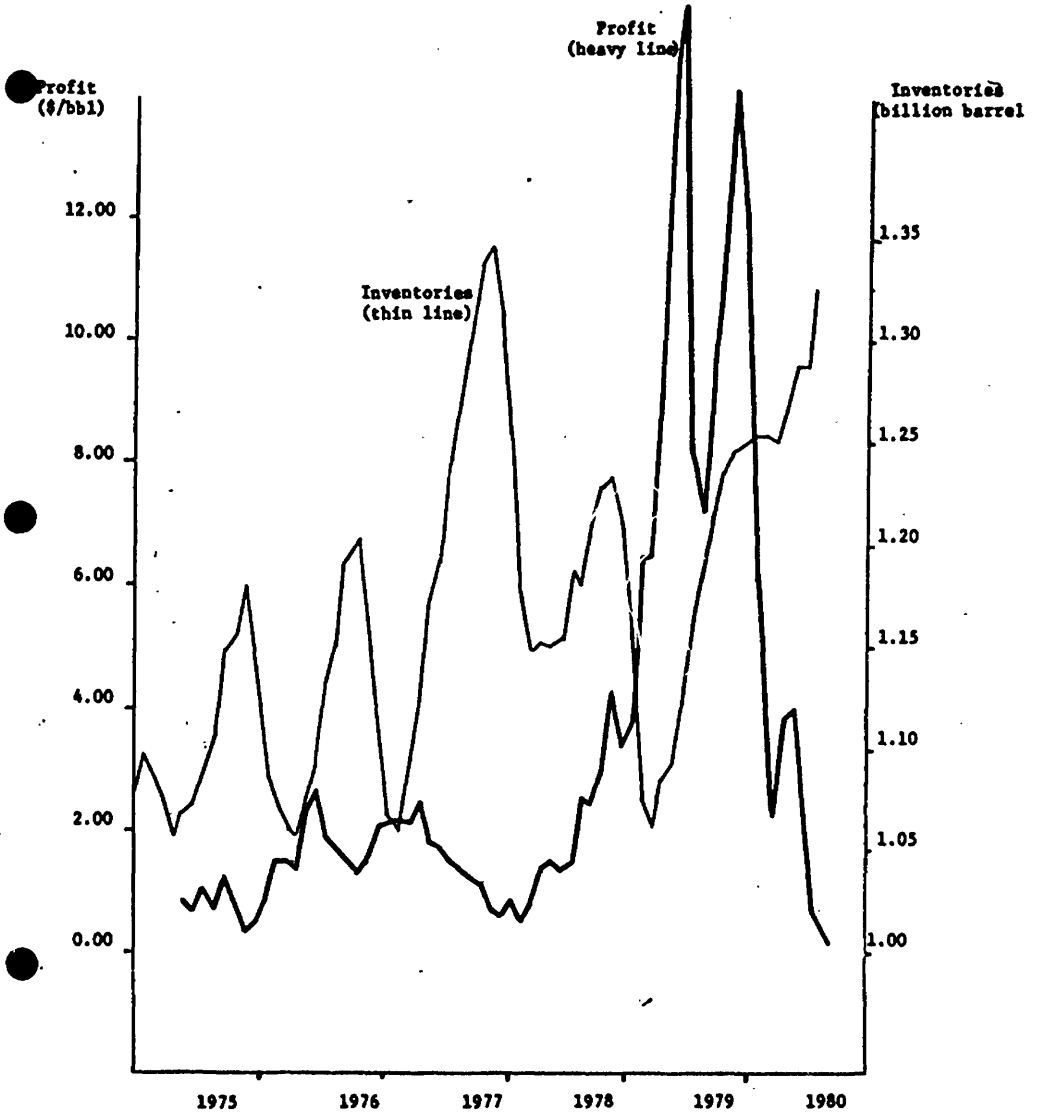


Figure 2  
 Comparison of Petroleum Inventories (Not Seasonally Adjusted)  
 With the Profit on Products From a Barrel of Oil  
 Sold at Platt's Gulf Coast Spot Prices



Now the relationship between inventories and profit on the spot market and the relationship between the spot market and future crude costs can be tied together by noting that private investors seeing an increase in the price of products on spot markets should increase their inventories in the expectation of future increases in crude oil prices. Of course, such profit maximizing behavior corresponds exactly to the undesirable actions identified by the editors of *The Economist*. Further, one can note that firms holding large stocks and unable to increase inventories should at least refuse to liquidate them when spot prices of product begin to increase, because the increase in spot prices is a harbinger of increased crude prices and offers the reward of inventory profits. This is, of course, the behavior which was noted by the editors of *Business Week*.

These structural characteristics should form a basis for our planning to meet an interruption. I will try to use them in my response to the questions posed to me.

1. Given the limited strategic reserves and private stocks of oil that would be available if a major disruption occurred within the next few years, what measures would be needed to protect the United States and the international economy against the depressing effects of foreign oil price increases, domestic shortages, and massive new outflows of funds to foreign producers?

My basic answer is that we should keep our stocks high. I would also note that the potential for private stocks is much less limited than one might imagine (and is suggested by the question). For instance, if I refer back to Figure 2, one can note that the range in U.S. stocks has been from a low of approximately 1 billion barrels in 1976 to a high of 1.35 billion barrels this summer. (These estimates exclude oil held in the Strategic Petroleum Reserve). The swing in inventories of approximately 350 million barrels (the equivalent of 720 days supply during a disruption of 1 million barrels a day—assuming the U.S. share is 50 percent—and 180 days supply during a 4 million barrel a day disruption) represents our buffer if stocks remain high. This is hardly a limited reserve.

The trick, then, is to create incentives which discourage firms from liquidating their inventories (as they did in 1978) and to encourage them to increase storage capacity. The solution to the first problem (getting firms to hold inventories) is suggested by the analysis surrounding Figure 2. Specifically, the federal government should recognize that it is probably not in the public interest to allow spot market prices to fall to a point where it is unprofitable to hold inventories.

How can the government prevent this? Let me suggest two ways: price supports and tax incentives. DOE could either consult with the experts at the USDA who have designed price support programs for various other commodities which have had similar effects, or consult with the tax experts at Treasury on ways of reducing the cost of holding inventories. Either approach would have the same effect. (As a recent alumnus of the U.S. Treasury, I will note, however, that DOE is more likely to receive cooperation from the USDA.)

As respects inventory capacity, I can suggest two approaches. The simplest would be to offer tax incentives to build more storage capacity. Given the appropriate size credit or depreciation schedule, firms would certainly add storage capacity. Alternatively, DOE might establish storage capacity goals which a refiner would be required to meet in order to qualify for access to oil from the Strategic Petroleum Reserve during an emergency. Refiners failing to add capacity would be forced to acquire their oil on the open market or, better yet, develop their own secure sources of supply. Given my feelings towards regulations, I would endorse the tax incentive.

Assuming that we have successfully increased storage capacity and topped off all available capacity, we must then develop a set of rules for selling the stocks if we are to prevent the "massive new outflows of funds to foreign producers" described at the end of the question. The achievement of this goal is harder. Here I will note only that the increase in prices will be smaller if stocks are full (compare the behavior of prices in 1979 with the movement in prices during the Iranian crisis). This answer is, however, insufficient. I will try to perfect it in my answers to questions 2 and 7.

2. How effectively and efficiently would a \$10, \$20, or \$30 per barrel emergency surcharge imposed on all crude oil acquired by United States refiners restrain domestic demand and foreign procurement prices for crude oil?

At today's prices, I would estimate that these tariffs would cause short term reductions in consumption of between 200 and 700 thousand barrels a day (mbd) during the first quarter following the imposition of the tax, and probably cut consumption by between 1 and 3 millions barrels a day within a year. I base my estimates on a price elasticity of final demand of 0.075 in the short run and 0.2 for a year and assume that a \$10.00/barrel tax increases the price of the average barrel of products 24 percent.

I would also like to echo the comment made by Bill Nordhaus on November 11 when he noted that a tax on consumption would reduce the speculative incentive to hold stocks. As a result, I would argue that the tax would cause inventories to be lower than might be achieved in the absence of a tax. Since, as noted above, the swing in inventories of 350 million barrels (a swing we have already observed) could offset a greater reduction in imports than the \$30.00 fee, I conclude that the tax might be totally counterproductive.

3. Would import fees, tariffs, or quotas be more or less effective and efficient?

If a tariff of \$10, \$20 or \$30 on all imports were imposed instead of the tax on crude acquired by domestic refiners, the problems noted above would vanish. In fact, the imposition of the fee would, if it were absolutely clear that it was a temporary fee, cause firms to sell from inventories in order to reap inventory profits while they were available. Thus, the tariff would create downward pressures on prices and probably lead to lower long run OPEC prices. In short, it is a good idea.

At the same time, imposition of an import fee would cause domestic crude prices to increase temporarily. In the past this would have created a problem because of the transfer of income from consumers to producers. Today, however, the windfall profits tax would temporarily divert a portion of the increased revenues to the federal government, reducing the magnitude of the problem, if the revenues were rebated to consumers. Thus, while I have no love for the windfall profits tax, it could serve a useful purpose during disruptions.

A fee on imports is, then, attractive because it would serve the dual function of creating incentives to increase inventories during times of plenty and causing producers to unload inventories when the market gets tight. Imposition of a quota is not so attractive because it would require development of an allocation apparatus.

4. Could an emergency surcharge be adequately and equitably offset by some combination of reduced withholding of payroll, income, or other taxes?

In principle, the answer is yes. Seven years ago, at the time of the first embargo, Henk Houthakker of Harvard and I showed by simulation of the DRI model that gasoline taxes of 10¢ to 30¢ a gallon could be recycled to the economy without substantial loss of GNP, assuming that the inflation was accommodated.<sup>3</sup> I believe that study was the first one published. Since then there have been literally hundreds of macroeconomic simulation of recycled energy taxes. All reach the same conclusion, which is that, properly recycled, a tax has no adverse impact. Further, to the extent that a tax slows the rise in OPEC prices, it may even have long term GNP benefits.

However, while we can argue theoretically that it is possible to adequately and equitably offset the effect of the tax, administration presents more problems. In the first place, there are unavoidable income distributional effects. Residents of California and Texas who must drive long distances would suffer, as would those of us forced to heat with oil in New England. Those who heat with gas and do little driving would gain. There is no way around this problem.

It is also not administratively possible to make sure that every individual receives one check and no individual receives two. The system will inevitably overlook a few individuals while providing others with an unexpected largess. From my experience at Treasury, I would expect that this last problem will dominate the discussions as it did in the past, e.g. the debate over the ill-fated gasoline tax/rebate which was included in the NEF. This would be unfortunate, because the costs of overlooking a small number of individuals are probably infinitesimal when compared to the direct and indirect costs which would be associated with the only alternative approach I can think of: regulation and rationing.

5. What are the practical problems with implementing this approach? How should imports and exports of petroleum and petrochemical products be treated?

The practical problems of implementing an emergency fee/rebate scheme seem to be trivial; at least from the vantage point of New Haven. The mechanisms for collection of oil import fees and moneys due under the windfall profits tax are already in place. Thus the cost is fairly small. In addition, changing the withholding tax rate presents little difficulty (although there is a time lag). Compared to the costs of maintaining the Economic Regulatory Agency and the costs of setting up a rationing program, these costs are trivial.

Concerning petrochemicals, my preference would be to take no action. As an alternative, however, a value added tax might be imposed. Under such a tax the fee would be imposed on imports of petrochemicals and rebated to exports of U.S. made petrochemicals.

<sup>3</sup> It can be found in Jorgenson (ed) "Econometric Studies of U.S. Energy Demand" (Amsterdam, North Holland Press, 1975).



6. For an emergency surcharge to reduce the outflow of funds to producers, how important would it be for the United States to act in concert with other major importing nations? What are the advantages, costs, and risks of unilateral action by the United States?

Let me respond to this question in two parts, addressing first the question of the outflow of funds and second the issue of unilateral action.

The question has been phrased in terms of reducing the flow of income to oil producing countries. I think that is both an inflammatory and incorrect way of asking the question. My understanding of the problem is that we are seeking methods to avoid the sudden surges in oil prices due to shortages. While these increases do result in long run transfers of income to producers, they involve other, far greater economic problems (inflation, queues, disruption of the normal process of government, etc.). In the long run, the income transfer to the producing countries will probably take place anyway as oil prices increase to maintain a balance between supply and demand, with the rate of income transfer depending upon the success of initiatives to conserve or substitute other forms of energy as well as the rate of growth of the economy. However, by putting in place programs to "buffer" the oil market through disruptions, prices can be kept more stable (and the rate of economic growth faster).

I make this differentiation because I believe it has important implications for negotiations with some members of OPEC. If policies are adopted for the purported reason of reducing OPEC income, I would not expect producing countries to be overly cooperative. On the other hand, if a program of standby tariffs and price supports were adopted for the stated purpose of preventing surges in spot prices, I would think that some of the important members of OPEC would react positively.

With respect to the issue of unilateral versus coordinated action, one would think that coordinated action would be better. It would, for instance, make no sense for the United States to adopt a tariff on oil imports which had the effect of encouraging U.S. companies to reduce inventories while others, such as France, acted to increase inventories. Indeed, if that were to happen, the effect would be to move oil from tanks in the U.S. to tanks in France. While prices on spot markets would be lower than they would be if the U.S. took no action, they would be lower still if the French and the U.S. both attempted to liquidate inventories.

I would note, however, that it appears extremely difficult to get the other major industrialized states to use their stocks. In fact, the reflexive action seems to be to act as France did in November: to order stocks increased.

In the past problems such as this could have been solved by the international oil companies. Today, however, they can do less because the exporting countries have diversified their supply arrangements. Thus, we are forced to lean on the IEA sharing agreement—an agreement which appears to outside observers to be very weak.

In the face of these problems, there is really little choice. The U.S. can try to hold down prices—a strategy which will cause us to run out first—or do nothing—in which case everyone will do nothing and prices will certainly rise. About all that can be suggested is that the U.S. stress to its allies that the subjects are linked to other trade matters and that in the event of a disruption the U.S. might limit or completely deny access to its market to countries that refused to abide by international agreements. This may be seen as a confrontational approach, but then disruptions in oil markets do involve confrontations.

7. On balance, how does the desirability of such an emergency oil surcharge and tax relief program relate to the actual as well as expected depth, duration, and permanent price effect of an oil supply disruption? For example, would the program's relative effectiveness depend on whether the supply loss to the United States were one, two, or three million barrels a day? How is it affected by very large uncertainties as to the duration of the loss?

Of course the program's effectiveness would depend upon the size of the disruption and the uncertainties as to the expected duration of the loss. The three disruptions described represent the equivalent of an interruption in world oil production of between 2.5 and 7 million barrels a day (assuming that the U.S. absorbs between 40 and 50 percent of the disruption). Obviously, a program of taxes and policies which encourage the building of inventories will be better able to cope with a small disruption than a large one (assuming that we respond quickly to each).

However, a market-based strategy will probably be less onerous than any other system even in the case of a major disruption which is expected to last a long time; at least until the United States decides it must put itself on a war footing and react quickly. In short, an emergency oil tariff or import fee coupled with a rebate is a preferable alternative to regulation.

## SUMMARY

In 1974 and 1979 the world economies suffered disruptions because world oil markets and particularly the spot market were imperfectly understood. Today, economists have a much better understanding of these markets. With this understanding it should be possible to propose and implement policies which stabilize the markets during many but not all disruptions at a far smaller cost than that incurred from regulatory attempts. Whether such a program will be adopted, however, remains to be seen.

Senator BRADLEY. Could you go into this in a little greater depth?

Mr. VERLEGER. Yes, in the case of oil what we have is a spot market with fairly limited reports right now. Platt's Oil Price Service—there is another publication in Europe—that essentially is the standard publication source for oil prices. You can watch daily prices in these. You can monitor the Rotterdam market. In the future hopefully we will have a much better futures market as we do for wheat and cotton.

What you need is a fairly continual monitoring of those markets together with some experienced—it does not have to be somebody who necessarily has played the oil game but somebody who has played the commodities game—to watch those markets. In 1979 in February there were sudden sharp increases on the Rotterdam market. They were very observable, corresponding to the announcement by Saudi Arabians they were reducing production for the first quarter to an average of 9½ million barrels a day.

There was a sharp increase in May when we announced our ill-fated \$5 entitlement for heating oil. It is possible to monitor it. I would use my trigger mechanism through the IEA with countries acting in concert setting fees with their eyes focused on those markets and with a committee that has authority, members of each State, to advise their head of State to take joint action on oil import tariffs. This is very roughly thought out.

Senator BRADLEY. You drew a parallel with the Federal Reserve. The Federal Reserve is a U.S. institution.

Mr. VERLEGER. That is true. As I recall it in late 1978 there were frequent cases of concerted action between the Federal Reserve Board and the heads of the German Bundesbank, French banks and Japanese banks, the New York Federal Reserve being our delegate for dealing in international monetary affairs to defend the relative values of currencies.

Senator BRADLEY. What powers would you give this new institution and how is this different from the Secretaries of Energy of the Big Seven Summit countries meeting to discuss positions on stocks, spot market, or working through the IEA to accomplish this same aim?

Mr. VERLEGER. One, the Secretaries of Energy of the Seven Summit countries meet irregularly to discuss the market conditions. In the case of monetary conditions those in charge of trading, cooperating to hold the relative values of the international currencies, talk daily. I think that there is a vast difference, a very narrow focus. Two, if Congress does impose a fee and you are talking about how to trigger it, my experience is that Congress will not delegate taxation authority or something like that to the Secretary of Energy. The Secretary of the Treasury is almost invariably the person who has that authority. Section 232(B) of the Trade Expansion Act delegates that authority to the Secretary of the

Treasury who makes investigations to determine whether goods are being imported in amounts which damage the economy. It basically has to be related to the Department of the Treasury.

Senator BRADLEY. What you are saying is that we establish for spot markets in oil the same kind of consultation and maintenance of value stability as we attempt to do in the currency markets, is that right?

Mr. VERLEGER. Yes, except that you are not trying to prevent prices from rising slowly wherever the market takes them. You are trying to avoid spikes.

Senator BRADLEY. In such an atmosphere might you find a much greater impetus than in world trade in general to barter and move away from currencies? If it acquires a stable value, might you find that people will not want to be paid for their widgets in dollars but in oil that will be maintained at a stable price over time by this new institution?

Mr. VERLEGER. I would not establish, one, such a large institution and, two, I think the answer to that is unrelated to oil but it is related more basically to the way we manage inflation in the economy.

Senator BRADLEY. I do not want to spend too much time on this idea since I knew you just threw it out in the presentation.

I would like to thank all three of you for your testimony. Now let us move to a discussion. Feel free to interrupt each other and criticize, attack, however you choose to do it.

I was interested in what Bill Hogan said about the oil producer retaliation theories. As I talked about a tariff with some of the producing States, the suggestion of a tariff always elicits a response, "Well, we will raise the price the amount of the tariff." Could you describe in a little more detail what those retaliation theories are and whether you think this fear is legitimate?

Mr. HOGAN. The retaliation theory, I guess, derives from the theory of producer behavior, which is in disarray. We have many theories, which makes for a long discussion.

At one extreme we might assume we have a rational monopolist, with a long horizon, maximizing present value of and so forth.

If we adopt this model, then we conclude that producers are charging what is in their longrun interest. If we impose a tariff, that changes the demand curve that they face, which is going to change the economics of their decision. If you do work it out, the logic suggests that producers have to lower their prices in response to a tariff. It is not in their own interest to raise prices because, assuming we stick to our tariff, it further lowers the demand and lowers their revenues, and they are worse off. In this case there is no retaliation.

If we adopt at the other extreme the view that producers have only the vaguest idea what their oil is worth, but in fact it is probably worth more than what they are charging for it. What they need are signals or excuses to raise prices, and every time a signal comes, such as spot price going up because of a temporary shortage or actions by the consumers, in this case imposing a tariff, it suggest that the oil is worth a lot more. The higher price provides the information or the political excuse to blame someone else for the action they are taking, and they raise prices. This "ratchet"

model is essentially the theory that you, Senator Bradley, summarized earlier. It may be also that they don't do rational calculations at all. It may be that producer pricing is an erratic process involving more complex interplay of different interest groups within the producing countries. They may not quite know what they want to do. If they are producing more than some interest groups want to produce, as is the case in a country like Saudi Arabia, if their revenues are greater than what they can spend now; it seems to me that we could have a very sharp political reaction which would strengthen the hand of the group that says:

We are producing too much, we are collecting more revenues than we now need, and now they have arranged it so that even some of that revenue does not flow to us, it flows to them. Let us stop producing. It will not cost anything in the longrun because we don't need the revenue now.

A blatant tariff could lead to lower production and higher prices.

Mr. HOGAN. So, you would have an essentially irrational process. I don't know which of those arguments is correct.

Senator BRADLEY. Do any of them depend on what amount of spare capacity a country has? You can reduce a certain amount and then you begin to hurt?

Mr. HOGAN. Right. Certainly, the reaction of poorer countries would be quite different—Iraq before the war—their reaction would be quite different from that of Saudi Arabia or Mexico. They are all in different situations.

What we are concerned with here are the Saudis and Kuwaitis, and people who are producing more than their current needs demand. They could handle any short-term perturbation in their own flow of revenues. It is a tricky question as to how much retaliation there would be, if there would be any at all.

Clearly, I would prefer a tariff; a straight, simple tariff, if we could have it without retaliation, particularly if we believe the hypothetical model of the rational monopolist or rational oligopolist. To the extent we are not facing that, it is at least worth our attention to design the form of the tax or the form of the effective tariff so that we do not provoke the producers unnecessarily.

There are things that we can do that won't cost us very much. I heard a suggestion yesterday, circulating among the staff on the Hill here, that we could combine our strategic petroleum reserve fill with this need for an effective tariff. Suppose that we mandated that everyone who imported oil, every refiner who imported oil, had to contribute 30 percent of the volume of imports into the strategic petroleum reserve. They could contribute the actual barrels of oil, or they could contribute money to a fund for future oil purchases. There would be ways to operate efficiently. If we legislated a quantity contribution to the Strategic Petroleum Reserve and we set it at 30 percent, it does not take much calculation to suggest that is much like a 30 percent tariff on imported oil; it is going to have that effect.

If also we have decontrol of prices, that increase in prices will be passed on to everyone, since that imported oil would be the marginal source.

Senator BRADLEY. It would have the same effect as the tariff by raising the market price, because you put the oil into the reserve, so stockpiling serves as a kind of tariff?

Mr. HOGAN. Yes.

Senator BRADLEY. Would you also buy the argument that it would be an automatic stabilization in the event of a disruption?

Mr. ALM. No, one of the disadvantages of that particular proposal is that it does not provide automatic stabilization; it is mandating that the firms fill the strategic petroleum reserve. It does not create any special incentives to draw down reserves during interruptions.

Senator BRADLEY. If it goes into the reserve, the firms don't decide when to draw it down; the Government does. In deciding when to draw it down, the Government would not act as a profit maximizer, whereas the whole point of Mr. Verleger's analysis is that oil companies do act as profit maximizers.

The public strategic petroleum reserve would have the goal to put downward pressure on prices to try to lessen the impact of price runups in the event of a disruption; therefore, if the Government controls the inventory drawdown and chose to draw it down, that would have an automatic stabilizing effect, would it not? In other words, the cushioning effect of releasing stored oil onto the market would be amplified by the cessation of purchases for the stockpile.

Mr. HOGAN. Frankly, I am not sure. I would want to think about that before I try to answer.

I think the distinction between public and private stockpiles is important because the incentives are quite different. The proposal I just outlined does not solve nor create any new problems or incentives associated with the public versus private. If we mandated that refiners fill the strategic reserve in proportion to their imports, let us say 30-percent of their imports, that would be part of the public stockpile.

Senator BRADLEY. Your suggestion is that for every refiner that buys a barrel of imported oil, one out of three barrels that he receives must go into the strategic petroleum reserve?

Mr. HOGAN. That would be the first thing I would legislate, to do something like that. The problem is that it is too many barrels of oil at the moment. We would have to have some period where we had exemptions for people, and all they would have to do is contribute money to a fund that would later buy the oil to put in place.

I am trying to design something like a quantity oriented program, looking to filling the strategic petroleum reserve, which at the same time ends up with a 30-percent increase in the price of imported oil. We are trying to solve a very complicated political problem, the problem of retaliation. I think that is right. In dealing with the political aspect, in public discussion with the oil producers, with our leadership talking to their leadership, many of the features which now seem overwhelmingly difficult, if you have responsibility for legislating them, many of those features would have advantages.

Senator BRADLEY. Mr. Verleger has a different view.

Mr. VERLEGER. Our experience with complicated procedures and exemptions and everything—we have had it since 1958 with the MOIP—mandatory oil import program—they have been almost

nothing short of welfare programs for the wealthy, independent oil refiners. I can't see this scheme.

You have to start differentiating on retaliation between short term and long term. In the long term, the imposition of a fee, regrettably, no matter how it is done, is going to cause OPEC to respond with higher prices, although it is hard to figure out how OPEC sets prices.

What would happen with this 30-percent requirement is that it would cause the price of domestic crude oil to rise, because refiners are paying a 30-percent fee.

Senator BRADLEY. Would that not reduce consumption?

Mr. VERLEGER. That would reduce consumption; but domestic crude oil posted prices, if we are paying OPEC \$30, domestic prices would be \$39. That is a very clear signal.

Senator BRADLEY. If OPEC prices were \$30, domestic would be \$39. Why?

Mr. VERLEGER. Because you are paying a 30-percent fee, hidden or otherwise, on the SPRO system. What we know is that the domestic price of crude oil would go to the cost of the imported crude oil plus the fee.

Senator BRADLEY. That would bother me.

Mr. VERLEGER. That would be a clear signal to the producing countries that the price of the most expensive crude oil, if the price of the marginal crude oil in the world, least efficient producer is \$39, their price should be \$39.

In a steady state, what that does is lead to an escalation in prices. In the short term it would be understood as being a nonconfrontational device if explained properly. The Saudi Arabians have made protestations that we have to take actions to reduce consumption when the price of oil is going up.

Morry Adelman has said at the time they make these protestations then they reduce their supply. We should not look at what they say but at what they do. At a time when we cut our consumption and their oil prices are going up, one can argue a fee on imports designed to dampen increases in spot prices would not be viewed as confrontational, particularly, if it were temporary.

I think an oil minister who looked at prices of \$39 would have a hard time understanding why he was not getting \$39 a barrel in the long term.

Mr. HOGAN. I certainly agree with the economic argument which concludes that the price of domestic oil would go up. The Saudis have sophisticated analysts and would not be misled by what is happening. There is no doubt about it; if we increase our prices domestically, if in the end prices go up at the pump, the sophisticated analysts in the world will know what is happening, and we are not going to be fooling them in any sense.

But there is quite a difference between a situation where the effect is such that the sophisticated analyst can point out what happened and capturing that analysis for mobilizing political forces to take action. Witness the discussion we have had for 7 years in this country.

We have many people who can uncover the economics. But the form of presentation counts too. This proposal, which I don't necessarily say is the best one, is an example of something where we can

take action to accomplish the substance of what we want. The substance of what I want is higher prices domestically to capture the effect of these oil import externalities. We can do it in such a way that as a political matter it is as inoffensive as possible.

If the Saudis want to increase prices and decrease production, they don't need much provocation. The leaders are not going to be fooled one way or the other. But if they would accept a tariff, if they think it would be in their long-run interest to allow us to do so, they need a way to repackage it so that it does not tip the balance of power inside Saudi Arabia.

Senator BRADLEY. I would like to break for 2 minutes. I have to make a phone call. I will be right back.

[Brief recess.]

Senator BRADLEY. You wanted to say something, Mr. Verleger?

Mr. VERLEGER. Yes. Bill makes a very important distinction. If we can get a fee past the price of crude oil, it will be accepted, it will be more likely to be accepted, by the Saudis, by most of the OPEC countries.

After all, the European countries have very high taxes on petroleum products and those have bothered the producing countries, but not greatly. I think the red flag would be posted prices of U.S. crude oil at premiums over and above the posted price of Saudi crude oil or any of the OPEC—

Senator BRADLEY. At the recent IEA ministerial meeting it was concluded that we should implement, if the Iraq and Iran cutoff continues, a stock drawdown policy. What they didn't come out forcefully for is any kind of target for demand restraint.

My question is, what do you have to assume about the length of the Iraqi-Iranian war, the length of the interruption and the size of the interruption to only go with a stock drawdown policy and not demand restraint policy, too?

Mr. HOGAN. Short and small. It has to be a short war and it has to be a small interruption.

Senator BRADLEY. What is short and small, 2 million barrels a day for another month, or what?

Mr. HOGAN. I think that the stock drawdown policy is more contingent on the expectation of the possible expansion of that war. I don't know what the probability is that it extends into Saudi Arabia and gets them involved and affects their production. If that probability is 1 in 100, then maybe the stock drawdown policy is optimal. If it is higher, it may not be optimal.

I have not done that calculation. But it is clear that there is a significant probability that things will get worse than they are now, in the next 6 months or a year. So a stock drawdown policy, to the extent it is more than just seasonal use of inventories, to the extent it is actually dipping into the strategic reserve, strikes me as not very wise, particularly when you recognize that we have ignored the demand restraint alternative.

The assumption of this policy and the assumption of many discussions about what to do with the stocks now usually is that all the ways that we are using oil now, all the ways we are consuming oil now, are essential. The discretionary item is stock filling or stock drawdown. I don't accept that view.

Senator BRADLEY. The question that I am often asked is, "Terrific; let us fill the reserves, let us build the stockpile." Then people say, "But we will never draw them down." Mr. Verleger has given us one reason why we will never draw them down, because people figure that the payoff will be bigger tomorrow.

You have given us a second reason why they won't draw them down, because expectations of a cutoff, increasing in size or lengthening in duration, argues for keeping it full.

Will you give us some guidelines as to how we could assure that stocks will be optimally drawn down? Yours is a governmental judgment—and yours is a private sector judgment. How can we assure ourselves that we can actually use this tool and it is not just like another 100 missiles and another 100 missiles and another 100 missiles all acquired in the name of deterrence.

Mr. VERLEGER. Let me interject 1 second on the question of the length of the war. I think the decision was proffered to draw down stocks at this point as the war remains isolated between Iran and Iraq.

Given the supply/demand situation in the world next year, with recession in Western Europe, recession quite possibly here, we can get by as long as Saudi Arabia continues to produce at its present volume. We may not even need all of Saudi production. The world supply situation was in glut prospectively in 1981 before the war began. Given a recession, there is no reason why the market won't stay in balance.

Senator BRADLEY. If you believe what Sheik Yamani said in the press, that Iran and Iraq will be producing as much as they were before the Iraqi-Iranian war by the fall of 1981—

Mr. VERLEGER. OPEC will have a serious problem because they will have to accommodate roughly 5½ to 6 million barrels a day of oil.

Senator BRADLEY. Isn't that precisely at the time we should move to fill?

Mr. VERLEGER. To fill the strategic petroleum reserve.

Senator BRADLEY. I want you to address the question of how we can assure a drawdown policy that maximizes public interest.

Mr. VERLEGER. I suggested one, by the fee on oil imports. The other question is on the strategic petroleum reserve. In all other strategic commodities the Government drawdown strategy has always been come a crisis, hold on to it. Morry Adelman has suggested to take the spot market price internally and always be willing to sell it at that price plus 20 or 30 percent.

It turns out that the literature on stock selling and stock drawdowns for stocks of wheat and other commodities have produced rules on how you should go about selling, what price rules, what quantity rules you should set. Those people who have looked at the literature—and I have only skimmed it—say it is extremely complicated.

Senator BRADLEY. You are saying that you make the strategic petroleum reserve available to combat high spot prices by saying you will sell it to anyone who wants to purchase it at spot plus 30 percent?

Mr. VERLEGER. Or 20 percent. Last month's spot. That is Adelman's suggestion. Others have suggested that that rule—



Senator BRADLEY. Wouldn't the first purchase on that basis suddenly blow the roof off the spot market?

Mr. ALM. That is the possibility. I was going to make a number of observations, starting with an observation about drawing down stocks.

I think Phil has done excellent work, but I would argue that decisions on building and drawing down stocks are more than economic decisions; they are decisions on perceptions of the way the world is going.

Certainly, one cost of a big stock pile is an attempt by oil companies to assure maintenance of their supply channels, even to the point of building up large stocks. Of course, the fact of decontrol is another reason; they know that future oil prices will be higher. If you look at the U.S. pattern—and the pattern of stock drawdown is different in every country—indeed we have been drawing down stocks. Our stocks right now in total stocks are down to 1.35 billion barrels. They have been much higher, almost 25 million barrels higher. Our stocks are being drawn down.

You have a short-term problem and long-term problem. If you have a large strategic petroleum reserve, which is what we all would like to see happen, then you have a strategic consideration whether that becomes your first line of defense against increases in spot market prices.

If there is one lesson from Iran, it is that you need to use the stockpiling in a very predictable way. I would argue that whatever the trigger is in terms of deciding that there is an interruption, you would want to then indicate publicly what the withdrawal from the strategic petroleum reserve would be for some time in the future as a way of reducing panic.

Now, waiting for a strategic petroleum reserve, you have the question of what do you do to encourage private stock buildup and drawdown. The first question is buildup. This is obviously not the time to build up private stocks. When this war terminates and production is resumed—and I assume both Iraq and Iran will want to build up production quite quickly after the war because of its economic impact—there will be a tendency among the Western nations to hope that there will be a period of market softness and that the West can achieve some benefits by shaving prices.

I would argue that this is a disastrous course of action because in no time at all as the markets get soft OPEC will begin to cut production. We will get the same price impact; we will lose our chance to build up stockpiles and when the next high market comes, we will be in the same box we are in now: We won't have the kind of reserve, both public and private, that we want.

I think it is critically important when production is restored that the West use that window—and there will not be many windows like it—to build up stockpiles as quickly as it can without placing undue price pressures on the market.

Senator BRADLEY. When you say "as quickly as you can," you mean all stockpiles, not just the reserve?

Mr. ALM. Public and private.

Senator BRADLEY. What incentives would you put in place now so that when that favorable market condition exists you will have a very large fill?

Mr. ALM. I have not looked at this in detail. Philip suggests \$1 a barrel per year.

Senator BRADLEY. That is about a \$1 billion loss of revenue. How many extra barrels?

Mr. ALM. Let us assume we had 300 million barrels in the private stockpile, \$300 million a year; is that right? The question is—and what one would have to think about—are the national security benefits worth \$300 million a year in the private stockpile, and what is the tradeoff between that and filling the strategic petroleum reserve?

Senator BRADLEY. Why do you say dollars?

Mr. VERLEGER. I picked the dollar as a rough estimate. One would have to look more carefully at the cost of holding oil to decide whether that really gets you what you need. It depends also on the conditions in the spot market. If the spot market prices really collapse when Iran and Iraq come back, you need much more than \$1.

My answer is that I would not do it this way. I would look more to the price support program, adopt the USDA approach, which is to buy commodities from farmers and leave them on the farms. They also have selling rules associated with the crop support programs.

Senator BRADLEY. This is a theory particularly popular at Yale?

Mr. VERLEGER. Yes.

Mr. ALM. Can you combine that with the food stamps?

Mr. VERLEGER. I would use the money rather than paying the money to small refiners.

Mr. ALM. There are other possibilities. In the report we released yesterday, we indicated the possibility of requiring the stockpiles to be built up like many European nations do, a requirement that refiners hold some percentage of their annual throughput. Then the third option is the public-private corporation, such as exists in the Federal Republic of Germany, that stores both public and private stockpiles.

Senator BRADLEY. Let me go back to my original question and see if I don't summarize what is Bill Hogan's point:

I would like to know if all the panelists agree with this formulation: that if the interruption is likely to be small in size and short in duration, it should be handled by demand restraint rather than by stock drawdown.

If one assumes a relatively large interruption of long or uncertain duration, then the private companies will be reluctant to draw down stocks at the outset because the price is going to go up. From a public standpoint, you are going to want to stretch out supplies over a longer period of time. It follows from this that if you believe the interruption will be short in duration and small in size, you are not going to want to draw your stocks down. If it is a small blip, you might handle it with demand restraint. Is that right or wrong?

Mr. VERLEGER. I am not sure what you mean by demand restraint. If it is temperature controls—

Senator BRADLEY. Don't get concerned with what the policies are, but decreasing consumption.

Mr. VERLEGER. The only way I can envision decreasing consumption, in my view, is higher prices, either through taxes or through the marketplace. That is it.

Mr. ALM. Our experience in Iran and this experience seem to be very similar. A gasoline tax, I think, right now would make a lot of sense. If you take a look at the history of the Iranian experience, from January through May gasoline demand was high, despite the fact that we knew that we were approaching a shortage, we knew that gasoline lines were highly likely.

It strikes me that we are facing somewhat the same situation now.

In answer to your question, I would do both.

Senator BRADLEY. Could you argue the opposite formulation, namely that you draw stocks down as your primary response only if you are fairly certain you are dealing with a very small interruption and that you rely on demand restraint as your initial response to an interruption if you believe that it will last a long time or if its magnitude and duration are uncertain? Trying to get a balance for these policies is fairly important. You would do nothing?

Mr. VERLEGER. I said that if one is worried about it, I would use an import fee on imports of crude product, because firms learn by repetitive experience that that would give a signal that profits are to be made, and they would build inventories in normal periods.

After Iran and Iraq come back, that would mean you would not have a softening of demand or OPEC production; OPEC production would remain relatively strong, and we could build up oil inventories quickly. In June and July OPEC had a problem of substantial overcapacity. Producing countries in the cartel would have liked to sell more oil. In 1979 what happened, in my view, is warm weather, and there were large consumers who could build up gasoline stocks.

You are right, I almost invariably would rely strictly on the market or a tariff to do it. I wouldn't do it today because I don't see a shortage next year as long as this war remains within the confines of Iran and Iraq.

Mr. HOGAN. I don't agree with your formulation Senator. Let me say why: The problem with it is that it leaves out two critical variables. One is the size of the existing tax or tariff to capture the externality of oil consumption, and the other is the size of the stockpile that is in place when you are trying to make a decision about whether or not to draw down stocks or to use demand restraint. It is unlikely that the optimal answer would be to use all of one instrument or all of the other. So, some combination is certainly going to be right.

There are many ways we are now using oil every day, oil consumption, that are much less important than increasing the size of our strategic reserve. The reason they are less important is because the reserve is so small.

If we had a total public and private stockpile, above normal use, on the order of the billion barrels we talked about for the United States, or maybe double or triple that for the world, then a strategy of drawing down the stockpile in order to moderate some of the spot market increases, coupled with tariffs in order to moderate demand at the same time, would be optimal.

Or if we had a very large tariff in place already, the best policy might be primarily stock drawdown and very little demand restraint, because we would already be at the margin of balancing demand with the true cost of oil.

In the present situation we have neither case. We have low stockpiles and no tariff. It might be that the market will soften this year and Yamani will be right. But we don't want to make the mistake of ignoring the possibility that the war continues or expands. It involves a small probability but a significant probability that the entire Persian Gulf will be inflamed and the stocks we have now will be more valuable later than they are now.

The possibility that IEA adopts is very shortsighted, that the demand restraint option should be much more exercised and we should moderate the seasonal drawdown of our inventories. We certainly could not keep them constant. We should not be ignoring the demand restraint and we should not be ignoring the potential value of those inventories much later, given the probability that the war could expand.

Mr. ALM. I would advocate four things and pretty much agree with what Bill said:

One, immediate decontrol of crude oil prices, not a huge act, but it would decrease demand 15 percent and have symbolic value.

Second, I think a gasoline tax would be a useful restraint now.

Third, I would draw down private stocks. Indeed, there is nothing the Government has to do. They are being drawn down anyway. Since that is the case, I think within IEA a reasonable drawdown program is probably sensible, but I would not terminate filling the strategic petroleum reserve. Indeed, I would expand fill. The reason is that the strategic petroleum reserve is currently very small—one-tenth of the legislated goal. Considering the threats we face in the next decade, building the reserve is critical to our national security.

I think it was a big mistake to terminate the fill before. If we don't have the resolve to fill the reserve now, we will never find that perfect time to do so.

Senator BRADLEY. Let me ask you if you have taken a look at the economics of a Government strategic petroleum reserve, the Government filling saltmines and the Government establishing Government above-ground storage in the various regions around the country?

Mr. ALM. We did that when I was at DOE. As a result, the storage in salt domes is considerably cheaper. I think it is twice as cheap. As I recall, it is 30 to 40 cents a year compared to 80 cents to \$1 to store above ground.

I could find the actual numbers for the record, if you like.

Senator BRADLEY. How long can you store the oil?

Mr. ALM. In the salt domes?

Senator BRADLEY. Yes, before the oil changes in consistency.

Mr. ALM. Crude oil, of course, is easily storable. Product storage is a problem; you have to keep the products moving in and out of a reserve to prevent deterioration.

Mr. VERLEGER. You can store crude above ground and below ground. Gasoline particularly deteriorates.

Mr. ALM. It is a problem that you have to continually move product, such as, say, distillates.

Senator BRADLEY. You don't know how long you can store crude oil?

Mr. ALM. I think you can store it indefinitely.

Senator BRADLEY. What would you say in answer to the statement that we don't need a reserve; we have the reserve in the ground and all we have to do is do one of the things that I think Bill Hogan mentioned, which is, exceed maximum rates of oil production? This is made by a number of politicians, some of whom come from those States where their oil is in the ground.

Mr. HOGAN. In the event of an interruption, exceeding the maximum efficient rate of production would be highly desirable, even though it may cost us some long-term production. But the quantities are relatively small compared to what you would want to do with the strategic petroleum reserve.

Senator BRADLEY. So, these people are arguing what this surge capacity is; is that right?

Mr. HOGAN. I have heard the argument: we should create a number of capped wells in the existing reserves so that during an interruption we could open these capped wells and produce from them in order to produce the same flow that we could from the strategic petroleum reserve. After all, we have the oil in the ground already.

The economics are that it is much cheaper to pump the oil out now and put it in the strategic petroleum reserve because the number of wells we would need in the existing field would be so enormous, in order to get the necessary flow rate, that it would be much more expensive to rely on existing reserves.

Leaving oil in the ground and maintaining excess production capacity of the scale that we need is much more expensive than using the strategic petroleum reserve in the salt domes.

Senator BRADLEY. Do you have any numbers on that?

Mr. HOGAN. I don't know what the cost numbers are, but I can think about it in terms of the production rate from the existing reserves in the United States of, in round numbers, 10 million barrels per day.

It is often proposed that the United States use oil already in the ground as a strategic petroleum reserve. If the oil is already available domestically, the suggestion is that we have no need to move oil to salt domes for a strategic petroleum reserve. We could set aside existing reserves and use these during a supply interruption.

The principal reason for pumping oil out of natural fields and placing it in salt domes is to create a capacity for rapid use of the oil. In 1978 the United States had 27.8 billion barrels of crude reserves with production of just under 9 million barrels per day. Hence, in order to maintain a capacity to produce 3 million barrels per day we would have to dedicate approximately 9 billion barrels of crude oil in the ground for the strategic reserve.

The Department of Energy is engineering the first 500 million barrels of the salt-dome SPR to have a nominal draw down capacity of 3.3 million barrels per day. Therefore, an oil-in-the-ground strategic reserve would require nearly 20 times more oil than the salt-dome reserve. While the cost details for wells and pumps in

natural fields and salt domes differ slightly, this dramatic 20 to 1 difference in the reserve to capacity requirements summarizes the reasons for the clear preference for building the strategic petroleum reserve by filling the salt domes.

Senator BRADLEY. That suggests that someone who would advocate this has not really looked at the numbers or thought it through.

Mr. ALM. I have one additional comment.

Senator BRADLEY. By the way, this is not a Senator who had this view; this is a government.

Mr. ALM. If you take a look at the domestic crude oil production pattern, domestic crude oil production over the next decade will probably decrease. For example, Exxon estimates a 40-percent drop by 1990. So, the notion of building a huge in-the-ground reserve at a time that crude oil production is declining means we would forgo oil production and reap all the costs from the oil premium we were talking about earlier.

Mr. VERLEGER. I would like to add a couple of facts: On the value of capping wells, when you go back to producing, it turns out they don't work very well. If we look back at experiences in the 1960's, the Texas Railroad Commission followed market demand for rationing. At the time wells that were not marginal wells were producing only 20 percent of their effective rated capacity.

In 1973 we needed extra production, so we lifted all ceilings. In Texas we didn't get anywhere near the amount of production that we thought we would get.

One of the problems with a policy like that is, you say we have all these wells and have excess capacity; then when you go to use it you find it is not there. We have a lot of oil reserves in the United States and in order to continue production we have to go into enhanced recovery.

We had trouble developing incentives for enhanced recovery until we passed the windfall profits tax. The Wall Street Journal argued when we passed the windfall profits tax we created a moral equivalent of \$1,000 a barrel for oil to encourage people to go into enhanced recovery.

Indeed, we have seen several major companies now move into enhanced recovery in a big way, the most recent being Amoco in the University of Texas fields. They are using injections of natural gas. In that type of field, at least as I understand the petroleum production process, is that essentially you are down to the last oil and you are getting out the last oil, which we have known we ought to go after, but they are not susceptible either to the surge capacity.

It is a very long-term, steady phenomenon. The same thing is true in California, with the heavy oil, where you have to inject steam; you have to slow down the present steam injection system so that you can increase it again.

Senator BRADLEY. California is certainly a place where it would not work.

Mr. VERLEGER. Yes. Most of our reserves are not susceptible to this sort of procedure.

Senator BRADLEY. I just wanted to get that on the record for my own reasons.

I would like to go now to the question of a tariff or a quota with an auction and their regional impact.

Do you think that such a system would affect some regions more than other regions of the country, and if so, why, and what can be done to promote regional neutrality?

Mr. HOGAN. There is no doubt about it. A tariff or quota auction system which raises the price of oil is going to affect different regions differently. That is a fact of life.

Regional imbalances will be less in an environment with no control on oil prices than in an environment of heavily controlled oil prices, for the obvious reason that the imbalance would be in proportion to oil use, not in proportion to imported oil use, since the price of imported oil would be passed on to every form of oil.

To the extent that other energy forms saw sympathetic increases in prices, the effect would be future dispersed. Of course we won't see the same total increases in natural gas. We have controls to prevent this. In the case of coal, it is hard to convert. There will be problems of regional imbalance.

I must say I find it hard to think of any reasonable policy that we could adopt that would not forgo the advantages of the tariff, that would eliminate these regional imbalances.

It is a fact that if people are using a lot of oil, and oil is costing us more all of a sudden, that we want to provide consumers with the incentives not to use oil.

If I were going to look for a set of policies to compensate regions, I would prefer policies like those we talked about under rebates. I am more concerned about equity across individuals than equity across regions. Obviously, if we design a rebate program that goes to the people who absorb the greatest income loss because of higher oil prices, that will restore some of the regional equity as well as some of the individual equity.

My preference would be to stop there, but if it is necessary, either because of some broader set of value judgments or necessary to get the program through, then we might want to think about rebates that have a regional twist to them in order to solve some of these problems.

Senator BRADLEY. Does anyone else wish to deal with that? Do you agree?

Mr. VERLEGER. I think it is a fact of life people in Texas and farmers out in the Midwest who use a great deal of oil and gasoline and diesel fuel will pay higher prices for their diesel fuel. The best answer is to decontrol natural gas too and the price of gas will go up with the tariff, and to the extent that gas will be available, that will promote substitution.

Senator BRADLEY. Do you think there is any difference between the impact of a tariff and the impact of a quota action system regionally?

Mr. HOGAN. I think there is a difference nationally, but not so much regionally. Nationally, under the quota auction system the first thing is that the price of imports would go up. I think there is some more opportunity for mischief in a quota auction system in providing special access. There may be different regional effects in that regard.

As a first approximation, for the ideal version of the quota auction system or the ideal version of the tariff, the effect would be the same.

Mr. ALM. One observation about the quota auction system: It is a highly unpredictable mechanism. If it appears that you were going to exceed the quota level, oil companies obviously will have an incentive to stockpile before the end of the year. So, in a sense, a quota can create its own panic.

In that regard, a tariff is highly preferable because it is a more dependable, predictable kind of instrument for planning by the Government and the oil industry. The quota can be unpredictable which leads to panic.

Senator BRADLEY. With tariff you know how much money you are going to get?

Mr. ALM. Right.

Senator BRADLEY. With a quota, you don't quite know what the auction is going to bring?

Mr. ALM. Let us assume for a particular year that everybody makes a calculation of how much oil they will hold in stockpile and how much they will supply to consumers. Let us assume that during the summer, driving is somewhat more than predicted and it is a cold winter. Weather alone can create situations within 1 year that can create a quota with a very large price bite.

There are a lot of irregularities with a quota.

On the question of regional equity, there is a general presumption that any kind of activity hurts New England more than other parts of the country.

Senator BRADLEY. We didn't say New England. We said any kind of activity hurts the consumers of oil.

Mr. ALM. I think that is correct. The question is, where?

Senator BRADLEY. We don't want to be that regional.

Mid-Atlantic is also——

Mr. ALM. I have probably more parochial interests than I did in Washington since I now heat my house with oil. But one needs to look closely at the total balance of petroleum product use because in some of the mid-Atlantic and New England areas, driving is considerably less than in many Sun Belt States. So, the total numbers of equity may not be as bad as appear at first blush.

Mr. VERLEGER. I think that on the quota question, the question of whether quota should cause a speculative surge in prices, if one looks at the agricultural market, where one has essentially a quota after the end of the harvest, and the futures market performs fairly well, one does not see behavior such as that described by Al.

Senator BRADLEY. I have several questions, but I am afraid that I am going to have to go to the floor. There is an emergency in the last days of this session.

What I wantd to get into are two things that I didn't have a chance to. One that I would like to talk about is the Consumer Price Index.

One of the main arguments I hear against a tariff is that it will show up as an increase in the CPI.

Now, my view is that prices will go up anyhow, and these higher prices will be reflected in the Consumer Price Index, regardless of whether it happens because of a tariff or because of the market.



But in the case of a tariff you may produce a net national economic benefit that would be reflected in an indicator of real wealth, like GNP.

So, I think we should't just look at the CPI and base our decisions on a single economic index. I think we may just have to live with the one-time effect of a tariff or quota on the CPI and console ourselves with the enhancement of real economic wealth and national security that we can expect from reducing imports.

And it also seems to me that we can turn the CPI argument on its head somewhat. People say one of the problems with a tariff/rebate scheme is that its inclusion in the CPI will trigger compensatory increases in entitlements programs and contracts tied to the CPI; but the very fact that significant groups are thereby insulated against the tariff-induced price rise by the CPI trigger means that at least some of the equity and distributional concerns with the tariff are also taken care of.

I would like you to comment on this and any other macroeconomic issues you want to raise.

The second one is that rationing would only work with price controls. If so, what does that mean?

In an earlier hearing, several witnesses testified that coupon rationing would work only if we have price controls. The reason is that for a coupon to have any value you have to control the price of gasoline. Then the coupon is worth the difference between the controlled price and the world market price.

But if you control only gasoline you give refiners an incentive to produce less gasoline and more uncontrolled products, like diesel, heating oil, jet fuel, et cetera.

To correct this shift, you would have to tell refiners what their product mix has to be; then we are back where we are today, and where we were in the summer of 1979.

Another economist, Alan Jacobs at MIT, has analyzed coupon rationing, and he concludes that if it is done in conjunction with price controls and allocation then it won't eliminate—and may not even reduce—gas lines, and any reduction in lines or other forms of inconvenience rationing would only occur in a single region of the country.

The reason is that controls and allocations would cause the equilibrium price of the coupon to fall to zero, except possibly in one region, thus defeating the whole purpose of the scheme.

So, it seems that we are damned if we do and damned if we don't. We cannot implement rationing unless we have price controls, but the operation of price controls will prevent the coupons from having any value.

What do you gentlemen think about these arguments? Is there any rationing scheme that you think would work and that you think would be preferable to a market-oriented tax-based approach?

Unfortunately, I have a real emergency and have to go. So, if you could possibly comment for the record on those two items, I would appreciate it very much.

I want to thank you for your appearance today. I think from the hearings have come a number of innovative ideas which I hope we will be able to develop in the next Congress.

Thank you very much. Actually, this hearing lasted longer than I thought it would, given the floor session. Thank you very much.

Mr. ALM. Thank you, Senator.

Senator BRADLEY. You can continue to talk for the record and answer the questions, and then when you are finished with that, you can leave.

Let the record state that as soon as the two questions are answered by each of the three, the subcommittee will stand in adjournment at that point.

Mr. ALM. I will confine my comments to the rationing question, because I have two distinguished economists on the panel who can cover the CPI question much better than I can.

On the question about whether rationing would require price controls to be effective, I should turn the question around. The question is: Is there any need for rationing without price controls?

Assuming both crude and product prices are decontrolled, there would only be a temporary imbalance between supply and demand during a supply interruption. As the world oil price increased, the market would be brought back into balance. If the United States or the United States in combination with other countries imposes tariffs, it would help bring supply and demand in balance without transferring all the wealth to OPEC. That would obviously be one policy option.

If the West fails to impose the tariff, however, OPEC prices will rise, first in the spot market and ultimately in the contract market. The market will clear at some point, and the gasoline rationing program will be unnecessary. We will have some through the horrendous experience of creating a bureaucratic monstrosity that was not needed, and worst, we will probably develop some rationale for keeping it in place.

I think, realistically, 6 months would be an absolute minimum for putting a rationing program in effect. It is hard to believe you wouldn't be approaching a situation where prices reflected the markets clearing prices or were approaching them by then. So, the only rationale for rationing, as I understand it, is to allow us to control both crude oil prices and product prices.

Once in a rationing program, you are creating an administrative nightmare that is beyond anything I can conceive of. It begins with sending out entitlement checks to the owners of 150 million registered vehicles in the country. Anywhere from 10 to 20 percent of those would not be received by recipients; 60,000 new distribution centers would be created. The 20 billion coupons would be used in the first year of operation. They would have to be recycled from the Government to the distribution center, to the motorist, to the service station, and back to the Government.

I think the system would clearly break down. The only rationale for the system is to continue to impose price controls. Then the question is, is that necessary for equity? As we have discussed, you can just simply let the marketplace allocate supplies and send people money rather than rationing checks.

Indeed, you can develop a more equitable system of allocating funds to consumers. The rationing program allocates tickets which are worth money only to owners of registered vehicles. The regressivity is obvious. A family with one car which has maybe two or

three drivers gets the same number of tickets as the family with three cars with the same number of drivers.

The rationing program rewards the generally affluent.

Mr. VERLEGER. I am going to respond on the Consumer Price Index question.

I think the rationing probably would require allocation, price controls.

In terms of the CPI, there is going to be an increase in the CPI from the tariff and that increase is unavoidable. One should not lie about it, for the purpose of the tariff is to prevent increase in crude prices, longrun OPEC crude prices.

The increase in the longrun crude prices which would occur in the absence of the tariff would also cause increase in the CPI through the price of petroleum products and this increase in CPI would be permanent.

What one has to realize is that once in comparing a permanent increase in CPI, is due to petroleum prices going up permanently with a temporary increase in CPI like that explained with food prices, when one has a bad harvest, or mortgage rates when the prime rate goes to 25 percent. The CPI goes up; elements in the CPI relating to food prices go up and come back down. When the tariff comes off, the price of petroleum products would go down and you would get a reduction in the CPI.

One of the problems we have had in Washington, in my personal opinion, in the last 3, maybe 6 or 7 years, is total focus on the CPI in a desire to prolong agony, at a modest level, rather than just taking the agony when one has to have it.

The cost of the tariff is a shorrun increase in CPI; it is unavoidable, but when it is taken off you would get, assuming the mechanism worked to dampen the longrun price of crude oil, a lower level of the CPI in the long run.

Mr. HOGAN. First, in response to the question about the CPI, there is no question that by increasing the tariff the price of oil is going to raise the CPI and it will have inflationary effects; macroeconomic problems will be created.

Many of the actions we have taken tend to exacerbate those costs. I am talking of actions in the fiscal and monetary side which recognize that the price has gone up, so we have to accommodate that inflation.

I prefer to avoid the real cost of increase in unemployment. There will be some problems of timing because of the fiscal drag. If we have an increase in prices it draws down our spending power.

I think there are steps that can be taken to try to mitigate those economic losses, and they should be taken. I think the idea of removing the oil price or tariff increase from the CPI is attractive on the surface, but I would not recommend it. The reason I would not is that I think it is clearly a superficial change. Everyone knows what is happening and what we are trying to do is get around the institutional problem of all of the contracts that have been formally tied to the CPI, and we would not fool anybody about what was happening to the true cost of living.

In all these contracts the institutional arrangement is a fundamental problem and cuts across our economy. The contract linkages and adjustments to the CPI are motivated by a model of

inflation which is essentially a monetary inflation. We double the size of the money supply; that doubles everybody's prices and there are no real changes in the relative prices, so we should allow wages and so forth to adjust to maintain the relative price vis-a-vis other items in the economy.

But changes in oil prices or even changes in food prices or any of these real cost changes are real changes in relative prices. It is an illusion to think that somehow by ratcheting up to the CPI we can avoid changes in prices that take place in the United States or other countries or individual groups within the economy.

I would be much more interested in trying to attack that problem, somehow have whatever mechanism that is used for compensating people for inflationary effects restricted to those which are not representing real changes in the relative prices. That is a much broader problem and harder problem to solve.

I don't think we are going to solve that by piecemeal and exempting this and that every time it happens. Energy is an example of that kind of piecemeal modification of the CPI.

On the second question regarding rationing and allocation, for some reason it often does escape discussion. I think that at some point an allocation program and price controls are an essential part of a rationing scheme. It is a formal part of the standby rationing proposal that is being developed. If rationing coupons are going to have value, they will sell in the market.

By definition, we have to do something to keep the price down that people pay at the pumps. If we do have price controls, we are going to need allocation systems, because they don't have incentives for oil producers to move oil around to the various places; so we will have Government allocation.

So, at a minimum we have everything we now have and now we have some more. We have a coupon system going through.

I am familiar with the work of Alan Jacobs at MIT who has looked at this problem. The sense of his argument is sound and correct and frightening.

What we will end up with is a situation where, if we are lucky, we will get the coupon allocations and the price of coupons in one region of the country just right to balance the demand and supply in that region. Every place else in the country we will have the specter of irate consumers standing in gasoline lines, waiting to get access to the gasoline, with their coupons in hand, the coupons which they view as their entitlement, their guarantee, that this would not happen again in the future.

I think what we will end up with, except for one region of the country, is the worst of all worlds. The lines may be shorter because of the coupon price being higher than the controlled price, but the lines will still exist and I think the political cost that goes with those kinds of disruptions will be much greater under a rationing scheme than under the scheme we have had in the past.

I think rationing actually makes the effects worse, even if rationing works efficiently from an administrative point of view.

As Mr. Alm pointed out, administratively it is not going to work either, so we will have all those problems compounded as well.

I think the arguments are clearly against gasoline rationing and clearly if gasoline rationing is going to take place, controlled allo-

cation, it will produce lines and make consumers even more unhappy in the future than they were in the past.

The best alternative is to use a market allocation system.

Mr. ALM. The first question is, if you have a coupon rationing system, do you have to establish the refiners' yield on gasoline? The answer is yes; otherwise, you just have an absolute mess. You would not be able to control the quantity.

The second question: Do you need allocations? I don't think you need allocations to make the market work with a rationing system. Presumably, the coupon and value of the gasoline could allow some shifting. I am afraid that is a political matter; you need the allocation because of the claim that some stations would be cut off from supply. If you are stuck with price controls and allocations, then you get all the problems that Jacobs and Bill Hogan just talked about, which are a likely possibility.

[Whereupon, at 11:10 a.m., the subcommittee was adjourned, subject to the call of the Chair.]

