ENERGY INDEPENDENCE OR INTERDEPENDENCE: THE AGENDA WITH OPEC

852

HEARINGS

BEFORE THE

SUBCOMMITTEE ON ENERGY

OF THE

JOINT ECONOMIC COMMITTEE

CONGRESS OF THE UNITED STATES

NINETY-FIFTH CONGRESS

FIRST SESSION

JANUARY 12 AND 13, 1977

Printed for the use of the Joint Economic Committee

U.S. GOVERNMENT PRINTING OFFICE

90-664 WASHINGTON : 1977

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

JOINT ECONOMIC COMMITTEE

(Created pursuant to sec. 5(a) of Public Law 304, 79th Cong.)

RICHARD BOLLING, Missouri, *Chairman*
HUBERT H. HUMPHREY, Minnesota, *Vice Chairman*

HOUSE OF REPRESENTATIVES

HENRY S. REUSS, Wisconsin
WILLIAM S. MOORHEAD, Pennsylvania
LEE H. HAMILTON, Indiana
GILLIS W. LONG, Louisiana
OTIS G. PIKE, New York
CLARENCE J. BROWN, Ohio
GARRY BROWN, Michigan
MARGARET M. HECKLER, Massachusetts
JOHN H. ROUSSELOT, California

SENATE

JOHN SPARKMAN, Alabama
WILLIAM PROXMIRE, Wisconsin
ABRAHAM RIBICOFF, Connecticut
LLOYD BENTSEN, Texas
EDWARD M. KENNEDY, Massachusetts
JACOB K. JAVITS, New York
CHARLES H. PERCY, Illinois
WILLIAM V. ROTH, JR., Delaware

JOHN R. STARK, *Executive Director*
LOUIS C. KRAUTHOFF II, *Assistant Director*
RICHARD F. KAUFMAN, *General Counsel*

ECONOMISTS

WILLIAM R. BUECHNER
G. THOMAS CATOR
WILLIAM A. COX
ROBERT D. HAMRIN
KENT H. HUGHES
SARAH JACKSON
JOHN R. KARLIK
L. DOUGLAS LEE
PHILIP MCMARTIN
GEORGE R. TYLER

MINORITY

CHARLES H. BRADFORD
C. CATHERINE MILLER
STEPHEN J. ENTIN
GEORGE D. KRUMBHAAR, JR.
MARK R. POLICINSKI

SUBCOMMITTEE ON ENERGY

EDWARD M. KENNEDY, Massachusetts, *Chairman*

SENATE

HUBERT H. HUMPHREY, Minnesota
WILLIAM PROXMIRE, Wisconsin
ABRAHAM RIBICOFF, Connecticut
JACOB K. JAVITS, New York
CHARLES H. PERCY, Illinois

HOUSE OF REPRESENTATIVES

WILLIAM S. MOORHEAD, Pennsylvania
LEE H. HAMILTON, Indiana
GILLIS W. LONG, Louisiana
OTIS G. PIKE, New York
CLARENCE J. BROWN, Ohio
GARRY BROWN, Michigan
JOHN H. ROUSSELOT, California

JOHN G. STEWART, *Professional Staff Member*

CONTENTS

WITNESSES AND STATEMENTS

WEDNESDAY, JANUARY 12, 1977

	Page
Kennedy, Hon. Edward M., chairman of the Subcommittee on Energy: Opening statement	1
Adelman, M. A., professor, Massachusetts Institute of Technology, Cambridge, Mass	5
Lichtblau, John H., executive director, Petroleum Industry Research Foundation, Inc., New York, N.Y	30
Moran, Theodore H., professor, School of Advanced International Studies, Johns Hopkins University, Washington, D.C	35
Meyer, A. J., professor, Harvard University, Cambridge Mass	45

THURSDAY, JANUARY 13, 1977

Brown, Hon. Clarence J., member of the Subcommittee on Energy: Opening statement	75
Sewell, John W., vice president, Overseas Development Council, Washington, D.C	76
Carter, Anne P., professor, Brandeis University, Waltham, Mass	97
Kauffmann, Howard C., president, Exxon Corp., New York, N.Y	112
Sawhill, John, president, New York University, and former Administrator, Federal Energy Administration	126
Davidson, Paul, professor, Rutgers—The State University of New Jersey—New Brunswick, N.J	130

SUBMISSIONS FOR THE RECORD

WEDNESDAY, JANUARY 12, 1977

Adelman, M. A.: Prepared statement	7
Kennedy, Hon. Edward M.: Opening statement of Senator Percy	4
Moran, Theodore H.: Prepared statement	39

THURSDAY, JANUARY 13, 1977

Brown, Hon. Clarence J.: Opening statement of Senator Kennedy, chairman	73
Carter, Anne P.: Prepared statement	102
Davidson, Paul:	
Response to Representative Brown of Ohio's request to submit a list of petroleum companies who own sufficient amounts of other sources of energy to have an impact on price	135
Prepared statement and an attachment	141
Kauffmann, Howard C.:	
Prepared statement and an attachment	117
Response to Senator Kennedy's query regarding the price of heating oil	180
Sewell, John W.: Prepared statement and attachments	82

APPENDIX

Response of John W. Sewell to additional written questions posed by the minority members of the Subcommittee on Energy	189

Page

Response of Howard C. Kauffmann to additional written questions posed by the minority members of the Subcommittee on Energy ---------- 196

Response of Paul Davidson to additional written questions posed by the minority members of the Subcommittee on Energy ---------- 197

Letter from M. A. Adelman, professor, Massachusetts Institute of Technology, to Senator Kennedy, dated February 22, 1977, stressing his position for supplying a continuing programed flow of any given type of crude oil to refineries ---------- 210

Statement of Ragaei el Mallakh, director, International Research Center for Energy and Economic Development and professor of economics, University of Colorado, Boulder, Colo ---------- 211

Letter from Senator Kennedy to the members of the Subcommittee on Energy, dated January 4, 1977, announcing hearings on January 12 and 13, 1977, entitled "Energy Independence or Interdependence: The Agenda With OPEC" ---------- 214

ENERGY INDEPENDENCE OR INTERDEPENDENCE: THE AGENDA WITH OPEC

WEDNESDAY, JANUARY 12, 1977

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON ENERGY
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:38 a.m., in room 1318, Dirksen Senate Office Building, Hon. Edward M. Kennedy (chairman of the subcommittee) presiding.

Present: Senator Kennedy; and Representatives Long and Brown of Ohio.

Also present: John R. Stark, executive director; Louis C. Krauthoff II, assistant director; John G. Stewart, subcommittee professional staff member; William A. Cox, Kent H. Hughes, and Sarah Jackson, professional staff members; Michael J. Runde, administrative assistant; and Charles H. Bradford, Stephen J. Entin, and Mark R. Policinski, minority professional staff members.

OPENING STATEMENT OF SENATOR KENNEDY, CHAIRMAN

Senator KENNEDY. The subcommittee will come to order.

This is the first of 2 days of hearings before the Subcommittee on Energy of the Joint Economic Committee to hear testimony on a timely and important subject: "U.S. Energy Independence or Interdependence: The Agenda With OPEC."

Events last month at the OPEC ministerial meeting at Qatar have made today's topic, "The Future of OPEC: Will the Glue Hold?" a matter of considerable interest to the United States and other oil-importing nations.

OPEC's decision to adopt a two-tiered pricing system for crude oil, coupled with Saudi Arabia's decision to increase its daily production ceiling to support its lower price, caught most experts by surprise. There have been considerable differences of view over what these events mean for the oil-importing nations and for the cartel itself. But out of this welter of opinion and analysis, one fact is indisputable: The United States is paying higher prices than ever for the oil we buy overseas. These higher oil prices, moreover, will soon drive up the cost to consumers of all other energy resources not subject to Government controls.

No doubt the United States is less vulnerable to these higher prices than many other oil-importing nations, such as Japan, which have little or no domestic energy production. But as a Senator from

Massachusetts, in a region also totally without indigenous energy resources, I take very little solace from the fact that the OPEC split will result in Saudi Arabia selling its oil at an increase of 5 percent instead of 10 percent. This is not the kind of diplomatic victory that we can afford indefinitely.

This is the third set of hearings which the Subcommittee on Energy has convened to examine U.S. international energy policy. Other congressional committees have also examined this question from time to time. We have listened to speeches on this subject from President Nixon, President Ford, Secretary Kissinger, and other officials of the executive branch. Yet, I believe it is fair to say the United States is as unclear today about its international energy policies as it was during the Arab oil embargo 3 years ago. And this absence of clarity has resulted in U.S. policies that are confusing and often contradictory.

My hope is that this hearing, where we will hear some of the most knowledgeable persons in this country, will at least clarify the basic policy choices that are open to the United States and the likely consequences of these choices. It would be my hope that Congress, working cooperatively with the new Carter-Mondale administration, could then agree on a basic posture for the United States in its international energy dealings and move promptly toward implementation of these policies.

After 2 years of active consideration of these issues, I am convinced that the U.S. energy program will remain in limbo until we decide how to deal with the reality that this country will be importing substantial amounts of oil for most, if not all, of the balance of this century. And even if, by some miracle, we could become self-sufficient in energy our closest allies overseas will still be heavily dependent on oil imports. In this sense, the issue of energy independence is a mirage.

We face, instead, a complicated and interrelated set of questions that point to the issue of how much oil this country has to import, from which oil-exporting countries, and on what terms. In approaching this issue, four basic questions must be addressed.

First, how should the United States deal with the OPEC cartel? Assuming we can all agree that the outgoing administration's initial attempt at rhetorical confrontation—tough talk with little to back it up—is a useless exercise, what course do we follow?

A clear factor in answering this question is the cartel's internal economic and political makeup. As the Qatar meeting demonstrated, there are real differences among OPEC states that surface from time to time. But as I have already noted, these differences do not seem sufficiently great to produce any lowering of the price of oil. Are we then deluding ourselves into believing that bilateral negotiations between the United States and individual OPEC states, in an effort to capitalize on these differences, will result in any significant benefits for this country? To what extent can the need of OPEC states for our capital goods, technical expertise, and the like, provide the United States with bargaining leverage in acquiring OPEC oil on more favorable terms?

I think all of us saw on the network news last evening the recent report that Iran expects a shortfall in revenues of up to one-third in the immediate future and it is entering into a variety of bartering arrangements for distribution of its oil. I would be interested to have our panel members' interpretations of this matter.

Or should we actively pursue a policy designed to diminish the cartel's internal cohesion, along the lines of Professor Adelman's plan for the sale of import entitlements or quota tickets? What would be the political consequences of such a U.S. policy, especially in this period where prospects for a Middle East settlement have brightened?

Second, how should the United States deal with the U.S. multinational oil companies that are this country's agents in acquiring imported oil? There are those who believe that the cartel could not function without the active assistance of our companies—by informally determining the production shares of each OPEC state, by providing assured markets for OPEC soil, and by providing important managerial and technical services. Remove this protection, it is argued, and the cartel would be unable to control the production levels of individual OPEC members; competitive price-cutting and lower prices would soon follow.

Legislatively imposed divestiture is one remedy that is proposed to deal with this situation. Short of such action, the need for more vigorous enforcement of existing antitrust statutes and careful review of tax policy as it relates to the oversea operations of multinational corporations is stressed.

There is also a growing body of opinion that the U.S. Government should assume a larger presence in the overseas transactions of our oil companies, by acquiring advance knowledge of oil supply contracts, with the right of veto over those contracts deemed not in the U.S. national interest. Regardless of the ultimate disposition of these various policy choices, it is clear that the question of U.S. Government policy toward our multinational oil company is at the core of any serious effort to formulate an effective international energy policy.

Third, what, if any, relationships exist between the interests of the United States in acquiring reliable sources of imported oil at reasonable prices and the need for restructuring the world economy, with special concern for the problems of the developing nations? This question will be examined in greater detail at tomorrow's hearing. We should recognize, however, that the Conference on International Economic Cooperation, presently in recess in Paris, is premised on the proposition that a solution to the world's problem of high oil prices is related to achieving a broader international economic settlement that takes explicit account of the special economic problems faced by the world's developing countries.

Is it feasible for the International Energy Agency, the organization of the industrialized oil-importng nations, to assume a more forceful role in the consuming nations' dealings with OPEC?

Fourth, what domestic energy programs are needed to carry out a successful international energy policy? There is general agreement that the existence of an adequately stocked strategic petroleum reserve would greatly enhance our bargaining power with OPEC and protect us from the political threat of another oil supply interruption. There is also the need to expand the world's supply of oil by encouraging exploration and production in non-OPEC countries. But what should be the relative priority between our efforts to reduce consumption and expand energy supplies in this country?

In my judgment, these are the basic issues that must be faced. Until we do face them squarely, our international energy policies will con-

tinue to be characterized by a high degree of improvisation, inconsistency, and confusion. And the American people will continue to bear the brunt of these failures.

Our panel this morning is unusually well qualified to help us in this important inquiry.

Our colleague, Senator Percy, will be unable to attend the hearing this morning because of a scheduling conflict, therefore, I would like to insert his opening statement into the record at this time.

[The opening statement of Senator Percy follows:]

OPENING STATEMENT OF SENATOR PERCY

The two-tier world crude oil pricing system, established by OPEC in Qatar just before Christmas, took most observers by surprise.

Saudi Arabia and the United Arab Emirates said they would raise their oil prices by 5 per cent. Their partners in OPEC said they would raise theirs by 10 per cent in January, and 5 per cent more in July.

This fissure in the cartel means that we are not entirely certain what price we will be paying for oil in 1977.

There are many unanswered questions. Will the OPEC majority stick to their new price and let Saudi Arabia grab part of their market with its cheaper oil? Will individual members of OPEC break ranks and cut prices in order to hold as much market share and revenue as possible? Will Saudi Arabia increase its production of oil beyond its current ceiling of 8.5 millioon barrels a day?

These are vital questions to the American public and I look forward this morning to getting answers from our distinguished witnesses.

In the midst of all this uncertainty, one thing stands out starkly: the need for conservation. Ever since the energy crisis hit us in 1973, conservation has been the last option rather than the first option.

Our nation has failed miserably to formulate a national energy policy that has conservation as its top priority. For too long we have defined the energy problem as "not enough of" and the solution to "get more of." Our traditional policies have encouraged supply expansion and hardly any attention has been given to demand management. This type of "provide more" thinking ignores more efficient and less costly alternatives which emphasize demand reduction.

The United States' conservation efforts to date have been rated near the bottom of all consuming nations in the International Energy Agency. We have to change this.

One project that I think has tremendous promise is the creation of a new national organization devoted totally to conservation. We have given it the name Coalition on Energy Conservation, or COEC.

There is now *no* national organization dedicated solely to the promotion of energy conservation. Although scattered efforts are being made, there is no central focal point to marshal these efforts so that they have political muscle.

COEC must not compete with existing efforts. Rather it must strengthen them by fostering information exchange, preventing duplication of activity, and coordinating disparate efforts to produce a coherent national effort.

OPEC will continue to increase unilaterally the price of oil while we continue to squander energy so wastefully. Conservation means doing better rather than doing without. We can and we must do better.

Senator KENNEDY. Before introducing the panel, I will ask Mr. Brown if he would like to make any comments.

Representative BROWN of Ohio. No, I will save my comments for my questions.

Senator KENNEDY. All right.

Our panel consists of M. A. Adelman, professor, Massachusetts Institute of Technology; John H. Lichtblau, executive director, Petroleum Industry Research Foundation, Inc. of New York; Theodore H. Moran, professor, John Hopkins School of Advanced International Studies in Washington, D.C.; A. J. Meyer, professor, Harvard University.

We would like each witness to make a short opening presentation, not to exceed 15 minutes, and we will ask questions of the entire panel after the opening statements have been completed.

STATEMENT OF M. A. ADELMAN, PROFESSOR, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

Mr. ADELMAN. Having filed a prepared statement I wish now to answer the questions in the chairman's letter of invitation and then to give the highlights.

Answering the questions: Energy independence is impossible. We are dependent on the cartel because they are a monopoly. They are not dependent on the industrial nations, who have no monopoly.

However, we are not dependent on Arab oil as such. To exclude it would cost us little or nothing, neither would it help.

Interdependence is a meaningless phrase which ignores the market structure on both the buying and the selling side.

The cartel will probably hold together unless we take steps to dissolve the glue. We can and should do so.

Now, the highlights of my statement.

1. The United States has aided and collaborated with the oil cartel. As a direct result, cartel government take at the Persian Gulf, the price floor, is up by a factor of thirteen since 1970. This is shown on table 1, in my prepared statement.

Of the total increase, about a third was the result of the 1973 production cutback.

2. Fear lest there be "not enough oil for our needs" is confusion. There will always be enough oil—at a price. The cartel will fix the price to maximize its profits, and at that price, the amount supplied will suffice to meet the lower demand.

If it does not suffice, the price will be raised further. The "shortage" or "gap" is fiction no matter what you assume about reserves, demand, et cetera.

3. The cartel is strong, but fragile like all cartels; absent some shock, it will probably flourish. It will keep raising the price toward the point of maximum revenues, not yet reached.

4. The cartel governments sometimes agree, sometimes disagree on the optimal rate of price increase. Saudi Arabia was the leader in repeatedly raising the price in 1974, while repeatedly calling for lower prices.

Their hypocrisy and promise-breaking may be excused—the United States asked for it.

Since early 1975, Saudi Arabia has favored a slower rate of price increase, fearing rightly that in recession or lagging recovery they will bear too much of the burden of output restriction, while the others enjoy the higher revenues.

The current so-called two price system heralds no split in the cartel and is of little importance. As a practical matter, it means an increase of somewhere between 5 and 10 percent in the first half of 1977, and about 10 percent in the second half. These prices will be increased, at a favorable time.

5. The incoming Carter administration may share the stubborn delusion of the Kissinger-Nixon-Ford administration that they can

make a deal with the cartel so-called moderates, giving them economic or political benefits in return for greater output.

They should reflect:

(*a*) Maximum revenues also mean maximum political clout. Hence, there are few, if any, political concessions which can possibly be attractive to a cartel nation.

(*b*) Agreements can only be enforced by competition or law or both. If somebody breaks his word, customers go elsewhere, and he is out of business. Or a court can force him to deliver.

But, the cartel has suppressed competition, and there is no law against a sovereign. Any deal with sovereign monopolies is, to coin a phrase, inoperative, from the start. Whatever you do for them becomes past history as soon as you cannot take it back.

We are sure to be losers in any bind of deal. Better to do nothing and have the courage to admit it than to do harm.

It makes no sense to freeze the dismal present into the future, and give up our chance to resist and damage the cartel.

6. The 1973–74 embargo was actually a production cutback which hurt others more than us. A selective Arab embargo against the United States was and is impossible because non-Arab capacity far exceeds our imports.

But because our friends are more vulnerable to production cutbacks than we, and will long remain so, even zero oil imports would not give us "energy independence," nor freedom from blackmail. A large stockpile and a standby program of short-term reduced consumption constitute the only passive defense.

7. Laying aside doomsday rhetoric of world economic ruin, and also cartel apologetics, the cartel is an economic burden and makes the world a more dangerous place.

Monopoly and supply insecurity are two sides of the same coin. The richer the cartelists, the easier for them to cut back production by armaments, and start wars.

The more we reduce cartel revenues, the better for us.

8. The consuming nations, acting together, could tax the bulk of the cartel revenues back into their own treasuries through a tax proportional to the price of oil.

For example, assume they all levy a tax equal to three-quarters of that price. The tax would automatically rise or fall with the price of oil.

If before imposition of the tax the cartel maximizes its revenue at a given price, then after the imposition of the tax the same price would still maximize revenues. The price that allowed them to reach "x" billion dollars before the tax would be the price that yielded them one-fourth of "x" after the tax.

The consuming countries would get the other three-fourths.

A scheme such as this can only work if all consuming nations act together. They are too scared today of shortages and bemused by empty slogans of dialog and interdependence to enact such a program, but they may do so inadvertently.

9. The United States, acting alone, could divert large sums from the cartel to our Treasury. We should put import entitlements up for monthly auction by sealed bids, with no limitation on resale and transfer of tickets.

Tickets would be very cheap, at first, because cartel nations would not buy tickets, at first. But a ticket would be worth up to $12 to a cartel nation, and 200 million tickets, worth nearly $2½ billion would be up for grabs month after month.

Cheating to get more sales would be easy. Tickets could be bought anonymously through front men. A cartel country would sell at the current market price, and not even the customers would know that it was chiseling—rebating—by buying tickets from the United States.

Any country needing extra revenues would buy more tickets to sell more barrels, and any country which lost business could recoup itself by buying tickets, thereby jostling other cartelists.

The tickets would not stay cheap for long. With no interference in industry logistics, and with a handful of employees administering the auction, the United States would pocket substantial revenues.

The quota auction could only fail if each and every cartel nation would resist temptation indefiinitely, month after month. Only one cartelist need defect to get the process of cheating started.

In contrast, a government purchasing monopoly would be a logistical horror, it would lose the secrecy, essentially the chiseling, and if it involved term contracts, it would legitimatize cartel prices.

A quota auction would not put an end to the cartel, but the damage to it and benefit to us would be great. The worst that can happen is that we are not better off than now. But the readiness of the United States to defend itself should at least give the cartel pause, and make them act more slowly and cautiously.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Adelman follows:]

PREPARED STATEMENT OF M. A. ADELMAN

I thank the Committee for the invitation to testify.

CONTINUING AMERICAN SUPPORT FOR CARTEL—NEVER EXPLAINED

The United States Government has always supported the world oil cartel, and without explaining why, either to insiders or outsiders. Congress should bring these issues into the open.

There can be little doubt about American support. I gave much offense by saying this in 1971 and 1972[1] but I understand the case. It would help if we could put on the public record the relevant State Department briefings and internal correspondence. But at least we know now that when the Libyans opened Pandora's box in 1970, some oil companies wanted to resist, some to comply, and some waffled. The United States government insisted on giving the Libyans what they wanted. The then managing director of Royal Dutch/Shell later wrote Senator Church that he did not know why.[2] Recently the Treasury's Mr. Parsky said that "breaking up OPEC would be detrimental." [3] He does not explain why. Nobody on Capital Hill has enough interest or curiosity to ask him.

The United States Government has already legitimatized a Persian Gulf price 50 percent higher than today. The U.S.-Iranian communique and press conference of August 7, 1976[4] estimates the value of Iran oil shipments to the United States during 1976–1980 as around $14 billion. Quantities are not mentioned, but even

[1] M. A. Adelman, "Is the Oil Shortage Real? Oil Companies as Tax Collectors," Foreign Policy, No. 9, Winter 1972, and earlier speeches reported in the trade press.

[2] Multinational Corporations and American Foreign Policy. Hearings before the Subcommittee on Multinational Corporations of the Committee on Foreign Relations, 92d Cong., 2d sess., pt. 8, pp. 771–773, (1975). For brief explorations of this history and what followed, see "A Diplomatic Situation Where Oil and Hauteur Just Didn't Mix," Washington Post, Mar. 14, 1976, p. F11, and "How OPEC Came to Power," Forbes, Apr. 15, 1976, pp. 69–85.

[3] Time, Jan. 19, 1976, p .54.

[4] Department of State Bulletin, Sept. 6, 1976.

if they were somewhat higher than in recent years, the 5-year total could hardly exceed $900 million barrels. Since a year's exports have already gone at $11.50, a little arithmetic shows the target price to be around $17.

Recently the State Department deliberately leaked documents to a friendly writer,[5] who twice gave the official view that cooperation with oil producers, particularly with Saudi Arabia, has been a great success. Nobody can doubt that the Saudis have "a vast commitment by the U.S. government to play a major part in fashioning their infrastructure and to sell, over the years, arms worth many billions of dollars". But the State Department should explain why this burden on us is a success. A United States Senate Committee sees things a little differently: they are concerned that tens of thousands of American "advisors" are our hostages to Persian Gulf ambitions and feuds. It is not the only political danger.

CARTEL A BURDEN AND DANGER

We can set aside doomsday rhetoric and cartel apologetics. Direct tribute to the cartel is over $125 million per year worldwide, about a fourth paid by us. Building new energy sources at home diverts capital and labor and thereby lowers our real income. The industrialized countries have so far largely avoided beggar-my-neighbor policies to adjust balances of payments, but their resolution seems to be wearing thin, and there could be heavy effects on world trade. The less-developed countries are in much worse straits.

OPEC success in monopolizing a natural resource has inspired strife all over the world. Patches of barren ground or ocean seem worth fighting for; the Law of the Sea conferences have failed; there are confrontations from the Aegean to the East China Sea. Investment in minerals in the less developed countries decreases as they try to follow the OPEC examples both in taking over properties and trying to form cartels. There has also been political damage. (See below, "Embargo".) And cartel revenues are fueling an arms race which could go nuclear.

It is a long overdue question, why the procartel policy has persisted so long, and what good it is supposed to be doing. I suggest that there are three reasons, all honestly believed, all of them delusive and harmful.

First, since 1945 and particularly since 1950, it has been our policy to subsidize the oil producers in order to have friends at the Persian Gulf and oppose Russian advances in that area. We could do it directly for a tiny percent of the cartel tribute. It would be not only cheaper but much more effective. Governments would be much more amenable to American wishes and interests if they were directly dependent on us, and if they did not have billions of dollars with which to pursue their own adventures.

Saudi Arabia as a supposed force for moderation in Middle East politics is based on just one thing: its money. If we were to subsidize Egypt directly, not only would we save billions, the money would go farther. The Egyptians would also like it much better: "It has long been ruefully said in Cairo that the [Saudi] Arabs are determined to fight to the last Egyptian."[6]

The second reason, which has only gained currency in the last few years, is that high prices are good because they discourage energy consumption. But that is no reason for pouring out billions in tribute. If we collect an excise tax on oil products, we can use it to subsidize low income consumers, energy research, or for any other useful purpose.

The third delusion is the belief that we face a long-run energy shortage. Now, regardless of what we think about demand growth, fossil fuels reserves, etc., the belief in shortage is nonsense. Except when a government deliberately holds a price below the market-clearing level, any shortage, any excess of demand over supply, forces up the price and closes the "gap". In any but the short run, the amount supplied will equal the amount demanded. When a monopolist swears, his hand on his heart, that he will never let us run short, we had better believe him. For if supply is less than demand, he will raise he price and increase his profits. Under competition, prices will be less and profits approach the normal level for marginal production—but again, no shortage.

If Saudi Arabia enforces a "production ceiling" on its output, and if the amount demanded worldwide really exceeds world capacity, the price will rise.

---

[5] Edward R. F. Sheehan, "How Kissinger Did It," Foreign Policy, No. 22, Spring 1976, pp. 3–70.

[6] Cairo correspondent, in London Economist, November 13, 1976, p. 83.

It is merely a problem of tactics: whether the Saudis prefer to raise the price directly or indirectly. But a price rise there will be in either case.

Price is the only issue; energy "needs" and "gaps" and "shortages" are time-wasting confusion.

Our foreign-policy makers, in and out of the government, continue to labor under a mythical problem: "Will the oil producing governments produce enough for our needs? We must somehow induce them to do this. We are interdependent—they need the money, we need the oil. Let us make some kind of agreement, with both economic and political elements, to make it worth their while."

This is all illusion. The cartel governments will aim to produce enough oil to maximize their revenues—no more or less. Maximum revenue means also maximum political clout, for the royal road to power is money.

Therefore despite any political diversity these nations agree on the cartel objective: maximum revenues. They may disagree on what price would maximize revenues, in short or long run. Moreover, a price which maximizes for one may not do it for another. Moreover, they do not agree on how to divide up those gains; the discord has been contained, so far. But thoughts of splitting the so-called OPEC moderates from OPEC extremists, linkage with nonoil issues, political settlements, etc. disregard the nature of the cartel and are addressed to phantoms.

Mr. Kissinger's thesis that world oil prices are "political prices" is gratuitous error. When higher prices increase the reevnues of the sellers, we need no far-fetched political hypothesis to explain them.

"DEPENDENCE" NOTHING BUT MONOPOLY. NO MONOPOLY, NO DEPENDENCE. "INTERDEPENDENCE" IS MYTH

Dependence on any nations or persons requires, first, an essential product or service; second, its control by a single hand or united group. We need food, but farmers cannot deny us food so long as they are many and not united, hence we are not dependent on farmers. We are dependent on those persons who in concert control the supply of oil, and may restrict its production. Control of supply is the essence of monopoly, and dependence only an aspect of monopoly.

The cartel of the oil-producing nations has two special features which increase dependence.

(a) Oil is a nondurable good, needed in a continuing stream. It is quite unlike the metals. The service we get out of steel or aluminum is embodied in an enormous stock of durable instruments. The stock is consumed only very slowly. So a year's cutoff by a steel or aluminum monopoly would deny us only the small annual increase in the stock, and we would have enough time to retrieve the situation. Oil stocks are normally a small percent of current consumption, and a cutoff does quick damage.

(*b*) The oil cartel is composed of sovereign states. Some of them have accumulated very large foreign-exchange holdings, and can the more easily do without current income.

The cartel nations are not dependent on us, because we have no monopolies comparable to their oil monopoly. However much they need our food or industrial products, they are sure of getting them by normal purchase, if not from one county then from another. The industrial nations are not united to control prices, and are not going to cut off their supply. (Nor, in my opinion, should they try.)

Trade may be called "interdependence", if we prefer five syllables to one. Aside from this, to speak of "interdependence" between oil producing and consuming nations simply ignores the market structures on both sides of the fence. Of course a few people are getting rich out of that trade, and will use all their influence to help increase cartel revenues and prevent any resistance.

(*c*) We are dependent on cartel oil, but not on Arab oil. If we imported not a drop of Arab oil, it would be replaced by non-Arab oil at little additional expense or trouble. But neither would this exclusion do us much good, because as will now be explained the problem is not an "embargo" but a production cutback.

"EMBARGO" NEVER WAS. "ENERGY INDEPENDENCE" IMPOSSIBLE

During the production cutback of 1973–74 (the so-called "embargo") the industrialized democracies fell apart. Member nations of the European Economic

Community broke their own law, the Treaty of Rome, which prohibits restrictions on movements of goods, in order to help cut off the Netherlands. As in the 1930's, Europeans hastened to make friends with the tiger, in the hope he would go eat someone else.

Yet the fraction of oil imports lost was not greatly different among the "friendly" French (as the Arabs saw them) or British, or the "odiously neutral" Japanese, or the "enemy"—meaning us.[7] And we were the only one who produced most of the oil it consumed.

A selective embargo against the United States was and is impossible. If oil becomes more scarce in some consuming countries, prices are higher there. Those producer nations who do not cut back increase profits by diverting exports to those countries, until prices are roughly equalized. (The oil companies did well to anticipate the inevitable and do the complex logistics.) The non-Arab governments have no difficulty in doing well by doing good. American imports are now around 7 million barrels daily (mbd) and by 1980 may be 9 mbd. Non-Arab OPEC capacity is today 14.5 million, and growing.

This is both good and bad news. The Arabs cannot hurt us without hurting everybody even worse, since we import much less of our oil consumption. But in hurting everybody else they also exert pressure on us. Therefore even zero U.S. oil imports would not remove energy dependence, hardly mitigate it. *Energy independence is literally impossible.* So long as the cartel keeps prices very high, and the oil producing nations get richer, they can more easily afford production cut-backs, and we are more subject to blackmail.

Moreover, if the cartel runs into trouble, a temporary production cutback is an obvious way to clean out inventories, jack up prices, and scare consuming nations. It will be used when and as the cartel needs to use it. No political settlement has the slightest relevance to this clear and present danger. The Administration has been "unwilling to depict publicly and vividly the danger of another deliberate, unfriendly embargo by nations, notably Saudi Arabia and Iran, which Mr. Kissinger regards as essential to stability and American interests in the Middle East".[8] It is the last of the cover-ups.

SOVEREIGN MONOPOLISTS CAN'T BE HELD TO ANY AGREEMENT. SAUDI ARABIA, PROMISE-BREAKER EXTRAORDINARY

It is impossible to make any binding agreements with sovereign monopolists. An agreement can only be enforced by competition or law or both. If anyone persistently violates his word, people will go elsewhere, and after a while he is out of business. Or else a court will say; perform or we will seize your assets. But the monopoly has suppressed competition, so there is no other place to go. And sovereign states are beyond any law. Hence any agreement is truly "inoperative".

Experience supports logic. Table 1 shows government take per barrel of the Saudi marker crude. Government take has always been the bulk of the price, and is today nearly all of it. Nearly every line represents a broken agreement, and

[7] Imports, Four Large Nations, 1973–74:

Nation	Amounts (million barrels per day)						Percent		
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Nov.–Jan. / Sept.–Oct.	Nov.–Feb. / Sept.–Oct.	Dec.–Feb. / Sept.–Nov.
United States	6.4	6.5	6.9	5.9	5.4	5.2	0.94	0.91	0.83
United Kingdom	1.8	3.0	2.4	2.0	2.7	2.2	.98	.97	.95
France	2.7	2.8	3.0	2.2	2.7	2.7	.95	.95	.89
Japan	5.2	6.0	5.4	5.3	5.0	5.5	.93	.95	.95

Note: U.S. inventories bottomed in January, thereafter increased.

Source: Petroleum Industry Trends (Parra, Ramos & Parra, London).

Spot crude prices peaked in January, thereafter decreased.

There is no satisfactory way to measure the shortfall, i.e. the difference between what a country wished to buy, at current prices, and what was available. The above table would look different, but not substantially so, if we used a different base period. But there is a strong reason not to go beyond January or at most February 1974, since the accumulation of inventories means that more was being supplied than consumed. Hence the two extreme right-hand columns exaggerate the real shortfall in the United States.

[8] Edward Cowan, in New York Times, January 2, 1977, Section 4, page 2.

some have been omitted. The entry for 1971 is the Tehran agreement, for which our State Department claimed credit because "they expected the previously turbulent international oil situation to quiet down following the new agreement".[9] This is the same illusion they peddle today. The agreement was to last for five years. It lasted about five months, and after repeated violations it was openly repudiated in September 1973, before the Middle East war. Sheik Yamani made the classic statement: "We in Saudi Arabia would have liked to honor and abide by the Tehran agreement, but . . . " circumstances had changed.[10]

TABLE 1

Date	Saudi Arabian light—government take (dollars per barrel). Amount	Index
December 1970	0.88	100
June 1971	1.26	143
January 1972	1.45	165
January 1973	1.52	173
October 1973	3.05	347
January 1974	7.00	795
June 1974	9.35	1,054
October 1974	9.80	1,114
November 1974	10.12	1,150
January 1975	10.16	1,155
October 1975	11.18	1,270
January 1977	[1] 11.74	1,334

[1] Approximate.

Sources: Petroleum Press Service [Petroleum Economist], November 1973, February 1974; June 1974, October–December 1974; January 1975; October 1975; Petroleum Intelligence Weekly, March 11,* June 17,* July 22, September 9, September 16, September 23, October 14, November 25* (1974); Dec. 20, 1976. The starred dates show when the Saudis led the price rise, while Iran followed.

The Saudi boycott of the United States in 1973–74 was a violation of their treaty of commerce with us, and should have resulted in prompt loss of their most-favored-nation status—had not the Nixon Administration covered up.

At the start of 1974, government take was $7.00 per barrel. (The higher figures usually shown are later adjustments, made retroactive.) Repeatedly our government proclaimed that the price was too high. The Saudis were very cooperative. They repeatedly called for lower prices. And they repeatedly raised the price, chiefly by the trick of increasing the percent of participation. The trade press shows that on at least three occasions the Iranian price "hawks" *followed* the Saudi lead upward.[11]

An executive agreement was signed on June 8, 1974 for Saudi-American economic cooperation. Two days later, after a celebration-reception at the Saudi Embassy in Washington, the price was raised, retroactively, by $1.35.[12] On at least two later occasions, the American Secretary of State said he had assurances of lower prices, and both times the price went up.[13]

In mid-1974, the Saudis announced an auction to bring down prices. They garnered millions of golden opinions, and then cancelled the auction. After all it might really have brought down prices.

Soon thereafter, in October 1974, another promise: they would not permit output to be reduced. Of course they did permit it. Disappoined American officials complained that the Saudis had "pulled the rug from under them" by allowing reduced production.[14]

We need not admire hypocrisy, but we may excuse it. American policy makers were so eager to be deceived, so avid for any soothing word which they could represent to the public as a deed, that it would have been almost cruel not to give them what they wanted.

[9] Platt's Oilgram News Service, February 18, 1971.
[10] Middle East Economic Survey, September 7, 1973.
[11] See Table 1.
[12] New York Times, June 9, 10, 11, 1974.
[13] New York Times, October 13, 1974; Oil & Gas Journal, October 21 and December 23, 1974.
[14] Oil & Gas Journal, March 17, 1975.

Cooperation with the oil producing nations is not good or bad, it is illusory. No matter what we give them, once it cannot be withdrawn, it becomes irrelevant. They need only keep a bargain when it suits them.

The idea that "we must come to terms with oil producers because they have the oil and we need it" is a cliche that gained acceptance because it was vague, and now seems clear because it is familiar. If the United States does anything that a large group of oil-producing countries do not like, or even if it does nothing, they can interrupt or reduce supply. Whatever we do to please them becomes past history, and they can use the same weapon later.

CARTEL REMAINS STRONG BUT FRAGILE

All cartels including this one are fragile because they fix the price at a level where it would pay any individual member to expand output by means of secret price cuts, which when matched by enough rivals would break up the whole scheme. This cartel is strong because it has prevented the chiselling from getting started.

High cartel prices are self-reinforcing. They promote lower supply instead of higher. With large enough revenues, the cartel nations can fulfill their spending plans and commitments. The higher the price, the easier to pay debts and stay solvent. Then the less the pressure on them to gain some extra revenues by shading the price.

High prices cause lower production in noncartel countries as well. Windfall profits to domestic producers are so repugnant to public opinion that special taxes or price controls hold back expansion or (as in Canada) actually decrease investment in oil and gas production. Another variant of the perverse effect: Norway and Mexico would speed up the rate of development and exploration if prices were not expected to go higher. (In economists' jargon, these are "backward bending supply curves" in cartel and non-cartel countries.)

But strength one way is fragility the other way. Lower prices would make cartel countries strapped for cash, and more likely to reduce prices still more to get badly needed incremental sales. The self-reinforcing and cumulative tendency either way is what makes a cartel unstable.

Another source of strength: the cartel members are sovereign nations, and can suppress competition by force or the threat of force. Iran can limit outshipments from the Persian Gulf. Saudi Arabia can invade and occupy its neighbors. Distances are short, local populations scanty, the terrain ideal for a quick grab. Today they account for 6 million barrels daily of capacity, and they can be taken out quickly. The knowledge of such a backstop is an important cartel strength.

The chances seem small of reduced world demand breaking the cartel. In 1974, there was a large reduction in volume, accomplished in only a few months, hence with greater shock value than conservation and new supplies could ever do. Yet there was a 50 percent increase in the price. (See Table 1.) This is not a market where prices are set by competitive supply and demand. We are dealing with a cartel which is in process of learning how high the world price can be pushed.

The cartel can live with selling fewer barrels than in 1973. The ultimate question is: can Saudi Arabia take the whole burden of excess capacity, letting the others produce as much as they wish? How far down will Saudi Arabia be willing to go?

We can dismiss the nonsense, however seriously urged by some Americans, that Saudi Arabia would rather produce less oil, but makes a sacrifice for the good of the world. But undoubtedly they could if need be meet their commitments with considerably less than current output.

Professor Moran calculates about $32 billion annually a minimum acceptable Saudi income.[15] At prices of $15 (or $20) per barrel, this could be met with 6 (or with 4.5) million barrels daily. Assume the Saudis would be content with that production, if they were certain of getting it. But certainty is impossible. That is the basic cartel problem. Suppose total OPEC production is lower than expected by one or two mbd, a fluctuation or error of only 3 to 6 percent. Then if Saudi Arabia is the residual supplier of 6 mbd, and absorbs the 1–2 mbd decrease, it is a 20 to 40 percent loss. (If they are producing 8 mbd, it is 15 to 30 percent.) Simple prudence will not let the Saudis permit output to go that

[15] Theodore H. Moran. "Why Oil Prices Go Up: OPEC Wants Them", Foreign Policy, No. 25, Winter 1976, p. 65. It would be better to subtract the amount of foreign investment income, which will be substantial by 1980.

low, while others produce as they like. They will need and demand compensation, in the form of either a higher share or of an agreement for others to cut back proportionately.

Similarly, suppose it is profitable to raise the cartel price by a third because the sales loss would be only about 10 percent (elasticity of demand assumed as —0.37). If even half the loss fell on Saudi Arabia, it would be no gain for them even if everything happened exactly as planned. They could not agree to it. This is the basic reason for Saudi caution since the great days of 1974. They want to postpone as long as possible their role as residual supplier, and keep their market share as high as possible for as long as possible.

The real danger to cartel cohesion, therefore, is not slack demand for their oil, but rather the difficulty of assigning the inevitable excess capacity. To speak of Sauda Arabia (and the rest of the Southern Gulf) as residual suppliers is correct, but too simple. There are difficulties and dangers in their acting this role. Their danger is our opportunity.

OBSESSION WITH "ASSURING ADEQUATE SUPPLIES" A POWERFUL AID TO THE CARTEL

The "backward bending supply curves" noted earlier are a special case of a powerful delusion in both consuming and producing countries. Products which emerge from the earth—including food and timber but especially minerals—are not viewed as subject to the economic axiom; all products are scarce. It takes scarce resources to produce (or extract or grow) them. Scarcity is a matter of degree, and is measured by price, which registers the pressure of demand upon supply, and also regulates each of them. If a product becomes more scarce, the higher price will ration it, encourage new supplies, and promote substitution. And this may be painful—nobody enjoys paying higher prices and skimping on the use of a necessary good.

But minerals, above all oil, are not viewed in that common sense way. Either one has "enough" or "not enough". A producing nation which is also a consumer finds it hard to regard the oil as a national asset, whose value should be maximized for the sake of the nation. It is rather considered a duty to insure that "there will always be enough for us", and better to err on the side of conservatism, and assume more will be "needed". Since this usually means a subsidized low price, it is at least partly a self-fulfilling prophecy. Keep it at home in the ground, where it is safe. (It is really too good for wretched foreigners anyway.) If we're to be all right, we must resist all blandishments to produce for the sake of humanity, or the world community, or whatever. Investment and production decisions are difficult, but when in doubt, don't.

Non-producing nations share the same delusions, from the unhappy side. If we can't find our own, then let's line up supplies for the future, and assure "access" by offering the producing nations any political or economic premium. If the producers are not content with last year's prize, we must give them more * * * and more. Nothing is too much to give for oil, since without it the wheels would all be standing still.

This is nonsense, and "access" is a non-problem. Whatever the amount available, it will be rationed mostly by price. But we must live with the consequences of these delusions. So long as governmental thinking is paralyzed by "gaps" and "shortages", not only will much oil stay in the ground, but consuming nations will outsmart each other, and normal market forces will act with great difficulty and very slowly. I turn now to two feasible means of active resistance.

IF ALL CONSUMING NATIONS LEVY A PERCENTAGE TAX THEY CAN DIVERT MOST CARTEL REVENUES INTO THEIR OWN TREASURIES

Over time, the cartel will raise prices until the higher take per barrel no longer compensates for the lower volume. This is the price which maximizes profits. We cannot prevent this and should not fool ourselves that any agreement will keep the cartel nations from charging their optimal price, as far as they can discern it. But consuming countries acting together could divert the bulk of cartel revenues right into their own treasuries, through a tax proportional to the price of oil.

For example, assume we levy a tax per barrel equal to twice the Persian Gulf price. The tax would then automatically rise and fall with the Persian Gulf price. The same Persian Gulf price which maximized cartel revenues in the absence of the tax would maximize cartel revenues with the tax. If the producer

countries raised the price higher, it would lose so much volume as to cost them money. Two-thirds of the cartel revenues would be diverted into consuming-country treasuries. They could use the monies to reimburse low-income consumers, or for any other purpose.

Appendix 1 shows the proof in detail.

The proportional tax will only work if most consuming countries levy it together. At present they are too bemused with fear of shortage and empty slogans like "cooperation and dialogue." They have yet to face the fact of a monopoly, which is going to keep raising the price despite all the pretty words addressed to them.

Yet oddly enough, the chances are fair that consuming countries will drift into this policy without meaning to. It depends more on how quickly the cartel governments raise the price, than on how high. If the cartel nations are content to keep raising the price by small increments, as they have done since the end of 1974, then balances of payments can adjust. Higher priced oil imports mean a gradual adjustment in many directions: some oil importing nations will devalue in small steps; they will import less of all goods, including oil; some will have higher exports, not necessarily to the oil producers. Producer country surpluses will be gradually invested through world capital markets, and less-developed-countries will be covered by "loans". But large sudden changes in oil prices force consuming country governments to take strong action to check imports, including taxes or tariffs on crude oil or products. Therefore consuming countries may find themselves taking one step after another, inadvertently doing what they would never dream of doing deliberately—levying a proportional or more-than-proportional tax.

This is another reason why the larger cartelists, chiefly Saudi Arabia, will continue to practice moderation as long as the consuming countries are in recession or at least not peak prosperity. Another retason is that they fear that the burden of restriction may in the future fall chiefly upon them—as it has not fallen in the recent past.

IMPORT QUOTA AUCTIONS

Every cartel with excess capacity is vulnerable to disruption. Hence what the oil cartel nations really fear, as Iraq said so well in the autumn of 1975, when threatening Kuwait for a trifling price cut, is "competitive bidding among producers", i.e., among producing nations.

The United States could take the hint. As a large buyer, it could inject some competition, exploit the cartel's one weakness, lower its own import costs and disrupt cartel cohesion. A detailed plan for this, published elsewhere, is Appendix 3 to this statement.

Briefly, it provides that imports be fixed monthly to equate demand with supply at prevailing prices. (Mistakes are easily correctible the following month.) Import entitlements or tickets would be sold monthly at public auction to anyone paying in advance. This would create a primary market of some 200 million tickets monthly. Resale of tickets would be permitted. In order to allow forward planning and term contracts, a part of the tickets could be issued valid for future periods.

The cartel nations would not buy tickets, at first, and tickets would be very cheap. So much the better for getting the system off to a smooth start. But a ticket would be worth up to $12 to a cartel nation. Nearly $2.5 billions' worth of them would be up for grabs, month after month. Cheating by a cartel government would be easy. They could bid for tickets, through third parties, or buy them. A cartel country would sell at the cartel price and not even the customers would know that it was chiselling, by buying tickes, thereby rebating to the United States Treasury.

Today, governments chisel only on peripheral short-term supplies, and word gets around quickly. The great bulk of the oil moves at publicly known contract prices, and buying companies are not free to shop around for small bargains. The costs and risks of losing continuity of supply are too great when handling large amounts of liquids. The quota auction would separate the movement of oil from the bargaining over cartel surpluses. The total amount of cartel surplus would be on the block every month.

Any country wanting extra revenues would buy more tickets to sell more barrels. Any country which lost business would recoup itself by buying tickets, jostling other cartelists. The tickets would not stay cheap for long. Without any interference in industry logistics or disturbance of the flow of oil, and with a

handful of employees administering the auctions, the United States would pocket substantial revenues.

No serious argument has ever been offered against the quota auction system.[16] The burden of proof ought to be on those who assume that every cartel nation would resist temptation indefinitely, month after month. We need only one defector to get the process started. As it develops, the big cartelists would be the holdouts. Then imports from Saudi Arabia would drop, to be replaced by imports from producing nations who were more eager or needy for money—i.e., whose interests were closer to ours.

The import quota auction system has often been misunderstood or misrepresented as a government purchasing monopoly. That would be a logistical horror. It would also lose the secrecy in chiseling.[17] The United States as buyer would need to make long term purchases, thereby legitimizing a cartel price—just the contrary of what is desirable.

CARTEL CANNOT SOON BE QUICKLY DESTROYED, BUT SHOULD NOT BE HELPED

The cartel could have been prevented from ever getting started, and as recently as two years ago it might have been quickly destroyed. That is not feasible now. The profits of their raid on the world economy have been so huge that if the cartel collapsed tomorrow, the most strenuous violent efforts would be made to put it together again. Strength may give rise to extreme tactics, but so also may weakness. There could, as pointed out earlier, be a production cutback to put the price back up again. Hence the need for a stockpile, to prevent both Arabs and non-Arabs from scaring us out of any rational counter-action. See Appendix 2.

Some would claim that as things stand today, there is nothing at all which the United States or other nations can do. If so, we should at least not collaborate with our oppressors. Let us make no deal which would tie our hands, and prevent us from using any future opportunities for resistence. There is nothing to be gained by freezing a dismal present into the indefinite future.

President Carter and Secretary Vance will probably not give us a repeat of September 1974, when Mr. Ford gave his "tough" speech in Detroit, and Mr. Kissinger gave his "tough" speech in New York. On almost the same day, Federal Energy Administrator John Sawhill was asked what plan there was for lowering world oil prices. He replied truthfully: there were none. Mr. Kissinger was angry and Mr. Sawhill left. But the incoming administration would do well to remember: the illusion of "doing something" is a dangerous temptation. Hence for our government to somehow "get involved in the oil importing process", for the sake of being involved, could lead to an implicit under-writing of cartel prices and revenues.

APPENDIX 1. HOW A PROPORTIONATE OIL TAX OR TARIFF WOULD DIVERT MOST CARTEL REVENUES INTO THE HANDS OF THE CONSUMING NATIONS

In the attached Figure 1, AB represents consumer demand for a barrel of oil products at various prices. The vertical difference between lines AB and CD represents the necessary cost of production, transport, refining, etc., so that the line CD represents what is left for Persian Gulf government take.

At a consumer price of FG, corresponding to an output of OF, government take is maximized. This is shown by the marginal revenue curve CF becoming zero at the quantity OF and price FG.

Suppose now that the consuming governments levy a tax which is always equal to the Persian Gulf government take, i.e. OE=EC. This amounts to forcing the Persian Gulf governments from CD on to ED. Their new marginal revenue curve FF goes to zero at the same output OF and same consumer price FG, which means that they will still maximize revenues at that amount of out-

[16] It was endorsed by President-elect Carter's energy task force. See Oil & Gas Journal, January 10, 1977.

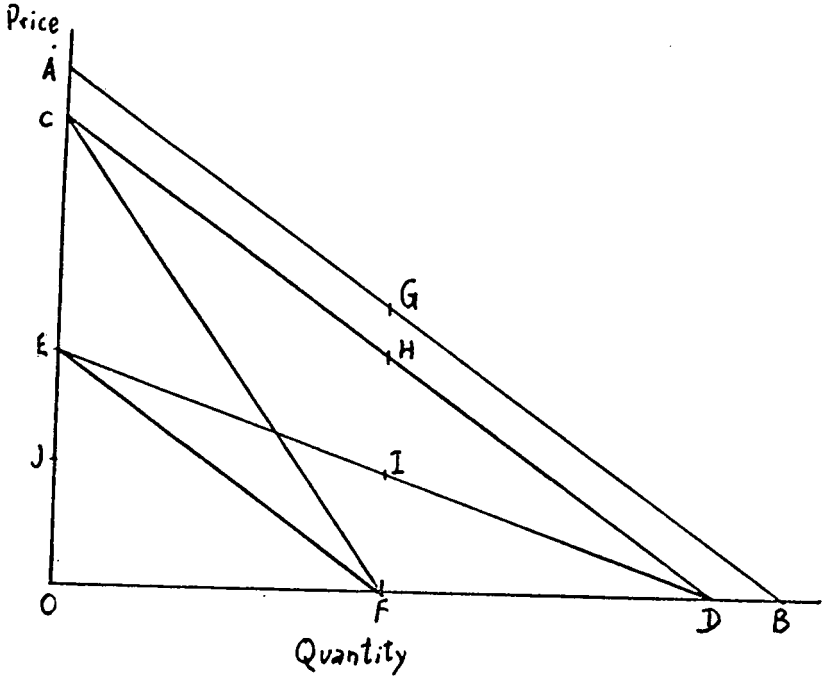
[17] Some proponents of such a monopoly recognize (inadequately, I think) the loss of secrecy as well as the supply difficulties, but urge that it would not be serious because a given landed price would leave the Persian Gulf f.o.b. price unclear because of the possibile variations through freight and quality. Unfortunately these are quite small relative to the price, so a serious reduction would be impossible to hide. See Christopher D. Stone and Jack MacNamara, "How to Take On OPEC", New York Times Magazine, December 12, 1976, pp. 38–44.

put. Of course they can push their take higher, or cut back on production. But this would penalize them by reducing their net revenues. Anyone who doubts this should draw in other rectangles along the line ED, and satisfy himself that none is larger than OJIF.

In our example, we have made consumer-country taxes equal to Persian Gulf take, but it can be a larger or smaller percent.

We can also prove the result generally. Let P be the net Persian Gulf government take, and $P'=P(1-K)$ the net take when the consumer country tax per barrel is K percent. The change in price P corresponding to a change in output is dP/dQ, while the change in price $P'=dP/dQ(1-K)$. Marginal revenue for price P is: $dPQ/dQ=P-Q/dP/dQ$, and profit is maximized at zero marginal revenue, $P=Q_m dP/dQ$, or $Q_m=PdQ/dP$. Marginal revenue for price P' is: $dP'Q/dQ=P(1-K)-QdP/dQ(1-K)$, and profit is maximized at zero marginal revenue, $Q_m=PdQ/dP$, since the expressions in parentheses cancel. Or, what comes to the same thing, elasticity of demand is the same for P and for P': $E(P)=P/Q\ dQ/dP=P(1-K)/Q\ dQ/dP\ (1-K)=E(P')$.

FIGURE 1



APPENDIX 2. EXTRACT, ENERGY INDEPENDENCE ACT OF 1975. HEARINGS BEFORE THE COMMITTEE ON BANKING, HOUSING AND URBAN AFFAIRS, UNITED STATES SENATE, 94TH CONGRESS, 2ND SESSION (1976), P. 463 (TESTIMONY OF M. A. ADELMAN)

The short of the matter is that because of our help and the accumulation of huge amounts of foreign assets, Saudi Arabia and the other cooperating countries can now make much bigger cutbacks. They also have more support in the United States. Some people are getting rich selling them armaments, civilian goods, construction services, and so on.

For this reason, the chances of another production cutback become uncomfortably high without the protection of excess capacity. Time is not necessarily on our side.

Taking EIA at its best, it provides some very expensive *permanent* assurance of a very small part of the fuel supply, ten years from now. (It also tells the oil cartel that incremental supplies of oil are worth to us much more than even

the prices they charge today.) But what we need is a *short-time* assurance of a *large* part of the fuel supply. So the Energy Independence Act is useless.

It is also expensive. If the oil-equivalent cost were $21/barrel (the law end of the range for coal-based gas), the premium per barrel would be $9.50 over the 1976 cartel price. If one million b/d were provided, the *annual* insurance payment would be $3.5 billion, for which we would have very little insurance.

A stockpile would help. Half a billion barrels would tie up an investment of about $8 billion, for years. But even on conservative assumptions (see Appendix) it would protect us for about a year and a half—*provided* that we reduce consumption by 10 percent through a severe excise tax and rationing, recycling the tax revenues in order not to penalize consumers as a group. Such a conservation program costs us nothing until it goes into effect. And the knowledge that we are prepared makes another cutback less likely.

Some parts of the oil supply are much more sensitive than others. The penalty of a residue fuel oil shortfall is loss of jobs. In November 1973 the then U.S. Ambassador to Saudi Arabia predicted a "critical" situation at the East Coast if the Arabs did not increase output "within a matter of days" (N.Y. Times, November 10, 1973). This was far fetched. In any case, residual fuel oil is particularly cheap to store, here or in Caribbean islands.

National security will continue to be a problem, even with emergency stockpiles here and abroad, so long as oil production is monopolized, mostly by nations which are ready to damage us. The more money they accumulate, the greater the danger. The Energy Independence Act is not merely useless but harmful, because it gives the illusion of protection.

Appendix.—Protection by Stockpile Against 50 Percent Arab Cutback in 1980.

Assumed.—Arabs produce 65 percent of OPEC oil: no non-OPEC imports: no significant excess capacity: hence 50 percent Arab cutback—33 percent less output; consumption cut 10 percent by excise tax and rationing.

	Before cutback	After cutback	Difference
1. Total consumption (million barrels per day)	20.0	18.0	−2.0
2. Total imports demanded (million barrels per day)	10.0	8.0	−2.0
3. OPEC supply (million barrels per day)	10.0	6.6	−3.4
4. Deficit (million barrels per day)			−1.4
5. 30 pct of normal stocks (45×20×0.3) (million barrels per day)		270	
6. Security stockpile (million barrels)		500	
7. Total stockpile (million barrels)		770	
8. Days supply (770÷1.4)		500	

APPENDIX 3. OIL IMPORT QUOTA AUCTIONS—FOLLOW THIS SCENARIO, AND THE CHANCES ARE THAT THE POWER OF THE OIL CARTEL WILL BE CHECKED AND THE PRICE OF IMPORTED OIL WILL COME DOWN

(By M. A. Adelman)

The United States, acting alone, can disrupt the cartel of the oil-producing governments and bring down the price it pays for imported crude oil.

This would be a drastic policy change. From early 1970 to the end of 1973, our government helped and encouraged the cartel. After the price exploded to about $7.00 per barrel, the Administration began making faces, wagging fingers, striking attitudes, and warning in heavy tones that someone might go too far. The late King Faisal is said to have been a dour man, but surely we succeeded in making him laugh. In September 1974 our policy was summed up perfectly: while Secretary Kissinger made a "tough" speech in New York and President Ford made a "tough" speech in Detroit, Federal Energy Administrator John Sawhill was asked what plans there were for getting the world price down. He replied there were none. Mr. Kissinger was angry and Mr. Sawhill was fired. By November 1974 the price was up to $10.50 per barrel and is now $11.50. It will be raised again when economic conditions improve.

A monopoly of sovereign states is unrestrained by competition or by any law. They cannot be held to any contract. Shouting or cooing at them deserves and gets only their contempt. An agreement would tie our hands, not theirs.

What we should do is put a limit on U.S. oil imports and sell import entitlements (or quota tickets) at public auction by sealed bids. This would at least contain the cartel and would probably do it heavy damage. The cartel has maintained a remarkable discipline by using the oil companies to limit output, share markets, and let everyone check on everyone else. We can prevent this use of the oil companies without even slightly hampering either their operations or the continuing flow of oil.

The auction system should not be used to reduce oil consumption, or even to reduce imports. For by reducing imports we would lessen supply and eventually raise prices. In this case, the temptation would be strong to allocate or ration the limited imports, thus increasing the burden by trying to hide it. Indeed the main benefit of quota tickets is a lower import cost of oil, although limiting imports can also provide security for investment in the production of domestic fossil fuels and nuclear power.

HOW TO LIMIT IMPORTS WITHOUT A SHORTAGE

The scheme would have to start small in order to establish an efficient routine quickly. Imports should be set at a level equal to what importers would demand at existing prices, with a mandate that the level of imports permitted should not create scarcity in the United States. The control lever would be a careful watch on inventories.

At the end of June 1975, stocks of crude oil and products totaled 1,071 million barrels and covered 69 days' consumption and 198 days' imports. Only a minor fraction of stocks are actually available to cover fluctuations in demand, but that fraction provides us with plenty of room to correct mistakes.

For example, suppose that the Federal Energy Administration (FEA) estimates that demand for imports next month will equal imports a year ago plus an expected 4 percent growth factor. Suppose they have underestimated badly, that demand for imports is really up 10 percent. Then the error would be 6 percent of imports, about 0.3 million barrels a day or 10 million barrels in a month. Stocks would be drawn down by 1 percent. The next month the FEA could raise the import allocation to bring the stocks back up.

The state of Texas (with a little help from Louisiana) used this system for many years. Its task was much more demanding, since it had control of nearly two-thirds of the output east of California, and mistakes therefore had a much bigger impact. Even those who (like myself) questioned the policy, never doubted that it was efficiently carried out.

Frequent auctions—say, once a month—would prevent accumulated surpluses or deficits. They would also help to avoid the disruption of oil trade logistics, and would counter cartel power.

PROTECTION OF DOMESTIC FOSSIL FUELS AND NUCLEAR POWER

Current high oil prices are a strong incentive to expand domestic energy sources, but the incentive is diluted by uncertainty over cartel behavior. We are getting the worst of both worlds—high prices *and* lagging investment. Let us say that a proposed project can just about return a satisfactory profit at today's prices, allowing for the usual risks. But then, if the investors know there is a nonnegligible chance that the cartel will deliberately cut prices to destroy competition, the investment will not be made.

A tariff, on the other hand, would raise prices and damage the economy, but it would not protect us. The big Persian Gulf producer countries have such low costs that they can absorb any tariff. Worse yet, they could by prearrangement step up imports into the United States, despite the tariff, to undermine domestic prices. Even if a tariff were effective we would not be able to determine how much additional domestic output would be forthcoming at any given price. Therefore we would incur heavy costs without even knowing what we were getting in return.

By contrast, a limit on imports, set at a level where it will not affect the import price, is standing notice that there is an unlimited market for domestic energy sources *if* the price can be met. For example, if domestic oil production ceases to decline and starts to grow, excess inventories will accumulate. Then imports

must be cut. It is always imports which must move over to accommodate the domestic industry. In effect, we would be giving an unlimited guaranteed market to domestic energy industries. They could not be undersold by any special price cuts. Of course, if there were a worldwide price reduction, some backstop measure, such as setting an upper limit to imports, might have to be taken. That might force the domestic price above the world price—but it would win us security. Still, as we shall proceed to show, even the higher domestic price could be offset by higher government revenues.

WEAKENING THE CARTEL

If for any reason the cartel broke up today it would reconstitute itself tomorrow. The mosts trenuous, violent efforts would be made to put it together again. Instead of talking about "destroying" the cartel, we should take measures to contain or damage it. If we need a metaphor, it should be severe erosion, not collapse.

A cartel's weak point is excess capacity. The classic breakdown sequence is: (1) incremental sales at less than the collusive price, with incremental revenues for the cheaters; (2) matching of price cuts, with the bigger cartelists, reluctant to cut, losing market shares to the smaller; (3) accusations, confrontations, and then (4) renewed agreements among the cartelists, but with mutual suspicion and readiness to retaliate. The cycle may be repeated many times before cheating through flagrant price cuts begins to accelerate, and dumping today looks better than bigger losses tomorrow. Then comes a stampede to the exit.

The Administration's program to reduce consumption in the United States cannot even annoy the cartel. At heavy cost, reduced oil consumption can increase excess capacity only slightly, with no effect. Since the end of 1973, cartel excess capacity has rapidly built up to about 10 million barrels daily, a third of production. In the spring, it was about 12 million barrels a day. Yet over this very period the price has not only failed to decline but has actually risen from about $7.00 or $8.00 to $11.50. Excess capacity by itself will not bring down the price or curb the cartel. An additional 2 or 3 million barrels a day is a normal mild fluctuation. But a larger excess is a lever if we have the will to use it.

The cartel has been able to solve the classic problem of limiting production and dividing markets. The producing countries transfer the great bulk of their oil at their fixed price through integrated oil companies which refrain from collusion. (Company collusion has been an influential myth hiding the real source of market power, government collusion.) Each company sells all it can and produces only what it can sell. The companies cannot compete by offering lower prices, because their margins are too narrow, roughly 2 to 3 percent of crude oil prices. The market share of each exporting government depends on what its resident companies can sell. It is a somewhat haphazard system, but it works, so long as the governments accept these market shares and do not sell large amounts directly. Hence, despite "participation" and "nationalization," they continue to sell through the companies. But we can remove the companies from the crude oil marketing process, leaving them in place to produce, transport, refine, and sell products. It would force governments to compete with each other in the American market.

PHASE I: GETTING STARTED

The first object should be to let the oil trade make the quota auction system a matter of routine. Our motto should be: Start small. The number of tickets issued would be approximately equal to the amount desired, at current prices. Therefore the tickets would have no scarcity value—but only a small convenience or insurance value—since importers and exporters would have to possess tickets to stay in business. Hence there would be enough demand for tickets, and enough oil supply, to meet consumer demand. On each transaction, the importer and supplier would decide who was to bid for how many tickets. They could offer only a few cents per barrel.

Tickets should be sold monthly. I suggest that half of them be valid for the month after the auction, the other half assorted among validity periods of three, six, and twelve months. Proportions could be changed later, after public hearings, to suit the convenience of refiners and distributors. Quota tickets should be freely transferable, like stock certificates, recording the name of each transferee and also informing the selling agent, the U.S. Treasury, to prevent counter-

feiting. An active resale market in tickets should be encouraged, perhaps by maintaining a public computer file of all wishing to buy or sell tickets.

In any given month, the oil could use not only the tickets covering that month's demand, but also the stock of tickets valid for future use. This would permit flexibility in planning, and commitments for months or even years ahead, as long as the system was expected to last. Nobody would ever need to slow down operations for lack of tickets. The value of tickets would also be kept very low during the phase-in period. The producing governments would ignore the auction system, since there would be nothing they could or needed to do about it. Oil would be lifted and sold as before.

PHASE 2 : THE EXPORTING GOVERNMENTS ARE FORCED INTO THE ACT

Once the quota auction system was running smoothly, we would have created a market where the cartelist governments could cheat to gain incremental revenues by selling behind each other's backs, each knowing that others might be selling it out.

The secrecy would be achieved by letting *anybody* bid, with no requirement except a certified check for the deposit. Then cartel governments could use front men. A lawyer or broker deposits a check for several score million dollars, without revealing his sponsor. But the identity of nominal bidders could be kept secret for at least a short time to prevent bugging, tapping, or kidnapping.

There is a second barrier to knowing the real bidders: since tickets could be transferred, a given shipload of oil arriving here could be covered by tickets issued to various people at various times. A third barrier: transshipment terminals are fed by sources all over the world. Oil would be arriving in the United States from the Bahamas, Japan, Rotterdam, France, etc. The cost of diversion, reloading, and even mixing would be very small relative to the price. A fourth secrecy barrier, crude or product exchanges, exists because there would already be a substantial and growing open market. For example, a broker acting for Iraq buys tickets, sells Iraq oil for delivery in Europe and Asia, displacing other oil which the broker ships to the United States, shipment covered by the tickets. Iraq gets the incremental production and revenues. The United States gets the rebates. Some exporting nation somewhere loses U.S. sales and wants to recoup. Because of the transshipment and swapping, higher U.S. sales by some governments would not necessarily indicate cheating. Countries making higher U.S. sales could always explain it—and usually correctly—by better quality, lower sulfur premiums, lower freight costs, better business conditions, and so on.

Cheating would be practical immediately, and it would be very tempting to any nation wanting incremental sales. We assume no cartel nation would try it, at first, while tickets were dirt cheap. But once the value of a ticket exceeded a few cents per barrel, oil companies could no longer afford it. They would be out of the act except as front men. Governments would now have to bid, not only to get additional sales but to keep what they already had.

All barrels imported into the United States would be incremental barrels, up for grabs every month. No exporting country could count on any sales in the American market, through the inside track of its resident companies or through other long-term buyers who had a large U.S. market. The exporting nations would have to keep on buying tickets to compete on equal terms with excess oil from all over the world coming here to find a home.

OPEC capacity is now 38 million barrels daily, and growing. Sales to countries other than the United States account for about 22 million. Thus, taking the rest of the world as safely divided up, there remain about 16 million barrels daily of OPEC capacity and 2 or more million barrels daily of non-OPEC capacity available to supply the American market. But our imports are less than one-third of the 18 million barrels daily. Excess capacity vis-a-vis the United States is proportionately much larger than excess capacity vis-a-vis the whole world.

Frequent auctions would be a convenience to the trade but a torment to the cartel. They would want as little price bargaining as possible, with very few price and sales decisions taken at any given time. When every seller knows what everyone else is charging, he can easily conform. He knows also that everyone is watching him. With monthly auctions there is no time even to start tracing who has bid what. Considering the need to compete for every barrel, it is hard to imagine how the cartel nations could keep from bidding up the price of a ticket month after month.

The revenues from the auctions could be refunded to consumers generally, or used to subsidize low-income consumers, or public transport, or energy research and development. But we should not count the chickens before they hatch.

SPREADING DAMAGE TO THE CARTEL

The cartel would of course try to prevent the spread of competition. But containment would be difficult, costly, and probably impossible. For one thing, other large consuming nations would be watching with keen interest. However timid and obsequious they had been up to now, our example would be hard to ignore.

Producer countries who lost their market share in the United States in any given month would need to recoup their losses the next month, not only in this country but elsewhere. For example, if Venezuela was bid out of the American market, it would lose nearly 40 percent of its revenues and would be forced to sell in Europe. In these days of a huge tanker surplus and very low transport costs, pressure at one place becomes pressure everywhere. Some exporting governments would already have overspent their revenues and more would need money in the future. They would all want Saudi Arabia to act as the industry statesman and cut back production to make room for them. Were there no great excess capacity, Saudi Arabia would accede. It would reason: "the capacity of the would-be chislers is limited; let them use it fully. Better for us to lose part of the market than to retaliate and risk breaking prices." But for the near future, excess capacity would be so great that if those who wanted to chisel expanded to their limit, Saudi Arabia could be forced down to levels it could not tolerate. (In mid-1975, if Saudi Arabia had shut down completely, capacity would have exceeded demand.) At some point it would have to retaliate and risk disrupting the cartel.

In any case, it would be in our interest to have the lesser producers expand at the expense of Saudi Arabia. The more the Saudis lost their market share, the less concentrated, and hence the weaker, the cartel would be. The biggest producing nation is our chief enemy *ex officio*, because it is the chief cartelist.

A government which wanted more American sales would need to negotiate with American refiners and distributors who could offer them a market—if the government provided tickets, or money to buy them. Oil companies large and small would move from being the agents for exporting governments to being their customers. They would shop around for better deals. As customers, oil companies would be working for us, not for the exporting governments.

To make use of the companies as customers, the U.S. government should sell tickets but should not buy, sell, or allocate oil. A U.S. government buying monopoly, mediating between customers needing an infinite variety of oils and suppliers seeking to know their customers' needs, would be engaged in "shuttle diplomacy" to the thousandth degree. Even if it did not break down in confusion, it would be counterproductive. Secrecy would be lost, since the supplier would have to identify himself to his customer, the government. The cartel would need to make only one decision, to fix the price to the one customer. Cartel governments would not be under pressure to decide individually every month how much to bid. We would lose the benefit of their not knowing who was not to be trusted. The more customers they had, the harder it would be to control the better deals some of those customers might be getting.

REACTION OF CARTEL GOVERNMENTS

The cartel nations would probably meet quickly to stop the hemorrhage of revenues to the United States and to other nations following our example. They would surely pledge not to pay rebates, but that would change nothing.

There is no way of finding out the cheaters, who along with non-OPEC nations would have the inside track. To divide the American market among cartel members would be another empty gesture.

The only thing they could do would be to set up a joint selling agency, with exclusive rights to sell all cartel oil. The sooner they did this, the worse matters would be for them and the better they would be for us. The company buffer would be gone. The governments would have the constant divisive job of haggling over market shares. Confrontation in council, month after month, is what they now avoid. We should force it on them. Acrimony and suspicion would be cumulative, increased by frequent meetings and arguments over sharing the burden of

excess capacity, which would in turn aggravate the usual difference of opinion about the best price to charge. The OPEC meeting of September 1975, with its still-unresolved haggling over small quality and freight premiums, is a mild sample of what we can bring about.

The cartel might buy up all tickets to destroy them. This would be a boycott as ineffective as the "embargo" of 1973–74, when the United States did as well as the "friends" of the Arabs. The production cutback was real. A selective boycott is as impossible now as it was then. If it were tried, prices of tickets would shoot up, benefiting us at their expense. If no tickets were presented for one or two weeks, the FEA could order special auctions, extend the expiration dates of all outstanding tickets or increase their value, or at worst briefly suspend the import limitation. Since the United States accounts for only 12 percent of cartel production, even a very low rate of defection would suffice. Furthermore, as governments boycotting the United States tried to recoup their losses in sales, there would be great downward pressure on prices everywhere else in the world.

IS THERE A CASE FOR DOING NOTHING?

Many people in Washington were confident, in early 1974, that the price would soon come down without our doing anything about it. It has since risen by half. Spontaneous reduction looks even less likely now than it did then. In my opinion, the dominant cartel members have increased long-run earnings by raising the price. But even if they preferred a lower price they would find it necessary to raise the price as a bribe to the smaller producers, who want to get more money immediately. In return, the smaller countries restrain output instead of shading prices.

Time is not necessarily on the side of the consumer nations. Excess capacity can be gradually worked off. Some expansion plans have already been sharply cut back in the smaller countries. Smaller and militarily weaker producers will be afraid to expand capacity. Thanks to American armaments and training, Saudi Arabia and Iran will soon be able to occupy some oil-rich neighbors and stop production. The mere threat may suffice. The fewer the members, the stronger the cartel and the worse for its customers.

This Administration's obsession with expanding Saudi Arabian capacity is the worst possible strategy. The higher its market share, the less room there is for others, the stronger the cartel. An auction quota scheme would provide unlimited sales for small countries, at the expense of the larger ones.

WHAT IF THE SCHEME FAILS?

If the scheme fails, we lose nothing and gain some respect from the cartel. Showing them that we understand our plight and are looking for ways to oppose them should make them at least a little more cautious.

"Dialogue" with the oil exporters, as a group, has been taking place for years. It goes like this: *They*: "This is it." *We*: "Yes, boss."

An auction quota scheme would be an invitation to genuine dialogue with each individual exporting country. Then we would say: "If you want to sell oil in the States at your rivals' expense, see us next month."

APPENDIX 4. QUARTERLY REVIEW OF ECONOMICS AND BUSINESS

THE WORLD OIL CARTEL: SCARCITY, ECONOMICS, AND POLITICS

(By M. A. Adelman)

I shall try to maintain two propositions. First, future scarcity cannot possibly explain the current price of oil in the international market. In fact, a group of oil-producing nations have formed a cartel like any other, but not like every other. No cartel is like every other cartel; each is a historical individual. My second thesis is that for the immediate future the elements of strength look more impressive than the elements of weakness and that the cartel will not soon disappear.

On the first proposition, I apply the ideas of economists who in the 1950s and 1960s reconciled an elegant theory and some awkward facts. In theory, mineral resources were limited; costs and prices had to increase over time. The future scarcity threw its shadow far ahead through the discounting mecha-

nisms, and prices rose at approximately the rate of interest. Thus mankind was never in danger of driving blindly off the cliff of apparent plenty into the void of materials running out, but received signals a long way ahead. The awkward fact was that minerals prices did not persistently rise over the long run. The minerals industries were acting at any moment as though their admittedly finite stocks were infinite; and in retrospect they were right to act this way.

The new theory was stated in the 1967 papers by Richard L. Gordon [5] and by the late Orris Herfindahl [6]. Their reward has been to be ignored, not only by policymakers but even by fellow economists. Let me restate their thought briefly.

All minerals are limited because the earth itself is. Where the limit lies, we shall never know and neither will our descendants, ever. Oil, for example, is only one member of a large class of combustibles which in the fullness of time will include seawater, granite, the wind, and the sun in amounts never contemplated today. However, we ignore these far-off possibilities and deal only with shale oil, tar sands, coal, and to a minor and dispensable extent, uranium. The only difference between oil and these other combustibles is that oil is cheaper to extract and use. When and as it becomes more expensive, people will give over the search for it and we shall never get to the end of the stock of oil. In that real sense oil is inexhaustible.

Table 1 shows the assumptions I would like to test. By A.D. 2000, oil reserves, that is, visible usable stocks, will be rapidly disappearing and all growth in consumption must come from substitutes and synthetic oils, which are available at $16 a barrel, an oil company estimate of what can be done with 1975 technology. The price of conventional oil must therefore also be $16. By the year 2000 the average production cost of Persian Gulf crude oil will be about 10 times the present level or about $2.50. Hence there is an economic rent of $13.50 per barrel. (If the cost rises more than we assume, the rent will be less, and also the present value.) If an asset oil-in-the-ground is worth that much, net of production cost, in 25 years, at what price must one sell it today in order to suffer no loss? I am assuming a discount rate (in real terms) of 10 percent. If we consider the last period of price stability, 1957–65, when the GNP deflator was rising at only 1.6 percent per year, a fair approximation to the riskless rate was a median yield of 4.0 percent on U.S. taxable bonds. The median after-tax return on equity for all manufacturing was 10.3 percent.

A discount rate of 10 percent real may be too low. It attaches no particular risk to the possibility of improved technology putting the price down below $16. As we shall see later, this risk is only one special case in a larger class.

The present value (1975) of the 2000 economic rent is about $1.25 a barrel. (Recently President Kingman Brewster of Yale University proposed a "value-subtracted tax" for the use of nonrenewable resources. The rent in Table 1 is exactly that.) In summary, if we expect to be running out of oil by the year 2000, under competitive conditions the 1975 Persian Gulf price should be around $1.50.

TABLE 1.—ASSUMPTIONS

1. In A.D. 2000, oil reserves disappearing, substitutes and synthetic oils available at $16 per barrel (Source: oil company, 1975 technology). Conventional oil price equates.
2. In A.D. 2000, Persian Gulf average costs $2.50 per barrel, hence, economic rent $13.50.
3. Discount rate, real, 10 percent.
4. Economic rent, present value $1.25 (that is, $\$13.50 \times 1.1^{-25}$).
5. Persian Gulf 1975 development cost $0.25.

Tentative conclusion:

6. Competitive 1975 Persian Gulf price $1.50 (that is, $1.25+$0.25), price rises approximately 10 perecnt per year (that is, $\$1.50 \times 1.1^{25} = \$16$).

In Table 2 we see whether this estimate can be squared with what we know about current oil resources outside the communist areas. First, as to consumption: Over the 20 years before the market convulsions of late 1973, total energy use was growing at about 4.6 percent a year. Oil consumption grew faster, at about 7 percent a year, as oil displaced the other fuels. This was a period of declining fuel prices and a world growth rate that most observers do not expect to see maintained for the rest of this century. (In 1925–68, energy and oil growth

were respectively 2.8 and 6.1 percent.)[1] However, I assume that the autonomous growth in demand for oil declines steadily from 7 to 4.6 percent a year, averaging 5.8 percent a year. I assume elasticity of demand in the long run as —0.3, which is at the low end of the range of published estimates. Essentially it means that if price increases by a factor of 10, consumption will decrease by 50 percent. Such results are not achieved overnight but require time enough for households and firms to change the apparatus they use for fuel consumption. Let me mention two illustrative facts: (1) Per capita income in Sweden is about as high as in the United States but per capita energy consumption is about half; and (2) The oil industry appears to agree with the president of General Motors who said last summer that automobiles on the road in 1980 would use less gasoline than did automobiles on the road in 1973. That could be wrong. Also, the change in American gasoline consumption may be due less to rising gasoline prices than to a change in consumption patterns, which in turn is largely a response to congestion and pollution. In any case, with 10 percent annual price increases, the combination of an autonomous increase of 5.8 percent and our demand elasticity of —0.3 is consumption growing at 2.8 percent a year.

TABLE 2.—TEST (EXCLUDING COMMUNIST AREAS)

Demand:

1. Total energy consumption 1953–73, 4.6 percent per year growth.
2. Total oil consumption 1953–73, 7.0 percent per year growth.
3. Autonomous oil demand growth assumed to decline to 4.6 percent in A.D. 2000, averaging 5.8 percent per year, 1975–2000.
4. Assumed demand elasticity=—0.3, long run.
5. Annual consumption increase, with 10 percent annual price increase, 2.8 percent (that is, $1.058 \times 1.1^{-0.3}$).

Consumption:

6. Starting level 47.9 million barrels daily, 17.5 billion barrels a year (=1973 level, omits recession).
7. Cumulative consumption 1976–2000; 620 million barrels (that is, $17.5 \sum_{1}^{25} (1.028)^{25}$).

Reserves:

8. Proved reserves in known reservoirs (recoverable "with reasonable certainty" with existing costs, prices, technology) end-1974: 609 billion barrels.
9. Additions to reserves in known reservoirs: Persian Gulf "worst case": 170 billion barrels.
10. Additions to reserves in known reservoirs: US: 60 billion barrels. (Sources: [1 and 8]).
11. Rest of noncommunist world, assuming Persian Gulf proportion, 70 billion barrels. (That is, $165 \times (170/404)$.)
12. Minimum additions in *known* reservoirs, 300 billion barrels.
13. Expected *discoveries* 1976–2000, 641 billion barrels. (Source: [7] (unexplored deeper offshore may add another 1,250 billion barrels).)

Cumulative consumption for the rest of the century is about 620 billion barrels.

Turning now to the visible stock of oil: proved reserves in known reservoirs are mostly what can be produced at prices not of 1975 but nearer to $2 a barrel. Proved reserves, the industry ready-shelf inventory, were about 609 billion barrels a year ago. Estimates have been made of what can be produced from known reservoirs by more intensive exploitation. A "worst case" for the Persian Gulf is about 170 billion barrels. For the United States, it has been estimated that about 60 billion barrels are available. Particularly in the US the additional oil is worth recovering only at high prices—the estimator, Standard Oil of Indiana, says about $12 a barrel, a figure to which of course we should not try to hold them very closely. Assuming the Persian Gulf proportion for the rest of the world, we obtain a minimum addition of about half of proved reserves. So much for known reservoirs. A recent estimate, generally considered conservative, is of 641 billion barrels to be discovered, though deeper offshore areas may add twice that [1; 8 and personal communication; and 7].

To speak of discoveries, of course, refutes the idea of oil as a nonrenewable resource. The economic asset oil reserves are certainly renewable and replaceable by the economic processes of finding and of improved recovery. The question is the cost at the margin of discovery or of better exploitation.

No allowance has been made for natural gas which, outside the United States and the Soviet Union, has not been sought for its own sake but has been found as the accidental result of the search for oil. The reserves known today outside these two countries are in heat value a large fraction of known oil reserves but are not worth exploiting. Given the prices in our scheme, they would be worth exploiting. The technology already exists and is commercial at prices lower than those we contemplate for the year 2000. Gas reserves are also expansible, like oil reserves.

In summary: the assumptions in Table 1 about the current value of future economic rents because of supposedly limited oil supplies are well within the limits set by our knowledge of oil resources. Indeed, they rattle around inside those limits. The most important implication of this quick review is the way in which a market system operates to take account of scarcities long before they occur and to provide feedback to change the basic data.

The expectation in 1975 of higher prices later will lead to considerable investment in new knowledge: of the earth's crust, of better extraction methods to leave underground less than the current 70 percent in the United States and the over-80 percent elsewhere; and knowledge also of how to make better use of increasingly higher-priced fuels. I have merely done a worst case, using known data. Prices are made by endless iteration and reiteration, as new data enter.

Some would say that a market system cannot possibly handle so large a number of combinations and uncertainties; others, that only a market system is flexible enough to incorporate new data as they appear. Either way, the discounting process is the only way to avoid the impossible task of playing God, as though we really knew what was underground or aboveground.

The test was no forecast. Where in fact, absent monopoly, the price would rise at all from 1975, I have no idea. In 1938 reserves as then known were being depleted at the rate of 6 percent a year and obviously this could not go on forever. In 1975 reserves are being depleted at the rate of nearly 3 percent a year and just as obviously this cannot go on forever. But whatever scarcity *may* come to pass is fully, perhaps over fully, accounted for in a price which is around $1.50 a barrel. If we bent every assumption, we might double it.

Now for recent price history: Five years ago the Persian Gulf price (at 1975 values) was about $2. It is now about $11.50 and it will undoubtedly be raised again as the industrial countries recover from the current recession. The current price has no possible relation to scarcity, present or future, known or feared. Therefore, having cleared away the unfact, we are free to look at the fact, the control of price by a group of exporting countries, the members of the Organization of Petroleum Exporting Countries. OPEC is not important in itself but the nations composing it constitute the greatest monopoly in history, its tribute now being over $100 billion a year.

The forces acting against the cartel are subsumed in the fact of excess capacity. This is the usual nemesis of cartels, since it puts in motion the sequence of small price reductions by some sellers to gain additional sales volume, then competitive or matching reductions. Each cartel member must avoid acting for his own independent good and must do what is best for the group as a whole. The greater the burden of excess capacity, the greater the temptation to act independently, the greater the fear of others' independent action, and the higher the probability of severe erosion or breakdown. So the fate of the cartel depends essentially on the strength of exogenous factors, demand and uncontrolled supply, versus the strength of an endogenous factor, the cohesion of the group. All too often either one of these factors is treated in isolation as though the other were not there.

By mid-1975, production of the OPEC nations was around 26 million barrels daily and unused capacity was 12 million, or nearly half. Clearly great strain was being exerted. Just as clearly there was great strength, for the price was actually raised at the end of September. Let us therefore look at the principal factors of strength.

One preliminary but important comment: political factors are not likely to damage the cartel any more than they have helped it. It is widely but wrongly believed that the cartel and the level of oil prices are somehow connected with political strife in the Middle East. However, assume a political settlement acceptable to both Israelis and Arabs. There is simply no reason that anyone should lower the price of oil. Non-Arab members of OPEC are

of course pretty emphatic on the point. But there is no disagreement from Sheik Yamani, the Saudi petroleum minister, or from the former American ambassador to Saudi Arabia, who has been relieved of his post because he apparently confused himself with the Saudi ambassador to the United States.[2] They both deny that a political settlement would lead to lower prices. We had better believe them.

The royal road to power is money. Therefore, whatever a nation's political aims, these are best achieved by acting as a good revenue maximizer. Back in the 1920s Soviet Russia, the international pariah, felt free to join several cartels and was welcomed in.

We might also recall that the price increase during October–December 1973 was about $4, that is, from $3 to about $7 a barrel. But during the whole period of OPEC's success beginning in late 1970, the increase in the Persian Gulf has been over $10, from $1.25 to $11.50, so that the increase associated with the embargo has been less than half of the total increase, and it will be a still lower percentage as the price rises more.

But although political *objectives* of these sovereign nations have little to do with the cartel objectives, their sovereignty is a great help. These nations are subject to no law that would limit or abridge their monopoly. It is free enterprise at its freest. The larger Persian Gulf producing nations have or soon will have the ability to occupy their neighbors. The mere threat should be enough.

The second great advantage enjoyed by this cartel is in using the multinational oil companies to make the market clear, ensuring that the amount offered at the prevailing price does not exceed the amount demanded. The multinational oil companies, without any collusion, limit output and allocate it among the producing countries. The system is simple and has worked excellently so far. The exporting countries transfer the great bulk of their oil to the companies at the fixed price. Each company produces only what it can sell at that price. Since margins are very thin, around 2 percent of the price, companies cannot make significant price cuts. As nobody makes lower offers to get more outlet, the market clears at prevailing prices.

The market share of each country depends on what its resident companies can sell. What matters is not "nationalization," but that the exporting nations accept those market shares and shun any large-scale independent selling efforts. This has imposed some strains. Since the companies now have a relatively small stake in operating in any particular country, they are more ready to buy crude elsewhere and have done so, in small amounts. Hence governments have engaged in the novel experience of bargaining over prices and even losing sales. Even when the amounts are tiny they react with surprising vehemence. Algeria has not hesitated to make harsh criticisms of Nigeria and Libya for having given small incentives to their resident companies, preventing them from buying Algerian crude oil. The outstanding nonconformist is Iraq, which has shaded prices just enough to keep output at over 90 percent of capacity and has in consequence now upgraded its 1980 plans by 50 percent. Much of its gain has been at the expense of Kuwait, which has found its former resident companies, Gulf and British Petroleum, uninterested in taking all the oil made available. Kuwait shook a stick at the companies—no oil sales contract whatever—and offered a carrot, a 10-cent price reduction, promptly denounced by Iraq in an official diplomatic note: such reductions would "inspire competitive bidding among producers." Competitive bidding is the clear and present danger and its avoidance is worth many times 10 cents. I expect Kuwait to come to some kind of understanding with the companies. Yet the tie that binds companies to any given source of supply is weaker than ever before. Even with no cataclysmic change, when the margin on crude oil becomes thin, even if a government scrupulously maintains it, the company has shifted its emphasis away from *disposal* of profitable crude oil toward the *procurement* of crude oil for its refining-marketing operations to run at a profit.

My own guess is that the situation will be contained for the immediate future because both parties know that the multinational companies are indispensable. Perhaps the governments could themselves limit output and divide markets. They do not want to find out. Haggling over market shares, surveillance, and compensation of losers would be a constant divisive irritant. Confrontation in council, month after month, would strain and I think severely damage the cartel.

Another advantage of the cartel nations is the superabundant liquidity of some of them. Many a price-fixing agreement has been undermined by reluctant price-cutters, who cannot help themselves because they must have additional cash and can only raise it by increasing sales even at lower prices. Most OPEC governments are in excellent financial shape and have therefore tolerated the companies' sales reductions. Even those which have overspent revenues find their credit is very good. There is a backward bending supply function: the higher the price, the greater the cohesion of the cartel, the less put on the market.

We touch here on a very important point, the rate of expansion of capacity of the fringe of the cartel, the nations which must choose between (1) acting as price takers and expanding output as fast as possible or (2) permitting the companies to operate the cutback scheme or understanding. The fringe nations—broadly the non-Arab members plus Iraq—have mostly refrained from pushing output to the maximum and have chosen rather to bear as great a reduction as the core countries—broadly the Persian Gulf Arab states. If the fringe nations were to sell at capacity and expand capacity, the cartel would be much weaker. Each fringe nation knows that what each does makes no difference. If they see others complying they will most likely do the same. Conversely, every flouting of the implied obligation makes it more likely that others will flout. It is a basic instability; a tendency in either direction becomes self-reinforcing, but today the self-reinforcing tendency strengthens the cartel.

Relations between core and fringe are complicated by the fact that no two governments have quite the same rate of time preference. Some of them want higher prices today even if it means lower prices tomorrow, whereas others would maximize the present value of their assets by a somewhat flatter gradient. A long-run equilibrium monopoly price for Saudi Arabia *would be* lower than for Algeria. But that is a conditional statement, not a reference to any actual prices. There is no truth in the United States government's romance of Saudi Arabia trying to keep down the price. In fact, that nation was the leader, raising prices throughout 1974. They not only acquiesced in the price increase of 1975—recent statements by Sheik Yamani clearly foreshadow further price increases when industrial recovery is farther advanced. However, Saudi Arabia like any prudent monopolist advances the price step-by-step, pausing to test the market before raising it again, and just as with other cartels where costs vary greatly among the cartelists, it may be necessary for the lower-cost producers to make side payments to the higher-cost. In the oil nations' cartel, the side payment would take the form of agreeing to a price higher than would optimize the holdings of the lower-cost producer. However, that problem has not yet become serious.

This brings us to an advantage for the cartel which is potential rather than actual, Saudi Arabia as the restrictor of last resort. In the United States, from the end of World War II to the end of the 1960s Texas absorbed all of the production cutbacks and tolerated excess capacity that was often 75 percent of the total. Texas had about two-thirds of east-of-the-Rockies output, whereas Saudi Arabia accounts today for about one-fourth of OPEC production. They cannot yet serve as the backstop of the cartel and let others produce as they wish. Suppose they had tried to do this in the middle of 1975, when OPEC excess capacity was equal to or a bit greater than Saudi capacity. Saudi output would then be zero, quite an intolerable result, but in the near future they will be able to occupy all the coastal states of the Persian Gulf. Then in similar plight they could produce about 6 million barrels daily. With Iran producing more than 6 million barrels daily and with all fringe nations booming ahead to develop additional capacity, thereby promising attrition of even that 6 million barrels, would this be tolerable? I submit that even the Saudis do not know and rightly do not want to find out.

Let me in passing pay proper disrespect to the slogan that Saudi Arabia would rather keep oil in the ground than money in the bank. A barrel sold today sacrifices the present value of a barrel sold in the future. Saudi Arabian reserves can easily be expanded to 50 years' supply. If the price of oil were then not $11.50 but $111.50, its present value would be less than $1. A monopolist, or member of a joint monopoly, restrains output not for the sake of the distant future but to avoid wrecking the price structure today.

Let me turn now from the factors inside the cartel to those outside. The amount of excess capacity with which the cartel must cope depends on the speed with which noncartel production develops.

The noncartel reaction might at first be supposed very simple: these countries would act like simple price takers and expand output as fast and as far as possible, until its marginal cost is equal to the price.

This is the case in countries where the oil industry is nationalized. The Soviet Union, China, and Mexico are expanding like rational if sometimes sluggish capitalists. However, in most private enterprise countries, political forces have not permitted that simple response of output to higher prices. The economy as a whole would, of course, be benefited by any production whose total cost was less than the import price of equivalent energy, but the producing companies would get "too big a share" of that increased national income. Governments would rather prevent windfall gains than get the production response. Whether right or wrong, this policy prevails and its results must be allowed for. In the United States, oil prices are under control, thereby subsidizing consumption, inhibiting production, and promoting imports. Field price regulation of natural gas has done it for years. Expansion of low-sulphur coal, particularly in the Rocky Mountain states, has been prevented largely by those states, both directly and through their congressional delegations. To some extent this is a matter of concern over the environment and to some extent a desire to share in the windfall gain; whatever the reason, the production response is prevented.

In Canada higher prices led actually to large-scale *disinvestment*—the provincial and national governments raised taxes enough to send scores of rigs migrating southward. The result was to decrease Canadian reserves, which in turn set off a further reaction, to restrict exports lest Canada run out of oil; this will diminish reserves still more. In the United Kingdom, the price explosion of 1973 led to a North Sea profits explosion which had two effects. One was a wild bidding up of factor prices. The other was a steep increase in taxation, which recently drew back short of taking all of the economic rents. The slippage in the North Sea has already been considerable, so that expected output in any given year of the near future will be considerably less than attainable, and there is also a considerable reluctance by private investors to explore and develop further.

Norway is a special case; a small country with large potential which it restrains for several reasons; fear of the impact of excessive development on an attractive way of life; the illusion of scarcity and belief that prices must rise far more; distaste for unearned income; fear of foreign business; and so on. In time the fears and hopes will be seen to be unwarranted, the dangers avoidable, and the ceiling lifted, but surely not so far as to equate cost with price.

It would be tedious to extend the list but I draw the general conclusion, which is again that of a backward bending supply curve—past some point, higher price in the world market has led to less, not more, investment in the non-OPEC countries because other objectives have overborne the desire for increased national income.

I come now to the reactions of the consuming countries as such to the price increases of the cartel. There are several reasons that public opinion will tolerate and even defend actions which had they been taken by private parties would have brought swift punishment. There is the Club of Rome syndrome, that we are quickly running out of everything and hence the price increase is actually a good thing enforcing a little more thrift upon us. There is also a feeling of guilt in the face of the poor nations of the world, a wish to make it up to them. Recently, a Swedish minister of state, speaking at the United Nations General Assembly, congratulated OPEC for having broken through the domination of the advanced industrial countries. I do not see what good is done by making the poorest nations still more poor and by giving the Saud family—4,000 adult males—an income of $100 million a day. However, belief is all that matters.

Moreover, the rapidly escalating imports of the OPEC nations from $20 billion in 1972 to $100 billion estimated by Morgan Guaranty for 1976 are building up a powerful vested interest in the consuming countries. Thousands of people have jobs and some are getting rich selling them goods and services. The Office of Munitions Control in the State Department has released the federal registration certificates of 1,033 companies licensed to make or export armaments. It is a fairly good cross-section of American business, including 153 of the *Fortune*

largest 500 companies. Academia is included, a wholly owned subsidiary of Cornell University. Overseas sales of munitions in 1974 were $11 billion, of which an increasing proportion is going to the Persian Gulf.

The United States is the most important consuming nation. It is impossible to give any kind of statement of American policy. A mystery or void remains at its center. In 1972, I gave considerable offense by saying that the State Department was actively helping the cartel but I could only speculate as to the reasons. Insiders were baffled too. The hearings of the Church subcommittee have shown that in 1970, when the Libyan demands were ready to blow the door off the hinges, some oil companies were for resisting, some for compliance, and some waffled. The United States government was determined that the Libyans should get what they wanted but the then head of Royal Dutch Shell, writing three years later, could not give any clear account why. American support for the cartel is shown in Secretary Kissinger's statement that the price before December 1973 had been "too low." The nearest he came to explaining "too low" was in saying that "the demand for oil had outrun the inducement to invest." This is at least an intelligible statement. The 1973 investment requirements for Persian Gulf oil production are rather generously put at $200 per daily barrel and the operating expense at 10 cents per barrel. A $3 price meant a return on investment of 529 percent per year. Later the secretary seemed to abandon any economic rationale, alleging that 1974 prices were "political." One would have thought that a price which increases the sellers' net revenues needs no further explanation. Since the end of 1973 there has been preachment and admonition, with occasional warnings that somebody may go too far. In September 1974, Mr. Kissinger made a "tough" speech in New York and Mr. Ford made a "tough" speech in Detroit. The then Federal Energy Administrator John Sawhill was asked what plans there were for getting the world price down. He replied truthfully that there were none. Mr. Kissinger was angry and Mr. Sawhill was fired.

Our policy at its best is import reduction. However, lower imports can affect the cartel only by adding to excess capacity. But in 1974-75 the growth in excess capacity was greater and faster, hence with more shock effect, than anything the United States could accomplish. The cartel took the strain and kept raising prices. "Conservation" generally will not affect the world price unless used as a lever to disrupt the cartel and no such act is now contemplated.

The United States is now negotiating to purchase oil from the Soviet Union, but that country has no current or expected excess capacity. Every barrel they sell to us is subtracted from sales elsewhere. They are a small part of the world market and can sell anything at the world price. The very fact that our government has been spending so much time and effort on this empty show is a good index to our policy: the empty barrel making the most noise. Bluster, self-deceit, fantasies of self-sufficiency—these explain why the producing nations have taken the measure of the United States and fear us not.

The forthcoming conferences on energy and raw materials between consuming and producing nations will hear talk of interdependence. The oil-exporting countries will be told they cannot prosper if their customers are in a depression—though the experience of the last two years shows this is false. If the industrial nations give investment guarantees to the OPEC nations with the largest foreign exchange surpluses, that will be a disguised price increase. It will also strengthen the core at the expense of the fringe. A long-term deal to fix what Mr. Kissinger has called "a just price" seems less likely now, fortunately. A sovereign monopolist cannot be held to any agreement. A private firm or individual is constrained by competition or law, or both. Anyone who welshes on a deal is either abandoned, as people go elsewhere to do business, or else a court orders him to keep his word or have his assets seized, but the cartel has suppressed competition and there is no law against the sovereign.

Summing up, I would say that the strong points are more impressive for the immediate future than the weaknesses and that we must therefore expect to see continued increase in prices. Admittedly, things may change, and swiftly. Even great success does not change the basically fragile nature of a cartel, which is the home of the self-fulfilling prophecy and the self-reinforcing trend. Saudi Arabia may be the restrictor of last resort, but it has swiftly built producing capacity which it cannot possibly use even well into the 1980s. It is a hedge or more accurately a threat that if anyone starts any price war, they will finish it. Cartel-watchers should pay attention to the role of the oil companies as the market-clearing instrument. Eventually some consuming nations may realize

that the Iraq government, in the remark quoted earlier, states the cartel's greatest fear, "Competitive bidding among producers." But that is another story.

NOTES

The David Kinley Lecture, delivered at the University of Illinois at Urbana-Champaign, 4 December 1975.

1. For 1925–68 [3, Tables 1–6]; for 1953–73, [2].
2. [4, p. 63]. He 'argued that OPEC could do no ill because it was under the thumb of the Saudis and the Saudis believed in lower prices. Sadly, while Mr. Akins spoke, prices still went up."

REFERENCES

1. Z. R. Beydoun and H. V. Dunnington, *Petroleum Geology and Resources of the Middle East* (Beaconsfield, England: Scientific Press Ltd., 1975).
2. British Petroleum Company, *Statistical Review of the World Oil Industry* (London, 1975).
3. Joel Darmstadter and others, *Energy in the World Economy* (Baltimore: Johns Hopkins Press, for Resources for the Future, 1971).
4. *Economist* (London), 23 August 1975, p. 63.
5. Richard L. Gordon, "A Reinterpretation of the Pure Theory of Exhaustion," *Journal of Political Economy*, Vol. 75 (June 1967), pp. 274–86.
6. Orris C. Herfindahl, "Depletion and Economic Theory," in Mason Gaffney, ed., *Extractive Industries and Taxation* (Madison: University of Wisconsin Press, 1967).
7. John D. Moody, paper presented at World Petroleum Congress, May 1975.
8. *Oil and Gas Journal* (17 November 1975), p. 26.

APPENDIX 5. THE UNREAL DILEMMA—OIL-IN-GROUND VERSUS MONEY-IN-BANK

Much has been made of the Saudi Arabian trade-off between keeping oil in the ground versus selling it to invest the money. In fact, the problem is unreal. Any barrel which Saudi Arabia can sell is worth producing.

A barrel of oil produced today sacrifices a barrel of oil to be produced in the future. For example, if Saudi output is limited to 8 million barrels daily, or 3 billion barrels annually, then currently known reserves will take over 50 years to exploit. ("Proved reserves" were recently reduced by the Saudis, but this gesture was not explained and need not detain us; "proved reserves" are not the relevant number anyway.) Then a barrel less today means a barrel more in 2027 A.D. If we discount from 50 years hence, we must consider all the risks of technological change and political upheaval in the interim. Then a 10 percent rate (which was approximately the return on U.S. equities during the last inflation-free period) is conservative. At this rate, if we expected a barrel of oil in 2025 A.D. to be worth $1000, its present value would be around $10, and the barrel not worth holding.

Saudi Arabia must restrain production, because to increase it would break the price. Our problem is not how to give them favors or inducements (which they will pocket, and ask more) to expand output. The problem is how to change the market structure so that it does not profit them to restrain.

Senator KENNEDY. Thank you very much.

Mr. Lichtblau.

STATEMENT OF JOHN H. LICHTBLAU, EXECUTIVE DIRECTOR, PETROLEUM INDUSTRY RESEARCH FOUNDATION, INC., NEW YORK, N.Y.

Mr. LICHTBLAU. Thank you, Senator.

It is still too early to assess all the consequences of the decisions taken by the OPEC members at their ministerial meeting in Doha last month. To some extent the decisions may be considered beneficial to the United States and other importing nations. Certainly, Saudi

Arabia's removal of all production restrictions is welcome news, for the possibility that the country might not raise its imposed 8.5 million barrels per day ceiling in response to higher future demand for its crude had given rise to fears of a possible shortage of OPEC oil, perhaps as early as the middle of this year.

The other major decision, the establishment of a two-tier price system, is good for the consuming countries relative to the most likely alternative course of action, a 10-percent increase for all OPEC members. As it is, we estimate the new price system will mean a weighted average increase in the first half of 1977 for all OPEC crude of nearly 8 percent based on current output shares, and about 7.5 percent if Saudi production rises to 10.5 million barrels a day.

In the second half of the year, the price increase could go to 11 to 11.5 percent if the 11 other members go through with their announced additional 5-percent increase while Saudi Arabia and the United Arab Emirates, UAE, remain at 5 percent. Since none of these price increases were the result of market forces but were all decreed by government edict, the question may be asked: Are any of them reasonable, from OPEC's point of view, as well as that of the consuming countries.

One answer frequently voiced in consuming countries is that after the 350–400 percent increase in OPEC oil prices in 1973–74 an extended pause before any further increase is eminently reasonable even if it means an erosion, in real terms, of the price levels achieved earlier. There is clearly much merit in this argument, particularly if one considers the significant impact which the earlier oil price increases had on the recession of 1974–75 which was the longest and deepest in the postwar period.

But I believe the argument lacks political realism. Between 1971 and 1974 OPEC had won a bloodless revolution of major historic proportions, taking control over the production of nearly 70 percent of one of the free world's most important resources and transferring hundreds of billions of dollars from the industrial nations to a group of developing nations. Having succeeded in this beyond expectations, OPEC is unlikely to stand by quietly now and watch its victory shrink away through a steady erosion of the purchasing power of its exported oil.

Thus, instead of the various pleadings and exhortations by the leaders of the consuming countries prior to the Doha meeting for a moderate price increase or no increase at all or an increase no higher than a certain percentage, a possible alternate approach might have been for the consuming countries, perhaps working through the International Energy Agency or OECD, to calculate the real loss in the purchasing power of a barrel of oil in world trade since the last OPEC price increase and then attempt to negotiate an increase of approximately that magnitude with OPEC.

Now, I know this would be in the form of some kind of indexation with all the problems inherent in such a system and I am not advocating this as such, but I think if the consuming countries have a direct influence in the construction of the index it might be worth experimenting with, and I would like to emphasize the word "experimenting."

It certainly would have given us a better result at Doha than the combined OPEC increase. Even the lowest of the various increases, such as Saudi Arabia's increase of 5 percent, was slightly higher than OPEC's real loss in purchasing power since the last oil price increase in October 1975. It is to Sheik Yamani's great credit that he publicly recognized this fact and thus was the first OPEC leader to break with the organization's party line which says increases of 15 percent to 25 percent would barely offset the inflation in OPEC's import prices.

Thus, an increase of about 5 percent for 1977 can be called reasonable. It would not present a major financial burden for most of the world's importers. If all OPEC producers had adopted a 5 percent increase its annual cost would have been about $6 billion. On a global scale, this is a relatively negligible amount, equal to about 0.6 percent of this year's likely $1 trillion world import trade.

Furthermore, it follows 15 months of virtual price stability in OPEC oil. By most standards of measurement a 5-percent price increase could therefore be considered quite tolerable for all but the less developed countries who represent really a special problem requiring special measures.

But, of course, for the moment a 5-percent overall price increase for 1977 is just wishful thinking. As we know unless something is done we will be saddled with a 15-percent price increase by next July for the 11 OPEC members accounting for 60 to 65 percent of total OPEC production. This increase may not be tolerable. What can be done about it? Perhaps nothing, but I would like to suggest two general approaches that may be helpful.

1. We must stop planning and hoping for OPEC's downfall, because it will not occur and it is counterproductive to an atmosphere of cooperative coexistence with OPEC, on whose oil we will have to depend significantly for the next 12 to 15 years, even with our efforts at conservation and new energy source development.

2. We and the other consuming nations must use our collective leverage, which is quite considerable, to start a direct and specific dialog with OPEC, and only with OPEC, on the one area of direct specific common concern—the price and production of oil. As you know, the North-South dialog in Paris was initially meant to do just that. It became a fiasco because it turned into a laundry list of problems and grievances between the industrial nations and the less developed ones, completely overshadowing its initial purpose.

I think we can make clear to OPEC that what is now happening in world oil price formation is the exact mirror image of their historic complaint prior to 1973; namely, that prices were determined in and by the consumer nations without any regard for the interests of the producer nations. Now it is just the other way around and it is just as untenable. When OPEC meets to set prices, no one speaks for the consumer and since free market signals have been banished by the cartel, the decisions are arbitrary from the consumers' point of view.

True, we have been fortunate so far in that Saudi Arabia, OPEC's most important member, has been a very effective moderating force at all OPEC price setting sessions since December 1973. This has saved the consuming countries many billions of dollars. But, Saudi Arabia's economic and political interests and orientations are quite different from those of the major consuming countries.

We should therefore not assume that Saudi Arabia will always use its influence on the side of the consumers. At the Doha meeting, Saudi Arabia's official reason for not going along with the 10 percent increase contained the implication that if certain political expectations were not met its price posture might change. Sheik Yamani could have employed the same rationale to announce a high price increase now with a promise for a later reduction if the expectations are met.

The consuming countries must therefore try to find some forum where they can directly debate, discuss or negotiate the price of oil with OPEC. The new uncertainty over Saudi Arabia's future role in OPEC and the scheduled further price increase on July 1 make this a matter of real urgency.

Now, I would like to briefly examine how OPEC might fare under the new price system. The impact will be quite uneven. The additional revenue generated from the higher prices will accrue primarily to the two countries which least want or need it, Saudi Arabia and the United Arab Emirates, because the increase in their combined production will more than offset their lesser price increases.

It is not known yet how much Saudi production will actually be raised as a result of the removal of the 8½ million barrel annual ceiling on Aramco production, but it appears that a sustained production level of about 10.5 to 11 million barrels per day is technically achievable in the first half of 1977. This would be 1.5 to 2 million barrels per day above actual production during the fourth quarter of 1976. In the UAE production may be increased by about 250,000 barrels per day in the first half of 1977. Thus, under our assumptions, the two countries will increase their combined output by about 15 to 20 percent above the high levels realized in the fourth quarter of 1976.

Meanwhile, total OPEC production in the first half may decline by about 1.5 to 2 million barrels per day from the fourth quarter 1976 level. The decline will be largely concentrated in the first quarter and will be due primarily to the worldwide inventory accumulation of OPEC crude which is now being reversed.

Thus, under our assumed level of Saudi and UAE production increases, the 11 other countries would have to absorb both the entire decline in the total demand for OPEC oil and the increase in the output of the two others. The result would be that the entire additional revenue generated by the OPEC price increases, about $5 billion in the first half, would go to the two countries with the lower increases.

Among the 11 others, those principally negatively affected would be Iran, Iraq, and Kuwait since their oil is most similar in quality to Saudi Arabia and, unlike some crudes of other OPEC nations, all of their crudes were increased by 10 percent or more.

Thus, for the next 2 or 3 months, the oil revenues of these three countries will decline substantially if their price relationship to the new Saudi Arabian prices remains unchanged. Venezuela will also be somewhat hurt because more Saudi Arabian crude and products made from it will come from the Caribbean to the U.S. east coast. In the second quarter the situation is likely to improve somewhat for these countries because of an expected increase in world demand for OPEC oil. However, they could still earn less in the second quarter than if they had not raised their prices at all and Saudi Arabia had maintained its output ceiling.

If the 11 countries go through with the announced additional 5 percent increase on July 1, their situation will improve, since they will not lose much more business to Saudi Arabia at the higher price differential than at the lower one. This consideration might in fact strengthen their determination to move to the higher level if the two other countries maintain their current prices.

Such a scenario is, of course, only speculative at this moment. It is equally possible that by next July the two sides will have come together again and will have established a uniform base price for all members. There are pressures on both sides to move toward a compromise. Iran, Iraq and Kuwait know that a price reduction toward the Saudi level in return for reinstatement of a lower Saudi production level will net them significantly more revenue than the present system.

On the Saudi Arabian side, there have been the repeated public and private complaints that the 8.5 billion barrel per day ceiling was already much too high in terms of the domestically investable revenue it generated, and that the country's interests would be better served if any oil volume which had to be converted into foreign investments, over which the country has no ultimate control, stayed in the ground. The removal of the output ceiling will, of course, greatly exacerbate this problem.

But even if the split continues, I do not think it will mean the end of OPEC's effectiveness, if by that we mean its power to set and enforce prices. For one thing, Saudi Arabia continues to provide a floor for all OPEC prices which is 4 to 5 percent higher than last year's floor. Second, Saudi Arabia's productive capacity is limited in the short run. Theoretically, it is 12 million barrels a day but a sustained production level above 11 to 11.5 million barrels a day is unlikely to be achieved this year.

Thus, the two countries together cannot supply more than about 13.5 to 14 million barrels a day maximum. Since world demand for OPEC oil for the last 9 months of 1977 will be 31 to 32 million barrels a day, the 11 other members, if they can absorb the shock of the first quarter reduction, will have an assured outlet of above 18 million barrels a day for the rest of the year, which is 9 percent less than in 1976, but at 10 to 15 percent higher prices.

In the short term, the most the consuming countries can therefore hope to gain from the OPEC price split is an eventual official or unofficial reduction of the prices of the 11 countries toward the new Saudi level. This would be significant. But, it would hardly herald the end of OPEC's price-setting power.

I would like to end with a brief comment about the international oil companies and OPEC prices. The decisions at Doha have made it clear, if further evidence was needed, that the companies' influence on OPEC prices is non-existent. They would hardly have come up with the price structure adopted there.

While the two-tier system lasts, the companies with access to Saudi and UAE oil—that includes not only the companies with concessions in those countries, but also those which buy from them or from the two countries' government companies—may derive some relative downstream advantage, but no increase in crude oil profit margins, from the

lower cost oil. Those without access to this oil will, of course, be at a corresponding disadvantage. Inventory profits are likely to be quite limited, particularly for those who stored additional volumes of Saudi Arabian crude, since the inventory appreciation is largely offset by the cost of storage.

More importantly, in many major consuming countries, including, of course, the United States, some form of price controls or price supervision exists which would prevent the accrual of such profits. In fact, past expetrience has shown that in many of these countries permission to pass on higher crude oil costs is usually delayed well beyond the time of the arrival of the higher priced crude so that the companies often incur initial losses on OPEC price increases.

But how a foreign company fares under a given OPEC price change is really quite irrelevant to the reasons for the price change. None of the considerations that went into the two price decisions at Doha had anything to do with oil company profitability. In fact, the only comment made on that subject was Sheik Yamani's warning that he would not let the companies with access to Saudi crude make a profit on the price differential.

Thus, if we are frustrated by OPEC's pricing policy, we must discuss it with OPEC and stop inventing convoluted theories of how OPEC's survival depends on the oil companies' support. The reality is much simpler, but admittedly much more difficult to deal with.

Thank you very much.

Representative LONG [presiding]. Thank you, Mr. Lichtblau.

We are appreciative of your provocative statement. Obviously, a good deal of thought and a great deal of preparation went into it.

Our next witness is Professor Moran of Johns Hopkins.

Mr. Moran, we are pleased to have you and why don't you proceed in your own way?

STATEMENT OF THEODORE H. MORAN, PROFESSOR, SCHOOL OF ADVANCED INTERNATIONAL STUDIES, JOHNS HOPKINS UNIVERSITY, WASHINGTON, D.C.

Mr. MORAN. Thank you very much.

Let me, if I may, present a brief verbal summary of a somewhat lengthier viewpoint.

Representative LONG. We will have your complete prepared statement included in the printed record.

Mr. MORAN. You asked me to consider two questions, the first, what would life with OPEC be like over the medium term? The second is, will the glue that holds OPEC together continue to stick? The answer to the first question, what will life with OPEC be like over the middle term, I think, is fairly straightforward. It will be painfully difficult and unavoidably tense. Why? Because learning to live with OPEC does not mean adjusting to a one-time increase in oil prices which is now past. Rather it means having to accommodate to a push for steadily higher real prices for oil this year, next year, and each year into the future.

The second question: Will the glue that holds OPEC together now continue to stick in the future?

The answer to that is more ambiguous. If left to its own devices, OPEC will almost certainly insure that the glue will stick. But OPEC need not be left to its own devices.

Over the next 3 to 5 years, OPEC will become more vulnerable to pressure on the part of oil importing governments that weakens its ability to restrict production.

OPEC will become more vulnerable. That has not been the predominant view in the U.S. Government. I will take a few minutes later to analyze the first point.

Why should we expect OPEC to push for higher real prices for oil? By that I mean, of course, not simply indexization, as Mr. Lichtblau mentioned, but oil prices that increase faster than the rate of world inflation.

A year or two ago that would have appeared ridiculous. OPEC was awash with petrodollars and the expectation was that they could not dispose of the money. It appeared OPEC could not absorb the petrodollars internally. Now the situation is dramatically reversed. OPEC governments have found that what they want—economic development, domestic stability, social welfare, national defense, international influence—all of these are enormously expensive.

Not only will the OPEC countries not be able to afford the grandiose development plans and military expenditure programs that they want—few of us ever thought that they would be able to achieve those plans. What is remarkable is that even if they stretch out, cut back and reduce both their development plans and their military expenditures dramatically, they still will not be able to generate nearly enough revenues if the price for oil "only," and I use that in quotation marks, "only" remains constant in real terms.

In my prepared statement I have sketched the impact of spending more and getting less on Iran and Saudi Arabia. Most of my fellow analysts would agree on what is going on and the dramatic shifts in expectations about spending that has taken place with respect to Iran.

They have gone from predicting a large surplus in its fiscal and balance of payments to now forecast a fiscal deficit and balance-of-payments deficit. Most analysts are reluctant to acknowledge that the same process is going on with respect to Saudi Arabia. According to my calculations, by 1980, Saudi Arabia will have to carve out a large permanent share of the OPEC market for itself. By that I mean, 8 to 9 million barrels per day to finance a minor part of the programs that it considers essential for national defense, domestic stability and minor degrees of economic development.

If it proves too difficult to carve out that large a share of the market permanently, then I would predict that Saudi Arabia would join the other OPEC members in pushing for higher prices in real terms.

Let me underscore this point. Saudi Arabia will not be able to go below 8 or 9 million barrels per day except for short periods of time such as in the case of a Middle East war or an embargo. It will not be able continuously to cut back whatever is needed to balance supply and demand at the price that other OPEC members decree.

The idea that OPEC in the future will be able to act as a residual supplier, cutting back whatever is necessary, is simply a myth.

Representative LONG. Mr. Moran, may I ask one question there? I gather, without having been over your prepared statement which I

shall look at, that you are saying that maybe one of the reasons Saudi Arabia moved the way they did in this recent situation is to carve out for themselves a percentage of the market?

Mr. MORAN. As is——

Representative LONG. Or is that a logical conclusion from what you have said?

Mr. MORAN [continuing]. I think that it is a logical conclusion to what I said, but I am not trying to make that argument with respect to the near term. At the present time, Saudi Arabia is spending maybe $20 billion per year. It is continuing to build financial reserves. It has many more financial reserves than it knows what to do with.

What I am projecting, and I have done some simulations of this, I refer to them in my paper, is that the process of accumulating financial reserves will peak at about late 1977–78 so that after that I would agree with you, that they will try to carve out that permanent share of the market for themselves.

Representative LONG. I understand that, thank you.

Mr. MORAN. My projections suggest that by 1980 probably 10 of the OPEC members will be running both fiscal and balance-of-payments deficits.

Then they will see the energy crisis and we will have to see the energy crisis for what it is. Namely, a zero sum struggle between the oil exporting and oil importing countries for real financial resources that elites and governing bodies on both sides perceive as vital to their development and security. That is why I project the continual push for higher real prices for oil.

Let me turn to the second question. Will the glue stick? I argued earlier that OPEC will become more vulnerable in the late 1970's and early 1980's. Why is that?

To maintain or raise the price of oil in real terms, OPEC in the aggregate will have to absorb 5 to 6 million barrels per day of spare capacity in the hands of governments who want to use that capacity to generate more revenues.

Let me underline that. The aggregate spare capacity in total may be 15 to 16 million barrels per day, but much of that—governments who hold it won't want to use it, won't feel the need to use it.

The 5 to 6 million barrels per day—that is the equivalent of three Venezuelas at today's production level—will be in the hands of governments that want to generate more revenues. That means the mirror image of the 1973 market.

In 1973, you will recall, we had a sellers' market. There were more buyers than sellers at almost any given price.

In the late 1970's and early 1980's we will have the mirror image. There will be more sellers than buyers at any given price. This is a highly unstable situation for producers associations. It makes OPEC vulnerable to the possibility of oil importing governments playing off one producer against another and rewarding those who choose to alleviate their financial squeeze by increasing volume rather than restricting production.

Finally, let me ask, how might the United States take advantage of this vulnerability? What are the policy implications for the United States?

In economic terms, the United States might take advantage of this vulnerability by adopting the plan that Professor Adelman mentioned earlier. I won't try to discuss the pros and cons of such an approach. All I would say is that my analysis shows that the environment for such an approach will be favorable in the late 1970's and early 1980's. But there are other areas of linkage; political, military, intelligence, through which the United States could also exercise great leverage.

Let me take briefly the case of Saudi Arabia. We currently have a whole range of public programs ranging from commercial-financial-labor-engineering to military-communications-cryptographic-intelligence.

The operating hypothesis in the U.S. Government at the present time is that the Saudi Arabians could do without any of these, they could buy them elsewhere, with no cost, with no delay, with no penalty.

For some of those programs, that is clearly the case. They would turn to the French or the Germans or the Japanese. But there is clearly a spectrum. Toward the other end, in the communications, cryptography, military equipment, training, et cetera, they could do so only at great cost and with a large amount of soul-searching within their own hierarchy.

It seems to me that the United States could explore the possibility, therefore, of making the continuation or expansion of such programs at that end of the spectrum contingent upon Saudi Arabia meeting long-term targets on price or volume.

Let me emphasize that this is not intended to be hostile to Saudi Arabia. In the Saudi hierarchy, as I am sure you are aware, there are both price hawks and price doves. The price doves frequently couch their argument in terms of doing a favor to the United States, but, in fact, they are interested in their own self-interest. Self-interest because the only way they see to curb the imperial ambitions and military expenditures on the other side of the gulf is to keep oil prices low.

It seems to me that American policy should move in the direction of trying to orchestrate an approach to give these kinds of voices greater predominance in Saudi Arabia.

Representative Brown of Ohio. This is, in fact, what Sheik Yamani said, wasn't it? "Mr. Carter, if you will be a nice fellow in terms of your policy, we will be more generous."

Mr. MORAN. Yes, sir.

Let me conclude. I said that OPEC will become more vulnerable. Does that mean I am implying that OPEC will spontaneously fall apart? Not at all. On the contrary, the kinds of internal strains over market shares that I am projecting, 3 to 5 years out, may very well be the catalyst for the producers association to perfect its structure as a cartel. Indeed, the most rational response for OPEC would be to solve its financial squeeze and ease the internal tensions over the market shares by prorationing explicitly and rewarding members with regular and dependable price hikes.

Therefore, left to its own devices, I come back to the argument that OPEC will push for steadily higher real prices.

In conclusion, I think the implications of my analysis are clear.

The energy crisis is not dead, it is only resting. The United States faces a clear choice either to accept the prospect of a steady push on the part of OPEC for higher real prices for oil, or to begin to develop tools to counteract that pressure.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Moran follows:]

PREPARED STATEMENT OF THEODORE H. MORAN

*Oil Prices and the Future of OPEC**

Mr. Chairman, in your letter of invitation to appear today you suggested that I might be able to use research I have been conducting under the sponsorship of Resources for the Future to address two questions of interest to your Committee, namely: (1) what will life with OPEC be like for the United States (and for the world) over the medium term in the future? And (2) will the glue that binds OPEC together continue to stick?

My calculations suggest that the answer to the first question is fairly straightforward. Life with OPEC will be difficult and painful. Adjusting to the emergence of OPEC does not mean having to accommodate to a one-time increase in the price of oil, which is now over. Rather it means having to face a regular and steady push toward higher real prices for petroleum this year, next year, and each year in the future. This appraisal is not contradicted by the apparent "moderation" of OPEC in this year: a 5 percent to 10 percent increase in oil prices in the first half of 1977, followed by another increase later in the year.[1] Had the economic recovery been stronger in the OECD countries, as Sheik Yamani admitted, Saudi Arabia would have gone along with an even greater price increase. The most optimistic prediction one can make about OPEC behavior between now and 1980 (and beyond) is that the price of oil will rise in real terms as fast as the macroeconomic policies of the major industrial countries can adjust. That could mean an average annual price jump of 10 to 15 percent above the OECD rate of inflation.

The answer to the second question is more ambiguous. To keep prices high (or raise them higher) will require OPEC to absorb larger and larger amounts of spare capacity in the late 1970's. In the past most of this spare capacity has been able to be shunted off, with only a small amount of tension, onto OPEC members for whom the marginal utility of the revenues foregone was near zero. Before the end of the decade, this will no longer be possible. Instead, approximately 6 mbd of idle facilities will have to be held by governments who feel they "need" the revenues those facilities would generate. This has implications that are not now widely appreciated.

A large amount of spare capacity in the hands of governments who would like to use it is a tremendously unstable situation for a producers' group that is trying to restrict production. It renders the group vulnerable to the efforts of consumers to play one producer against another and thus weaken the group's ability to collude. But it does not ensure, by itself, that OPEC will break up. Indeed the rational way for OPEC to respond to this vulnerability will be to establish a system of explicit pro-rationing, with a faithful commitment to higher prices being the reward for the members accepting the decision on who must accept how much spare capacity.

Thus, life with OPEC over the middle term will be costly and difficult. But, between now and the early 1980s, the oil-importing countries (led by the United States) will face an unprecedented opportunity to moderate the impact of the energy crises that otherwise will surely come by applying a little solvent to the glue that holds OPEC together. This will require establishing procedures to reward differentially those members who choose to alleviate their financial "squeezes" by expanding volume rather than by restricting it. If the oil-importing countries do not seize this opportunity, however—specifically if the United States continues to drift along with no identifiable energy policy in the vague

*This testimony is drawn from a larger study, entitled Oil Prices and the Future of OPEC: The Political Economy of Tension and Stability in the Organization of Petroleum Exporting Countries (Washington, D.C.: Resources for the Future, work in progress.)

[1] For an appraisal of the impact of the two-tier price system on OPEC, see infra., footnote 4.

hope that the energy crsis will somehow disappear—they will find themselves having to shift ever larger annual amounts of real resources to the OPEC nations with traumatic implications for the Third World, for the Fourth World, for the weaker industrial countries and for the international financial system as a whole.

Let me turn to the analysis of these points.

What will life with OPEC be like over the medium term? Since 1973 the conventional prediction in the U.S. government and in private business circles has been that energy prices would remain level, or decline slightly, in real terms between the date of the prediction and 1980. This seemed a reasonable expectation as long as the OPEC countries were awash in petrodollar revenues, supposedly unable to "absorb" them and searching anxiously for ways to recycle them. But the conventional prediction will prove false precisely because constant real oil prices will not generate enough revenues to finance programs that civilian or military elites in the OPEC countries consider too important to gve up if they have any choice in the matter.

The perception about the extent to which the oil exporting states will "need" petroleum revenues for their government budgets has taken a quantum leap since 1973 for three reasons: (1) there has been a worldwide explosion in the cost of heavy equipment and construction; (2) the diseconomies of scale of rapid growth have proven very great in the OPEC countries; (3) the goals that the OPEC nations have set for themselves ("development," "welfare," "defense," international "influence") have proved to be enormously expensive. As a result the "Development Plans" of the major OPEC governments would be, if carried out, prohibitively costly. But that is an unrealistic standard—such Plans were typically too grandiose to begin with. What is striking is that even small fractions of the economic, social, and military plans of the major OPEC governments will be too costly to finance if oil prices "only" remain constant.

Iran, for example, planned to spend $112 billion between 1973 and 1978 to lay the foundation for a modern state before the country's petroleum capacity begins to dwindle in the mid-1980's. The Iranian Plan and Budget Organization projected a net revenue surplus, after the completion of all projects, of more than $11 billion. But before the end of 1975 the Iranian government already faced both balance of payments and fiscal deficits. A recalculation of the cost of the programs more realistically suggests that the total Plan will cost at least 50 percent more than the initial estimate of $112 billion dollars. Of this jump, approximately 15 percent will be due to the higher price of imported goods if current trends continue; 35 percent will be generated internally. Even if Iran is able to export oil at full capacity from 1976 through the end of the Five Year Plan with oil prices rising no more than the 15 percent decreed by the majority of the OPEC members for 1977, it will still be able to finance only about half of the civilian projects contemplated by the Plan and perhaps even a smaller fraction of the military and internal security programs desired by the Shah. At the same time, the authorities in Tehran are facing pressures for additional programs—food subsidies, public housing, rural development—that are needed to retain the present level of domestic political stability. Iran has, not surprisingly, been the forefront of those oil exporting countries pushing for dramatically higher oil prices.

Saudi Arabia is discovering that its oil earnings are buying even less than the Iranians when measured against the original expectations of the Central Planning Office in Rüyadh. The Five Year Plan announced for 1975–1980 was supposed to cost $142 billion. In fact it will cost much more than double that figure. (Of the rise in program costs in the Saudi plan, 5 to 10 percent have thus far been "imported inflation." The remainder can be attributed to domestic causes). Few outside analysts thought that the timetable contemplated in the plan was even faintly realistic. Now subsequent calculations indicate that even if the Saudis were to stretch out the plan over a twenty-year period, and drop many projects altogether, they will still have to earn more than $30 billion per year to finance their budget on a current basis. Even if Saudi authorities drop their expectations about economic development dramatically (especially industrial development that requires the use of foreign workers), place no more than moderate priority on national defense and popular welfare, and maintain

their interest in domestic stability and the ability to influence intra-Arab affairs (via aid) at current levels, they will have to finance programs at a rate of $30 to $35 billion (1976 prices) in the late 1970s-early 1980s. Should oil prices rise no more than 5 percent to 10 percent in 1977 and remain constant (in real terms) thereafter, the Saudi government will have to export 8–9 mbd per year to cover its expenditures or else draw down its financial reserves at a very fast rate. (With massive cutbacks and stretch-outs of programs, Saudi financial reserves will probably peak in 1978 at not much more than $50 billion and decline steadily after that).

But what about those in the royal family or in the Council of Ministers who dislike the high level of economic activity and the pace of public spending in Saudi Arabia, and who would like to go back to the relative quiet of the pre-1973 period? Or what about the assertion, made by Sheik Yamani and others, that Saudi Arabia could cut production to 3 mbd, or even 1 mbd, without feeling the effects Due to the high current level of official reserves. the Saudi government could easily do this for a short period of time. Thus the threat should be given serious consideration in the event of another Middle East war (although the behavior of other oil exporters with excess capacity at the time would be crucial to the effectiveness of a Saudi production cut). As a longer term strategy, however, one has to weigh the credibility of the Yamani assertion against the kind of domestic upheaval that might result against a future government that tried it. A Saudi government that had already stretched the country's Five Year Plan out over 20 years (and placed stringent limits on the spending of ministers concerned with national defense, economic development, or social stability) would, by 1979, have an annual budget of $26 billion remaining even if it suddenly reduced expenditures on new infrastructure, gas gathering, and industrial projects to zero. That would require exports of 6.4 mbd to finance on a current basis. It could cut its budget to $24 billion by also stopping new municipal water projects completely and eliminating the entire food subsidy program. That would require exports of 5.9 mbd. It could cut its budget to $20 billion by also firing half of the bureaucrats in the Saudi administration. That would still require exports of 4.9 mbd. It could cut its budget to $17 billion by also stopping all foreign aid (predominantly to other Arab states). That would require exports of 4.2 mbd. It could cut its budget to $14 billion by also eliminating all expenditures on military construction and equipment. That would get to the 3.5 mbd mark. And so on.

The record of survival for regimes that try to stop, or reverse, the process of social mobilization and rising expectations once it is started should not recommend this as a promising strategy for a monarchy.

These projections do not mean, of course, that Saudi Arabia will have any inclination to break away from OPEC if its export level does not earn the country $30 billion each year. It simply means that below that level the Saudis will either have to expand their market share at the expense of their OPEC colleagues or to become more sympathetic to the urgings of their fellow members for an escalation in the real price of oil.

Prominent among those members will be the high-population, high-mobilization societies—such as Algeria, Indonesia, Nigeria, Iraq, and Venezuela. Before 1980 ten or eleven of the thirteen members of OPEC will likely be facing current fiscal deficits. Indeed, depending upon how the market for OPEC oil is divided, all thirteen countries could be experiencing deficits.[2]

What will this financial squeeze do to the "glue" that holds OPEC together?

OPEC's approaching financial squeeze could be, paradoxically, either the catalyst for the producers' association to perfect its structure as a cartel, or the opportunity for the major oil-importing countries to weaken the ability of the association to collude and thus moderate the impact of the continuing energy crisis. The most plausible calculations of demand for OPEC exports in 1980,

---

[2] The measure here is fiscal deficits, not balance of payments deficits which will lag somewhat behind fiscal deficits, depending on the country. For the assumptions about the rate of growth of non-petroleum revenues during the simulation period, see Moran, *Oil Prices and the Future of OPEC: the Political Economy of Tension and Stability in the Organization of Petroleum Exporting Countries,* (Washington: Resources for the Future, in progress 1977).

for example, indicate a figure of 29–30 mbd (million barrels per day oil equivalent) at current prices, including oil, natural gas, and petroleum products.[3]

With the expanding appetite for revenues, this will mean that by 1980, with a 5 percent to 10 percent price rise in 1977 and constant real prices thereafter, OPEC will have to absorb not merely 17 mbd in aggregate spare capacity but more than 6 mbd of spare capacity in the hands of governments for whom the marginal utility of the revenues foregone is high. While the near-term matching of OPEC revenues with perceived OPEC needs will be close, the medium-term prospects—after Alaskan, North Sea, and other sources come on-line—portray a far different picture. In the late 1970's and early 1980's, the market will be a mirror-image of the post-1973 market, with more sellers than there are buyers at the given OPEC price.

Does this mean that OPEC will fall apart spontaneously and the energy crisis thereby disappear? Such a hope surfaces perennially in Washington as government officials try to persuade themselves that if they do nothing the problem will vanish.[4] But there is little justification for it.

It is based on the assumption that, instead of gaining experience and sophistication in the years since 1973 (or, indeed, since 1971), the OPEC members will be less skillful in balancing supply and demand in the future than they have been until now. More plausible is the expectation that, if left to themselves, the OPEC countris will do what is most rational from the point of view of their own self-interest: namely, assign explicit market shares and reward compliance (as well as ease internal tensions) with generous and dependable price hikes.

Will the United States be able to rely upon the "special relationship" with Saudi Arabia that has been the centerpiece of Secretary Kissinger's approach to

---

[3] On the demand side, the "base case" in my study assumes an aggregate growth in (non-Communist) world energy demand of 4% per year. The projection is consistent with an average GNP growth of 5.0% per year, with an income elasticity of energy consumption of 1.0, a price elasticity of —0.15, and an appropriate lag effect as an energy-intensive capital stock is replaced by less energy-intensive capital goods. On the supply side the "base case" includes cautious assumptions about output, such as a steady decline in U.S. "lower 48" oil and gas production even with price decontrol, a continuing slowdown in nuclear construction, a one year delay in the Alaskan pipeline, Mexican oil production of only 1.1 mbd in 1980, Egyptian oil production of only 0.5 mbd in 1980, Chinese oil exports of only 0.5 mbd in 1980. From this "base case" comes the figure of 6.1 mbd of spare capacity in the hands of governments for whom the marginal utility of the revenues foregone is high. Under three plausible alternative scenarios unwanted spare capacity rises as high as 8.9 mbd. Under four plausible alternative scenarios unwanted spare capacity drops as low as 5.3 mbd. Only if demand is substantially higher that 4% per year *and* supply is substantially lower than the cautious projections made in the base case does spare capacity drop below 3.0 mbd.

[4] Indeed, there is occasional wishful thinking that the present two-tier price system constitutes the beginning of OPEC's break-up. While the next six months could highlight the potential for extreme tension that exists among the OPEC members, and indicate how disruptive a Saudi Arabia that refuses to act as a residual balancer to accommodate the price level decreed by the other members could be, the probable outcome will be merely a price rise very close to Saudi Arabia's 5% rather than the begining of a "breakup."

If the two-tier price system continues through the first quarter of 1977, the eleven members of OPEC who try to hold their price rise at 10% will suffer an *aggregate net revenue loss of 16%* in comparison to a rapid capitulation to the 5% level. In terms of the strain on their budgets, their tax receipts will be running *a full 25%* behind what they were in the second half of 1976. For some countries, such as Iran, Kuwait, and Venezuela, whose heavy crudes compete directly with Saudi Arabia's the net revenue loss could be much greater. For this reason, if Saudi Arabia holds firm to its rumored production intentions and if the oil companies are aggressive price shoppers, I would expect the eleven to discover rapidly that adopting the 5% formula (openly or covertly) will be in their own best interest.

Analysis: *For the aggregate net revenue loss*

1. Demand for OPEC exports in the last quarter of 1976 was about 32 mbd with an inventory build-up of 3–4 mbd, for a "real" demand level of approximately 29.5 mbd.
2. Demand in the first quarter of 1977 will equal about 29.5 mbd minus the inventory drawdown of about 3.5 mbd and minus almost 0.5 mbd in fewer bunkers, or 25.5 mbd.
3. I assume that if all the OPEC countries had adopted an equal 5% price rise the Saudi share of the market would be about 7.0 mbd and the Abu Dhabi share about 1.2 mbd, for a market of 17.3 mbd for the other eleven (25.5–8.2).
4. If, instead, Saudi Arabia increases its production to 9.8 mbd and Abu Dhabi to 2.0 mbd, the market for the other eleven will be 13.7 mbd (25.5–11.8).
5. Thus the eleven lose 3.6 mbd in volume or 21% (3.6/17.3), but gain 5% in price (a rise of 10% instead of 5%) for a net loss of 16% in revenues.

For the quarter to quarter comparison

1. Demand for OPEC oil in the first quarter of 1977 will equal (from above 25.5 mbd.
2. If Saudi Arabia exports at 9.8 mbd and Abu Dhabi at 2.0, the other eleven members of OPEC will share a market of 13.7 mbd.
3. During the last quarter of 1976 Saudi Arabia exported at a rate of 9.2 mbd and Abu Dhabi at 1.6 mbd, leaving the other eleven a market of 21.2 mbd (32.0–10.8).
4. Thus, the eleven will have a market 7.5 mbd smaller (21.2–13.7) or 35% less (7.5/21.2) than the last quarter of 1976.

OPEC? This will be a policy approach of increasing fragility over the next three or four years, especially if the United States continues to ignore the sources of strength that reinforce its own position in that relationship. As the real or perceived revenue needs of the OPEC governments mount, the Saudis will become caught, unavoidably, in having to make a zero-sum choice: either to side with the other members of OPEC that are cutting back on development projects and are angry about the cost of industrial equipment and weapons imported from the West, or to provoke their wrath by following a unilateral policy designed as a favor to the United States, Europe, and Japan. Thus, reliance upon the gratuitous goodwill of a "moderate" Saudi Arabia assumes that the Saudis will regularly and dependably put the interests of consumers above the interests of their fellow producers, Arab and non-Arab alike, and stand ready, at the same time, to withstand the mounting wrath of their neighbors and fellow exporters (a wrath the depths of whose intensity is being demonstrated only mildly in the first quarter of 1977). More plausibly, Saudi Arabia will probably limit its role as a "moderate" in the future as it has in 1976–7 to ensuring that the shift of resources demanded by the other members of OPEC is kept within bounds that does not "strangle" or "destroy" the strong, developed economies of the West.

How high might an explicit OPEC cartel be likely to raise oil prices? Since even the scaled-down versions of the OPEC development plans would require more than a doubling of the oil price in real terms by 1980 (under the most favorable assumptions about supply and demand elasticities), and since a doubling of the oil price would be counterproductive if it produced another severe recession in the West, the primary constraint on the cartel's price strategy would probably be the fear of an adverse impact on industrial activity in the OECD countries. Thus, depending on how well the macroeconomic policies of the U.S., Europe, and Japan will be able to cope with the strain, OPEC price raises might range from "only" 5 percent when the large Western economies are shaky (or when OPEC members want some political favor like pressure for a favorable Middle East settlement) to 10 percent to 15 percent above the rate of OECD inflation when the large Western economies are relatively robust.

While this push will ultimately be constrained by the price of substitutes (for example, shale oil or gasified coal), it could in the meantime have a severely adverse impact on the weaker OECD economies, such as Italy and the United Kingdom, and a devastating impact on the Third and Fourth Worlds.[5]

What are the policy implications of this analysis for the United States?

There are three principal implications for U.S. policy: (1) the energy crisis is not dead. It is only resting, and will soon reappear with potentially more devastating consequences. (For example, the apparent "ease" with which Third World countries have expanded their debt to more than $130 billion since the 1973 oil price jump does not mean that future increases in their import bills will be handled with equal ease. Instead, "ease" in financing the last round means that future rounds will be much tougher to finance).

(2) Relations between the major oil-importing countries and OPEC will, necessarily, become more tense and strained in the next years as both sides realize that (while neither wants to kill the goose) they are engaged in a largely zero-sum struggle for real resources that each side feels is necessary for its economic health, social welfare, and national power. There will be no easy, amicable resolution to the problems in the relations between the oil exporting and the oil-importing countries.

(There is one heartening corollary to the above point. The "financial squeeze" projected for OPEC means that the petrodollar surplus "problem" is vanishing as abruptly as it appeared, and the justification for pushing every possible policy designed to sop up those petrodollars [especially selling massive amounts of military arms] has disappeared.)

(3) The balance of power is not inevitably tilting, however, in favor of the OPEC countries. The need for oil exporters who desire higher revenues to absorb large amounts of spare capacity will render OPEC vulnerable to the possibility of the oil importing countries playing one producer off against another. (As a

[5] The non-OPEC LDCs "lose" about $13 billion per year on account of the past increases in oil prices, and "gain back" about $5 billion per year in aid from OPEC (with over half of that going to Arab states). The analysis presented here suggests that the opportunity cost of giving aid will rise for most members of OPEC over the next 5 years—that is, foreign aid will constitute an increasingly sharp "sacrifice" in terms of other programs foregone. Thus one would predict a *declining* rather than a rising level of foreign aid from OPEC between now and the early 1980s. Indeed the decline has already begun. Iranian aid dropped 41% if one compares the budget for 1975–76 (1354) with the budget for 1976–77 (1355).

corollary to this point, conservation measures in the United States plus efforts to stimulate non-OPEC sources of supply will in the future greatly complicate OPEC's future ability to operate as a cartel. A few years ago Secretary Kissinger's call for conservation measures to reduce U.S. consumption by 1 mbd died a quiet death within the Ford administration as other advisers warned that the sacrifice of American consumers could easily be matched by an offsetting reduction in Saudi output that would, if anything, be welcomed by Saudi financial authorities. By the late 1970's this will no longer be possible for Saudi Arabia.)

How might the oil-importing countries, led by the United States, strengthen the power they have to countervail OPEC's pressure for higher prices?

The tactical options range from open confrontation (which would probably be both inefficient and undesirable) to quiet subtlety. But the strategic principle would remain the same: to weaken the ability of the OPEC members to collude by rewarding differentially (in economic, political, and military terms) those members who choose to augment their revenues by expanding output rather than by restricting it.

Economically, it could include the plan suggested by M. A. Adelman, for example, to auction import tickets for the U.S. market by secret bidding.[6] This system would favor any hard-pressed government anxious to expand its market share by discounting its price, while giving OPEC as a whole minimal opportunity to monitor either who the cheaters were or how large the discounts became. Since Professor Adelman is here today I shall not elaborate on the pros and cons of this system, except to point out that the intensification of the spare-capacity-cum-financial-squeeze problem within OPEC will create a favorable environment for its success. With 6 mbd of idle facilities in the hands of governments that need the revenues those facilities produce, there will be a continuous buyers' market, with more sellers anxious to dispose of their product than there are customers.

Politically and militarily this approach could make the continuation of crucial services provided to OPEC countries by American suppliers contingent upon certain production or price targets being met over specified periods of time. The operative wisdom in the U.S. government at the present time is that any good or service supplied by Americans would be instantly and painlessly provided by others if the U.S. government threatened to stop or slow its provision. For some goods and services that is certainly true. But for others it is patently false. Clearly there is a spectrum from housing construction carried out by private American companies (which could be easily replaced) to sophisticated military equipment and intelligence information provided by American government agencies (which could not be replaced at all). The United States currently has extensive commercial, financial, labor, communications, cryptographic, engineering, cultural, educational, managerial, military, and intelligence-sharing programs with the governments of Iran and Saudi Arabia, for example. Yet it has never taken an inventory of how many of these could be replaced, at what cost, with how long a disruption, and with what reaction among pro-U.S. elements in the civilian and military elites if the United States were forced, because of OPEC policy, to make an "agonizing reappraisal" of the structure of relations between ourselves and either of the two countries.

In the case of Saudi Arabia, these are both price-hawks and price-doves influential in the governmental hierarchy. The price-doves argue that from the point of view of the country's national interest the only way to retard Iran's military expenditures and curb its imperial ambitions is through preventing oil prices from rising. These voices could be strengthened with carefully orchestrated American encouragement.

The main point to be considered as the U.S. government (both Congress and the Executive) begins at last to give energy policy the priority it deserves is that OPEC will be pressing for ever higher real prices for oil. The United States can remain passive only at great economic and political cost. It must begin to develop the tools to counteract that pressure.

Representative LONG. Thank you, Professor. Your statement is certainly an unusual approach to it. It is not one I have heard pursued nearly so completely and actively as you pursue it. I think it is worthy of serious consideration and we thank you for your statement.

---

[6] M. A. Adelman, "Import Quota Ticket Auctions," Challenge, January–February 1976.

Professor Meyer, we are pleased to have you and if you would proceed in your own way, sir.

STATEMENT OF A. J. MEYER, PROFESSOR, HARVARD UNIVERSITY, CAMBRIDGE, MASS.

Mr. MEYER. Thank you, Mr. Long. I will adhere to my prepared statement rather closely this morning. I hope there is no objection to that.

The several questions posed by this committee and in Senator Kennedy's opening remarks today are timely and appropriate. Obviously, this panel can't answer any of them with certainty. Yet, my emphatic answers to the one facing us today is "yes," so long as the United States continues to supply the glue.

First, a few comments about OPEC. The 16-year-old oil producers club is an American creation. It owes both its birth and its growing strength to actions and policies of the U.S. Government, Congress, oil companies, conservationist organizations, the academic community, and above all, our energy-consuming public. American universities educated and developed its foundling leadership; its first consultant study contract went to a firm in Cambridge, Mass.; it hired its first chief economist, later its secretary-general (and the architect of its growth) from that same firm; an American oil company announced the August 1960 crude oil price cuts—which led to OPEC's launching. In short, Americans played the major role in its conception.

Since then OPEC has drawn even more heavily on U.S. sustenance. Some examples: American oil companies, performing impressive technical feats and competing viciously for markets, led the way to supply oil to the consuming world at costs which by 1970 still equaled real levels of 1938. This great bargain created (among other things) a "flight from coal" in Europe and a worldwide postponement of plans for massive nuclear electric power generation—under serious discussion in the early 1950's. The oil "surplus" of the 1950's and 1960's gave OPEC its reasons for existence and at the same time discouraged development of alternatives to natural crude oil.

The Congress and several presidential administrations—Republican and Democratic—have also unwittingly since 1960, supported OPEC. Oil import controls, abandoned only in 1972, drew down U.S. oil and gas reserves dramatically and reduced a domestic stockpile far larger than that now advocated by energy planners. Another boon to OPEC has been congressional and administrative failure to plan and develop programs to utilize U.S. coal reserves and nuclear power capabilities effectively. Proponents of legislative divestiture of oil companies offer OPEC continuing hope for a weakening of U.S. oil firms through loss of integrated facilities—and, in my opinion, inevitably higher crude oil prices. The "two-tier" oil price system still provides U.S. consumers with subsidized low-cost gasoline while speeding depletion of U.S. oil supplies. Natural gas regulation does the same for this rapidly vanishing resource.

U.S. conservationists have also supported OPEC vigorously—by checking efforts to develop domestic coal reserves and slowing the U.S. nuclear power program. In effect, conservationists have helped

commit the United States to growing dependence on imported crude oil—while remaining comfortably oblivious to the inevitable pollution risks of a rising world tanker tonnage and dependence on natural crude oil. The east coast oilspills offer recent testimony.

Another staunch, if unwitting, OPEC ally has been the American academic community. Economists and political scientists frequently point to the imminent explosion within OPEC which will tumble oil prices. Equally frequent forecasts from academe also see stripper wells, Mexico, Alaska, and the North Sea as sources certain to return bargain oil prices to Americans. Others, motivated by political and ethnic considerations, and advocating Jeffersonian democracy for foreign governments they dislike, point to Arab OPEC members or the Shah of Iran as inspiration for OPEC's evil doing. Scholarly journal articles and seminars on these subjects appear regularly. Such predictions and aspersions irritate America's friends among OPEC decisionmakers and we have many friends there—while simultaneously lulling our public into false and dangerous complacency.

Probably the greatest single supporter of OPEC, and chief mixer of glue for its structure, is the American energy consumer. We reject the warnings issued frequently by oil companies, government officials and utility executives about looming shortages of natural gas and oil. Conservation of energy remains a task for "others," not us. Wooed by the silken depravity of TV commercial announcers, we buy large cars and leave the Pintos and Chevettes unsold. We assure polltaking firms that energy shortage forecasts are wildly exaggerated and merely a cover for rising corporate profits. Collectively, U.S. energy consumers provide OPEC with a guaranteed rising yearly market increase of at least 1 million barrels daily for the foreseeable future. This provides a lot of glue for OPEC.

Growing U.S. dependence on OPEC oil, with a similar need for OECD nations (including Japan) makes me conclude that OPEC will remain a force for at least 10 years, maybe twice that long. Internal disagreement among OPEC's parents will be frequent and noisy, but so long as Saudi Arabia, the UAE and Kuwait remain financially able and committed to "moderate fine tuning" of oil prices, I would guess that OPEC will remain intact. And oil prices will, in my opinion, continue to rise for at least another decade.

The question is not "whether," but how much.

In the near term—for five years at least—Saudi Arabia's role will be crucial. Its policies on price and volume of crude oil remain a prime, perhaps the prime factor in world energy. Important also are Saudi Arabia's efforts to join the United States in promoting an Arab-Israeli settlement. Equally important will be the Kingdom's success or failure in its development effort and in winding down levels of arms expenditures. The latter are currently at all-time highs, as Saudi Arabia has belatedly joined Israel and Iran as a massive buyer of Western (mainly United States) arms. With luck, Saudi Arabia's policy of moderation in oil pricing will succeed and its peace initiative will not be rejected outright by the United States and the Middle Eastern nations also involved.

U.S. policy toward OPEC should, in my opinion, consist of the following: First, we should recognize that OPEC is a fact of life to be

reckoned with and not just a subject for speeches and writings expressing righteous indignation at its behavior; second, we should admit candidly that OPEC's price controls, and even the occasional embargoes enacted by its parents, are weapons invented by the United States and used repeatedly by this country from 1941 to the present—for oil, food, and other strategic materials; third, we should welcome, and not rebuff piously, those OPEC nations—such as Saudi Arabia—on whom we are increasingly dependent for our energy supply (and funds for our capital markets) particularly when they make overtures for cooperation. We badly need them, now.

Finally, the most important element in U.S. policy towards OPEC, by far, in my opinion, should be a flat-out drive to cut the staggering growth in U.S. dependence on OPEC crude oil. To do this involves reshaping of U.S. energy policy and elimination of current chaos. The massive supplies of energy within the United States (in Btu's, several multiples of oil reserves controlled by OPEC countries, I remind you) must be developed. Instead of seeking scapegoats to blame for the U.S. energy plight, those involved, and I include all of us here, consultants, company executives, academics, Congressmen, Government officials, must work to find substitutes for OPEC crude. For legislators, and members of the new administration, the decisions will be difficult, since the right ones won't, in many instances, prove popular with American voters.

Thank you.

Senator KENNEDY [presiding]. Thank you very much, Mr. Meyer, for your comments.

Before getting into some of the questions. I would like to get the reactions any of you might have to some of the comments that others on the panel have made. Are there any comments that any of you made that triggered or stimulated any additional thoughts?

Mr. Adelman, is there anything that you would like to add?

Mr. ADELMAN. No, Mr. Chairman, I would rather have the interplay brought out by the questions from the committee. We do get together one way or another among ourselves. We are not exactly strangers to each other.

Senator KENNEDY. All right.

Then let me get some reaction from the different members of the panel on how you view the two-tier OPEC pricing and whether it provides a way to assess the competitive instincts, or lack of them, that motivate our oil companies. What is your assessment of what will be their performance in seeking lower priced Saudi and UAE crude? Will they be willing to buy the higher-priced crude in order not to disrupt agreements already in place, what is the latitude for shifting purchases among OPEC producers, and how much flexibility is there in the access to crude?

Mr. ADELMAN. I would say, Mr. Chairman, that there is a limited significant amount of freedom to move from one supplier to another. In the short run, very little, because refineries are highly programed. If you get away from the immediate short run, then certainly shifts are possible. They have been made in the past. They will be made again as oil companies in their own interests try to shave even a penny or so a barrel off their crude costs.

So, I would expect the switch to be made, but this is, as I indicated earlier, a matter of rather small importance.

Mr. Lichtblau mentioned an increase of 7½ to 8 percent in the first half of the year, 11-plus percent the second half if all goes as planned; and I think that is about what we can count on.

Senator KENNEDY. Do the others agree?

Mr. LICHTBLAU. Well, I think that the shift will take place, I agree with Mr. Adelman, it cannot be done immediately, but by immediately I would mean the next few weeks. Beyond that, I think a rather significant shift can take place because some of the Saudi Arabian oils are of the same quality as Iranian, Iraqui, Kuwait, and some of the Venezuelan oils. So, there is a possibility to substitute the lower cost crude, and to the maximum extent possible companies will do so.

For instance, in Kuwait, the major companies have a right to underlift by 10 percent under their contracts, the three being Shell, Gulf, and BP. I think they will do that. In Iran, there is a great deal of oil sold directly by the Iranian Government to companies other than the consortium members, as much as 1 million barrels a day was expected to be sold. These companies are likely now not to take nearly as much Iranian crude.

In fact, an announcement has been made by the Iranian Government that they expect this to be cut by as much as 50 percent. So, I think you will see an immediate, within the next few weeks, shift toward more Saudi production if, indeed, more Saudi production is forthcoming.

All we have now is that Sheik Yamani said that there will be no limitations on production. Actually whether they get to that 10½ to 11 million barrels a day level is something we don't know. Physically they could, because Saudi production was at 9 million barrels daily in the fourth quarter, but that was a fairly high level. But any company that possibly could have access to the lower cost Saudi crude will do so for purely competitive reasons. On the other hand, as was suggested, there are contracts. You cannot simply walk away from long-term contracts with countries which may have gone to the 10 percent price increase. But within those limitations there could be a fairly significant shift, enough, I think, for some of the countries, Iraq, Iran, Kuwait, to show a substantial loss in earnings throughout the first half if the present price system remains, while the two countries with the lower increase will show a substantial increase in earnings.

Senator KENNEDY. Mr. Moran.

Mr. MORAN. Mr. Chairman, I agree very much with Mr. Lichtblau that the internal impact would be very great and that the distribution on earnings and market share could be quite significant.

In my prepared statement I ran through some calculations on the impact of the two-tier system. What I find is that the aggregate net revenue loss to the countries that went up 10 percent, in the first quarter now could be probably about 16 percent. If you compare—if you make a quarter to quarter comparison, first quarter next year versus that of last year, my figures come out to nearly 25 percent shift in the aggregate, of the 10 who will try to raise their prices 10 percent; now, if following through on——

Representative BROWN of Ohio. Negative shift for those people.

Mr. MORAN. Negative shift, of course.

If you follow through Mr. Lichtblau's argument that the burden of that will be borne by the heavy crude sellers, in particular if you just look at the Persian Gulf area, Iran, Iraq, and Saudi Arabia, and you already predict—and Kuwait, yes. And you predict a decline of 26 percent in the aggregate cutback and feel the brunt of that will be borne by those three countries, and you recall that the Shah was worried about running a balance-of-payments deficit and not being able to buy the weapons he wanted, it seems the impact would be very dramatic. We see some of it reflected in the comments by the Iraqis and by the Iranians as to what they think of the Saudis right now. We don't yet know exactly what the Saudis are going to do in terms of increasing production, but if they carry through with what they said, I think the impact could be dramatic.

Senator KENNEDY. What do you see as some of the opportunities for the United States in this area vis-a-vis the problems of the countries with the higher tier price? Are there increasing opportunities to take advantage of in terms of various capital goods, expertise, other kinds of commercial opportunities? Do you see any possibility to increase the commercial opportunities for this country?

What is your impression of that possibility?

Mr. ADELMAN. Exports of both goods and services to the oil producing countries have boomed, and will continue to do so, and in so doing, of course, they build up strong vested interests in the exporting countries, chiefly the United States, to support the cartel price level.

Senator KENNEDY. Well, do you see any possibility for more intensive and tougher bilateral bargaining with the OPEC states or exchanges for a better deal on oil prices?

Mr. ADELMAN. Not really, Senator, I do not. As I indicated, there is no monopoly by the industrial nations which supply these goods and services, and unless we were to try to monopolize and try to raise prices, which I think would be a thoroughly unwise thing to do, there really is no opportunity for any kind of bargaining on this.

Representative BROWN of Ohio. If you will yield on that point, haven't they suggested that our foreign policy is one of the things they would like to negotiate?

Mr. ADELMAN. That is correct, Mr. Brown. They have, and I think it would be the height of folly to make any kind of concession to them in the realm of foreign policy or in any other realm because you would get nothing in return. You cannot keep them to any kind of agreement.

Senator KENNEDY. Mr. Lichtblau.

Mr. LICHTBLAU. Well, I would say we are not quite as powerless as it may seem sometimes. As Mr. Adelman said, we probably can't raise the price of the goods we sell them, if we do it unilaterally we will lose the sales. If we do it on worldwide basis there are tremendous complications.

But these countries, as Mr. Moran said, depend very much on us for technology, for development, for services, for thousands of experts that are there, and to some extent we have leverage that we can use. If a country like Iran insists on raising the price 10 percent now and 15 percent in July without any regard of what this might do to consuming countries all over the world, perhaps we ought to somehow at least

indicate that we might reappraise our commercial policies toward that country. These countries do need us to some extent and if we are making it clear that there is reciprocity involved, I think we might possibly get a better understanding and better relationship with OPEC. That is why I suggested we have to sometimes sit down with OPEC and discuss directly the one and only subject of immediate direct concern to both of us, namely, the price and production of oil, rather than have these vast problems that have taken a year in Paris without getting anywhere.

This is really only a sideshow. The big issue is the price of oil and how to spend the money that these countries earn from the price of oil.

That is the one thing that was hardly discussed in Paris. I think somewhere we have to find a forum to discuss the one thing which is more important to us than any of these others, and we have not yet.

Perhaps the IEA is the instrument to do it, but it would have to be strengthened a great deal for that purpose.

Senator KENNEDY. Yes.

Mr. MEYER. Mr. Senator, I think it is very difficult to separate the price of oil from the political considerations. I don't believe it is in the U.S. interest at all to reject out of hand proposals from OPEC countries with a political nature which seem to be constructive and aimed at promoting peace in the area. If the price of oil can somehow be related to a winding down of the military expenditures areawide, I think that this offers the United States a very exciting possibility and it is not one that we should take the traditional view toward.

Mr. MORAN. Mr. Chairman, you asked whether or not there were sources of leverage with respect to the OPEC countries, specifically with respect to Iran and Saudi Arabia.

Isn't it curious that the main answer is that we don't know? I spoke earlier saying that there was a spectrum of goods and services that the United States, both public and private institutions, supply to these countries.

Some of these could be replaced literally overnight. Provision of construction facilities for a hospital in Riyad and so on. There is another end of the spectrum in terms of military construction, intelligence and so on, other high technology items that could be replaced only at great cost with great delay, and only after great soul searching within the hierarchy of the two governments.

I know from agonizing experience if you search through the U.S. Treasury, State Department, CIA, FEA, you can go on, NSC staff, down the list, there has never been an inventory taken of all of these. I don't think there has even been an inventory simply of the programs. At least, I have been unable to locate it.

Certainly, there has never been an evaluation of the things I am talking about to see what areas we can exercise what leverage in and what areas we can't.

Mr. ADELMAN. Mr. Chairman, may I respond to what Professor Meyers said, and I hope I will be forgiven for drawing attention to a television program on which there was an agreement on one point and I fear not on much else, between Mr. Akbar of the Iranian Embassy, and Mr. Aikins, our former Ambassador to Saudi Arabia, and myself, namely, that the price of oil and a Middle East settlement were two

entirely separate questions, and that what happens in one sphere is not going to control what happens in the other.

I would like to reiterate that now.

Senator KENNEDY. Well, then, how do you account for the lowering of the price? Do you divorce it from any political considerations?

Mr. ADELMAN. I think that a nation is fortunate when it can do what is in its economic interests and hope for some political dividends as well.

From the Saudis' point of view, this was not a good time to raise prices. Decisions had to be made, remember, when the consuming nations were coming out of the deepest recession since World War II, and when there seemed to be this very discouraging pause, especially in the United States, which is still the case in most of the big OECD countries.

For Saudi Arabia, fearing always that they will have to bear the burden of production restrictions, that was not a good time to raise the price as much as others in OPEC wanted to raise them.

Therefore, they were against raising the price. Now, in addition, they wanted political concessions. It does no harm to ask for them and they may very well get some.

Senator KENNEDY. Your point is that as a country they were more interested in the economic rather than political considerations, and in a more stable kind of a pricing situation than the other countries, than Iran or the others?

Mr. ADELMAN. Well, both their economic and their political interests were served by a more moderate pricing increase. I can't get inside of anybody's head and say what motivates him more and, furthermore, I am sure their decisionmakers would not all agree among themselves on what was more important.

Senator KENNEDY. Would the others agree that in terms of their economies that Saudi Arabia was more vulnerable than, say, Iran, in terms of the shortfall of dollars and the natural kind of shortages they would have in terms of productivity as a result of it?

Mr. MEYER. I disagree completely on what Mr. Moran says on this.

Senator KENNEDY. I am just talking about the economic factors now. If you divorce the political, I am saying they were only acting in their narrow economic self-interest.

Would all of you agree that it was more in the interest of Saudi Arabia given its development programs to do this than the other countries.

Mr. MEYER. I think Saudi Arabia is in a far stronger position than any of the others. It is far better able to withstand cutbacks in revenues or elimination of foreign ties even though that would involve loss of access to the American market.

Representative BROWN of Ohio. Iran appears to be most vulnerable; doesn't it?

Mr. MEYER. It seems to me as a not very knowledgeable observer on Iran, however, that Iran is far more vulnerable than is Saudi Arabia. I also think that Saudi Arabia's overture should not be rejected out of hand at this point as being merely commercial rug dealing. I think the Saudis should be taken very seriously and should be worked into our calculations.

Representative LONG. Mr. Chairman, if I may ask a question of Mr. Adelman.

What economic interests of Saudi Arabia do you see were served—let's try to be specific on this—what economic interests do you see being served by taking the action that they took in the recent price increase?

Mr. ADELMAN. Mr. Long, Saudi Arabia is slated in almost everybody's scenario to be the residual supplier, to let all the other OPEC members produce as much as they can and by cutting back their own output control total supply. Thereby they support the price.

The knowledge of this backstop is part of the glue that holds OPEC together, if you will permit the mixed metaphor.

But, it is not in Saudi Arabia's interest to hasten that day. Indeed, it is in their interest to postpone it as long as possible and they have been successful in doing so.

If you compare the cutback in output since 1973 for OPEC as a whole, you find that Saudi Arabia has not cut back as much as the others.

What they fear, rightly, is an attrition of their market share. They can stand it, as Professor Meyer says, but that doesn't mean they have to like it.

They are well advised to postpone it as much as possible. Given the unfavorable economic climate for a price increase, given the fact that other countries are in a difficult financial position and have, therefore, a great deal of nuisance power, are able to say, "We will increase production if we can't get the revenues that we want."

This would be a time for Saudi Arabia to fear that a higher price increase and a production cutback would come mostly at its own expense.

Contrarywise, if they were to undercut their partners as they have done, they would expand their market share and buy time in that way very profitably in the interim, to where their market share is much higher than that of their partners.

I think they have acted very wisely.

Representative LONG. This is a question that I asked Mr. Moran during the course of his presentation, and Mr. Moran didn't really share that view to the extent that you are now projecting.

But these problems of the nouveau riche, which are really what they have, is the inability to put their money into developing a long range and short range program that doesn't get them into the financial bind. Is this in any way, in your opinion, the motivation for the action they have taken?

Mr. ADELMAN. Well, Mr. Long, I think there are two questions: one, the management of your assets and your overflowing surpluses; and two, the management of your production. On production, long term, they are well advised in trying to hold on to a high market share for as long as possible knowing that eventually they may have to retreat from it.

I don't think Mr. Moran and I disagree on that but, of course, he must speak for himself.

Representative LONG. Mr. Moran.

Mr. MORAN. I am in the advantageous position of being in agreement with Mr. Meyer and Mr. Adelman. In the next 18 months to 2

years you will find that Saudi Arabia is comfortable in terms of its financial needs.

It is continuing to build up financial reserves, in terms of effective reserves over $40 billion now. Those, according to my calculations, will probably peak at about $50 billion in 1978.

That is subject to a wide range, but it is in that range, nowhere near as high as people were saying a long time ago. From about 1978 on, you are going to find that Saudi Arabia will want to spend annually according to my calculations approximately $30 to $35 billion equivalent per year.

They have to export 8 to 9 billion barrels per day and have that as a permanent part of their market if oil prices remain constant or they have to start drawing down their reserves.

Now in my projections that I made before the subcommittee today, I projected that they would draw down their financial reserves at a rate that would exhaust them in 10 years.

As you know from talking to Saudi financial officials that is anathema and that is an extraordinarily pessimistic way of looking at what they are going to do but I do it to highlight the management problems that I think they will face in the late 1970's and early 1980's.

Representative BROWN of Ohio. Could I ask a question at this point?

It seems to me that the Saudis have about four motives for doing what they have done. The first is avarice in order to maintain their own economic development.

Second is a fear of the foreign ambitions of their OPEC partners, notably Iran; nations who might be developing militarily and threaten their own leadership in the Near East.

Third is an opportunity to gain some leadership leverage with the West vis-a-vis the Israeli-Arab problem.

Fourth is the question—perhaps least significant and most kindly—of supporting some of the tottering Western nations in Europe against inroads of communism which is another one of their enemies.

Now, is that essentially correct?

Do you have another reason or another motive that you would add to that list and then I would go on and pursue something with Mr. Moran.

Mr. LICHTBLAU. I would say the first one, avarice for economic development, should not be part of the four. This is not the Saudi's motivation at this time.

Representative BROWN of Ohio. It isn't as great for Saudi Arabia as it is, say, for Iran as was brought out in Senator Kennedy's questioning.

Mr. MORAN. Well, but it's one of the issues that motivates the oil producers including Venezuela and Indonesia and even Canada.

Mr. LICHTBLAU. Yes, with the exception of Saudi Arabia. Saudi Arabia's price increase was more modest than anyone else's. But this was not due to economic development motives because what actually will happen as a result is that Saudi Arabia will earn far more money than any of the other countries, far more than it would have earned had it gone to the 10 percent level or found some other common denominator with the others. So, in effect, Saudi Arabia, by doing what it did, will get a surplus which is much bigger than the surplus it already has. Their surplus, at least in the short run, already far exceeds

their own ability to absorb it. Saudi Arabia's statements, over and over again, that 8½ million barrels a day is too high a production level, that they would really like to go lower and are only producing at that level because they would create a worldwide shortage otherwise has to be taken seriously, at least in the short run.

Representative BROWN of Ohio. I guess all four would be applicable to all of the OPEC nations, particularly.

Mr. LICHTBLAU. Yes, some of them.

Representative BROWN of Ohio. Particularly the Arab members of the OPEC nations, in varying degrees, and perhaps for Iranians it would be avarice for economic development which would be first, perhaps for somebody else the opportunity to be against communism would be higher, and so forth.

Mr. LICHTBLAU. Yes.

Representative BROWN of Ohio. Now, your suggestion that the market circumstances have changed, that the market was a sellers' market a few years ago and now it is a buyers' market, indicates the——

Mr. MORAN. Beginning in the late 1970's, 1978 or 1979.

Mr. LICHTBLAU. In the future.

Representative BROWN of Ohio. Yes, all right.

Mr. MORAN. Not at the present time.

Representative BROWN of Ohio. Perhaps not at the present time, but it is more of a buyers' market than it was when all the Western nations were zooming along in prosperity and when we got to the embargo situation they all got kicked in the teeth economically.

It was not quite as much of a sellers' market as it was just a few months before. So the policies which might be pursued at that time versus the policies that might be pursued at this time might be modified by a change in the worldwide market, isn't that correct?

Mr. MORAN. Not "modified," I would say altered dramatically.

Representative BROWN of Ohio. Well, remember Mr. Adelman was presenting his proposal then, and I wasn't too interested in it because I didn't think it would work. It may work a little bit better now under the circumstances.

The more avarice for continuing their economic development and meeting the commitments that the Arab nations have, the more your suggestions might now be an appropriate idea.

But I wonder, before I get to that specific thing of what we do now, ask a generalized question.

Setting aside our efforts in this country to ease the economic impact of a 400 percent increase in the price of one major commodity in the United States—setting that aside; our price controls on oil, and now, also, natural gas because of the substitution situation, it seems to me is a policy that helps glue OPEC together because we are literally subsidizing the existence of the OPEC cartel by our price controls, are we not?

Mr. MEYER. Yes.

Mr. LICHTBLAU. Yes.

Mr. MORAN. Yes.

Representative BROWN of Ohio. Would you all agree on that; that it has been a policy pursued by the Congress of the United States, which in turn has supported the OPEC cartel?

Mr. ADELMAN. Yes.

Mr. LICHTBLAU. I would say it has been helpful to the OPEC cartel, clearly. I wouldn't think that OPEC would not exist if we had a different pricing policy, but it certainly has been a helpful factor that we have controlled prices well below the OPEC level.

Representative BROWN of Ohio. And a continuation of that policy would not be in our nation's interest now, is that correct?

[Panel nods affirmatively.]

Representative BROWN of Ohio. In terms of trying to negotiate directly as you have suggested with the OPEC countries on a political basis, or in terms of trading our—here I am lost a little about the differentiation between military equipment which it seems to me the French may supply, military intelligence which you say we probably have more of a monopoly on, and foreign policy of the United States which is a clear United States monopoly—at least to a degree it is a monopoly, I guess—but it seems to me that you sort of settle one product into a political consideration and I worry about that a little, Mr. Moran. I should ask you to define it further, but I won't. Or whether you can go to your system, Mr. Adelman, which is a mere economic negotiation where you allow the guy who wants to do a little dealing under the table—isn't that essentially what your system calls for?

Mr. ADELMAN. Yes, sir.

Representative BROWN of Ohio. To deal directly with whoever owns these import rights.

Mr. ADELMAN. It is the U.S. Government which gives out the tickets.

Representative BROWN of Ohio. The U.S. Government sells the tickets, but essentially they will sell the tickets initially to Exxon and Gulf and Texaco and another oil company, wouldn't they? They wouldn't sell them directly to OPEC nations?

Mr. ADELMAN. They would sell them to whoever wants to buy them. Initially they would sell them to people you heard of at a price of a penny or two, after that, as the price got higher, they sell them to a lot of people you never heard of.

Representative BROWN of Ohio. You and I could go in and buy one and we could call up Sheik Yamani and say, "We have an opportunity here, and you might want to sell some of your oil, otherwise, we are going to import it from Venezuela or Canada," or some place, but, "if you really want to sell some oil and keep up your economic development and have my influence about our situation in this country vis-a-vis Israel or to help the Italians keep from going communist, why, we would be glad to have you ship us your oil, but we can't quite meet that $13 price. How about $9.99?" Is that about it?

Mr. ADELMAN. The negotiations between buyer and seller would be unaffected, it would be in the privacy of their own hearts or meeting rooms they have to decide how much cheating they are willing to do and how much cheating they expected their good friends and friendly competitors will do.

Representative BROWN of Ohio. Yamani responded: "We will check and see what the Iranians are doing."

Haven't you suggested that kind of a system?

Mr. ADELMAN. No, sir; we as a government——

Representative BROWN of Ohio. Why not suggest to the government——

Mr. ADELMAN [continuing]. I am talking about avoiding confrontation.

Representative BROWN of Ohio [continuing]. I am talking about you and I as private citizens or you and I as part of some oil company. That is the way the negotiation would be undertaken, wouldn't it?

Mr. MEYER. Would you buy some of those tickets yourself?

Mr. ADELMAN. If I had the money which I fear is far beyond my present and prospective means.

Representative BROWN of Ohio. As a professor, you have a better reputation than some of us in politics; you might get better credit. [Laughter.]

The point is that somebody will be in that type of negotiation you are suggesting because we have only so many import tickets.

Mr. ADELMAN. Yes.

Representative BROWN of Ohio. Let me go to the next point.

Would you suggest that the Federal Government sell import tickets beyond our need for imported oil?

You suggested that government control doesn't seem to be an administratable problem. So, my question is: Would the Government have the planning responsibility—here I begin to get nervous about your idea—would the Government have the planning responsibility in determining how much oil we were likely to need to import from abroad and only sell that many import tickets or would we sell those import tickets willy-nilly?

Mr. ADELMAN. No, the number of tickets to be issued in any given month would be equal to the expected imports at the given price.

Representative BROWN of Ohio. Not more, not less?

Mr. ADELMAN. Not more, not less.

Representative BROWN of Ohio. That is what worries me because that is where Government control comes into the picture and if we don't sell enough import tickets, we might have somebody like you and me selling the ticket to the Arabians rather than having it subsidize the imports. Isn't that right?

Mr. ADELMAN. The way to guard against that is frequent auctions and watching inventories and, also, giving tickets a longer length than just 1 month.

Representative BROWN of Ohio. I didn't mean selling the ticket; we might be trying to subsidize the Arabs or somebody to take our ticket over somebody else's ticket. That is the part that worries me here, see?

Mr. ADELMAN. No, no, I think, sir, I know what is in your mind on that and that is some kind of government determination of what the total of imports should be.

Now, you can, if you wish, put that kind of a scheme into operation, but it is not one that I would advocate and it is not necessary at all.

What you are doing is having the government forecast how much the demand for tickets is going to be, which is nothing more nor less than the shipments, the imports of oil. And any mistakes you make, since you must inevitably be somewhat over or under, will be absorbed by inventories and past experience indicates that's very easily done. It will, of course, be corrected up or down the next month.

Representative BROWN of Ohio. Without pursuing further the individual plan that you have suggested, I would like to ask for comment of each of the gentlemen here on that plan before we conclude today, but first, let me see if I can figure out what the areas of agreement are that you all have on what our policy should be with reference to energy.

We have already established that you all agree that we ought to go for decontrol as quickly as possible. I gather in both oil and natural gas.

Second, I gather that you're all for some form of direct negotiation, economic, political, whatever, trade, which may be both economic and political with the OPEC nations with regard to oil, to our oil relationship, is that correct?

Mr. ADELMAN. Count me out on that, Mr. Brown.

I think the last thing we want to do is negotiate with the OPEC nations.

Mr. MEYER. But include me in on it, please.

Representative BROWN of Ohio. Mr. Moran, you have suggested negotiation on certain areas of military intelligence and other things, didn't you?

Mr. MORAN. Yes, but negotiations defined in the sense that we have countless commissions, joint commissions, and so on, that have to talk about something, the evidence from the past is that they only talk about giving, not about receiving anything.

It seems to me that we can——

Representative BROWN of Ohio. Are you part of the majority or splitting, Mr. Lichtblau?

Mr. LICHTBLAU. No, I suggested in my paper that we have to find a way of direct negotiations with OPEC on the subject of oil.

Representative BROWN of Ohio. Would any of you disagree that we ought to develop our synthetic fuels, for lack of a better term, substitutes for oil as an energy source in this country which would embrace, I guess, nuclear and coal synthesis and solar energy and anything else that seems to be desirable?

Mr. ADELMAN. Only at a price which was equal to or less than the price of imported oil. At higher prices, I think it would be a deadweight economic loss.

Representative BROWN of Ohio. But the only way we know what those prices really are in terms of our economy is if we sustain that real price in our society, isn't that correct? That is, by not fuzzing it up with controls and so forth.

Let me go to a fourth point or fifth or whatever it is. Would you agree that a better way to ease the pain of having to pay the OPEC price, and also keeping the price at a market price, would be or would have been to substitute for decontrol, and, therefore, a higher price that everybody pays, a tax reduction that might have in some way or a tax reorganization that might in some way have enabled the consumer not to have to bear the full price of the increase of oil and have the economic impact of that eased on them, rather than controls? Would you go to that point?

Mr. Moran is shaking his head no.

Mr. MORAN. If I understand you, sir, I think I disagree.

I think that probably the most effective means of getting conservation is to have higher energy prices. If you——

Representative BROWN of Ohio. I know that——

Mr. MORAN. If what you mean is a tax redistribution——

Representative BROWN of Ohio. If the Federal Government wants to ease the economic impact on society, we would have been better off by letting the prices go up and cutting taxes and saying to the consumer, "You pay more for oil and less for taxes."

Mr. MORAN. That would be one way to do it. I am not sure I would choose that.

I would focus, however, on the distributive aspects and there are some groups, namely, the poor in society that you wouldn't want to bear as much of the brunt probably as other groups.

Representative BROWN of Ohio. That was one of the proposals, you know, and I am just asking if that is a desirable way to deal with it.

Mr. LICHTBLAU. I would agree with you 100 percent at least, on that suggestion.

I think it is exactly what we have to do. We have to try to get rid of this very cumbersome and very complicated entitlement system which is absolutely necessary while we have price controls; raise the prices and at the same time use a large part of the extra money not to give the oil companies but to skim off in the form of windfall profit or some other profit tax, with a plowback provision for exploration which can be limited, of course; and thereby reduce the tax burden and when you reduce the tax burden you keep the consumer whole.

He pays more for energy cost and less for taxes so his spendable income has not changed, but his pattern of expenditure will change because his energy costs have gone up now, yet his money is available, and it has not changed.

Representative BROWN of Ohio. I would ask you this question, Mr. Lichtblau, and all of you may answer, perhaps all of you are not related to oil engineering, and so forth. First, the discovery of oil in the North Sea or discovery of oil off the coast of Vietnam or you name the place, that is outside the continental limits of the United States, that is not going to help us a great deal because as soon as they discover it they will jump into the OPEC situation and get the highest price they can get; although we might be able to negotiate with them. So the only real opportunity we have for easing our strain is to either find oil in this country or find a substitute for it, and oil in this country has been pretty well exhausted.

We know we don't have that much left because we have drilled a hole in every square mile of the United States looking for it; is that a fair summary?

Mr. LICHTBLAU. Yes: I don't think we can become independent of OPEC in the foreseeable future. I am talking about 10 to 15 years, no matter what we do. Our imports of oil, even under the most optimistic scenario of developing alternate resources, realistic conservation, the kind of conservation that will not have a negative impact on our economy, under any scenario, our oil imports will rise between now and the mid-1980's. There may be a brief dip in the late 1970's because of Alaska, but after that it will go up. So there is no way that by 1985 we will import less oil than in 1975. In fact, we will almost certainly import more oil.

Mr. MEYER. And in the long term the only real answer for the United States to OPEC is success in the effort to find alternatives to natural crude oil produced within this country.

Mr. ADELMAN. I would like to address the tax point and to express opposition to lowering of excise taxes. I think it should be just the contrary. They should be increased, and for this reason: Most of us at the table, and perhaps all of us, are agreed that OPEC is going to keep increasing prices because they have the power to do so.

The more we preempt of that higher price by taxes at home, the less is left for them.

Representative BROWN of Ohio. You are talking about an excise tax, I was talking about a general tax reduction.

Mr. MORAN. So was I.

Mr. ADELMAN. I was speaking more specifically. Furthermore, the more we offset higher prices with lower taxes, the less incentive we give consumers to economize. I think we should focus our attention on those groups who are low income and who cannot afford the increase in energy that it costs. To try to buffer the shock for them and for nobody else. I commend the suggestion of my colleague, Prof. Robert Hall, for energy stamps or for an addendum to food stamps which would be aimed specifically at those groups and would not give the rest of us a windfall.

Representative BROWN of Ohio. Like Sarah Bernhardt, here I have one more farewell comment:

> It becomes clear with the benefit of hindsight, and it should have been clear at the time, that the uncompensated loss of consumer purchasing power stemming from the OPEC price rise would generate a substantial reduction in aggregate demand in the industrial countries. A tax reduction could have maintained after tax real incomes in those countries, without raising wage costs and at the same time it would have offset the demand-depressing effects of the oil price increase.

Now, Charlie Schultze said that. Our new OMB Director. Maybe there is something there that we are headed for.

Mr. ADELMAN. I would like to read that statement in context certainly.

Senator KENNEDY. I have enjoyed the exchange, and I am personally convinced, with all due respect to my colleague, that with the decontrol you wouldn't have had the United States economy. Mr. Adelman, you can't travel around my region and talk to any, not just poor people, but lower middle-income people who think that they can afford to pay for the kind of program in terms of decontrol. It is completely unrealistic as far as the part of the country that I know something about.

Maybe it is different in other sections of the country. With the mess in the food stamp program as one who supported that program, it is completely unrealistic to think that the Congress is going to respond to a souped-up energy stamp program. I think it is interesting conceptually but in terms of the practical hard-nosed reality of these programs, let alone what this kind of a rebate program would mean in a budget deficit—estimates anywhere from $15 to $25 billion—is wholly unrealistic. But that is part of our purpose to try to examine these matters. I just think in the end, obviously, there will be a healthy difference in viewpoint on that.

Representative BROWN of Ohio. Your budget director and I would suggest, in general, a tax increase.

Senator KENNEDY. Decontrols and others are involved.

I am afraid I am going to have to leave shortly to answer the bells.

I would be interested where you view the role of the oil companies in the relationship of the OPEC countries to the United States. We have taken OPEC as an institution.

Professor Adelman, you have written about this in the past. I would be interested in what you see as the real role of the oil companies in terms of their complicity with the increase in price. Are there things that can be done institutionally to alter it? Could a change like divestiture have an impact in the whole area of pricing?

I would be interested in the views of the panel on that, and let's consider this question including aspects of antitrust tax policy.

Mr. ADELMAN. Senator, I think the role of the oil companies in the world market today is just about negligible in determining the level of price. They are essentially specialists in production, refining and distribution, and they are compensated for the services they render.

But they have no influence that I can discern.

What does matter is the determination of the OPEC nations that most of their oil is to be marketed through the oil companies and not directly. But that is their own arrangement. It serves their interests and if for some reason, divestiture, or disagreement over compensation, or whatever, all of these resident oil companies were expelled from their current producing properties and were acquired by someone else under the same arrangements, I can't see that there would be any result except the inconvenience.

Senator KENNEDY. That's true with the separation of refining from production?

Mr. ADELMAN. No; I think again that would be quite independent. Whether the companies are integrated vertically or whether they would be separate producing companies, I can't see that it makes any difference.

Senator KENNEDY. Would the rest of you comment, please?

Mr. MEYER. There are a whole lot of questions involved here and obviously we don't have a great deal of time. It seems to me at this point the oil companies remain one of the assets on the consuming countries' side of the ledger, and until a substitute is found for them, they are far better off functioning as integrated units than they would be broken up into several parts, and I think that divestiture at this point in history would serve no purpose whatever for the consuming countries.

Mr. LICHTBLAU. I think you have to consider in addition to these facts, all of which I agree with, that there has been a sharp increase in direct sale by OPEC countries; that the balance is changing. It is true that in some countries the oil companies are the primary outlet for international sales. But in more and more countries, government companies are beginning to take over. In Iran, it is now 25 to 30 percent and in some it is even more. The Iraqis also have a government company, Algeria the same. So if you look at 1971 and 1972 and then at 1976, the share of oil sold by private companies has declined while that sold by government companies has increased sharply, and this

trend will continue probably over a period of time, even applying to Saudi Arabia although there, 90 percent of the oil is currently sold by Aramco.

I think divestitures could cause these countries to no longer want to cooperate with the oil companies. It may be that the countries would then independently sell all of their oil. Whether that is in our interest, I don't know. To some extent these countries want oil companies there because they have access to foreign refining and distribution facilities. That is the only thing that these companies can still offer in addition to technical knowledge. If they can no longer offer this, I think their whole function in these countries might end, and I don't think this is in our interest because it would remove the last vestige of any kind of order in the international market.

Senator KENNEDY. Mr. Moran.

Mr. MORAN. I would agree with my colleague, Senator, that vertical divestiture from the point of view of U.S. public policy at this time would be a bad idea. But horizontal divestiture, I think, would merit closer consideration.

Senator KENNEDY. We were talking briefly about the political implications. Professor Adelman took a strong position on the importance of nonnegotiation in dealing with Saudi Arabia, and if the spin-off comes, fine. I would just be interested in the other panel members' views about the importance of the international meetings in Paris on the North-South issues.

Based upon your own concepts and studies and views, how important do you feel the political implications are to actions on pricing? What priority do you place on it in terms of pricing within the OPEC countries? Would you give us your comments?

Mr. LICHTBLAU. I would say the Paris meeting was a failure. I mentioned that in my statement. The reason for that was that what started out to be a dialog about the direct problems between the OPEC nations and the consuming countries became a laundry list of problems between the underdeveloped countries and the developing nations and there were so many other factors that the real issue, namely, the price of oil, was hardly even discussed.

I think it was a year's discussion about something that accomplished absolutely nothing.

Senator KENNEDY. Whatever happens now, they have the subcommittees on energy, and the other subjects, but you generally discount their work?

Mr. LICHTBLAU. They would have to start from scratch. They would have to get down to discussing the issues significant to these two groups rather than getting involved in the complex question of financing of debts of these countries. I am also not quite sure to what extent the OPEC nations are really the best representatives of the less developed countries by now. They are no longer exactly like Bangladesh and when they talk about the poor, the starving countries they are talking about someone entirely different from themselves. I think it would be desirable if we made the really poor countries, the countries of the fourth world, speak for themselves. It's been very frustrating that the countries which have been most hurt by the oil price increases have hardly ever spoken up. We had to say, "well, the industrial nations of

the world can possibly afford a 10-percent increase, but look at the poor nations of the world, they cannot." Why didn't the poor nations say, "we cannot," which would have been a big difference in a place like Paris.

So we have actually made it unnecessary for the real poor nations to speak on their own behalf and save them the embarrassment of disagreeing with OPEC.

Senator KENNEDY. Mr. Meyer.

Mr. MEYER. Oil is a much more manageable subject than the whole range of matters that paralyzed the Paris talks. I would hope that we could continue the dialog of consuming countries with the Middle Eastern countries and I would hope that the political involvements would not be rejected out of hand.

Representative LONG. I have two questions, Mr. Chairman.

One, Mr. Meyer, in your provocative statement which I thought was really a very realistic appraisal of the current situation, you say the United States has on occasion, since 1941, used a boycott provision similar to what was used by the OPEC nations 5½ years ago. Would you relate some of those incidents where that was done?

Mr. MEYER. Yes. In 1941 we embargoed oil shipments to Japan. We threatened to do it with the British in the Suez invasion when we threatened to embargo oil shipments to the United Kingdom. Also we have done so in our continuous embargo on shipments to Cuba and to China.

Representative LONG. Fine, thank you.

Maybe I could get a comment from all of you on this, on the position you have taken with regard to the major oil companies on the separation of their responsibilities for production on the one hand and distribution and refining on the other. It has been very interesting to me because there is so much rhetoric about divestiture and breaking up the companies.

I have been one who feels that maybe 20 years ago they should have been broken up, but I think that day is past and there is no justification for it.

To the contrary, it might do more harm than good to have divestiture. Is this the general view of the panel?

Mr. MEYER. I agree emphatically. Times may change 15 years from now, but at the moment certainly this is my opinion.

Mr. LICTHBLAU. Yes.

Mr. ADELMAN. Yes, I agree, somewhat.

Representative LONG. I agree with that position, but it surprised me that four of you, who on most matters represent so many divergent views, agree on this. I think you have made an excellent contribution, an excellent panel discussion.

It did surprise me that you have a unanimous opinion with respect to divestiture.

Going a step further—and I am not sure whether this is something that should be done—we had the head of the Mobil Oil Co. here some months ago, and he suggested that really what we needed is for the American oil companies to import this oil. He said in effect or implied that perhaps we should pursue policies to keep American companies from losing their business to the nationalized oil companies in the various producing countries.

Do any of you have a view on that matter?

Mr. ADELMAN. Well, I think it would not accomplish anything one way or the other.

Certainly, the companies themselves operating in those countries are earning profits there but from the point of view of the national interest which is concerned with the price of oil, I don't see that it would make any difference one way or the other.

Having American companies there didn't do anything to prevent the increase in price of oil; having other nationalities there won't do anything to make it worse or better.

Mr. MEYER. I would agree with that.

Representative LONG. Do either of you gentlemen have additional comments?

Mr. LICTHBLAU. I would say that nationalization in the Middle East and other countries has been so widespread, that to say, now we must do something, is a little late.

There is hardly anything left.

Mr. MEYER. It is too late.

Representative LONG. I agree. I didn't really see anything that we could do now. If we were going to do something in this regard, we should have done it much before now.

Mr. LICTHBLAU. Right. The trend is clear. Whatever has not been nationalized will be within the next 12 to 24 months.

Representative LONG. I have had my differences with the major oil companies. I come from a major producing State, and on the basis of acreage, we probably produce more natural gas and oil than any State in the Union. Some other States are geographically larger and produced a great deal more than Louisiana, but in many instances I've termed them the banana republics. Consequently they don't always take kindly to me.

One of the things that has amazed me as I watched it develop is the offshore production in Louisiana. I do a great deal of fishing and the degree to which the fishing has improved offshore Louisiana has been fantastic in the past 10 or 12 years as a result of the plant life growing on the rigs underneath the water. You can stand in a boat in the Gulf of Mexico and look in all directions and see nothing but oil rigs, each one representing generally about four wells.

It has been fascinating to me that this has happened.

The other thing surprising to me, because I had great concern at the time it was started, is that we have had an absolute minimum of disruption of our environment as a result.

We have had no major oil spill off the coast of Louisiana and we have had no major break that has occurred or resulted in any serious damage.

We have had some small ones, but nothing compared to what has happened here with these tankers in the last weeks. I don't know if the bottom is falling out now and it has been a long time coming and they have just been lucky that it didn't happen before; or whether they are unlucky in having a run of them right now but it is not symbolic of a major problem.

I suspect it is the first. I suspect that they have got some real problems in the transportation of oil, particularly in these small out-

dated tankers. The standards to which they adhere are in many instances not what they ought to be.

This whole problem of transportation of oil has become, with the supertankers and the super ports, a very, very substantial problem.

Would any of you like to comment on this question of what's happened on these tankers and what you see occurring in this field?

Mr. MEYER. I would only like to say that it is obvious that the long-term pollution of oceans by ever-growing tanker tonnages is a major ecological problem. It is a problem that grows as U.S. dependence on imported crude oil grows.

Representative LONG. That is one of the reasons I gathered from your statement, Mr. Meyer, that you were recommending—one of the substantial reasons—that we start developing as fast as we can our domestic resources.

Mr. MEYER. And I was referring specifically to coal and nuclear.

Representative BROWN of Ohio. If you yield, Gillis, we have had over a 30 percent increase, which is a higher increase in the volume of oil barrels that we have imported, since the embargo, because of controls in my viewpoint. We have had that increase and that necessarily has meant that we have had to have more ships to carry that oil and that has meant that we have probably gotten a lot of old ships out of mothballs to carry the oil, which are not in very good shape.

I heard the ship that broke in half here just yesterday or the day before was 43 years old.

We also are experimenting with the development of these half-mile long ships that it seems to me, from what little I learned in the Navy, would create a ship that would probably in a wave-trough situation have more tendency to break in two because there is more of it.

I think the environmentalists ought to pick up on that, rather than the coal mining situation.

Mr. MEYER. On divestiture, it seems to me the operation by the integrated oil companies of their fleets is an exemplary one. They are vulnerable to public opinion——

Representative LONG. Would you say that again, Mr. Meyer?

Mr. MEYER. I say the operation of the tanker fleets by the integrated oil companies has been outstandingly good in terms of damage, big spills, and major ecological degradation. The series of incidents that we have had off this coast recently have been by tankers which were operated under virtually no controls and as we have seen from our Coast Guard investigations that the fashion of operation of those ships has left much to be desired. I don't think that our oil companies should be blamed for this, but some sort of international or national system of controls on the operation of these ships, it seems to me, is clearly in order.

Representative LONG. Do either of you other gentlemen have any comments you would like to make on this?

I would make one comment on what Mr. Brown said. I have been active in the establishment of the offshore facility for the deepwater port, and it was my hope that it would be a public facility rather than one owned and operated by the oil companies.

Unfortunately, the State of Louisiana didn't see fit to follow my recommendations in that regard, at least so far as I am concerned.

But I do think that one of these days, in the not too distant future, we are going to have a real spill. When you get one of those big ones that Mr. Brown is talking about and let it break, then you will really see some oil. Those things are three times as long as a football field and carry fantastic amounts of oil.

Representative BROWN of Ohio. We had the idea you suggested, the offshore unload and have them lighted in in smaller vessels.

At least you would have the situation that developed in the Delaware River obviated to some extent.

So, I would support you in that, though I guess I shouldn't speak to it not coming from a State that doesn't have a coastline.

Representative LONG. We appreciate support wherever it comes from.

Representative BROWN of Ohio. I would like to get to the IEA and reserve question.

I left out of my list of things which I thought we were in agreement on the idea that we should establish a national energy reserve.

I sense that everybody would agree that we ought to have a national energy reserve.

Let me go on and say that one of the reasons for that is, as I see it, is that the International Energy Agency, IEA, is an alliance of consuming nations, is probably as vulnerable perhaps more so than the OPEC producing nations to be picked off, one by one, because the nations which belong to it all have varying degrees of dependence, notably the Japanese are allies, the French are allies, in many ways beyond our oil consumption concerns; both have greater dependence by considerable degree than we have.

Therefore, that is also a fragile compact, I would assume, if one looks at it from the standpoint of self-interest. Therefore, the importance of our having a strategic reserve in the country, particularly in view of what you said, Mr. Lichtblau, that it will take 10 years optimistically and 15 to 20 years pessimistically, perhaps, to develop some method of energy utilization aside from oil.

During that period of time we are going to need something to protect us against the possibility of an embargo that would take 41 percent of our oil out of our economic system.

What amount of reserve should we have?

Mr. LICHTBLAU. I would say that the law that was passed is a quite good one. I think it is—the basic idea of having total oil reserves equal 3 months of total imports is probably sufficient because it is most unlikely that we are going to have a cutoff of foreign oil to 100 percent extent.

There are too many different sources involved.

The most we are likely to have is a sustained 50-percent cut. If all our Arab oil were unavailable to us, not now but say 5 years from now, it might cut off 50 percent of our oil imports.

So, a 3-month supply of all oil imports would be equal to a 6-month supply of 50 percent, which would be our endangered oil.

One of the problems with the law is that the 3-month basis is 1973, I believe, is the law. I think it should be changed to, say, a 3-month supply of the latest year——

Representative BROWN of Ohio. There is a 35-percent difference between 1973 and 1977.

Mr. LICHTBLAU. Right.

So, the idea was good but I think it should not have been frozen to a specific year.

Representative BROWN of Ohio. It should be indexed?

Mr. LICHTBLAU. It should be indexed based on 3-months import supply for the previous year.

We can under the law store as much as 1 billion barrels of oil theoretically. That is the maximum that Congress permits.

But, the law also has a formula limiting storage to 90 days of imports in 1973; and the difference in imports between 1973 and 1977 could be as much as 200 million barrels in storage requirements.

So, we should move up to a higher figure as soon as we can.

I don't think there is anything more important in the short run than having a strategic reserve. You can imagine any number of things that could be wrong in the Middle East, not just an Arab-Israeli war, and not just a boycott.

If a civil war breaks out in any of the major countries that supply 4, 5, 6, 9 million barrels of oil a day so that the oil would not be available, you have the same problem. This happened in Nigeria when there was a civil war there. Virtually no oil could be shipped out, not because anyone was denying it to us for political reasons, but we couldn't have access to it.

I think the sooner we have a significant strategic reserve, the easier we can live with the situation that we are forced to live with.

Mr. ADELMAN. I support that strongly and I have a one-page addendum to my statement that enlarges on that.

It consists of previous congressional testimony.

But a strategic reserve can be much more effective and protect you for a much longer time if you join to it a standby program of restricted consumption for a limited duration.

Mr. LICHTBLAU. Yes, that is right.

Mr. ADELMAN. Because the lower consumption is all of your oil and the reduction in supply consists of only part of it, namely the imported part and as Mr. Lichtblau says, only a part of the imports. There is a very strong multiplier effect.

Now, the costs of such a program are zero until and unless you actually need to apply it, and the very fact that it exists and that it multiplies the effectiveness of your stockpile means the chances are less that anybody will deliberately reduce exports.

Mr. MEYER. In my opinion a stockpile is an expensive cumbersome and, above all, short-term effort.

Representative BROWN of Ohio. The estimates that I recall added to the cost of a barrel of oil at least a dollar and perhaps as much as $3 to the barrel; is that correct?

Mr. MEYER. It is also very cumbersome to make it function well, in terms of having the right quality of oil, in the right storage place and moving it to the areas in the country which need it the worst at the correct moment, et cetera. Long term, we have to find a substitute for natural crude oil from within this country. We have to find a substitute for imports of oil.

Representative BROWN of Ohio. Mr. Moran, I want to go back to one thing and I am trying to clean up loose ends here and then I want to have you all comment on Mr. Adelman's proposal.

But you said you had been unable to find any indication in the various places that you looked as to whether or not the Federal Government over the past few years has done any listing of the things with which we could deal with the Arabs in terms of quid pro quos for their cordiality in sending us oil at more moderate prices.

You mentioned military information and CIA type data and that sort of thing. It raised a question in my mind as to whether if that were likely it would be, if that had been done, whether it would be on the record at some point or not, that is the public record, to say we are going to trade military secrets or information about so on to the Saudis about how much the Iranians have in the way of strategic equipment or the atomic bomb or something else.

Is that a fair comment or do you think I am naive?

Mr. MORAN. No, I wasn't trying to argue that I would find or we would find somewhere an analysis of the kind that you are talking about.

If you take just military equipment, for example, the operating assumption in the Defense Department, and to a certain extent in the U.S. Congress, I participated in the hearings on the arms sales to Saudi Arabia before the Senate Foreign Relations Committee and the operating assumption was anything we try to deny the Saudis or Iranians or whoever, would immediately be supplied without any delay or cost or anything by someone else.

Well, when you ask specifically about the Maverick or modified F-5-E or F-14, they would say no that is an exception.

But, when you list the exception and you don't have to be as sophisticated as the Maverick, you will see it is a long list.

That may not be true of the most important military equipment, but a lot of the managerial services and Army Corps of Engineers services they supply, in arranging for a great managerial gap that the Saudis may have, and as you pointed out with regard to Iran, and there have been numerous hearings on this, and the support facilities that the Americans have to supply are very great.

Now, all I was arguing that there wasn't even an inventory of how easy it would be for various governments to replace A, B, C, through "X" programs, which ones are really sources of leverage, which ones we shouldn't mention because our bluff would be shown, et cetera.

That is the kind of undertaking that it seems to me the United States should determine to try to countervail the power of OPEC, those which we would try and accomplish.

Representative BROWN of Ohio. What would you think of a real wild idea of taking the least replaceable of those items that are U.S. exports and taxing them and then with the Federal Government realizing revenue on them, and using that tax to generate some general tax reduction to ameliorate the impact of higher energy prices?

Mr. MORAN. Well, I think that is appealing in terms of logic but it isn't the way I would proceed.

I don't think that you would get a lot of money by trying to charge billions of dollars for intelligence liaison or something like that, but you can exercise a fair amount of leverage.

Representative BROWN of Ohio. But in any of those areas you go from the area where we have our own monopoly at a price, to where

we get the price up to where the French or the Russians or somebody else can come into the Arabs and say, "Hey, we have essentially the same thing, not quite as good, but it is also cheaper and so forth," and you tend in all of those areas to fade into a situation where you are in a competitive situation of consumer nations.

Mr. MORAN. Right.

Representative BROWN of Ohio. My concern is that we dare not, just as the OPEC nations dare not, let one of them get ahead of one of the others; we dare not encourage a situation where we say to the oil producing nations, any of them, OPEC or others, that they are better off dealing with the Germans or the Japanese or even the French, who are our industrial competitors because we set up a situation wherein they have the oil and we haven't and therefore they are more able to produce and we are less able to produce and that the downside of that becomes very serious; does it not?

Would you all agree?

Mr. MORAN. I would agree and——

Representative BROWN of Ohio. In the economic sense, never mind the foreign policy.

Mr. MORAN. May I ask my colleague, Professor Meyer, who, much better than I, much better than almost anybody, to comment on this.

It is not as if you are hitting the Saudis over the head with the proposal that their self-interests might be served by lower oil prices.

Not only are they interested in all your list of the five or six, but they are right now, at least some people I have talked to, almost hypnotized by what is going on on the other side of the gulf.

They would like the United States to stop selling such sophisticated military equipment to the Iranians but they don't think they will get much action via that route.

The only thing that will restrain the Shah and really give them more national security is to have lower oil prices, which means for the next 10 years Iran can't have quite as fast a military buildup, et cetera.

Representative BROWN of Ohio. So, the sale to the Shah of military equipment helped modify or moderate the oil prices?

Mr. MORAN. Well, I am not trying that causal conclusion in this instance, but I think that is the linkage that ought to be explored.

Representative BROWN of Ohio. Let me raise one other question, I was hoping that Senator Kennedy would be back in order to do this, however.

I recognize that certain parts of the country have had a higher impact because of their dependence on oil and from other parts of the country.

There are parts of the country that still have natural gas supplies that they can use for electricity generation, and other parts of the country use to some extent coal, although I don't know where that would be.

What occurs to me is that that whole business of letting prices go up in order to encourage conservation of oil, while it does have an economic impact, if you gave a general tax benefit to everyone the economic impact might not be as severe if you had offsetting tax reductions as the problem that those areas now face with the loss of jobs because industries are moving to other parts of the country where

they know that they are not going to be as dependent on oil in the future.

Now, is that a fair conclusion?

Mr. LICHTBLAU. I think yes, it is very important in an area like New England where there has been a trend for businesses to move out of the area to lower cost energy areas because of the higher regional cost of energy.

All energy prices would tend to rise to the highest level if there were no energy price control, in which case the cost differential between New England and the sun belt which exists now would disappear.

So, I think energy cost differentials throughout the Nation would be greatly reduced because you would have a level of energy prices which would try to rise to the cost of replacement which would be the cost of imported oil.

This is not possible under the present situation because you have controls on two forms of energy, oil and gas. But, if you didn't have these controls, I think you wouldn't see anybody moving from one area to another because of lower energy costs.

As I say, if you had a tax rebate, the public—I am not talking about those too poor to pay taxes—but the public at large would not be affected negatively.

Representative BROWN of Ohio. I don't want to continue too long because we are past our high noon adjournment, but I would like to ask you each to comment—except for Mr. Adelman—on Mr. Adelman's proposal and make any criticisms of it which you would like to make for the benefit of the panel and then suggest, as the subject came up a moment ago, any areas of conservation you would like to have us undertake besides the natural conservation or conserving effects of higher prices with removal of controls.

Mr. Moran, would you like to start?

Mr. MORAN. I don't have really anything to add except to agree with you, Mr. Brown, that my calculations make it appear that the environment for the successful implementation of Professor Adelman's plan will be much more fertile by the end of this decade or the end of the next than it has been for a long time.

So, I think we ought to look at it much more seriously.

Representative BROWN of Ohio. Do you feel, or am I confused about it with reference to the Government making a predetermination of how much oil is going to be imported?

Do you see that as a problem in the plan?

Mr. MORAN. I believe it is a minor problem that I think could be dealt with fairly effectively.

Representative BROWN of Ohio. Mr. Lichtblau.

Mr. LICHTBLAU. There can be some merit to this proposal. One of the fears I have had for some time is that it will be combined with the Government oil purchasing agencies. Professor Adelman insists that this is not the intention, but most of the time we see the two proposals tied together and this is one of the concerns I have.

Otherwise, I would say——

Representative BROWN of Ohio. You think Congress would be unable to resist that?

Mr. LICHTBLAU. Most likely, yes, at least initially. You don't know where we go from there.

One of the problems I have with the idea of the chiseling among OPEC members, which Professor Adelman says is the principal reason for his scheme, is that much of this is possible right now.

If OPEC members want to sell oil below the official price there are any number of opportunities to do so and do it with the deepest and darkest secrecy that you can possibly have.

Representative BROWN of Ohio. Has that been going on already?

Mr. LICHTBLAU. Yes, exactly.

Representative BROWN of Ohio. More now than it was 2 years ago?

Mr. MEYER. No.

Mr. LICHTBLAU. Not much more but I think we are entering a new situation. I think it will go on now, because I don't think the Iranians and Kuwaitis and Iraqis will accept the sharp reduction in exports in the next 3 or 4 months, so they will start doing some of that.

The Iranians have announced they will go to a barter system. A barter system is nothing more than an invisible reduction in the price, which nobody can check. So, you have opportunities for this type of thing right now and it assures secrecy.

I am not so sure that this same secrecy can be assured if you go via this ticket system that Professor Adelman suggests because we do have import statistics.

For instance, over the next 90 days with the huge differential in price between Iranian and Saudi heavy oil, if there is no decline in Iranian heavy oil imports to the United States, then you will know that the Iranians have somehow chiseled.

You would not know by how much, but they must have chiseled by about the amount of the difference between the Saudi and Iranian prices.

Finally, there is a possibility of a joint OPEC posture against the auction system.

I don't know whether there will be, but it is possible. After all, it is designed to weaken OPEC and it is possible that OPEC might say, all right, in a counterdefensive action, we will submit a joint bid and not try to undersell each other.

So, these are the various concerns I have.

Another one would be that there is a possibility that someone or some group might corner all the import tickets. You would have to have all kinds of regulations that none can buy more than a certain percentage but I am not at all happy with all these bureaucratic safety measures.

They could create a lot of problems there and I don't think it will really reduce the price of oil available to the United States.

Representative BROWN of Ohio. Mr. Meyer.

Mr. MEYER. I find the proposal an extremely interesting one but one which I don't feel would be workable. I believe first there would be the inevitable emergence of a U.S. Government bureaucracy which would even confuse matters more than they are now in the energy area. Second, I think this could strengthen the backbone of OPEC and provide it with new unity and make sure that nobody came to the auction.

Representative BROWN of Ohio. Would there be any danger of encouraging some nation in OPEC to send their army over to make sure that somebody else in OPEC didn't break the joint effort?

Mr. MEYER. I don't think this is a game the United States ought to try to get into. All those facilities are too subject to interruption; they are too vulnerable: there are too few oil wells producing this massive quantity of hydrocarbons in the area, and the world supply is terribly vulnerable and I don't believe that military adventures are the way to control either the price or guarantee the volume of crude oil exports from the Middle East.

Representative BROWN of Ohio. I think you deserve a chance for rebuttal, Mr. Adelman.

Mr. ADELMAN. I will take the time to deal with the point that only Mr. Lichtblau made, which is a valid one, namely, why shouldn't there be chiseling going on right now?

Indeed, there is. But, this is confined only to the small marginal parts of crude supply because a buyer of crude or a lifter of crude has got to have continuity in flow.

Therefore, he cannot move back and forth easily in response to a better offer except on a rather small part of his takings.

The second reason why chiseling is so limited is, of course, that the word gets around.

Now, given the quota auction, neither of these two conditions will exist because the buying of tickets would be a completely separate thing from the actual movement of oil.

All tickets would be up for grabs as I said, every month, regardless of the movement of oil.

Representative BROWN of Ohio. There would both be an auction of the ticket and an auction of who the holder of the ticket is going to get his oil from; is that it?

Mr. ADELMAN. No, the arrangements for lifting oil would proceed as they have before to minimize the cost of moving a huge amount of crude.

The key to that is a large amount moving in continuous flow. The tickets would have to be arranged between buyer and seller in order not to disrupt this.

But the tickets themselves would be salable and would be the subject of transactions for 10 million barrels a day or whatever the total would be.

The second point is that not even the buyer would know of the chiseling because the price he would pay would be a current market price less, perhaps, whatever concessions he was able to get.

The chiseling would be for the benefit of the third party, the U.S.A.

So, what the buyer doesn't know the buyer can't tell.

Representative BROWN of Ohio. Are you sure that that price reduction on the part of the OPEC seller of oil would be passed on in some way to the general consumer of that oil here in this country or, would we just be creating a lot of American millionaires who are the brokers in oil, the way we have the brokers in grain?

Mr. ADELMAN. No, the only beneficiary would be the U.S. Treasury.

They are the ones who would be collecting the money because they would have the tickets to hand out.

The various other objections are handled in the appendices to my testimony.

I know the time is short and I won't read them.

Representative LONG [presiding]. Gentlemen, we are very appreciative of all of you coming and as I said I think you have made a real contribution and this hearing now stands adjourned until tomorrow, Thursday, at 9:30 a.m., room 1202, in the Dirksen Building.

[Whereupon, at 12:16 p.m., the subcommittee recessed, to reconvene at 9:30 am., Thursday, January 13, 1977.]

ENERGY INDEPENDENCE OR INTERDEPENDENCE: THE AGENDA WITH OPEC

THURSDAY, JANUARY 13, 1977

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON ENERGY
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The subcommittee met, pursuant to recess, at 9:41 a.m., in room 1202, Dirksen Senate Office Building, Hon. Edward M. Kennedy (chairman of the subcommittee) presiding.

Present: Senators Kennedy, Proxmire, Javits, and Percy; and Representative Brown of Ohio.

Also present: Louis C. Krauthoff II, assistant director; Sarah Jackson, professional staff member; John G. Stewart, subcommittee professional staff member; Michael J. Runde, administrative assistant; and Charles H. Bradford, Stephen J. Entin, M. Catherine Miller, and Mark R. Policinski, minority professional staff members.

Representative BROWN of Ohio [presiding]. In the absence of Senator Kennedy, who should be here within the next few minutes, and with Senator Javits here and soon to be off the phone, I think the desirable thing for us to do is go ahead and get started with the witnesses who are already here.

Without objection, we will insert Senator Kennedy's opening statement in the record at this point, and then I would like to make a brief opening statement of my own.

[The opening statement of Senator Kennedy follows:]

OPENING STATEMENT OF SENATOR KENNEDY, CHAIRMAN

This is the second of two days of hearings before the Subcommittee on Energy of the Joint Economic Committee to hear testimony on a timely and important subject: "U.S. Energy Independence or Interdependence: The Agenda with OPEC."

Events last month at the OPEC ministerial meeting at Qatar have made today's topic—"Energy Independence or Interdependence: U.S. Policy Choices"—a matter of considerable interest, to the United States and other oil-importing nations.

OPEC's decision to adopt a two-tiered pricing system for crude oil, coupled with Saudi Arabia's decision to increase its daily production ceiling to support its lower price, caught most experts by surprise. There have been considerable differences of view over what these events mean for oil-importing nations for the world's developing countries, and for the cartel itself. But out of this welter of opinion and analysis, one fact is indisputable: the United States is paying higher prices than ever for the oil we buy overseas. These higher oil prices, moreover, will soon drive up the cost to consumers of all other energy resources not subject to government controls.

No doubt the United States is less vulnerable to these higher prices than many other oil-importing nations, such as Japan, which have little or no domestic energy production. The U.S. economy is far better able than those of the developing countries to withstand this shock. As a Senator from Massachusetts, in a region also totally without indigenous energy resources, I take very little solace from the fact that the OPEC split will result in Saudi Arabia selling its oil at an increase of five percent instead of ten percent. This is not the kind of diplomatic victory that we—or any oil-consuming country—can afford indefinitely.

This is the third set of hearings which the Subcommittee on Energy has convened to examine U.S. international energy policy. Other congressional committees have also examined this question from time to time. We have listened to speeches on this subject from President Nixon, President Ford, Secretary Kissinger and other officials of the executive branch. Yet, I believe it is fair to say, the United States is as unclear today about its international energy policies as it was during the Arab oil embargo three years ago. And this absence of clarity has resulted in U.S. policies that are confusing and often contradictory.

My hope is that this hearing, where we will hear from some of the most knowledgeable persons in this country, will at least clarify the basic policy choices that are open to the United States and the likely consequences of these choices. It would be my hope that Congress, working cooperatively with the new Carter-Mondale Administration, could then agree on a basic posture for the United States in its international energy dealings and move promptly toward implementation of these policies.

After two years of active consideration of these issues, I am convinced that the U.S. energy program will remain in limbo until we decide how to deal with the reality that this country will be importing substantial amounts of oil for most, if not all, of the balance of this century. And even if, by some miracle, we could become self-sufficient in energy, our closest allies overseas will still be heavily dependent on oil imports. In this sense, the issue of energy independence is a mirage.

We face, instead, a complicated and interrelated set of questions that go to the issue of how much oil this country has to import, from which oil-exporting countries, and on what terms. In approaching this issue, four basic questions must be addressed.

First, how should the United States deal with the OPEC cartel? Assuming we can all agree that the outgoing Administration's initial attempt at rhetorical confrontation—tough talk with little to back it up—is a useless exercise, what course do we follow?

We discussed this question in some detail yesterday. Witnesses were in general agreement that we now face a much-improved situation for conducting bilateral negotiations between the U.S. and individual OPEC states. The growing need of OPEC states for our capital goods, technical expertise, and the like may provide the U.S. with improved bargaining leverage for acquiring OPEC oil on more favorable terms. Iran, for example, is likely to experience considerable losses in revenue due to Saudi Arabia's decision to sell increased amounts of oil at lower prices. This imbalance presents the U.S. with new bargaining opportunities that should be explored immediately.

Second, how should the United States deal with the U.S. multinational oil companies that are this country's agents in acquiring imported oil? There are those who believe that the cartel could not function without the active assistance of our companies—by informally determining the production shares of each OPEC state, by providing assured markets for OPEC oil, and by providing important managerial and technical services. Remove this protection, it is argued, and the cartel would be unable to control the production levels of individual OPEC members; competitive price-cutting and lower prices would soon follow.

Legislatively-imposed divestiture is one remedy that is proposed to deal with this situation. Short of such action, the need for more vigorous enforcement of existing antitrust statutes and a careful review of tax policy as it relates to the overseas operations of multinational corporations is stressed.

There is also a growing body of opinion that the U.S. Government should assume a larger presence in overseas transactions of our oil companies—by acquiring advance knowledge of oil supply contracts, with the right of veto over those contracts deemed not in the U.S. national interest. Regardless of the ultimate disposition of these various policy choices, it is clear that the question of U.S. Government policy towards our multinational oil company is at the core of any serious effort to formulate an effective international energy policy. We plan to examine this issue in some detail this morning.

Third, what, if any, relationships exist between the interests of the United States in acquiring reliable sources of imported oil at reasonable prices and the need for restructuring the world economy, with special concern for the problems of the developing nations?

At the Conference on International Economic Cooperation, now presently in recess, the developing countries have pressed their demands in two areas: the great burden of debt on developing countries (exacerbated by a net energy bill of more than $35 billion last year); and the need to stabilize their income produced by the sale of commodities in the world market. Neither issue is simple; neither can be resolved easily; both are heavy with symbolic significance in terms of the willingness of industrial states to respond to the economic needs of developing nations. Yet, the creation of CIEC has changed the terms of the debate. There is less emphasis on political confrontation by the Group of 77 nations and the developing states have concentrated more on their objective than on the concrete means to achieve it—the objective of increasing and protecting income from the sale of commodities. We will explore this question in greater length this morning.

Fourth, what domestic energy programs are needed to carry out a successful international energy policy? There is general agreement that the existence of an adequately-stocked Strategic Petroleum Reserve would greatly enhance our bargaining power with OPEC and protect us from the political threat of another oil supply interruption. There is also the need to expand the world's supply of oil by encouraging exploration and production in non-OPEC countries. But what should be the relative priority betwee our efforts to reduce consumption and expand energy supplies in this country?

These are the basic issues, in my judgment, that must be faced. Until we do face them squarely, our international energy policies will continue to be characterized by a high degree of improvisation, inconsistency, and confusion. And the American people will continue to bear the brunt of these failures.

Our panel this morning is unusually well qualified to help us in this important inquiry. The panel includes:

Howard Kauffman, President, The Exxon Corporation, New York, New York;

Anne Carter, Professor, Brandeis University, Waltham, Massachusetts;

John Sawhill, President, New York University, former Administrator of the Federal Energy Administration;

John Sewell, Vice President, Overseas Development Council, Washington, D.C.; and

Paul Davidson, Professor, Rutgers, The State University of New Jersey, New Brunswick, New Jersey.

Opening Statement of Representative Brown of Ohio

Representative Brown of Ohio. We will hear from the witnesses then in approximately the following order: Mr. Sewell, Ms. Carter, Mr. Kauffman, Mr. Sawhill, and Mr. Davidson, assuming that they are here at that time.

In a nutshell, the effect of the higher OPEC oil prices of the last few years is to require importing nations to trade more of their real output for each barrel of oil. Instead of turning over 1 percent of real output to OPEC for oil, some countries might have to start turning over 2 percent or more.

While the shift is made to higher percentages, real income left over in the importing nation dips; that is, the new percent is reached, growth of disposable income once again resumes.

The developed world can survive this dip which is largely taking place already, but it will continue to be impacted as long as prices are forced up by the OPEC countries. The West now gives slightly more of its economic activity to the production of all goods OPEC nations like to buy while the production of other goods fell as a percent of GNP, but only fell temporarily in absolute terms.

Our balance-of-payments problems during the transition were handled by the redeposit of OPEC earnings in western banks which lent to those consuming nations that did not receive the original deposits. Then as OPEC spent the proceeds, lending only had to continue to these countries from which OPEC was not buying more goods. In the long run, each consuming country has to find something to sell either to OPEC or to a country running a surplus with OPEC to earn the money back to pay for its oil.

Third world nations have had a harder time, because the dip in real income was a dip in a very low income in the first place, barely above subsistence. These crippled development plans of many poor nations which could not reduce consumption and had to give up funds that had been earmarked for growth. These nations were forced to borrow heavily from western banks, not only to maintain consumption but to invest in facilities that would inable them to produce more exports to pay for the oil in the future.

Insofar as the third world has been unable to make the investment exchange rate adjustment to enable it to export more to pay for its oil, it is still dependent upon bank loans, foreign aid or reduced consumption to make ends meet. This also applies to developed countries, which have refused to ask their citizens to go through the adjustment process, that is Italy and Britain.

If we wish to assist the third world and those countries that have not adjusted, we can encourage investment by OPEC of some of its profits into developing projects in developing nations. We could lower tariffs of developed countries on third world products to help them earn foreign exchange or grant them direct foreign aid.

We should plan this assistance, if there is to be any. We should not let the countries' leading banks think that they are free to lend enormous sums to risky third world nations or other risky nations on the theory that the Federal Reserve System or the Congress could be pressured into bailing out either the bank or the borrowing nation in the case of default.

Ultimately the third world must adjust by attracting capital investments to increase exports to earn money to pay for the oil. We must see to it that any assistance we give them is not simply used to avoid adjusting, but rather, to develop a rational policy in the oil industry.

Senator Javits, do you prefer to make an opening statement?

Senator JAVITS. Thank you very much, Mr. Chairman. I have no opening statement.

Representative BROWN of Ohio. Our first witness then is John Sewell, vice president, Overseas Development Council, Washington, D.C.

Mr. Sewell, you may either submit your testimony and summarize it or you may proceed with your testimony as it is prepared.

STATEMENT OF JOHN W. SEWELL, VICE PRESIDENT, OVERSEAS DEVELOPMENT COUNCIL, WASHINGTON, D.C.

Mr. SEWELL. I would like to summarize what I put in the prepared statement that I gave to you, and then ask if you have questions or comments.

Representative BROWN of Ohio. I think we will proceed with hearing all the witnesses and then open it up for questions and encourage, perhaps request the witnesses to have a little reprise with each other if they feel so moved. Otherwise, we will raise that in our questions.

Mr. SEWELL. I would like to make several points which were raised in the subcommittee's letter to me. These were summarized in the first part of the prepared statement. Attached to that are two longer documents. One is a background piece on relations between the United States and the developing countries, taken from "The United States and World Development: Agenda 1977," the Overseas Development Council's annual assessment of U.S. relations with the developing countries, and the other is a forthcoming publication, "Energy and Development: An International Approach," by my colleagues at the Overseas Development Council concerning a global approach to the energy problem.

I do not particularly consider myself a specialist in energy matters nor in the internal dynamics of OPEC. You heard from a number of people yesterday who are specialists and will hear from more today. I will leave those specialized questions to them. I approached the issues you raised, rather, from the standpoint of someone involved in analyzing the relationships between the United States and the developing countries in general. Much of what I have to say is going to be based on the Council's forthcoming publication, "The United States and World Development: Agenda 1977," which I mentioned earlier.

I would like to make basically five points which may be useful for your deliberations on these questions of U.S. energy policy and whether we should follow an interdependent or independent energy policy.

First, the relationship between the decision of the members of the Organization of Petroleum Exporting Countries on the price of oil and the demands of the developing countries in the South for a much greater voice in the management of the world's economic and political systems is a very difficult and complex one.

A positive U.S. response to the proposals of the developing countries probably would not be the dominant factor in future decisions by OPEC on oil prices; but a continuing reluctance by the industrialized countries, particularly by the United States, to negotiate seriously with the developing countries, may well provide OPEC with much greater freedom for larger price increases in the future.

Obviously OPEC makes their decisions on prices based upon a variety of factors. Their identification with the oil-importing developing countries seems to be a part, but I would guess not a major factor, in those decisions. Nevertheless, I think it is important to realize that there is a close economic, political, and psychological linkage between the oil-exporting and the oil-importing developing countries, and both certainly favor using the power and leverage of OPEC to pressure the industrialized countries to negotiate seriously on these issues. I think this was made clear by Sheik Yamani's statement after the recent OPEC meeting where he linked Saudia Arabia's moderation to progress on the Israel-Arab issue and on the North-South dialog now going on at the Conference on International Economic Cooperation in Paris. Therefore, I would say that while our attitude

90-664—77——6

toward the developing countries will not be the determinant factor in OPEC price decisions, the continuing reluctance on the part of the United States to engage fully in North-South discussions will clearly give OPEC greater freedom to increase prices in the future.

Members of OPEC are willing to use their leverage to enhance the bargaining strength of other developing countries. I think we should all be concerned that we may see much higher prices in the future if some progress is not made in the negotiations between the developed and developing countries.

I would also say there are secondary benefits concerning our relations with OPEC stemming from a more positive approach to the problems of the developing countries. First of all, oil supplies from non-Arab OPEC members will again be of crucial importance if there is an embargo resulting from renewed conflict in the Middle East. In 1976, some 40 percent of our imports of crude oil came from non-Arab OPEC members. Our leading suppliers from that group—Nigeria, Indonesia and Venezuela—put a high priority on the matters being discussed in the North-South dialog. To the extent we respond positively in that area, our relations with these countries will be improved. Finally, a forthcoming U.S. response to the needs of the developing countries may lead to some degree of increased pressure from the developing countries themselves for a more effective, positive OPEC response to their needs. I don't want to overplay that. I would guess it would not affect the price we have to pay for oil, but would rather be reflected in the expanding programs of aid and other financial pressures for the developing countries themselves.

The second point I would like to make is that both OPEC and the oil-importing developing countries see their continuing alliance as a major asset in persuading the industrialized countries to negotiate change in the existing international economic order. Those political and economic alliances, enhanced by an intangible psychological and emotional identification, means that attempts to split OPEC and developing countries will be both unwise and unprofitable.

I think it is worthwhile remembering that the demands for a new international economic order do not emerge de novo in late 1973 after the oil embargo. They result from long years of deliberations among the developing countries themselves in the group of Nonaligned States and in the United Nations' Conference on Trade and Development (UNSTAD) both of which were established in the early 1960's. These discussions have led to a cohesive, coherent set of proposals.

Whether or not we disagree with these proposals, they were well thought out, and are the predictable outcome of more than a decade of fruitless efforts to evoke a significant response from the developed world to what they see as their central problem: the fact that they feel they are being unfairly treated in a variety of ways by the industrial world on which they are highly dependent for their economic well-being. They think they are getting less for their exports; paying more for their imports; and very little has been done to increase their access to markets in the developed countries for the manufactured goods they produce.

The strength of this alliance shouldn't be underrated, particularly by Americans who have gone through a somewhat analogous experi-

ence in the rise of the trade union movement in this century or in the pressures from minorities—blacks, Hispanics, women—for increased rates and status within our own society.

It also has parallels in some ways to the emergence of Japan in the end-of-war period where we learned that pressure from outsiders, if not accommodated, can lead to economic problems. It is interesting to note also that the cohesion betwen the two groups within the developing countries hasn't been particularly affected by the rather severe impact the developing countries themselves have felt from the higher prices of oil. It has been estimated, that if the current price increase in 1977 ends up averaging 10 percent, the developing countries are going to pay an additional $1 billion on top of their current oil bill, which already has put them into financial distress.

It is worth noting, I think, though that since 1973 both the Ford and Nixon administration policies have been in one way or the other to keep the demands of the developing countries and the issues of our relationships with OPEC separate. The first set of policies seems to be to make the developing countries hurt as much as possible in the hopes that their screams would pressure OPEC to lower oil prices. Then when that policy failed there has been a careful effort to keep apart the issues of oil prices and the issues of concern to the developing countries.

Both policies in my view have failed. Oil prices have not gone down and the problems of the developing countries, remain largely unresolved. I think the experience over the past 12 months in the Council of International Economic Cooperation in Paris indicates that despite a series of stresses and strains within the developing countries, the cohesion between them has been maintained.

The third point I would like to make is that a U.S. policy which seeks to deal with OPEC by strengthening bilateral relationships between countries may not necessarily have much of an impact upon oil-pricing policies in the absence of a serious domestic conservation program and a variety of other measures, will not measurably diminish the cohesion between OPEC and the oil-importing developing countries, and will not address some of the pressing global problems now facing both the developed and the developing countries, of which energy is just one.

First of all, I would guess that strengthened bilateral relationships between the United States and individual OPEC countries are not likely to diminish their collective desire to force changes in the existing international economic and political systems.After all, our relations with a number of OPEC countries have intensified drastically since 1973. I don't see any decreases in the pressure for changes in these systems.

There has been an alternative proposed by a number of observers who recommended that not only should the industrialized nations seek cooperation and intensification of relationships with OPEC members, but that we should carefully pick one or two major powers from within each geographical region of the developing world and, in effect, bring them into the club.

We might seek, therefore, to deal with, say Nigeria and Zaire in sub-Saharan Africa; Egypt; as well as Saudi Arabia and Iran in the Mid-

dle East; Mexico and Brazil in Latin America; perhaps India or Indonesia in Asia. These countries would be treated as "representatives" of the remaining developing countries, and would be given positions of power in various international organizations.

My guess, however, is that this policy would involve all the costs of a more positive response, which I will outline in a minute, and none of the benefits. After all, countries such as India and Brazil are demanding far-reaching changes in trade and commodity policies. We would, therefore, be forced to make much the same concessions on these issues which we would also have to make in much broader solutions to these same problems.

The fourth point I would like to make is that relations with the developing countries themselves have to be considered in their own right, not either as an adjunct to our relations with OPEC at the current moment or as in the cold war period as a derivative of American interests in some other parts of the world. I feel that relations with developing countries should become one of the major concerns for American foreign policy in the years ahead. I don't want to go into this in any detail at this point, but I think it is fair to point out the world we are going to face in 1977 and beyond is in a state of rapid change, so much so that to say that is almost a cliché.

We are beginning to realize that the political systems created after World War II are no longer adequate for our needs and that there is a growing understanding that the situation of the world's poorest billion people who live in the 40-odd poorest countries is going to get worse unless special measures are taken by rich and poor to enable those countries to meet the basic minimum needs of the majority of people within some reasonable period of time.

We now know we need a whole host of new systems. We are in the midst of creating a new sort of monetary system. There is a great deal of discussion of the need to consider more comprehensively both the world food and energy problems.

And we are beginning to realize that social problems such as population growth cannot be controlled and narcotics traffic can't be handled unless all nations agree to handle it together.

Finally, I would submit the United States has a growing economic interest in what is happening in the developing countries. More of our exports, for instance, go to the nonoil-producing developing countries than to the members of the European community, Eastern Europe and the Soviet Union combined. They provide a great number of jobs in this country. If the developing countries were to continue to grow as they did in the last decade, that would mean an even greater number of jobs.

My final and last point is that the United States at this moment, particularly with the Carter administration, has an opportunity to transcend the current strained relationships between the United States and developing countries and to take the lead in reforming and restructuring many of the world's political and economic systems so they benefit everybody.

One element of such policy could include a global approach to world energy needs which might have the promise of helping to meet this country's needs for energy, but not just petroleum-based energy. I

would argue there are a number of benefits, both tangible and intangible, to be derived from such an approach which includes three elements.

Senator JAVITS. Would you mind talking a little bit more slowly? I am listening closely, but I must say you are beginning to lose me.

Mr. SEWELL. The new policy geared to current realities would include three elements: The first would be a response to the various proposals now on the table for changes in the world's trading system, the world's commodity system, and the world's monetary system.

The second would be a global approach to the three key issues of food, energy and oceans. The third element would be a concerted address by both the industrialized countries, and OPEC; and, I would maintain, the centrally planned economies, to the problems of the world's poorest billion people.

I will be happy to go into this in detail. I am trying to hold to 15 minutes.

Let me spend one short period of time on a global approach to energy patterned after the approach which has already been taken in the food area after the Rome World Food Conference.

It would recognize that the goal of energy independence is impossible to achieve, but that the possibility of achieving energy security through an approach that more clearly recognizes the realities and opportunities of our energy interdependence is a possibility.

I draw this from the work of one of my colleagues at the Council, James Howe, who has written extensively on this area, and whose ideas are summarized in the attachment to my testimony today. It would include several elements: First, the initiation of global energy analysis and planning. It is somewhat of an anomaly that we have quite good estimates of the world food situation and projections of at least a decade or more in to the future based mainly on the work of the United Nations' World and Food Organization. We are only beginning to get this kind of analysis on planning in the energy field on a global basis.

The second element would be much wider cooperation in the exploration for additional fossil fuel resources to increase the existing supply not only of oil, but coal and other fuels. It is generally recognized that most of the oil that will be discovered in the future is in non-OPEC member countries. It seems to me a much greater exploration of the possibility of these resources plus other fossil fuels must be begun if we are to overcome our current difficulties.

The third element would be a collective reconsideration of the nuclear option which recognizes the dangers inherent in continuing reliance on nuclear energy. I won't go into that issue for the members of this group.

The fourth would be redirecting world energy research and development toward a much greater emphasis on renewable sources of energy, to benefit us directly in our own energy supply and to give the developing countries an alternative to continuing reliance either on petroleum energy or nuclear energy. Currently, I believe some 10 percent of U.S. R. & D. expenditures go into this type of research.

Finally, we would suggest the convening of a world conference on energy alternatives analogous to the recent United Nations Confer-

ences on Population, Food, and Housing. We conclude that an interdependent approach to energy is not a threat to our energy security. Independence would be far more costly to the United States and could itself lead to deepening global economic confrontation.

Therefore, let me summarize by saying that a global approach to restructuring our relations with the developing countries would treat these relationships as intrinsically important in their own right. It would hopefully begin to defuse the dangers inherent in the growing confrontation between the North and the South with subsequent savings for both sides. It would recognize the developing countries themselves are not monolithic, but that they will maintain a common front so long as the United States and the industrialized countries don't enter into serious negotiations.

Finally, and I cannot overemphasize this, it would put this country in a position of leadership that we have not enjoyed since the beginning of the last decade. Let me say, in conclusion, that unfortunately the new administration is not going to have the luxury of making these decisions in a very leisurely fashion. Currently we are committed to participate in at least three major meetings in the months of 1977, at which both OPEC and the developing countries will be looking for some indication of changes in preexisting U.S. policies. These are the proposed ministerial meetings of the CIEC, the opening of the commodity negotiations to which we agreed, albeit reluctantly, at the meeting of UNCTAD last May in Nairobi; and the resumption sometime in the spring of the United Nations General Assembly.

Therefore, the decision will have to be made early in this administration about how the United States will respond to what is a traditionally changed international environment.

Thank you very much.

[The prepared statement and attachments of Mr. Sewell follow:]

PREPARED STATEMENT OF JOHN W. SEWELL

Energy Independence or Interdependence: U.S. Policy Choices

Mr. Chairman and members of the subcommittee: you have asked me to comment on the policy choices open to the United States that will move this country toward a ". . . more realistic goal of assured supplies of imported oil at reasonable prices." Specifically, you asked if the United States should take the lead in negotiating a broad agreement among oil exporting nations, the industrialized consuming nations, and the LDCs, perhaps within the framework of the Conference on International Economic Cooperation which would involve U.S. concessions to the developing countries in return for OPEC restraint on oil pricing. Or, alternatively, should the United States engage in an approach which would focus on more aggressive bilateral negotiations with individual OPEC members linking their need for U.S. capital goods and technical supplies to our need for OPEC oil.

I would like to make several points in reaction to the questions you raised and then summarize what has led me to these conclusions. More detailed background to these issues is contained in the attachments to my testimony. I should point out, however, that I do not consider myself a specialist in energy matters, nor in the internal dynamics of the Organization of Petroleum Exporting Countries. You already have heard from a number of distinguished specialists on these questions who are far more expert than I. Rather, I have approached the questions you raised from the standpoint of someone who has been thinking about American relations with the developing countries, a group which includes the members of OPEC, for the past several years. Indeed, much of my testimony will be based on the Overseas Development Council's forthcoming annual assess-

ment of American relations with the developing countries, The United States and World Development: Agenda 1977, of which I am project director. I should add, of course, that the views I am expressing here are my own and not necessarily those of the Overseas Development Council, its Directors,, or my colleagues on the Council's staff.

Specifically, I would like to make the following observations which may be useful for your deliberations:

1. The relationship between the decisions of the members of the Organization of Petroleum Exporting Countries on the price of oil and the proposals of the developing countries for a greater voice in the management of the world's political and economic systems, and for a greater share of the resulting material rewards, is complex and difficult to assess. A positive U.S. response to the proposals of the developing countries probably would not be the dominant factor in future decisions by OPEC on oil prices. However, a continued reluctance by the industrialized countries, and particularly the U.S., to negotiate seriously with the developing countries can provide OPEC with greater freedom for larger price increases in the future.

The experience since 1973 indicates that OPEC countries make their pricing decisions based on a variety of factors including global inflation and the state of health of the world's economy. Their identification with the oil-importing developing countries seems to be a part but not a major factor in these decisions. Yet for reasons discussed below, there is a close political, economic, and psychological linkage between the oil-exporting and non-oil-exporting developing countries and both favor using the power of OPEC to pressure the industrialized countries to negotiate seriously on these issues. Sheikh Yamani made it quite clear that Saudi Arabia's current moderation on price increases should result not only in progress in the Arab-Israeli dispute, but also in the North/South Dialogue now going on at the Conference on International Economic Cooperation (CIEC) in Paris. And indeed many other OPEC leaders from countries who chose the higher price increase have expressed dismay at the lack of progress at the Paris talks.

While a positive U.S. approach to the North/South Dialogue may not in and of itself determine price decisions, a continuing reluctance on the part of the U.S. to engage fully in discussions with the developing countries will give OPEC greater freedom to increase prices in the future. The shaping of a new relationship with the developing countries is of intrinsic importance for the United States, as will be discussed later, but it is important to underline that the members of OPEC are willing to use their leverage to enhance the bargaining strength of other developing countries. And I think it is fair to be concerned that we may see much higher price rises in the future if some progress is not made in the negotiations between the developed and the developing countries.

There also may be secondary benefits from a positive U.S. response to the demands of the developing countries. In the event of another oil embargo stemming from renewed conflict in the Middle East, oil supplies from non-Arab OPEC members will again be of crucial importance to the U.S. In 1976 some 40 percent of U.S. imports of crude oil came from non-Arab OPEC members. Our leading suppliers from this group—Nigeria, Indonesia, and Venezuela—all put a high priority on the issues being discussed in the North/South Dialogue. To the extent that we respond positively in this area, our relations with these countries will be improved. Finally, a forthcoming U.S. response to the needs of the developing countries may lead to some degree of increased pressure from the developing countries for a more positive OPEC response to their needs. This response, however, probably will not be reflected in the price of oil paid by the industrialized countries but rather in aid and other financial measures for the developing countries. Even then, however, I understand the financial capacity of the major oil exporters to expand such programs may diminish greatly in the future.

2. Both OPEC and the oil-importing developing countries see their continuing alliance as a major asset in persuading the industrial countries to negotiate changes in existing international economic and political arrangements. This political and economic alliance is enhanced by an intangible psychological and emotional identification that will mean attempts to split the two groups through confrontation will be both unwise and unprofitable.

It is worth noting that the complex series of proposals by the developing countries for a "New International Economic Order", which are now under negoti-

ation between the industrial "North" and the developing "South", did not emerge *de novo* in late 1973. Rather, they result from a long series of deliberations and discussions stemming back to the establishment in the early 1960s of the Group of Non-Aligned Countries and the United Nations Conference on Trade and Development (UNCTAD). These groupings have brought together a group of seemingly disparate states which now have a coherent and well-formulated series of proposals for change. These proposals are the predictable outcome of more than a decade of fruitless efforts to evoke a significant response from the developed world to what they see to be their central problem: the fact that they are being unfairly treated, in a variety of ways, by the industrial world on which they are highly dependent for their economic well-being. They maintain that by and large they are receiving less for their exports, mainly raw materials and commodities, and paying more for the industrial goods they import. In addition, they feel that very little has been done by the developed world to remove the obstacles to their access to developed country markets for the increasing amounts of manufactured goods they produce.

The strength of this alliance should not be underrated. Indeed, it is important to realize that the OPEC countries see themselves as members of the developing world and have been perfectly willing to use the leverage provided by the dependence of the industrialized world on their petroleum supplies to support the current demands of the developing countries. There have been a number of attempts to split the two groups, and their cohesion has not been substantially affected by the rather severe impact of higher oil prices on the oil-importing developing countries. It is estimated, for instance, that if the current price increase ends up averaging 10 percent, an additional $1 billion will be added to the oil bill of the developing countries, which already are in severe financial distress.

The Ford and Nixon Administration first sought to break OPEC by denying the oil-importing developing countries any relief from the burdens posed by higher prices for both oil and industrial goods in the hopes they would turn against the oil exporters. Since then the policy has been to carefully separate the issue of oil prices and the negotiations with the developing countries. Both policies have failed. Oil prices have not gone down and the problems of the developing countries remain largely unresolved. Indeed, the recent experience with the Council of International Economic Cooperation in Paris indicates that despite a series of stresses and strains within the group of developing countries, the cohesion between the developing countries and OPEC has been maintained.

3. A U.S. policy which sought to deal with OPEC by strengthening bilateral relationships with individual countries may not necessarily have much impact on oil pricing policies in the absence of a serious domestic conservation program and a variety of other measures, will not measurably diminish the cohesion between OPEC and the oil-importing developing countries, and will not address some of the pressing global problems now facing both developed and developing countries of which energy is just one.

As the linkages between OPEC and the oil-importing developing countries are likely to remain intact, strengthened bilateral relationships between the United States and individual OPEC countries are not likely to diminish their collective desire to force changes in the existing international economic and political systems. Some analysts have suggested an alternative which would be to seek active cooperation with OPEC members and with one or two of the major powers within each geographical region of the developing world. The U.S., therefore, might seek to deal with a group which might include Nigeria and Zaire in Sub-Saharan Africa; Egypt in the Middle East (as well as Saudi Arabia and Iran from OPEC); Mexico and Brazil in Latin America; and perhaps India or Indonesia in Asia. These countries would be considered as surrogates for the remaining developing countries, and the rich and more powerful of this group would be given a greater voice in the various international institutions now dominated by the industrialized world.

This policy, however, still would have to involve concessions on a number of issues now in contention between the developed and the developing countries. Trade and commodity issues, for instance, are important to countries like Brazil and India and for this policy to succeed the current U.S. positions on these issues would have to change. Such a policy would, in my judgment, involve all of the costs of responding to the demands of the developing countries without some of the long-term benefits that could be derived from the global approach outlined below.

4. Relations with the developing countries have to be considered in their own right and not either as an adjunct to our relations with OPEC or, as in the Cold War period, as a derivative of American interests in some other part of the world. Rather, relations with the developing countries should become one of the major concerns of American foreign policy in the years ahead.

The world Americans face in 1977 is in a state of rapid change. Global economic growth and expanding population have put severe strains on the multiplicity of economic and political institutions created after World War II which contributed so greatly to growth and progress among the industrialized countries. At the same time the world's political environment has changed drastically and the developing countries are now demanding a greater voice in the management of and benefits from the world's economic and political systems. There also is a growing realization that the situation of the billion people living in the world's poorest countries will worsen unless special measures are taken by both rich and poor countries to enable these countries to meet the most basic minimum needs of the majority of the people within a reasonable period of time. These developments are forcing a major restructuring of the world's political and economic systems, a restructuring in which developing countries are playing a major role. Therefore, relations with the developing countries must become a major concern of American foreign policy, joining relations with our industrial partners and with the Soviet Union and China as one of the central issues for Americans for the next decade and beyond.

The developing countries will be of importance if the global problems now facing both rich and poor countries are to be resolved by all nations working together. We now are in the midst of slowly creating a new monetary system and negotiating a new regime for the oceans. In addition, there is discussion of the need to consider more comprehensively than heretofore the world's food and energy problems. Many Americans also now perceive that the social cost of problems such as terrorism or the narcotics traffic cannot be handled unless there is cooperation between nations, both rich and poor. We also have a growing economic interest in the economic progress of the developing countries. More of our exports now go to the non-oil producing developing countries than to the members of the European community, Eastern Europe, and the Soviet Union combined. Our exports to these developing countries now provide a large number of jobs in this country's export industries and these industries should continue to expand in the future. In addition, the developing countries are continuing to grow in importance as sources of raw materials and consumer goods, both of which can affect inflation in the U.S. For all of these reasons we should consider our U.S. relations with the developing countries as of intrinsic importance and not merely as an adjunct to our relations with the OPEC countries.

5. The U.S. and the Carter Administration have a major opportunity to transcend the current strained relationships between the U.S. and the developing countries, and to take the lead in reforming and restructuring many of the world's political and economic systems so that they provide maximum benefits for all countries, whether developed or developing. One element of such a policy could include a global approach to world energy needs which might have the promise in the long-run of helping to meet this country's need for energy (but not just oil) security.

There are a number of tangible and intangible benefits to be derived from a new U.S. foreign policy which has as its goal what the political scientist Stanley Hoffman recently called "world order politics." It would involve in the case of the developing countries creating a new series of cooperative global policies and institutions which are designed for the needs of the next decade and beyond. These policies will be spelled out in detail in the Council's forthcoming Agenda 1977, but in essence they would involve three elements: first, a response to the proposals of the developing countries for changes in the world's trade, commodities, and monetary systems; second, a global approach to food, oceans, and energy; and third, a concerted address of the problems of the world's poorest people, who live mainly within the world's 40-odd poorest countries. To do so would involve a number of changes in current U.S. policies on issues of trade, commodities and debt; it would imply full implementation of the recommendations of the Rome World Food Conference; renewed attempts at reaching agreement on an oceans regime; a global attack on energy security; and an increase in U.S. development assistance focussed on the poorest countries.

A global approach to energy patterned after the approach taken in the field of food may be of particular interest. It would recognize that the goal of energy

interdependence is impossible to achieve, but that the possibility of achieving energy security through an approach that more clearly recognizes the realities and opportunites of our energy interdependence is a possibility. It would include the following elements which are drawn from the work of my colleagues at the Overseas Development Council and which are spelled out in detail in an attachment to my testimony. It includes initiation of global energy analysis and planning; cooperation in the exploration for additional fossil fuel resources in order to increase the existing supply, not only of oil but also of coal and other fossil fuels; collective reconsideration of the nuclear option which recognizes the dangers inherent in continuing reliance on nuclear energy; redirecting world energy research and development toward a much greater emphasis on renewable sources of energy which would benefit both the U.S. and give the developing countries an alternative to continued reliance on petroleum; and finally, the convening of a world conference on energy alternatives analogous to the recent U.N. conferences on population, food, and housing. An interdependent approach to energy is not a threat to our energy security. Energy independence would be far more costly to the U.S. and could itself lead to deepening global economic confrontation. It is time to recognize the opportunities implied in a global approach emphasizing energy interdependence.

A global approach to restructuring our relations with the developing countries recognizes the changing nature of international politics and sets the pattern for the future rather than the past. It would largely defuse the danger inherent in the growing confrontation between the North and the South with subsequent savings for both sides. It also quite frequently recognizes that developing countries are not monolithic but that the developing countries are maintaining a common front so long as the U.S. and the industrialized countries will not enter into serious negotiations. Finally, it would put the U.S. in a position of leadership that this country has not enjoyed since the late 1960s.

Let me say in conclusion that the U.S. will not have the luxury of making decisions on all of these issues in a leisurely fashion. Currently we are committed to participate in at least three major meetings in the early months of 1977 at which both OPEC and the developing countries will be looking for indications of changes in current U.S. policies. These are the postponed ministerial meetings of the CIEC, the opening of the committee negotiations agreed to at the meeting of UNCTAD last May in Nairobi, and the resumption of the United Nations General Assembly. Therefore, decisions will have to be made early in this Administration about how the U.S. will respond to a drastically changed international environment.

Attachments.

THE UNITED STATES AND WORLD DEVELOPMENT: AGENDA 1977

The world Americans face in 1977 is in a state of rapid change. Global economic growth and expanding populations have put severe strains on the multiplicity of economic and political institutions created after World War II which contributed so greatly to growth and progress among the industrialized countries. At the same time the world political environment has changed drastically and the developing countries now are demanding a greater voice in the management of the world's economic and political systems, and a greater share of the resulting material rewards. Finally, there is a growing realization that the situation of the billion people living within the world's poorest countries could worsen unless special measures are taken by both rich and poor countries to enable these countries to meet the most basic minimum needs of the majority of their people within a reasonable period of time.

These developments are forcing a major restructuring of the world's political and economic systems created after World War II, a restructuring in which the developing countries will play a major role. It has become increasingly clear in the last several years that in 1977 and beyond, the choice of treating policy toward the developing countries as a derivative of American interests in some other part of the world is a luxury that is no longer possible. Relations with the developing countries now must become a major concern of American foreign policy, joining relations with our industrial partners, and with the Soviet Union and China, as one of the central issues for Americans for the next decade and beyond.

Many observers, particularly in the United States, see these developments as a threat, and indeed a failure of post-war American foreign policy. Yet this

need not be the case. The current situation is part of a process of continuous adjustments in the international system that has been going on for at least a century. The disappearance of the former colonial empires, the emergence of the European Community, and the evolution of a new relationship between the Soviet Union and the industrialized countries are part of a process of bringing new states into the international system and adjusting relationships among states already fully participating. Where this historic process has been handled with foresight and statesmanship, as in America's relationships with the European states and Japan after World War II, the accommodation to new realities has worked to the benefit of all nations. When it has been handled poorly, as with Japan in the pre-World War II period and the OPEC nations in the 1970s, it has led to a variety of crises and increased costs.

Those who feel threatened by the current assertiveness of the developing countries and their seemingly intractable poverty also miss the point that much has been achieved since 1945. More than 80 countries have become independent. Development has been accepted as a goal by most of these countries, although there is much controversy over its definition. During the 1960s, the developing countries as a group achieved impressive growth rates surpassing those experienced by the industrialized countries during comparable stages of development. And while the income gap between rich and poor countries continues to widen, the life expectancy "gap" has been slowly narrowing at least since 1960. Population growth is slowing in an increasing number of developing countries as birth rates fall even faster than death rates.

THE NEW PERCEPTIONS OF A RAPIDLY CHANGING WORLD

The opportunities to resolve some of the current differences between rich and poor countries so that all benefit are available. But to take advantage of them will mean that both sides will have to understand that neither will be able to achieve its own goals unless the needs of the other are accommodated.

These opportunities, however, must be acted upon at a time when the perception is growing in both rich and poor countries that there are a number of new factors at work in the international environment which will affect policy choices and also will help to determine the eventual outcome of international decisions.

The Need for New Global Systems.—The last decade has been marked by the emergence of global political and economic interdependence on a scale hardly imaginable at the end of World War II. This interdependence has been manifest in such seemingly unrelated phenomena as the continued 'stagflation' in the industrialized economies, the depletion of the world's fisheries, the impact of a four-fold increase in the price of oil, and in the continuing threat of a world food shortage.

These developments have led many observers in both the rich and poor countries to conclude that these global problems will not be resolved unless they are addressed by most if not all nations working together. Thus, the world is in the midst of slowly creating a new monetary system and negotiating a new regime for the oceans, and there is discussion of the need to consider more comprehensively than heretofore the world's food and energy problems. Many Americans now perceive that the social costs of problems such as terrorism or narcotics traffic also cannot be handled unless there is cooperation between most nations, rich and poor.

A still less widely understood aspect of increasing interdependence is America's economic interest in the economic growth and progress of the developing countries. At present 27 per cent of our exports, more than we sell to the members of the European Community, Eastern Europe, and the Soviet Union combined, now go to the non-oil-producing developing countries. These exports have increased from under $6 billion in 1955 to nearly $25 billion in 1974. If the developing countries were to grow at the same rate in the next decade as in the 1960s and if the U.S. share of developing country imports also were to remain the same as in the past decade, these countries could be expected to import an additional $27 billion of goods per year from the United States by 1985. That total could mean up to two million additional jobs in this country's export industries. The importance of the developing countries as sources of raw materials and consumer goods will continue to grow; this can contribute significantly to containing inflation in the United States. In the short run, their economic growth also will be necessary if they are to repay the heavy burden of debts that will be

coming due in the next few years. Thus, the continued growth and progress of the developing nations is directly in the U.S. interest.

The Emergence of the Developing Countries.—At the same time the developing countries are pressing, with ever-increasing vigor, for major changes in the international economic and political structures that have governed international relations since 1945. The pressure for fuller and more equitable participation in existing institutions from countries and groups that consider themselves disadvantaged has many parallels, both internationally and domestically. It is analogous, for instance, to the drive by Japan prior to World War I and then in the interwar period for equal standing in the international system. It also has parallels to the emergence of organized labor in this country in the late 1920s and 1930s. But in each case the world learned after much resistance by those in power and after prolonged struggle and strife, that accommodating to the demands of those on the outside for full participation within the system paid both political and economic benefits for those in power and those out of power.

The demands of the developing countries are the predictable outcome of more than a decade of fruitless efforts to evoke a significant response from the developed world to what they see to be their central problem: the fact that they are being unfairly treated, in a variety of ways, by the industrial world on which they are highly dependent for their economic well-being. They maintain that by and large they are receiving less for their exports, mainly raw materials and commodities, and paying more for the industrial goods they import. In addition, they feel that very little has been done by the developed world to remove the obstacles to their access to developed country markets for the increasing amounts of manufactured goods they produce.

The new assertiveness of the developing countries also finds its roots in the desire to end what they see as their second-class political status. In effect, they see themselves as subject to all the rules of the international economic systems, but with little or no voice in the formulation of those rules. There also is a growing frustration with the lack of results achieved over the past two decades of applying conventional development strategies patterned after those followed in the North. While some developing countries have experienced high rates of economic growth, the distribution of the results of that growth in most poor countries has left much to be desired.

It is important to remember that the current demands of the developing countries did not emerge *de novo* following the events of late 1973 and 1974. Rather, they originated at least a decade earlier in two separate but related developments. The first was the establishment in 1961 of the Group of Non-Aligned States which met most recently this past summer in Colombo, Sri Lanka. The second is the emergence of what is now known as the "Group of 77" developing countries which was established during the first conference of the United Nations Conference on Trade and Development in 1964 in Geneva. UNCTAD, which is seen by the developing countries as their own organization within the U.N. system, has met five times since then. most recently in Nairobi in May of last year. The results of the extensive discussions, studies, and network of contacts which have been established through these two groups have resulted in a series of developing country positions on a range of global issues. Their proposals have been subjected to extensive analysis and discussion among a variety of different developing countries which, on the surface, would seem to have differing and often disparate interests. It is important to realize that the alliance with OPEC came well after the developing countries had sought strength in their own unity.

These long-standing discontents were catalyzed by the 1973 Arab-Israeli War, and the subsequent oil embargo and dramatic price increase of petroleum. These events demonstrated that concerted economic action by a group of militarily weak states could force political concessions and a transfer of resources from the industrialized world to heretofore relatively powerless countries. It is unlikely for a variety of reasons that any other group of raw material producing states will be able to emulate effectively the oil-producing countries in drastically increasing prices or using an embargo for political purposes. Nevertheless, the political and psychological impact of the events of the past several years will remain very great; and the developing countries have fully absorbed the lesson that their strength vis-a-vis the industrialized world lies in their unity.

In brief, the developing countries are proposing a "new international economic order" that includes: 1) nondiscriminatory and hopefully preferential treatment

for their manufactured goods in the markets of the industrialized world; 2) higher prices for their commodities; 3) curbs on the activities of multinational corporations and greater access on more favorable terms to the technology of the industrialized countries; 4) a growing share in the world's industrial production; 5) a greater voice in the management of the world's monetary system, and a greater share of any new reserves created in the future; and 6) a new aid relationship that would be less demeaning and which would transfer greater resources on a more automatic basis. They also would like the official debt of the developing countries, which has grown 50 per cent in the last two years, to be renegotiated.[1]

The years since 1973 have been marked by a series of sometimes bitter political confrontations between the developed and the developing countries as these demands were presented at almost every international meeting. In each case the demands of the developing countries for changes in the internal economic order were not new.

What was new is their belief that they had at their disposal new bargaining power both in their own unity and in alliance with the oil-producing countries. In addition, they believed that by putting all their demands in one package—calling for a "new international economic order"—they could gain added bargaining strength. The continuing unity of these two groups, which has been maintained despite the very heavy adverse effects of the higher oil prices on many developing countries, has been one of the largely unforeseen developments of the past two years. Indeed, those who still maintain that the current unity of the LDCs including OPEC is ephemeral miss the central point that the basis for their demands is political. Therefore, they may in some cases appear to act against their individual short-run economic interests for the sake of political impact and long-run gains.

There is still much debate, however, about the durability of the alliance between non-oil-producing and oil-producing developing countries and, indeed, of the cohesion among the non-oil-exporting developing countries themselves. Until now this cohesion has remained strong.

But it is an open question how long this cohesion can be maintained. While the developing countries are cognizant that unity is important, that unity is threatened in two ways. If confrontation is resumed, then individual countries may diverge on tactics. But if negotiations are seriously joined between developed and developing countries, the differing economic interests of the various developing countries will quickly become apparent. There already are differences emerging among the developing countries over questions of a debt moratorium, which is opposed by some better-off countries because it would affect their ability to borrow in the future, and over an emphasis on better prices for primary commodities compared with more favorable market access for their manufactured goods. Similar splits have been evident during the Law of the Seas negotiations, where the interests of the coastal states diverged sharply from those that are landlocked or otherwise "disadvantaged." In fact, some observers maintain that the pace of negotiation in 1976 slowed down because of these differences among the developing countries stemming from their diverging interests. To some degree the unity of the developing countries has been enhanced by the continuing unwillingness on the part of the developed countries to come up with comprehensive responses. If that changes, Southern cohesion may be more difficult to maintain.

It would be unwise, however, for Americans to overestimate the possibility that the developing countries will split apart. Their unity has held for the past four years despite adverse economic and political circumstances. When negotiating with the industrialized countries, both the members of OPEC and the oil-importing developing countries have seen their strength in their unity and have gone to some lengths to maintain it. Ironically, the disarray among the developed countries has oftentimes been more marked than that within the developing world.

THE PAST FOUR YEARS—A TIME OF TRANSITION

In the past two decades American concern over events in the developing countries has gone from a high level in the early 1960s to a low ebb ten years later.

[1] More background on these proposals can be found in Guy F. Erb and Valeriana Kallab, *Beyond Dependency: The Developing World Speaks Out* (Washington, DC: Overseas Development Council 1975).

Now, however, a growing number of Americans are coming to realize that these countries must be accorded much greater status in American foreign policy. This realization has come at a time when the pace of our involvement in a broad series of negotiations has steadily increased to a point where the number and complexity of the discussions now going on, or about to commence, between the rich nations of the North and the poor nations of the South may be unprecedented in any past period of human history.

The Development of Negotiations.—The catalyst for this changed perception of the importance of the developing countries came, as mentioned earlier, from the events of late 1973 with the actions of the oil-producing states and their subsequent alliance with the rest of the developing world.

Initially, the United States obdurately opposed most requests from the developing countries, hoping either to break the oil cartel by maintaining pressure on the non-oil-producing developing countries, or to arrive at a series of separate agreements with the OPEC governments. This policy held until the spring of 1975, when some government officials realized that OPEC and the other developing countries would not be easily split, and that a number of pressing problems would have to be addressed globally or not at all. The result was a decision within parts of the U.S. government to negotiate on a variety of North-South issues, marked by a major speech by Secretary of State Kissinger at the Seventh Special Session of the United Nations General Assembly in September 1975. This seeming shift of U.S. policy engendered a surprisingly positive and moderate response on the part of the developing countries and a new atmosphere for negotiations seemed to emerge.

It was anticipated that these developments would make 1976 a "year of opportunity" to create a new relationship between the developed and developing countries. A seeming lack of rapid progress may lead some to despair that this opportunity has been missed. But the situation is not that simple. In the past year the United States has been involved in negotiations at the Council on International Cooperation (CIEC) in Paris, the Fourth United Nations Conference on Trade and Development, the Law of the Seas Conference, the World Food Council, and the ILO's World Employment Conference, as well as negotiations within the International Monetary Fund and the World Bank. In addition, North-South relations were discussed within the OECD, and in the preliminary sessions of the multilateral trade negotiations. Indeed, these issues assumed such importance that Secretary of State Kissinger participated personally at both the UNCTAD meetings and at the Law of the Seas negotiations, one of the few times that a Secretary of State has committed himself in such an intensive fashion to relations with the developing countries.

The pace of these negotiations, however, has been less than rapid, and often reflecting the lack of a coherent Northern approach to the issues, has proceeded in fits and starts, particularly at UNCTAD and the CIEC.

The Conference on International Economic Cooperation was the major institutional departure of the mid-1970s. It was established to link the concerns of the North and of the South, and to allow discussions to be held among a more manageable but yet representative group of countries. It was designed so that all parties at interest could feel that their legitimate concerns were represented. The four separate commissions of CIEC—on energy, raw materials, development, and financing—began meeting in December 1975, but so little progress had been made by the time they recessed in July 1976 that the entire process threatened to break down. The stalemate arose because the industrialized countries, led by the United States, were seriously interested only in discussing energy problems; the developing countries and their OPEC allies would not discuss energy unless the industrialized countries also were forthcoming on their debt and commodity price problems. A face-saving compromise was worked out which allowed the Conference to reopen discussions in September but when the stalemate continued both sides agreed at year end to postpone the Council's final meeting from December to March 1977. The postponement was due at least partially to continued opposition by the United States and because the developing countries hoped a new American Administration would be more forthcoming.

Since that postponement, a number of interesting details have come out concerning the attitude of the Administration now leaving office toward these negotiations which will be of interest for your deliberations. If press accounts are to be believed, the OECD countries proposed making some concessions at the November CIEC meeting in order to exert pressure on OPEC for a moderate in-

crease in the price of oil in their December meeting. The United States, however, opposed this idea and the Conference was able to come to no conclusion.

Opposition by the United States apparently was based on the Executive Branch's belief that there was no conceivable package of proposals that could be agreed upon by the industrialized countries which would represent a sufficient inducement to OPEC to refrain from a substantial increase in the price of oil. In addition, the United States felt that compromise proposals would be dangerous because they would strengthen the linkage between the CIEC and OPEC, a linkage which would neither moderate decisions on price increases, nor would weaken the ties between OPEC members and the other developed countries.

The future of CIEC is in question. The twelve months of experience so far has given rise to much dissatisfaction on all sides, not only because of the slow pace of negotiations but because the deliberations have been dominated on both sides by a small group of countries. On the developed country side, the United States, the European Community, Japan, and Canada apparently have led the discussions; on the developing country side, a smaller group comprised of India, Saudi Arabia, and Iran has played the dominant role. The other countries do not feel that their interests have been represented. In addition, there is continuing dissension on the developing country side between the 19 countries participating in CIEC, and the much larger "Group of 77" developing countries. Others feel that CIEC derogates from the U.N. system and these countries would rather see the negotiations move to the United Nations or to the Development Committee community of the World Bank and the International Monetary Fund. Finally, there is neither direct nor indirect participation by the U.S.S.R., China, or Eastern Europe.

What have we learned?—What lessons can be drawn from this negotiating experience during the past year or more? *First*, that the negotiations are fully joined and there no longer is a choice about whether or not to negotiate with the developing countries. The question now is the outcome. *Second*, that the pace and progress of the negotiations are likely to be much slower than some initially had expected. A new "international economic order" will not be created over night to be ratified by some glorious international gathering reminiscent of the Congress of Vienna or the Treaty of Versailles. Rather, there will be hammered out in a multiplicity of forums increasingly many different states negotiating on what may seem to be unrelated issues. If the CIEC cannot provide a mechanism for monitoring and managing these negotiations, some other organization will have to be used or created. *Third*, it has proven to be virtually impossible to split the concerns of the OPEC countries and those of the rest of the developing world. Initially, the United States opposed the demands of the developing countries in the hopes that their economic distress would lead them to put increased pressure on OPEC for price moderation. Then we have opposed all linkage between the price of oil and the demands for a "new international economic order." Neither policy has worked as the recent pronouncements of the Saudi Arabian government make clear. *Fourth*, a full-fledged U.S. Commitment to these negotiations in the Executive and Legislative Branches is still lacking. Despite heavy and sometimes creative involvement by parts of the State Department and several congressional committees, the United States was often not prepared for the negotiations and had not consulted fully either with its industrialized country allies or with the developing countries. There is a clear need for much greater analyses and discussion, both within and outside the government of the real interest of the United States in these issues.

Therefore, the United States is paying many of the costs but reaping few of the benefits of participating in these negotiations. It has agreed to negotiate, but has done so reluctantly and with manifold reservations. The challenge in the months ahead will be for the United State Government to develop some more general understanding of our interests in the multiplicity of issues that will provide guidance for the various parts of the government participating in these multiple negotiations.

THE TASKS AHEAD

The United States now faces two distinct but interrelated challenges in establishing a new set of relationships with the nations of the developing world. They are, first, to ensure that the developing countries are incorporated fully into a series of restructured world economic and political systems that will benefit both developed and developing countries; and, second, for both rich and poor

countries to devise policies that will enable the world's poorest billion people, a majority of whom live within the world's poorest countries, to obtain for themselves within the foreseeable future at least the minimum physical requirements for basic human life and dignity.

Changes in the existing international economic and political structures will be necessary in any event to accommodate the new demands of the developing countries. These changes will be a necessary but not sufficient underpinning for the effective address of global poverty. They will provide additional resources to the developing countries, but these resources are likely to be highly unevenly distributed among countries, with the poorest countries likely to benefit the least. For instance, the World Bank estimates that if all trade barriers on manufactured goods were eliminated the middle income developing countries would export an additional $29 billion worth of goods while the poorest countries would gain only $4 billion additionally. Therefore, it will be necessary to look to other programs, particularly those that transfer resources directly on a concessional basis, in order to help the poorest countries address their problems of absolute poverty.

—

Energy and Development: An International Approach

By James W. Howe and William Knowland*

The immediate U.S. reaction to the shock of the 1973 Arab oil embargo and OPEC oil price increases was to seek national energy self-sufficiency—energy independence. But several years after the oil embargo, the United States is growing still more dependent upon OPEC oil and facing ever higher energy costs. It is time to reassess the situation and consider the possibilities of achieving energy security through a *global* approach that more clearly recognizes the realities and opportunities of our energy interdependence.

The energy problem for the United States and other developed countries is largely one of adapting to suddenly higher energy prices without a significant loss of economic welfare. But for over half the world's people living in the oil-importing developing countries, the energy problem is more fundamental. Despite low per capita consumption of oil in these countries, rising oil costs have forced many of them to choose between importing either less oil or less food, fertilizer, and other inputs essential to their economic development. Without support either to help pay their higher fuel bills or to increase their indigenous energy supplies, they are doomed to remain poor.

Taking the energy needs of developing countries into consideration would cost the United States and other developed countries relatively little but could yield significant benefits, including making the world's use of energy more efficient, more secure, and possibly even cheaper for all nations, rich and poor.

U.S. ENERGY INDEPENDENCE

The official U.S. energy strategy since 1973 has sought to reduce U.S. oil imports to a point where the United States would no longer be vulnerable to another embargo. The basic tactics of this policy—Project Independence—are to 1) reduce U.S. consumption of oil imports by 1 million barrels per day by 1985 (present U.S. consumption totals about 17 million barrels per day, of which about 7 million are imports), 2) greatly increase domestic production of fossil fuels and nuclear power, 3) build up an oil storage reserve equal to six to twelve months of oil imports, and 4) develop a standby rationing system that could be quickly implemented in the event of another embargo.

There is, however, a growing realization that the direct and indirect costs of fully implementing this program would be enormous. For the 1976–1985 decade, the U.S. Federal Energy Agency estimates that investment in the energy industry would approach $600 billion (in 1975 dollars); some private analysts expect the final figure to exceed $1 trillion.. And after 1985, the program's costs would accelerate even more. In addition, the amount and type of energy growth projected (with an emphasis on electrification) would produce tremendous amounts of pollution and waste heat. Thousands of square miles of U.S. landscape would

*James W. Howe is a Senior Fellow of the Overseas Development Council and William E. Knowland a Staff Associate of the Council.

The ODC is a nongovernmental, nonprofit organization seeking to increase American understanding of the problems faced by the developing countrnes and the importance of these countries to the U.S.

be irrevocably altered by strip mining, as would be the lives of many communities in coal and oil-shale areas or areas adjacent to offshore oil fields. Major development of nuclear power would present additional environmental, health, and political problems.

But even if the United States were willing and able to increase its domestic energy production and to achieve the other goals of Project Independence, it still would not be immune from a future embargo. As long as its major trading partners—Western Europe and Japan—are not similarly independent in energy supply, the entire world economy will remain vulnerable to the actions of the Organization of Petroleum Exporting Countries (OPEC). Despite the North Sea oil reserves now being tapped, neither Western Europe as a whole nor Japan has any short- or medium-term hope of ending its heavy reliance on Middle East petroleum.

These observations are not offered as a condemnation of the goal of energy independence. In fact, it would be ideal if the technology were developed to permit nations and even localities to be truly energy independent—i.e., to draw their energy needs from safe, clean, inexpensive, and renewable *local* sources such as sunshine, wind, or wastes. However, the best route to such eventual independence (if it is indeed technologically and economically feasible) is a cooperative international approach—without which there will be time-consuming and costly duplication of research and development and neglect of the potential of *all* nations to make the most efficient use of their resources.

ENERGY AND DEVELOPMENT

It is the oil-importing developing countries that suffer the most from rising energy prices. In order to purchase essential fuel, many have little choice but to borrow foreign exchange and go further into debt. And if developed countries reduce other imports to compensate for higher fuel costs, the developing countries will lose their export markets—and the ability to repay their debts.

Developing countries have two distinct energy sectors. The first is commercial energy such as oil, gas, coal, and electricity, which are bought and sold in large regional or national marketing and distribution networks. Many of the developing countries are attempting rapid industrialization and trying to meet the commercial energy needs of quickly growing and increasingly urbanized populations. The second sector is traditional or noncommercial energy such as firewood and draft animals, which are used on the spot by the producer and gathered or traded only within the traditional village context. Noncommercial energy is still very important in the developing world and represents the larger share of the total energy consumed. One source estimates that the amount of noncommercial energy consumed is comparable to the entire flow of crude oil among nations (about 30 million barrels a day). Yet *per capita* consumption of traditional energy is low; most individuals use no more than 15,000 calories daily for food, firewood, and animal power. (By contrast, the suburban American who lives 10–15 miles from work burns more than three times as much energy just driving to and from work.)

For the 50–80 percent of the people in developing countries who still live in rural areas, relatively cheap and abundant energy is a prerequisite for development. The conventional answer to this need has been to slowly extend modern electrification networks. But for many Latin Americans and most Africans and Asians, this remains a dream for their grandchildren. Long before that dream can become a reality, however, it might be possible for small-scale technologies that utilize locally available energy sources to help in the performance of essential daily tasks. Among such small-scale options are the conversion of animal and human wastes and crop residue into methane gas and fertilizers; the use of windmills for water pumps and electricity; the use of small streams for electricity generation; and the use of direct solar energy for heating, crop drying, and electricity generation. Most developing countries, however, lack the knowledge to create such technology or the capital to import it without outside help.

Throughout the 1950s and 1960s, the general economic development strategy of most poor countries was patterned after the economic model of the North. That model was largely urban-oriented and capital-intensive and emphasized the development of large-scale industry. It was assumed that the benefits of this approach would "trickle down" to the poor, even where the poor constitute the majority. Many scholars and policy makers in the developing countries are now challenging this approach and calling for a strategy to benefit the majority from

the very start—a strategy that emphasizes agriculture more than industry, rural more than urban development, small-scale rather than large-scale technology, and labor-intensive rather than capital-intensive investments. Those countries which focus their development strategy on human needs may well find that an energy strategy that relies on small-scale renewable or inexhaustible sources (such as solar energy, wind, water, and bioconversion) would be more appropriate and less expensive—especially for rural areas—than one dependent on a centralized energy system.

A GLOBAL APPROACH

It is in the self-interest of all countries to pursue a global approach to the energy problem on several counts:

Cooperation can avoid time-consuming and costly national duplication of energy research and development. Thus it can help develop energy sources to meet global needs when oil, gas, and uranium supplies are depleted, as they are likely to be in a few decades.

Encouraging development of oil and gas, *wherever* they are found, is economically rational and will provide more time to develop alternative sources.

If developing countries have sufficient energy from other sources, they will be less likely to turn to the costly development of nuclear fission (with all that it also portends for weapons proliferation and terrorist activities).

To the extent that poor countries can develop their own energy resources economically, they can lessen their economic and political dependence on outside sources.

A global effort at cooperation on energy development and related problems might begin with the following steps:

1. Initiation of Global Analysis and Planning.—The energy supply and demand picture for the United States and most developed countries is known in considerable detail, but for much of the world there is very little information available. The problem is similar to that which until recently existed for food. Thanks to the efforts of the U.N. Food and Agriculture Organization and the U.S. Department of Agriculture, we now have substantial information about global food supply and demand and the projections of the balance into future years. The same is needed for energy, yet there is no international energy agency to perform such an analysis. We need a World Energy Council—an international agency capable of coordinating the necessary data-gathering on energy use and supply, assessing that information, preparing and keeping current a global energy balance sheet, and performing special analyses that would be of use to national energy decision makers.

2. Cooperation in Exploration for Fossil Fuel Resources.—Experts estimate that there may be between 1.7 and 5 times more oil in the earth's crust than already has been discovered. The U.S. Geological Survey estimates that about half of this oil will be discovered in the poor countries that are not now members of OPEC. Why hasn't this oil already been discovered? Some observers point to the lack of intensive exploration. There are vast areas of Africa and to a lesser extent Latin America and Asia that have not yet been adequately explored, even though they are geologically promising. For every well drilled in Africa, for example, 300 wells have been drilled in the United States on geologically comparable terrain.

The international oil companies have traditionally underwritten the high costs of petroleum exploration. But the oil companies now maintain they are reluctant to invest in developing countries because they cannot get sufficient guarantees for the security of their investments. Thus international action is needed to improve the investment climate. One possibility is to establish an international program to insure oil and gas companies against the political risk of contract abrogation. A variety of other steps are also worth considering, including the provision of technical assistance to developing countries to strengthen their ability both to negotiate satisfactory contracts and to confidently monitor the execution of these contracts by foreign companies.

In addition to oil and gas resources, which are the most important fossil fuels expected to be found in the developing countries, many developing countries almost certainly have significant reserves of coal and other fossil fuels. There has been even less exploration, on a worldwide basis, for coal, lignite, peat, shale oil, and tar sands than for gas and petroleum. Means should be sought through

international cooperation to help developing countries find and develop these assets.

At the May 1976 session of the U.N. Conference on Trade and Development, the U.S. government proposed an International Resources Bank (IRB), which is still being discussed in a variety of forums. It would provide political risk insurance, such as was suggested above, for both energy and non-energy minerals. The IRB, or at least a variation of it which would deal exclusively with energy and would incorporate other actions designed to make the climate for investment more reliable for both developing countries and foreign companies, is worth pursuing.

3. Collective Consideration of the Nuclear Option.—The euphoria of the 1950s over the promise of cheap, "clean" electricity from nuclear fission has deteriorated into a state of confusion. The scientific community is split over questions of safety. Businessmen, concerned with rising costs, cancelled or delayed plans in 1975 for 148 nuclear power plants in the United States alone. Manufacturers of such plants, however, are continuing efforts to sell nuclear plants abroad—an activity their governments encourage.

At the same time, there is growing citizen concern in the developed countries both over the further proliferation of nuclear weapons and over the environmental consequences of the spread of nuclear power. But as long as nuclear technology continues to grow in other nations, local or unilateral national opposition cannot ensure safe storage for radioactive residues, prevent the diversion of explosive materials into weapons, or avert the resort of terrorist groups to radioactive or explosive materials. All of these are issues that can be resolved only by global action. Thus the debate within industrialized countries over whether to go ahead with nuclear power needs to be complemented by an international dialogue on the same issue.

In many developing countries, the developed world's recent concern about the spread of nuclear technology—after years of Western promotion of the anticipated "blessings of the atom to mankind"—is viewed with considerable resentment. This feeling is strengthened by the fact that international discussions and decisions on nuclear matters often exclude the developing countries. These countries see the developed countries applying a "double standard" in the nuclear field: nuclear technology is judged to be "safe" when produced and used by other developed countries (capitalist or communist)—in spite of the fact that four developed countries use it to manufacture nuclear weapons—but not when used by the developing countries. There is also suspicion of the motives of developed-country spokesmen who advise the developing world that nuclear energy is not in its best interests. To some in the poorer countries, Northern talk about "appropriate energy technology" seems a ruse to keep the South from modernizing. But many specialists who are genuinely in favor of advancing the development of the poor countries (including the authors of this communique) are convinced that a growing list of disadvantages (quite apart from proliferation of weapons) now makes the development of nuclear energy an unwise policy for most developing countries. Among the particular limitations of the nuclear option to the developing countries are the lack of capital, the shortages and high costs of skilled manpower and management, dependence on outside sources for fuel and technology, and the fact that most plants are too large to be cost-effective for the small national electrical grid systems now used in most of these countries.

Given the now widespread recognition of nuclear energy's many problems—which have highly undesirable implications for all countries, developed and developing alike—the United States and other developed countries should move to change their international positions on the development of nuclear energy. They should (1) discontinue the subsidies they presently offer in the form of government financing on favorable terms for a portion of nuclear exports; (2) revise the mandate of the International Atomic Energy Agency (IAEA) so that the Agency would end its advocacy of the use of atomic energy and instead concentrate its efforts on its second main task, that of regulating the production and handling of radioactive and explosive nuclear materials; (3) discourage the developing countries from following the nuclear path and actively help them find better alternatives to meet their energy needs; (4) offer to work closely with those developing nations which, despite advice to the contrary, do opt to follow the nuclear path, by extending technological support to them to make their development of nuclear energy as safe and environmentally sound as possible; and (5) search for an acceptably balanced mechanism to include representatives of

the developing countries in discussions of international nuclear energy options and policy choices.

4. Making World Energy Research More Applicable to Development.—Not surprisingly, most energy research and development is financed by and takes place in the industrialized countries. That research has three general characteristics. First, almost all of it is devoted to large-scale, centralized energy production units. More than 90 percent of U.S. energy research and development is devoted to such large-scale technologies as fission, fusion, fossil fuels, and geothermal electricity-generating facilities, even though a portion of modern energy use (such as the bulk of domestic and commercial water and space heating) could be more efficiently met by decentralized, "on-site" sources. For much of the developing world, where, according to World Bank estimates, nearly half of the people still will not be reached by centralized national electrification by the turn of the century, there is an urgent need to explore appropriate village-scale or form-scale energy sources.

The second characteristic of energy research and development is that it is conducted mostly on a country-by-country basis, with all too little international cooperation. Yet international cooperation offers an opportunity to speed up research and development and to reduce its costs. Internationally coordinated research has paid handsome dividends, for example, in the case of research on food grains, as is evidenced by the rapid spread of high-yielding varieties of rice, corn, wheat, and sorghum developed within internationally coordinated agricultural research networks. Similar networks might be formed for research on wind, waste, the sun, and other nonconventional energy sources.

Finally, all but a small fraction of energy research and development is devoted to depleting the remaining finite stocks of fossil and uranium fuels. Almost all energy authorities agree, however, that sometime before or near the turn of the twenty-first century, most conventional sources of energy (oil, gas, uranium) will be in short supply and that it will be necessary to have competitively priced inexhaustible sources of energy such as solar heating and solar electricity. Thus the hundreds of billions of dollars that are being invested in oil, gas, and nuclear fission are for a transitional period of perhaps 15 to 30 years until the technologies to tap inexhaustible and renewable energy sources become widely available. Yet in the United States today, only one energy research dollar out of twenty is spent on increasing the efficiency with which conventional fuels are utilized, and only one out of four is spent on the development of inexhaustible or renewable sources.

A number of prototype small-scale and renewable/inexhaustible energy technologies have already been developed. The problem is that they generally are not yet cost-effective, at least in the major market areas of the industrialized countries, which have well-established electrical transmission networks and traditional pricing practices favorable to conventional electric and fossil-fuel consumption. But the costs picture is shifting inexorably against the continued consumption of finite fuel reserves even in the developed countries. Meanwhile, in the developing countries some of these alternative technologies may already be competitive with conventional approaches, particularly for providing energy to the villages and farms that are not located near major electrical transmission lines. Studies and pilot programs comparing the cost and performance of conventional and alternative approaches in rural areas would be very useful.

As promising village-scale technologies are identified from these pilot programs, it may be warranted to extend aid to install them in village experiments on a wide scale and—if experience so indicates—eventually to finance their export to developing countries on a major scale through loans with favorable terms (as every country that exports nuclear fission facilities has done). This not only would help to meet an important need for rural development but also would provide a large market for small-scale energy technology. Recent experience with other technologies (e.g., the transistor radio and the pocket computer) suggests that this will lead to dramatic cost reductions which would benefit both developing- and developed-country consumers.

5. Convening a World Conference on Energy Alternative.—A World Conference on Energy Alternatives—organized along the lines of the 1974 U.N. World Food Conference—should be held to stimulate and symbolize the need for the kind of cooperation outlined in this paper. One or two years of comprehensive preparatory work by national and international groups and debates at international workshops would be needed in preparation for such a Conference.

THE U.S. ROLE

The United States clearly has an opportunity to play a cooperative role in a global energy strategy and should do so in a number of areas:

1. The United States should support the creation of an international World Energy Council to coordinate the collection of global energy facts, maintain an energy balance sheet, and perform global energy analyses and planning.

2. It should support and help underwrite a political risk insurance program and other actions to encourage increased exploration for gas, oil, and coal.

3. The United States should use its influence to assure serious collective consideration of the nuclear option. It should discontinue subsidies on nuclear exports; cooperate in revising the IAEA mandate to focus on regulating the production and handling of nuclear materials; help developing countries find better alternatives to meet energy needs; cooperate with those nations which decide to use nuclear energy to facilitate safe nuclear development; and seek institutional improvements that would represent developing countries in nuclear discussions.

4. It could play a significant role in improving world energy research and development activities by refocusing a portion of its energy research and development programs on small-scale renewable sources of energy. It should take the lead in creating energy research networks to gain the benefits of international cooperation; eventually it should subsidize the sale of suitable small-scale technologies to developing countries and help those countries develop their own energy hardware production facilities.

5. The United States should cooperate in initiating and planning a World Conference on Energy Alternatives.

6. In order to enhance its credibility in assuming a leadership role in a global energy strategy, the United States should—at the same time it takes action in the above areas—launch a government-supported program of domestic energy conservation. The per capita energy consumption of the United States and Canada is unique—nearly 40 percent above that of West European countries with similar or higher standards of living. Energy conservation is less a question of making life-style changes than one of making all forms of energy use more efficient.

An interdependent approach in the energy field is not a threat to U.S. energy security. On the contrary, energy independence would be far more costly to the United States and could itself lead to exacerbated global economic confrontation. After three years of striving for an illusory energy independence, it is time to recognize the advantages implicit in a global approach emphasizing energy interdependence.

Representative BROWN of Ohio. Thank you very much, Mr. Sewell.

Senator Javits.

Senator JAVITS. I think I will wait.

Representative BROWN of Ohio. Our next speaker is Ms. Anne Carter, professor at Brandeis University, Waltham, Mass.

STATEMENT OF ANNE P. CARTER, PROFESSOR, BRANDEIS UNIVERSITY, WALTHAM, MASS.

Ms. CARTER. In a funny way, I think my testimony should have been scheduled first because what I want to do is give a background on the situation and familiarize you with a tool we have just been developing for dealing with the very issues that Representative Brown and Mr. Sewell have been talking about, namely getting a broad view of what's going on in the world economy and doing some informal long-run planning about our own role and about what is going to develop there.

We at Brandeis developed a model for the United Nations of the world economy of 15 regions, quite detailed model, which is still very young and untested. Right now its structure really represents pre-OPEC structure. The opportunity that this invitation gave me was

to put OPEC prices into the model with pre-OPEC structure to see what OPEC pricing does to the world balance of payments.

Now, since OPEC prices have been in force for some time, there has been some adjustment; so really our computations exaggerate the plight of where the various regions are now. But I still think that it gives us some insight into the picture.

The situation we are really looking at is that there has been an enormous capital transfer between the rest of the world and OPEC when OPEC raised its prices. Our original estimates—and I think they are in the right ballpark—were that by the year 2000 OPEC would have exported something in the neighborhood of 700 billion barrels of oil to the rest of the world; and, at a price of about $2.50, this amounted to $2 trillion worth of oil.

Speaking now in terms of the 1970 price levels, at a price of $7.88, which is the $11.51 OPEC price reduced to 1970 levels this amounted to $5.5 trillion worth of oil. At 25 percent more, it goes up to $7 trillion worth of oil, which means that this price rise has increased the value of OPEC's assets considerably.

Over the next 30 years, or over the next 20-some odd years, OPEC is going to claim its assets through the balance-of-payments mechanism. It can't pick it up all at once, but as it sells oil, it gradually picks up the increased value of what it owns of the world.

Now, what we have tried to do here—and it is spelled out in a lot of tables, is to show how this works. First of all, increases in imported oil prices don't just affect oil prices; they affect all other prices. We did a rough computation to see what it would do to all other prices in the system; and one of the interesting things that we found was that the other price that was hit most sharply as a result of an oil price rise is the fertilizer price. Fertilizer prices, transportation prices, chemical prices, prices of things that use a lot of oil will increase relative to the price of things that are less energy intensive. This is shown in table 1 in my testimony.

Now, with this repricing we get a change in what we call technically the terms of trade of the various nations. The average price of what they export goes down relative to the price of what they import, in countries that are not oil exporters. Oil exporters export prices go up relative to the prices of what they import. Oil importers export prices go down relative to the prices of what they import.

In table 2, you see a computation of what happened to the terms of trade of the various regions as you went from pre-OPEC to OPEC prices; and then in the second part of the table, what would happen if you went to OPEC prices raised by 25 percent over what they are now. One of the things that you notice is that the United States is hit, but it is not hit nearly so hard as, for example, Japan and Latin America, medium income.

It is interesting that the terms of trade in the Middle East and of Latin America low income, which includes Venezuela, improved dramatically. You see dramatic improvements in the terms of trade of the oil exporting countries, deterioration—but not as dramatic because it is spread over the world—in the oil consuming regions. The oil consuming regions that really seem to be hit hardest in all of this, of course, are the ones that don't have much oil, and not the lowest income ones; they don't buy much oil because they don't have much

The second set of questions concerns the dependence of OPEC on the world economy. However rich, OPEC does not function in isolation from the economies of the rest of the world. By examining the quantitative ties of the Middle East oil exporters to the rest of the world, we can develop a clearer sense of our own options and the context within which we choose our course.

(1) THE EFFECTS OF INCREASED PETROLEUM PRICES ON REGIONAL BALANCES OF PAYMENTS AND GROWTH

(A) Changes in Relative Prices of Traded Goods

To analyze the effects of rising petroleum prices on the near term picture, we focus primarily on the 1980 solutions of the world model. As in the three other benchmark years, the outputs, imports, exports and other variables are studied in real terms, i.e. in physical units valued at constant 1970 prices. Estimates of current (1980) relative prices, normalized to eliminate any inflation, enter as coefficients to revalue trade in the balance of payments equation. Thus, while the system does not deal with changes in price levels, it does estimate the effects of changes in the relative prices of traded goods on the balance of payments. Relative prices were estimated in a separate price model based on the projected 1980 input-output system for North America. In the original 1970 world system, 1970 imports and exports of petroleum were valued at observed 1970 prices that differed from region to region. Prices to value the 1980 trade were derived by multiplying the original region-specific prices by a factor of roughly 1.3 to allow for trends of rising extraction cost. Thus the base or "reference" system represents price conditions as they were expected to develop prior to the 1973–74 embargo.

Current petroleum price conditions were simulated in two stages. First, we fixed the price of crude petroleum at 1976 levels ($11.50 per barrel in 1976, or $7.88 at 1970 price level) and solved for a second set of prices. The newly estimated prices were normalized using 1970 consumption weights.[2] The ratios of each of the newly estimated prices to those originally in the 1980 system are shown in Table 1.

Increasing petroleum prices tends to increase the prices of those other commodities that are petroleum-intensive and, since the prices are normalized to retain a constant average level, to decrease the relative prices of all other goods.

TABLE 1.—RATIOS OF POST- TO PRE-OPEC PRICES ESTIMATED FOR THE 1980 WORLD SYSTEM

	Ratio to pre-OPEC price estimate	
	Based on 1976 oil price	Based on 1976 oil price × 1.25
Product group:		
Meat and fish	1.00	1.00
Oilcrops	1.04	1.06
Grains	1.04	1.05
Roots	1.01	1.02
Residual agriculture	1.03	1.04
Copper	.97	.96
Bauxite	.95	.94
Nickel	.97	.96
Zinc	.95	.94
Lead	.97	.95
Iron	.98	.97
Petroleum	3.25	3.98
Natural gas	.98	.97
Coal	.98	.97
Residual resources	.99	.99
Agricultural margins	.97	.97
Petroleum refining	1.21	1.28
Primary metal processing	.98	.98
Textiles, apparel	.97	.96
Wood and cork	.98	.97
Furniture and fixtures	.97	.96
Paper	.99	.98
Printing	.97	.95
Rubber	.98	.97

[2] To eliminate the influence of inflation, prices were scaled down so that the average estimated price for 1980 equals the average price for 1970.

TABLE 1—RATIOS OF POST- TO PRE-OPEC PRICES ESTIMATED FOR THE 1980 WORLD SYSTEM—Continued

	Ratio to pre-OPEC price estimate	
	Based on 1976 oil price	Based on 1976 oil price ×1 25
Industrial chemicals	1.02	1.03
Fertilizers	1.11	1.15
Miscellaneous chemicals	1.01	1.01
Cement	1.02	1.02
Glass	.98	.98
Motor vehicles	.97	.96
Shipbuilding	.97	.96
Aircraft	.96	.94
Metal Products	.97	.96
Machinery	.97	.96
Electrical machinery	.97	.95
Professional instruments	.97	.96
Watches, clocks	.97	.97
Transport	1.05	1.07
Communications	.97	.96
Services	.97	.96

Specifically, in Table 1, we find that sizable increases appear in the prices of petroleum refining margins, fertilizer, chemicals and plastics, and transportation as well as crude petroleum. Since higher petroleum prices push up the prices of fertilizers, they also produce increases in the prices of four of the principal agricultural commodities: grains, high protein crops, root crops and other agricultural products.

(B) Changes in the Terms of Trade

Changes in prices affect the balances of payments of each region by changing its terms of trade, i.e., the ratio of the prices received for the goods its exports to those paid for the goods it imports. Regions differ widely in the relative importance of individual commodities among their imports and exports. Thus, some import a lot of machinery, others, primarily raw materials. Because the composition of their trade varies, relative price changes shift their terms of trade by different amounts and even in different directions. Table 2 contains indices that show how the terms of trade for each region are affected by shifting from the pre-OPEC prices originally in the model to prices based, first on a petroleum price of $7.88 and then on a price of $9.85.[3] The changes in terms of trade occasioned by the 25 percent increase are shown in the last line of the table. As might have been anticipated, a rise in petroleum prices improves the terms of trade for net exporters of petroleum: Middle East and Latin America (low income) and the Soviet Union and deteriorates it for most other regions. Regions that are net exporters of grain and chemicals and fertilizer stand to gain because of the increases in the prices of those products. Japan, which is a net importer of both petroleum and agricultural products, and Latin America (medium) face the sharpest deterioration in their terms of trade.

[3] These prices are explained in (1) (A), supra.

TABLE 2.—INDICES OF EXPORT AND IMPORT PRICES AND CHANGES IN TERMS OF TRADE WITH SHIFTS FROM PRE-OPEC TO OPEC (A) AND TO OPEC PLUS 25 PERCENT (B) PRICES

	North America	Latin America (medium)	Latin America (low)	Western Europe (high)	Western Europe (medium)	U.S.S.R.	Eastern Europe	Asia (current prices)	Japan	Asia (low)	Middle East	Arid Africa	Tropical Africa	South Africa	Oceania
Prices of goods with oil price at $7.88—relative to pre-OPEC prices:															
Exports	2.99	1.00	1.75	1.21	1.01	1.31	1.01	1.07	1.01	1.04	3.00	1.02	1.00	0.99	1.01
Imports	1.08	1.39	1.00	1.20	1.19	1.03	1.14	.99	1.41	1.14	1.00	1.02	1.12	1.17	1.19
Terms of trade: Ex/Im (A)	.92	.72	1.75	.84	.85	1.28	.88	1.07	.72	.91	3.01	1.00	.89	.85	.85
Prices of goods with oil price increased by 25 percent—relative to pre-OPEC prices:															
Exports	.99	1.00	1.97	1.01	1.02	1.41	1.01	1.09	1.02	1.05	3.56	1.02	1.00	.99	1.01
Imports	1.10	1.49	1.00	1.26	1.24	1.04	1.18	.99	1.53	1.18	.99	1.02	1.16	1.22	1.25
Terms of trade: Ex/Im (B)	.90	.67	1.96	.80	.82	1.36	.85	1.10	.66	.89	3.58	1.00	.86	.82	.81
Effects of 25 percent oil price increase on terms of trade: (B/A)	.98	.93	1.12	.96	.96	1.06	.97	1.02	.93	.98	1.19	1.00	.97	.96	.96

(C) Changes in Regional Balances of Payments with Fixed Growth Targets

In earlier applications of this model for the United Nations we computed the various regional output, trade, investment, employment and resource use levels implied by prespecified regional growth targets. These solutions are labeled "Scenario X". The targets were chosen so as to reduce substantially the gaps between per capita income levels of developed and developing countries by the year 2000. Table 3 shows the assumed percentage rates of growth between 1970 and 1980 for all regions. Growth rates in Scenario X for the developing regions are in the neighborhood of the United Nations Development Decade targets and not far out of line with the actual growth rates achieved in the mid and late 1960's. Growth rates for the poorer African regions are assumed to be somewhat lower in view of their histories of slower development. Economic growth in developed regions is assumed to be somewhat below the trends apparent in the 1960's.

1980 balance of payments estimates for the fifteen regions are shown in Table 4. Because target growth rates for Latin America (medium income), Asia (low income), and Southern Africa are somewhat above accustomed rates, it is not surprising that these regions show substantial balance of payments deficits in the 1980 Scenario X projections.[4] In the absence of substantial increases in available aid or credit, such deficits could not be sustained. Thus their appearance in the solutions casts doubt on whether the target growth rates are achievable.

A modification of Scenario X, called Scenario M was designed to see how trade policies favoring increased export shares and import substitution for Latin America (medium), Asia (low) and Arid Africa would affect the balances of all regions. The computation showed that increasing export shares of light manufactures and reducing import dependence in light manufactures, machinery and equipment, and industrial materials at the rate of one percent per year would reduce the payments deficits for these three regions to reasonable levels.[5] Arid Africa, which initially had balanced trade, would achieve a moderate surplus. Since the specified improvements in the trade positions of developing countries would cut into the markets of the developed regions, the trade balances of the latter would deteriorate correspondingly. These results are also shown in Table 4.

TABLE 3.—*Assumed regional growth rates for gross domestic product, Scenario X, 1970–80*

Region	*Percent per annum*
North America	3.8
Latin America (medium)	5.3
Latin America (low)	5.5
Western Europe (high)	3.7
Western Europe (medium)	6.0
U.S.S.R.	5.8
Eastern Europe	5.4
Asia centrally planned	5.5
Japan	6.5
Asia (low)	5.1
Middle East	14.8
Arid Africa	3.0
Tropical Africa	3.0
Southern Africa	5.8
Oceania	4.0

The lines of Table 4 labeled X′ and M′ show what the balances of payments of the various regions would be if the real trade assumed under Scenario X (or M) were to take place under OPEC oil prices (with corresponding computed prices for all other products). Similarly, the lines label X″ and M″ show what the balances of payments would be if petroleum prices were raised by 25 percent over present prices while other prices were changed to remain consistent with that rise in petroleum cost. Liberalization of trade opportunities and import substitution for developing countries (Scenario M) acts to transfer a portion of the world payments deficits from developing to developed regions (North America, Western Europe and Japan) rather than to lower the total volume of world

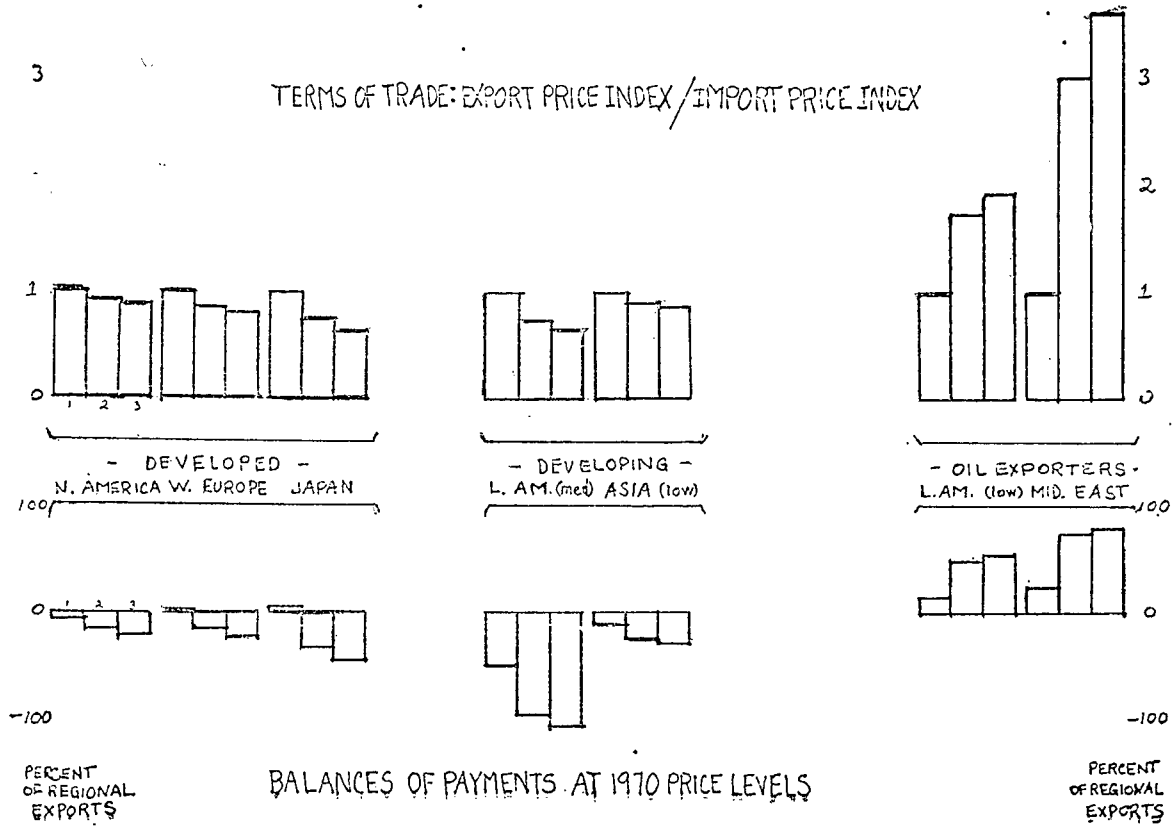
[4] Centrally Planned Asia shows a large percentage deficit because its trade volume (exports) is very small.

[5] Exports of agricultural products from Latin America (Medium) were also increased at 3 percent per year.

TABLE 4.—EFFECTS ON BALANCES OF PAYMENTS OF SHIFTING FROM PRE-OPEC TO OPEC (′) TO OPEC PLUS 25 PERCENT (″) PRICES, 1980, SCENARIOS X AND M

	North America	Latin America (medium)	Latin America (low)	Western Europe (high)	Western Europe (medium)	U.S.S.R.	Eastern Europe	Asia (current prices)	Japan	Asia (low)	Middle East	Arid Africa	Tropical Africa	South Africa	Oceania
Balances of payments in various prices:															
SCN X	−9.85	−9.90	2.96	1.25	−4.29	2.17	4.59	−1.52	2.64	−4.03	12.24	−0.04	5.18	−2.12	−0.28
SCN X′	−20.81	−19.33	16.43	−49.23	−8.97	8.52	.83	−1.31	−15.53	−7.73	98.14	−.05	4.20	−3.24	−2.33
SCN X″	−23.98	−21.68	20.35	−63.75	−10.31	10.33	−.24	−1.24	−20.80	−8.79	122.33	−.06	3.90	−3.57	−2.93
Balance of payments as percent of region's total exports:															
Percent SCN X	−8.50	−47.96	16.42	.48	−17.83	9.89	14.76	−53.75	5.75	−11.68	28.56	−.78	46.31	−32.52	−2.13
Percent SCN X′	−18.10	−93.45	52.13	−18.79	−36.81	29.51	2.64	−43.34	−33.35	−21.63	76.29	−1.02	37.58	−50.02	−17.54
Percent SCN X″	−20.90	−104.74	57.40	−24.25	−42.13	33.47	−.77	−40.22	−44.47	−24.30	80.06	−1.14	34.96	−55.17	−21.99
Balances of payments in various prices:															
SCN M	−13.15	−.98	2.51	−5.30	−5.01	1.65	3.59	−1.74	1.56	1.61	12.17	.68	4.69	−2.34	−.92
SCN M′	−24.09	−10.54	16.00	−55.93	−9.71	8.01	−.20	−1.53	−16.66	−1.92	98.19	.69	3.70	−3.46	−2.96
SCN M″	−27.26	−12.92	19.92	−70.50	−11.05	9.82	−1.28	−1.47	−21.95	−2.91	122.42	.69	3.40	−3.79	−3.56
Balance of payments as percent of region's total exports:															
Percent SCN M	−11.56	−3.91	14.16	−2.08	−21.26	7.63	11.81	−64.24	3.44	4.43	28.44	13.57	43.15	−36.59	−7.04
Percent SCN M′	−21.35	−41.86	51.20	−21.78	−40.67	28.05	−.65	−53.12	−36.37	−5.07	76.30	13.42	34.13	−54.48	−22.95
Percent SCN M″	−24.21	−51.25	56.61	−27.36	−46.11	32.15	−4.17	−49.79	−47.72	−7.60	80.08	13.34	31.41	−59.74	−27.55

FIGURE 1.—Effects of shifting from pre-OPEC (1) to OPEC (2) to OPEC plus 25 percent (3) prices, 1980 scenario X.



deficit. The substantial surpluses of the oil exporting regions expand. Liberalization of trade conditions for developing countries can not give them a share of the oil trade.

If balance of payments deficits made the achievement of rapid economic growth in developing regions difficult under the earlier price conditions, the new set of prices has put these growth targets out of reach and a 25 percent increase over the present petroleum price makes the situation even worse. The more industrialized developing regions, Latin America (medium) and Western Europe (medium) are more sensitive to petroleum prices than the poorer regions because they use more energy.[6] Arid Africa, which uses very little energy, is assumed to be self-sufficient in petroleum. Hence it is not sensitive to rising costs of petroleum imports.

It is, of course, important to remember that businesses and individuals do adjust by reducing their purchases of those items whose relative prices have risen. Thus, we might expect imports of petroleum to decrease as use is curbed with rising prices. Unfortunately, it is difficult to know what is the actual "elasticity of demand" under given conditions. Some economists talk of an elasticity of —.5 for oil in the world as a whole. Presumably there is much more opportunity for discretionary curtailment in North America than in most industrialized regions and more in industrialized regions than in those whose energy consumption is still very low. Even the most optimistic reductions in the physical volume of petroleum purchases by developing regions, in response to increased petroleum prices, would still leave their balances of payments in far worse shape than they were with 1970 relative prices.

(D) *Changes in Regional Growth Potential*

Under the present international economic system deficits of the orders of magnitude shown in Table 4 cannot be sustained. First, it is difficult for a nation in substantial arrears to obtain additional loans to cover its growing deficits. Second, loans carry sizable interest charges that further intensify the balance of payments problem.[7] Thus the availabliity of foreign exchange often becomes a constraint on the growth potential of developing regions. This is particularly true for resource-poor areas. Developing regions with substantial resource or other export potential are less constrained by lack of foreign purchasing power. They are more likely to be limited by the availability of capital for necessary investment or by a network of bottlenecks in skilled labor and management talent and construction lags, called "absorptive capacity".

Thus different economic constraints are likely to bind in different regional economies. These varying regional development conditions are simulated in Scenario A. Under Scenario A income targets are *not* preassigned. Instead it is assumed that resource-poor developing regions must limit their imports to keep their international payments in balance. In resource-rich developing regions, investment is set equal to available savings coming from abroad and from domestic sources. Developed regions' growth trends are assumed to depend primarily on the productivity of the available labor force. Developed regions can, at least to a limited extent, adapt to adverse balance of payments conditions by devaluation or other measures that promote exports at the expense of consumption. It is very difficulty to quantify the absorptive capacity that constrains the development of the Middle East region. For this reason the preassigned growth goals of Scenario X are retained for the Middle East in the Scenario A computation.

Table 5 shows the 1980 income levels for five developing regions under Scenarios X and A. To the extent that certain developing regions are required to keep their payments in balance, the income levels they can achieve will depend on their terms of trade—on the relative prices of the products they buy and sell. Thus Table 5 contains different income estimates for the various regions, associated with the different sets of prices for traded goods. Those based on the petroleum price of $7.88 are labeled A′, on $9.85, A″. Regions whose incomes are not tied to their own payments balances in this simulation are less sensitive to the oil price changes than those whose incomes are so constrained. Nevertheless, the balances of payments of industrial countries are affected by the loss of equipment and other exports to developing regions and by the deterioration in their own terms of trade.

[6] Fig. 1 summarizes the details in tables 2 and 4 for selected regions.
[7] In the present model deficits are cumulative from 1970 on and subjected to interest charges of 8 percent.

A number of measures, including increased aid, generous loans and lower interest rates, and the policies simulated under Scenario M—increased export shares and import substitution—would cut the burden of increased cost of imports to developing countries. To the extent that these policies are forthcoming, actual incomes will exceed those shown in Table 5. However, history does not give a basis for great optimism on that score.

TABLE 5.—1980 GROSS DOMESTIC PRODUCTS FOR 5 DEVELOPING REGIONS UNDER DIFFERENT RELATIVE PRICE ASSUMPTIONS

	GDP under scenario[1] (billions of 1970 dollars)				Ratio of GDP estimates	
	X	A	A	A	A'/A	A''/A
Latin America (medium)	191.4	128.8	88.4	82.2	0.69	0.67
Western Europe (medium)	135.4	113.9	92.3	87.3	.81	.77
Asia (low)	201.6	180.2	162.9	159.1	.90	.88
Arid Africa	36.2	34.6	34.4	34.3	.99	.99
Southern Africa	29.6	21.9	18.4	17.6	.84	.80

[1] Key to scenarios: X—U.N. target incomes; A—Income with balanced payments, pre-OPEC relative prices; A'—Income with balanced payments, current OPEC relative prices; A''—Income with balanced payments, prices with oil raised 25 percent.

(2) DEPENDENCE OF OPEC ON THE WORLD ECONOMY

At the new relative prices the growth potentials of many regions of the world are substantially lower than they were prior to the price increase. At the same time, the transfer of wealth has certainly augmented the OPEC countries' own growth potential.

Development for OPEC countries means that they will become major customers for the exports of the rest of the world. Table 6 shows projected levels for the major imports of the Middle East under Scenario A for 1980, 1990 and 2000 and the relative importance of the Middle East's imports in each of these markets. By 2000, the Middle East can be expected to absorb 21 percent of world imports of machinery, 26 percent of world imports of electrical machinery, 7 percent of world imports of textiles and 6 percent of world imports of grain. Since the Middle East will be developing very rapidly, it will be a relatively good customer for capital equipment which is sold primarily by the developed world.

TABLE 6.—1970 AND PROJECTED IMPORTS FOR THE MIDDLE EAST, 1980, 1990, 2000

	Middle East				Percent of world total imports
	1970	1980	1990	2000	
Imports:[1]					
Livestock	0.19	0.46	0.95	2.03	9.9
High protein crops	.64	1.07	2.10	4.09	6.7
Grains	2.69	4.45	7.36	14.87	5.9
Roots	.24	.56	.90	1.87	8.2
Other agriculture	.40	1.65	4.34	8.55	16.8
Food processing	.38	1.32	3.30	6.55	22.4
Textiles, apparel	.67	1.37	5.02	15.22	7.2
Wood and cork	.14	.60	2.21	6.95	26.0
Furniture, fixtures	.02	.08	.28	.76	17.7
Paper	.17	.89	3.82	13.29	19.4
Printing	.04	.15	.77	3.50	19.8
Rubber	.11	0.34	1.53	5.98	34.8
Industrial chemicals	.26	.97	3.02	7.80	11.0
Fertilizers	.29	.49	2.53	3.58	11.3
Other chemicals	.33	1.70	6.24	17.63	34.6
Cement	.05	.13	.52	2.20	56.4
Glass	.14	.77	2.98	11.26	29.9
Motor vehicles	.82	1.21	5.99	20.61	14.3
Other transportation equipment	.04	.16	.32	.51	2.5
Aircraft	.09	.22	5.7	1.27	4.9
Metal products	.40	1.50	3.67	8.52	31.7
Machinery	1.23	7.11	18.25	38.82	21.3
Electrical machieery	.65	3.12	9.91	32.77	25.8
Instruments	.12	.86	2.65	6.44	18.4
Other manufactures	.11	.36	.95	1.90	5.5
Services	.14	.54	1.59	3.36	6.6
Transport	.63	1.94	4.90	10.96	10.3

[1] Agricultural products and fertilizers are measured in millions of metric tons. All other imports are valued in 1970 prices.

Table 7 indicates the relative share of individual regions in selected goods that the Middle East will import. As the Middle East expands economically, the opportunity to increase exports to a wealthy rapidly developing region should ease the balance of payments problems of the developed world. The less developed regions will not have a significant share in these benefits unless policies to increase their exports of manufactures are successful.

On the other hand, experience suggests that the potential growth rate of OPEC countries is limited by their absorptive capacity. Thus it does not seem to be possible for OPEC to make use of all of its newly realized purchasing power in the development of its own economies. It must take its wealth transfers at least partly in the form of assets and equities in other regions of the world.

TABLE 7.—PROJECTED 2000 EXPORT SHARES FOR SELECTED REGIONS AND PRODUCTS

[Percent of world exports]

	North America	Western Europe	U.S.S.R. and Eastern Europe	Japan	Other
Livestock	9	44	13	20	34
High protein crops	66	5	3	0	26
Grain	53	15	8	2	22
Fertilizer	21	37	19	5	18
Motor vehicles	17	45	19	13	6
Aircraft	44	24	28	0	4
Machinery	12	45	28	8	7
Electrical machinery	13	49	11	20	7
Instruments	19	51	7	18	5

Rough calculations indicate that OPEC foreign investments will be 1.5 trillion dollars in 1990 and 4 trillion in 2000 (at 1970 price levels). These estimates of OPEC foreign investments are based on the assumption that present OPEC prices were inititated in 1975 and will prevail until the end of the century.

Even under these conservative oil price assumptions, projected OPEC foreign investments are enormous, amounting to 1.5 times the value of their domestic reproducible capital stock in 1990 and 2000. These investments amount to roughly 15 percent of the estimated world stock of reproducible capital installed between 1970 and the year 2000. If this occasions considerable concern for domestic economic autonomy in the developed countries, it may also give some reassurance. Those who own a 15 percent share in the world economy should have a vested interest in its viability.

CONCLUSIONS

It is clear that the world economy has suffered from a severe jolt that has altered the course of regional development. It is only natural to wish that we could put it back on the old course. And there are plans under discussion to do so. For example, it has been suggested that the heavy dependence of OPEC on imports of food and machinery makes them vulnerable to retaliatory cartelization. The information on projected export shares in Table 7 suggests that sources of supply of most of its import classes are too diffuse for that. North America does not have the dominance in any of the broad product classes that the Middle East has in oil. There may, of course, be specific products within the broad groups: special types of machinery or military equipment, where we do have substantial monopoly. But the outstanding exception is food. North America supplies a major proportion of world grain exports and is expected to continue to do so.

Bargaining on the basis of our own market dominance in food or high technology equipment might be helpful in maintaining our political strength but it holds out little hope for lowering the world oil price. To take advantage of our monopoly position in food, we would have to be prepared to maintain monopoly food price levels in world markets and to take responsibility for the impact of a second major jolt to the world economy. The strain on the developing world and on other developed regions would be much greater than that on our wealthy OPEC customers.

In general, I fail to see any policy options that will restore the world economy to its pre-OPEC state. OPEC or no, world energy prices had been expected to rise to present levels over the next 20 years as demand rose and most accessible resources began to run out. A more gradual price increase would have allowed time for smoother transitions to new sources and to new technologies and consumption patterns. With the abrupt OPEC stimulus, the substitutions and adjustments required to restore balance in the world economy seem to be very slow. Substitutes for OPEC oil either in the form of new petroleum discoveries or of "alternative" forms of energy suply will limit the level to which petroleum prices can rise. New sources of petroleum are being developed in Europe, Latin America, China and elsewhere but it takes time for that oil to reach the market. Energy saving technologies and consumer practices would also serve to limit petroleum prices. Their emergence is hindered, in part, by all-too-necessary short run measures to cushion the distributional and social impact of the price rise.

In terms of the world model, adaptive changes to the new world economic situation should be translated into revised input structures, prices and trade coefficients. Right now we have some general impressions about new energy technologies and energy saving measures and have inserted some allowances for them into the world system. But the information on new processes and sources and the timing of their availability is still very sketchy. I look forward to the time when our best guesses give us new solutions with more reasonable balance of payments accounts and more optimistic prospects for developing and developed countries. I see no reason to believe that those solutions will match those of the cheap energy era.

Senator KENNEDY [presiding]. Thank you very much, Ms. Carter.

I apologize to the panel at this time for not being here earlier. When we were considering these hearings in December, I initially thought that this would be a slow week for the House and the Senate prior to the inauguration of a new President and the receipt of his nominees for the cabinet positions, but contrary to that expectation, President-elect Carter has submitted his nominees and we have Mr. Bell's nomination before the Judiciary Committee today.

I know Senator Javits very much wanted to remain here but Mr. Marshall, the Labor secretary-designee is before the Labor Committee. Mr. Califano is also on the Hill this morning.

Ms. Carter, we value very highly the opportunity to gain your insights into this situation.

Perhaps we could continue with Mr. Kauffmann of the Exxon Corp.

STATEMENT OF HOWARD C. KAUFFMANN, PRESIDENT, EXXON CORP., NEW YORK, N.Y.

Mr. KAUFFMANN. Good morning, Mr. Chairman. First, I want to thank you for this opportunity to express our views on how the Government and the oil industry of this country can work together to try and take some of the sting out of the Nation's energy problems. If your hearings lead us to a common ground of understanding, they will have accomplished something badly needed.

I am told you have copies of the prepared statement. If I may, I would like to make that part of the record. I have a shorter statement.

Senator KENNEDY. We will make it a part of the record.

Mr. KAUFFMANN. In your invitation, Mr. Chairman, you wrote that: no economically acceptable combination of policies can eliminate this country's need for imported oil by the 1980's. We are in complete agreement with you and would go even further to indicate that we believe this country will need large quantities of imported oil well beyond

the mid-1980's. You have pointed out that conservation and development of new domestic supplies of energy are needed in the light of this predicted reliance on imported oil. Again, we agree with your conclusion.

Our studies indicate that, provided the oil is available, imports will have to reach 12 million barrels a day by 1980, or 100 percent more than U.S. oil imports in 1975. And we see imports at about that same 12 million barrel per day level straight through to 1990.

So we feel a burden to stress how serious the energy gap can be and how long it can last. Indeed, the hour is late for recognizing the scope of the problem and for facing up to its implications.

But whether the barrel is described as half full or half empty, you and we seem to agree that there is a void in our prospective energy balance and that it must be filled with imported oil. A sentence from your letter puts the key question which then arises about as neatly as one could. You asked, "What governmental policies are likely to provide the most effective protection to the U.S. consumers both in terms of adequate supplies of energy and reasonable prices? "There are two very important qualifications in your question: adequate supplies and reasonable prices. I will not dwell on either, but I need to share with you what they mean to me. Otherwise, my observations about appropriate government policy may have little meaning to you. Adequate supplies to me, Mr. Chairman, mean some surplus. A precisely balanced oil supply system is just too tight. As foreign governments take over from private oil companies in OPEC countries, one must wonder if they will maintain sufficient spare capacity, something that till now has been a result of competition between private oil companies operating in those countries.

The second concept to put boundaries around is reasonable prices. We need to be very straightforward on this subject lest we create confusion and vain hopes that energy prices will drop. Put simply, energy prices would level off or fall if alternatives or surpluses became available at current or lower prices. Over the period we're considering, no such alternatives or surpluses are foreseen. So far, all the alternatives that we in Exxon are working to research and develop are turning out to be more costly than the current prices of fossil fuels; hence higher future energy prices should not be considered unreasonable. They are, in fact, inevitable and policy deliberations would be frustrated hopelessly if we were to work from a different starting point.

But being realistic doesn't have to mean being passive. A workable national energy policy is urgently needed, and the relationship of the government and of the companies with OPEC is an important aspect of policy. It is vital to other countries as well. Nations everywhere, industrialized and lesser-developed alike, share concerns about price and security of oil supplies. In many cases, other nations' problems are more severe than this country's, for they have fewer domestic alternatives. They are, therefore, keenly aware of the importance to them of actions taken here. As the world's largest importer of energy and its most powerful economy, the United States has a special responsibility to see that its policies adequately reflect these shared concerns. The initiative of this country in establishing the International Energy Agency and the active participation in it since have helped demonstrate that U.S. commitment to friends abroad.

The continuing delay in developing a coherent set of domestic energy policies, however, has left a contrary impression. To many foreign observers, as well as to many here at home, it seems clear that the prime requisite for dealing with international energy matters is sorting out the conflicting trends of action and reaction and inaction within the United States. Hopefully, President-elect Carter's stated intent to reorganize and bring new Government effort to developing realistic national policies including conservation, stockpiling, and the development of all domestic resources will soon be successful.

But with the best of efforts, we will not escape our need to import oil. And that, of course, means imports from OPEC. All major-consuming areas will be increasing their use of OPEC oil, but especially the United States. Over the next decade, the increase in U.S. imports from OPEC will be almost three times as great as the increase in Europe and Japan combined. The question for the nation, therefore, is how to maximize the chances that producing country decisions will reflect the interests and concerns of their customers.

To this end, Mr. Chairman, you suggested various steps which our Government might take. An uncertainty common to all those possibilities is how aggressively the United States should push its interests, as a consumer, against those of the producing nations. It seems to me that since large imports of oil are vital to us—and to other consuming nations—confrontation should be avoided, particularly in view of the disparity in bargaining positions. Some of the major producers on which we will increasingly rely for oil can afford to cut back production even if they lose revenues by doing so. We have much less flexibility in our use of imports.

The alternatives you mentioned included both a broad economic settlement, perhaps within the framework of the Conference on International Economic Cooperation, and greater use of bilateral arrangements. Both courses offer possibilities which should be explored, but it's probably unwise to expect too much of either. With respect to multinational arrangements, it seems to me that the greater the number of issues which are linked in a search for solutions and the greater the specificity with which they are treated, the less the likelihood of success in such a broad negotiating forum.

An obvious alternative, or supplement, to a multinational approach is bilateralism. Unfortunately, the goods and services which the United States has to offer the OPEC countries are less vital to them than the oil which we need from them. They have other suppliers. We do not.

Also, emphasis on bilateral arrangements might signal an every-man-for-himself approach which could be disruptive both to alliances with other nations and to the world economy. What we should rather emphasize to OPEC is the mutual interest of all nations in a prosperous world economy in which the goods and investments of both sides are allowed access to the markets of the other on a nondiscriminatory basis. Bilateralism may, however, have a useful role to play in the political and diplomatic arena, the possibility of which you gentlemen are well aware.

A third question was whether the Government should become more directly involved in day-to-day operations of the business itself. Should it establish a U.S. national oil company to deal directly with

the governments of producing countries? No, sir, it should not. I share the conclusion of Robert Krueger, consultant to the FEA, who advised that there appears to be no convincing basis on which to recommend a U.S. Government oil company to participate in international petroleum transactions.

It could be argued that setting up a Government agency, with the stated purpose of breaking OPEC's basic price would worsen the U.S. bargaining position. The likely result would be a further drawing together of OPEC nations in the face of a direct threat. OPEC countries could decide to treat the United States selectively, perhaps offering oil at a price above the world level in recognition of our allegedly excessive use of energy. What would the United States do in such circumstances?

Beyond these considerations are the almost limitless practical difficulties which a centralized purchasing agency would encounter. It would be a bureaucratic nightmare, if indeed, it could be done at all.

A different approach calls for a Government role limited to the auctioning of import tickets. Proponents argue that this would provide countries with excess producing capacity, a new incentive to seek additional outlet.

For such a scheme to work, there must be both desire and capability within individual producing countries for additional outlet. To our knowledge, no country that is actively seeking more revenue has substantial spare capacity. Moreover, any OPEC country with capability and a desire for more revenue has already been free to increase its production, and the availability of import tickets would create no new incentive. If ever there were an incentive for individual OPEC countries to cut prices to gain business, it would have been a year to 18 months ago when there was substantial excess capacity. In fact, at that time, individual countries did vary the relative prices of their crudes in response to market pressures and there were significant shifts in volumes of production among countries. But the basic price level held. As long as one country, Saudi Arabia, holds a dominant position within OPEC, and is producing well above its immediate need for income, it will be difficult to break the organization through bargaining tactics against that nation's will. On the other hand, if that nation becomes convinced, for whatever reason, that price moderation is desirable, it may be able to achieve it, or at least cause considerable strain, and we may be entering such a test period.

Still another form of direct involvement in the operations of the oil industry, which has been suggested from time to time, calls for U.S. Government participation in the negotiations which the companies conduct with foreign producing governments. This is not the answer, either. When the companies negotiate, they do so primarily as commercial entities. They bargain within the limits of what is possible for them to achieve. For some years now, this has not included a say in the basic price of the oil they purchase. The OPEC countries have made it crystal clear that the basic price level is a matter for their determination alone.

What the companies have bargained about has been the terms under which company assets have been taken, volumes of oil which the companies will buy to meet the needs of their customers, the various

conditions associated with those purchases and the fees to be received for management or technical services to the producing governments. For the commercial give and take on the issues where the companies retain a voice, they are sufficiently equipped, and it is hard to see how more direct U.S. Government involvement would help. By introducing politics more obviously into the process, the result could instead be both a hardening of positions and the injection of extraneous issues which could prove very troublesome.

Senator KENNEDY. Mr. Kauffmann, on that point, doesn't it also include the terms of credit that has an impact on price? Maybe indirectly?

Mr. KAUFFMANN. Doesn't the bargaining which the companies are involved with?

Senator KENNEDY. Yes. Doesn't OPEC set the price? In these negotiations——

Mr. KAUFFMANN. Credit terms are one of the items negotiated.

Senator KENNEDY. Doesn't that itself reflect real prices?

Mr. KAUFFMANN. To a very marginal extent. The market price is in fact the price set by OPEC, which in the past has been the price of Arab light crude. That, of course, is the dominant factor that sets all the OPEC country prices.

Well, as I was about to say, Mr. Chairman, if we accept that, then, there are good reasons for questioning most forms of direct U.S. Government involvement in international oil operations, as I believe there are, what is left for the Government to do? I believe that there is a great deal and that it is enormously important. In the first place, there will be occasions when some variety of direct action is justified. For instance, it makes sense that the Government should move directly to acquire oil for strategic storage. And we all recognize that if the circumstances are compelling, the Government will intervene for other purposes. In general, however, direct Government involvement in commercial operations is neither necessary nor desirable.

What is necessary and desirable, is first, that this government should establish a realistic and consistent set of energy policies; and, second, that it should utilize its resources of diplomacy and international economic policy to influence the broad framework within which transactions with foreign firms and governments are conducted. The importance of energy policy is paramount, both domestically and internationally. It is far more significant than the mechanics of oil trading.

Whatever oil companies can do to keep the Goverment informed about international oil developments will enable it to state its concerns and express its views more forcefully. In a recent submission to the FEA, a copy of which is attached to our written statement, we offered our thoughts on how the flow of information to the Government could be improved. We have expressed concerns about the consequences of confidential information being inadvertently released. But we strongly endorse the need of the Government for information and the responsibility of companies to provide it.

In the long run, however, the resolution of U.S. reliance on imported oil must begin with the right kind of guidance here at home. So, while imports are sought on the best terms achievable, steps must be taken at a more fundamental level to reduce our reliance on them.

All within the limits of acceptable economic and environmental restraints.

There are frequent objections to energy development proposals on environmental grounds. We dare not ignore such concerns for many are real and industry does not have an unblemished record in respect of pollution. But we must learn to resolve such issues when they affect energy development rather than just avoid the difficult trade-off's involved.

Finally, Mr. Chairman, it seems to me that our Nation needs a bipartisan approach to its energy problems. To whatever extent we in Exxon can contribute, we are anxious to do so.

Thank you for your attention.

[The prepared statement and an attachment of Mr. Kauffmann follow:]

PREPARED STATEMENT OF HOWARD C. KAUFFMANN

Mr. Chairman, members of the subcommittee, I welcome the opportunity to be here today and to express my views on how members of the oil industry and the government can best work together in addressing our international energy problems. I particularly welcome the opportunity to lay out systematically important issues which are sometimes lost in the emotion which surrounds them.

Among the many questions about national energy policy which have been posed by the Subcommittee, the most basic is what governmental policies are most likely to assure U.S. consumers adequate supplies of energy at reasonable prices. If we are to agree to an answer to this question, I believe that it must start with a joint realization that what is reasonable in today's world is in many respects far different that it was five to ten years ago. As consumers of energy, few of us may be convinced that it is reasonable that oil which can be produced in some places for twenty cents-per-barrel should be sold into export markets for more than $12 a barrel. The fact is, however, that whether measured by the cost of alternative energy development or by the power of OPEC, oil prices are now calibrated on a new and different scale. Our national energy policy can have an effect on price—at a minimum it can retard price increases—but I believe there is no reasonable prospect for a major decrease in price. To assume otherwise is more likely to frustrate policy deliberations than to produce useful results.

But, being realistic does not mean being passive. Effective national energy policies are urgently needed, and the relationship of the companies and of our government with OPEC is clearly an important aspect of these policies. It is important to other countries as well. Nations everywhere, industrialized and less-developed alike, share concerns about the price and security of oil supplies. In many cases, their problems are greater than our own, for they have fewer domestic alternatives. They are, therefore, keenly aware of the importance to them of actions and decisions taken by this country. As the world's largest consumer of energy and its most powerful economy, the United States bears a special responsibility to see that its policies adequately reflect their shared concerns. I believe that the initiative of this country in establishing the International Energy Agency and its active participation in it since have helped to demonstrate our commitment to our friends abroad. However, the continuing delay in developing a coherent set of domestic energy policies has left a different impression.

The nature of the international energy problem is clear. In your own words, Mr. Chairman, "No economically acceptable combination of policies can eliminate this country's need for imported oil by the mid-1980's." Nor for many years beyond the mid-1980's, in my judgment. Our forecast at Exxon sees U.S. oil consumption over the next fifteen years growing at less than half the historical rate. This change reflects the substantial impact of price increases on demand, amounting by 1990 to a twenty percent reduction in demand from what it would otherwise have been. It also reflects a major increase in reliance on coal and nuclear energy. But even at this low rate of growth in oil consumption, the amount of oil which the U.S. must import is expected to double by the early 1980's, and to hold at this level through the decade. Even more imports will be needed if the many

obstacles which stand in the way of coal and nuclear expansion are not overcome or if significant new domestic discoveries of oil and gas are not made.

The story on where the imports must come from is familiar. OPEC nations hold more than 80 percent of proved oil reserves in the non-Communist world and account for almost 70 percent of current production. All major consuming areas in the free world are dependent on oil from these countries. Even with the development of the North Sea, two-thirds of Europe's oil is likely to be coming from OPEC sources by 1985. In Japan, the dependence will be close to 100 percent. But, it is in the United States that the greatest increase in dependence on OPEC takes place. We estimate that OPEC oil will account for more than 50 percent of domestic consumption by 1985, as compared with about 30 percent in 1975. The increase in U.S. imports from OPEC over this period will be almost three times as great as the increase in Europe and Japan combined. Clearly, the United States is the new actor in this drama, and it has a leading role.

Whatever the exact magnitude of these numbers, it is clear that the world will be operating within a framework of OPEC decisions on oil price and on expansion of productive capacity. The question, therefore, is how best to insure that producing-nation decisions reflect the interests not just of themselves but of consumers as well.

Producing nations and consuming nations have some interests in common and some which diverge. Consumers have an interest in supplies growing as they are needed at prices which do not cause economic hardship. Producers want income to support ambitious development plans, and some of them want opportunities to invest in industrialized nations. At the same time, the producers recognize that oil will not last forever, and they see the advantage of stretching out the life of their reserves. The chances of long-term OPEC actions which undermine reserve values are, therefore, small.

Within this framework, the oil market will be influenced by the various factors which affect energy supply and demand, and particularly by the policies which consuming nations see fit to adopt with regard to energy use and alternative supply. I believe that these policies will be of far greater importance in determining the terms of oil trade than attempts to modify the mechanics of oil trading. However, the oil market will also be influenced in a major way by broad economic and political considerations which go well beyond the oil trade as such, and there is no question of the importance of a government presence in these areas. The issue for our country, and for the world, is where within the spectrum of interests involved can we find a course which minimizes the risks and maximizes the benefits of the interdependence between producing and consuming nations.

In elaboration of these basic issues, Mr. Chairman, you have asked for Exxon's views on various possible actions which our country might take, and I should like now to turn to these. An uncertainty which runs through the proposals is how explicitly, and aggressively, the United States should contrast its interests, as a consumer, against those of the producing nations. It would seem to me that since large imports of oil are vital to us and to all consuming nations, a posture of confrontation should be avoided if at all possible. This is particularly true since some of the major producers on which we rely for oil can afford to cut back on their production, for conservation or other reasons, even if they lose short-run revenues by doing so. America must pursue its legitimate interests, and pursue them vigorously, but my conviction is that this will best be done by an approach which fully recognizes the interdependence between consuming and producing nations.

You asked, first, whether the government should approach the oil problem by seeking a broad economic settlement, perhaps within the framework of the Conference on International Economic Cooperation, which would encompass the interests of the producing, consuming and developing nations. I lay no claim to expertise on broad international agreements, but I'll offer a few observations. It seems to be that the greater the number of issues which are linked in a search for solutions and the greater the specificity with which they are treated, the less the likelihood of success in a broad negotiating forum.

Even if the focus of a CIEC Agreement could be narrowed just to oil, I am not optimistic about what might be accomplished because of the complex issues involved. Nevertheless, CIEC does afford an important meeting ground where the concerns of all parties can be expressed and areas of possible agreement explored.

The U.S. role in shaping the positions expressed by the IEA is important to this dialogue. Outside the formal sessions, our government can pursue quiet diplo-

macy in an effort to achieve a better understanding of the thinking of other nations, and to emphasize to them the potential impact of their decisions.

An obvious alternative, or supplement, to a multinational approach is bilateralism. Hence, your question, "Should the United States move more aggressively in bilateral negotiations with OPEC members, linking our needs for oil with their need for U.S. supplies, capital equipment and technical expertise?" I believe, first, that whatever is done bilaterally should not ignore the obvious interests of other consuming nations. In any case, it's easy to expect too much of bilateral arrangements. By and large, the goods and services which the U.S. has to offer the OPEC countries are less vital than the oil we need from them. They have alternative suppliers. We do not. An attempt by the U.S. to trade too hard on its position as a supplier, therefore, could eventually result in reduced OPEC purchases from the U.S., to the ultimate detriment of our negotiating and trading positions.

I am particularly concerned that an emphasis on bilateral arrangements would signal an every-man-for-himself approach which, if generalized, would be disruptive both to alliances with other nations and to the world economy. For forty years now, since the great depression of the 1930's, the United States has successfully taken a different approach to its international economic problems. What we should rather emphasize to OPEC is the mutual interest of our nations in a prosperous world economy in which the goods and investments of both sides are allowed access to the markets of the other on a nondiscriminatory basis. Given the surplus funds which some OPEC nations are accumulating from oil earnings in excess of their fiscal requirements, and acknowledging that even more oil is required to satisfy the energy needs of the U.S. and other consuming countries, it may be that greater attention needs to be given to providing investment outlets. Bilateral arrangements might well help in this respect. Where I believe bilateralism may have a greater and more useful role to play, however, is in the political and diplomatic arena.

A third question posed by the Subcommittee is whether, in the new circumstances of international energy, the government should become more directly involved in the day-to-day operations of the business itself. Should it, for instance, establish a U.S. National Oil Company to deal directly with the governments of producing countries? My answer is, no, I share the conclusion of Robert Krueger, consultant to the FEA, who advised that whether viewed economically, functionally or from the standpoint of the over-all public interest, there appears to be no convincing basis on which to recommend a U.S. Government oil company to participate in international petroleum transactions.

An argument sometimes given for a U.S. National Oil Company is that by centralizing imports, it could achieve greater leverage in bargaining with OPEC. But in the circumstances which the member countries of OPEC present to us, the difference in the bargaining power of a centralized import agency of political origin and of the commercial companies now making purchases cannot be great. If there is a difference, it may not be positive. It can be argued that setting up a government agency, with the avowed purpose of getting lower prices out of OPEC, would worsen the U.S. bargaining position, since the likely result would be a further drawing together of OPEC nations in the face of an obvious threat. If this happens and the OPEC response takes the form of administering prices selectively to different nations, it is not at all clear that the U.S. will be among the favored. The OPEC countries could decide, for instance, that if the U.S. wishes to be treated differently from other nations, they will accommodate us, perhaps offering oil at a price above the world level in recognition of our allegedly profligate use of energy. What would the U.S. do in these circumstances? Do without? Ration? Take a loss in economic growth?

Beyond these considerations are the almost limitless practical difficulties which a centralized purchasing agency would encounter. The reality of the oil business is that there are many different crude oils, differing widely in quality, and many different refiners with specific crude needs that change as product demand varies. It would be a bureaucratic nightmare, if indeed it could be done at all, for a government agency to attempt to acquire and distribute all the types of crude oil. in the needed volumes, to allow U.S. refiners to respond rapidly and flexibly to changing consumer requirements. It is this variability of company circumstances which has sometimes been used to persuade producing country negotiators to agree to terms more favorable than those initially proposed. Such possibilities would be greatly reduced in the case of a single government purchaser.

A different approach, which recognizes some of these difficulties, calls not for a centralized purchasing agency but for a government role limited to the auction-

ing of import tickets. Proponents argue that this would provide countries with excess producing capacity an incentive to seek additional outlet. Presumably, they could acquire import tickets secretly and thus escape the wrath of their fellow OPEC nations. I doubt very much that this scheme would work. By examining data on international oil movements observers would be able to detect extraordinary volume changes, Secrecy would therefore be hard to maintain.

For such a scheme to have any chance of working, the necessary condition is widespread desire among producing countries for additional outlet, not the mere existence of spare producing capacity, of which in any case there will be less and less as the world's demand for oil inexorably grows. Because OPEC does not operate with fixed production quotas, any member with idle capacity and a desire for more revenue has already been free to increase production, and the availability of import tickets would create no new incentive. One would have thought that if ever there were an incentive for individual OPEC countries to cut prices to gain business, it would have been a year to eighteen months ago when there was substantial excess capacity. In fact, individual countries did vary the relative prices of their crudes in response to market pressures and there were significant shifts in volumes of production among countries. But the basic price level was unaffected. As long as one country, Saudi Arabia, holds such a dominant position within OPEC, and is producing well above its immediate need for income, it will be difficult to break the organization through bargaining tactics against that nation's will. On the other hand, if that nation becomes convinced. for whatever reason, that price moderation is desirable, it may be able to achieve it, at least in part.

Some have suggested that even though an auction ticket scheme may not work, it should be tried nevertheless because it is a low-cost option. I do not believe this to be the case. The administrative burden could be substantial. Moreover, any scheme which depends upon anonymity for its operation and rationale is potentially open to manipulation. The added costs to U.S. consumers of an apparently simple experiment could therefore be considerable.

Still another form of direct involvement in the operations of the oil industry, which has been suggested from time to time, calls for U.S. Government participation in the negotiations which the companies conduct with foreign producing governments. In an earlier communication to Senator Kennedy, Cliff Garvin, Chairman of our company, explained why we believe this would not be desirable. When the companies negotiate, they do so primarily as commercial entities. They bargain within the limits of what it is possible for them to achieve. For some years now, this has not included a say in the basic price of the oil they purchase, although we at Exxon have continuously urged moderation. It is also true that the companies have been able to influence the prices of various grades of crude oil relative to the basic price by adjusting purchases in response to market conditions. The OPEC countries have made it abundantly clear, however. that the basic price level is a matter for their determination alone.

What the companies have bargained about has been the terms under which company assets are being nationalized, the volumes of oil which the companies wish to buy to meet the needs of their customers, the various conditions associated with those purchases and the fees to be received by the companies for management services to the producing governments. For the commercial give and take on the issues where the companies retain a voice, they are well equipped, and it is hard to see how more direct U.S. Government involvement would help. By introducing politics more obviously into the process, the result could instead be both a hardening of positions and the injection of extraneous issues which could prove very troublesome.

If, then, there are good reasons for questioning most forms of direct U.S. Government involvement in international oil operations, as I believe there are, what is left for government to do? I believe that there is a great deal for it to do and that it is enormously important. In the first place, there will be occasions when some variety of direct action is justified. For instance, it makes sense that the government should move directly to acquire oil for strategic storage. And I recognize that if the circumstances are compelling, it will intervene for other purposes. In general, however, it is my view that direct government involvement in the commercial operations of the industry is neither necessary nor desirable.

What is necessary and desirable is, first, that government should establish a realistic and consistent set of energy policies and, second, that it should utilize its resources of diplomacy and international economic policy to influence

the broad framework within which transactions with foreign firms and governments are conducted. The importance of energy policy is paramount, both domestically and internationally, and I shall have more to say on this in a moment. But the arts of diplomacy can have an impact as well.

The oil price issue is a case in point. Although the producing governments are unwilling to negotiate the basic price of oil with the companies, they are sensitive in varying degrees to the impact which higher prices might have on the world economy and on particular consuming governments. In forming their judgments, they keep an ear open for views expressed by this government and others. We have seen some evidence in recent weeks of how this process works. OPEC prices went up but not by as much as they might have, with the result that the industry and the world now find themselves in an anomalous two-tiered pricing situation. How this will be resolved remains to be seen, but for our purposes today, it does show that the concerns of the consuming nations are not ignored in OPEC deliberations.

Whatever the companies can do to keep the government informed about international oil developments will enable it to state its concerns and express its views more forcefully. In a recent submission to the FEA, a copy of which is attached, my company offered some thoughts on how the flow of information to the government could be improved. Although in that document we expressed certain concerns about the consequences of confidential information being inadvertently leaked, we strongly endorsed the need of the government for information and the responsibility of the companies to provide it.

In the long run, however, the resolution of U.S. reliance on OPEC oil, and the higher prices which this has brought, must be rooted in the basic decisions of energy policy, and it must begin with the right kind of policy here at home. Without this to signal our nation's intent and seriousness, OPEC will never be much impressed. So, while imports from OPEC are sought on the best terms achievable, steps must be taken at a more fundamental level to reduce our reliance on those imports. This means that, within the limits of acceptable economics and environmental restraints, we must both conserve in the use of energy and develop new sources.

So far, our nation has not faced up to the politically difficult steps needed to accomplish these objectives, and has instead chosen the path of relying on increased imports, while hoping to find ways to break OPEC or to harness new energy sources quickly and cheaply. The sense of urgency and the willingness to accept the painful side effects of a straightforward pursuit of conservation and high-cost supply development have been missing. Hence, price controls on oil and frequent objections to energy development proposals on environmental grounds persist. I do not wish to minimize the concerns which have led to these results. They are real. But they divert us from what must be done if the energy problem is to move toward resolution.

By keeping the price of energy below its replacement cost to the economy, the nation encourages consumption while discouraging the development of new sources, and needlessly complicates the energy enterprise through layers of regulations which require patch upon patch to keep them from falling apart. If this is being done for fear that the oil companies will reap excessive profits, or because of the possible impact on low-income consumers, surely there are simpler and better ways to handle such matters. The paradox, as Professor Adelman has said, is that the higher the price for oil imposed by OPEC, the greater the need for decontrol in the U.S. and the less the chance of getting it. Similarly, the lack of resolution of the many environmental issues which affect energy development adds uncertainty and delay to decisions which must be taken.

Wise energy policy, then, must sort out what is basic from what is peripheral and find a way of getting us moving. The more I listen to what people in the energy business have to say about energy and to what government representatives and public interest groups have to say, the more I become convinced that what the nation needs is a bipartisan, or multipartisan approach to the problem. We need fewer decibels, less polarization of views, and a lot of hard thinking. Those of us who have extensive experience in energy affairs feel a responsibility to see that this is done. We look forward to working with this Subcommittee and others in Congress who have special knowledge about energy matters.

I thank the Members of the Subcommittee for listening to me, and I shall be happy to answer your questions.

Attachment.

Reporting Requirements: Foreign Oil Supply Arrangements

Exxon Corporation Comments

THE PROPOSAL AND THE ISSUES

The Federal Energy Administration is considering the imposition of new reporting requirements with respect to supply arrangements which U.S. oil companies and their subsidiaries have with producing governments and their oil companies. Specifically, it is suggested that U.S. companies either (1) provide notice to the FEA of such arrangements, with a summary in standardized format of their major features, together with access as required to the actual agreements, or (2) provide, at the time of filing, the full text of any agreement or governing decree, together with information on any informal or ancillary understanding which may accompany it. Such reporting might be restricted to agreements already concluded or might be extended to ongoing negotiations.

In assessing the need for these potential new reporting requirements, several questions arise:

1. What is the proper role of the U.S. Government with respect to the international crude oil supply arrangements of private companies?
2. What kind of information does the government need to play its role, and to what extent is such information already available?
3. In what form and manner can additional information be most usefully supplied without jeopardizing supply arrangements, unduly burdening the companies or adversely affecting competition within the private sector?

THE GOVERNMENT'S ROLE

There can be no doubt that the events of the past four years have radically transformed the international petroleum scene. One consequence has been a more explicit awareness by everyone, and particularly by governments, of how important energy is to our way of life. With this has come a recognition that in the future our own government, as well as those of other countries, will play an increasing oversight role in energy affairs. Indeed, it is now commonly accepted that without the right kind of energy policy by government, as a nation we shall be unable to solve many of our problems.

Some would go beyond this and have the government more directly involved in the energy business. We at Exxon believe that this is neither necessary nor desirable. We continue to believe that in our kind of society, government and business have basically different roles to play and that the country will suffer from overly mixing them up. Fundamentally, as we seee it, the role of government in energy, as in most other economic matters, should be to provide the guidelines, incentives and constraints within which private enterprises can function in the interests of society. Government should mobilize the capabilities and ingenuities of the private sector, not assume its functions.

INFORMATION NEEDED AND AVAILABLE

Taking this as our premise, the question becomes, what purposes are the proposed new reporting requirements to serve. The answers given by the FEA are three:

1. To allow a better assessment of the current and prospective state of the international oil market;
2. To assure that government decisions with respect to that market are fully informed; and
3. To permit the government to foresee cumulative consequences resulting from individual decisions.

We believe that information for each of these purposes is important if sound national policy is to be achieved, and we will work actively to provide it. But it is also our view that the content of such reporting and the way in which it is communicated must be carefully structured if it is not to prove counter-productive. We say this because we are concerned that inadvertent disclosure of confidential information can have harmful effects on agreements, both those concluded and those under negotiation.

If the government is to arrive at an energy policy which gives promise of greater energy independence for the country, its information flow must be broad-

based and reliable. It needs to achieve and maintain an understanding of the international oil trade, including all the elements which determine access to oil supplies. Such information should start first with a firm understanding of world energy supply-demand prospects; it should encompass knowledge of export country policies on crude oil production and terms of sale; and it should include data on basic contract terms and related matters in specific arrangements with producing governments.

We would urge the government to seek information on these matters from a variety of company and industry sources, as well as from diplomatic contacts. Exxon and, we believe, other oil companies have in the past communicated extensively with the government on energy issues, and for our part we are prepared to do even more in the future. Forms of Exxon communication have included: (1) presentations—on numerous occasions—of worldwide and U.S. supply/demand outlooks. These have been made both to senior officials in the administration and to Congressional staff groups; (2) briefings on trends and developments in arrangements with producing governments; (3) reports on the progress of ongoing negotiations; and, (4) briefings of U.S. Ambassadors to producing countries, at the time of assignment and on the occasions of visits of negotiating teams to those countries.

The result of these company communications has been an extensive accumulation of information in the government about the petroleum industry. Indeed, we would speculate that, contrary to the beliefs of some, more is known about the affairs of this industry, both foreign and domestic, than of any other major industry in the country.

In the main, this information flow has been an informal process, frequently at the initiative of the companies, sometimes at the request of the government. By and large, the emphasis has been not on providing numbers as such, of which there appears to be an abundant supply already, but on trying to provide understanding and perspective. That is where we think the emphasis should be, and that is why we have reservations about a formalized reporting system which would stress primarily fact-gathering. Not because we wish to conceal facts, but because we think it is of utmost importance that they be properly understood.

WHAT WE THINK SHOULD BE DONE

In our view, an expansion and deepening of the kind of reporting relationship which we have had in the past would best serve the needs of the government and the industry. We would propose that on all concluded agreements with producing governments or their national oil companies, other than those of routine significance, the companies have discussions with the government of whatever length and in whatever detail the government might wish. Such consultations should be on an individual company basis, and although focussed on a specific government agency, they could involve other governmental departments as well. They should place information with respect to specific agreements in the broader context of general oil industry developments. Company views and opinions on all matters having a bearing on international oil trade should be a part of them.

We would also suggest that certain basic issues and categories of fact be mutually agreed as the framework for these consultations, and that the pattern be substantially held to from meeting to meeting. It may have been that in the past, consultations were largely ad hoc in the materials covered, reflecting the personalities and particular interests of those involved. A somewhat greater continuity in theme could build a more solid understanding over time. For this purpose, the factors of special interest identified in the FEA proposals would seem a good starting point: i.e., volume and price of oil covered by the agreement, length of contract, reopeners, services rendered, lifting flexibility, and novelty of arrangement.

We believe that consultations of the kind which we are proposing could, in most cases, provide the government with all the information and assurances which it might want. In those cases where the government feels that more information is needed, specific arrangements for handling additional data, including provisions for security and confidentiality, could be agreed to on a case by case basis. Our hope would be that in these latter cases, written summaries of the principal features of agreements would suffice. Complete texts of basic agreements and of any ancillary side arrangements, if required, should be accorded confidential handling.

THE SPECIAL PROBLEMS PRESENTED BY ONGOING NEGOTIATIONS

With respect to ongoing negotiations, we feel even more strongly that consultation between the companies and government, rather than formal data submission, is the route to follow. The government is entitled to know the shape and thrust of significant prospective agreements. It should be made aware of the principal provisions and of any precedent-setting features which have been tentatively agreed to. It is reasonable for the government to express its reactions and for the companies to respond to them. However, all this can be done through consultation and without the filing of documents. On those occasions when it is nevertheless felt that access to the documents is needed, we believe that it would be preferable that arrangements for access be worked out at the time, with appropriate attention being given to the need for confidentiality.

As the FEA and its consultant, Mr. Krueger,[1] have both recognized, the continuing nature of negotiations and the special sensitives which surround them make it essential that briefings of government on negotiations in progress be handled with maximum confidentiality. A formalized reporting system involving the submission of documents would be particularly hazardous. One obvious possibility is that leakage of competitive information could penalize the reporting company vis-a-vis competitors. It was concern on this score, and related considerations of antitrust policy, which led the U.S. Government to resist in the IEA the formalized reporting of data which connot be meaningfully aggregated.

Of even greater concern is the possibility of disruption of ongoing negotiations because of publicity or the possibility of publicity. In the past, through aggressive bargaining and with the expectation that confidentiality would be maintained, the companies have from time to time been able to persuade the negotiators of producing governments to agree to terms which were more favorable to consuming countries, and to the companies, than those initially proposed. This would have been much more difficult to achieve had producers feared publicity either during negotiations or after the event. A consequence of publicity could be that producing governments, rather than negotiate, would dictate standard stringent contract terms for fear of being politically embarrassed by the disclosure of terms more favorable to the buyer than the accepted norm among producing governments.

Alternatively, disclosure could result in the publicizing of terms which are unfavorable to the companies, and which would then become precedents, or "leapfrogs," that producing governments would insist on imposing on all of their customers. For instance, companies with minimal import needs might be less concerned with inflexible terms imposed by the exporting countries, and thus be more willing to accept them, than other buyers with large import needs. Disclosure would highlight these terms and increase the likelihood of their being forced on all companies.

Beyond these practical concerns, there are broader grounds for questioning the effectiveness of formalized reporting with respect to ongoing negotiations. One of these arises from the fact that many foreign consuming governments have as much, if not more, reason than our own to be concerned about the terms under which imported oil is made available. Japan and most European countries are far more dependent on foreign oil than is the U.S. There exists, therefore, the likelihood of emulation by foreign governments of any U.S. example on formalized reporting and, in turn, an increased prospect of intervention in ongoing negotiations. If each government sought to intervene in ongoing negotiations, either directly or through the local affiliates of U.S. companies, a state of chaos would prevail. Yet, the interest of these many governments in what is going on is undeniable. Not to recognize it would imply that only the U.S. should attempt to influence the conditions of world oil trade. This is wholly unrealistic. Recognizing this, it seems to us that informal consultations with these countries, either directly or through the IEA, is the sensible way to respond to their needs for information, and that this is more likely to be accepted if a similar system prevails in the U.S.

Second, there is a question of how effective the reporting net would be in catching all relevant pieces of information. Prior screening of documents to which a U.S. company is a party may alert the U.S. Government to potentially disturbing precedents, although these are just the kinds of things which would

[1] Author of February, 1975 report to the FEA, "An Evaluation of the Options of the U.S. Government in its Relationships to U.S. Firms in International Petroleum Affairs."

in any case be brought to light in a system of consultations between the companies and the government. But prior screening of U.S. company documents will not bring to light adverse terms agreed to by foreign companies. And yet these terms will be an integral part of a body of negative precedents. During the last four years, for example, there have been numerous instances of foreign companies with total dependence on Middle East oil acceding to onerous terms.

Finally, there is the matter of intent. What is the purpose of the FEA in demanding access to agreements which have not yet been finalized? If it is to gain understanding and to express concerns which are important to the government, then consultations are preferable. If it is instead to exercise the right of prior approval of agreements, in all their details, then the issue of what role the government should play in negotiations comes immediately to the fore. As a matter of principle, we would be opposed to a routine extension of governmental power in this direction. Practically, we believe that it could frustrate meaningful negotiations. As Mr. Krueger said in his report to the FEA, "Time is critical and valuable opportunities may be lost while the wheels of bureaucratic review are turning. The necessity of informing government officials in Washington of the terms of a proposed agreement and awaiting consent thereto will inevitably increase the difficulty of closing agreements."

Presumably, any desire by the government to inject itself more actively into the negotiating process would arise from a feeling that it could be more effective than the companies in securing favorable terms or, alternatively, that it could represent national interests which go beyond those of the companies. In assessing these possibilities, it is important to understand just what the negotiations are about. When the companies negotiate, they do so primarily as commercial entities. They bargain within the limits of what it is possible for them to achieve.

In years past, as the U.S. Government knows, Exxon and, we feel sure, other companies negotiated hard and successfully to contain increases in the cost of oil. Under currently prevailing conditions, however, the basic price level is no longer on the bargaining table when the companies sit down to negotiate. This is established unilaterally by the producing countries, as a matter of sovereign prerogative. What we can realistically aim for, therefore, is only that we be allowed access to oil on a non-discriminatory price basis.

Consequently, company negotiations have dealt instead with such matters as the terms under which company assets are being nationalized, the volumes of oil which the companies will be allowed to purchase, the various safeguards associated with these purchases and the fees to be received by the companies for services to the producing countries. For this commercial give and take, the companies are well qualified even while laboring under a very limited negotiating leverage vis-a-vis the producing governments. It is hard to see how a formal requirement for U.S. Government approval would help. On the other hand, it could further circumscribe the room for bargaining still left to the companies.

It may be argued that the focus of the companies in their negotiations is too narrow, that the interests of the country are broader. That is probably true, but it does not follow that a commercial negotiation is the place to pursue these broader interests. A quest for lower oil prices or, more realistically, for a slower pace of increase, is a case in point. The basic level of oil prices is negotiated within OPEC, not by the companies. Consuming country governments try to influence the outcome by national expression of concern and through related diplomatic initiative, and for this purpose adequate input of information from the companies on supply arrangements is obviously needed. Fundamentally, however, price and related issues of energy independence will be solved not by negotiation but by the creation of energy supply alternatives, and this calls for government action of a very different sort.

THE ISSUE OF CONFIDENTIALITY

It is clear that a major reason for the reluctance to provide copies of agreements, particularly those which have not yet been finalized, is the fear that the information will somehow be disclosed. This would have the practical consequences for the companies, and for the country, which have been described above. It is important, therefore, to assess realistically the prospects for effective confidential treatment.

Our reading of the situation is that presently available legal protection is at best equivocal. Practically speaking, the working assumption has to be that

whatever is submitted under the cloak of confidentiality will become widely known, and often sooner rather than later. Experience teaches us that this can lead to a use of information for which it was not intended. Consultation rather than formal document submission does not wholly solve this problem, but we believe that it reduces it. It is for this reason, and because we believe that consultation brings greater understanding of the issues, that we recommend it as the primary vehicle for informing the government on international oil developments.

If, nevertheless, it is concluded that copies of agreements must be made available on a routine basis, we would urge that explicit attention be given to the possibility of abuse and to the need for carefully defining standards for administrative action.

CONCLUDING REMARKS

To reiterate, it is our position that the government needs to be knowledgeable in international oil affairs so that its involvement in energy matters will be effective and constructive. Accordingly, it has obvious and legitimate needs for information. We wish to facilitate this process. But we wish to do so in a way which will preserve the basic distinction between public sector and private sector roles. In our view, the basic issue raised by the FEA proposal is whether the suggested action would help or hinder the course of international negotiations on oil supply matters. If carefully interpreted, we believe it would help; if pushed too far, we believe it would create problems for the nation, as well as for the companies.

We would be pleased to discuss our views further with the FEA and to address any matters which have not received adequate attention in this response. In particular, we would be happy to work with the FEA in any restructuring of future reporting requirements.

Senator KENNEDY. Thank you very much. We will come back to some of those areas, Mr. Kauffmann.

Mr. Sawhill, glad you could be here. Glad to have you with us.

STATEMENT OF JOHN SAWHILL, PRESIDENT, NEW YORK UNIVERSITY, AND FORMER ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION

Mr. SAWHILL. Thank you, Mr. Chairman.

Senator KENNEDY. You have appeared before various other committees of Congress. We always benefit from your thoughts.

Mr. SAWHILL. Thank you very much, Mr. Chairman. I appreciate the opportunity to appear before you. I will try to make my testimony brief. We are discussing a terribly important issue today, the whole question of the relationship of the Government to the international oil industry and the Government's progress in developing an international energy policy. I have chosen to address myself to the first part of this issue, that is the Government-industry relationship, since many of the other people that have spoken on the panel have addressed other parts of this issue.

It seems to me that the domestic, economic, and foreign policy implications of oil dealings make petroleum far more than simply a commodity. And, they make it far more likely that the public and private interest will diverge in negotiations for foreign supplies. That is really the key point that I want to make.

Senator KENNEDY. Would you just say it once more, Mr. Sawhill?

Mr. SAWHILL. The critical point, I think, is that it is very likely, because of the importance of petroleum in the economic as well as the political affairs of the world that the interests of the U.S. Government, namely the public interest, and the interests of private cor-

porations will diverge; and for this reason, it seems to me it is important that the government seek ways to develop a new relationship between the Government and the industry so that we can be insured in the future that negotiations will be carried on in the pubilc interest. When I say that the interest will diverge and that private interest and public interest do not necessarily coincide, I certainly do not mean to imply that there is something illegal about the way the companies are and have been operating. The fact is, however, that the incentives for the companies may not cause them to act in the public interest. At least, that is the issue that we must explore carefully.

The Government's concerns of necessity go beyond such variables as prices, sulfur content, and refining characteristics and encompass a whole range of political, economic, and national security interests as well. These include the damaging impact of higher oil prices on the economies of many of our OECD allies, the potential disruptive effects on international finances and international political stability of the mounting debt burdens being incurred by the non-oil-producing LDC's—Professor Carter's testimony has given ample evidence of both of those points—and the increasing vulnerability of the major oil importers, including our own country, to another oil embargo.

It is not difficult to cite cases where public and private interests might diverge. For example, a given oil company or group of companies may prudently seek to assure a stable, long-term source of supply from one country and might make certain concessions in the form of higher prices in the interest of ensuring supply continuity. From the company's point of view, the absolute level of prices is less important than that the terms of acquisition be no worse for it than for its competitors. Actually, a sharp reduction in prices could even be detrimental in the short run since it would result in large inventory losses—just the converse of the situation we saw in 1973 and 1974 when sharp increases in prices resulted in very large inventory profits.

Now, the interest of the U.S. Government, in such a situation, might be to maintain diverse sources of supply and to do everything possible to reduce prices. The Government and the companies in this case, therefore, would approach the problem from an entirely different perspective and employ quite different negotiating strategies.

Historically, the companies dominated international oil negotiations. Today, however, control of world oil supplies and prices has passed into the hands of the oil-producing countries. As a result of this change in the balance of power, it is probable that noncommercial factors will be increasingly important in determining oil prices and production levels, and for this reason, there are both short-term and long-term reasons why Government must make its presence felt more strongly at the international oil bargaining table than it has in the past. In the short term, our undue reliance on imports from the Arab States makes both the domestic economy and our foreign policy vulnerable to manipulation by these States. For example, it is probable that the price of Saudi Arabian oil next fall will be determined less by market conditions than by the progress in negotiations on a Mideast settlement, and—as Mr. Sewell pointed out in his testimony—in in North-South dialog as well. The point is that we are dealing with more than just an economic cartel, and the U.S. Government

brings more chips and a different perspective to the bargaining table than the oil companies.

Again, this is not an attempt on my part to criticize the oil companies, but an attempt to characterize the different perspectives by which the problem is approached by the Government representing the public interest and the companies representing their commercial interests and the interests of their stockholders.

In the case of the Government, whether these chips represent arms sales, diplomatic initiatives or agreements affecting international investments and technology transfer, the higher stakes of today's oil game suggest that they be more visible in negotiations than previously.

Mr. Kauffmann made the point that the negotiations should be narrowed as much as possible; my feeling is that it would be nice if we could narrow the negotiations exclusively to price, but I am afraid we cannot. The realities of the world today are that the negotiations of necessity will spill over into political and broader economic questions. And, the recent statements of Sheik Yamani following the OPEC meeting in December, I think, illustrate this point.

In addition to the short term problem, there is a long term problem, as well. Obviously, we must find alternative sources of energy to sustain the world economy in the next century, when oil and gas supplies are depleted. If we do not, we will have great difficulty in maintaining a rising standard of living, once liquid hydrocarbon reserves are exhausted.

It is essential that the Government begin now to plan for this transition to a new energy base. Part of this planning will necessarily involve the type of commercial contracts we should establish with the oil-producing countries in the intervening period. In the years ahead, we will run up against natural rather than contrived production limits among oil producers. We obviously have to decide as a matter of national policy to see whether we want to maintain our domestic petroleum reserves and stretch them as far as possible for use in petrochemical, pharmaceuticals, and other nonenergy applications. If we do, we will necessarily be asking others to deplete their supplies more rapidly than might otherwise be the case. Such a strategy would require delicate and far-ranging negotiations which would require significant government involvement.

The question before us then is that given the new world energy realities, how best might private industry and Government participate, and with what relationship to each other in dealings with foreign oil suppliers? There is no question in my mind that the Government-industry relationship which has prevailed for so many years—and on balance served the public interest quite well at least until the late 1960's—can and must change. The issue before the country is how to preserve the great technical and managerial strengths of the companies and their enormous expertise in world oil production and at the same time insure that the public interest is protected and attended to by the Government.

It may be that we do not know enough today about the consequences of the alternatives which have been proposed to date to specify in detail the best possible working relationship for the years ahead. I think it should probably fall somewhere between a government-run oil purchase operation at one extreme or, at the other, simply having the

private oil companies provide more complete and timely information on their arrangements with foreign suppliers, existing and proposed. But just where on the spectrum we should be is difficult to answer in the short time allotted for this presentation.

It is clear, however, that we cannot afford to delay new initiatives indefinitely. Congress should begin immediately to analyze how a government-run oil company might work, studying the experience of foreign governments such as Canada, Italy, and Great Britain with these arrangements and determining their relevance, if any, in the American context. Why did other countries first exercise this option? How have they operated domestically and internationally, and what has been the scope of their activities? How have their operations been monitored and supervised? How have their goals been met and how have these goals evolved over a period of time? How has the national company related to the private sector?

In many countries, we have a mix. What special strengths or vulnerabilities has this policy had in dealing with foreign producers? Has the experience of other countries with national companies shown that it provides the way to bring the political and economic clout of government effectively to the bargaining table? Would it serve as a useful "yardstick" for the private sector or would it inevitably substitute for private sector initiatives, and thus cause us to lose the managerial and technical strengths I spoke of earlier?

One way to reach conclusions on these issues quickly would be to test them on a small scale. Mr. Kauffmann indicated that if we try to create greater Government involvement in the form of a Government purchasing agency, we would create a bureaucratic nightmare. I am not sure whether we would or not; but we could find out if we construct a prototype national oil purchasing agency for the limited purpose of building all or some portion of our national oil stockpile. Mr. Kauffmann indicated in his testimony—and I agree with him—that this is one area where the Government must be involved. The Government must deal directly with the producing governments or with the companies in acquiring supplies for our national stockpile. So, this gives us an opportunity to test out whether a purchasing agency in fact would be a bureaucratic nightmare or whether it might be able to solve some of the concerns over the public interest that I spoke of earlier. This prototype agency might experiment with the sealed competitive bidding approach and test the effectiveness of this approach as a way of holding down oil prices and widening any cracks which might be forming in the OPEC cartel. It might be the system would not work but none of us would know until we try. Alternatively, it might apply in awarding contracts, other criteria which are definable in our national interest, both domestic and international.

Or, it might purchase a portion of the stockpile through the companies rather than directly from the producing governments and compare the results. In either event, we could monitor its operation closely, and hopefully learn from its experience. The risks of failure are almost nonexistent, and the potential gains as we acquire more expertise in dealing with new forms of institutional arrangements are significant. In the worst case, we would end up building our stockpile more slowly than desirable, and we would learn a great deal in the process.

In the meantime, however, I think it is important that the Government learn more about oil company arrangements with foreign suppliers than it does now. The proposed FEA reporting requirements for existing arrangements seem to me reasonable provided that careful procedures to maintain confidentiality are devised. As to documentary reporting on ongoing negotiations, I can understand the oil companies' reluctance to go beyond briefings and consultations to the filing of documents as a matter of routine. I am well aware of how publicity, or the expectation of publicity, can disrupt ongoing negotiations. And I understand that public disclosure could harm not just the competitive position of a given company, but might damage the interest of their country or its allies by inducing face-saving rigidity into the position taken by suppliers, or "leap-frogging" of unfavorable terms agreed to by one company.

Nevertheless, I believe it inevitable that Government will move to protect the public interest by intruding more into private international bargaining over oil. Intrusion in the form of a Government oil procurement agency would be far more burdensome to the private sector than detailed data sharing. If detailed Government knowledge of current and prospective arrangements now negotiated privately is prerequisite to an informed decision on creating such an agency—and I think it is—then I think we must insist on generating this knowledge. Of course, we should take concurrently every practicable measure to assure confidentiality of individual company data.

I don't say this lightly. I think that is terribly important.

Before closing, let me say that the more quickly we can define the new way in which Government will make itself felt at the oil bargaining table, the better off we will be. In many aspects of our energy dilemma—powerplant siting, strip mining of coal, offshore oil and gas exploration, to name a few—uncertainty over Government intent, or vacillating Government policy, has paralyzed the industries concerned and stifled initiatives. As a result, our energy problem today is more acute than ever before.

We should set a tight timetable on the study of alternatives, proceed immediately to require reasonable reporting of international oil negotiations, and establish a program to test out Government purchasing procedures for all—or a portion of—the stockpile requirements. Any enabling legislation which may be required to implement these steps should be passed within the next several months. In matters of energy policy—and surely this must be a vital facet of that policy—we can no longer afford the luxury of indecision.

Thank you very much.

Senator KENNEDY. Well, that was a very provocative and interesting commentary, Mr. Sawhill, giving us a good deal of food for thought. We will get back to those points.

Mr. Davidson, Professor Davidson, would you proceed?

STATEMENT OF PAUL DAVIDSON, PROFESSOR, RUTGERS—THE STATE UNIVERSITY OF NEW JERSEY—NEW BRUNSWICK, N.J.

Mr. DAVIDSON. Thank you very much. I have a prepared statement; rather than read it, I would like to summarize it and provide some new information which has come to my attention since this prepared statement has been written.

Let me say my interest in the economics of the oil industry can be traced by to 1960 when I was assistant director of the economics division of Continental Oil Co. Since that time, I have returned to academia, but I have done a number of studies for the Ford Foundation, Brookings, and others. The emphasis I place as an economist is on supply behavior, how the industry behaves, and also on how one can create market incentives to get the industry to behave in a way one thinks is socially desirable if for some reason the market is not providing socially desirable objectives.

In doing this, I want to make clear that I am not trying to cast anybody as a villian or anybody as a hero. It is just that in a market, many people observe the situation and are forced to react in a certain way; and it is not necessarily an overt collusion.

I would like to start by talking about the historical perspective just to get a feeling. I want to call your attention to the cabinet task force on import controls which was published in 1970. This task force had inputs from Exxon and all the other major oil companies, the Department of the Interior, the Council of Economic Advisers, the Office of Science and Technology, Federal Power Commission, et cetera. They made projections about the oil industry and oil prices through the 1980's. One of the things they projected, for example, was that if the 1980 price was $3.30—which in 1976 dollars would be $4.95—U.S. producers could profitably produce 13.5 million barrels of oil a day in 1980.

They did a number of other forecasts, and they did not allow for technical advance. They used a very high decline rate. In other words, they were very conservative. Yet, they saw a price to U.S. producers which is clearly much lower than we see today. U.S. producers now claim that they couldn't profitably produce even 8 million barrels a day at a price far in excess of what this task force said they could.

The question then becomes what is the cause of our energy shortage? In essence, there are two possibilities. One is it could be a Malthusian shortage, that is that we are running out of oil, nature is being very stingy and given our current technology we have to invest resources at high real costs to provide energy. The other one is that the shortage is man made or man induced.

The historical perspective that I tried to provide suggests that it is the latter rather than the former. Just let me give you one statistic which I think is very interesting. Between the years 1962 and 1972, world consumption of petroleum increased by 107.4 percent, while world crude oil, crude reserves increased by 108.5 percent during the same period. Thus, the world at least was no greater threat of running out of oil in 1972 than it was in 1962. Of course, what has happened is that the distribution of crude oil has changed significantly over the period. In older days, economists would have called that cornering the market, and, of course, this is part of the reason why the cartel—the OPEC cartel is much stronger in the 1970's than it was when it initially was formed in the early 1960's.

The energy question is not that we are running out of oil or fossil fuels in the next decade or so, but really what price will the consumer have to pay to get all their energy needs filled? I believe neither Mr. Kauffmann or any other spokesman for the energy industry would deny that there is plenty of oil. It is just very expensive, domestically, foreign, and so on. The question is the price.

The price then depends upon whether you believe this energy shortage is a Malthusian problem or a manmade monopoly problem; and as I say, I think the historical perspective and some of the other studies I have done which I referred to suggest that even before the cartel exercised its muscle, there was evidence both by the way the industry behaved and the way Government behaved that energy supply was constrained by manmade institutions, legal and business or commercial, and not by nature. So that it's not nature that is threatening us. It is man and therefore the solution it seems to me is in the hands of man.

I then go on to propose a nine point energy policy. The point of this is if we can decide what is the goal we want on the supply side, then we can develop a policy; and the goal in essence that I argue is what we have to do is break the cartel; and in order to break the cartel, you have to create economic forces in the marketplace which will make or give an incentive for the cartel to break down.

These economic forces involve taking what the economists call the price elasticity of demand for OPEC oil. Price elasticity of demand is a technical term that suggests the sensitivity consumers have to price increases. At the present time, for OPEC oil, the price elasticity is very inelastic and it is that inelasticity which is the fulcrum upon which the cartel is based. It is that ability of the inelastic price which permits them to drive a wedge between the price they charge and the actual real costs of production, which are quite high.

Therefore, one has to convert the demand curve facing the OPEC nations from an inelastic one to an elastic one; and it is these nine proposals that I have suggested which all have as their objective to create a more elastic demand for OPEC oil.

Now, these proposals include divestiture; they include changes in leasing policy on Federal lands; they include an import tax. By the way, one of the bits of information that I just found, Professor Houthakker of Harvard in a letter to "The Economist," which was just published points out, and I think quite correctly, that if nothing is done, there is still sufficient inelasticity in the demand for OPEC oil that they could—the cartel could by the 1980's, he suggests, almost double the real price that they charge us. In other words, after adjusting for inflation, he suggested the OPEC countries could still double the real price of their oil because of the inelasticity of demand.

He suggested an import tax so that the United States could share in the monopoly profits and prevent them all from being exploited by the cartel. I think that is an important point.

Also, I think an import auction scheme. Some people have already discussed that. In the appendix to my prepared statement, I suggest that not only do we want such a scheme, but it should be so designed to create incentives which in essence encourages cheating by members of the cartel; a scheme to create market incentives for cheating in the cartel and therefore change the price elasticity of demand.

What is important, the price elasticity of demand facing producers, or landowners, will depend upon the availability of substitutes at lower prices. If there are substitutes available at lower prices, then the consumer facing an increasing price from the original seller will be very sensitive to that and turn his custom away from that increase in price to the substitutes. So, the question is how do we get these substitutes out of the ground and into the marketplace?

Conversely, it seems to me the wrong approach would be one of conservation. That is, of relying on higher energy prices either through a large gasoline tax or unregulated domestic energy prices to encourage conservation, because that assumes that merely by moving up what the economists call the demand curve, that merely by raising the price, moving up the demand curve, you will get the OPEC nations to squabble among each other. As long as that price elasticity still remains inelastic, they have more of an incentive to stick together than to squabble. So, conservation by itself does not break up the cartel.

Just coming down on the train today, I read the "American Economics Review," the latest issue, December 1976, issue. There is an article by a Mr. Osborne of the Federal Reserve Bank of Dallas on what he calls cartel problems. He indicates that he, like many other economists, thought the cartel would break up very rapidly in 1973 when it first formed; and now it has not. So, he went to work on game theory to explain what strategy keeps the cartel together. I think it is an excellent article on strategies and so on. His argument is very simple. In essence, his argument is that there are problems for the cartel, internal problems; but they are soluble. The problem is to prevent cheating and so on. They are soluble. He points out that the solution is often easily worked out. As long as the managers of the cartel go to the Harvard Business School, they learn how to solve these problems very easily.

Therefore, they stick together. It is a management of a cartel problem.

The one point I would like to raise which he says in the footnote at the end, he says:

> A cartel will last although from time to time there will be cheating; but it will reform itself unless and until new substitutes appear at a price near their marginal costs.

He says:

> I can find no record of a cartel which died of internal problems alone, but there are plenty which fell to new substitutes.

That is the importance of my argument about divestiture. One must have these new substitutes, the other fossil fuels, in the hands of producers who have no vested interests in maintaining the value of underground reserves of oil, either OPEC oil or domestic oil and gas.

This is a question strictly of profit maximization. If you are a firm and you have—you bought property rights to reserves of oil and gas, whether it be domestically or anywhere else, you have to evaluate them at some price. If you think that the oil price is going to be $10, $11, $12 a barrel, then those reserves are very valuable to you, you paid a good price for them. That is part of your inventory. If you then had a subdivision of your company which can produce a fossil fuel which could sell on a Btu equivalent, fossil fuels at $7 or $8 a barrel, and significant amounts, that will break the oil price; but it will in essence force upon you an inventory loss on all your underground reserves; therefore, before you engage in such activity, you have to make sure there is a profit—that the profits from the substitute fuel will more than compensate you for the loss on the reserves that you are now valuing at the higher monopoly price.

Hence, there is a market incentive built in to avoid that kind of situation; and here I would like to call your attention to an article that appeared in the New York Times in October 1976, in which Mr.

Hardesty, the president of Continental Oil Co. was testifying before the Senate Antitrust Committee. He was asked, "What if a utility company was trying to find a cheaper energy," I am quoting the question. "Would Continental tell its coal subsidiary to go in with such an attractive price that it could take the business away from oil?"

To which Hardesty replied, "No, sir, not under those circumstances."

"Not even if the coal cost less to produce?"

Hardesty remained adamant, "We are not going to play one source of energy against another."

I think that is good business if you have lots of vested property rights in various resources. When we say, "play one against the other," it means to force a capital loss on one segment of the industry to make profits on another.

Since most of these conglomerate energy companies are primarily in the oil and gas business, the likelihood of the profits on shale, uranium, and so on to force a reduction in oil prices is very small. Accordingly, if one would divest these interests, you could create additional incentives, substitutes, which would create problems for the cartel and could, I think, create a more price-elastic demand.

Representative BROWN of Ohio. Could you submit a list of those who own sufficient amounts of other sources of energy to have an impact on price? I am assuming that there are companies that own vast energy resources, or your presumption is a little silly.

Mr. DAVIDSON. In the testimony before this subcommittee, on November 19 and December 18, 1975, there is a—particularly on coal, which is the next point I was going to come to, a long study that provides you with these lists by two professors, Barth and Bennett. I believe, on just the questions for coal, which I think is the most important substitute at the present time, I can provide you with some other simple ones.

Representaive BROWN of Ohio. What I mean is a percentage of ownership that presumedly would hold that fuel off the market to have an impact on keeping oil prices up.

Mr. DAVIDSON. It is not necessary to hold it off the market. It is not like a go/no-go decision. It is merely a question of permitting it to reach markets, but at what price and what rates of production over time.

Representative BROWN of Ohio. Once again presumedly you would have to have enough to have some impact on controlling the price of the alternative fuel source. That is what I want to know. I didn't realize there were companies that owned that much of our coal reserves, for instance.

Mr. DAVIDSON. Yes, sir. There are. In fact, concentration ratios suggest that these reserves are being more concentrated over time. Whatever the control was five years ago, it is greater now; and the evidence is that there is a trend towards greater and greater concentration.

Representative BROWN of Ohio. And there is withholding?

Mr. DAVIDSON. I am saying there is an incentive, Congressman. It is very hard to demonstrate withholding. I can tell you an interesting anecdote about when we found some statistics which showed—when I was doing the study for Brookings—we found between 1971 and 1972 that the number of producible shut-in zones in the gulf coast increased

from something like 900 to 2,900, while only 300 new producible zones were brought in. That kind of statistic, which was collected——

Representative BROWN of Ohio. This is——

Mr. DAVIDSON. Producible shut-in zones.

Representative BROWN of Ohio. Oil?

Mr. DAVIDSON. Oil. But the same incentives are there, Congressman. The incentives are there for everybody. Obviously, you cannot divest oil companies of oil companies, but you can—you see, domestic oil is a substitute for OPEC oil just as much as domestic coal is.

Representative BROWN of Ohio. In 1970, that wasn't a problem. I don't mean to carry on this dialog. I am just asking you to supply the information on the numbers of companies and the amount of the percentages of the coal business, for instance, that they control that indicates that they have some impact on the price.

Mr. DAVIDSON. OK. I will be glad to submit that.

[The following information was subsequently supplied for the record:]

THE STRUCTURE OF THE U.S. PETROLEUM INDUSTRY—A SUMMARY OF SURVEY DATA—SPECIAL SUBCOMMITTEE ON INTEGRATED OIL OPERATIONS (WASHINGTON, 1976)

VII. URANIUM AND COAL

Within the context of overall U.S. energy consumption, the roles played by coal and uranium are in marked contrast. In 1900 coal supplied nearly all of primary energy (excluding wood), and supplied 78 percent in 1920. In 1973 coal supplied 18 percent of total energy consumption. Both Dupree and West and Hudson and Jorgenson forecast a doubling of U.S. coal use from 1973 to 2000, but with the percentage of primary energy being 16 percent.

Nuclear power in 1973 supplied only 1 percent of U.S. energy consumption but is widely believed to be the most important source of future energy growth. Table 7–A shows historical data on energy consumption, the engineering projection of Dupree and West, and the economic forecast of Hudson and Jorgenson.

In 1971 the House Subcommittee on Special Small Business Problems[1] reported that major oil companies accounted for 20 percent of domestic coal production and 30 percent of reserves, 25 percent of uranium milling capacity and over 50 percent of uranium reserves.

TABLE 7–A.—ENERGY CONSUMPTION: HISTORICAL AND SELECTED FORECASTS

Year:	Total energy	Coal	Petroleum	Natural gas	Hydro-power	Nuclear power
1970:						
Quadrillion Btu	19.8	15.4	2.8	0.8	0.8	0
Percent	100.0	78.0	14.0	4.0	4.0	0
1971:[1]						
Quadrillion Btu	75.6	13.5	34.7	23.6	2.9	0.9
Percent	100.0	18.0	46.0	31.0	4.0	1.0
2000—Hudson-Jorgenson:						
Quadrillion Btu	163.4	26.2	61.4	28.6	47.2	
Percent	100.0	16.0	38.0	18.0	30.0	
2000—Dupree-West:						
Quadrillion Btu	191.9	31.4	71.4	34.0	5.6	49.2
Percent	100.0	16.0	37.0	18.0	3.0	26.0

[1] 1973 consumption of coal was 561.2 million tons; petroleum, 6.30 billion barrels; natural gas, 22.85 trillion cubic feet; hydropower, 0.28 trillion kilowatthours; nuclear power, 0.08 trillion kilowatthours.

Sources: Survey of Current Business; Gas Facts; E. A. Hudson and D. W. Jorgenson, Tax Policy and Energy Conservation, January 1975 (also U.S. Energy Policy and Economic Growth, 1975–2000, Bell Journal of Economics and Management Science, autumn 1974); W. Dupree and R. West, United States Energy through 2000; Energy Policy Project, Exploring Energy Choices; Coal Facts.

[1] U.S. House of Representatives, Select Committee on Small Business, Concentration by Competing New Fuel Industries in the Energy Market and Its Impact on Small Business, Report, 92d Cong., 1st sess.

TABLE 7-B.—REPORTED COAL PRODUCTION AND RESERVES, 1973

Company	Reserves (million tons)	Production (million tons)
A. Survey response:		
Ashland	482	12.4
Belco	84	1.4
Cities Service	60	0
Continental	12,058	60.6
El Paso	4,954	0
Exxon	7,000	2.7
Getty	63	0
Gulf	979	8.1
Lone Star	2	0
McCulloch	124	0.4
Occidental	4,376	20.4
Panhandle	715	0
Shell	5,000	0
Standard/California	500	0
Standard/Ohio	868	11.1
Tenneco	851	0
Texaco	2,340	0
Union Texas	148	1.7
Total	40,104	119.2
B. Other sources:		
Amax (Standard/California)	4,900	16.7
Atlantic Richfield	1,500	----------
Falcon	140	3.7
Kerr-McGee	1,000	----------
Mapco	----------	2.1
Sun	2,200	----------
Zapata	265	1.0
Eastern Gas & Fuel	----------	10.6
Houston Natural Gas	1,000	4.3
Total	10,005	38.4
Total, survey and other sources	51,109	157.6
Total, United States (identified reserves)	707,395	597.5
Percentage, oil companies	7.1	23.4
Percentage, oil and gas companies	7.2	26.4

Note: Reserves as reported here were defined as specific identified mineral deposits or geologically hypothetical resources. Production figures are presumably both bituminous and anthracite coal.

Sources: Other sources used in pt. B of the table include, Coal Facts; T. D. Duchesneau, Competition in the U.S. Energy Industry; National Economic Research Associates and Peabody Coal Co., Actual and Potential New Entrants into Domestic Coal Production; Peter Max, testimony before the Senate Judiciary Committee Subcommittee on Antitrust and Monopoly (June 17, 1975); and Federal Energy Administration, The Petroleum Industry, A Report on Corporate and Industry Structure and Ownership. National reserve data is for 1972; national production for 1972 was 602,500,000 tons.

Eighteen oil companies in the survey reported current coal reserves or production in 1973 as reported in Table 7–B. In 1973 these survey companies accounted for 20 percent of total coal production. Total coal production of oil and gas companies listed in both parts of the table accounted for 26.4 percent of annual production. This appears to reflect no significant change from 1971. However, other sources contradict this conclusion. The United Mine Workers Journal alleges that large oil and gas companies control 40 percent of coal production.[2] The Federal Energy Administration reports five oil or gas companies are active in the coal industry directly, and that 29 coal companies are subsidiaries of oil or gas companies.[3] Further, 7 of the 15 largest coal companies are subsidiaries of oil or gas companies.

There is some concern about the comparability and accuracy of the coal reserve data reported in the survey. It includes both identified and hypothetical reserves, and defines a reserve/production ratio of 336:1. However, national data define an identified and hypothetical reserve/production ratio of 5,350:1. Considering

[2] United Mine Workers Journal. Aug. 16–31, 1975, p. 4.
[3] See "other sources," Table 7–B.

national data for identified bituminous and anthracite coal, the ratio is 1,174:1. If it is correct to assume that coal companies operated by petroleum companies maintain at least the same ratio of reserves to production as the coal industry as a whole, and that the national data are reasonably accurate, then the data on coal reserves as reported by petroleum companies within the survey must be viewed as inaccurate. Alternatively, both reserve/production ratios may be approximately correct and reflect different management practice.

The maximum nuclear fuel cycle in the civilian nuclear power industry consists of eight basic steps: mining, milling, gas conversion, enrichment, fabrication, power generation, reprocessing, and waste storage. The survey requested information from the petroleum companies with respect to uranium mining, reserves, milling, and fabrication. Eight companies reported activity in uranium mining and/or uranium reserves, and five companies reported uranium fuel fabrication.

Survey data on uranium milling capacity can be compared to total national milling capacity. Table 7–C presents data on uranium milling capacity according to oil company affiliation in 1973. The Bureau of Mines reported capacity at 30,550 tons of ore per day in 1973.[4] Seven companies in the survey reported ownership interest in mills, accounting for 40 percent of capacity as indicated in part A. Part B, based upon reported directorate affiliations in the survey, indicates that five companies in uranium milling share directors with oil companies, and these companies owned 36 percent of milling capacity. Twenty-nine percent of capacity is owned by companies with subsidiary oil production (part C). The remaining 4.7 percent of milling capacity was owned by groups of companies which have coal operations.

As a consequence, 95 percent of uranium milling capacity was owned by companies associated with oil production, and 100 percent of capacity was associated with oil or coal production.

Table 7–D shows data prepared by the Atomic Energy Commission for 1970. In the ensuing 3 years, oil companies added 7,850 tons per day of capacity, and companies with subsidiary oil production increased their share of national capacity from 49 percent to 69 percent.

TABLE 7-C.—URANIUM MILLING CAPACITY AND AFFILIATION WITH OIL COMPANIES, 1973

	Gross capacity	Net capacity	Net, percent United States
A. Ownership reported in survey:			
Atlantic Richfield	(250)	(250)	
Continental	1,175	1,115	
Pioneer Natural Gas		635	
Exxon	2,000	2,000	
Kerr-McGee	7,000	7,000	
Getty	1,500	750	
Kerr-McGee		750	
Standard/Ohio	(1,000)	(550)	
Reserve Oil & Gas		(550)	
Total		12,250	40.1
B. Milling capacity owned by companies having management affiliation with oil companies:			
Union Carbide	2,300	2,300	
Anaconda	3,000	3,000	
Homestake Mining	3,500	1,050	
Cotter	450	450	
Western Nuclear	1,200	1,200	
Total		8,000	26.2

See footnotes at end of table.

[4] U.S. Bureau of Mines, Division of Non-Ferrous Metals, personal communications with Duane Chapman, Sept. 23, 1975.

TABLE 7-C—URANIUM MILLING CAPACITY AND AFFILIATION WITH OIL COMPANIES, 1973—Continued

	Gross capacity	Net capacity	Net, percent United States
C. Milling capacity owned by companies with subsidary oil production:			
Susquehenna-Western	2,000	2,000	
United Nuclear	3,500	2,450	
Utah International	2,400	2,400	
Atlas	1,500	1,500	
Dawn Mining	500	500	
Total		8,850	29.0
D. Milling capacity owned by companies with coal operations:			
Rio Tinto-Zinc	500	500	
American Nuclear	950	950	
Federal Resources			
Tennessee Valley Authority			
Total		1,450	4.7
Total, U.S. milling capacity, 1973		30,550	100

Notes to table 7-C: Each statement refers to circumstances in 1973 unless otherwise indicated. Pt. A—The Atlantic Richfield mill in Oregon was not operating in 1973 and is not reported by the Bureau of Mines. Exxon reported 2,800 tons per day capacity in the survey, but 2,000 tons are reported by the Bureau of Mines and in this table. Getty and Kerr-McGee reported that Getty was in partnership with its subsidiary, Skelly, and with Kerr-McGee at the Shirly Basin, Wyoming mill. Standard Oil of Ohio reported a mill under construction in partnership with Reserve Oil & Gas; this 1,100 tons per day mill is not included in the 1973 total. Pt. B—Directors of Louisiana Land & Exploration and of Commonwealth Oil Refining are directors of the Union Carbide Corp.; Union Carbide is a major user of petroleum and natural hydrocarbon feedstocks, operates natural gas pipelines, and may, according to its annual report, have oil or gas properties. 2 directors of Champlin Petroleum (owned by the Union Pacific Corp.) and 1 director of Texaco are directors of Anaconda. Homestake Mining owns part of the Grants, N. Mex. mill in partnership with United Nuclear which is in the oil, coal, and gas industries. The Cotter Corp. is wholly owned by Commonwealth Edison; 1 director of Standard Oil of Indiana is also a director of Commonwealth Edison. Western Nuclear, Inc. is wholly owned by the Phelps Dodge Corp.; directors of Monsanto (active in oil and gas production), Marathon Oil, and El Paso Natural Gas are also directors of Phelps Dodge. Pt. C—Susquehenna-Western, Inc. is a wholly owned subsidiary of the Susquehenna Corp. The Susquehenna Corp. is in turn a subsidiary of Studebaker-Worthington (38 percent ownership) which owns the STP Corp. and 52 percent of the Pasco Oil Co. United Nuclear is also in the oil, gas, and coal industries. Utah International Inc. owns the Ladd Petroleum Co. and is in the coal industry. The Atlas Corp. is also active in oil. The Dawn Mining Co. is 51 percent owned by Newmont Mining, which owns the Newmont Oil Co. Pt. D—Rio Tinto-Zinc, in coal mining, owns 51.2 percent of Rio Algom Mines. The American Nuclear Corp. is involved in a joint venture between the Federal Resources Corp. (owner of coal properties) and the Tennessee Valley Authority. The Authority, a major coal user, holds estimated reserves of 355,000,000 tons. Total active capacity declined slightly in 1973 and 1974, apparently because of less than expected growth in demand for nuclear fuel.

TABLE 7-D.—FOSSIL FUEL CORPORATIONS AND URANIUM RESERVES AND MILLING CAPACITY, 1970

	Reserves, tons U_3O_8 ($8 per lb [1])		Production capability, tons U_3O_8 per year	
	Amount	Percent	Amount	Percent
Oil companies	107,000	43	4,400	31
Oil as subordinate revenue source	17,000	7	2,500	18
Companies with natural gas or coal production	37,000	15	2,800	20
Total, oil, gas, or coal production	161,000	65	9,700	69
Total, uranium industry	246,000	100	14,000	100

[1] Recent price increases make this class of ore more valuable than at the time the $8 figure was used for planning purposes.

Source: Concentration by Competing Raw Fuel Industries in the Energy Market and Its Impact on Small Business, op. cit., p. 255.

VIII. CONCLUSION

In this summary of survey statistics we do not believe it is useful to address certain issues of national policy. We recognize that natural gas and oil price regulation, divestiture, nationalization, and other such issues are of importance. In this context, however, we wish to direct our attention to conclusions relating only to information availability as these conclusions arise from and are related to the survey.

A common theme to much of the discussion in the preceding sections is the desirability of a continuing information collection and dissemination system.

Such a system should collect data on a uniform basis and public accessibility should be presumed in all respects. (However, the need for confidentiality or aggregation in certain areas may be a subject of future determination.)

Establishing an organization to manage such a system requires either the utilization of an existing organization or the creation of a new entity. The standards which should be met include: (1) A charter of public responsibility which places the organization in a desirable middle ground, that is, responsible neither to the executive branch nor the Congress on a sole basis, nor directed by the energy industry, nor dependent upon political or partisan support; (2) a staff competent in such areas as engineering, finance, and economics, etc. in the energy field; and (3) a data processing and publication capability.

It follows from these assumptions that industry organizations such as the American Petroleum Institute cannot assume this responsibility, although their cooperation is desirable and perhaps essential. Nor should the Federal Energy Administration be expected to fulfill responsibilities which create the potential for a major divergence of interest from that of the Executive. Nor are a series of ad hoc surveys capable of attaining the necessary competence on a continuing basis. Nor can the responsibilities be satisfactorily divided among various commissions and agencies because such division creates both gaps in coverage and the organizational politics of overspecialized data gathering.

The remaining kind of organization is that of the independent commission. We suggest that consideration be given to assigning these information responsibilities to the Federal Power Commission or to a new commission which would have these and other duties. The Commission's problems with respect to conflicts of interest and data management have been widely discussed. However, we believe that the remedies necessary for better performance already exist by means of (1) Senatorial approval of appointed commissioners, (2) budget review, and (3) corrective legislation.

The Federal Power Commission does meet the three criteria suggested above with respect to (1) a charter of public accountability, (2) a professionally competent staff, and (3) data processing and publication capability. It is one possible means.

Alternatively, a new energy commission might be established with responsibilities for data collection and dissemination related to petroleum, natural gas, electricity, coal, nuclear power, and other eneregy forms. Information responsibilities can logically be undertaken separately from regulatory duties (although the reverse is not so), and perhaps the question of information availability could be addressed apart from other matters.

To recapitulate the survey findings: It has collected data from individual petroleum companies with respect to mergers and acquisitions, directorate affiliations, nominal ownership of 1 percent or more of common stock, largest debt holders, subsidiary holdings, multiple affiliations with legal and accounting firms, and selected financial data; production, reserves, and joint ownership in petroleum and natural gas by geographic area; natural gas sales, refining output, ownership, and sales, and joint activities in ownership, production, and exchange; the marketing of each major refined product on a State basis, and the trade in finished products; and operations in coal and uranium.

The major findings in each area are as follows:

(1) Mergers and acquisitions since 1954, while significant in magnitude and numbers, have left essentially unchanged the group of 20 largest companies.

(2) Direct directorate affiliations between competing petroleum companies were infrequent. However, indirect affiliations (in the sense that bank A has employees serving on the boards of X and Y) exist in larger number. The three companies with the largest numbers of indirect affiliations were banks. Directorate affiliations with financial corporations are more common than with other kinds of economic activity, accounting for one-fourth of the directorate affiliations for both large and small oil companies.

(3) Ownership data is generally in a nominee form which effectively precludes the recording of actual or beneficial ownership.

(4) Sharing of debt holders among the 20 largest oil companies is high.

(5) Subsidiary data are generally inadequate to describe interactions. Relationships between different families of major companies cannot be determined with accuracy.

(6) Multiple affiliations by accounting firms are common, and virtually nonexistent with law firms.

(7) Reported financial data are inadequate to determine the effect of Federal tax subsidies on industry production and investment.

(8) Joint ownership of oil production and wells is general for large and small companies. Similarly, most reported oil and gas reserves are jointly owned. Large companies appear to be partners with most other large companies. Differences in reporting methods result in major discrepancies in reported well ownership between partners.

(9) State concentration in refinery ownership is significantly greater than national concentration. Survey response with respect to trade in refinery output was generally poor. For two major companies, somewhat less than one-half of their refinery output was sold or traded to other petroleum companies for resale. The absence of adequate data prohibits an accurate summary of markets for trading in refined products.

(10) Trading between petroleum companies in finished products is common. Concentration in final gasoline sales is significantly higher in the average State than for the Nation as a whole. Concentration according to quantity supplied differs from that of final sales because of intercompany trading, and is probably higher. Concentration is lowest in gasoline marketing, highest in jet fuel, and intermediate in residual oil. Concentration in distillate oil marketing appears to lie between that of gasoline and residual oil. The pattern of leading suppliers of gasoline and leading marketers in final sales on a state basis is similar to the pattern of marketing territories allocated to the antecedent Standard Oil Trust Operating Units in 1911. The measure of concentration commonly used (that of final sales of gasoline on a national basis) appears to define lesser concentration and cooperation than any other possible measure.

(11) Holdings by petroleum companies in coal production and reserves are significant, and 7 of the 15 leading coal companies are owned by companies in the oil industry.

(12) Ninety-five percent of uranium milling capacity is affiliated with companies in the oil industry, and the remaining 5 percent is owned by companies with coal properties.

In general, unreported, inaccurate, or nonuniform data, and errors in data processing, are biased in a statistical sense. That is, the defects in the survey data will in general obscure and understate the degree or nature of cooperative activities between companies.

Our interpretation of the reported data has led us to propose that future responsibility for the collection and publication of these kinds of information be placed in an independent commission as noted above.

Mr. DAVIDSON. I have taken a good deal of time. Let me just finish by saying that the companies are integrated because they have been grown and nurtured in an economy over the last 50 years whereby government policy as well as market policy, there have been manmade constraints on supply. Those companies that survive in the Darwinian world are those that had sureties of supply. That lead to integration on the vertical level and also integration lately on the horizontal, what is called the horizontal, but I prefer to call the conglomerate level.

If we change the market structure, you see, we will be able to create free markets again. One of the claimed benefits—and this I got from a—I received a—let's see if I have it.

I received a statement which was submitted to the Congressional Record on June 3 by Frank Zarb, the Administrator of the Federal Energy Agency indicating what are the advantages of integration. One of the advantages—and I discussed this in my prepared statement. I take Mr. Zarb's statement at face value. He lists the advantages. He indicated these advantages are because the market has manmade constraints on supply and that these advantages would disappear of there truly was a good market, free market for fossil fuels and energy. Maybe I ought to stop at that point.

[The prepared statement and an attachment of Mr. Davidson follow:]

Prepared Statement of Paul Davidson

My name is Paul Davidson. I live at 18 Turner Court, Princeton, New Jersey. I received a Bachelor of Science degree from Brooklyn College in 1950, a Master of Business Administration degree from City College of New York in 1955 and a Ph.D. in Economics from the University of Pennsylvania in 1959. I was a member of the Economics Department of the Wharton School of Commerce and Finance of the University of Pennsylvania and taught there during the periods of 1955-1958 and 1961-1966. From 1958 to 1960 I was an Assistant Professor of Economics at Rutgers University. In 1960-61, I was Assistant Director of Economics Division of the Continental Oil Company. In 1964–65, I was Visiting Lecturer and Fulbright Scholar at the University of Bristol in England. In 1970-71, I was a Senior Visitor at the Faculty of Economics and Politics of the University of Cambridge (England). I have been a Professor of Economics at Rutgers since July 1966.

I am the author of a book entitled "Theories of Aggregate Income Distribution" (Rutgers University Press, 1960) and one entitled "Money and the Real World" (Macmillan, 1972). I have coauthored books entitled "Aggregate Supply and Demand Analysis" (Harper and Row, 1964), Milton Friedman's "Monetary Framework" (University of Chicago Press, 1975), and a monograph entitled "Demand and Supply of Outdoor Recreation" (Bureau of Outdoor Recreation, 1969). I am the author of numerous articles on various economic subjects which have been published in professional journals such as The American Economic Review, The Economic Journal, Oxford Economic Papers, Canadian Journal of Economics and Political Science, Public Finance, Econometrica, Land Economics, The Southern Economic Journal, The Natural Resources Journal, Review of Economics and Statistics, The Journal of Political Economy, Economic Inquiry, and the Brookings Papers on Economic Activity.

My interest—in the economic problems of the oil and gas industry can be traced back to 1960 when I was the Assistant Director of the Economic Division of the Continental Oil Company. Since then I have analyzed economic aspects of oil and gas in professional articles, in testimony as an expert witness before the Federal Power Commission and various congressional committees, as a member of the Supply-Technical Advisory Committee of the National Gas Survey, and in the past two years as a consultant to the Ford Foundation's Energy Policy Project where I was the senior investigator on a study entitled "The Relations of Economic Rent and Price Incentives to Oil and Gas Supply," and as a member of the Brookings Economic Panel where I was the senior investigator of a study entitled "Oil: Its Time Allocation and Project Independence."

I. WHAT ENERGY CRISES?

In 1973, the onset of the so-called "energy crisis"—a crisis involving primarily petroleum supplies—caught many knowledgeable observers by surprise. As late as 1970, for example, the prestigious Cabinet Task Force on Import Controls reported that a 1980 U.S. demand of 18.6 million barrels per day (MMb/d) could be easily supplied. The task force noted that "without import controls, the domestic wellhead price would fall from $3.30 per barrel to about $2.00, which would correspond to the world price. Although we cannot exclude the possibility, we do not predict a substantial price rise in world markets over the coming decade" [p. 124]. At this $2.00 price ($3 in 1976 dollars), the Cabinet Task Force predicted that approximately half of total U.S. demand, or 9.5 MMb/d, could profitably be produced from domestic wells, while if the 1980 price was $3.30 ($4.95 in 1976 dollars) U.S. producers could profitably produce 13.5 MMb/d in 1980 [p. 41.]

Since the task force did not permit any allowance for technological advances during the decade while they used a very high "decline rate" of 12.5%, these U.S. production projections can be considered to be extremely conservative. Nevertheless, by 1976, many spokesmen for the petroleum industry are suggesting that a price of approximately $8.00 per barrel is not sufficient to induce production of even 8 MMb/d. Hence, the first question which must be analyzed is what are the essential factors, controlling the supply price of petroleum? Is available supply limited by, as the classical economists would have said, the niggardliness of nature? If we are rapidly running out of oil because of the stinginess of nature, why did the prestigious Cabinet Task Force which had productive inputs from all major oil companies, the Department of Interior, the Council of Economic

Advisors, the Office of Science Technology, the FPC, etc., make such an inaccurate, optimistic forecast of profitable domestic productivity? Can it be that the energy crisis is in large measure due to the rapacious behavior of humans rather than of nature? Policy actions for dealing with the energy crisis will differ depending on how much of the "shortage" is due to nature's behavior and how much is due to man's.

Obviously, given the current state of technology, if nature is penurious in giving humans access to cheap sources of fossil fuels and other energy supplies by strongly reducing our current demands, i.e., conservation, and/or (2) to invest significant resources into R and D in order to learn how we can "trick" Mother Nature into providing us with abundant energy at lower real costs than our current knowledge permits. Thus, stimulation of science and technology becomes an important and necessary policy option only if our energy crisis is due to a Malthusian limit to our energy supply. If we are reaching our "limits to growth" given the current state of knowledge in the energy sector, then the desirability of such policy options as divestiture for example may be questioned— even if it aids in creating more competitive eneregy markets—if simultaneously it significantly impedes technological progress. (Of course, if technological progress can occur only in the presence of monopolistic markets for energy, the regulation might be a substitute for divestitute to achieve competitive-type pricing which passes the advances in technology on to the consumers.) Of course if divestiture either (1) does not significantly alter the rate of technical progress, or (2) it creates incentives for increasing R and D, or (3) the energy crisis is due to monopolistic structure of domestic and international industry and not due primarily to a high inelasticity of supply of oil due to the clasical law of diminishing returns, then divestiture is a worthy policy to pursue. Consequently any intelligent energy policy requires an analysis of the economics of energy supplies.

II. DOES THE CURRENT PRICE OF OIL REFLECT NATURE'S SCARCITY?

1. A Historical Prospective

Since World War I (and probably before) the petroleum industry had been plagued by potential oversupply at existing market prices. Between World War I and II, a strong international cartel prevented the world price from dropping to the competitive level although it could not keep the world price from deteriorating somewhat. In the United States during the same interwar period, governmental policies were deliberately designed to keep huge quantities of oil off the market (e.g., the setting aside of Naval Reserves, the Federal Connally Hot Oil Act, market prorationing. In the period following the second World War, the potential surfeit of oil grew dramatically as advances in technology led to a significant reduction in the real costs of finding, developing, producing and delivering petroleum. Despite the rapid growth in demand in the post-World War II period, the international corporate cartel could never regain the same control of world oil prices as it possessed earlier. Between World War II and the early 1960's the real price of world crude (excluding the U.S.) dropped by almost 50 percent.

In the United States, however, governmental policy deliberately constrained supplies far in excess of what would have been possible for the oil companies to do on their own. Prorationing and then import controls augmented and monopoly power which might have existed in the U.S. industry. For the consumer the ultimate effect was the same, whether it was the industry and/or the government which limited the availability of cheap oil supplies. While world crude prices tumbled between 1950 and 1972, the delivered price of crude imports in the United States declined by only 12.5 percent (in constant 1967 dollars), while U.S. wellhead prices declined by only 7.27 percent.

Despite these declines in real prices during the past World War II period, both the world price and the U.S. crude price was still far above the long run competitive supply price of crude as we entered the decade of the 70's. In 1975 Professor Adelman noted that: The world price is now around $8 to $9 at the Persian Gulf, while the long run marginal cost (assuming a 20 percent return on investment and an improbably fast shrinkage of reserves) approaches a limit of 20 cents. In such relatively high cost regions as Algeria or the North Sea, a big field produces at $1 to $1.50. Again this is a very small proportion of the price. ["Population Growth and Oil Resources", Quarterly Journal of Economics, 1975, p. 272.] Even in 1970 the price of Persian Gulf crude was over $2 per barrel, still well above long run incremental costs of such oil.

Professor Nordhaus has calculated that the U.S. domestic price of $3.23 per barrel in 1970 involved a mark up (or monopoly rent) of 169 percent over the long-run marginal cost of efficiency price of $1.20. Moreover, for 1970 Nordhaus has estimated " the competitive supply price for domestic petroleum in a world without international trade in energy products at $2.33 per barrel, about 90 cents below the actual price" ["The Allocation of Energy Resources," Brookings Papers on Economic Activity, 1973, p. 577].

Thus, even before the advent of the "energy crisis," both world price and the U.S. price was far in excess of the price one would expect in a truly competitive market. Moreover, the historical evidence is that these substantial monopoly rents, due to actual price in excess of long run competitive prices, was due to a confluence of man-made cartel and legal constraints rather than due to the niggardliness of nature. In fact, one can say with some assurance that the petroleum industry—both domestically and internationally—has never (at least in the last half century) operated in a market environment which would meet any neoclassical economist's definition of competition. To be sure, the artificial constraints on supply where often the result of deliberate government policy rather than of direct market action of monopolistic or oligoplistic producers, but the economic result was the same—namely a redistribution of income and wealth from consumers of energy to producers and property owners vis-a-visthe distribution that would have existed in a competitive environment. Moreover, in order for business firms to survive and grow in a market environment which is dominated by artificial constraints on supply for a half century, they must follow the Darwinian law of survival. Those firms with the structure best suited to this environment of artificially limited supply, namely the integrated (but not necessarily fully integrated) firm, has tended to survive and even thrive.

Thus, if governments of consuming nations are going to reverse this historical trend, they must determine what should be done regarding the structure of world energy markets.

2. The Energy Supply Price

Recently I have engaged in two major studies involving (a) price incentives and oil gas supplies and (b) the time allocation of the production of crude oil. The results of these studies led me to conclude:

(1) If monopoly power in energy markets were the same as in the 1960's, domestic petroleum supply would be price elastic, i.e. a one percent increase in price will bring forth more than a one percent increase in oil supply. (An elastic supply was implicit in the Cabinet Task Force projections reported above.) In terms of ultimate supplies of indigenous fossil fuels, there is no danger that the United States will be depleted in the next 100 years even if present demand trends continue. Furthermore, Western Europe is likely to be nearly self-sufficient in fossil fuels in the 1980's. Thus there is no danger that most of the Free World will be running up against a Malthusian Constraint in the foreseeable future.

The energy crisis, whatever else it may mean, does not mean that the age of "cheap" fuels is over—at least, not in terms of cheap economic real costs of finding, producing, or distributing oil. Nor does it mean, on either worldwide or North American basis—at least if history is a basis for judgment—that large increases in market prices are necessary to bring forth additional reserves to meet growing petroleum consumption demands. For example, during the years 1962 through 1972 (where until the very end of the period prices were not rising) world consumption of petroleum increased by 107.4% while crude oil *proved* reserves increased by 108.5% during the same period. In other words, the world was not facing any greater threat of running out of crude oil in 1972 than it was in 1962.

What had happened was that the world-wide distribution of proved reserves had shifted as North American proved reserves increased by only 18 percent from 40 to 47 billion barrels, while Middle Eastern reserves climbed spectacularly from almost 200 billion to over 350 billion barrels. This modest rise in North American reserves vis-a-vis the Middle East should not be interpreted as meaning that this Continent is "running out" of oil. During this period, all rational producers who could afford it preferred to invest their time and money to find cheap reserves in the Middle East (10 to 20 cent per barrel) rather than more expensive reserves in North American ($2 to $4 a barrel). This shift in reserves, however, did promote the possibility of what in the olden days economists referred to as "cornering the market." It has created what is clearly the most powerful cartel in history—OPEC. But the U.S. because it is such a large producer of fossil

fuels as well as consumer could, with a concerted effort and proper government policies, reduce or eliminate the power of the OPEC cartel, whereas the oil producing companies, on their own cannot (or will not).

(2) The energy question, of course, is merely at what price are American consumers going to get all their energy needs filled. Neither the oil industry spokesmen nor academics will deny there is plenty of domestic energy as well as foreign energy sources for decades to come; the only question is the price.

The economic evidence is clear. Current free market prices of energy are primarily a reflection of man-made constraints on supplies and not nature's. Hence a rational energy policy shold be developed which reduces sellers' powers in energy markets and creates profits opportunities which will be earned by increasing production rather than limiting supplies.

III. PROPOSAL FOR A NATIONAL ENERGY POLICY (NEP)

The sudden quadrupling of the world crude price during this 1973–74 period is at least partially responsible for the severity of the 1974–75 world-wide recession and the slow recovery which consuming countries have been experiencing. Moreover OPEC's future oil price actions constitute a serious threat to the survival of consuming nations' economies.

In this section I propose to outline a nine point National Energy Policy (NEP) for the United States which will have both short run and longer run implications. In the appendix to this statement I spell out the rationale and provide some supporting data for this NEP package.

In the short run we should not undertake policies which are likely to exacerbate the current problems of unemployment and inflation. In the longer run, our policies should be oriented towards breaking up the OPEC cartel and the growing monopolistic control of domestic energy sources.

A nine-point National Energy Policy (NEP) which could provide U.S. consumers with sufficient energy while allowing producers to earn a competitive return rather than permitting them to share in cartel profits would include: (1) extensive antitrust action to break up conglomerate energy companies and to create competitive alternative sources of energy (competitive to OPEC sources and the major oil and gas producers), (2) governmental coordination and regulation of wellhead prices of oil and natural gas so that any necessary price increases occur at such low annual rates as to make speculative withholding unprofitable (and in no case should wellhead price of oil and gas be suddenly decontrolled), (3) prohibitive capital gains taxes on oil and gas properties to catch any speculative profits which avoid other policy nets, (4) the changing of leasing policies on federal properties in order to reduce the financial constraint of the front-loaded bonuses and permit independents to develop offshore properties, (5) policies which encourage and require accelerated exploitation of old and new properties, even if in certain situations such policies were to encourage flows in excess of MER, (6) policies which prohibit the "shut-ins" and other practices which permit speculative withholding, (7) an announced increasing schedule of import taxes on foreign crude oil and products over the next three or four years. Such an import tax schedule must be phased in with growing U.S. production while U.S. wellhead prices are controlled as suggested in (2) above, (8) a federal sponsored corporation which at a minimum would aid in financing the development of new properties and might even enter into joint ventures with independents; in other words, a Federal Oil and Gas Corporation (FOGCO); (9) the adoption of an import auctioning system with unidentifiable foreign sellers to supply the diminishing share of the U.S. market as we approach self-sufficiency in the next few years is desirable. Such a program will create a positive incentive for members of OPEC to break with the cartel. (This last point could be especially effective now that the OPEC nations have begun to haggle about the magnitude of income and wealth they should extort from consumers.)

If, on the other hand, the government permits an unregulated market price for oil without altering existing market institutions and conditions, then the 1980 domestic wellhead price for crude oil will in essence be set by the Sheiks on the Persian Gulf. I see no economic reason to believe that the OPEC cartel will necessarily unravel of its own accord. The OPEC nations are engaged in an economic war with the major consuming nations over the distribution of the world's wealth. Existing economic and political conditions in consuming nations such as the U.S. have made the OPEC cartel's job of preventing price cutting competition from alternative sources easier. Until the consuming nations rec-

ognize that the dispute underlying this economic warfare can only be negotiated from a position of internal strength, the consuming countries will remain at the mercy of the producing nations and domestic conglomerate energy companies and royalty owners who have a vested interest in redistributing future income and wealth from consumers to producers and property owners.

Reliance on higher energy prices (either through a large gasoline tax or unregulated domestic energy price) to encourage "conservation", i.e., to reduce U.S. consumption will not in itself create economic forces which will lead to a break up of the OPEC cartel. Such a conservation policy might make economic sense if there was a Malthusian: shortage of fossil fuels or if you wanted to reduce gasoline fumes pollution (which may explain why many environmental groups find common ground with the major oil companies in urging higher energy prices). But industry proponents of higher (unregulated) prices to "conserve" our energy resources often imply that this will also aid in breaking up the OPEC cartel. From an economic standpoint, this is unlikely since a high-price conservation policy to destroy the cartel assumes that merely by driving up the price to the consumer in order to reduce the quantity demanded of imported oil (but without altering the price inelasticity of demand which is the economic factor creating monopoly), the cartel will break as the result of Arab squabbling over the spoils extorted from the consuming nations. Since such a policy does not directly change the demand curve of OPEC oil (except perhaps in the "long run" when we will all be dead), it merely requires consumers to move along a short run price inelastic demand curve; its potential for success due to economic forces is very low.

From the economist's viewpoint, a more certain way of breaking the cartel is to alter the demand curve for imported oil, that is to create conditions which all recognize cause the demand for OPEC oil to become price elastic in the relevant range in the near future. Such a price elastic demand will occur when there are potentially significant quantities of alternative sources of energy available which are (1) profitable to produce at less than the cartel price and (2) whose production rates are not controlled by managers who have a vested interest—and by their own actions can force the market price to the same level as the cartel price.

OPEC's price can be brought down by government policies which foster increased domestic production of oil and other fossil fuels by producers who have no legal way of providing market support for world oil prices in the U.S. and who operate under laws which make it unprofitable to either speculate or create additional monopoly revenues by withholding energy supplies or slowing development of energy resources. Simultaneously our laws should create incentives for increased domestic production of oil and other fossil fuels at prices which permit fair competitive profits while such prices are significantly below OPEC's prices. This availability of additional domestic production at profitable but controlled prices well below the OPEC cartel level will create an elastic demand for OPEC oil and hence aid in the reduction of world oil prices.

Thus the basic economic condition which is necessary and sufficient to break the OPEC cartel's extortion of the world's energy consumers is to create a price elastic demand for OPEC oil at current market prices. At the same time we wish to minimize the economic costs and dislocations of changing this price elasticity of demand. The NEP policy package suggested in this testimony is designed to accomplish these results. Adoption of this policy will alter the demand for OPEC oil and in so doing will create market forces which will create a market supply price response for energy which more closely reflects nature's stinginess in providing non human energy resources at close to their long run real costs (including a competitive profit) of finding, developing and producing.

I should caution that the entire package of policy actions must be undertaken if success is to be assured within a reasonable period of time. Adopting one or two parts of my suggested NEP may not, by themselves, significantly improve the current situation. For example, one of the 9 points of my NEP proposal involves the divestiture of the major energy companies in order to create competitive markets in energy available to all buyers. Divestiture, however, is only part of an entire policy package; divestiture is a necessary but not a sufficient condition for establishing a market in energy supplies whose price will ultimately more closely reflect long run marginal costs rather than monopoly rents. Solution to the energy crisis requires extensive action on many policy fronts and not just on one. Nevertheless, let me discuss in some more detail the relationship of divestiture of the OPEC cartel.

IV. OPEC AND DIVESTITURE

The economic fulcrum upon which OPEC's cartel power and hence worldwide energy prices are based depends in large measure on the current price facing consumers and ultimately on the supply price at which an alternative source of energy will become a significant substitute for OPEC oil. Many major suppliers of substitutes for OPEC oil, however, have an economic interest in OPEC's petroleum reserves or other large proved oil reserves. These suppliers are typically conglomerate integrated energy companies with significant facilities to produce coal, shale, uranium and even domestic oil as substitutes for OPEC oil. If these suppliers are rational profit maximizers, they will anticipate a positive user cost (in the loss of monopoly rents from future oil production) if large scale production of their substitutes at a price above all production costs but below the OPEC price (on an equivalent basis) will cause the future price of oil to decline relative to costs of finding, developing and producing oil. This expectation of a positive user cost in marketing a substitute at any price which threatens to reduce the future price of the company's existing reserves of oil will force any rational entrepreneur to raise his supply price (above resource costs) of the substitute until the expected profit from marketing the substitute embodies all the expected discounted monopoly rents which can be expected to be earned in oil production over time, if the substitute energy source were not available. In other words, profit maximizing conglomerate energy corporations would not find it profitable to make large quantities of a substitute to the cartel's oil available, if the result was to inflict a capital loss on the present value of existing underground reserves (which already reflect expected monopoly rents).

In these circumstances this positive user cost of substitutes internalizes a cost that in a competitive economy would be external to an independent producer of a substitute energy source. Independent producers of domestic oil, shale, tar-sands, coal, uranium, and so on (provided they were not permitted to share the monopoly returns of the major energy companies), would not care if they inflicted capital losses on the value of foreign underground reserves of petroleum by providing a cheaper energy source. Most reasonable people would argue that society is the beneficiary of a decision to produce a less expensive substitute even though the oil producers and property owners would suffer a capital loss. The existence of rational, multi-source, energy-producing conglomerates, however, constrains production of substitute fuels, makes monopolistic control and exploitability of all markets easier. The ability of conglomerates to maintain high prices for the substitutes tends to reinforce monopoly power in the market for oil.

If at the current price consumer demand for OPEC oil is, therefore, still in the exploitable inelastic range, a strong cartel of oil-producing nations will encourage integrated energy companies to limit current production in order to bring substitute energy prices up to parity with OPEC oil, even if real resource costs of producing the substitute does not increase.

For example, the July 28, 1976 issue of *The Wall Street Journal* reported "The average price of coal has gone up 145% during the past three years—to an estimated $18.75 per ton—compared with a rise of only 50% in the previous 25 years." At the same time, according to the *Journal*, U.S. coal production has increased by less than 15%. Thus, either the supply elasticity of coal due to diminishing returns is either very inelastic (in the neighborhood of 0.1) or else the rapid increase in coal prices reflects in large measure the spilling over of monopoly power from the oil market.

Given the high level of technology which already exists in the coal industry and the hundreds of years of known, easily recoverable coal reserves, it is difficult to believe that the elasticity of the supply of coal is anywhere as near the 0.1 range, or even that coal supply is price inelastic. It seems more reasonable to deduce that with the onset of the energy crisis in oil, if the coal market was competitive, then coal production would have expanded sufficiently in the last three years to limit coal price increases to much less than 145%. Even if one were to accept the argument that the 145% price rise was a short run (temporary) inelastice response while the long run response will be elastic, then in a competitive market we should expect coal price to decline substantially in the next few years, while production expands dramatically *even if there is no additional technology progress.* Since most observers, according to the *Journal* article, do not expect this latter scenario to occur, the inevitable conclusion for any objective student of the coal industry is that the rapid rise in coal prices over the last three years is due primarily to the user cost of substitutes which en-

tered into the profit calculations of conglomerate energy companies. Hence divestiture and not additional R and D expenditures is more likely to bring about lower coal prices and greater production.

As the consuming nations continue to recover from the current recession we can expect the OPEC nations to continue to probe via higher crude prices as to whether any additional exploitable monopoly power exists or has been created. For any given demand situation with any degree of elasticity, however, higher prices require production restrictions, and hence at least tacit market-sharing arrangements to prevent one member of the cartel from increasing its gains at the expense of others. This requires some institutions to limit producers' access to marketing outlets. The vertically integrated energy companies also have vested interests in maintaining the current present value of their foreign and domestic oil and other energy reserves. As long as the present value of these energy reserves already reflect some monopoly rents based on expectations that the existing monopolistic structure and control of energy supplies will not be dismantled, then the vertically integrated companies who are the major instruments for ultimately marketing the products will be willing instruments in maintaining "orderly" markets in all energy sources so that there will not be any decline in expected oil (and other energy) prices over time.

To permit energy prices to fall from present and expected future levels will involve the production departments of integrated energy companies in large capital losses on the value of their reserves. Thus, in the current situation monopolistic and cartel control of energy supplies and speculative withholding of energy supplies based on the consensus expectation of future monopoly rents reinforce each other and merge into an almost irresistible force which contributes to the strength of the OPEC cartel. In other words, given the current integrated structure of the energy industry there is disincentives for (i) potential producers of substitutes to compete on a price basis with OPEC, and (ii) for major marketers of the products to search the market for lower price alternatives to OPEC oil.

From the consumers' standpoint, any solution must, therefore, involve altering the structure of the industry so that there are many suppliers of energy who (a) have an incentive to earn a competitive return by underselling OPEC and (b) who believe that it will be impossible to obtain current levels of monopoly rents from consumers of energy since control of supplies will be so widespread that no small group of producers can limit production and proration market demand by controlling marketing and distribution channels. Divestiture of both vertically integrated petroleum producers and conglomerate (horizontally) integrated oil companies is one small step forward in this direction.

V. THE CLAIMED BENEFITS FROM INTEGRATION

At the present time, the major benefits of conglomerate energy integration claimed by spokesmen from the industry are (1) oil men can readily transfer their technical and marketing knowledge to coal, shale, uranium, etc. and (2) the large cash flows in oil permit large investments in other energy sources which would not be forthcoming from investors otherwise. I am neither a geologist nor a petroleum engineer, but I remain dubious of the great economies that would result from the transfer of technology within legal corporate firms. The transfer of marketing information, on the other hand, is, as explained above, a basic impediment in reducing monopoly power in the current energy market. It should be discouraged not encouraged!

Finally, if alternative energy sources are profitable, then investment funds should be available in our efficient capital markets and hence there would be no financial need for conglomerate integration of energy companies.

The major arguments for vertical integration of oil companies propounded by industry spokesmen include (1) input and output flow stability, i.e., the insurance of supplies of raw materials and greater predictability. (2) in the current environment, non-integrated companies fear foreclosure of supplies and/or markets, (3) economies of scale and (4) complimentary use of existing skills.

Obviously item (4) is similar to the first benefit claimed by proponents for conglomerate integrated oil companies. Given the size of production units at each stage of the oil industry, there is some doubt whether vertical integration provides further technological economies of scale.

I would focus, however, briefly on the desirability of benefits (1) and (2) which are obviously complimentary. The desire or even necessity for security of supplies and markets on the part of oil producers, and the real threat of fore-

closure is evidence that current markets in this industry are dominated by firms who control supply and outlets via monopoly power. These needs for security suggest there is little or no arms-length bargaining or competition in markets at the various stages of the oil industry. The insecurity of supply and the fear of foreclosure of sales outlets must be the result of the fact that so much of the supply of oil is already controlled as it moves through the stages of production that only marginal amounts are available in the "free" market. If we truly had well-developed "free" competitive markets for a commodity as widely used as oil, then both supplies and market outlets would be readily available to all and these two supposed "benefits" of vertical integration would be unecessary. These are benefits to firms only because oil markets are dominated by monopolistic integrated firms. If we eliminate these, then there will be no "benefits" to insuring supply sources and market outlets. The existence of monopoly power because of vertical integration should not be turned around and used to explain the benefits to others emulating the existing majors and thus increasing the monopolistic power of sellers of this basic commodity.

VI. CONCLUSION

If, as I believe, the fundamental cause of the world's current energy problem is the growth of a worldwide monopolistic cartel and the concomitant growth of monopoly power by multinational conglomerate and vertically integrated energy companies, rather than the niggardliness of nature, then successful policies must be designed to reduce this exercise of monopoly power in the market by creating incentives for individual producers to cheat on the cartel and undercut the opposition. The solution lies in creating conditions which foster lower market prices, not higher ones.

APPENDIX. WHY ENERGY PRODUCTION CAN'T BE LEFT TO EXISTING "FREE" MARKET DECISIONS

The primary objective of any rational energy policy must be to reverse and hopefully eliminate the recent growth of monopoly power in the international and domestic energy producing industries for it is this growth of monopoly power and not a Malthusian shortage of resources that has created the energy crisis for the consuming nations. Elimination of the power of the OPEC cartel and its ramifications on the domestic energy industry will once again permit consumers to obtain abundant energy fuels at lower prices—prices that are closer to the real costs of production including a fair return on investment.

Since for any particular property the fosil fuels in the ground are a fixed inventory (or exhaustible resource)—the more used today, the less will be available for future delivery. Consequently, a rational oil producer will compare the expected profits of selling a barrel of oil today with the expected profit (properly discounted) of selling that same barrel at some future date. Thus, if producers expect the difference between wellhead prices and cost of production to increase (at an annual rate which exceeds the rate of discount) in the future, there is an incentive to reduce current production and hold it in underground inventories; while, if expected future profits are less than current, there is an incentive to produce more now. This phenomena of comparing discounted future profits vis-a-vis current profits in determining the rate of exploitation of fossil fuel properties by producers has been developed in the economic literature via the analyses of user costs.[1] Economists say user costs are positive and there will be a deceleration of current production when the expected difference between future prices and costs (properly discounted) has increased. When user costs are negative, the expectations of future prices relative to costs lead to an accelerated exploitation of the property.

Thus, in a world where the future is uncertain with producers "free" to make any production decisions they think most profitable, we are left with a bootstrap theory of the time rate of exploitation of fossil fuel bearing properties; current expectations of producers about future prices relative to costs play the pivotal role. Accordingly, relative stability over time in prices and production of energy

[1] For a complete discussion of user costs and petroleum production, see Paul Davidson, "Public Policy Problems of the Domestic Crude Oil Industry," *American Economic Review*, Vol. 53 (March 1963), pp. 85–108; also see Robert G. Kuller and Ronald G. Cummings, "An Economic Model of Production and Investment for Petroleum Reservoirs," *American Economic Review*, Vol. 64 (March 1974), pp. 66–79.

resources requires that most producers believe that tomorrow will not be significantly different from the recent past, although the market can perhaps accommodate some divergency of views among producers as long as on average producers expect stability.

Competition in such markets will provide intertemporal stability of prices and production flows only if the views of the competitors either coalesce in the belief that the future will not be significantly different from the recent past, or the views of the competitors differ as to whether user costs are positive and negative in such a way that the "average" view is that user costs are zero. If, even with competition, most producers expect a significant change in prices relative to costs in the future, the current rate of exploitation will be accelerated (i.e., if user costs are, on average, negative) or retarded (if "average" user costs are positive). Thus in the 1930's the discovery of the huge East Texas fields touched off expectations of large negative user costs (i.e., expectations of wellhead price declines) in an industry that at that time was relatively competitive at the well head stage. The result was a disastrously rapid rate of exploitation of domestic oil fields which brought about the fulfillment of the expectations of rapidly declining wellhead prices relative to costs. (The moral of this historical episode is that expectations of rapidly changing prices relative to costs in this industry can encourage behavior which will make the prophecy self-fulfilling, if the expectations are widely held and not readily altered.) Market prorationing supported by the 1935 federal Conally Hot Oil Act was required to alter these negative user cost expectations of competitive producers and stabilize the domestic industry. In later years as foreign oil became important in world supplies, the operation of import quotas plus market prorationing effectively eliminated any strong positive user cost expectations by domestic producers. At the same time user cost speculation in the international market was restrained by the ability of the "Seven Sisters" to maintain an orderly market.

Most sellers of energy resources have, however, been led to expect rapidly rising prices by the events of the early seventies—including the relaxation of market-demand prorationing, the growth of the power of the oil cartel, the Organization of Petroleum Exporting Countries (OPEC) at the same time that import quotas were being removed, and the unsettled politics of the Middle East. These events have stimulated speculative proclivities and consequently retarded current production of fossil fuels and other energy sources such as uranium.

Current events have created an environment where most domestic energy producers and property owners expected rapidly rising wellhead prices of natural gas, old crude oil, coal (as conglomerates "require" equal returns from each division), and even "new" crude as OPEC turns the cartel screw a little tighter and tries to "catch-up" to some extent on the world inflationary forces that the cartel released in the recent past, and the Administration talks about removing all controls from wellhead prices. Currently regulated wellhead prices in the U.S. are below what the market could be forced to pay (i.e., demand is in the price inelastic range) while competitive fuels are controlled by growing monopolies (e.g., OPEC) and separate but not independent divisions of the same "energy companies." The Congress and F.P.C. specifically hold public hearings to determine whether the wellhead price should be increased or even decontrolled. All these factors encourage producers to expect, at worse, no change in the existing price; and at best, a substantial increase. In other words, producer expectations are biased in the direction of price increases as monopolistic control of supply is validated by events and governmental policies—and hence speculative expectations can have a significant impact on diminishing current supply offerings.

John Maynard Keynes once pointed out that economic progress depended on the spirit of Enterprise, which in this context refers to the activity of producers motivated by a desire for action rather than inaction and operating under reasonably stable conditions in an uncertain world, to produce a steady flow of output for the economy. Keynes recognized that in an uncertain world some men's proclivities would always turn to the possibility of making speculative profits via supply manipulations, and he noted "Speculators may do no harm as bubbles on a steady stream of Enterprise. But the position is serious when Enterprise becomes the bubble on a whirlpool of Speculation." The critical current supply situation for natural gas and oil in the U.S. and the cartelized supply of all fossil fuels in the world is in part due to Enterprise becoming engulfed in Speculative as well as Monopolistic practices.

Growing Monopoly Power and Speculative Successes Reinforce Each Other

In the current energy crisis two major processes have occurred concurrently and these have exacerbated the speculative excesses of the energy market. These processes are (a) the growth of monopoly power of the OPEC cartel and (b) the development of conglomerate multinational energy companies who control substantial quantities of substitute domestic energy supplies.

The impact of the OPEC cartel in recent years is obvious and I need not pursue it at this point. Instead, I shall dwell a few moments on how the growth of conglomerate energy companies has reinforced the ability of the OPEC cartel to raise prices and to create positive user costs in recent years.

The existence of an exploitable monopoly position depends on the present and future price elasticity of demand in the relevant price range. As far as the OPEC cartel is concerned, therefore, it depends in large measure on the current price in consuming countries and ultimately on the supply price at which alternative sources of energy will become significant substitutes for OPEC oil. Suppose, however, the supplier of a substitute energy source also has an economic interest in OPEC petroleum reserves because it is a conglomerate energy company with an OPEC concession or other large oil reserves. Then it will anticipate a positive user cost in providing the substitute if production of this substitute reduces potential profits from its oil reserves. This positive user cost will raise the suppy price (above resource costs) or marketing the substitute.

In these circumstances this positive user cost of substitutes internalizes a cost that in a competitive economy would be external to an independent producer of a substitute energy source. Independent producers of domestic oil, shale, tar sands, coal, uranium, and so on (provided they were not permitted to share the monopoly returns of the major energy companies), would not care if they inflicted capital losses on the value of foreign underground reserves of petroleum by providing a cheaper energy source. Most reasonable people would argue that society is the beneficiary of a decision to produce a less expensive substitute even though the oil producers and property owners would suffer a capital loss. The existence of rational, multisource, energy-producing conglomerates, however, constrains production of substitute fuels, makes monopolistic control of energy markets easier, and reduces consumer welfare. The ability of conglomerates to maintain high prices for the substitutes tends to reinforce their monopoly power in marketing their OPEC oil.

If at the current price consumer demand for OPEC oil is therefore still in the exploitable range, a strong cartel of oil-producing nations can allow multinational energy conglomerates to continue to raise prices relative to real resource costs. The continuous revenue increases of host nations since 1970 seem to be attempts to search out the point at which demand for OPEC oil becomes so elastic that monopoly rents are fully exploited. (However, for any given demand situation with any degree of elasticity, higher prices require production restrictions, and hence at least tacit market-sharing arrangements to prevent one member of the cartel from increasing its gains at the expense of others.) Since the multinational energy companies also have vested interests in the price of OPEC reserves as long as they retain any monopoly rents, they will be willing tools in maintaining an "orderly" production market in all fossil fuels. Thus monopolistic and speculative withholding reinforce each other and merge into one.

SOME SPECIFICS ON A NEP

Hence a NEP must be aimed at: (1) creating an elastic demand for imported oil via encouraging the existence of many independent domestic producers of energy who cannot share in the monopoly rents of OPEC and the Seven Sisters, (2) squelching producer speculation activities in all energy sources, and (3) creating incentives for individual OPEC members to cheat on the cartel by removing the international energy companies as a mechanism for enforcing OPEC price decisions.

Stopping Speculation

Speculation can be squelched in either of two ways:

(a) adoption of a regulated wellhead price policy which creates an atmosphere of certainty that any future price increases relative to production costs will be at an annual rate so small as to be below annual carrying costs so that it will never pay to speculate on inventories, (e.g., ceiling prices will never increase by more than six percent per annum) ; or

(b) creation of conditions which make expectations of a future price decline just as likely as an increase, so that individual's speculative expectations tend to cancel. Bluntly, in the current context, this means permitting those who have withheld production in order to profit by it should be so well rewarded by the "free" market that it would appear to many that the consumers no longer have sufficient wealth or income to leave them open to further extortion.

Many people, including President Ford's advisers, believe that decontrolling natural gas and "old" oil wellhead prices would be sufficient to establish the condition (b) above. In present circumstances, however, even decontrol with wellhead prices rising to current cartel levels may not be sufficient to create condition (b).

In the first place history is replete with episodes where "free" or uncontrolled commodity markets have been subjected to disruptive speculative withholdings.[2]

Given that control of significant quantities of alternative fossil fuels are either in the hands of foreign nations or other divisions of the same domestic "energy companies" who are the major producers of oil and natural gas, it may be difficult to create condition (b) as consumers could be continually whip-sawed by price rises[3] in the alternative fossil fuel markets until multinational conglomerate energy producers and OPEC nations believe they have extracted the maximum transfer of income and wealth they can from the impoverished U.S. energy consumers. Even if it were possible, however, condition (b) would probably require, in present circumstances, an immediate and substantial rise in wellhead prices—high enough to convince a sufficient number of producers that the new price exceeded the long run price that the market could bear so that further price movements were more likely to be in a downward direction. Such a price increase would create tremendous economic rents for producers and landowners (which violates any reasonable fairness criterion). It would in essence formally legitimize the existing monopoly control of fossil fuel markets, and it would contribute to our inflationary problem by creating conditions where individual groups of workers and other industries would try to catch up, that is, to re-establish the pre-"energy crisis" purchasing power of their incomes by demanding wage and price increases to offset higher energy prices. Even if it were possible to decontrol old oil and natural gas, it would be socially and politically undesirable. Accordingly, we are left with condition (a); to design a policy of regulating the wellhead price in such a way as to eliminate speculation as a factor affecting supply offerings. This will require: (4) regulation of wellhead prices of oil and gas in such a manner as to permit prices to rise relative to costs at an annual rate, which is less than the rate of interest only if such increases are necessary to permit producer to earn a "fair rate of return" and property owners a "fair" payment.

Federal Leasing Policy

A change in the lease contract from the constant percentage royalty and front loaded bonus would reduce the financial constraints and aid the independent producers in the development of new properties on the Outer Continental Shelf. For example, a bonus-variable royalty system under which the total bonus plus accrued interest would be paid on a schedule of annual payments out of sales receipts after the property was on-stream would virtually eliminate the producers' flow of funds problem for financing leases and would substantially reduce the total financing problem of exploration and development (E & D) costs.

---

[2] The case of the "Centre Point" office blocks the corner of Tottenham Court Road and Oxford Street in London, is a case in point. Although it was built in the early '60's and although there has been an acute office space shortage in central London, this building has remained unoccupied. The developer discovered that because of the space shortage, the price per square foot is rising faster each year and the capitalized value of the unused building increases by more than the building would if the space was leased out on long term supply contracts. Thus, the shortage problem is exacerbated by a free market and the right to speculate by withholding.

[3] The argument that price should be based on the real value of a good where value is determined by the highest-cost alternative is a familiar ploy used by many groups in making special pleas for improving their own income. For example, natural gas and "old" oil is "artificially" cheak relative to the (cartel set) "free" market price of oil. The argument is going to be perpetuated in the energy market as long as monopoly power remains. For example, *Fortune* magazine (May 1975, p. 274) indicates that OPEC has hired a prestigious American "think tank" to provide a computer model which will "determine" the "real value" of crude oil through the year 1990 on the basis of the price of available alternatives rather than on the costs of production Caveat emptor!

Lease bonus costs are a substantial portion of E & D. Data provided in a recent FPC Opinion[4] indicates that for the nation as a whole, ⅓ of total E & D costs for successful non associated gas properties are lease acquisition costs. If dry hold costs are included in the calculations, the figure is approximately ⅕ of total E & D costs.

Similar information was not readily available for oil properties. By making some reasonable assumptions and using statistics provided by USGS and World Oil,[5] I estimate that lease bonuses in 1972 vary from a low of 25 percent to a high of 65 percent of total E & D for offshore oil properties. Accordingly, I would think that a rough estimate of between ¼ to ⅓ is representative for all oil and gas properties in the U.S.

In absolute terms, recent lease bonus sums are staggering. In 1972 federal offshore lease bonus receipts totaled $2.25 billion.[6] Offshore acreage which received bonuses of a few hundred dollars per acre in the 1950's now receive bonuses as high as $20,000 per acre and more. These costs are so substantial that very few producers below the top 16 largest have obtained leases independently and even these "majors" must normally enter into joint ventures. For example, in testimony before the House Subcommittee on Activities of Regulatory Agencies,[7] FPC economist David S. Schwartz provided substantial evidence of how the high lease bonuses effectively prohibit independents from obtaining offshore leases. Schwartz showed:

1. Only 4 of the 16 major petroleum companies with an interest in Federal offshore properties own 50% or more of their producing leases independently,
2. 10 of the 16 own 80% or more of their offshore leases jointly with one another,
3. Major banks have representatives serving as directors on two or more petroleum companies.[8] Moreover, the FTC and the Justice Department are investigating several cases where individuals are serving on two or more boards of directors of petroleum companies,
4. In recent offshore federal lease sales, the top 8 firms in each auction paid btween 72% and 96% of all lease bonuses.

Such evidence strongly suggests that "old" supplies of oil and gas, and even more significantly "new" supplies of oil and gas (which many are advocating should be decontrolled and never regulated), are concentrated in the hands of a small, tightly knit oligopoly—perhaps even tighter for new supplies than for old. The members of this oligopoly can not be expected to vigorously compete with each other since they are joint partners in numerous properties. Moreover, this domestic cartel could view its most profitable course as being complimentary to the OPEC cartel.

It is imperative, therefore, to encourage new entrants into the leasing and developing of offshore properties. In my view this will probably require not only the removal of the front-load bonus, but also the formation of a FOGCO to aid in financing exploration and development of offshore properties by independents primarily via joint ventures.[9]

Lease Bonuses and the Federal Budget

Lease bonuses have, in the last few years, brought substantial revenues into the federal treasury. Removal of the front-load bonus will result in the postponement of these revenues for a number of years. Consequently the immediate impact would be to increase the federal cast flow deficit. Moreover, if a FOGCO was formed to aid in the cost of E & D by entering into joint ventures with the independents, the immediate impact would be to increase the government's cash deficit even more in the next few years.

---

[4] FPC Opinion #699. June 21. 1974, Appendix C.

[5] USGS. *Outer Continental Shelf Statistics* (June 1974) p. 20; *World Oil,* Feb. 15, 1974. p. 86.

[6] For some individual auctions the data are: 12/20/73 (87 tracts): $1.5 billion: 6/19/73 (100 tracts) $1.6 billion; 12/19/72 (116 tracts); $1.7 billion; 9/12/72 (62 tracts) $586 million.

[7] Testimony dated March 26. 1974.

[8] This raises the issue as to whether independent producers could readily obtain finance from banks who have interests in majors who might be adversely affected by the competition.

[9] One significant side advantage of FOGCO joint ventures is that the federal government would get reliable information on reserves. probably for the first time. Economist Schwartz, in his testimony. provides an example—which would be amusing if it were not so serious. Using data in FPC certification applications, Schwartz showed that for a given period in Southern Louisiana 6 applications for certification showed the "discovery" of 4.3 trillion c.f. of reserves on those properties alone while AGA gross reserve additions for all Southern Louisiana was reported as less than one trillion cubic feet in the same period.

Nevertheless, the removal of the front-load bonus and the creation of FOGCO can be readily justified by looking upon these actions as (a) productive investments which will provide our government with a fair rate of return over the long run while significantly providing consumers of energy with lower priced fossil fuels, and/or (b) a part of the defense budget for offensive weapons which will help the U.S. negotiate a more favorable peace settlement in the economic war that the OPEC cartel has declared on the consuming nations.

AN IMPORT AUCTION SCHEME

To help achieve the intermediate range goals of breaking the OPEC cartel with the desirable attendant reduction in Arab-country power over Western Europe and the Third World, I would argue for elimination of the major international oil companies as direct importers of OPEC crude for the U.S. The OPEC cartel has not yet broken down, as a cartel usually will (because of its members cheating on price), for two important reasons: 1) the solidarity among the Arab producers, and 2) because the international companies willingly police prices and quantities in non-Arab OPEC countries. To act differently would threaten their Arab oil concessions. For example, Aramco, the sole producer in Saudi Arabia is a combination of four of the "Seven Sisters." These four companies cannot purchase large quantities of crude over long periods at prices well below OPEC levels from sources outside Saudi Arabia, or else they will be in serious danger of losing thier control of more than six million bbls. per day of crude production in Saudi Arabia.

The establishment of a federal agency as the sole purchaser of imported crude and petroleum products via a secret auction system would eliminate the price surveillance mechanism of the internationals which is a strong prop holding the OPEC cartel together. This federal agency should not be limited to making a zero profit or loss in each year. The agency should be able to, at any point of time, refuse any or all sealed bids as part of a strategy to prevent collusive bidding arrangements; hence, the agency may not be able to purchase sufficient oil to cover the difference between domestic demand and supply for any one period. If the agency was forced to sell this limited quantity of imports at a zero profit price, and if there was no domestic price controls, the refining companies could make a windfall profit because of the shortage. Moreover, for reasons given below, there may be circumstances where it may be strategic for the agency to operate at a loss.

The bidding duration of purchase contracts should have a built-in flexibility which encourages sellers to price at less than the cartel price so that the greater the discount offered from the cartel price, the longer the purchase agreement. For example, suppose all bids submitted are at the world cartel price. The agency should be required to limit purchases to 60 or 90 days (and perhaps even reduce imports) and request another auction. If sellers are willing to undercut the world price, the purchase contract should have a longer duration. For example, if the seller's dollar price is 5% below world price, a 4 months contract for a specified quantity per month would be accepted; if the discount is 10%, a year contract; if 15%, a two year contract; etc. Such a duration-discount schedule may be extended to as long as four or five year purchases for substantial discounts. This will increase incentives to cheat on the cartel if the U.S. will guarantee quantity purchases at below current cartel prices for a number of years; especially if a cartel member thinks that this may mean a guaranteed market in later years at a dollar price above the world price when the cartel disintegrates. The objective is to make it so lucrative for any one member of OPEC to cheat and guarantee his income for a number of years that each member is uncertain as to who will be the first to break; while those with the greatest reserves have the most to lose if others break first.

Of course, if the agency is successful in breaking the cartel, it will be saddled with purchase contracts for specified quantities for a number of years which may be a price above the market price. The agency should then sell the oil to domestic refiners at the world price thereby passing the gain on to the American consumer, and the loss of the agency should be subsidized from tax revenues. These agency losses can be looked upon as a defense expenditure for economic warfare, and a successful expenditure at that!

Attachment.

Review of Current United States Fossil Fuel Resources (Revised, November 17, 1975)*

(By J. D. Parent and H. R. Linden, Institute of Gas Technology, Chicago, Ill.)

In these times of ever-tightening domestic natural gas and crude oil supplies, increased attention is being given to the reliability of estimates of the total remaining economically recoverable resources of these fuels, that is, both proved reserves and potential additional supplies. Until their own recent modest revision, estimates of coal resources by the U.S. Geological Survey have remained quite stable over the years and have not been questioned by anyone. However, estimates of remaining economically recoverable oil and gas have come from many sources, varied widely, and have been a focus of controversy. This unsettled state does not apply to the proved reserves portion of the total remaining recoverable oil and gas. Estimates of proved reserves of these fuels, published annually by the American Gas Association and the American Petroleum Institute, have been validated within reasonable limits repeatedly, as in the case of the Federal Power Commission study of gas reserves and, most recently, by the Federal Energy Administration. The real issue has been the quantities of oil and gas economically recoverable in the future over and above proved reserves.

As shown in Tables 1 and 2, there has been no lack of quantity of independent estimates in recent years. It can also be seen that the reported results have shown only limited agreement. This is hardly surprising, since widely differing mathematical and geological methods have been used, geographical coverage has not always been the same or complete, assumptions of what constitutes technical and economic feasibility of recovery have varied substantially (as indicated by different limits on drilling and offshore water depths and on ultimate recovery factors), and so forth.

TABLE 1.—ESTIMATES OF REMAINING RECOVERABLE U.S. NATURAL GAS RESOURCES AT YEAREND

[In trillion cubic feet]

Yearend and sources	Potential supply		Proved reserves (American Gas Association)	Total
	Old fields	New fields		
1974:				
U.S. Geological Survey (Miller, Thomsen, et al.) [1]	201.6	322–655	237.1	761–1,094
National Academy of Sciences	[2] 118.6	530		886
Moody [3]	65.0	485		787
Average, some major oil companies (Garrett)	100.0	500		837
1973: Mobil Oil (Moody & Geiger)	65.0	443	250.0	758
1972:				
U.S. Geological Survey (McKelvey) [4]	130.0–250.0	1,000–2,000	266.0	1,396–2,516
Potential Gas Committee [5]	266.0	880		1,412
IGT (Linden) (old and new fields)	634.0	----------		900
1971:				
U.S. Geological Survey (Hubbert) [4]	[6] 130.0	[7] 361	279.0	[8] 770
IGT (Linden) (old and new fields)	575.0–704.0	----------		854–983

[1] Based on 80-percent recovery and 660-ft water depth.
[2] Calculated as half of the proved reserves.
[3] Water depth to 6,000 ft.
[4] Water depth to 660 ft.
[5] Water depth to 1,500 ft and drilling depth to 30,000 ft.
[6] Calculated by subtracting the sum of the proved reserves and new field discoveries from the estimated remaining recoverable gas.
[7] As given in U.S. Geological Survey Circular 725 for undiscovered gas.
[8] Ultimate recoverable given as 1,184,000,000,000,000 ft³ for the total United States. Subtracting cumulative production as of yearend 1971 of 414,000,000,000,000 ft³ gives 770,000,000,000,000 ft³ remaining recoverable.

*This manuscript was published is its original form in Pipeline and Gas, J. 202 No. 12, 60–62, 64–65 (1975) October. Subsequently, the U.S. Geological Survey released updated coal reserves in the revised bulletin noted in the first reference in the list of references, necessitating changes in table 3. Table 3 is as up-to-date as possible as of November 17, 1975.

Note.—The views herein are those of the authors and do not necessarily represent the official position of the FPC.

TABLE 2.—ESTIMATES OF REMAINING RECOVERABLE U.S. CRUDE OIL RESOURCES AT YEAREND

[In billion barrels]

Yearend and sources	Potential supply		Proved reserves [1] (American Petroleum Institute)	Total
	Oil fields	New fields		
1974:				
U.S. Geological Survey (Miller, Thomsen, et al.) [2]	23.1	50–127	38.9	112–189
National Academy of Sciences (including natural gas liquids)	[3] 22.7	105–120	45.3	173–188
1973: Mobil Oil Corp. (Moody and Geiger) [4]	[5] 11.0	[6] 88	40.4	139
1972: U.S. Geological Survey (including natural gas liquids) (McKelvey) [8]	[7] 24–45.0	200–400	48.3	272–493
1971: U.S. Geological Survey (Hubbert) [8]	[9] 18.0	[10] 55	43.0	[11] 116
1970:				
U.S. Geological Survey (including natural gas liquids) (Theobald, et al.) [12] (old and new fields)	450.0		52.1	502
National Petroleum Council				[13] 339

[1] Includes American Petroleum Institute indicated additional reserves.
[2] Based on 32-percent recovery and 660-ft water depth.
[3] Calculated as half of the proved reserves.
[4] Water depth to 6,000 ft.
[5] Proved plus potential in known fields given as 51,000,000,000 bbl.
[6] Also reported as including natural gas liquids.
[7] Listed as indicated-inferred reserves, although the reported proved reserves also includes the indicated reserves of 5,200,000,000 bbl.
[8] Water depth to 660 ft.
[9] Calculated by subtracting the sum of the proved reserves and new field discoveries from the estimated remaining recoverable oil.
[10] As given in U.S. Geological Survey Circulation 725 for undiscovered crude oil.
[11] Ultimate recoverable given as 213,000,000,000 bbls Subtracting cumulative production as of yearend of 97,000,000,000 bbl gives 116,000,000,000 bbl remaining recoverable.
[12] Water depth to 8,200 ft.
[13] Based on estimated oil in place and 60-percent recovery.

It has been difficult to make a fair comparison of these estimates, since full details of procedure and the data base are seldom published. Further, in published summaries of resource estimates, and sometimes in the original documents, two ambiguities of special importance are encountered. One relates to interchange of the terms oil, petroleum, crude oil and crude oil plus natural gas liquids. Frequently, estimates of total petroleum liquids, i.e., crude oil plus natural gas liquids, are reported as "crude oil" and vice versa. While the difference is not great, say 15 to 20 percent, it is an unnecessary cause of variation and uncertainty.

An even more serious ambiguity in some of the published accounts of gas and oil resource data lies in what is reported as potential supply above and beyond proved reserves. Additional reserves of gas and oil may be found in the future in either known (old) fields, or in new fields. Reserve additions in known fields take the form of new reservoir discoveries as well as of extensions and revisions of known reservoirs. The annual A.G.A. and API reports on reserves give data for each of these categories. Recent press reports, however, have generally related the potential supplies of gas and oil to new fields only, so the reader may not be aware of the potential supply expected to be developed in old fields. Even the source documents often do not clarify this point sufficiently. As a particular example, the National Academy of Sciences discusses both discovered and undiscovered gas and oil, but makes only a brief reference to the additional or inferred supply in known fields. Under the heading of "Total Discovered Reserves," the report states: "In addition to the proved reserves discussed above there is a sizable increment of reserves that have been discovered but are not considered to be 'proved.' This increment, estimated to average 50 percent, is the difference between ultimate production actually obtainable from any given reservoir, and the proved reserves assigned to that reservoir at any given time." Presumably, this includes new reservoir discoveries in known fields as well as extensions and revisions.

A particular source of difficulty in the case of crude oil is that quite different ultimate recovery factors of oil in place may be used on the basis of expected

economic and technical feasibility, and these factors are not always stated by the authors. In some cases, recovery is assumed to remain at the current average level of about 32 percent because the impact of post-embargo changes in oil prices, exploration and development costs, and tax and regulatory policies has not yet been fully assessed.

Returning to the general problem of disagreement among various investigators, the evolution of the current relatively low estimates is of interest. M. King Hubbert, one of the most active workers in this field, has relied on a mathematical approach, based largely on fitting historic production and discovery data to the logistic equation and evaluation of the decreasing finding rate per foot drilled. Even while with the U.S. Geological Survey in recent years, he has published estimates of potential oil and gas supplies which have been substantially lower than geologically-based estimates of the U.S.G.S. The conflict was heightened in 1974 when Moody and Geiger of Mobil Oil Corporation also published estimates which were considerably lower than those of the U.S.G.S. Because of the great importance of having reliable resource data in the formulation of national energy policy, the National Academy of Sciences agreed to consider the issues involved. The data and procedures used by the disagreeing agencies were reviewed and it was decided by the N.A.S. review panel that a major problem was that, up to that time, the U.S.G.S. had probably been crediting too much gas or oil per unit volume of rock to the unexplored prospective sediments. The N.A.S. panel then proceeded to give its own estimates based on the work of others.

Meanwhile, the U.S.G.S. had under way a new and more critical study. This resulted in publication of Geological Survey Circular 725 in June of 1975. This new study represents a review of pertinent geological and geophysical data relating to more than 100 different provinces by more than 70 specialists. Accordingly, the results can be expected to have considerably validity, even though proprietary data of petroleum producing companies were not used. An excellent feature of this new set of estimates for potential oil and gas supply is the use of 5 percent and 95 percent probability estimates, much as Moody and Geiger had done. Of considerable importance is the fact that the new estimates are considerably lower than those published earlier by U.S.G.S. (with the exception of Hubbert's) and are reasonably in accord with recent estimates by other agencies.

It is also important to note the points of economic cutoff used in Circular 725: "The estimates of undiscovered recoverable resources take into account relevant past history and experience and are based on assumptions that undiscovered recoverable resources will be found in the future under conditions represented by a continuation of price-cost relationships and technological trends generally prevailing in the recent years prior to 1974. However, rather than quote some particular level of price to cost relationship, the report actually used a recovery factor of 32 percent for that part of the undiscovered oil in place which was assumed to be economically recoverable; the comparable figure for gas was 80 percent. For that part of the undiscovered oil in place reported as subeconomic. the report used an additional 28 percent of the oil in place[1] (total of 60 percent for economic plus subeconomic) and an additional 10 percent of the gas in place for the subeconomic undiscovered gas.

Figure 1 is taken from Circular 725. It shows 322 to 655 Tcf of as-yet-undiscovered natural gas expected to be economically recoverable from new fields, and 201.6 Tcf as identified-inferred, i.e., additional gas expected to be found in known fields. The comparable figures for crude oil are 50 to 127 billion bbl and 23.1 billion bbl, respectively. It should be noted here again that most press reports of this study omitted reference to the additional (inferred) 201.6 Tcf of natural gas and 23.1 billion bbl of crude oil in known fields, thereby giving a much darker picture of remaining resources and heightening the appearance of disagreement with earlier estimates.

Press reports have also generally omitted any mention of the large quantities of "subeconomic" (on the basis of pre-embargo price-cost relationships) potential supplies. When the total (identified and undiscovered) "subeconomic" natural

[1] Here, we use a term, oil in place, which, as fas as we can determine, has never been precisely defined. Presumably, some point of cutoff is implied, so that deposits smaller than some reasonable limiting value are not considered. The character of the oil and reservoir rock are also taken into consideraiton, since extremely viscous oil and oil in very tight reservoirs are evaluated separately.

gas resources of 130 to 197 Tcf are considered (see Figure 1), what appears in Table 1 to be a very substantial disagreement with the Potential Gas Committee estimates (which includes a large "speculative" component) may be narrowed. The same applies to the new U.S.G.S. oil values with respect to some of the older estimates, if the total 164 to 251 billion bbl of "subeconomic" crude oil is considered. The subeconomic gas and oil will be at least partially recoverable economically in the future, given sufficient economic incentive and appreciable technological development in recovery methods. It is stated in Circular 725 that: "The higher price-cost rations existing in 1975, if they should continue or increase even higher, would likely increase estimates of both undiscovered recoverable resources and reserves significantly—some economists think perhaps half again. This possible added potential is being considered in a follow-on study planned for completion within a year." A study of the effect of price-cost ratios on potential supply would be of great value to the industry. Although increased recoveries are expected, it is stated that it would be extremely optimistic to expect (ultimate) recovery of as much as 60 percent of the oil in place and that "if such is realized it is likely to occur only through a gradual development over an extended period of time."

Returning to Figure 1 for explanation of the quantities given for subeconomic undiscovered gas, in keeping with the assumed possible increase from 80 to 90 percent recovery of the gas in place, we note that $10/80 \times (322 \text{ to } 655 \text{ Tcf}) =$ 40 to 82 Tcf. For crude oil, the assumed possible increase from 32 to 60 percent recovery of the undiscovered oil in place corresponds to $28/32 \times (50 \text{ to } 127 \text{ billion bbl}) = 44$ to 111 billion bbl. These are the numbers given in Figure 1.

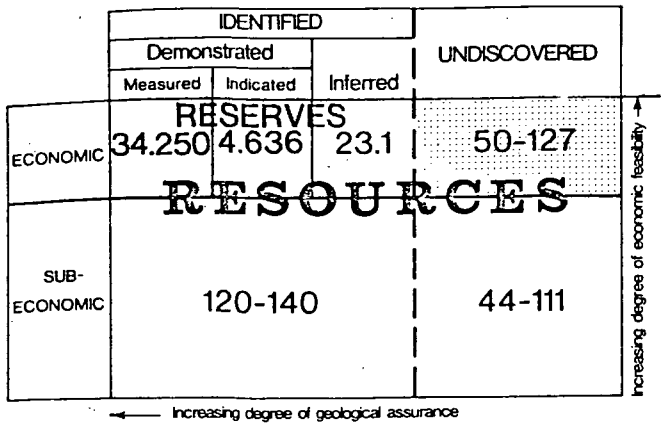
If one applies similar ratios to the sum of cumulative production plus measured (proved) reserves and to the sum of cumulative production plus measured and inferred reserves, estimates are obtained for the subeconomic identified (already known) recoverable resources. Thus, for gas, $10/80 \times (480+237 \text{ Tcf}) =$ 90 Tcf, and $10/80 \times (480+237+202) = 115$ Tcf. This, again, agrees with the numbers shown in Figure 1. Similar computations can be made for crude oil which also check with the data of Figure 1 quite well.

An interesting final point with respect to Figure 1 is the use of Hubbert's α factors to calculate the identified-inferred recoverable resources. This is one of the several methods which have been published for accounting for the expected rate of growth of new discoveries attributed initially to a given year, i.e., how subsequent drilling and testing adds to the original estimates.

90-664 O—77——11

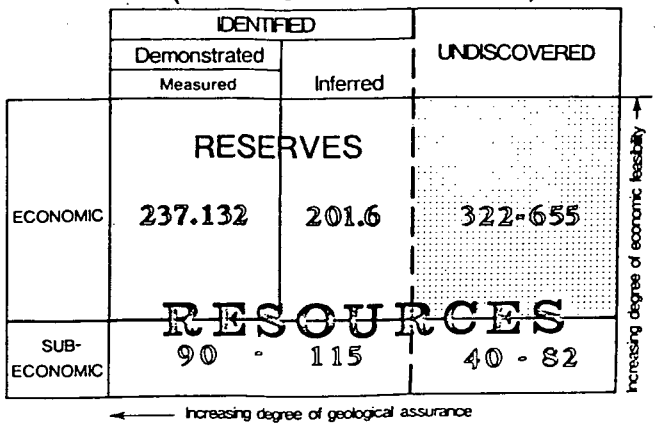
FIGURE 1

CRUDE OIL RESOURCES OF THE UNITED STATES
(BILLION BARRELS)



Total U.S. Cumulative Oil Production 106 Billion Barrels
12/31/74

NATURAL GAS RESOURCES OF THE UNITED STATES
(TRILLION CUBIC FEET)



Total U.S. Cumulative Gas Production 481 Trillion
Cu Ft 12/31/74

Source: U.S. Geological Survey Circular 725.

The periodic Potential Gas Committee estimates also deserve particular attention, because of the sponsorship (American Gas Association, American Petroleum Institute and Interstate Gas Association of America) and the expertise of the members. The PGC estimates as of year-end 1972 are rather high relative to more recent estimates by others. However, they must be given considerable weight, because they represent the work of regional committees of highly qualified oil and gas industry personnel who have had access to producing company proprietary information. It is not known at this time if and when PGC will update its last estimates, or how they would be affected by the developments already

discussed. In any event, with recent estimates converging to reasonable agreement, the reduced level of expected potential supplies with respect to earlier more generous estimates must be accounted for in realistic planning and policy making by the oil and gas industries and governmental agencies.

The various estimates which have been reviewed have been taken into consideration in preparing Table 3, which shows IGT estimates of remaining recoverable fossil fuel resources in both conventional and common energy units. The very recent revision of U.S. coal resources is included.

TABLE 3.—U.S. FOSSIL FUEL RESOURCES AS OF DEC. 31, 1974

	Proved and Currently recoverable		Estimated Remaining recoverable	
Dry natural gas:				
Trillion (10^{12}) cubic feet	[1] 237		[2] 900–1,375	
10^{18} Btu		0.24		0.93–1.42
Natural gas liquids:				
Billion (10^9) barrels	[1] 6.4		[3] 24– 36	
10^{18} Btu		.03		.10– .15
Crude oil:				
Billion (10^9) barrels	[1] 34.3		[4] 150– 380	
10^{18} Btu		.20		.87– 2.20
Coal:				
Billion (10^9) short tons	[5] 216		[6] 1,038–1,790	
10^{18} Btu		4.75		20.76–35.80
Shale oil:				
Billion (10^9) barrels	[7] 74		[8] 1,026	
10^{18} Btu		.43		5.95
Bitumens:				
Billion (10^9) barrels	[9] 2.5		[9] 15	
10^{18} Btu		.01		.09
Total, 10^{18} Btu		5.66		28.70–45.61

[1] "Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas in the United States and Canada and U.S. Productive capacity as of Dec. 31, 1974." Vol. 29, published jointly by American Gas Association, American Petroleum Institute, and Canadian Petroleum Association, 1975. Includes 3,900,000,000,000 ft³ of gas in storage.

[2] The higher figure is based on the potential natural gas supply of 1,146,000,000,000,000 ft³ given in "Potential Supply of Natural Gas in the United States as of Dec. 31, 1972," prepared by Potential Gas Committee, sponsored by Potential Gas Agency, Mineral Resources Institute, Colorado School of Mines Foundation, Inc., Golden, Colo., November 1973; and proved reserves of 237,000,000,000,000 ft³ including gas in storage as of Dec. 31, 1973. The PGC estimate of 1,146,000,000,000,000 ft³ potential was decreased to 1,138,000,000,000,000 ft³ as of Dec. 31, 1974,to allow for discoveries in new fields and reservoirs totaling 8,000,000,000,000 ft³ during 1973 and 1974. The lower figure is a rounded value based on the potential reserves as estimated by the U.S. Geological Survey as of Dec. 31, 1974 (Geol. Survey Circ. 725), the estimate of the National Academy of Sciences given in "Mineral Resources and the Environment" (N.A.S., 1975) and estimates of several major oil companies as reported by Garrett at the June 1975 A.G.A. executive conference.

[3] Based on 900,000,000,000,000 to 1,375,000,000,000,000 ft³ estimated total remaining recoverable natural gas and the average ratio of the reserves of natural gas liquids to natural gas given in the reference listed in (a) for 1950–74. The ratio is 26.27 bbl per million cubic feet.

[4] The higher figure is based on 810,400,000,000 bbl of original oil-in-place as given in "U.S. Energy Outlook, A Report of the National Petroleum Council's Committee on U.S. Energy Outlook," Washington, D.C., December 1972, an ultimate recovery of 60 percent as suggested in "Future Petroleum Provinces of the United States," National Petroleum Council, Washington, D.C., July 1970, and cumulative production of 106,100,000,000 bbl through 1974 as stated in the reference listed in footnote 1. The lower figure is a rounded value based on the potential reserves as estimated by the U.S. Geological Survey as of Dec. 31, 1974 (Geol. Survey Circ. 725), the estimate of the National Academy of Sciences given in "Mineral Resources and the Environment" (N.A.S., 1975) and the estimate of the Mobil Oil Corp. as published by Moody & Geiger in Technology Review, p. 39, March/April 1975. These estimates include 4,600,000,000 bbl indicated additional reserves as given by API.

[5] Based on a demonstrated reserve base of 434,000,000,000 short tons of economically mineable coal as given by the U.S., Bureau of Mines in "Demonstrated Coal Reserve Base of the United States on January 1, 1974," U.S. Department of Interior June 1974. Recovery factor of 50 percent assumed.

[6] The lower figure (1,038) is as given in Geol. Survey Bull. 1412. It excludes thin beds (14–28 inches thick for anthracite and bituminous coal and 2.5–5 ft thick for subbituminous coal and lignite) from the new total of identified coal (1,731,000,000 tons) plus hypothetical coal (1,849,000,000 tons) to a maximum over burden of 3,000 ft. The higher number includes the thin beds on the assumption that they may be economically recoverable in the future (not immediate). In both cases, 50 percent mining recovery is assumed, and allowance is made for 1974 production (U.S. Bureau of Mines, Mineral Industry Surveys, Weekly Coal Report No. 3005, Apr. 18, 1975).

[7] Based on only the most accessible and better defined oil shale deposits in the Green River formation in the Uintah and Piceance basins of Colorado and Utah at least 30 ft thick and averaging 30 gal of oil per ton by Fischer assay as given in the first reference cited in footnote 4 and assuming 60 percent recovery of shale in the mineable seam and oil recovery corresponding to 96 volume percent of Fischer assay.

[8] Based on the total quantity of oil shale resources in the Green River formation ranging down to 15 gal of oil per ton by Fischer assay as estimated in the first reference cited in footnote 4 and assuming 60 percent recovery of shale in the mineable seam and oil recovery corresponding to 96 volume percent of Fischer assay.

[9] Averitt, P., "Coal Resources of the United States, Jan. 1, 1974," U.S. Geol. Survey Bull. 1412, U.S. Govt. Print. Office, Washington, D.C., 1975.

Note: Heating values used in the calculation of heat energy content of fossil fuel resources were: 1,031 Btu/ft³ for dry natural gas; 4,100,000 Btu/bbl for natural gas liquids; 5,800,000 Btu/bbl for crude oil, shale oil and bitumens; and 20,000,000 Btu/ton for coal (incompletely specified mixture of anthracite, bituminous and subbituminous coal, and lignite); and 22,000,000 Btu/ton for the higher average rank proved coal reserves.

Supply estimates are most meaningful when considered in relation to present and anticipated future annual production and consumption. For evaluation of the adequacy of supply over the intermediate and long range, it is desirable to consider all of the fossil fuels collectively. The static (zero growth) life index at the current annual production rate of fossil fuels (currently oil, gas and coal) amounts of 100 years in terms of proved reserves and to 508 to 807 years in terms of the estimated remaining recoverable resources of oil, gas, coal, shale oil, and bitumens.

Zero growth is not only undesirable but unlikely, since energy consumption has for many years paralleled GNP. If we calculate dynamic life indexes based on fixed percent per year growth rates and a requirement that reserves at each year-end equal ten times the annual production rate during that year, we obtain the following effective life estimates: At a growth rate of total fossil fuel production of 2 percent per year, proved reserves would be reduced to a 10-year life span in 46 years and the mid-range of total remaining resources in 124 years. At a growth rate of 3 percent per year, proved reserves would reach this point in 38 years, and the midrange of total remaining resources in 93 years. At a growth rate of 4 percent per year, proved reserves would last in the same sense for 32 years, and the midrange of total remaining resources for only 75 years.

If the United States were to be self-sufficient in fossil fuels, i.e., if there were to be zero net imports of fossil fuels, and if annual consumption increased 2 percent per year with respect to the 1974 level, proved fossil fuel reserves, with a 10-year supply remaining, would last 39 years, and the midrange of total remaining fossil fuel resources would last 115 years. At a growth rate of 3 percent per pear, proved reserves would last 31 years, and total remaining resources (midrange) would last 87 years. At a growth rate of 4 percent per year, these figures would be reduced to 28 years and 70 years, respectively.

In summary, realization of the new, lower estimates of total remaining economically recoverable natural gas and crude oil resources—about 900 Tcf and 150 billion bbl. respectively—would still provide sufficient lead time for an orderly transition to increased direct use of coal and to synthetic gaseous and liquid fuels produced from coal and oil shale. Further, the extent of these recent downward revisions may be substantially reduced by current and prospective changes in price-cost relationships and by improvements in technology. Moreover, the new estimates are large enough, even without upward adjustments, to permit substantial response of production rates to economic incentives during the critical years until the end of the century. Over the longer range. the lead time for conversion from a fossil-fuel-based economy to one based primarily on nuclear and solar energy seems adequate, even at substantial energy demand growth rates, if our abundant coal and oil shale resources are developed to their fullest extent.

LITERATURE REFERENCES

Averitt, P., "Coal Resources of the United States, January 1, 1974," U.S. Geol. Survey Bull. 1412, U.S. Govt. Print. Office, Washington, D.C., 1975.

Brobst, D. A. ad Pratt, W. P., Eds., "U.S. Mineral Resources," U.S. Geological Survey Professional Paper 820. U.S. Govt. Print. Office, Washington, D.C. 1973.

"Demonstrated Coal Reserve Base of the United States on January 1. 1974," Bureau of Mines, U.S. Dept. of the Interior, U.S. Govt. Print. Office, Washington, D.C., 1974.

"FEA Lists Higher US. Reserves Figures," Oil Gas J. 73, p. 32 (1975) July 7.

"Future Petroleum Provinces of the United States," National Petroleum Council, Washington, D.C., (1970) July.

Garrett, R. W., Panel presentation to American Gas Association Executive Conference, June 9–11, 1975, Colorado Springs, Colo.

Hubbert, M. K., "U.S. Energy Resources, A Review as of 1972, pt. 1," in A National Fuels and Energy Policy Study: U.S. 93rd Cong., 2nd Sess., Senate Comm. Interior and Insular Affairs, Comm. Print., Serial No. 93–40.

Linden, H. R., "New Policies Could Stimulate Gas Production But U.S. Gas Requirements May Not Be Met," Pipeline & Gas J. 200, pp. 29–32, 34, 36 (1973) January.

Miller, B., Thomsen, H., et al., "Geological Estimates of Undiscovered Recoverable Oil and Gas Resources in the United States," U.S. Geol. Surv. Circ. 725, U.S. Dept. Interior, Washington, D.C., 1975.

"Mineral Resources and The Environment," National Academy of Sciences. Washington, DC. 1975.

Moody, J. D., Presentation to Federal Power Commission, April 14, 1975.

Moody, J. D. and Geiger, R. E., "Petroleum Resources: How Much Oil and Where?" Technology Review, p. 39, (1975) March/April.
"National Gas Reserves Study, A Staff Report," Federal Power Commission, Washington, D.C., (1973) May.
"Petroleum Statement, December 1974," Bureau of Mines Mineral Industry Surveys, U.S. Dept. of the Interior, U.S. Print. Office, Washington, D.C., (1975) April 18.
"Potential Supply of Natural Gas in the United States (as of December 31, 1972)," prepared by Potential Gas Committee. Sponsored by Potential Gas Agency, Mineral Resources Institute, Colorado School of Mines Foundation, Inc., Golden, Colo., 1973.
"Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas in the United States and Canada and United States Productive Capacity as of December 31, 1974," Vol. 29. Published jointly by American Gas Association, American Petroleum Institute, and Canadian Petroleum Association, 1975.
Theobald, P. K., Schweinfurth S. P. and Duncan, D. C., "Energy Resources of the United States," U.S. Geol. Surv. Circ. 650, U.S. Dept. of the Interior, Washington, D.C., 1972
"U.S. Energy Outlook—A Summary Report of the National Petroleum Council," National Petroleum Council, Washington, D.C., (1972) December; "U.S. Energy Outlook—A Report of the National Petroleum Council's Committee on U.S. Energy Outlook," Washington, D.C., (1972) December.
"USGS Releases Revised U.S. Oil and Gas Resource Estimates," U.S. Dept. of the Interior, News Release, Washington, D.C., (1974) March 26.

Senator KENNEDY. Thank you very much, professor.

One very important area on which I think all of you have commented is the relationship between the oil companies themselves and OPEC and the extent to which the interests of the American people are carried forward by the companies themselves. We have been interested in this subject have heard differing testimony related to it. We have considered it in a broad context and from the perspective of our short and long-term interests. We have also examined the various public policy questions it raises and the impact on congressional energy policy; the formulation of foreign policy; and North-South negotiations. Perhaps we could talk just a little bit with Mr. Kauffmann about this relationship in some greater detail. I invite the participation of other members of the panel on this particular question.

It is something we, in the Joint Economic Committee, have been interested in and have been making a major inquiry into. The GAO is presently engaged in reviewing that relationship; and as complex and involved as that relationship is, I think the American people will welcome the opportunity to know something more about it.

So, Mr. Kauffmann, if I could ask you some questions in this area dealing with the current situation overseas. In your judgment, will other oil companies who are not partners to Aramco make a concerted effort to purchase the lower priced Saudi Arabian crude oil?

Mr. KAUFFMANN. I would think they would, Senator, to the extent that they see the alternative supplies. I assume what you mean is these supposedly 5-percent cheaper supplies?

Senator KENNEDY. Yes.

Mr. KAUFFMANN. To the extent they see those as being a lower cost alternative to the supplies that they otherwise have on the way, I would think that they would be willing to purchase Saudi crude.

Senator KENNEDY. How extensive do you think that would be? For your information, how much of an opportunity would there be to the outside?

Mr. KAUFFMANN. That is a very difficult question for me to answer. I don't know what their terms of supply are, Senator, with their ex-

isting suppliers, so I don't know how quickly they can turn down other supplies and shift. I would expect that certainly we would see—if there are going to be significant shifts—I would think we would see them within 30 days.

Senator KENNEDY. Pardon.

Mr. KAUFFMANN. I would expect we would see some shifting, certainly, within 30 days of the time they perceive the difference in the price.

Senator KENNEDY. But with regard to the magnitude of that shift, you are not prepared to make an estimate?

Mr. KAUFFMANN. I don't know enough about other companies' supply options, Senator.

Senator KENNEDY. Do you know what the supply in terms of Aramco would be, what the market for other companies outside of Aramco would be?

Mr. KAUFFMANN. Aramco doesn't market, Senator. The off-takers of Aramco crude, as we now understand it—and I am sure you appreciate that this is all very new and our understanding and perception of the situation is pretty tenuous at this point—we understand that there will be, to the extent there is capacity, new volumes of crude offered. We have been told that we'll be expected to see that crude, at least initially, move to the same historic markets that Saudi crude has moved in the past.

Senator KENNEDY. Does that mean through Aramco then?

Mr. KAUFFMANN. No. To the countries. The statement we have seen which we attribute to the Saudi Government—actually seen in one of the publications—indicates quite clearly that it is their intent that, at least initially, those plus supplies of crude be offered to the same historic purchasers of Saudi crude that have been their purchasers in the past.

Representative BROWN of Ohio. Does that mean they would be buying more?

Mr. KAUFFMANN. They would be offered more supplies.

Representative BROWN of Ohio. That means whoever does the purchasing, that forces out somebody else's crude at a higher price crude?

Mr. KAUFFMANN. Yes. The tendency would be if other companies—we are talking about companies other than Aramco companies—buy more Saudi crude, they, of course, will have to shut in somewhere else or cut off their purchases from some other country.

Representative BROWN of Ohio. Wouldn't they cut off the highest price supply?

Mr. KAUFFMANN. Of a like quality.

Representative BROWN of Ohio. That is what I am concerned about. What is the perception? You said whether they perceived this to be a saving. That is what I am curious about. What do you mean by that?

Mr. KAUFFMANN. I am hesitant to make a judgment on how some other company might see Saudi crude versus its alternate supply, since I don't know what its alternate supply is. If Saudi crude is available to it and of the quality it needs, at a price lower than its alternatives, I am sure it would tend to try to shift its purchases to Saudi Arabian crude.

Representative BROWN of Ohio. How would your company see that?

Mr. KAUFFMAN. We would very definitely shift to the lower cost crude.

Representative BROWN of Ohio. How would you make that judgment as to how much cheaper it was? This speaks to the quality of the oil?

Mr. KAUFFMANN. It is a straight economical calculation, Congressman, depending upon the type of refinery equipment you are intending to run crude in and the markets you are trying to serve. That is the reason I cannot answer for another company.

Representative BROWN of Ohio. Could you answer for your company in that regard?

Mr. KAUFFMANN. In our case, there is no question about it. We intend to run more Saudi Arabian crude.

Senator KENNEDY. Can you tell us about the extent of it? How much more?

Mr. KAUFFMANN. We will be running several hundred thousand barrels a day more in the first quarter. That is really about all I can say, Senator. That is really all the time we have had to study this problem.

Senator KENNEDY. The other companies in Aramco——

Mr. KAUFFMANN. I don't know. I don't know what the other companies will be doing.

Senator KENNEDY. Will the resource be available through Petromin to the other companies? Do you know?

Mr. KAUFFMANN. Will additional oil be available through Petromin?

Senator KENNEDY. Yes.

Mr. KAUFFMANN. My understanding is that at least initially, the government has said that they would like to move the additional crude initially through the Aramco partners and then have the Aramco partners sell it to other purchasers at the same price. There is no markup, no margin involved. They have been very specific on that.

Senator KENNEDY. So, the—from your answer, you don't expect that there will be more of a movement of the product through the national company, through Petromin but through the traditional members of Aramco?

Mr. KAUFFMANN. I don't know now that there will, Senator; but of course, I can't say that there won't be.

Senator KENNEDY. Could you tell us what is your estimate of Aramco's outer limits of production?

Mr. KAUFFMANN. Right now?

Senator KENNEDY. Yes. Well, let's say over the next year.

Mr. KAUFFMANN. I think I can give you an answer that will be responsive to what I believe you are looking for. Right now, Aramco can probably produce a little in excess of 9 million barrels a day and load that much. We understand that the Saudi Government has given instructions that will allow that production to climb throughout the year 1977 to where it would be almost 12 million barrels a day by the end of the year. Now, this is a matter of bringing on additional reserves, additional facilities, plans that were already in progress, hurrying up some of the secondary recovery work that was underway.

Senator KENNEDY. In this opportunity to purchase more oil from Saudi Arabia, has Exxon experienced any pressure from Iran to continue purchases of Iranian crude? You know the price is now considerably higher?

Mr. KAUFFMANN. Not that I am aware of. This, of course, again Senator is all very new and I don't know how Iran perceives its off-

take these days. We have been asked to give new estimates as to what the off-take arrangements would be short term; of course, all of us—I expect all other companies are doing the same thing—are trying to rework their balances.

Senator KENNEDY. You mean even since the announcement of the price change you have no impression of any pressures from the Iran Government on your company?

Mr. KAUFFMANN. The Iranian Government?

Senator KENNEDY. Yes, sir.

Mr. KAUFFMANN. No.

Representative BROWN of Ohio. If the Senator would yield, let me ask you directly what the constraints are that would keep a company from moving to the lower cost Saudi oil?

For instance, does an American oil company in making its purchase commitments to, say, the Iranians, sign contracts that call for a long-term commitment of a minimum purchase or something that is in that nature; and second, does the quality of the oil from various producing countries related to the nature of their refinery capacity, say, on the east coast of the United States, or the gulf coast, have an impact on their capacity to switch from the oil of one country to another country?

Those are two things that I think of. There may be others; but I wish you would address that point of what the constraints are for a company—purchasing company that might refine and distribute of not switching to a lower cost oil or the move to switch?

Mr. KAUFFMANN. I believe it would be characteristic within the industry to pretty much have your running plans and lifting plans set at least 30 days in advance.

Representative BROWN of Ohio. When you say "running plans," you are talking about refinery operation?

Mr. KAUFFMANN. Yes. But we are talking about off-lifting crude in the Persian Gulf and of course, it is a 30-day journey from that point to the off-loading port, so those plans are set. I am dealing with averages, of course. They are set well in advance. There generally are lifting schedules with respect to the various operations as to how much crude you are going to lift at least 30 days in advance. Some of those plans are extended for longer periods, but they get pretty firm when they get down to 30 days. And that is the reason I am suggesting to you that it takes a little bit of time to see the valve turn down or the valve turn up, because we are talking about the movement of tankers to and from various loading ports in the Persian Gulf.

Representative BROWN of Ohio. Shipping is one of those constraints?

Mr. KAUFFMANN. That is right.

Representative BROWN of Ohio. Where do we go from there?

Mr. KAUFFMANN. As company X sees the opportunity to buy more crude, let's say, from Saudi Arabia at what it sees is a cheaper price to it than its alternatives, and this must be a crude of comparable quality, I think it is going to tend to change its plans to pick up the Saudi crude.

Representative BROWN of Ohio. You mentioned crude of comparable quality.

Mr. KAUFFMANN. Somewhat comparable quality, yes.

Representative BROWN of Ohio. How significant a restraint is that?

Mr. KAUFFMANN. That is a very significant restraint, Congressman.

Representative BROWN of Ohio. Why?

Mr. KAUFFMANN. Depending on the type of refining equipment you have installed. For large companies that are dealing with a big supply system, that have an awful lot of refineries, they have more flexibility to absorb the swings than smaller companies. But you can't, for example, substitute heavy Arab crude for Algerian crude. That just won't work.

Representative BROWN of Ohio. Within the gulf coast—Persian Gulf supply countries, producing countries, does the quality of the oil vary greatly?

Mr. KAUFFMANN. Oh, yes.

Representative BROWN of Ohio. In what way?

Mr. KAUFFMANN. There is a considerable difference right in Saudi Arabia itself. There are three, or really four principal grades of Saudi crude itself.

Senator KENNEDY. Before we get into that, I would like to come back to one area that particularly interested me.

As I understand, Exxon intends to substitute some Saudi crude for Venezuelan crude in its east coast operations?

Mr. KAUFFMANN. I didn't say that, Senator.

Senator KENNEDY. I understand that to be the case. Am I correct in my understanding?

Mr. KAUFFMANN. I think what you may be referring to—I believe it has been said that we plan to substitute some—or to run some Saudi crude in the Caribbean. Now, the products from that crude will, of course, come into the east coast, but the refineries are actually in the Caribbean.

Senator KENNEDY. As opposed to Venezuelan?

Mr. KAUFFMANN. It will be in addition to it initially.

Senator KENNEDY. Can you tell us how much you are planning to run or approximately, the percentage?

Mr. KAUFFMANN. Oh, if I remember correctly, we already have something like 5 million barrels on the water and on the way.

Senator KENNEDY. How much is that?

Mr. KAUFFMANN. You realize, Senator, ships are loaded every day.

Senator KENNEDY. I understand. There is a change—am I correct that that is a change?

Mr. KAUFFMANN. That is a change.

Senator KENNEDY. How much of a change is that?

Mr. KAUFFMANN. It is a change by the total amount of barrels.

Senator KENNEDY. How much of a change over a year ago?

Mr. KAUFFMANN. Can I give it to you in barrels a day? Say for the first quarter?

Senator KENNEDY. Percentages, whatever.

Mr. KAUFFMANN. That would be 50,000 barrels a day.

Senator KENNEDY. And what impact will that have, if any, on prices of the east coast for consumers?

Mr. KAUFFMANN. Well, I haven't worked that one all the way through. I am not sure it will have any, Senator.

Senator KENNEDY. How much cheaper is it for you to purchase in the Persian Gulf than Venezuela?

Mr. KAUFFMANN. To run that crude in the Caribbean today, considering the Venezuelan crudes you back out on, I am not sure it is any cheaper. It is probably a trade off.

90-664 O - 77- 12

Senator KENNEDY. Do you know that to be a fact?

Mr. KAUFFMANN. Yes, sir.

Senator KENNEDY. That is a fact?

Mr. KAUFFMANN. It's pretty much of a switch.

Senator KENNEDY. Why are you shifting it then?

Mr. KAUFFMANN. Because there's a price differential that has changed from a very negative impact on Saudi crude to at least a balanced situation—or near a balanced situation.

Senator KENNEDY. I don't understand.

Mr. KAUFFMANN. Remember, the Venezuelan crudes, Senator, have gone up about 10 percent in recent days.

Senator KENNEDY. You just told me there was no difference in price.

Mr. KAUFFMANN. No, no, excuse me. May I finish?

Senator KENNEDY. Yes.

Mr. KAUFFMANN. The Venezuelan crudes have gone up about 10 percent. That particular Saudi crude has only gone up about 3 percent.

Senator KENNEDY. There is a difference in price?

Mr. KAUFFMANN. Yes. There was a different negative to Saudi Arabia. That difference has just about been removed, within pennies a barrel, by this disparate price action. So, we are going to run some of that crude in the Caribbean.

Representative BROWN of Ohio. Rather than prices going up then for east coast consumers, prices will remain the same; is that what you are saying?

Mr. KAUFFMAN. I don't think it will make an awful lot of difference in the price.

Representative BROWN of Ohio. Had you stated with the Venezuelan oil, the prices would have gone up for consumers on the east coast, is that what you are saying?

Mr. KAUFFMANN. Yes.

Senator KENNEDY. Senator Proxmire.

Senator PROXMIRE. Thank you, Mr. Chairman.

Mr. Chairman, I want to apologize to the panel, a very distinguished panel, for coming in late and not having a chance to hear your testimony. I had a chance quickly to review it and the staff gave me a quick rundown on what your positions are.

Mr. Kauffmann, we have had hearings in the Banking Committee on this same issue in the last week or so. One of the points made is that the reason why the demand for a higher price was a decision by OPEC to have a split price system, and the reason why Saudi Arabia was a little more moderate and had a 5-percent increase instead of a 10- or 15-percent increase was largely because of their estimate of the economic situation.

In other words, they saw a recession in the world. They saw a situation where France and England and Italy were in trouble. This country hasn't recovered fully. They felt that 5 percent was about what the world economy would take.

There is another perception that they did this for political reasons; and what was said or shortly after it implies that the reason was because they wanted us to adopt a more favorable policy to them in the Middle East with respect to Israel.

Is it your view that the decision on the part of Saudi Arabia not to go along with the other OPEC countries, but to stick to a 5-per-

cent increase instead of a 10 and then a 15, that that was largely an economic decision on their part?

Mr. KAUFFMANN. Senator, I believe what has been said that they did take a moderate view because they were concerned about the impact of not only this prospective price action, but to some extent past price actions, on countries outside the OPEC sphere, particularly the less-developed countries.

Senator PROXMIRE. Does that suggest that as we recover and if we recover, if we have a good recovery, as we all expect to have and certainly have had in this country, and if we have a recovery here it will help the lesser developed countries and likely help the developed countries that are in more serious trouble.

Would that suggest that when they would go ahead 6 months from now and put into effect a higher price if they thought the world economy could stand it?

In other words, if we proceed to prosperity, we are going to be faced with higher and higher oil prices?

Mr. KAUFFMANN. I am afraid that is probably an outcome that we likely could look to. We probably will be faced with higher and higher oil prices. How rapidly they will rise and whether or not they will rise at all again in midyear, I really do not have any way to forecast.

Senator PROXMIRE. Mr. Kauffmann, as you know, the Chairman, Senator Kennedy, made the statement in his opening statement, and I would like you and Mr. Davidson to comment on this, the question of how we should deal with multinational oil companies, including your company of Exxon. He said:

> There are those, who believe that the cartel could not function without the active assistance of our companies—by informally determining the production shares of each OPEC State, by providing assured markets for OPEC oil, and by providing important managerial and technical services. Remove this protection, it is argued, and the cartel would be unable to control the production levels of individual OPEC members * * *

As I am sure you appreciate, there are many people in the public who feel that the people who really engineered this price increase and who brainstormed it and inspired it are the big oil companies. They benefit from it. Their profits have gone up greatly.

What is your answer to that? I realize it is a cost for you, but you can pass that cost on. You pass it on in a way that seems to increase your profits?

Mr. KAUFFMANN. Well, Senator, basically—I don't have the material that you have in front of you here; but if I understand correctly what your statement was—this accusation about prorating for the OPEC cartel, it really is a myth. We have nothing to do with that. We make our own decisions. I say "we," Exxon does, makes its own decisions on where it will lift crude oil and how much it will lift. That depends upon how many sales we have and what our customers need.

Now the thing that I think has been brought out here and before, the thing that holds the cartel together, is that there is a greater demand for what the cartel has to offer than any alternative supply. That and that alone is what keeps the cartel glued together, has, and most of us are forecasting will.

Senator PROXMIRE. Before I call on Mr. Davidson, let me say it seems that there is a remarkable area of common interest between the big

oil companies that have had an explosion in profits and the big oil-producing countries that have had, and admittedly have, gotten the principal benefit out of this. Those countries have both been enormous beneficiaries of the developing world oil prices. All of a sudden they got their smarts.

You wonder where it came from?

Mr. KAUFFMANN. Senator, that explosion in profits you are referring to it subsided all of a sudden. It wasn't very permanent. And it is true that the scenario that was written and that the OPEC countries used for their rather drastic actions in October of 1973, and shortly thereafter when they first had the embargo and raised the prices so drastically, was forecastable. But I don't think that—I think there are an awful lot of people that suspected that if they decided to use oil as a political weapon, that could happen.

Nobody was able to forecast to what extent they would raise the price.

Senator PROXMIRE. Let me ask Mr. Davidson: The reason I am asking this question is not because of a devil theory or a conspiracy theory, but whether or not it would be good public policy for us now to do what almost half the Senate thought we should do last year, which is to divest the oil companies of their—at least of their vertical control and perhaps go further with a kind of horizontal divestment, or whether it might be better, as I understand Mr. Sawhill to suggest, to have a kind of Government company operating as a yardstick like TVA in some way to help us get a little more discipline in the process.

Mr. DAVIDSON. I prefer the attempt to make the market work rather than get the Government in. I think that is a last resort type of thing, even as a yardstick.

I think what the people have thought horizontal divestiture is probably even more important than vertical. Clearly the problem—again I agree it is not a devil theory here.

But the ability for a cartel to maintain itself depends upon its ability to have information about the market and alternative sources of supply that are not controlled by the cartel, which is domestic production and total demand. These things are known by the multinational corporations. They know demands. This helps make a decision about how much you can exploit the market.

There is always this problem of how much more can you get out of the market; and if the cartel had less information about it, I think Senator Kennedy's questions to Mr. Kauffmann were trying to get at that. That is the Saudi's are going to apparently increase production tremendously. But how is that going to get to the market? Who is going to get the benefit of it?

As I got from Mr. Kauffmann's statement that in essence the advantages that go into tankers because the delivered price in the Caribbean would be roughly the same now with the differential prices, and therefore, would not get passed on. All of this works with information flows as well.

I think divestiture by creating independent companies and making information to the cartel harder to get are what is needed.

Senator PROXMIRE. You are suggesting and I would agree with you that we have to do a better job. This would be a Government function. I take it, to get more information made available to the public, made

available also to all concerns involved so that they have an informed market, so they know what they are doing?

Are you saying that, or not?

Mr. DAVIDSON. No; the ability of people to tell you what consumption of $10 oil would be for the next 5 years in the United States, when a Government agency—the extent that they do a good job just encourages the cartel to know more information about how much they can exploit the market.

I don't think you want to provide that kind of information about where the demand is, how it is altering over time. The companies know and they make rational cost decision on it, and market decisions on—and lift the oil where they need it. No question about that.

Also, I should say there is a good theory in economics presented by Professor Chamberlain many years ago that when a monopoly exists, the monopoly revenues or profits do not stay with the intermediate seller, but ultimately go to the original holder of the monopoly, which are the landowners. I think Mr. Kauffmann is quite right that the initial profits that the companies receive will disappear over time as more and more of it gets recouped, so to speak, or caught bv OPEC.

The problem is to break the cartel; and the problem, if you are going to do it by market or economic incentives, is to create an awful lot of people who want to sell lots of things and can see that they can make more profits by underselling the cartel than by joining them.

The companies are in a terrible strait. No company would want to undersell the cartel, even if it had control over production, because it has all these long-term contracts; it has potential in some cases—in some countries has properties which could be nationalized. Its vested interest would be to stay with the cartel as long as the cartel looks like it can stay together.

Senator PROXMIRE. I understand Senator Percy has a question to ask at this point.

Representative BROWN of Ohio [presiding]. I find myself in the position of refereeing the time between the Senators here, not having had my time.

I think Senator Proxmire has had his 10 minutes. I will give Senator Percy his 10 minutes.

Senator PERCY. Congressman Brown, I appreciate that very much. I have questions relating to one particular sector, conservation.

I certainly want to welcome John Sawhill back, President Sawhill. Mr. President, we are glad to have you here.

The International Energy Agency ranks the United States near the bottom of all oil-consuming countries in conservation efforts. If you took an infrared photograph of the United States today, with the waste heat that we have, it would be flaming red. We would look like a seive. We would be seen to be burning and consuming nonreplacement petroleum, at a rate that would just startle us all, I think.

Why have we made so little progress in energy conservation in this country? Could I start with you, Mr. Sawhill; then Mr. Kauffmann? If we could limit your answers to maybe 30 seconds to a minute, and supplement it with anything in writing, and I would ask unanimous consent that the record be kept open for that.

Why have we made so little progress in conservation?

Mr. SAWHILL. I think the reason we have made so little progress is that in order to conserve energy in this country, we are going to have to make some very significant changes in the way we do things.

We are going to have to drive smaller automobiles and live in better insulated homes which may end up costing more. We are going to have to accept cogeneration of electricity rather than the conventional way we generate electricity. We are going to have to ban nonreturnable bottles. We are going to have to rely more heavily upon public transportation than we have in the past.

Those all represent major changes in the way we live, our relationships to our work, and in a whole variety of our social patterns of life.

Congress has been very reluctant, and the executive has been very reluctant also, to propose the kinds of financial incentives which would lead people to make those changes, because change is very difficult. I think the time has come when it is the responsibility of the Federal Government to move very strongly in this area, and to legislate some of these kind of changes.

Senator PERCY. May I ask each of you to address a response in writing to that question. We have to face these problems. We dealt with it at great length with Mr. Carter yesterday in the 8-hour meeting we had with him. I discussed the subject of energy again this morning in an hour-long meeting with Mr. Schlessinger. I think your testimony would help us.

Mr. Kauffmann, would you tell us what the attitude of Exxon is on conservation; and also what you know of the attitude of other oil companies. Are they positive toward conservation efforts in the national interest, taking into account your job is to sell fuel?

What has been the attitude of oil companies?

Mr. KAUFFMANN. Thank you, Senator. I don't think there is a conflict of interest here. I believe it is generally perceived among those companies that do long-range planning with respect to prospective energy sources, that there must be conservation.

I have heard no conflict on that. Our own company has strongly urged both the Government and the public for a long time, to begin to think seriously about conservation. You weren't here earlier, but in making the forecasts that I did of our import volumes will be, say, for the period through the 1980's—and I will refresh your memory—I forecast there will be an import volume of about 12 million barrels a day in 1980, continuing right on through the 1980's.

Now, we are forecasting when we make those kind of estimates, that there will be substantial conservation finally arrived at in this country through Government action as well as market action. It is going to take much persuasion and much——

Senator PERCY. But you think it is going to take Government action?

Mr. KAUFFMANN. Yes.

Senator PERCY. Do you think much has to be done to create a favorable climate of public opinion?

Mr. KAUFFMANN. Absolutely. Certainly true.

Senator PERCY. Our failure to act is perhaps due, for example, to the fact that CB radios are being sold to outwit and frustrate and beat the law, to warn people where "Smokey Bear" is, so you don't have to observe the 55-mile an hour limit.

The attitude that it is smart to beat the law.

We never did things like that in the war. This is in effect an economic war we are in.

I would like to ask you what you know to be the attitude of the OPEC producing countries toward conservation. I have heard it directly from every single one of them, but I would like to have you tell us in this testimony what their attitude is toward it, and also comment on Israel's attitude toward conservation in this country making us less susceptible to political pressure.

Mr. KAUFFMANN. I think I can do that quickly by simply saying as far as I know, foreign observers generally wonder why we are so slow in cutting off what they consider to be excessive use of energy in this country, and why we continue to, in effect, prop up these high prices that OPEC charges by continuing to place very high demands on these resources. And therefore, soaking up what available spare capacity, of fossil fuels, exist in the world today.

Senator PERCY. Finally, Mr. Kauffmann, I did invite you to a meeting that I held a month ago of companies, organizations, groups that I felt would be interested in discussing the feasibility of launching a new national organization, the Alliance to Save Energy. You were unable to attend yourself. But you did send a very high-level official of your company; and he made a valuable contribution for which I am grateful.

I thought you would be interested in knowing that Dick Lesher, president of the U.S. Chamber of Commerce came; AFL-CIO sent at top officer; General Motors did, Mobil, you did, League of Women Voters, a raft of top representatives; Harvard, MIT; Friends of the Earth; Sierra Club; individuals such as Barry Commoner, Jacques Cousteau, and Robert Redford. All indicated an interest in forming a new national organization devoted entirely to conservation.

Currently there is no such organization.

Do you feel that this is a worthy effort and a needed effort to create the kind of climate in this country so we can move toward a stiff, effective, conservation program consistent with President-elect Carter's pledges?

Mr. KAUFFMANN. Yes, I think it is essential that we get on, Senator, with a change in attitudes and a change in effort toward conservation.

Senator PERCY. Ms. Carter, I am really talking about energy conservation. I am not talking about not maintaining economic growth. I am talking really about using energy more efficiently, not simply curtailing energy consumption.

Would you care to comment on that?

Ms. CARTER. Yes. I had one strong impulse during this last 10 minutes of discussion; and that is to emphasize that conservation—I feel conservation is important, essential; and we should get on with it; but I think in trying to get on with it, we must recognize the distributional effects, the income distributional effects of rising prices of energy, commodities, and those things that are energy-intensive.

I think one of the reasons that we have hesitated to do some of the obvious things to conserve energy, like raising gasoline prices, is that we don't like to hit the low-income public with higher costs. I think that that is really quite humane and very sensible of us.

I think that we will be successful in implementing a conservation effort to the extent that we raise prices and compensate those who cannot afford to pay the increased prices. I think it is terribly important to put that package together, otherwise the poor, the elderly, the labor unions, whoever will come along and say, oh, you say you are trying to conserve, but you are really trying to redistribute to the benefit of the oil companies or whoever is opposed to us.

I think simply——

Senator PERCY. It is possible that a gas tax could be associated with a rebate for low income people.

Ms. CARTER. With a rebate for every user or for every user who needs it?

I think that simply there are differential effects on industry. Industries that have heavy energy requirements will tend to take it on the lam and may have to lay off people; and that kind of thing has to be watched so that you don't immediately put people out of work and companies out of business. I think this has to be done. I think prices have to go up. I think you can't—just because of the CB radio experience—you cannot rely on moral suasion right now. It just doesn't look as though it works, although I——

Senator PERCY. I am sure my time is running out. I would like to make this request of you.

Would each of you, with the unique backgrounds you have, give us in writing your suggestions as to what this country's conservation program should look like and what our goal's should be; and I can just assure you that not only will we benefit tremendously from it, but I will see that Mr. Schlesinger receives your answers.

The last question I would like to also ask for the record—because I think my time is up——

Representative BROWN of Ohio. You can ask your last question.

Senator PERCY. I will ask the last question. Possibly, Mr. Sewell, you could respond or anyone who would like to.

A recent report from Oak Ridge National Laboratories based on research funded by the Federal Energy Administration and ERDA shows that in the residential sector our consumption of energy need be no higher in the year 2,000 than now, yet conventional wisdom has us consuming energy at the continuing compound rate of 2.8 percent per year, which just gets us into a staggering usage figure.

Do you agree that there is a gap between the conventional wisdom on conservation and the latest research?

Mr. DAVIDSON. Can I answer?

Senator PERCY. If your answer would be over 20 seconds, why don't you give it to us in writing. You can give me a yes or no.

Mr. DAVIDSON. I think it is a false issue you are raising. Your lack of statistics would suggest that we are not running out of oil or gas. One could change one's lifestyle which is another thing completely.

Representative BROWN of Ohio. Domestically or worldwide?

Mr. DAVIDSON. Domestically. I have a study done by two people at the Institute of Gas Technology, Chicago, which gives statistics on reserves, et cetera, and forecasts the demand for the United States. It will show you what the available—if you did this one thing. Suppose you even assumed by the year 2000 we are going to have used up all

our oil and gas and we had to provide energy strictly by a synthetic new fuel of some sort, at $16 a barrel in current 1976 dollars. You would find that the current price of oil and gas right now is too high to use up the entire demand—the available fossil fuels between now and 2000. The price of oil right now is too high, if you had backup technology we could provide you with synthetic oil and gas at $16 a barrel, in current 1975 dollars. We are not running out of fossile fuels.

Representative BROWN of Ohio. Yesterday we had testimony from the four witnesses appearing before us, Mr. Moran, Mr. Adelman, Mr. Lichtblau, and Mr. Meyer who agreed that excess capacity would be widespread between OPEC members by the end of the decade, that the capacity to produce had increased over what it was at the time of the embargo; and that even the richest OPEC countries would find their individual national development spending outrunning their revenues by the end of this decade.

It was agreed that the prospect then for cheating, that is, for undercutting each other on price of oil to be sold to consuming nations would be very tempting and that many OPEC members would have the capacity in their production to do that; and I would like to ask each of you to the extent that you are informed in this area whether or not that is the case?

Mr. Kauffmann, I understood your testimony, I think, because you indicated that there was no excess capacity in the producing countries for production; is that right?

Mr. KAUFFMANN. At the time that we were using those numbers we were talking about the forward period, generally this period through the 1980's. No, we don't see any surplus producing capacity during that period.

Representative BROWN of Ohio. Are you suggesting they are producing up to capacity at this point?

Mr. KAUFFMANN. No. Right now, when OPEC production runs about 33 million barrels a day, that is probably something like 3 million barrels a day short of all-out capacity. Some of that is what they call political spare, the kind of spare the countries had, prior to their recent actions, said they didn't want to use. Some of that was in Kuwait, for example.

As we look forward to the continued growth, using a number like was used a minute ago, about 3 percent a year, our estimates are that spare capacity that otherwise would exist in OPEC is going to be used up by, say, 1985.

Representative BROWN of Ohio. Are you talking about productive capacity in excess of worldwide demand; is that right?

Mr. KAUFFMANN. That is right.

Representative BROWN of Ohio. Now, could you respond to Mr. Davidson's comment that there is no lack of productive capacity in this country?

Mr. KAUFFMANN. Yes. I thought Mr. Davidson was saying that there was spare capacity available to the industry in this country. And he—we just have a completely different view on that.

There is no spare capacity available to the industry in this country. We have been running less—we have been running more crude through our facilities than we have been discovering for some time.

Representative BROWN of Ohio. We also had testimony yesterday that there was no foreseeable alternative source in the near-term that would come in cheaper than the present cost of oil.

Now, one of you testified this morning, I believe, that there would not be substitutes at a lower price. Mr. Davidson says that there will be substitutes at a competitive price, I gather at the $16 price. Mr. Sawhill used a hypothetical example of prices decreasing to provide for the possibility of a substitute. Would you each comment on whether or not you think there are immediately available or available in the near-term substitutes that would push out domestic—push out our demand for OPEC oil?

Mr. SAWHILL. Could I just make a comment on your previous question to Mr. Kauffmann?

I certainly agree with his answer. I think the confusion is between the short-range knowledge and the long-range knowledge. In the short term there probably is excess productive capacity. If you look out to the next 15, 20 years, it is clear there isn't unless vast new reserves are discovered that we have no geological indication would be.

Representative BROWN of Ohio. You would differ with Mr. Davidson's comment?

Mr. SAWHILL. Very sharply, yes. I think this is well borne-out by the analysis of demand. If you look at the per capita use in the less-developed countries, and you project that into the future—and projecting the current per capita use is highly unlikely because these countries are becoming more and more developed—you find that there's an excess demand, and if you project an increasing per capita use in these less-developed countries to somewhere near the level of the U.S. today for them by the year 2,000, then you find that there's a very, very large gap between demand and supply on a worldwide basis.

Representative BROWN of Ohio. I think it was Mr. Sewell who said this morning that the oil to be discovered in the future will be in non-OPEC nations. I thought that was a fascinating comment. The North Sea oil coming in, the possibility, I suppose of—we heard that rumor recurringly that there is oil off the coast of South Vietnam.

The question I have is how long would oil discovered anywhere in the world wind up in the hands of a non-OPEC nation? In other words, wouldn't any producing nation quickly jump into the OPEC cartel?

Mr. SAWHILL. Noncommunist, yes.

Representative BROWN of Ohio. Does everybody agree with that?

Mr. SAWHILL. That has certainly been the experience.

Mr. DAVIDSON. They may not join OPEC legally, but they joined it informally in essence.

Representative BROWN of Ohio. Now we talked about one method of reducing demand, conservation. Do all of you—what is your view about the advantages of our producing through the Federal control on the price of oil a subsidy to OPEC to give us high consumption rates at lower prices, as opposed to the conservation effect of the world price of oil or increased price of oil?

Ms. CARTER. I guess you commented to this a moment ago by suggesting that maintaining artificially low prices in terms of the world-

wide OPEC price level does stimulate increased consumption in this country?

Ms. CARTER. No. Raising prises decreases consumption.

Representative BROWN of Ohio. I said maintains artificially low prices, stimulates consumption, does not encourage conservation; is that correct?

Ms. CARTER. Yes.

Representative BROWN of Ohio. Do the rest of you agree or disagree?

Mr. DAVIDSON. I disagree they are artificially low prices. Clearly if you raise prices people will buy less. Still people are very insensitive to price. You have to raise prices very high to get a very small reduction in demand.

Representative BROWN of Ohio. I understand our change in demand from the preembargo price level to the postembargo price level was in the nature of an average consumption growth rate of 3.6 prior to the embargo and it's now 2.8. You don't consider that to be a significant change in demand?

Mr. DAVIDSON. Not for a 400-percent change in price, no, sir. That's a tremendous change in price.

Representative BROWN of Ohio. Do you think it is not a significant change in demand?

Mr. DAVIDSON. I don't think it's a significant change in demand given the lower real growth in GNP since the embargo.

Representative BROWN of Ohio. There seems to be about a 25-percent reduction in the growth of our demand in this country?

Mr. DAVIDSON. But a 400-percent increase in price. If you want to reduce it again you would have to give another——

Mr. SAWHILL. This again is a short-term long-term issue. These prices have only been higher for a relatively short period of time, not really long enough for a major turnover in our automobile fleet, a major retooling of our industry, or a major insulation of our homes. It is unfair to compare the effects of the price change such as the 400-percent price change, and the reduction in demand, because that only shows the short-term impact.

I believe the impact on the longer term will be significantly greater.

Representative BROWN of Ohio. Would you agree, Ms. Carter?

Ms. CARTER. Yes. But we haven't had a 400-percent increase in domestic prices.

Representative BROWN of Ohio. You had a 400 percent increase—I don't want to defend Mr. Davidson—a 400-percent increase in world prices.

Mr. SAWHILL. The price of gasoline has gone from 35 or 36 cents up to 60 cents. It is really double.

Mr. DAVIDSON. Good point, thank you.

Representative BROWN of Ohio. In the discussion of the incentives to stay with the same sources of production or rather the constraints against switching to Saudi oil from some other supplier that might be higher priced, we discussed—I think you testified on the quality of the oil; but I would like to ask Mr. Kauffman again about the nature of the contracts which an oil company ordinarily writes or ordinarily is involved in with reference to its suppliers. Are there contractual constraints that oblige a company to be supplied by a higher priced supplier?

Mr. KAUFFMANN. No; not generally, Congressman. I think each company—certainly we do—makes a lot of long-term contracts. But we always maintain some flexibility out at the periphery of our buying, too. I suspect everybody is in about that same situation.

Representative BROWN of Ohio. When you say a long-term contract, to what do you refer?

Mr. KAUFFMANN. It can be as much as 5 years, generally less than that, maybe a year. Everybody, I think, every major buyer of crude oil is also buying some of what they call spot, trading on the instantaneous market.

Representative BROWN of Ohio. In addition to following such usual market practices then in shopping for the contracts and in buying the spot market, what is Exxon doing? You are, I guess, the largest oil company in the United States; aren't you?

Mr. KAUFFMANN. Yes, sir.

Representative BROWN of Ohio. In terms of supply of the domestic market, at least, what are you doing in terms of shopping around or encouraging cheating, if that is not an unfair term, among the supply nations, the producing nations in the Middle East or in the whole OPEC framework?

Mr. KAUFFMANN. Congressman, we will be aggressively pushing Saudi oil and we will be tending to use more of it ourselves.

Representative BROWN of Ohio. Pushing? What do you mean by that?

Mr. KAUFFMANN. To sell it. After all, we sell the oil, too, as crude oil. All the Saudi crude oil——

Representative BROWN of Ohio. You will not only be buying it for your markets but for provision to other markets?

Mr. KAUFFMANN. Exactly.

Representative BROWN of Ohio. Do you have any evidence that other American-based oil companies will be doing that?

Mr. KAUFFMANN. No, I don't have any evidence that they will. I would be very surprised if they wouldn't.

Representative BROWN of Ohio. Do you think Professor Adelman's proposals on the import ticket arrangement would encourage that cheating or discourage it?

Mr. KAUFFMANN. I don't think it has any impact on it. That cheating isn't going to be done secretly.

Representative BROWN of Ohio. The suggestion was that the pressure of concern about meeting their economic development requirements in the OPEC nations, in particular in the Middle East OPEC nations, and keeping their real income going up even though they might sell a little less oil, the price of that oil would go up fast enough that their real income from the oil would go up, that the pressure to keep up with their economic development in those countries would encourage them competitively to buy those import tickets or encourage somebody else to buy them and then discount their oil to the purchasers of those import tickets so that they would have a chance to get better marketing arrangements.

Does the import ticket arrangement encourage that in your opinion, or all of you, if you would like to comment on that; and does it encourage it more than the current purchase arrangements by which oil is purchased by American firms?

Mr. KAUFFMANN. Well, Congressman, my answer is that I don't think the import ticket has any impact or would have any impact on that at all. What encourages switching of suppliers is seeing a difference in price. That's exactly what Saudi Arabia has provided. That is what will encourage people to switch their purchases.

Mr. SAWHILL. If I could answer that question, I think the proper answer is that we really do not know, and what I have suggested is that we should do is try to find out; and the way to find out is to perhaps experiment with a ticket arrangement for the purchases for the national stockpile. Until we do that, the discussion is going to be hypothetical. There are going to be arguments on one side and arguments on the other; but until we really try it out, they are only going to be theoretical arguments and we are really not going to have the basis for making a decision about whether some kind of a government oil-purchasing arrangement, which might include import tickets or might include a variety of other bases for making these purchases could really work.

Representative BROWN of Ohio. Won't that cause an economic problem for us, though, to purchase oil for that stockpile from an OPEC country as opposed to purchasing it from a domestic supply administered by either a U.S. company in the United States at the old price, say, the $5.25 price; it seems to me you would save the taxpayer a little bit if you did that. Or getting it from Pet-4 at a free price because it's a nationally owned supply.

Mr. SAWHILL. If we wait to get it from Pet-4, we are going to have to wait a long, long time. I think we need to stockpile longer than that.

The second point I want to make is perhaps we ought to leave that old oil controlled price available to the American consumer rather than force the American consumer to buy the higher cost Middle Eastern crude.

Therefore, the higher cost Middle Eastern crude could be used for the stockpile rather than diverting the low-cost control oil from the U.S. market into the stockpile.

Ms. CARTER. I just wanted to comment on the question of whether the OPEC countries would be using all their surplus for their own economic development. I question whether they will on a continuous basis to be able to absorb their surplus through the 1980's. I think that there are lumps in investment when they really need more than their surplus, as Iran does now, but they are not likely to be able, just because of their absorptive capacity, to grow at more than 13, 14 percent a year.

Representative BROWN of Ohio. Mr. Sewell?

Mr. SEWELL. The import ticket is not my area. I think the question of whether the OPEC countries are going to have a financial surplus at their availability is a key one. If you look at Ted Moran's estimates, then their ability to finance their own development programs, their own armament programs, so forth and so on, is going to diminish rapidly.

Representative BROWN of Ohio. Would you concur with that?

Mr. SEWELL. It is based upon a detailed study he is carrying on. I am not qualified to do more than judge what he is doing. It is a key, it seems to move to the whole set of relationships for the developing countries. It will govern how they will be to developing countries.

that is, if they are only able to pay for some portion of their own needs, both military and economic, and their ability to respond to the other countries is going to be much more limited than it has been in the last 3 years.

Representative BROWN of Ohio. His indication yesterday was that there is also a competitive nature between the countries within the Middle East and OPEC, that the Saudies and Kuwaitis were a little nervous about the Iranians and so forth.

Mr. DAVIDSON. If you are going to play an import ticket game in the hopes of splitting the cartel, you want to rig the rules of the game in your favor. The way to do that, it seems to me, is not only permit them to sell but give them duration contracts. The more that the seller is willing to cut the world price, the longer the duration. You might even be willing to pay 2, 4, 5 years in advance, minimum quantities, from a seller if he will sell it to you at $10 a barrel or $9 a barrel.

If he has any fear that the cartel will break in the next 5 years, then he has an incentive of assuring the market with a fixed price for 5 years, you see.

So the object then would be not only to have the offer, but so make it that anybody who cheats is in a sense guaranteed a certain amount of wings for cheating. If you can create that kind of incentive, then the probability will be that they will cheat. If it means that 3 years down the pike you have to pay $9 for oil and the world price is now $7, that is a course of economic warfare which the U.S. ought to be willing to do in reducing the prices asked by the cartel.

Senator KENNEDY [presiding]. I apologize to the panel for being absent.

I was wondering, Mr. Kauffmann, if you are familiar with the very sizable increase in the cost of home-heating oil in my part of the country over the past 6, 7 weeks.

Mr. KAUFFMANN. I am not intimately familiar with prices, but——

Senator KENNEDY. But if there has been a significant price increase?

Mr. KAUFFMANN. I know the general trend up or down.

Senator KENNEDY. As I understand it, the increase in price that was agreed to by the OPEC, will not impact the United States until, as I understand, sometime in late February or March; am I correct?

Mr. KAUFFMANN. No, I don't think that is right. I suspect, Senator, what has been happening in your part of the country is really that the market has certainly—the market forces have been those that have been driving the prices up. I would expect that the prices have responded to the weather.

Senator KENNEDY. Why did they respond to the weather if you have enough product?

Mr. KAUFFMANN. They do every winter.

Senator KENNEDY. Why do they? I know they do every winter. Every homeowner in Massachusetts knows that; but I thought supply had something to do with it.

Mr. KAUFFMANN. Supply can have something to do with it. But I believe that——

Senator KENNEDY. Is there a shortage of supply?

Mr. KAUFFMANN. I have not heard of any outages of supply, so far, in the New England States.

Senator KENNEDY. You haven't heard of what?

Mr. KAUFFMANN. Outages in the New England States.

Senator KENNEDY. What are "outages"?

Mr. KAUFFMANN. Shortages of supply. We are talking distillate fuels I assume.

Senator KENNEDY. That is exactly what the people up in my country, independent fuel dealers, distributors, say. They say there is no shortage of supply. The major oil companies are taking advantage of a particularly cold winter. They are in effect reaping the benefits on this.

How do I respond to that?

Mr. KAUFFMANN. I am not aware that prices have risen really more sharply this winter than in the past, Senator.

Senator KENNEDY. They are about 10 percent since June of this year even by the FEA figures. As you are probably aware, on the vote that we had last year we tried to work out a triggering device to permit greater flexibility in prices for the independent fuel dealers. The FEA figures show prices increased by 10 percent since last June; and the figures that we have heard from the communities around my State, generally throughout New England, were significantly above. Even those that were mentioned by FEA.

When I was interviewed on television, I asked those people that were paying more than the FEA price to get in touch with my office. The phone hasn't stopped ringing over the period of the last 2½ days.

When we checked back, they say there is no shortage of product, but that there's a significant increase in price as you quite rightly pointed out that always comes around the wintertime. I just can't see why if there is no shortage of supply, there ought to be those kinds of increases in the price.

Mr. KAUFFMANN. You must have more recent data than I do, Senator.

Senator KENNEDY. From last year, January 15, 1976, to this—January 13, 1977, there's a 10.6 percent increase in the wholesale price; 8.4 percent in the retail price.

I am interested whether you had any special information about this?

Mr. KAUFFMANN. No, I just haven't kept up with the prices up there.

Senator KENNEDY. Would you take a look at it?

Mr. KAUFFMANN. I would be happy to.

Representative BROWN of Ohio. Would you yield and let me ask a question?

Why would the retail price go up more slowly than the wholesale price?

Mr. KAUFFMANN. I don't know how the two prices have been measured.

Representative BROWN of Ohio. Would you comment on that when you look at it? I would be curious to know.

Mr. KAUFFMANN. Yes.

[The following information was subsequently supplied for the record:]

EXXON CORP.,
New York, N.Y., January 25, 1977.

HON. EDWARD M. KENNEDY,
U.S. Senate,
Washington, D.C.

DEAR SENATOR KENNEDY: At the January 13th hearings before the Subcommittee on Energy of the Joint Economic Committee, you asked several questions about the price of heating oil. You expressed concern that heating oil prices have risen over the past year, particularly since last summer, and questioned why prices rise seasonally each winter. This letter is written to amplify the answers I gave at the hearing.

Our data show, for example, that wholesale prices at the suppliers' loading racks in Boston have been:

	Cents per gallon	
	Exxon	Industry excluding Exxon [1]
Jan. 15, 1976	31.2	32.1
June 15, 1976	31.2	31.2
Jan. 17, 1977	34.7	35.7

[1] Exxon estimate.

We believe these price changes have been fully justified and are predominantly a reflection of higher supply costs incurred. Within the past year, and particularly in the last six months, there have been four major components of the higher supply cost:

1. The cost of seasonal storage is reflected, with this including tankage expense and the cost of working capital tied up in the product for an average of six months storage. Although only a portion of the winter's consumption of heating oil has to be stored from summer production, the overall storage cost is substantial.
2. The higher cost of product imports must be covered. The U.S. East Coast is partially dependent on product imports during the winter to provide adequate supplies. This dependence increases in an abnormally cold winter such as the current one. Imports are made from foreign crudes and cost 7 to 8 cents per gallon more than domestically manufactured products.
3. Heating oil manufacturing costs are higher in the winter than in the summer. In a colder than normal winter, manufacturing costs rise further since increasingly costly manufacturing steps are required to meet the higher demands.
4. Crude prices for domestically produced products have risen because of the steadily increasing percentage of crude supplies which are imported and due to the slightly higher prices allowed on domestic crude oils. In Exxon's case, the increase has been more than 2 cents per gallon in the last year.

In summary, the 10 percent increase in wholesale prices from last summer to the present seems to reflect largely a combination of higher supply cost elements rather than increased margins.

Looking back at the seasonality of heating oil prices (as quoted in publicly available data for the eleven seasonal years 1960–61 through 1970–71), we found that the seasonal increases averaged about 8 percent. Of course, in those earlier years imports cost less than domestic supplies, so the influence of factor 2 above was actually to moderate seasonal price changes.

The summer/winter cost difference which Exxon experiences appears to be reflective of the experience of others. In fact, many resellers who own seasonal storage have often sought to keep their purchases from us at a low level in the summer, apparently reflecting an economic preference for winter supplies based on their own cost experience.

You also inquired as to whether FEA data which you had, reflecting a 10.5 percent increase in wholesale prices and 8.4 percent in retail prices, were correct. Although we cannot verify the figures exactly from FEA data or our own, the percentages appear to be generally correct. With reference to Rep-

resentative Brown's query, our data indicate that industry prices have increased virtually the same amount in cents per gallon at both wholesale and retail levels. Thus, the retail percentage increase is lower than the wholesale percentage increase since the net increase is being divided by a larger number.

You may also be interested in Exxon's pricing in respect to various geographical areas. At the present time our wholesale prices are as follows:

Local:	*Cents per gallon*
Boston, Mass	34.7
New Haven, Conn	34.6
Brooklyn, N.Y	34.5
Baltimore, Md	34.4
Charlotte, N.C	34.3

The differences in the figures are close to the differences in transportation costs of the various destinations. Quite importantly, I should like to stress that Exxon's Boston customers are not discriminated against; a real effort is made to assure absolute fairness in our pricing schedule.

Lastly, with reference to heating oil volumes, Exxon USA announced on January 19th that it would be making additional heating oil available to its customers to meet increased space heating needs caused by unusually cold weather. The added volumes will represent an average increase of about 17 percent over the first quarter volumes provided for under existing contracts. To provide these additional supplies the company has been incurring higher cost refining operations and is increasing its product imports, both of which steps tend to marginally increase our wintertime cost base.

In developing this information with Exxon Company, U.S.A., our affiliate responsible for U.S. heating oil pricing and supplies, it has been evident that cost pressures are currently substantial, with the January 1st OPEC crude price increase being a notable one. Additionally, market forces always play a leading role, and this year are manifest with the winter to date an extraordinary 24 percent colder than normal.

I hope this material is fully responsive to your inquiry and also indicates that Exxon genuinely seeks to be a responsible and dependable supplier. I will be replying in the near future to other questions asked at the hearing, but recognizing the keen current interest in heating oil, wished to reply as early on this topic as the material became available.

Very truly yours,

HOWARD C. KAUFFMANN,
President.

Senator KENNEDY. One of the things that was mentioned earlier was, as I understand, that Saudi Arabia has indicated that they were going to try and determine how its lower-prices are being passed through to the consumers. Sheik Yamani made some statements and comments on that.

I don't know whether you had any idea about what sort of expectations you contemplate from Saudi Arabia to pursue that. Are you aware of the comment or statement?

Mr. KAUFFMANN. I am aware of the comment that's been made. If I remember correctly, the words were along the lines that he wanted to establish a special auditing procedure to be sure that succeeding sales of the crude oil, surplus crude oil—actually moved at these same government established prices.

Now, we have no direction yet as to how he intends—or how they intend that that ought to be conducted. I presume we will be getting that.

Senator KENNEDY. How would they be able to do it unless they had some opportunity to examine the books?

Mr. KAUFFMANN. It might require affidavits from succeeding buyers. I just don't know, Senator, how they intend to audit that.

I believe also, to complete that, in the announcement put out in the Middle East, there was also a comment about suggesting that European

governments cooperate by assuring that the savings were in fact passed on; and again I have no information other than just that statement that was in the announcement.

Senator KENNEDY. Well, would you have any problem whatever way or process that the Saudi Arabian Government is going to try to initiate to try to carry forward that statement by Yamani? If it's in affidavits or inspections of books, would you have any problem in giving similar information to the United States Government?

Mr. KAUFFMANN. Well, I don't know what it would be, Senator.

Senator KENNEDY. Well, whatever it is.

Mr. KAUFFMANN. Excuse me. I don't know what he is going to require from other people who purchase. As far as we are concerned, no. But of course, I don't know what he will require from other people.

Senator KENNEDY. As far as your company policy, whatever they require, you would be willing to share it with the U.S. Government; is that right?

Mr. KAUFFMANN. Yes, sir.

Senator KENNEDY. Senator Proxmire?

Senator PROXMIRE. Well, I want to say, first, Mr. Chairman, I asked questions before. I am impressed by this excellent panel. I am particularly happy to see my old friend, John Sawhill, back. He is a marvelous witness. He is intelligent and articulate and thoughtful.

I say that in advance of saying that I am surprised at your reaction, Mr. Sawhill, to the position that Mr. Davidson took on the elasticity of demand on price.

In other words, the notion that in the—as I understood you to say in the short run you don't get as much of a reaction, but in the long run, if the price goes up, you get a reduction in consumption. It seems to me exactly the opposite.

When we had the big increase in 1973–74, there was a drop in demand. Now that we have had a doubling of gasoline prices at the pump, we had an increase last year that was just about as big as it had been before. Not much real effect. As you know, people aren't buying—for a while they were buying small cars.

Now the company in Wisconsin, American Motors, which has been in the vanguard of pioneering the small cars is in very serious trouble because people aren't buying the small cars. They are buying big cars. There was a concern about insulation. This terrible winter we are suffering from the northern part of our country, there seems to be far less interest than there was before, in 1974, in insulation.

I don't see this long-term adjustment. It seems once the price goes up, there is a short-term reduction in demand; and then we go right back on the old wasteful pattern.

I am inclined to agree with Mr. Davidson's implication. I will say it. If we had an increase to a dollar a gallon, you would have a sharp cut to begin with, and then I am afraid we would find ways of going back. You would have maybe a 4, 5 percent long-term reduction.

Mr. SAWHILL. If that is true, Senator, then you should take a look at European countries—Sweden is a good example—where you have significantly higher prices than the United States, and a significantly more energy-efficient economy. I think you have to attribute in part to the fact that there has been this significant price differential.

Senator PROXMIRE. Maybe in part, but there are all kinds of differences between the Japanese economy, the Swedish economy, and the American economy. Those countries are much more compact; they are countries that have been traditionally less mobile. The automobile has played a far less part in their society than it has in this country.

Mr. SAWHILL. Yes, but even the part the automobile plays is a much more efficient energy automobile. One of the big differences frankly is in the efficiency with which they heat their homes. Sweden certainly has a more severe climate than the United States. It is this emphasis on conservation that I think is ingrained after a long period of high prices. I am not trying to say that I categorically think the only conservation measure we should take should center around price. I don't think it should.

On the other hand, I don't think a conservation program can neglect prices. I think Professor Carter made a very useful point this morning in saying we have to be careful of the redistribution effect of prices.

Senator PROXMIRE. I would like to go to Professor Carter on that one.

I think you are absolutely right. It would be very unjust, and it would be politically impossible for us to have a big increase in the price of gasoline unless you provide for some kind of a refund so the people who drive to work and have jobs that pay then $5,000, $6,000, $7,000 a year would be able to get to work.

In my State and in almost all States, a lot of people have to drive to work, no matter whether they would like to get in carpools or mass transit. They can't do it. If they live on a farm, what can they do?

It is when you have a refund that you lose a big part of your increase in price. You don't get the adjustment that you need. So you say, well, maybe people will drive less on vacations. That's what you want to get at.

In our State, the third biggest industry is the recreation industry. That's true in many parts of our country. That would be devastated by a big increase in taxes. It would only permit people to get to work and back, maybe to shop.

There are very, very tough economic, political, constraints against our having an effective price conservation policy; although Senator Percy's very eloquent on it. It seems to me that no matter how hard President Carter—is he a relation?

Ms. CARTER. My son has a good way of approaching this: He meets anyone in the street and he says, before they have a chance, "Are you related to Jimmy Carter?" [Laughter.]

Senator PROXMIRE. Regardless whether the Congress is willing to take unpopular action, it seems to me this is going to be necessary.

Ms. CARTER. I agree it is going to be very, very tough. I do believe with President Sawhill that these situations should be overdetermined. You can't just rely on prices. For example, there is the situation of mandating automobile mileages. I think that is a good idea; but I think that these should be accompanied with programs for gradually decontrolling gasoline prices and for compensatory payments to the people who are worst hurt along the way.

I do think that the effects on business may be worse than the effects on the consumer in the sense that business will lay people off: the hotels will lay off the waiters, and whatever. This is harder on consumers than paying more money. There is no easy solution.

On the other hand, I don't see us consuming at $5 a barrel gasoline price levels over the next 25 years when the price of gasoline is realistically much higher.

Now, my colleague down the table says it isn't realistically much higher. If it isn't, then we don't have a problem. But so far it seems to be. I agree it is very difficult.

I think that we should be taking nonprice measures at the same time; but if the price doesn't rise, sooner or later people will say rationing is fouling us up, and we have to stop that; and we will rely on the market again.

Senator PROXMIRE. This really, really has to be the heart of our response to OPEC, doesn't it? As long as we don't get some kind of limitation on our demand, as long as we waste energy at the disgraceful rate we are, both in our heating and in our automobile use, we are going to be victimized, and we are going to, of course, more seriously, hurt the LDCA's.

Mr. SAWHILL. Senator, I think the point is if we continue to be victimized, prices are going to go up very rapidly. So those people in Wisconsin are going to end up paying higher prices any way. The question is are you as a Senator going to impose them, via taxes which can fund the research and development we need to do and perhaps fund some of the improvements in public transportation we need to make, or is that money going to go out of the country to OPEC?

The prices are going to go up in any event. The people in Wisconsin are going to pay more. The question is, who are they going to pay more to: The United States, and improve our own standard of living, or is it going to go out of the country?

Senator, I have to excuse myself, if I could.

Senator KENNEDY. We are not going to let you go, John. [Laughter.]

You are excused. Thank you very much. Nice to see you.

Mr. DAVIDSON. I think you have now put your finger on what the energy crisis is all about. It is not about the shortage of fossil fuels. It is about a redistribution of income and wealth from consumers to producers. The price of oil and gas does not reflect the real cost of production.

If we can get that price down to what are the real costs of production, then we can have lower prices. Mr. Sawhill speaks about Sweden, Scandanavia, and so on. That's a difference in lifestyle. Adam Smith a long-time ago told us the whole purpose of economic activity is consumption. We are a rich country and we provide a good standard of living by permitting our citizens to consume a lot. That's what makes the American lifestyle the dream of the rest of the world.

If we were running out of oil, then certainly you have to constrain yourself. You can't give up something that doesn't exist. Why should we self-embargo ourselves, so to speak, because the problem is not one of resource shortage, but of manmade shortage, of energy redistribution, not only between the United States and OPEC, but we should remember that we are not only the largest consuming nation in the world, but we are also one of the largest producing nations in the world.

There is a large distribution of income going on within this country.

Senator PROXMIRE. Mr. Davidson, your solution, then, is the breaking up of the oil companies; is that wrong or right?

Mr. DAVIDSON. My solution is either you break the cartel and break the oil integration horizontally and vertically as part of the program; or you agree the consumer will pay a tribute for the monopoly that has been developed by multinational corporations and producing nations. You have to choose. That is the fundamental choice.

If you wish to pay that tribute and say, yes, oil is $10 a barrel, and there is no getting back to $3, even if it only costs $3—as Professor Adelman told us 20 cents to a barrel, we are going to pay $10, and act as if it cost $10, we are going to conserve.

Senator PROXMIRE. Can you document and get other economists to document the contention that if we did break up the oil companies that it would reduce the price, that it would reduce somehow the cost of production?

They have given us advertisements overwhelmingly on television that show how you have to fit the whole jigsaw puzzle together. They come in time and time again in prime time and tell us how you have to have the integration between the pipeline, the refinery, and the distribution system.

They make the argument there are economies of scale. You are taking the position there are diseconomies, and if you break them up, you are going to be able to produce oil cheaper.

I haven't seen that case made very convincingly.

Mr. DAVIDSON. I try and at least indicate in my prepared statement why the so-called advantages are only advantages as long as there is a man-made constraint, that is in integration. We are not talking about breaking up Exxon into a mom-and-pop grocery store. If you broke up, according to the Hart bill that was before the Senate last year, if you broke up the majors, most of those majors would still end up being in the top 500, the Fortune top 500. We are not talking about——

Senator PROXMIRE. That is right. I voted for the Hart bill. I would again. I think it is right for all kinds of reasons. I just wonder if it would do all the things we are hoping. You can make a strong argument without the argument that this is going to reduce or hold down the price of oil significantly. You say it would?

Mr. DAVIDSON. I say it will. I say it will create incentives.

Senator PROXMIRE. Where are the incentives it would create? How would it do it?

Mr. DAVIDSON. It would create incentives because independent management would only look at its cost of its production and its opportunity to steal a good portion of the market of oil, if they can come in with substitute fuel.

Senator PROXMIRE. Mr. Kauffmann indicated although they made a windfall profit in 1974, their profits have been about the average of other firms since then.

Mr. DAVIDSON. That's right.

Senator PROXMIRE. Do you argue that you can show much greater efficiency so we can produce at a lower price if you have more units?

Mr. DAVIDSON. The costs which Mr. Kauffmann's company is unfortunately caught between is the cost of land. When the monopoly rents and the prices go up, what happens is you buy more land and you buy more reserves. You bid up the price and you pass down the monopoly profits from the producer to the landowner, OPEC nations. You see

OPEC doesn't produce the oil. They get the profits, or most of the profits. It is only the amount that Mr. Kauffmann can market to squeeze by between what the landowner is squeezing him, partly because he has contracts on some of his reserves which are fixed in money terms that gives him some profits. As he goes out and buys more land, if he's evaluating—he has to make a bid on land, even if it's Federal Government land. He evaluates how many barrels he thinks is on there. He evaluates the costs of drilling and exploring for it. Then he sees there is a certain profit per barrel of which I am willing to pay the landholder for x-percent of it. Then he is locked into that contract.

If the price of oil goes down——

Senator PROXMIRE. Yes; but if you have more firms bidding, if the competition is greater, why wouldn't the price of the land be greater?

Mr. DAVIDSON. Because some of these companies will be willing to take a lower profit. They will not have any problems with—if enough companies come in, the ability of the cartel to maintain control depends upon its ability to assure that the—that part of the production that is outside the cartel does not run off, so to speak, does not get too large. They can be reasonably assured as long as the internationals are dealing with them as well as they are dealing with the domestic. Mr. Kauffmann still has to worry about his Aramco lists, his requirements to take certain amounts, run it through certain refineries. He could not get into an economic war with Saudi Arabia. He would be very devastated.

If I had a well out off the coast of New Jersey and had no business contact with Saudi Arabia, I would get the price down.

Senator PROXMIRE. Mr. Kauffmann, what's your answer? We may very well have the Hart bill before us again. We would like for the record, and for my information, to know what your response would be?

Mr. KAUFFMANN. Senator, I am a very slow learner. I have had a lot of difficulty following some of these economic arguments. I believe part of the problem has been that we have been bouncing back and forth in this discussion between foreign situations and domestic. I think they are different.

Now, this question of surplus that I believe started this last discussion, I thought it was being asked in terms of a surplus in the United States and there we just have a difference of opinion. In my view, and in the view of the people that I have confidence, in their judgment, there is no surplus of oil or gas in the United States.

We have a very large shortage. We do have, indigenous in the United States, a very good fossil fuel, coal, that we are not using much of. If we use more coal it would go a long way, I believe, to providing a stimulus that Professor Davidson is looking for; that is an alternative. And would in fact, have a tendency to try to hold down the tribute that exporters of fossil fuel, that is oil, could extract from this country for their merchandise; but we are not doing that.

But I think it is wrong if we get away on a tangent that there are available resources of oil or gas inside this country that are not being produced. There are not. There may be some in the outer continental shelves that we haven't yet gotten to. I am sure you are well aware that there is a lot of pressure to step up that program; get into those

frontier areas; do the exploration work; find out whether or not there will be discoveries made, get on with the development.

We need to do that very rapidly. But this will not solve our import problem. They will help alleviate the pressure.

Senator PROXMIRE. Let me ask Mr. Sewell, while it is nice to talk about OPEC's concern for the developing countries and the United States should be more forthcoming in the council as a way of restricting OPEC's freedom to increase prices, isn't that really a form of self-delusion?

In the end, regardless of what we do, the OPEC States will make—I should say will base their calculations on what is preceived to be in their respective national interests Don't we really have to deal with the problem of the developing countries as such and not act on the assumption that those problems can somehow be linked with our own economic problems.

Mr. SEWELL. Senator, what I said was that relations with developing countries would be a small, if any, part of OPEC's decision on pricing. What I think is important to realize is that for political reasons, and I would maintain for psychological, cultural, and other reasons, OPEC consider themselves part of the developing world; and, therefore, the relationships with the developing world in general. of the same nature as their concerns about a settlement in the Middle East.

Senator PROXMIRE. Why can't we then persuade the OPEC countries to play a bigger part in providing credit to the LDC's?

I am aware that our banks have extended an enormous amount of credit to the LDC's. Some of the banks are having difficulties perhaps for that reason. Maybe they have gone too far. There probably will have to be more caution, which means the LDC's are going to be in even worse shape as time goes on.

Why can't the OPEC countries with their vast surplus, instead of putting them in the safe haven of the American banks and having the American banks be the fall guy, and the American taxpayer stepping in to save the banks; why can't the OPEC countries provide this kind of credit themselves?

Mr. SEWELL. I think there is. The debt problems of developing countries come from a number of factors, not only the price of oil. It is a world problem which has to be overcome. There is a role for the United States and other industrialized countries and for OPEC.

The problem is that we haven't been talking that kind of stance. we have preferred not to talk about it at all in the hopes that it will go away. One would hope that in the coming months that debt is high on the list of the priorities of the incoming administration.

I do not mean to imply that our actions or inactions, on the CIEC set of issues would determine what OPEC would do about pricing. They will feel some degree of constraints. How much constraint it is very difficult to be very specific about.

To go beyond that, if they are not very comforting in terms of—I am sorry. They may feel some degree of constraint to go beyond that. How much that is, it's not at all quantifiable.

Senator PROXMIRE. Well, I want to thank this panel very, very much. I think this testimony has been very helpful to us in an under-

standing of this problem. It is so different than the kind of problems we have been confronted with in the past.

As we know, it has an obvious effect on the price levels in this country. It has an effect on our employment.

Ms. Carter, I thought you have eloquently stated the effect the energy crisis has on growth here and something we should be most concerned with. I think the testimony will help us adopt a more thoughtful and effective policy.

Thank you very much. The subcommittee stands adjourned.

[Whereupon, at 12:55 p.m., the subcommittee adjourned, subject to the call of the Chair.]

APPENDIX

RESPONSE OF JOHN SEWELL TO ADDITIONAL WRITTEN QUESTIONS POSED BY THE MINORITY MEMBERS OF THE SUBCOMMITTEE ON ENERGY

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, D.C., January 26, 1977.

JOHN SEWELL,
Vice President, Overseas Development Council,
Washington, D.C.

DEAR MR. SEWELL: The Minority Members of the Subcommittee on Energy have requested that the following questions be submitted to you. The questions, along with your answers, will be included in the record of the hearings which were held on January 13th.

(1) The primary oil problem facing the Third World, if they are to be independent of foreign largesse, is how to generate the exports needed to pay for their oil. They will need capital to do this, and markets. Should we assist them by lowering tariffs? Should we encourage them to allow OPEC and Western capital investments?

(2) How long will it take the Third World to develop exports to pay for its oil imports, and can Western banks safely carry them along with loans until then? Are our banks over-extended?

(3) Are any of the Third World nations borrowing heavily without taking the necessary steps to eventually increase their exports to pay for oil? Are Western banks funding current consumption as opposed to investment? Can we expect Third World defaults and requests by banks for federal assistance?

We would appreciate your reply as soon as possible in order to insert the answers in the final transcript.

Thank you for your attention to this matter.

Sincerely,

JOHN R. STARK,
Executive Director.

OVERSEAS DEVELOPMENT COUNCIL,
Washington, D.C., March 30, 1977.

Mr. JOHN R. STARK,
Executive Director, Joint Economic Committee,
U.S. Congress, Washington, D.C.

DEAR MR. STARK: I have held off responding to your letter of January 26 with the three questions you posed until we had available the summary of the Overseas Development Council's Agenda 1977.

You may be familiar with our Agenda series which are annual assessments of the state of relationships between the United States and the developing countries. This year's Agenda brings out a series of proposals for new U.S. policies concerning our relationships with the developing countries. I am attaching to this letter the summary of the Agenda which you may wnat to consider enclosing with the testimony taken before the Joint Economic Committee on this subject. I think you will see the response to your questions concerning the impact of the energy crisis on the developing countries, the need for them to expand their trade, particularly with the developed countries, and finally, the ramifications of the pressing and growing problem of developing country debt.

Please let me know if you need further information.

Sincerely yours,

JOHN W. SEWELL,
Vice President.

Enclosure:

The United States and World Development

This summary is a condensation of the Overseas Development Council's fifth annual assessment of U.S. relations with the developing world. The full text of *Agenda 1977*, published by Praeger Publishers, includes:

■ An introduction by Theodore M. Hesburgh, Chairman of the Board of Directors of ODC, and James P. Grant, President of the Council.

■ "The United States and World Development, 1977," by ODC Vice President John W. Sewell, director of this year's *Agenda* project, providing the context and the background for the major policy questions facing the new Administration.

■ "Major U.S. Options on North-South Relations: A Letter to President Carter," by Roger D. Hansen, ODC Senior Fellow, outlining and analyzing three policy options for the Carter Administration: present policies with marginal changes, accelerated international reform, and support of a basic needs approach to development.

■ "Recommendations for U.S. Policy: Agenda 1977," by the ODC staff, suggesting specific U.S. policies on more than a dozen issues ranging from food security and human rights to arms transfers and the debt of the developing countries.

■ Five clusters of Statistical Annexes by Florizelle B. Liser: the global poverty-affluence spectrum; food, energy, and raw materials; world trade; world military expenditures; and resource flows.

Copies of *The United States and World Development: Agenda 1977* are available at $4.95 each from the Overseas Development Council, 1717 Massachusetts Avenue, N.W., Washington, D.C. 20036. A hardback edition is available from Praeger Publishers, Inc., New York.

Agenda 1977

"The industrial democracies should resist the temptation to see the current North-South dialogue as a situation in which losses are inevitable and negotiations are primarily designed to gain time or preserve the status quo. Rather, they should treat it as an extraordinary opportunity for initiating, in the words of President Carter, "a common effort"—which, by the end of this century, could create a world that not only better serves the already advantaged, but also is free of the worst aspects of absolute poverty and repression."

—Theodore M. Hesburgh and James P. Grant
Introduction, *Agenda 1977*

An open moment in history

The leadership of the United States passes to President Carter at one of those moments in history when circumstances combine to make change possible on a scale that was previously unthinkable. Developed and developing countries alike are recognizing the need for fresh approaches to solve the global problems that face them all—from food scarcity and energy shortages to nuclear proliferation and the plight of the nearly one billion people in the world living in abject poverty. The United States, under a President who bears no burden of prior identification with past disputes, has a unique opportunity to stimulate cooperation on global problems that no one nation can resolve alone. The question is, will the opportunity be seized.

In an unprecedented Inauguration Day statement to the "citizens of the world," President Carter pledged his Administration to "be more responsive to human aspirations" and to take the lead in the effort to guarantee freedom not only from political repression but from poverty and hunger as well. He called on other nations to join with the U.S. in "a common effort" to pursue these goals. What can the U.S. do now to signal its willingness to respond constructively to global problems? What shape might this "common effort" take? *Agenda 1977* analyzes and discusses these questions.

A rapidly changing world setting

The international order created after the Second World War has shown itself to be inadequate to changing patterns of economic growth and the increasing interdependence of nations. Both the developed countries of the North and the developing countries of the South agree on the need for a major overhaul of existing economic and political systems. This process of renegotiating the world order is already under way in a variety of forums, where a changing political climate is evidenced by the demands of the developing nations for a greater role in global decision-making. The U.S. has recognized that no one nation dominates the international scene and that it needs to treat its relations with the developing countries as a mainstream element of its foreign policy. It is also clear that the importance of U.S. economic relations with the developing countries continues to grow. The U.S. sells more of its goods to the developing countries than to the European Communities, Eastern Europe, and the Soviet Union combined (see "U.S. Trading Partners" chart, page 3), while developing countries provide it with both critical raw materials and low-cost consumer goods.

A new focus on basic needs

The developing countries as a group were well on their way to exceeding the 6 per cent annual growth target set for the 1970s when they were hit in 1974 with sudden and massive increases in the cost of essential imports such as oil, fertilizer, and food, and subsequently by a global economic slump. The stronger of these countries pulled through at the cost of reduced imports, diminished foreign exchange reserves, and a soaring national debt. The weaker required infusions of emergency aid and lost their chances for any significant development progress for the rest of the decade.

This dramatic change in development prospects hastened a rethinking of development strategies that was already under way. In the previous two decades, the developing countries experienced steady growth, some at rates unparalleled even in Western economic history. Despite this past record, the gap between rich and poor continues to widen today, both between countries and within them. If the per capita income of the world's forty poorest countries (population 1.2 billion people) were to grow at the rate of 3 per cent annually from now until the end of the century—which is highly optimistic—it would only then begin to approximate that of Britain and the U.S. in 1776. The old development strategies raised the gross national product of these countries, yet left almost a billion people living in chronic poverty.

A growing number of experts are coming to the conclusion that only major policy changes can bring about a change in the fortunes of the poorest fourth of humanity. The new strategies being proposed emphasize equity and the need to meet the basic human needs of the poor. Unlike the strategies of the previous twenty-five years, they assume that economic growth and greater equity in the distribution of its benefits are complementary, not contradictory. It is now thought that the right combination of domestic policies and reforms of international economic systems could overcome the worst aspects of chronic poverty by the end of this century.

Options for President Carter

It is essential that an overall policy for dealing with the developing world be established by the new Administration from the start. Already scheduled North-South negotiations must be prepared for almost immediately. In the first half of 1977, President Carter will make decisions on commodity agreements, trade negotiations, debt management, and arms sales to developing countries; he will have to coordinate strategy with the major Western trade partners of the U.S. in the OECD for important talks at the Paris-based Conference on International Economic Cooperation (CIEC) as well as at the U.N. If these problems are dealt with on an issue by issue basis, what seem like logical policy decisions now may prove in the long run to be mutually inconsistent and in some cases detrimental to U.S. relations with the developing world.

Several differing perspectives and options on North-South relations are examined in detail in *Agenda 1977*, illuminating the complexity of the development policy choices before the Carter Administration. In brief, the United States can attempt to defuse confrontations with the Third World by making only the minimum changes necessary—step by step. Or it can actively explore and adopt new policies to speed change in directions beneficial to developed as well as developing countries. Or, in varying combinations with the first two options, it can support a basic human needs strategy aimed at eliminating the worst aspects of absolute poverty worldwide by the year 2000.

If the Carter Administration selected the first option, it might adjust present policies slightly, implementing them more effectively than the U.S. has in the past. It could, for example, make available some increased support in areas such as development assistance and trade preferences, or act on recently proposed measures such as the "development security facility" to stabilize export earnings put forward by former Secretary Kissinger in 1975. The prime objective of this approach would be to reduce the potential for confrontation between North and South, although the U.S. would presumably continue to emphasize bilateral relations with some of the stronger developing nations, such as Brazil, Saudi Arabia, and Iran.

The second option would take President Carter beyond the marginal change of the first and into a commitment to a broader and more significant range of reforms. The proposals that make up the "New International Economic Order" called for by developing countries at the 1974 and 1975 special sessions of the U.N. General Assembly would be carefully examined, and those judged beneficial to the international economy as a whole would form the nucleus of the U.S. negotiating position. But the U.S. would go beyond these, in some cases supporting proposals which would spur development in the South at some cost to the North—a cost which would be justified on grounds of prudent statesmanship or moral responsibility.

Option three would aim more directly at meeting the basic human needs of the world's poorest billion people. U.S. policy here would be to try to overcome the worst aspects of this poverty and to attain specified minimum standards of nutrition, health services, and basic education by the end of the century.

The three "options" clearly are not watertight alternatives; elements of the basic needs approach presented as option three could be incorporated into either of the first two options.

Recommendations for U.S. policy

Agenda 1977 suggests an approach that would lay the basis for action on options two and three—the accelerated reform and basic needs strategies—but would start with the swift implementation of option one "marginal" changes that are not inconsistent with the two more ambitious options. This alternative would call for early and simultaneous action to 1) begin some far-ranging reforms of existing international economic institutions and practices, and 2) substantially increase support for programs to provide adequate food, nutrition, health care, and education for the world's poorest people.

TRADE IN MANUFACTURES

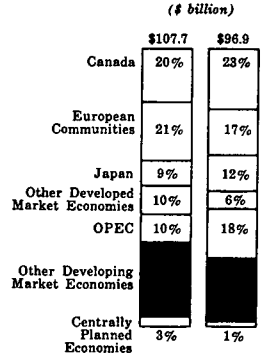
After much preparatory work, developed and developing countries are this year beginning serious multilateral trade negotiations. For developing countries, which derive nearly 40 per cent of their non-oil export earnings from manufactured exports, the outcome is critical.

The developing countries' manufactured exports grew an average of 25 per cent annually from 1965-1973, boosted in the 1970s by tariff preferences which allowed certain of their exports duty-free entry into the markets of the developed countries. This has resulted in lower prices of these goods for the consumers in the developed countries but has also significantly hurt some workers and firms. Consequently, important segments of the developed countries' labor movement and industrial sector, particularly in the U.S., oppose trade liberalization.

The *potential* gains for both developed and developing countries from trade liberalization are great. If all barriers to importing their manufactured goods were eliminated, the developing countries could increase their earnings by as much as $24 billion; and these increased earnings would largely be spent on goods from industrialized countries.

The U.S. should therefore: 1) press vigorously under existing legislation for the largest possible average tariff reductions; 2) continue to improve the U.S. Generalized System of Preferences (GSP); 3) refrain (with other industrial countries) from raising existing trade barriers, even as a corrective measure in balance-of-payments crises; 4) improve programs to assist domestic groups in adjusting to changes in international trade.

U.S. TRADING PARTNERS, 1975



COMMODITY ISSUES

Developing countries' export earnings from raw materials other than oil still account for more than half of their non-oil export revenues. Commodity policies therefore are an important part of their strategy for a New International Economic Order. Intensive negotiations on commodity agreements will be taking place this year and next in the U.N. Conference on Trade and Development (UNCTAD). Though both developed and developing countries would benefit from commodity agreements that stabilize prices, the two groups have differing concerns on this question. Developing countries prefer an "integrated approach" that would include a common fund to support buffer stock operations for a variety of commodities. The U.S. thus far has opposed the idea of a common fund, but has supported expanded efforts to compensate the developing countries for shortfalls in export earnings.

The U.S. should: 1) make an unequivocal commitment to participate in negotiations on a common fund for buffer stocks and on individual commodity agreements, without committing itself to either until negotiations are completed; 2) continue support for existing compensatory financing plans; 3) assess and help develop the potential for increased processing of raw materials within developing countries.

ENERGY

Until recently the U.S. has taken a narrow, parochial approach to the energy problem, focusing its diplomatic efforts on lowering oil prices and on the chimera of energy "independence." But solutions to the world energy problem must take into account the energy needs of both the developed and the developing world if they are going to serve either.

A global approach to energy would involve helping energy-poor developing countries pay for their energy imports, assisting them in developing untapped energy resources, emphasizing a nuclear energy policy stressing safety, and leading a worldwide research and development effort on renewable energy sources.

The long-run needs of the U.S., other industrialized countries, and the Third World probably will be better served by helping the developing countries to become less dependent on imported oil and developing more secure energy sources. With U.S. and other outside assistance, many Third World countries could avoid growing dependence on fossil fuels by moving now to concentrate on développing their ample renewable energy resources.

The U.S. should: 1) develop a coherent national energy policy that recognizes the energy crisis to be a

global problem that needs a global approach; 2) support creation of a World Energy Council to collect global energy data and conduct global energy analyses; 3) drastically increase federal research and development expenditures on renewable sources of energy—including small-scale sources; 4) take the lead in convening a world conference on alternative energy sources.

ARMS TRANSFERS

Arms aid and sales have been a major component of U.S. economic transactions with the developing countries in the past twenty-five years. The United States provided 45 per cent of the military equipment delivered worldwide in 1974, far exceeding such transfers from the Soviet Union and other European countries. Moreover, Third World sales orders have risen eightfold since 1970, and are likely to remain high.

Congress has in recent years tried to rein in U.S. arms transfer policies, but the Executive Branch has resisted. Proponents claim that the sales contribute directly to American security by fostering regional stability and increasing U.S. influence, and aid the domestic economy. Opponents argue that arms transfers often produce regional instability, raise the risk of U.S. involvement in local conflicts, hinder Third World development, and help repressive regimes.

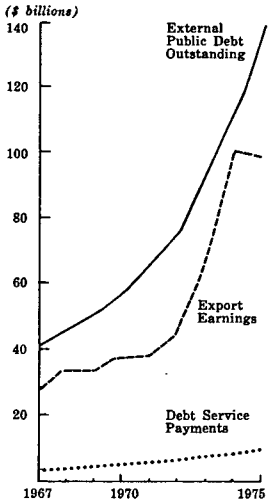
The new Administration has pledged to reduce arms transfers, but the U.S. needs a new, comprehensive policy in this area.

The U.S. should: 1) review U.S. arms transfer policy with the aim of reducing transfers substantially in the next five years; 2) take the lead in consulting with other major arms exporters on ways to reduce supplies, and with developing countries on ways to reduce demand.

DEBT

The growing debt of the developing countries is an issue that belongs high on any international economic agenda. Since 1972, the debt of the non-OPEC developing countries grew 80 per cent, reaching $165 billion by the end of 1975. Private banks have

DEBT OF THE NON-OPEC DEVELOPING COUNTRIES



become an important source of credit for some of these countries. However, the "world debt problem" is actually a series of problems faced by individual countries (both developed and developing). Debt per se is not dangerous. The danger comes when the debt burden grows so heavy that badly needed development efforts have to take a back seat to repayment. Moreover, the debt problems of the middle-income and low-income developing countries differ greatly. The former still have good long-range growth prospects; the outlook for the latter is bleak unless special measures are taken.

Debt relief efforts should aim to preserve the international credit system, strike a sensible compromise between the Third World's across-the-board debt relief demands and the reluctance of the creditor countries to agree to such solutions, establish international credit guidelines, and recognize that the ultimate solution to middle-income developing country debt lies in reforming world trade and commodity systems.

The U.S. should: 1) urge immediate international review of the debt problems of all *low-income* countries with the primary aim of revitalizing their development and not merely of maintaining debt service; 2) express willingness to consider official debt relief for any *middle-income* countries whose debt problems hamper their development programs; 3) recognize that the long-term interest of all sides is served if private banks continue to lend to the developing countries.

OCEANS ISSUES

The law of the sea talks encompass many of the issues and proposals involved with restructuring the international economic system. Questions which arise at these negotiations are bound to come up at future talks dealing with the common use of international resources.

The stalemate reached at the latest session of the U.N. Law of the Sea Conference produced considerable pessimism among participants and observers concerning the chances for a comprehensive oceans treaty. But overlooked were the achievements which have been reached since 1974; these include agreements on 12-mile territorial seas, 200-mile economic zones and unimpeded passage through international straits, an interim agreement on the environment, and a consensus on internationally supervising the exploitation of the resources of the deep ocean.

The talks have split not only developed and developing nations, but also landlocked and coastal states. The landlocked worry about being denied their share of the oceans' wealth by the coastal states; the Third World fears that transnational corporations that are already able to mine the ocean floor will dominate deep-sea mining schemes.

Despite these differences, all nations stand to gain from a comprehensive oceans treaty. The U.S. should: 1) press for early agreement on a comprehensive law of the sea treaty; 2) search for a compromise on the international seabed authority that will guarantee some international control over mining while meeting the needs of private concerns already able to exploit ocean resources.

90-664 O - 77 - 14

TECHNOLOGY TRANSFER

The economic successes of Japan, Taiwan, South Korea, and other nations demonstrate the importance of using technology to increase development progress. Other developing countries realize this but feel victimized by the monopoly they consider transnational corporations to hold on this know-how. In general, developing countries want easier access to new technology on more favorable terms and increased capacity to adapt and create technologies to suit their own needs and development goals. This will require intensified efforts in this field both within and among developing countries themselves, but outside support—both multilateral and bilateral—can be much more effective than it has been.

The U.S. can help by: 1) implementing the commitments concerning technology already made; 2) supporting efforts to develop codes of conduct for technology transfer and to revise international patent laws; 3) giving a high priority to the U.N. Conference on Science and Technology scheduled for 1979.

FOOD INSECURITY

Better weather substantially improved the 1976-77 crop outlook over the previous year, but medium- and long-term world food security is in fact as precarious as ever. The need for food has consistently outstripped food production during the 1970s. Given the rate of growth of the cereals deficit in the developing countries, bad weather in any major producing area could mean an even worse famine than the one experienced in 1972-73.

The World Food Conference of 1974 set three objectives for improving world food security: to establish a minimum level of food aid for the short term, to set up a grain reserve system for the medium term and, as the only long-term solution, to increase food production in the developing countries.

In 1977, Congress is due to reexamine most major U.S. food and agriculture legislation, from Food for Peace to food stamps. It is essential that a unified policy approach be taken to both the international and domestic aspects of the issue.

The U.S. should: 1) encourage increased food production and improved distribution in developing countries through an increased commitment to bilateral and multilateral development assistance programs; 2) resume negotiations aimed at establishing a world food reserve; 3) commit itself to guaranteeing an annual minimum of food aid on the basis of three-year advance commitments. In both food sales and grants, priority should be assigned to countries experiencing the greatest need.

BASIC HUMAN NEEDS

Of the nearly one billion people living in absolute poverty in the world, 750 million (nearly two thirds) are in the low-income countries, 170 million in middle-income countries, and 20 million in the richer countries. Per capita income in the poorest countries averaged $150 in 1973. These countries are pervasively poor in a way that was not true of today's rich countries in the early stages of their own development.

There is a growing consensus among specialists that economic growth and a more equitable distribution of its benefits are *compatible* goals—that with political will and an emphasis on programs aimed directly at the poor, the minimum basic needs of the poorest billion could be met over the next twenty-five years. In its recent report to the Club of Rome, the "Tinbergen Group" called for the following global basic needs goals for the year 2000: life expectancy, 65 years or more (compared to the low-income countries' present average of 48); literacy rate, at least 75 per cent (compared to 33); and infant mortality, 50 or less per 1,000 births (compared to 125).

The goal of meeting the basic needs of this segment of the world's population could be met at an estimated cost of $10-15 billion a year *over present aid levels*. The $10 billion figure would be feasible a) if developed countries would reach or exceed an aid level of one half of 1 per cent of their gross national product; b) if some portion of aid now going to middle-income countries were redirected to low-income countries; and c) if the increases were earmarked for basic needs uses such as jobs, health, and nutrition.

The U.S. should: 1) significantly increase its financial support to basic needs programs in low-income countries; and 2) explore the extent and forms of cooperation among the industrial democracies and developing countries to attain basic needs goals in all developing countries over the next generation.

POPULATION

The world's population has grown rapidly in the past twenty-five years, mainly in the developing countries, because death rates have until recently declined faster than birth rates. Currently, overall population growth rates have begun to decline due to increases in economic and social well-being and greater availability of family planning services. To lower the birth rate as rapidly as possible toward a stable level, much more focus is needed on alleviating negative factors that motivate large family size—on improving health care, nutrition, employment, education, and the status of women.

The U.S. should: 1) assess the impact of basic needs programs on decisions concerning family size; 2) greatly increase research efforts to develop more effective and acceptable methods of fertility control; 3) significantly increase support for expanding acceptable family planning programs in the developing countries.

HUMAN RIGHTS

The human rights issue is becoming highly sensitive as developed and developing countries continue to disagree vigorously on defining that term. The industrialized world stresses the political and civil liberties in the first half of the U.N. Universal Declaration of Human Rights, but the developing countries point to the wide-ranging economic and social rights in the Declaration's second half. The situation is complicated by the fact that many Third World governments are, in varying degrees, authoritarian.

Human rights recently has become a subject of contention in the U.S. between the Executive and Legislative branches of government, as the Congress has tied human political rights strings to foreign military

and economic assistance legislation. But the legislators have also addressed themselves to economic and social rights, as when both houses passed "Right to Food" resolutions.

Cutting foreign aid to punish human political rights violators is a popular idea, but cutting development assistance in particular is usually a weak lever on repressive regimes. A more comprehensive and effective approach is needed. Moreover, U.S. aid efforts in recent years have concentrated on reaching the poorest people in recipient countries. Aid cuts are likely to punish *them*, not their rulers.

The U.S. should: 1) ensure that its development assistance funds go to projects which directly benefit the poor majority in Third World countries; 2) actively seek to establish international criteria for identifying "gross violations" of political human rights—preferably in cooperation with international organizations; 3) consider what range of policies will effectively promote both economic and political human rights.

DEVELOPMENT ASSISTANCE

Most of the *poorest* countries will need aid in one form or another for at least the balance of this century. The U.S. currently contributes less than 0.3 per cent of its gross national product to programs of "official development assistance"—bilateral grants and loans or contributions to multilateral institutions such as the World Bank or the U.N. Development Programme. Adjusted for inflation, the total amount of U.S. development assistance has declined by nearly 50 per cent since 1963. If this country is to support efforts to alleviate the worst effects of absolute poverty, these programs require special attention in 1977. The bilateral legislation that was rewritten in 1973 to direct aid to the poorest people within the poorest countries requires reauthorization, and the U.S. is in arrears in its contributions to the World Bank's International Development Association (IDA), the regional development banks, and some U.N. agencies. The next replenishment of IDA also must be authorized in 1977.

The U.S. should: 1) commit itself to increasing levels of official development assistance to a level of 0.5 per cent of GNP by fiscal year 1981, with at least 75 per cent of these funds going to countries with per capita incomes of under $300; 2) urge an early decision on the fifth replenishment of IDA at a level of $8.1 billion for the OECD countries; 3) support prompt Congressional action to increase the capital of the World Bank; 4) explore with both developed and developing countries ways to provide automatic sources of assistance for low-income countries; 5) complete a comprehensive review of U.S. development assistance by 1978.

ORGANIZING FOR INTERDEPENDENCE

The resumption of North-South negotiations in the immediate future will be complicated by the lack of effective institutions that encompass the broad range of discussions now going on between developed and developing countries.

Existing international structures are accused by some of being too unwieldy (the U.N. General Assembly) or too exclusive (the International Monetary Fund). Perhaps the best indication of the need for mechanisms more acceptable to all sides was the creation of the 27-nation CIEC in Paris, made up of a carefully balanced group of OECD, OPEC, and other developing countries; yet CIEC had only a one year life span and will not be renewed unless all participants want to see it continued. In deciding on new and reformed institutions, it will be important to ensure that the interests of all major groups of nations are represented.

To deal effectively with the global issues outlined in *Agenda 1977*, including the new approaches needed to development cooperation, the Carter Administration also should reorganize and improve coordination among various branches of the U.S. government.

A quality of life index: the PQLI

The need for a quality of life index as a supplement to GNP figures has been recognized for some time—notably by the U.N. Secretary-General and by the recent "Tinbergen Group" report to the Club of Rome.

The Overseas Development Council has introduced a Physical Quality of Life Index (PQLI) that can be used in conjunction with the per capita GNP indicator to assess each country's progress in terms of human well-being. The PQLI index—which is a rough but useful composite measure of life expectancy, infant mortality, and literacy—is described and shown for all countries in the Statistical Annexes of *Agenda 1977*.

DEVELOPMENT PERFORMANCE BY TWO STANDARDS

Country Groups and Sample Countries	*Per Capita GNP*	*PQLI Index**
	($)	
Lower-Income Countries (average)	152	39
India	140	41
Kerala, India	110	69
Sri Lanka	130	83
Lower Middle-Income Countries (average)	338	59
Malaysia	680	59
Korea, Rep. of	480	80
Cuba	640	86
Upper Middle-Income Countries (average)	1,091	67
Gabon	1,960	21
Iran	1,250	38
Algeria	710	42
Taiwan (ROC)	810	88
High-Income Countries (average)	4,361	95
Kuwait	11,770	76
United States	6,670	96
Netherlands	5,250	99

**Composite of life expectancy, infant mortality and literacy figures, each rated on an index of 1 to 100.*

RESPONSE OF HOWARD C. KAUFFMANN TO ADDITIONAL WRITTEN QUESTIONS POSED BY THE MINORITY MEMBERS OF THE SUBCOMMITTEE ON ENERGY

Question 1. Do you believe that a conservation program is needed to solve our energy problems? What should be the extent of this program?

Answer. Energy conservation is essential, although it will have to be augmented by major efforts to develop new indigenous sources of energy. For a conservation program to have the greatest effect, it must involve the efforts of everyone in the nation. The Alliance to Save Energy, which you so effectively initiated, has already demonstrated that energy conservation can be more than a partisan issue—all of us must consume less energy than we used to.

Real energy savings will be the result of countless millions of individual decisions made by all citizens in their roles as consumers of energy. The program most likely to succeed, therefore, is one which will appeal to the direct, personal interests of all the people. We think nothing will do this more effectively than allowing the price of energy to reach its true cost to the economy.

The importance of conservation is shown by what has already been achieved. As I indicated in my letter of January 22, there has been considerable conservation in all the main consuming sectors of the economy. In aggregate, it now appears that total U.S. energy consumption in 1976 was three to four million barrels of oil equivalent per day less than it would have been had pre-crisis trends continued. Beyond question, most of this is owing to the greatly increased prices charged for energy since late 1973, although government-mandated conservation has also played a role.

It is also clear that besides consumers taking steps to save energy, individual entrepreneurs are trying to build profitable businesses supplying services to foster more efficient energy uses. One can hardly pick up a newspaper these days or watch television without seeing advertisements for such conservation services as insulation or for computer control systems to save energy use in buildings. Architects, too, appear to have responded to the challenge of designing buildings which will use more expensive energy more efficiently. Again, these activities would seem to have resulted primarily from the higher costs of energy to the consumer.

We have to be realistic, however, about the rate at which conservation can take place. To begin with, as became painfully clear in recent weeks, energy is vital to our economic activity. We must be efficient in its use, but aware of what can happen if it is curtailed too far. Existing patterns of neergy use in this country have developed over many years during which energy prices declined in real terms. These patterns, either for business or for consumers, are not going to be changed overnight. Furthermore, while the cumulative effects of consevation will mount over the years, many of the individual steps will represent one-time changes in efficiencies as new equipment is substituted for old.

Question 2. What methods should be employed to accomplish conservation (i.e., deregulation of oil and gas prices with tax rebates for low income groups, tax credits for "energy saving" expenditures, expanded research in the area of conservation, etc.)?

Answer. I believe that the first, major conservation policy step should be the realistic pricing of energy. It is price which carries the most immediate, compelling message both to the consumer and to the producer. In our present circumstances of controlled prices, anyone who uses more oil is effectively subsidized to the extent of the difference between the price he pays and the higher real cost to the economy of importing the oil he is using. The current problem with natural gas is a good example of how a mistake in pricing policy can have a significant impact on consumers, and the economy at large, many years after that policy is put into effect.

The higher prices which would come from lifting price controls would encourage conservation. Whether they would go far enough is uncertain. It might be that in addition higher excise taxes should be considered, for even without current price controls, prices of petroleum products in this country (gasoline in particular) would still be far below those in most industrialized countries. Higher taxes, however, should be considered only with full awarenes of their broader implications for economic activity and welfare.

The principal arguments against removing price controls are that the profits of oil and gas companies would rise and that the poor would no longer be able to afford a vital commodity. Considering the replacement costs of the energy which we are consuming, it is unclear that excess profits in any meaningful sense would be generated. For instance, in 1976, the Exxon Corporation invested

more than twice as much in exploration and production in the United States as it earned from producing operations in this country. If despite this, profits were considered too high, then that problem should be faced directly, probably through some form of special taxation. It seems obvious that there are better ways of handling this potential problem than through price controls which give the wrong signals to all concerned.

The impact of higher prices on low-income groups is a serious potential problem. But here again, price controls just don't cause the right things—conservation and additional production—to happen. We think that higher energy prices should be considered as just one of the many factors which bear on the economic well-being of low-income groups. Surely, there are better ways to attack this problem than through a system which would explicitly tie tax rebates to the amount of energy consumed. The importance of consuming less energy is a message which must be received by all our citizens.

Other conservation methods—fiscal incentives for energy saving expenditures, tighter efficiency regulations covering construction and operation of energy-using devices, a judicious and limited application of end-use controls—must also be evaluated. The primary problem I have with such non-price-driven steps, though, is that many of them would result in important losses of individual freedom. Moreover, it is my judgment that much of what such methods would hope to accomplish would be a natural fall-out from realistic pricing of energy. However, barring such pricing, or some combination of the other conservation methods mentioned, an even more drastic and onerous alternative—rationing—could stare us in the face.

Question 3. Hypothetically, if we establish a successful conservation program, what would be some possible response by OPEC? Would they boost prices to keep revenues flowing? Would it drive a wedge between OPEC members?

Answer. Based on their public statements, OPEC nations would not be unhappy to see progress toward conservation in the United States and other consuming countries. At least by implication they have justified past price increases partly on the ground that energy is being wastefully consumed, and they have frequently stated their desire to prolong the life of reserves. If we were to show that we mean business about conservation, and take related steps to develop new energy sources, the posture of OPEC toward us would probably be affected. I doubt that anything short of a significant, unforeseen technological breakthrough in the development of a cheap energy source alternative would cause OPEC to lower prices, but serious conservation and alternate source development efforts might make them less adventuresome in raising prices.

Clearly, in the longer run we shall shift the balance with OPEC only to the extent that we get our own house in order. But once again, we should not expect too much too soon from conservation or any other specific step. Inevitably, for many years we shall be heavily dependent on OPEC oil. Indeed, Exxon's forecasts suggest that even with major future progress toward conservation in the United States, most OPEC countries will be producing at near capacity levels. Only Saudi Arabia is forecast to have the potential for substantial excess capacity, and this is the OPEC country least in need of expanded revenues. Therefore, although conservation will be a moderating force in our relations with OPEC, it will not seriously threaten that organization.

In closing, let me reiterate the belief I expressed previously, that while it is essential for the United States to take serious energy conservation steps, it is equally essential to improve the supply of domestic energy resources. Only by taking both parallel steps can this country's dependency on imported energy be reduced and a solid foundation for future prosperity be assured.

RESPONSE OF PAUL DAVIDSON TO ADDITIONAL WRITTEN QUESTIONS POSED BY THE MINORITY MEMBERS OF THE SUBCOMMITTEE ON ENERGY

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, D.C., January 26, 1977.

Prof. PAUL DAVIDSON,
Princeton, N.J.

DEAR PROFESSOR DAVIDSON: The Minority Members of the Subcommittee on Energy have requested that the enclosed questions be sent to you. The questions,

along with your answers, will be included in the record of the Subcommittee hearings which were held on January 13th.

We would appreciate your reply as soon as possible in order to insert the answers in the final transcript.

Thank you for your attention to this matter.

Sincerely yours,

JOHN R. STARK,
Executive Director.

Enclosure:

(1) Do you believe that a conservation program is needed to solve our energy problems? What should be the extent of this program?

(2) What methods should be employed to accomplish conservation (i.e., deregulation of gas and oil prices with tax rebates for low income groups, tax credits for "energy saving" expenditures, expanded research in the area of conservation, etc.)?

(3) Hypothetically, if we establish a successful conservation program, what would be some possible responses by OPEC? Would they boost prices to keep revenues flowing? Would it drive a wedge between OPEC members?

RUTGERS UNIVERSITY,
DEPARTMENT OF ECONOMICS AND ALLIED SCIENCES,
New Brunswick, N.J., February 4, 1977.

Mr. JOHN R. STARK,
Executive Director, Joint Economic Committee, Congress of the United States, Washington, D.C.

DEAR MR. STARK: I am in receipt of your letter of the 26th of January, 1977. In that letter you submitted questions that the minority members of the Subcommittee on Energy have requested that I respond to. My responses are as follows:

The question of conservation and the energy problem requires clarification before a precise answer can be given. First, what do we mean by conservation and secondly, what is the objective of a conservation program. I shall answer each of these questions in turn and in so doing I believe will respond to the minority question.

The term conservation has at least two possible definitions for any professional economist. One definition implies that the consumer will use less of the resource or product at any market price; in economic terms this implies an inward shift of the demand curve for the resource. The other use implies that the consumer uses less because of an increase in the market price of the resource. The second definition of conservation implies a movement up an unchanging demand curve for the resource. As the attached xerox copies of pages 59 through 67 of the 10th edition of Samuelson's best selling textbook on economics indicates the first form of conservation economists would refer to as a change in demand while the second form of conservation would be a change in the quantity demanded but not a change in the demand for the resource.

The dictionary definition of conservation does not help us in determining whether we mean conservation in the sense of a shift in the demand curve or conservation in the sense of a movement up a demand curve. Much of the confusion in economists and politicians minds occurs because some people are talking about shifting the demand curve while others are talking about movement along the demand curve.

A conservation program with shifts in demand curve would have different effects and would be augmented differently than a conservation program which merely requires an upward movement along an unchanging demand curve. Hence, before we decide on conservation as a desirable program we would realize that these are two different possible programs and that their impacts and their effects will be quite different, and thus we cannot decide on which conservation program we want until we have decided on what the goal of conservation should be.

For some conservation is an end in itself. Many environmentalists and others merely see the modern society as a prodigal economic system which wastes everything it utilizes. For those people conservation is desired as almost a religious objective, that is, it is believed that self-denial is in some sense good for the human soul. For such people conservation is an end all in itself a way of getting back to a simpler way of life, a more frugal way of life. Such people

would like to shift the demand curve for energy and many other products to the left so that at any market price (even very low ones) people would consume less and spend more time in spiritual contemplation and non-materialistic endeavors. In terms of energy a program to achieve such conservation might be closing gasoline stations on weekends so that people cannot make long trips on their leisure time (somewhat similar to one of the objectives of the so-called Blue Laws which prevent people from spending money in retail establishments on the Sabbath).

The other form of conservation is when people are induced to buy lower quantities of a resource because the market price has risen, i.e. a price induced movement up an unchanging demand curve. As I have suggested in my written statement to the Joint Economic Committee, if there was a Malthusian shortage of fossil fuels then the real costs of obtaining oil and natural gas would be rising and a market induced increase in price to limit purchases would be a normal economic response. When the prices rise people would buy less as some individuals whose incomes are low could not afford to maintain their present consumption of energy. Of course such a market induced reduction in the quantity demanded would not only limit purchases but would lead to a large redistribution of income and wealth between consumers and producers of energy. This is particularly true as long as the price elasticity of demand for resources is highly inelastic as it is at the present time for fossile fuels. Thus conservation via market price increases are likely to lead to very small decreases in the amount that consumers buy while leading to very large shifts in the distribution of real income and wealth between consumers and producers both domestically and internationally.

Whether we want a conservation program which shifts the demand curve to the left or merely induces a movement along an unchanging demand curve depends therefore upon what is the objective of our conservation program. As I have already suggested in my written statement, if the primary objective of the conservation program is to break the OPEC cartel and have the market price for fossil fuels more closely reflect the real costs of finding and producing these fuels, than neither form of conservation will be in an efficient method to achieve this objective. As I have already indicated the most efficient method of achieving the breakdown of the monopoly control over fossil fuels both domestically and internationally requires the ability to provide substitute energy resources at prices below the OPEC price. I have already suggested a 9 point energy program which would achieve such an objective. On the other hand, merely de-regulating wellhead prices and permitting the price of domestic fuels to rise to the monopolistic OPEC price will do nothing towards breaking up the cartel. If anything it will merely legitimize the current cartel price. Moreover, such a policy of de-regulation would merely lead to large windfall profits for the oil producers and land owners in the United States. Such a conservation program should not be adopted unless it is explicitly adopted as matter of national policy that the OPEC caretel cannot be broken and that we must pay the monopolistic price for fossil fuels. The history of the United States, however, suggests that we would not be willing to take such action if it was explicitly well known that de-regulation meant paying monopoly tribute forever to OPEC and foreign producers and land owners and American producers and land owners as well. Many years ago the United States government made a specific policy that we would spend millions for defense but not one penny for tribute to the pirates of Tripoli. At the present time the pirates from the same region of the world are attempting to extort tribute from the United States economy and it would seem to me that millions for defense but not a cent for tribute should be our objective again. We should not give in to the OPEC cartel. We are rich enough and strong enough that we can break the cartel if we are willing to adopt a number of policies that I have already suggested in my written statement.

If however the United States economy and the administration is unwilling to engage in the economic warfare which is necessary to break this powerful cartel, then it should be made clear to the American consumers that they are paying a monopoly tribute, that the shortage of natural gas and oil is a function of man-made control of the market and not the stinginess of nature. Moreover, if we are going to force the consumer to pay high prices on domestic production (which can be controlled by the government) then the increase in price should be done via a excise tax so that the revenues from these higher prices accrue to the United States Treasury and can be used for all citizens of the country and do not accrue merely to the land owners in our fossil fuel producing states.

In sum if the government decides on a program of conservation by moving up the demand curve for energy and inducing lower consumption by higher prices,

then a tax rather than a market price increase should be the method employed with the tax used for general revenue purposes rather than for allowing the higher price to accrue to producers and landowners in the fossil fuel states.

In line with this idea of higher prices it should be pointed out that it has been recognized by many economists advocating higher prices to induce "conservation" of energy, that the income redistribution effects are gigantic and that low income groups particularly would be hurt by such a monopoly tax. Therefore, these well meaning but misguided economists suggest that the tax should then be used to provide rebates for low income groups. However, if the price inelasticity is greater than zero it is merely because we are reducing the ability of some consumers to purchase as much fuel as they did before once their price rises. Most of the effect will be on the low income groups who will merely be priced out of the market. To then recycle this tax to the low income groups and allow them to enter into the market will merely frustrate the whole program because under such situation the price inelasticity will become even more inelastic than before as the income reduction effect of the higher price is not felt by the low income individual. As long as there is very little substitution of other energy resources for existing fossil fuels the ability of the consumer to move out of the high priced goods and into the low priced energy resources is exceedingly limited and it is only by removing income from the consumer that we will get any price sensitivity to greater energy prices.

What about the first form of conservation, i.e., a shift of the demand curve inward so that at any price consumers will buy less energy than before. Such an inward shift of the demand curve can be done by either programs which involve (a) limiting the number of hours when fossil fuels will be sold, e.g., by closing gasoline stations on weekends, (b) by non price rationing systems, (c) by requiring greater insulation in all homes and industries, etc. All of these will accomplish the effect of reducing the amount of energy per capita that will be consumed by the population at any price even if the prices of energy were to fall when and if the OPEC cartel is broken. I have no particular objection to instituting such policies but I don't see how such policies in and of themselves will lead to the breakup of the cartel.

Finally, if we were to establish a conservation program which raised prices in order to reduce consumer demand (i.e. move up an unchanging demand curve) it may encourage the OPEC cartel to raise their prices even further. The OPEC cartel does not know what is the maximum price it can extort from consumers of petroleum. This depends upon knowledge about income and price elasticity of demand which at the present time the OPEC cartel cannot be sure of. If we were to raise the domestic price of oil and gas by de-regulation and if the effect was very little price sensitivity on the part of consumers (i.e. a high price inelasticity of demand) then the OPEC cartel would have additional information suggesting that the market is still exploitable and they could raise prices. In a letter to the Economist magazine in January, 1977, Professor Henry Houthakker indicated that on the basis of his studies of the demand for fossil fuels that the OPEC cartel could double the real price of crude oil from consuming countries by 1980. If Professor Houthakker is correct then the cartel has not yet exercised its maximum monopoly power and consumers can still be exploited. Consequently, it becomes even more urgent that we enter into programs which alter the elasticity of demand facing the OPEC oil cartel. Conservation program, by itself, will not do this although it may be desirable for other reasons it certainly is not desirable as a way of solving the man-made energy problem that this country now faces. Until we understand the economic forces that are at work in the energy crisis problem, we are unlikely to get our economic policies to solve the problem correct. In my view the primary choice facing the United States Government is whether we break the cartel or we pay continuous tribute to these pirates of the Middle East. It is strictly a question of economic warfare and I believe that the answer can only be that we must design policies which break the cartel and not teach the American consumer to live with high price energy in order for the pirates of the Middle East to extract the tribute they demand for energy.

The economic war is not with nature, we are not running out of fossil fuels. The economic war is with producers and land owners who have found that they have been able to "corner the market" in fossil fuels and extort consuming nations in order to provide these nations with sources of mechanical energy.

Sincerely yours,

PAUL DAVIDSON,
Chairman.

Enclosure:

(From P. A. Samuelson's "Economics," 10th ed., McGraw-Hill, New York, 1976)

THE DEMAND SCHEDULE

Let us start with demand. It is commonly observed: The quantity of a good that people will buy at any one time depends on price; the *higher* the price charged for an article, the *less* the quantity of it people will be willing to buy; and, other things being equal, the lower its market price, the more units of it will be demanded.

Thus there exists at any one time a definite relation between the market price of a good (such as wheat) and the quantity demanded of that good. This relationship between price and quantity bought is called the "demand schedule," or "demand curve."

DEMAND SCHEDULE FOR WHEAT

	(1) PRICE ($ per bu.) P	(2) QUANTITY DEMANDED (million bu. per month) Q
A	$5	9
B	4	10
C	3	12
D	2	15
E	1	20

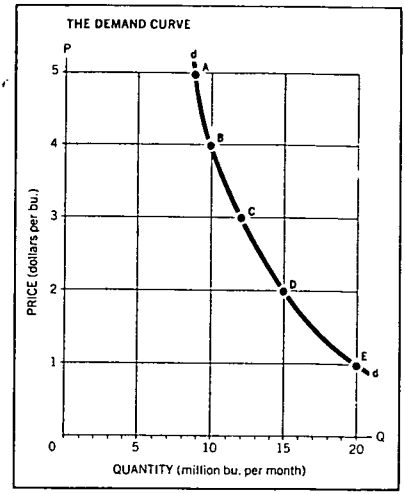


FIG. 4-1
A downward-sloping demand curve relates quantity to price
At each market price, there will be at any time a definite quantity of wheat that people will want to demand. At a lower price, the quantity demanded will go up—as more people substitute it for other goods and feel they can afford to gratify their less important wants for wheat. Compare table's *Q* and *P* at *A, B, C, D, E.*

In the figure, prices are measured on the vertical axis and quantities demanded on the horizontal axis. Each pair of *Q, P* numbers from the table is plotted here as a point, and a smooth curve passed through the points gives us the demand curve.

The fact that *dd* goes downward and to the right illustrates the very important "law of downward-sloping demand."

The table of Fig. 4-1 gives an example of a hypothetical demand schedule. At any price, such as $5 per bushel, there is a definite quantity of wheat that will be demanded by all the consumers in the market—in this case 9 (million) bushels per month. At a lower price, such as $4, the quantity bought is even greater, being 10 (million) units. At lower *P* of $3, quantity demanded is even greater still—namely 12 (million). By lowering *P* enough, we could coax out sales of more than 20 (million) units. From Fig. 4-1's table we can determine the *quantity demanded at any price,* by comparing Column (2) with Column (1).

THE DEMAND CURVE

The numerical data can be given a graphic interpretation also. The vertical scale in Fig. 4-1 represents the various alternative prices of wheat, measured in dollars per bushel. The horizontal scale measures the quantity of wheat (in terms of bushels) that will be demanded per month.

A city corner is located as soon as we know its street and avenue; a ship's position

is located as soon as we know its latitude and longitude. Similarly, to plot a point on this diagram, we must have two coordinate numbers: a price and a quantity. For our first point *A*, corresponding to $5 and 9 million bushels, we move upward 5 units and then over to the right 9 units. An orange dot marks the spot *A*. To get the next dot, at *B*, we go up only 4 units and over to the right 10 units. The last dot is shown by *E*. Through the dots we draw a smooth orange curve, marked *dd*.

This picturization of the demand schedule is called the "demand curve." Note that quantity and price are *inversely* related, *Q* going up when *P* goes down. The curve slopes downward, going from northwest to southeast. This important property is given a name: the *law of downward-sloping demand*. This law is true of practically all commodities: wheat, electric razors, cotton, Kellogg's cornflakes, and theater tickets.

The law of downward-sloping demand: When the price of a good is raised (at the same time that all other things are held constant), less of it is demanded. Or, what is the same thing: If a greater quantity of a good is put on the market, then—other things being equal—it can be sold only at a lower price.

REASONS FOR THE LAW OF DOWNWARD-SLOPING DEMAND

This law is in accordance with common sense and has been known in at least a vague way since the beginning of recorded history. The reasons for it are not hard to identify. When the price of wheat is sky-high, only rich men will be able to afford it; the poor will have to make do with coarse rye bread, just as they still must do in poorer lands. When the price is still high but not quite so high as before, persons of moderate means who also happen to have an especially great liking for white bread will now be coaxed into buying some wheat.

Thus a first reason for the validity of the law of downward-sloping demand comes from the fact that *lowering prices brings in new buyers*.

Not quite so obvious is a second, equally important, reason for the law's validity; namely, each reduction of price may coax out some *extra purchases by each of the good's consumers;* and—what is the same thing—a rise in price may cause any of us to buy less. Why does my quantity demanded tend to fall as price rises? For two main reasons. When the price of a good rises, I naturally try to *substitute* other goods for it (for example, rye for wheat or tea for coffee). Also, when a price goes up, I find myself really poorer than I was before; and I will naturally cut down on my consumption of most normal goods when I feel poorer and have less real *income*.

Here are further examples of cases where I buy more of a good as it becomes more plentiful and its price drops. When water is very dear, I demand only enough of it to drink. Then when its price drops, I buy some to wash with. At still lower prices, I resort to still other uses; finally, when it is really very cheap, I water flowers and use it lavishly for any possible purpose. (Note once again that someone poorer than I will probably begin to use water to wash his car only at a lower price than that at which I buy water for that purpose. Since market demand is the sum of all different people's demands, what does this mean? It means that even after *my* quantity demanded stops expanding very much with price decreases, the *total* bought in the market may still expand as new uses for new people come into effect.)

To confirm your understanding of the demand concept, imagine that there is an increase in demand for wheat brought about by a boom in people's incomes or by a great rise in the market price of competing corn, or simply by a change in people's tastes in favor of wheat. Show that this *shifts* the whole demand curve in Fig. 4-1 rightward, and hence upward; pencil in such a new orange curve and label it *d'd'* to distinguish it from the old *dd* curve. Note that such an increase in demand means that more will now be bought at each price—as can be verified by carefully reading off points from the new curve and filling in a new *Q* column for Fig. 4-1's table.

THE SUPPLY SCHEDULE

Let us now turn from demand to supply. The demand schedule related market prices and the amounts *consumers* wish to buy. How is the "supply schedule" defined?

By the *supply schedule*, or *curve*, is meant the relation between market prices and the amounts of the good that *producers* are willing to supply.

The table of Fig. 4-2 illustrates the supply schedule for wheat, and the diagram plots it as a supply curve. Unlike the falling demand curve, the *ss* supply curve for wheat *normally rises upward* and to the right, from southwest to northeast.

At a higher price of wheat, farmers will take acres out of corn cultivation and put them into wheat. In addition, each farmer can now afford the cost of more fertilizer, more labor, more machinery, and can now even afford to grow extra wheat on poorer land. All this tends to increase output at the higher prices offered.

SUPPLY SCHEDULE FOR WHEAT

	(1) POSSIBLE PRICES ($ per bu.) P	(2) QUANTITY SELLERS WILL SUPPLY (million bu. per month) Q
A	$5	18
B	4	16
C	3	12
D	2	7
E	1	0

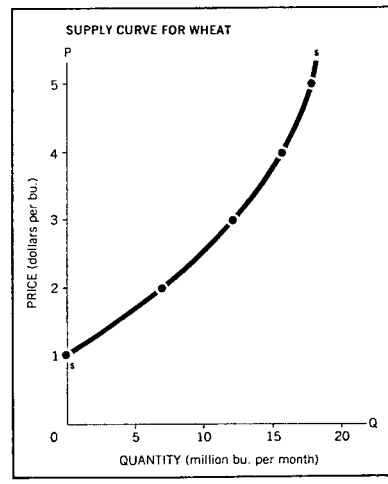


FIG. 4-2
The supply curve relates price to the quantity produced
The table lists, for each price, the quantity that producers will want to bring to market. The diagram plots the (*P*, *Q*) pair of numbers taken from the table as the indicated brown points. A smooth curve passed through these points gives the brown upward-sloping supply curve, ss.

As will be seen in Part Three, our old friend the law of diminishing returns provides one strong reason why the supply curve would slope upward. If society wants more wine, then more and more labor will have to be added to the same limited hill sites suitable for producing wine grapes. Even if this industry is too small to affect the general wage rate, each new man will—according to the law of diminishing returns—be adding less and less extra product; and hence the necessary cost to coax out additional product will have to rise. (Cost and returns are opposite sides of the same coin, as will be shown later.[1])

How shall we depict an increase in supply? An increase in supply means an increase in the amounts that will be supplied *at each different price.* Now if you pencil the new supply curve into Fig. 4-2, you will see that it has shifted *rightward;* but for an upward-sloping supply curve, this change means the new $s's'$ curve will have shifted rightward and *downward* (not rightward and upward as in the case of a shifted downward-sloping demand curve). To verify that $s's'$ does depict an increase in supply, fill in a new column in the table by reading off points from your new diagram carefully.

EQUILIBRIUM OF SUPPLY AND DEMAND

Let us now combine our analysis of demand and supply to see how competitive market price is determined. This is done in Fig. 4-3's table (page 64). Thus far, we have been considering all prices as possible. We have said, "If price is so and so, Q sales will be so and so; if P is such and such, Q will be such and such; and so forth." But to which level will price *actually* go? And how much will then be produced and consumed? The supply schedule alone cannot tell us. Neither can the demand schedule alone.

Let us do what an auctioneer would do, i.e., proceed by trial and error. Can situation A in the table, with wheat selling for $5 per bushel, prevail for any period of time? The answer is a clear "No." At $5, the producers will be supplying 18 (million) bushels to the market every month [Column (3)]. But the amount demanded by consumers will be only 9 (million) bushels per month [Column (2)]. *As stocks of wheat pile up, competitive sellers will cut the price a little.* Thus, as Column (4) shows, price will tend to fall downward. But it will not fall indefinitely to zero.

To understand this better, let us try the point E with price of only $1 per bushel. Can that price persist? Again, obviously not—for a comparison of Columns (2) and (3) shows that consumption will exceed production *at that price.* Storehouses will begin to empty, *disappointed demanders who can't get wheat will tend to bid up the too-low price.* This upward pressure on P is shown by Column (4)'s rising arrow.

We could go on to try other prices, but by now the answer is obvious:

The equilibrium price, i.e., the only price that can last, is that at which the amount *willingly* supplied and amount *willingly* demanded are equal. Competitive equilibrium must be at the *intersection point* of supply and demand curves.

[1] Although exceptions to the law of downward-sloping demand are few enough to be unimportant in practice, Part Three gives an interesting exception to the upward-sloping supply curve. Thus, suppose that a family farmer produces wheat and its price rises so much as to give him a much higher income. With wheat so lucrative, he is at first tempted to *substitute* some of his leisure time to produce more. But won't there reasonably come a time when he feels comfortably enough off at his *higher income* to be able to afford to take things easier, work less, and supply less Q?

SUPPLY AND DEMAND SCHEDULES FOR WHEAT

	(1) POSSIBLE PRICES ($ per bu.)	(2) QUANTITY DEMANDED (million bu. per month)	(3) QUANTITY SUPPLIED (million bu. per month)	(4) PRESSURE ON PRICE
A	$5	9	18	Downward
B	4	10	16	Downward
C	3	12	12	Neutral
D	2	15	7	Upward
E	1	20	0	Upward

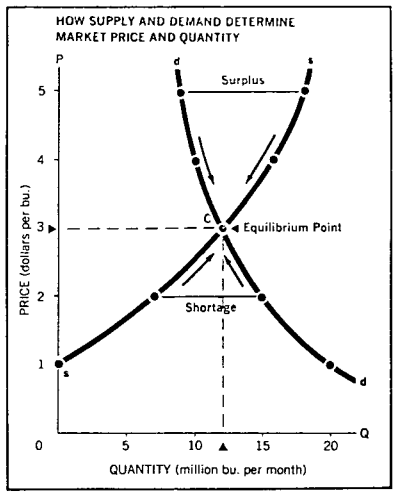


FIG. 4-3
Equilibrium price is at the intersection point where supply and demand match
Only at the equilibrium price of $3, shown in the green third row, will the amount supplied just match the amount demanded.

In the diagram, at the *C* equilibrium intersection (shown by the green dot), the amount supplied just matches the amount demanded. At any lower *P*, the excess amount demanded will force *P* back up; and at any *P* higher than the equilibrium, *P* will be forced back down to it.

Only at *C*, with a price of $3, will the amount demanded by consumers, 12 (million) bushels per month, exactly equal the amount supplied by producers, 12 (million). Price is at equilibrium, just as an olive at the bottom of a cocktail glass is at equilibrium, because there is no tendency for it to rise or fall. (Of course, this stationary price may not be reached at once. There may have to be an initial period of trial and error, of oscillation around the right level, before price finally settles down in balance.)

Figure 4-3's diagram shows the same equilibrium in pictorial form. The supply and demand curves, superimposed on the same diagram, cross at only one intersection point. This emphasized green point *C* represents the equilibrium price and quantity.

At a higher price, the green bar shows the *excess* of amount supplied over amount demanded. The arrows point downward to show the direction in which price will move because of the competition of excess *sellers*. At a price lower than the $3 equilibrium price, the green bar shows that amount demanded exceeds amount supplied. Consequently, the eager bidding of excess *buyers* requires us to point the arrow indicators upward to show the pressure that they are exerting on price. Only at the point *C* will there be a balancing of forces and a stationary maintainable price.

Such is the essence of the doctrine of supply and demand.

EFFECT OF A SHIFT IN SUPPLY OR DEMAND

Now we can put the supply-and-demand apparatus to work. Gregory King, an English writer of the seventeenth century, noticed that when the harvest was bad, food rose

... price; and when it was plentiful, farmers got a lower price. Let us try to explain this common-sense fact by what happens in our diagrams.

Figure 4-4(a) shows how a spell of bad weather *reduces* the amount that farmers will supply at each and every market price and thereby raises the equilibrium point E. The ss curve has shifted to the left and has become $s's'$. The demand curve has not changed. Where does the new supply curve $s's'$ intersect dd? Plainly at E', the new equilibrium price where demand and the new reduced supply have again come into balance. Naturally, P has risen. And because of the law of downward-sloping demand, Q has gone down.

Suppose the supply curve, because of good weather and cheaper fertilizers, had *increased*, instead. Draw in a new green equilibrium E'' with lower P and higher Q.

Our apparatus will help us also analyze the effect of an increase in demand. Suppose that rising family incomes make everyone want more wheat. Then at each unchanged P, greater Q will now be demanded. The demand curve will shift rightward to $d'd'$. Figure 4-4(b) shows the resulting travel up the supply curve as enhanced demand raises competitive price (to the E' intersection).

TWO STUMBLING BLOCKS

It is well to pause here to consider two minor sources of possible confusion concerning supply and demand. These have puzzled students of economics in all generations. The first point deals with the important fact that in drawing up a demand schedule or

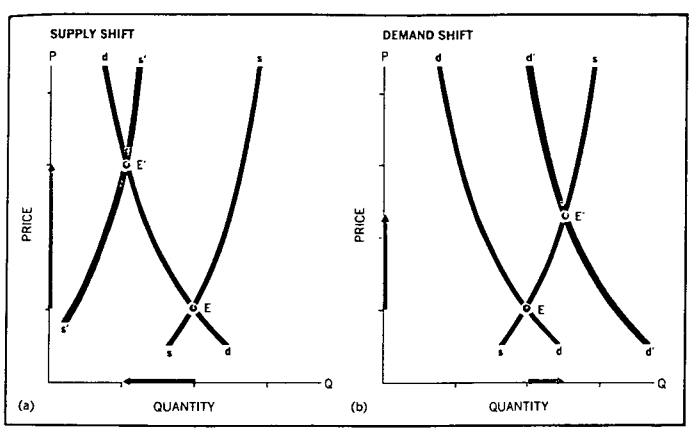


FIG. 4-4
When either supply or demand curve shifts, equilibrium price changes
(a) If supply shifts leftward for any reason, the equilibrium-price intersection will travel up the demand curve, giving higher P and lower Q.
(b) If demand increases, the equilibrium will travel up the supply curve.

curve, one always insists that "other things must be equal." The second deals with the exact sense in which demand and supply are equal in equilibrium.

"Other things equal" To draw up a demand schedule for wheat, we vary its price and observe what would happen to its quantity bought *at any one period of time in which no other factors are allowed to change so as to becloud our experiment.*

Specifically, this means that, as we change wheat's P, we must not at the same time change family income or the price of a competing product such as corn or anything else that would tend to *shift* the demand schedule for wheat. Why? Because, like any scientist who wants to isolate the effects of one causal factor, we must try to vary only *one* thing at a time. True enough, in economics we cannot perform controlled experiments in a laboratory, and we can rarely hold other things constant in making statistical observations of economic magnitudes. This limitation on our ability to experiment empirically in economics makes it all the more important *to be clear in our logical thinking*, so that we may hope to recognize and evaluate important *tendencies*—such as the effect of P on Q demanded—when *other* tendencies are likely to be impinging on the situation at the same time.

The case of demand shift back in Fig. 4-4(b) can illustrate this common fallacy based upon a failure to respect the rule. Other things must be held equal in defining a demand curve. Suppose that the supply curve shifts little or not at all. But suppose the demand curve shifts up to $d'd'$ in good times when jobs are plentiful and people have the incomes to buy more wheat; and suppose in the more depressed phase of the business cycle, demand always shifts down to dd. Now take a piece of graph paper and plot what would actually be recorded in the statistics of the wheat market.

In boom times, you would record the equilibrium point shown at green E', and in bad times, the equilibrium point E. Take a ruler and join the green points E and E' in Fig. 4-4(b). The fallacy to be avoided like the plague is expressed as follows: "I have disproved the law of downward-sloping demand; for note that when P was high, so too was Q—as shown by E'. And when P was lowered, instead of that change increasing Q, it actually lowered Q—as shown by E. My straight line joining E and E' represents an upward-sloping, not a downward-sloping, demand curve; so I have refuted a basic economic law."

Being alerted beforehand, one detects the fallacy in this argument. For at the same time that P went up, other things were *not* held constant; rather, income was also raised. The tendency for a rise in P to choke off purchases was more than masked by the countertendency of rising income to raise purchases. Instead of testing our economic law by moving *along* the demand curve, the beginner has measured changes that result from the *shift* of the demand curve.

Why is this bad scientific method? Because it leads to absurd results such as this: "On the basis of my revolutionary refutation of the law of downward-sloping demand, I confidently predict that, in the years when the harvest is especially big, wheat will sell for a higher rather than a lower price." Not only will such reasoning lead to absurd predictions that would lose fortunes for a speculator or a miller, but it also fails to recognize other important economic relationships—such as the fact that, when family incomes go up, demand curves for goods such as wheat tend to shift rightward.

Meaning of equilibrium The second stumbling block is a more subtle one, less likely to arise but not so easy to dispel. It is suggested by the following:

"How can you say that the equality of supply and demand determines a particular equilibrium price? For, after all, *the amount one man sells is precisely what another man buys*. The quantity bought must always equal the quantity sold, no matter what the price; for that matter, whether or not the market is in equilibrium, a statistician who records the Q bought and the Q sold will always find these necessarily identical, each being a different aspect of exactly the same transaction."

The answer to this must be phrased something like this:

You are quite right that measured Q bought and measured Q sold must be identical as recorded by a statistician. But the important question is this: At which P will the amount that consumers are *willing to go on buying* be just matched by the amount that producers are *willing to go on selling*? At such a price, where there is equality between the *scheduled* amounts that suppliers and demanders want to go on buying and selling, and only at such an equilibrium P, will there be no tendency for price to rise or fall.

At any other price, such as the case where P is above the intersection of supply and demand, it is a trivial fact that whatever goods change hands will show a statistical identity of measured amount bought and sold. But this measured identity does not in the least deny that suppliers are eager at so high a price to sell more than demanders will continue to buy; and that this excess of *scheduled supply* over *scheduled demand* will put downward pressure on price until it has finally reached that equilibrium level where the two curves intersect.

At that equilibrium intersection, and there alone, will everybody be happy: the auctioneer, the suppliers, the demanders—as well as the patient statistician, who always reports an identity between the measured amounts bought and sold.[2]

WHAT SUPPLY AND DEMAND ACCOMPLISHED: GENERAL EQUILIBRIUM

Having seen how supply and demand work, let us take stock of what has been accomplished. The scarce goods of society have been rationed out among the possible users of them. Who did the rationing: a board? a committee? No. The auctioneering mechanism of competitive market price did the rationing. It was a case of "rationing by the purse."

FOR WHOM goods are destined was *partially* determined by who was willing to pay for them. If you had the money votes, you got the wheat. If you did not, you went without. Or if you had the money votes, but preferred not to spend them on wheat, you did without. The most important needs or desires for goods—if backed by cash!—got fulfilled.

The WHAT question was being *partially* answered at the same time. The rise in market price was the signal to coax out a higher supply of wheat—the signal for other scarce resources to move into the wheat-production industry from alternative uses.

Even the How question was being *partially* decided in the background. For with wheat prices now high, farmers could afford expensive tractors and fertilizers and could bring poorer soils into use.

[2] A similar question of "measured identity" versus "scheduled intersection" can arise in the saving-investment discussion of income determination in Chapter 12.

90-664 O - 77 - 15

FEBRUARY 22, 1977.

Hon. EDWARD M. KENNEDY,
Russell Office Building,
Washington, D.C.

DEAR SENATOR KENNEDY: I have received a copy of the letter dated January 27, from Mr. T. A. Burtis, President, Sun Company, to yourself, and to Representative Bolling.

After reading the letter, I had some useful conversation with one of Mr. Burtis' colleagues, and we agreed to stay in touch to discuss questions relating to the quota auction proposal.

Mr. Burtis' letter is very welcome. He stresses, as would I, the variety of crude oils needed by various refineries. If anything, he does not go far enough in stressing the need for a continuing programmed flow of any given type of crude. The economics of moving huge amounts of liquids dictate a premium for the largest smoothest flow, and a penalty for irregularity or interruption. Parenthetically, this is what oil executives almost invariably mis-label as "access", or "security", two very different subjects.

Mr. Burtis' concern is well founded, but his objection is not relevant to the proposed system. The government cannot perpetrate a logistical horror because it takes no logistical action, touches no oil. Nor does it intervene at any stage in the process of buying and selling oil. The parties make their own deals, as they do now.

Because I was much concerned with the need for a smooth flow, which requires term contracts, I proposed in the Challenge article that half the tickets issued in any given month be valid for a period of months; and that there be unlimited resale. It would be an improvement to maintain a small inventory of tickets valid for a year ahead. During each month some of these inventory tickets would be used up, and some new ones offered, keeping the inventory constant. The net number of newly issued tickets would be expected imports. This would relieve sellers of hand-to-mouth existence, and make forward buying easier. I would tentatively purpose an inventory not to exceed one month's imports.

It would be helpful, though not essential, that the cartel governments not bid for tickets for at least a brief period, to let an orderly routine be established, with tickets selling at near-zero. But once even one government began paying more than a few cents for tickets bought covertly, every other government would be under the gun of a decision-either buy tickets or lose your whole market in the United States. Of the countries producing low-sulfur crude oil, Algeria. Libya, Nigeria and Indonesia sell us respectively 53, 24, 56, and 38 percent of their production. Venezuela is mostly a heavy oil exporter, but we take (approximately) 45 percent of their crude oil production, though much in the form of products.

Some of these countries are in acute need for foreign exchange, and all would face drastic sudden losses of income. In the rest of the world, customers are fully committed, for the same basic reason, the economies of large scale smooth flow. Substantial sales outside the U.S. would risk catastrophic breaks in price. These countries' bargaining position would be weaker than their customers'. Because one or more governments would have created by buying tickets, the rising price would mean that the demand for tickets exceeded the supply. By the same token, governments would be offering more oil than the American refiners were asking.

But suppose that the bidder produced not light low-sulfur crude oil but heavy oil. He might not send more of his heavy oil to this country than refiners wanted, forcing down the price, but exchange his heavy for light crudes to sell here. This is the kind of swap referred to in my Challenge article. We can turn to our advantage the worldwide network of exchanges which oil companies use all the time to get the right oil at the right time and place.

The need for a smooth flow also explains why, absent the auction system, there is little chance of governments chiselling substantial amounts on the price. (They have chiselled by small amounts). Refiners are free to shop around only intermittently, for small marginal quantities. The proposed system would put up for frequent bargaining not the supply stream itself but the value of the whole supply stream, i.e. the whole revenue stream to the OPEC nations.

I take the opportunity to point out an error, as I consider it, in the testimony of Mr. Kauffmann of Exxon, who stated that governments with suspiciously big

increases in their exports would quickly be identified as cheaters. This might have been true in the past. But under current conditions, large fluctuations in output have become commonplace. It would take months before a large persistent upcreep would be visible. But in the meantime, governments who lost market share would have only one means of self-defense: buy tickets. By retaliating, they would break-up the pattern. This would be the start of normal cartel erosion. It's always the other fellow who started cutting prices. Under the auction system, there is no use canvassing the customers to see who really started it, because they have all paid the market price. The cheating has been for the benefit of the United States Treasury.

A word about the proportional tax on oil prices. It is easy to say that the sellers would just add the tax on to the price, but that would lessen their net revenues. Appendix 2 to my statement is only a formal way to demonstrate what the cartel nations have long recognized, and complained of: the more the consuming governments take, the less is left for them.

The more we can take back from the cartel countries, the more we improve "the reliability and integrity of U.S. crude supplies". The less money those people have, the less their power to embark on political adventures, production cutbacks, further price hikes, etc.

I request that this letter be placed in the record of your Subcommittee.

Respectfully yours,

M. A. ADELMAN,
Professor, Massachusetts Institute of Technology.

STATEMENT OF RAGAEI EL MALLAKH, DIRECTOR, INTERNATIONAL RESEARCH CENTER FOR ENERGY AND ECONOMIC DEVELOPMENT AND PROFESSOR OF ECONOMICS, UNIVERSITY OF COLORADO, BOULDER, COLO.

Pursuant to the request of Senator Edward Kennedy as Chairman of the Subcommittee on Energy to report on my recent trip to various OPEC states with particular attention to policy recommendations to the United States Government, I submit the following observations and assessments relevant to economic options and trends.

In January of this year, I was in Iran, Kuwait, and Saudi Arabia, at which time I had a lengthy private meeting with the Prime Minister of Iran, a substantive interview with the Kuwait Minister of Oil and the Undersecretary for Economic Affairs of that Ministry (both of whom happen to be my former students), and two sessions with the Saudi Arabian Petroleum Minister, among other oil, economic, and planning officials and cabinet ministers in the three countries. Most of the discussions surrounded the future of OPEC and its pricing system arising from the December 15–17, 1976 Doha (Qatar) price fixing conference where the majority of OPEC (originally 11 members) supported a 10 percent increase as of January 1, 1977, to be followed by a further rise of 5 percent in July. Saudi Arabia and the United Arab Emirates did not follow this decision.

THE 1976 DECEMBER OPEC PRICING DECISIONS: WHO AND WHAT

First, this movement to the two-tier system should not have been unexpected by the United States and other consumers. Since 1974 there have existed two rather distinct schools of thought on pricing within OPEC, subliminal at times and, prior to the Doha meeting, having been dealt with through compromise and negotiations when the difference surfaced openly for formal price decisions. Moreover, regardles of pronouncements, there has always been variation through de facto prices based upon differences in oil quality. The unanimity on price increases in the past was due overwhelmingly to the Saudi position enforceable

---

NOTE.—Professor El Mallakh is Editor of the Journal of Energy and Development and has specialized in energy, developmental, and Middle Eastern and African economics for over 20 years. A citizen of the United States, the author has held grants from the National Science Foundation, Social Science Research Council, and the Ford and Rockefeller Foundations. He has written over 80 articles, reviews, contributions to books, and such volumes as Economic Development and Regional Cooperation: Kuwait (Chicago University Press 1968, 1971) and Capital Investment in the Middle East: The Use of Surplus Funds for Regional Development (Praeger Publishers, forthcoming 1977). The latter study was drawn in part from findings of a project on "Implications of Regional Development in the Middle East for United States Trade, Capital Flows, and Balance of Payments."

by that country's massive petroleum reserves (144 billion barrels) and its cushion of surplus funds (reaching some $47 billion in 1976) which allow for a relatively wide range of output fluctuations. Thus, while Saudi Arabia has not produced 50 percent or more of total OPEC output in the past, it is capable of doing so allowing for a slight time lag for technical adjustments.

Those in OPEC favoring the 10 percent increase base their judgments on (1) the rate of inflation as calculated by OPEC's Economic Commission Board (ECB) over the past 15 months (to December 1976) at a 26 percent rise in the cost of OPEC imports, (2) that the 10 percent hike (to be raised an additional 5 percent in mid-1977) can be managed and absorbed without major difficulties by the world economy, and (3) the postponement of the North-South meeting which was scheduled for December 1976. The latter point was interpreted as an indication that the industrialized nations were not yet willing to give an adequate response to Third World needs.

In the Saudi case, it appears their view was conditioned more by an evaluation of the international economy which believed the 26 percent imported inflation rate figure too high. Equally significant in Saudi decision making seems to have been the worry that the world economy's recovery was insufficient to absorb or deal with a 10 percent oil price rise. Additionally, Saudi Arabia takes the North-South dialogue more seriously than its fellow OPEC members because it has been an initiator and prime mover in this relationship since 1974 and heavily involved in the selection of the country representatives to the sessions. The Saudis saw their moderation in the price increase as an incentive to the industrialized consumer nations to deal with Third World problems in a constructive and affirmative manner when (not, in the Saudi view, if) the Conference on International Economic Cooperation convenes. Finally, the Saudis visualize the use of moderation in oil pricing as a method to secure an ongoing initiative and concern by the United States in resolving the Middle Eastern political conflict and bringing peace to the region through such measures as a determined effort in a reconvened Geneva Conference. Obviously, Saudi Arabia sees its oil price moderation as a clear and positive signal to the new Carter Administration and expects some response to its attitude.

WHERE IS OPEC HEADED?

The impact of the OPEC December 1976 price increase has been muted in large part to date because of the extensive stockpiling in the fourth quarter of that year. The first quarter of 1977 has been marked by destocking, giving a distorted demand picture which will be short lived. For example, Iran's oil production plummeted from about 6 million barrels per day (b/d) in the last three months of 1976 to around 4 million b/d in the first half of January 1977; stockpiling pushed up the first statistic while destocking depressed the latter. Similarly, Kuwaiti output averaged 1.2 million b/d in January 1977 as compared with an average of 2.2 million b/d in 1976. It is expected, however, that more lifting will occur in Kuwait and Iran as a result of the return of a more normal demand situation arising from the decline in stocks of the consumer countries and the severe winter in the United States. Further, as the economic recovery in the West gathers momentum, petroleum demand is expected to continue to rise overall. With growing demand, the price "conflict" within OPEC should lessen and OPEC as a body is likely to be strengthened under conditions obtaining in a "seller's market."

Another factor pressuring against the two-tier system and pushing toward evolution of a single OPEC price is the difficulty with which production programming can be designed and implemented among the group of 11 countries announcing the 10 percent price increase to share the cutbacks in output and thereby balancing the rise in production from Saudi Arabia and the United Arab Emirates. It will be recalled that member countries such as Algeria and Libya have suffered little from the temporary effects of destocking in early 1977 due to the high demand for their type of crude (light gravity, low sulfur). Demand for this type of oil is increasing, particularly in the Eastern region of the United States. The brunt of output slashes has fallen on Kuwait, Iran, and Iraq. Moreover, the absorptive capacities or the need for oil-generated funds vary among the OPEC economies. Iran and Iraq are large absorbers while Kuwait, with its limited population and high capital reserves, is a low absorber.

The split which occurred at the Doha meeting has fueled the hopes of those who are awaiting the demise of OPEC, predicted as imminent by a number of individuals for some time. In my view, these hopes might be at least two decades premature. OPEC as an organization with significant clout in international

petroleum trade will be here to stay for a number of reasons. (1) The seller's market will continue and even be strengthened through the 1970s and 1980s. (2) Both Saudi Arabia and its major so-called price adversaries realize that their past solidarity within OPEC is responsible for their present position of power in the oil market and in the increased government-take per barrel. Moreover, OPEC was created to protect its members against abrupt price declines and, hence, levels of revenues as experienced in 1959–60. (3) Although Saudi Arabia may be able technologically to up production dramatically after 1977 to meet increases in world demand, it is questionable that this is seen as a long-term or viable option by that country. With sufficient capital reserves and confronted by difficulties in absorbing the funds generated at the 8.5 million b/d ceiling at pre-Doha prices, Saudi Arabia has a hard time justifying a sustained substantially higher level of exports. (4) Aside from economic opportunity costs involved in lifting oil now as compared to later (under conditions of greater scarcity), there are political considerations other than bailing out the consuming nations.

Many of Saudi Arabia and United Arab's Emirate's fellow OPEC members are also neighbors and regional stability is politically desirable. Thus, the pivotal OPEC state of Saudi Arabia must balance its own political position between the two (the West and OPEC members) and unless there are rewards for increased Saudi output along the lines noted earlier, the regional benefits of lowering production could be more alluring and defensible in Saudi policy-making circles. (5) Within OPEC, one should always bear in mind the argument is not over whether prices should go up or down, but rather over how much they should go up. OPEC's decisions have never been binding on its member governments; this has been a structural strength in that the body only can and does move on issues of strong mutual interest.[1]

U.S. POLICY OPTIONS AND REALITIES

The most powerful components of OPEC in terms of oil reserves, output, trade, and capital funds are Middle Eastern nations. Accordingly, not only our specific economic and political policy vis-a-vis a given country is important but that towards the region as a whole. Clearly of benefit to the United States and the other consuming nations are peace and stability in the area for (a) security of oil supply and (b) a healthy trade relationship to offset importers' balance-of-payments outflows. Specifically, there are a number of policy options open to the United States within the framework of the new global realities.

The first and most constructive attitude or approach for the United States is in facilitating the transfer of technology to OPEC and Middle Eastern countries, particularly in energy-intensive industries. The oil producer commitment to the development of alternative energy sources is not a "smoke screen" but one of necessity as exports of a depleting asset increase. Moreover, such countries as Saudi Arabia, United Arab Emirates, and Kuwait are basically one-product economies. Most recently France has concluded two cooperative agreements with Saudi Arabia following President Valery Giscard d'Estaing's visit in January 1977 for the development of solar energy and nuclear research for peaceful purposes.

Second, to create incentives for such low absorbers as Kuwait, Saudi Arabia, and United Arab Emirates to continue a high level of oil exports, a positive attitude toward OPEC and more specifically Arab producers' investment in the United States should be fostered. This would entail eliminating obstacles and discrimination, opening up money and equity markets to oil investors, and providing safeguards against political actions such as freezing assets of nations and other governments as has happened in the past.

Third, because of the balance-of-payments problem of the United States as petroleum imports rise (and could continue to do so for the next 15 to 20 years), trade also must be encouraged and expanded. The Middle East is the fastest growing single market in the world today, more important in dollar value than trade with the entire Soviet bloc. A vital export sector in the United States is directly reflected in a higher U.S. employment level. While American products and services have a good name and are admired in the Middle East, the United States is not in a competition-free vacuum there in the trade arena. French con-

[1] The sinister and powerful image of OPEC per se has been greatly exaggerated. For example, when visiting the Vienna headquarters, one is struck by the fact that the entire Economic Department's staff, including secretaries and file clerks, numbers less than a dozen persons. The body is, in fact, a representative of its individual members' power.

tracts with Saudi Arabia alone have risen from $8.6 million worth in 1973 to $1.6 billion worth in 1976.

Fourth, the United States national interest lies in orderly development and stability in the Middle East region. In the past two decades, the American reliance on Middle Eastern petroleum was primarily indirect; the scales now have tipped since the opening of the 1970s toward greater United States interdependence with that region as the Middle East has become the major source of needed direct oil imports. An interruption, upheaval, or war would mean a measurable negative impact on the U.S. economy and level of employment. The drawing together economically and politically of the key moderate countries of Iran, Egypt, and Saudi Arabia should be viewed and reacted to as a positive development because these three states account for about one-half of the population of the region, more than a quarter of the world's oil reserves, and the most critical in oil logistics (Egypt with the Suez Canal and the Sumed pipeline stands as the most important transit country). All three are definitely pro-West generally and pro-United States in particular and are pushing for their national development in cooperation with the industrialized West. An aspect of regionalism in the area is the mobility of capital funds; investment in the region by the oil states enhances political stability in the recipient countries and can also finance additional imports expanded potential markets for American products. Some serious consideration should be given to triangular arrangements with OPEC states where U.S. technology, skills, and equipment could be combined with an oil producer's funds for a project in a third country.

Fifth, as 1977 opens it should be abundantly clear that direct United States interests in the Middle East are so great that they can no longer be sidestepped or overlooked. Were there to erupt another military conflict along the lines of 1973 and the subsequent dislocations, the economic consequences, quite aside from the tragedy of human suffering, are unthinkable for all parties concerned. It is highly questionable that there could be a winner and almost certainly the United States would be the major loser. If our economy and energy system are so precariously balanced that a prolonged cold spell can so disrupt our national economic life, an interruption which would affect almost 30 percent of our oil needs would be a disaster. Moreover, the Middle Eastern and North African members of OPEC are emerging as the major sources from which the United States will be importing LNG (liquefied natural gas).

Sixth, our policies toward OPEC and its individual members could benefit from an attitude of greater *cooperation rather than confrontation*. Within the Middle East one discovers almost bewilderment over what is apparently American resentment and antagonism against the growing United States-Middle Eastern interdependence. Such an aura of hostility is largely absent in the relationship between the OPEC members (the Middle Eastern states in particular) and other major importers as Japan and the European consuming industrial countries, e.g., France, Germany, and the United Kingdom.

Seventh, the solution to *the United States energy problem* and, in fact, the global energy crisis, *involves three interrelated elements* or policies; (a) *conservation*, (b) *development* of new energy sources, and (c) *cooperation* with the suppliers of traditional energy sources. For example, scarcity has added immediacy to the conservation impetus; nonetheless, implementing significant conservation will require time. Cost and the availability of capital play important roles in the development of new energy sources; again, time is needed to evolve rational and commercially feasible alternatives. Thus, conservation and the development of new energy sources cannot be viewed as alternatives to cooperation with the major producers but rather as part of an overall medium and long-term strategy to meet the world's energy demands.

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, D.C., January 4, 1977.

To: Members, Subcommittee on Energy.
From: Edward M. Kennedy, Chairman.
Subject: "Energy Independence or Interdependence: The Agenda With OPEC"—Hearings, January 12 and 13, 1977.

The recent decision by Saudi Arabia and the United Arab Emirates to split with the 11 other members of the Organization of Petroleum Exporting Countries (OPEC) over the price of crude oil was as unexpected as the decisions by

OPEC in the early 1970s that radically transformed the international oil market and made the "energy crisis" a household word. Although OPEC's decision to operate with a two-tiered pricing system is not likely to have an economic impact comparable to the quadrupling of crude oil prices that occurred in 1973–74, it has opened up another period of considerable uncertainty and change on the world oil scene. The assumptions and predictions of most experts, in this country and abroad, about the likely behavior of OPEC at the Qatar meeting have once again been proved wrong. The policies that the United States and other oil importing countries should pursue in these changing conditions remain either unclear or in dispute.

In light of these circumstances, the hearings by the Subcommittee on Energy—"Energy Independence or Interdependence: The Agenda with OPEC"—scheduled for January 12 and 13 are most timely. With the experience and knowledge of the post-embargo period to draw on, we now are in an excellent position to make some basic judgments about this country's future international energy policies. The time for "muddling through" and "hoping for the best" has clearly ended.

This staff memorandum outlines some of the issues that are likely to arise in the upcoming hearings and it draws from much of the testimony and data that were developed in hearings by the Subcommittee in 1975 and 1976. It is hoped that the Subcommittee members will find this summary analysis useful in considering the testimony of the scheduled witnesses and in asking questions. Questions about this material can be directed to John Stewart or Sarah Jackson of the JEC staff.

The topic for each day of the hearings and the scheduled witnesses are as follows:

January 12—"The Future of OPEC: Will the Glue Hold?"—1318 Dirksen

Theodore H. Moran, Professor, Johns Hopkins School of Advanced International Studies, Washington, D.C.

Morris Adelman, Professor, Massachusetts Institute of Technology, Cambridge, Mass.

Mr. John H. Lichtblau, Executive Director, Petroleum Industry Research Foundation, Inc., New York, N.Y.

A. J. Meyer, Professor, Harvard University, Cambridge, Mass.

January 13—"Energy Independence or Interdependence: U.S. Policy Choices"—1202 Dirksen

Anne Carter, Professor, Brandeis University, Waltham, Mass.

John Sewell, Overseas Development Council, Washington, D.C.

Howard Kauffmann, President, The Exxon Corporation, New York, N.Y.

John Sawhill, President, New York University; former Administrator of the Federal Energy Administration.

Paul Davidson, Professor, Rutgers University, New Brunswick, N.J.

I. ENERGY INDEPENDENCE

Although the outlines of the energy crisis of 1973–74 had been visible for several years, the magnitude and rapidity of the changes precipitated by the OPEC price rise and the Arab oil embargo caught the U.S. Government, and just about everyone else, by surprise. In November 1973, as the effects of the embargo and the higher prices were beginning to hit home, President Nixon declared in a nationally-televised address that "Project Independence"—a combination of increased domestic drilling, the use of alternative fuels, and a massive expansion of nuclear power—would achieve self-sufficiency in energy for the United States by 1980. Since then, the goal of energy independence has undergone considerable redefinition by the Administration, although the concept has lingered as the underlying goal of U.S. energy policy. At present, the Federal Administration considers oil imports of no more than 6 million barrels per day by 1985 to constitute "energy independence".

The obstacles to pursuing a strategy that would leave the United States totally independent of foreign oil by 1985 are several: the extremely high cost of producing alternative synthetic fuels in commercial quantities (in general, the cost of synthetic fuels is about $10 per barrel more than OPEC oil); the environmental risks that such a crash program would entail; doubts about the wisdom of a policy that would "drain America first", leaving future generations without essential oil and gas for petrochemical processes; continuing technical and cost problems associated with a large-scale shift to nuclear energy; and the inevit-

able dependence of our allies in Europe and Japan on imported oil for their economics, regardless of United States sources in achieving energy self-sufficiency. Whether it is from the perspective of economic costs, technical problems, or international politics, the process of achieving "energy independence" involves a host of problems that are not likely to be resolved in the foreseeable future.

It is time to abandon the rhetoric of "energy independence" and get on with a more realistic effort that acknowledges the inevitability of U.S. dependence on foreign oil. At the same time, we should be far more diligent and imaginative in working toward international energy relationships that protect the vital interests of the United States, along with those of other indusrialized consuming nations. This effort will necessarily include our taking into account the interests of the oil-exporting countries and those of the developing nations.

Because the policy goals of the United States have not been grounded in the reality of energy interdependence, our international energy efforts in the aftermath of the oil revolution of 1973–74 have reflected great uncertainty and improvisation. We have threatened the military occupation of Arab oil fields and then backed off. We have proposed ambitious schemes to link together the technical ability and capital of the industrialized nations with the development of energy resources in the developing countries and had these proposals ignored. Most of the time, we have been content to rely on informal jawboning of oil exporting nations.

This record of missed opportunities and false starts is unacceptable. To improve it, we need to reach agreement on and then carry out a U.S. energy policy that addresses two fundamental questions:

What domestic energy policies can hold our dependence on foreign oil to minimum levels?

What international energy policies can move us in the direction of securing reliable sources of imported oil at reasonable prices?

This memorandum and the testimony at the upcoming Energy Subcommittee hearings will focus primarily on the second question.

II. THE FUTURE OF OPEC

The Western oil importing nations, led by the United States, have displayed a remarkable ability to misread and misunderstand the functioning of OPEC. In most instances, international energy experts have relied heavily on past events and prior OPEC behavior in their attempts to understand the cartel's present and future actions. For, example, the probability of massive price increases and an oil embargo were almost totally discounted in the early 1970s because OPEC had been unable to sustain such policies in the 1960s. This year it was assumed by most experts that the members of OPEC would unanimously support a single price for Saudi Arabian marker crude because the cartel had demonstrated surprising cohesiveness during the events of 1973–74 and in the face of the sharp decline in world demand for oil during the recession of 1974–75. On both occasions the experts were wrong. In the first instance they failed to appreciate the new cohesion that OPEC developed once the vulnerabilities of the Western consuming nations and the companies were exposed and a five-fold increase in government oil revenues was achieved. More recently the cohesiveness of 1973–1975 was simply taken for granted, despite the internal politics of the cartel itself and the conflicting economic pressures that motivate its individual members.

In weighing U.S. policy towards OPEC, several factors should be kept in mind. Despite ringing public pronouncements about producer solidarity, OPEC remains a loosely aligned group of 13 nations with widely varying political and economic interests. The oil resources to support these divergent policy objectives vary greatly from country to country. Cultural, religious, and social traditions also vary widely. To cite two of the more obvious examples: the interest of Iran, Nigeria, Venezuela, and Indonesia in generating maximum revenues in the short run before their limited oil reserves are exhausted is very different from Saudi Arabia's interest in securing stable markets for its mammoth reserves that will last well into the next century. Although the Arab members of OPEC view oil as a political weapon in their struggle with Israel in a way not shared by non-Arab members, there are also striking differences among Arab states as to how this weapon should best be used.

Sheik Ahmed Zaki Yamani, the Saudi Arabian minister of petroleum, gave some hint of these differences—both economic and political—in the aftermath of the Qatar meeting when he commented: . . . In the past they (other OPEC

states) used to decide for the Saudi crude and raise the price for it, and in the meantime they sell their crude at a much lower price. For instance, the Iraqis—they used to dump the market with their oil at a very low price, and other nations did the same. So what happened today is just the other side of the story . . ."

It is generally agreed that the cartel has never assigned explicit production shares among its members, a function traditionally believed to be essential in supporting a collusive cartel price. Instead, OPEC has relied on an informal system of production control, keyed to the amount of oil that companies are willing to lift, taking into account a variety of factors: contractual obligations, market demand, price differentials, and company policies.

These factors can combine in different ways to produce results that are not always to the liking of all OPEC states. Exports from individual countries often diverge conspicuously from OPEC's general pattern; there can be sudden production shifts, now in favor, now against, the interests of a particular country.

For example: Libyan exports fell 50% from May to November 1974 (1.95 MBPD or 0.96 MBPD), compared with an aggregate 7% decline in OPEC production during the same period. Subsequently, Libyan production rose from 1.4 MBPD in May 1975 to 2.1 MBPD in July; OPEC exports rose by 6.3% during the same period. Qatar production suffered a 50% decline in production between April and July 1975. Abu Dhabi production fell from 1.62 MBPD in July 1974 to 0.75 MBPD in July 1975. In contract, Iraq had a consistent increase in exports from May 1974 through October 1975, notwithstanding an aggregate decline in OPEC production during the same period.

These gyrations on the production of individual OPEC states suggest that while the cartel's informal prorationing system avoids the problem of deciding explicit production shares, it can also result in distinct winners and losers at any given point in time. As noted above, the market demand for particular types of crude oil, in combination with the pricing differentials that are set by individual countries (to reflect differences in sulfur content, density, distance from market, etc.) and other unknown factors, can shift buyers from one crude source to another. Efforts to agree on a common formula for setting price differentials have always bogged down at OPEC ministerial meetings.

A cautionary note, however, needs to be injected at this point. One should keep the impact of these marginal production shifts in perspective. Dr. Paul Frankel, chairman of Petroleum Economics Limited, London, in his testimony before the Energy Subcommittee last June observed: ". . . The collapsible extension of the main program can cover only a comparatively small part of the oil OPEC has to dispose of, or the oil which the offtakers have to take. . . . These ideas . . . suffer from the fact that the people, especially the economist, mistake the tail for the dog. That is to say, they look in a fascinated way at the movable fringe of the market, the spot sales, if you like, and forget that in an energy industry the overwhelming part of the operations must be planned and operationally executed over a long period with a great deal of advance planning because it cannot be done on an ad hoc basis. . . . The fringe operations are very important, but they have to be seen in the right context."

OPEC's recent decision to operate under a two-tiered system for pricing its marker crude, if it is sustained for any period of time, will complicate OPEC's system of production control. A major factor in OPEC's success to date has been the single price for marker crude; it was relatively simple to administer and easy to police. A two-tiered system complicates the pricing process and provides more opportunities for price shaving and special deals. In addition, Saudi Arabia's willingness to serve as the residual balancer of the cartel—that is, its ability to hold aggregate OPEC production to levels that support the marker crude's price level—is now in doubt; its apparent decision to increase production beyond the annual average of 8.5 MBPD will exert downward price pressure on higher-priced crudes and the loss of crude sales by other OPEC states.

Initial pricing decisions by other OPEC countries provide a range of increases, including a $1.38/barrel increase for high-quality Libyan crude, a $1.06/barrel increase for better-grade Nigerian crude, $.75/barrel for the principal Indonesian crude, and about a $.58/barrel increase by Saudi Arabia on its marker crude. Increases seem to be averaging about 8% or $1.00/barrel. It also appears likely that the additional 5% increase in July 1977 that was approved by the 11 higher-priced countries will be abandoned.

OPEC's two-tiered pricing system has also created a situation where it will be possible to assess the degree of competition that actually exists among the

multinational oil companies in purchasing OPEC crude, as well as their alleged role in setting production levels within individual producing countries. As noted above, the basic price differential between Saudi Arabian and UAE crude and that produced by the 11 other OPEC states is in the range of $.60/barrel. Assuming Saudi and UAE production increases, will oil companies buy as much of the lower priced crude as they can, and will they cut back their liftings of higher priced crude in other OPEC countries? If, on the other hand, oil companies continue to lift higher priced crude in order to preserve their access to crude agreements with OPEC states. it will provide important evidence of noncompetitive behavior by the companies and illustrate a willingness by the companies to perform the prorationing functions of the cartel.

(Note: This crucial question of the relationships between the companies and the OPEC countries is being analyzed in detail by the General Accounting Office at the request of the Energy Subcommittee and the full Joint Economic Committee. This report, when it is filed in late winter, will provide additional data and analysis for making a judgment about whether the oil companies are in league with the cartel, a charge which oil company witnesses before the Energy Subcommittee have denied.)

It is too early to know how OPEC will attempt to resolve these new sources of instability within the cartel, or even if the breach can be resolved. Political factors not related to the economics of international oil, particularly the success or failure of efforts to reach a negotiated settlement between Israel and the Arab states, will be very important in determining Saudi Arabia's future course. Decisions by the oil companies whether or not to seek out the cheaper Saudi Arabian and United Arab Emirates crude will also be crucial in determining how much of the higher-price crude is lifted.

It is, however, premature to predict the swift demise of OPEC in the sense of widespread price-cutting as a way of protecting production shares. Even if all other OPEC members reduced prices to make their crude more competitive with Saudi Arabia's, the world would still be paying in excess of $12 per barrel compared to $11.51 before the Qatar meeting. The common need of all OPEC members, even Saudi Arabia, for large oil revenues to support ambitious development projects will also work against any trend toward wholesale price-cutting, even while individual producing countries attempt to manipulate price differentials to their respective advantage. Finally, there still exists among the cartel members a clear memory of the low prices that prevailed before 1973 and the real gains of the price quadrupling that resulted; this recollection should work against any disintegration of the cartel in the short-run.

III. U.S. POLICY TOWARD OPEC

The most obvious lesson of Qatar is that the consumer nations should not regard OPEC as monolithic entity impervious to external political and economic pressure. The consuming nations need for OPEC oil is, to some degree, offset by the oil-exporting nations need for revenue, capital goods, and expertise that only the industrialized West and Japan can provide. The factors affecting the cohesion of the cartel are multiple and can be influenced in unexpected ways. As a result, the opportunities to pursue potential bargaining advantages may be enhanced by the internal divisions, now becoming more apparent, in the loosely structured OPEC cartel. But in formulating U.S. strategy toward the cartel, it makes little sense to think in terms of restoring the international oil system that existed prior to the oil revolution of the early 1970s. We must, instead, think in terms of a system that simultaneously takes account of certain fundamental interests of oil-importing nations, oil-exporting nations, and the developing nations.

A renewed effort of the United States to deal realistically with the problems of an energy-independent world must include a candid appraisal of the proper roles of the U.S. multinational oil companies. Historically, two assumptions have governed the relationships between the U.S. Government and the multinational oil companies in their overseas operations: first, that U.S. interests and those of American oil companies abroad were largely identical; and second, that the oil companies could be used as vehicles of U.S. foreign policy, especially in the Middle East. Whatever else may be said about the efficacy of these arrangements, the oil companies succeeded in acquiring the concessionary rights to large quantities of the world's oil and in delivering this oil at prices that declined in real terms during the 1950s and 1960s.

The oil revolution of the early 1970s stripped the companies of their power to impose prices on the OPEC states and either has eliminated, or soon will, their

equity interest in OPEC oil production. The companies, however, continue to provide most OPEC members with valuable managerial and technical services and their integrated operations are essential to the orderly disposition of a large, although declining, portion of OPEC crude oil and products. Moreover, decisions by the companies to buy and sell different grades of crude oil from individual countries, taking into account their contractual obligations and price differentials, seem to have provided OPEC with an informal prorationing system. The companies, for their part, have an obvious commercial interest in maintaining their access to OPEC crude on terms no worse than their competitors.

These emerging arrangements between companies and producing countries clearly have challenged the two assumptions of the pre-1970 era. No longer can it simply be assumed that the interests of the United States and those of the companies are identical, since the companies' continued access to OPEC crude depends, in some measure, on their willingness to operate in a manner consistent with the producing country's view of its own national interest. Whose interests, then, command the loyalty of the U.S. multinational oil companies? Are they those of their stockholders, their home country, or the host OPEC nation?

There is no simple answer to this question. Yet, there can be no serious argument with the proposition, as stated recently by the Federal Energy Administration, that: "the international arrangements governing the lifting and pricing of oil . . . although traditionally and largely a matter of private commercial concern, nevertheless may substantially affect United States energy interests and objectives regarding supply security as well as the price of imported oil. The increased control over international oil production and pricing on the part of OPEC governments in the early 1970's, and the oil embargo and subsequent petroleum price increases by the OPEC cartel, have generated increased public concern about the impact on U.S. national energy interests and objectives of the arrangements between private U.S. companies and foreign governments affecting international oil trade."

In testimony before the Subcommittee on Energy last June, Robert A. Krueger, author of an FEA-sponsored study on options for U.S. international energy policy, said: "Our report, which was released in February of 1975, indicated that there was a clear-cut need for a greater involvement, a greater presence, by the U.S. Government in the activities of U.S. firms in international petroleum transactions. . . . It was also very clear that the oil companies operating abroad, both the U.S. and foreign countries, and both the independents and majors, had become virtually hostages of the major producer nations and lacked the will and resources to resist their demands for higher prices and greater 'participation'. We concluded that 'the existing incentives for the companies do not assure that their behavior will be consistent with the national interests of the United States'."

The June hearings explored several proposals to increase the presence of the U.S. Government in international oil transactions, such as:

access by the Government to relevant information regarding present and future significant international petroleum arrangements;

power by the U.S. Government to review and approve such transactions that affect significant aspects of the national interest;

placement of a U.S. Government member on the board of directors of every oil company operating abroad; this group of government directors could then form a body in itself to give direction to U.S. oil policy abroad.

U.S. Government witnesses at the June hearings testified that no further governmental powers were needed; the existing process of informal consultation between government and company officials was satisfactory. However, on November 10, 1976, the Federal Energy Administration published in the Federal Register a "request for comment" on the need for "additional reporting requirements with respect to arrangements which U.S. oil companies and their subsidiaries have with producing governments and their oil companies." The FEA "request for comment" outlined a number of informational categories that could be covered, including reports on significant negotiations in progress between U.S. oil companies and producing countries (such as the present Aramco negotiations with Saudi Arabia). A number of comments were submitted to the FEA; at this writing, however, no further action has been taken. Nonetheless, the fact of the FEA's issuing the "request for comment" casts doubt on the Government's earlier testimony about the adequacy of the informal consultative process that is presently relied upon.

In addition to weighing the need for a greater Government presence in international oil transactions, Congress must also focus on the level of competition that exists among the companies themselves in their overseas operations, as well

as the relationship of the companies to the producing countries in supporting the OPEC price. At the June hearings, William J. Lamont, a Washington attorney, pointed to the integrated structure of the major international companies as resulting in an absence of effective competition and a desire by the companies to cooperate with the OPEC cartel in maintaining its collusive price level. Mr. Lamont said: ". . . The multinational companies and their allies in the OPEC countries have basically a control which we cannot directly shape as long as the organization of the oil markets remains what it is. No matter what we choose to do, no matter what strategies we seek to apply, we will run up against the basic fact that oil movements are now controlled by a series of markets in which buyers and sellers have virtually identical interests, as far as crude oil is concerned."

Lamont recommended restoration of competition through active enforcement of the antitrust laws in relation to both the domestic and international operations of U.S. oil companies. In the absence of a judicial remedy, Congress should require divestiture of the oil companies' vertically-integrated components.

James F. Flug, director and counsel of the Energy Action Committee, in a more recent comment on the OPEC meeting, wrote: "The most pervasive factor is that all of the customers of the OPEC countries are 'integrated' oil companies. That is, the refineries which buy and use the OPEC oil are not just refiners but also have heavy involvement in oil production both in the OPEC countries and elsewhere. Thus, when they make a decision as to where to buy crude oil and how much to pay, they cannot really act as 'independent' arm's-length buyers looking for the best buy. They have to take into account the interests of their production affiliates and frequently those interests are contrary to the interest of the refiners and the customers for refined oil products."

As discussed earlier in this memorandum, the new two-tiered pricing system provides an opportunity to assess the validity of this allegation.

In addition to the proposals for requiring a greater presence by the U.S. Government in international transactions of private oil companies, there is existing authority contained in the Energy Policy and Conservation Act (EPCA) for the U.S. Government to become the exclusive importer and purchaser of all or any part of the crude oil or petroleum products of foreign origin for resale in the United States. The President is also granted authority ot sell, on the basis of competitive bids, at a price above or below cost "if . . . such sales may result in progress toward a lower price for oil sold in international commerce." In essence, this provision would remove private oil companies as the direct purchasers of OPEC oil and substitute a sealed bid procedure managed by the U.S. Government. It would also permit below-cost resale by the Government as a way of creating suspicion and distrust among OPEC members that others might be cheating, hopefully initiating a proces of retaliatory price-cutting.

Professor Morris Adelman of the Massachusetts Institute of Technology has proposed a variation of the direct Government import authority: that is, selling import entitlements (or quota tickets) at public auction by sealed bids. As with direct Government purchases, the objective is to drive down the cost of imported oil by disrupting the cartel's informal pricing and prorationing system. In Adelman's view, the oil companies would be removed as the cartel's agents for determining production levels by individual countries, although the companies would continue to produce, transport, refine, and sell petroleum products. Producing governments, by bidding secretly for entitlement tickets, would find themselves competing with each other for access to U.S. markets. Severe erosion, not collapse of the cartel, would be the end result.

Given the recent fissures in OPEC solidarity, such a scheme—or use of the EPCA authority for direct governmental purchases—might be plausible. Others feel, however, that such a strategy would be the most likely way to reunify the cartel around a single world price. Questions have also been raised about the U.S. Government's ability to manage the complicated logistics of moving oil in the international market. And what would happen if the cartel simply refused to offer any oil for direct sale to the U.S. Government? Or if the cartel members coordinated their "secret" bids at $.50 above the world price? Would the U.S. be forced to back down?

The direct Government purchase authority could be used in a more limited way to acquire crude oil and refined products for the Strategic Petroleum Reserve, as authorized by the Energy Policy and Conservation Act. The Federal Energy Administration has recently proposed that the United States acqire and store, over a period of about 5 years, 500 million barrels of crude oil at the cost of about $8 billion. Direct purchase of this oil by the U.S. Government would be another

way to exacerbate the cartel's divisions at a time when certain OPEC countries may be looking for opportuntities to replace sales lost to Saudi Arabia and ready to offer discounts or other price incentives. Such a direct purchase arrangement could also be viewed as a first-step in the operations of a U.S. national oil corporation whose functions could be expanded subsequently, both domestically and abroad.

There are other policy choices open to the United States in pursuit of the goal of constraining OPEC's power to fix world energy prices. The United States, for example, could link the availability of capital goods, technical services, and the like to a willingness by OPEC governments to provide oil at below the world price, possibly in relation to acquiring oil for the Strategic Petroleum Reserve, as discussed above. Exploratory talks in the pre-Qatar period between U.S. representatives and individual OPEC governments were not encouraging. But the new dynamics of the international oil market caused by the OPEC split may have opened up opportunities that are now worth exploring.

The U.S. Government could also move toward a stronger presence in existing and developing private sector relationships with OPEC, stressing the benefits of industrialization and high technology that can only be obtained from the U.S. and other industrialized countries. The U.S.-Saudi and the U.S.-Iran Joint Economic Commissions, for example, provide forums for strengthening these bilateral relationships and, it is hoped, further reducing the common economic interests of the cartel. Specifically, the charters of these joint commissions could be enlarged to include dealings in hydrocarbon-related areas. Even though the hydrocarbon industries are the most intensive parts of the Saudi and Iranian five-year development plans, they presently are outside the bilateral arrangements represented in these joint commissions.

Hard bargaining by the U.S. with individual OPEC states, expanded bilateral economic relationships, and policy initiatives designed to achieve greater competition and lower oil prices are important parts of a more realistic international energy policy by the United States. But U.S. international energy policy cannot limit its focus to problems caused by United States dependence on foreign oil. OPEC's energy price increases have had a much more severe, and continuing, impact on the developing countries. In fact, the energy crisis of 1973–74 has forced a new awareness by the United States of the broader problem caused by the developing countries' struggle to survive economically.

Initially the U.S. relied on a strategy of confrontation in response to the quadrupling of world oil prices, including some veiled hints at the use of military power in dire circumstances. This approach soon proved hollow: the United States had little intention of occupying Arab oil fields and we obviously needed OPEC's oil. Moreover, in the absence of a common front among oil-importing industrial nations, it was evident that most of the goods and services we might withhold from OPEC could (and would) be sold by Japan and Western European allies.

Since then, the United States has adopted a different approach, consisting of two basic policies. First, we helped to create the International Energy Agency (IEA) of industrial states, which has adopted common oil-sharing arrangements for a time of crisis, created a "safety net" to relieve the balance of payments problems of countries hardest hit by high energy prices, provided for an information system on international oil markets to which all member nations contribute, evaluated the efforts of member countries to reduce energy consumption through conservation, and initiated a limited number of cooperative energy research and development projects.

Second, the United States shifted to a policy of seeking better relations with OPEC states as part of a broader effort to deal constructively with the problems of the developing countries. Secretary of State Kissinger first presented this approach at the Seventh Special Session on Development of the U.N. General Assembly in September 1975. This was followed up by the convening in ministerial session of a Conference on International Economic Cooperation (CIEC), consisting of 8 industrial states and 19 from the developing world, in Paris in December 1975. CIEC was also an outgrowth of a proposal by the French Government, and met the objectives of the proposals for a world energy conference, in November 1973.

This cooperative approach to dealing with the world's energy problems reflected three propositions: (a) that there is value in drawing the oil producers increasingly into the global economy, with real responsibilities as well as benefits; (b) that while direct confrontation would not work, the oil producers are dependent on a workable global economic system (dominated by the Western

industrial states, despite OPEC power over world oil prices); and (c) that the OPEC states also were championing (at least rhetorically) ideas long advocated by the Group of 77 developing countries—namely, the striking of a new economic deal, often called a New International Economic Order.

Following the first ministerial meeting of CIEC, its work devolved upon four commissions—energy, other raw materials, development, and finance. While the industrialized nations have focused their efforts on convincing OPEC participants of the need for more moderate oil pricing policies, OPEC has stressed the need for guaranteed returns for its diminishing oil resources.

Saudi Arabia, for example, has proposed a deal where OPEC would guarantee production levels of crude oil adequate to meet the requirements in exchange for Western assistance for improving the absorptive capacity of OPEC states and diversifying their production base, protection of OPEC financial assets committed to investments in industrialized countries, and full access to industrialized country markets for crude and petroleum products by eliminating import restrictions. If the issue of oil prices was made part of this package, the basis for serious negotiation might be established.

Other oil producers want an agreement—more like a traditional commodity agreement—whereby future oil price increases would be related to the price of manufactured goods these countries seek. Most industrialized countries have opposed this scheme as unworkable.

The developing countries at CIEC has pressed their demands in two areas: the great burden of debt on developing countries (exacerbated by a net energy bill of more than $35 billion last year); and the need to stabilize their income produced by the sale of commodities in the world market. Neither issue is simple; neither can be resolved easily; both are heavy with symbolic significance in terms of the willingness of industrial states to respond to the economic needs of developing nations. Yet, the creation of CIEC has changed the terms of the debate. There is less emphasis on political confrontation by the Group of 77 nations and the developing states have concentrated more on their objective than on the concrete means to achieve it—the objective of increasing and protecting income from the sale of commodities.

The final ministerial session of CIEC was postponed this past December in anticipation that a new U.S. Administration might provide new impetus for reaching a comprehensive agreement. But the barriers to success are considerable. In particular, the large grouping of countries—8 industrialized nations and 19 developing nations—make it difficult to table negotiable proposals. Maximum demands hold both camps together. Fissures are likely to develop if any nation initiates more forthcoming proposals. It has been suggested that a reduction in the number of participants or in the size of the agenda would be beneficial in hammering out an agreement.

It remains to be seen whether future oil-pricing decisions by OPEC can be linked realistically to progress at CIEC. But in view of the generally increasing importance to the global economy of commodity-exporting developing countries, there is merit in proceeding with CIEC, on a business-like basis, while also pursuing on other fronts ways to achieve greater price restraint on the part of OPEC.

CIEC is also one among several forums where the impact of higher energy prices on the developing countries can be dealt with. Higher oil prices will mean an inevitable reduction in capital formation and the rate of economic growth in the developing countries. OPEC and the Western industrialized nations cannot escape the problem of devising politically and economically feasible arrangements for increasing the flow of capital back to the less developed countries.

IV. WORLD SUPPLY AND DEMAND

The future political and economic leverage of OPEC will be greatly affected by the world's demand for oil in relation to the world's supply (Recall that it was the elimination of all excess production capacity outside of OPEC that set the stage for the oil revolution of 1973–74.) In an analysis that generated considerable interest and discussion, Walter J. Levy's London office suggested last July that the world demand for oil by mid-1977 would exhaust the margin of OPEC's unused capacity that is currently available. To meet this demand and avoid a world supply shortage. Levy's firm calculated that Saudi Arabia would have to raise its annual production ceiling of 8.5 MBPD to about 10.0 MBPD. The significance of this decision by Saudi Arabia was underlined in the Levy analysis: "Saudi Arabia's decision could give some indication of how its policy is emerging

on what will be the most important single energy issue over the next 15 years. This is whether the level of Saudi Arabia's output will be that dictated by its own needs or that dictated by the needs of its customers; or whether it tries to bring the two figures closer together—by using the price mechanism."

The possibility of a supply crunch in mid-1977 has not developed. Saudi Arabia, for the moment, seems to have decided the production issue in favor of its customers by signaling its intention of increasing production above the 8.5 MBPD level. Recovery from the worldwide recession of 1974–75 has not been as rapid as anticipated. Moreover, new production from the North Sea fields and the North Slope of Alaska in 1977 is expected to alleviate any further world supply shortages for the next 4 or 5 years, although some experts are more pessimistic on this score. The Saudis will continue to hold the key to adequate world supplies.

Even if one is correct in predicting an adequate level of petroleum production into the 1980s, the question of security of supply will remain for oil-importing countries. By the spring of 1976, imports by the United States from Arab oil-exporting states and Nigeria had risen to over 3 MBPD—nearly 64% of total U.S. imports—and this upward trend has continued. These figures underscore the fact that the United States and other oil-importing nations remain extremely vulnerable to external developments affecting security of supply. A shortfall might result from several circumstances short of an outright embargo. First, a decision by Saudi Arabia (possibly in the aftermath of a failure to reach an acceptable settlement with Israel) to reduce production to about 5 MBPD; second, abrupt political change in oil-exporting nations which clearly have the potential for internal upheaval; and third, disruption of trans-shipment and transportation facilities by natural causes, accident, war, revolution, or terrorism. The long supply chain from the oil-exporting nations on which the United States now depends is only as strong as the most fragile link, such as loading platform, a pumping station, or a pipeline.

These contingencies—plus the fact that world supplies may again run short in the early 1980s—make it essential for the United States to take every reasonable step that will reduce its vulnerability. Edward R. Fried and Charles L. Schultz, in their overview for Higher Oil Prices and the World Economy (Brookings, 1975), emphasize the important role of energy conservation in reducing U.S. dependence on OPEC: ". . . There appears to be more room for minimizing economic losses through conservation measures than through expansion of domestic sources of energy . . . Apart from new production from the North Sea and from the north slope of Alaska, the reliability of the projected increases in U.S. production of oil and gas incorporated in the FEA and OECD projections is subject to particularly large uncertainties. While still highly tentative, the most recent official reasssessments of potential supplies of oil in the United States have been substantially more pessimistic than earlier views. The pursuit of expansion of supplies remains highly desirable, even in the face of considerable uncertainty about results. But success in limiting the growth in world oil imports probably will depend heavily on measures to restrain consumption."

Congress in the past two years has passed a number of important measures to achieve greater efficiency in the end-use of energy, but the implementation of these programs by the exeecutive branch has been slow and, in some cases, half-hearted. The first step, then, in any serious effort to reduce U.S. energy consumption is to proceed with the vigorous implementation of those programs already on the books. Adequate funding of these programs for the remainder of fiscal year 1977, coupled with committed executive leadership, would constitute a solid beginning. Of course, it is also essential to proceed with the balanced and economically-viable development of domestic energy supplies, with particular attention to our massive coal reserves.

The danger of excessive dependence on foreign oil is only partially economic in nature. There is the equally important consideration of the political leverage gained by oil-exporting nations over the domestic and foreign policies of the United States through the threat of a supply cut-back or embargo. This economic and political leverage can be materially reduced through the existence of the Strategic Petroleum Reserve created by the Energy Policy and Conservation Act.

As noted earlier in this memorandum, the FEA has released its plans for designing, constructing and filling the storage and related facilities of the reserve. However, the relatively small size of the reserve (less than a 90-day supply at present import levels) and the absence of any regional or product storage, as

permitted by statute, make it a less effective tool than Congress envisioned when it passed the enabling legislation. Congress should address this issue explicitly before acceding to the FEA's plan.

Finally, the United States must take a more active role in stimulating the discovery and production of oil in non-OPEC countries. The more oil that is made available for purchase in the international market, the more difficulty individual OPEC nations will have in maintaining their respective production shares. Even though oil from non-OPEC sources will likely sell at world prices (just as North Sea oil is now selling), the added world capacity will greatly magnify the cartel's problems in holding world supply at levels needed to support a particular price level. Incentives to offer discounts and special deals will grow. Dilution of OPEC's political leverage will also take place.

For these reasons, it is very much in the interests of the United States to encourage the exploration and production of oil in non-OPEC countries (just as reduction in energy consumption in any oil-importing country will eventually benefit all such countries). There is the additional benefit that oil discovered in any non-OPEC developing country will greatly assist in that country's economic development, as well as benefitting the international economy generally.

Some of this exploration and production will be carried out by multinational oil companies seeking additional sources of crude oil. But the high capital investments that are needed, combined with a growing concern that successful exploration will lead to nationalization of the facilities, is likely to limit the extent of such private commercial activity.

These circumstances suggest the wisdom of the U.S. Government playing a more active role in developing oil reserves outside of OPEC. The International Energy Institute and the International Resources Bank, both proposed by Secretary Kissinger, were initial attempts to devise mechanisms for providing the technical assistance and financial support that developing countries will need to develop new sources of oil. Although these proposals have not been acted upon, the concern which motivated them is well-placed and further efforts should be made to develop multi-lateral instruments. A U.S. national oil corporation established to purchase or supervise oil imports could also be used to carry out bilateral arrangements. Use of the Export-Import Bank is another possibility that should be explored.

In summary, the OPEC split of December 1976 is no cause for rejoicing that the cartel is about to collapse, even though internal differences and tensions have been brought to the surface. Since imported oil is an unpleasant but necessary fact of life for the United States, a broad range of policies—domestic and international—must be pursued to limit this dependency: developing supplies and reducing consumption; promoting a competitive market; defining a proper role for U.S. multinational oil companies; increasing global economic cooperation at CIEC and elsewhere; working with the International Energy Agency; and exploiting weaknesses in OPEC's cohesion and common pricing (but short of a confrontation that would push OPEC back together.)

○

global problem that needs a global approach; 2) support creation of a World Energy Council to collect global energy data and conduct global energy analyses; 3) drastically increase federal research and development expenditures on renewable sources of energy—including small-scale sources; 4) take the lead in convening a world conference on alternative energy sources.

ARMS TRANSFERS

Arms aid and sales have been a major component of U.S. economic transactions with the developing countries in the past twenty-five years. The United States provided 45 per cent of the military equipment delivered worldwide in 1974, far exceeding such transfers from the Soviet Union and other European countries. Moreover, Third World sales orders have risen eightfold since 1970, and are likely to remain high.

Congress has in recent years tried to rein in U.S. arms transfer policies, but the Executive Branch has resisted. Proponents claim that the sales contribute directly to American security by fostering regional stability and increasing U.S. influence, and aid the domestic economy. Opponents argue that arms transfers often produce regional instability, raise the risk of U.S. involvement in local conflicts, hinder Third World development, and help repressive regimes.

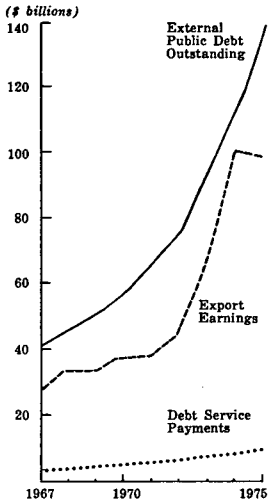
The new Administration has pledged to reduce arms transfers, but the U.S. needs a new, comprehensive policy in this area.

The U.S. should: 1) review U.S. arms transfer policy with the aim of reducing transfers substantially in the next five years; 2) take the lead in consulting with other major arms exporters on ways to reduce supplies, and with developing countries on ways to reduce demand.

DEBT

The growing debt of the developing countries is an issue that belongs high on any international economic agenda. Since 1972, the debt of the non-OPEC developing countries grew 80 per cent, reaching $165 billion by the end of 1975. Private banks have

DEBT OF THE NON-OPEC DEVELOPING COUNTRIES



become an important source of credit for some of these countries. However, the "world debt problem" is actually a series of problems faced by individual countries (both developed and developing). Debt per se is not dangerous. The danger comes when the debt burden grows so heavy that badly needed development efforts have to take a back seat to repayment. Moreover, the debt problems of the middle-income and low-income developing countries differ greatly. The former still have good long-range growth prospects; the outlook for the latter is bleak unless special measures are taken.

Debt relief efforts should aim to preserve the international credit system, strike a sensible compromise between the Third World's across-the-board debt relief demands and the reluctance of the creditor countries to agree to such solutions, establish international credit guidelines, and recognize that the ultimate solution to middle-income developing country debt lies in reforming world trade and commodity systems.

The U.S. should: 1) urge immediate international review of the debt problems of all *low-income* countries with the primary aim of revitalizing their development and not merely of maintaining debt service; 2) express willingness to consider official debt relief for any *middle-income* countries whose debt problems hamper their development programs; 3) recognize that the long-term interest of all sides is served if private banks continue to lend to the developing countries.

OCEANS ISSUES

The law of the sea talks encompass many of the issues and proposals involved with restructuring the international economic system. Questions which arise at these negotiations are bound to come up at future talks dealing with the common use of international resources.

The stalemate reached at the latest session of the U.N. Law of the Sea Conference produced considerable pessimism among participants and observers concerning the chances for a comprehensive oceans treaty. But overlooked were the achievements which have been reached since 1974; these include agreements on 12-mile territorial seas, 200-mile economic zones and unimpeded passage through international straits, an interim agreement on the environment, and a consensus on internationally supervising the exploitation of the resources of the deep ocean.

The talks have split not only developed and developing nations, but also landlocked and coastal states. The landlocked worry about being denied their share of the oceans' wealth by the coastal states; the Third World fears that transnational corporations that are already able to mine the ocean floor will dominate deep-sea mining schemes.

Despite these differences, all nations stand to gain from a comprehensive oceans treaty. The U.S. should: 1) press for early agreement on a comprehensive law of the sea treaty; 2) search for a compromise on the international seabed authority that will guarantee some international control over mining while meeting the needs of private concerns already able to exploit ocean resources.

90-664 O - 77 - 14

TECHNOLOGY TRANSFER

The economic successes of Japan, Taiwan, South Korea, and other nations demonstrate the importance of using technology to increase development progress. Other developing countries realize this but feel victimized by the monopoly they consider transnational corporations to hold on this know-how. In general, developing countries want easier access to new technology on more favorable terms and increased capacity to adapt and create technologies to suit their own needs and development goals. This will require intensified efforts in this field both within and among developing countries themselves, but outside support—both multilateral and bilateral—can be much more effective than it has been.

The U.S. can help by: 1) implementing the commitments concerning technology already made; 2) supporting efforts to develop codes of conduct for technology transfer and to revise international patent laws; 3) giving a high priority to the U.N. Conference on Science and Technology scheduled for 1979.

FOOD INSECURITY

Better weather substantially improved the 1976-77 crop outlook over the previous year, but medium- and long-term world food security is in fact as precarious as ever. The need for food has consistently outstripped food production during the 1970s. Given the rate of growth of the cereals deficit in the developing countries, bad weather in any major producing area could mean an even worse famine than the one experienced in 1972-73.

The World Food Conference of 1974 set three objectives for improving world food security: to establish a minimum level of food aid for the short term, to set up a grain reserve system for the medium term and, as the only long-term solution, to increase food production in the developing countries.

In 1977, Congress is due to reexamine most major U.S. food and agriculture legislation, from Food for Peace to food stamps. It is essential that a unified policy approach be taken to both the international and domestic aspects of the issue.

The U.S. should: 1) encourage increased food production and improved distribution in developing countries through an increased commitment to bilateral and multilateral development assistance programs; 2) resume negotiations aimed at establishing a world food reserve; 3) commit itself to guaranteeing an annual minimum of food aid on the basis of three-year advance commitments. In both food sales and grants, priority should be assigned to countries experiencing the greatest need.

BASIC HUMAN NEEDS

Of the nearly one billion people living in absolute poverty in the world, 750 million (nearly two thirds) are in the low-income countries, 170 million in middle-income countries, and 20 million in the richer countries. Per capita income in the poorest countries averaged $150 in 1973. These countries are pervasively poor in a way that was not true of today's rich countries in the early stages of their own development.

There is a growing consensus among specialists that economic growth and a more equitable distribution of its benefits are *compatible* goals—that with political will and an emphasis on programs aimed directly at the poor, the minimum basic needs of the poorest billion could be met over the next twenty-five years. In its recent report to the Club of Rome, the "Tinbergen Group" called for the following global basic needs goals for the year 2000: life expectancy, 65 years or more (compared to the low-income countries' present average of 48); literacy rate, at least 75 per cent (compared to 33); and infant mortality, 50 or less per 1,000 births (compared to 125).

The goal of meeting the basic needs of this segment of the world's population could be met at an estimated cost of $10-15 billion a year *over present aid levels*. The $10 billion figure would be feasible a) if developed countries would reach or exceed an aid level of one half of 1 per cent of their gross national product; b) if some portion of aid now going to middle-income countries were redirected to low-income countries; and c) if the increases were earmarked for basic needs uses such as jobs, health, and nutrition.

The U.S. should: 1) significantly increase its financial support to basic needs programs in low-income countries; and 2) explore the extent and forms of cooperation among the industrial democracies and developing countries to attain basic needs goals in all developing countries over the next generation.

POPULATION

The world's population has grown rapidly in the past twenty-five years, mainly in the developing countries, because death rates have until recently declined faster than birth rates. Currently, overall population growth rates have begun to decline due to increases in economic and social well-being and greater availability of family planning services. To lower the birth rate as rapidly as possible toward a stable level, much more focus is needed on alleviating negative factors that motivate large family size—on improving health care, nutrition, employment, education, and the status of women.

The U.S. should: 1) assess the impact of basic needs programs on decisions concerning family size; 2) greatly increase research efforts to develop more effective and acceptable methods of fertility control; 3) significantly increase support for expanding acceptable family planning programs in the developing countries.

HUMAN RIGHTS

The human rights issue is becoming highly sensitive as developed and developing countries continue to disagree vigorously on defining that term. The industrialized world stresses the political and civil liberties in the first half of the U.N. Universal Declaration of Human Rights, but the developing countries point to the wide-ranging economic and social rights in the Declaration's second half. The situation is complicated by the fact that many Third World governments are, in varying degrees, authoritarian.

Human rights recently has become a subject of contention in the U.S. between the Executive and Legislative branches of government, as the Congress has tied human political rights strings to foreign military

and economic assistance legislation. But the legislators have also addressed themselves to economic and social rights, as when both houses passed "Right to Food" resolutions.

Cutting foreign aid to punish human political rights violators is a popular idea, but cutting development assistance in particular is usually a weak lever on repressive regimes. A more comprehensive and effective approach is needed. Moreover, U.S. aid efforts in recent years have concentrated on reaching the poorest people in recipient countries. Aid cuts are likely to punish *them*, not their rulers.

The U.S. should: 1) ensure that its development assistance funds go to projects which directly benefit the poor majority in Third World countries; 2) actively seek to establish international criteria for identifying "gross violations" of political human rights—preferably in cooperation with international organizations; 3) consider what range of policies will effectively promote both economic and political human rights.

DEVELOPMENT ASSISTANCE

Most of the *poorest* countries will need aid in one form or another for at least the balance of this century. The U.S. currently contributes less than 0.3 per cent of its gross national product to programs of "official development assistance"—bilateral grants and loans or contributions to multilateral institutions such as the World Bank or the U.N. Development Programme. Adjusted for inflation, the total amount of U.S. development assistance has declined by nearly 50 per cent since 1963. If this country is to support efforts to alleviate the worst effects of absolute poverty, these programs require special attention in 1977. The bilateral legislation that was rewritten in 1973 to direct aid to the poorest people within the poorest countries requires reauthorization, and the U.S. is in arrears in its contributions to the World Bank's International Development Association (IDA), the regional development banks, and some U.N. agencies. The next replenishment of IDA also must be authorized in 1977.

The U.S. should: 1) commit itself to increasing levels of official development assistance to a level of 0.5 per cent of GNP by fiscal year 1981, with at least 75 per cent of these funds going to countries with per capita incomes of under $300; 2) urge an early decision on the fifth replenishment of IDA at a level of $8.1 billion for the OECD countries; 3) support prompt Congressional action to increase the capital of the World Bank; 4) explore with both developed and developing countries ways to provide automatic sources of assistance for low-income countries; 5) complete a comprehensive review of U.S. development assistance by 1978.

ORGANIZING FOR INTERDEPENDENCE

The resumption of North-South negotiations in the immediate future will be complicated by the lack of effective institutions that encompass the broad range of discussions now going on between developed and developing countries.

Existing international structures are accused by some of being too unwieldy (the U.N. General Assembly) or too exclusive (the International Monetary Fund). Perhaps the best indication of the need for mechanisms more acceptable to all sides was the creation of the 27-nation CIEC in Paris, made up of a carefully balanced group of OECD, OPEC, and other developing countries; yet CIEC had only a one year life span and will not be renewed unless all participants want to see it continued. In deciding on new and reformed institutions, it will be important to ensure that the interests of all major groups of nations are represented.

To deal effectively with the global issues outlined in *Agenda 1977*, including the new approaches needed to development cooperation, the Carter Administration also should reorganize and improve coordination among various branches of the U.S. government.

A quality of life index: the PQLI

The need for a quality of life index as a supplement to GNP figures has been recognized for some time—notably by the U.N. Secretary-General and by the recent "Tinbergen Group" report to the Club of Rome.

The Overseas Development Council has introduced a Physical Quality of Life Index (PQLI) that can be used in conjunction with the per capita GNP indicator to assess each country's progress in terms of human well-being. The PQLI index—which is a rough but useful composite measure of life expectancy, infant mortality, and literacy—is described and shown for all countries in the Statistical Annexes of *Agenda 1977*.

DEVELOPMENT PERFORMANCE BY TWO STANDARDS

Country Groups and Sample Countries	*Per Capita GNP*	*PQLI Index**
	($)	
Lower-Income Countries (average)	152	39
India	140	41
Kerala, India	110	69
Sri Lanka	130	83
Lower Middle-Income Countries (average)	338	59
Malaysia	680	59
Korea, Rep. of	480	80
Cuba	640	86
Upper Middle-Income Countries (average)	1,091	67
Gabon	1,960	21
Iran	1,250	38
Algeria	710	42
Taiwan (ROC)	810	88
High-Income Countries (average)	4,361	95
Kuwait	11,770	76
United States	6,670	96
Netherlands	5,250	99

**Composite of life expectancy, infant mortality and literacy figures, each rated on an index of 1 to 100.*

RESPONSE OF HOWARD C. KAUFFMANN TO ADDITIONAL WRITTEN QUESTIONS POSED BY THE MINORITY MEMBERS OF THE SUBCOMMITTEE ON ENERGY

Question 1. Do you believe that a conservation program is needed to solve our energy problems? What should be the extent of this program?

Answer. Energy conservation is essential, although it will have to be augmented by major efforts to develop new indigenous sources of energy. For a conservation program to have the greatest effect, it must involve the efforts of everyone in the nation. The Alliance to Save Energy, which you so effectively initiated, has already demonstrated that energy conservation can be more than a partisan issue—all of us must consume less energy than we used to.

Real energy savings will be the result of countless millions of individual decisions made by all citizens in their roles as consumers of energy. The program most likely to succeed, therefore, is one which will appeal to the direct, personal interests of all the people. We think nothing will do this more effectively than allowing the price of energy to reach its true cost to the economy.

The importance of conservation is shown by what has already been achieved. As I indicated in my letter of January 22, there has been considerable conservation in all the main consuming sectors of the economy. In aggregate, it now appears that total U.S. energy consumption in 1976 was three to four million barrels of oil equivalent per day less than it would have been had pre-crisis trends continued. Beyond question, most of this is owing to the greatly increased prices charged for energy since late 1973, although government-mandated conservation has also played a role.

It is also clear that besides consumers taking steps to save energy, individual entrepreneurs are trying to build profitable businesses supplying services to foster more efficient energy uses. One can hardly pick up a newspaper these days or watch television without seeing advertisements for such conservation services as insulation or for computer control systems to save energy use in buildings. Architects, too, appear to have responded to the challenge of designing buildings which will use more expensive energy more efficiently. Again, these activities would seem to have resulted primarily from the higher costs of energy to the consumer.

We have to be realistic, however, about the rate at which conservation can take place. To begin with, as became painfully clear in recent weeks, energy is vital to our economic activity. We must be efficient in its use, but aware of what can happen if it is curtailed too far. Existing patterns of neergy use in this country have developed over many years during which energy prices declined in real terms. These patterns, either for business or for consumers, are not going to be changed overnight. Furthermore, while the cumulative effects of consevation will mount over the years, many of the individual steps will represent one-time changes in efficiencies as new equipment is substituted for old.

Question 2. What methods should be employed to accomplish conservation (i.e., deregulation of oil and gas prices with tax rebates for low income groups, tax credits for "energy saving" expenditures, expanded research in the area of conservation, etc.)?

Answer. I believe that the first, major conservation policy step should be the realistic pricing of energy. It is price which carries the most immediate, compelling message both to the consumer and to the producer. In our present circumstances of controlled prices, anyone who uses more oil is effectively subsidized to the extent of the difference between the price he pays and the higher real cost to the economy of importing the oil he is using. The current problem with natural gas is a good example of how a mistake in pricing policy can have a significant impact on consumers, and the economy at large, many years after that policy is put into effect.

The higher prices which would come from lifting price controls would encourage conservation. Whether they would go far enough is uncertain. It might be that in addition higher excise taxes should be considered, for even without current price controls, prices of petroleum products in this country (gasoline in particular) would still be far below those in most industrialized countries. Higher taxes, however, should be considered only with full awarenes of their broader implications for economic activity and welfare.

The principal arguments against removing price controls are that the profits of oil and gas companies would rise and that the poor would no longer be able to afford a vital commodity. Considering the replacement costs of the energy which we are consuming, it is unclear that excess profits in any meaningful sense would be generated. For instance, in 1976, the Exxon Corporation invested

more than twice as much in exploration and production in the United States as it earned from producing operations in this country. If despite this, profits were considered too high, then that problem should be faced directly, probably through some form of special taxation. It seems obvious that there are better ways of handling this potential problem than through price controls which give the wrong signals to all concerned.

The impact of higher prices on low-income groups is a serious potential problem. But here again, price controls just don't cause the right things—conservation and additional production—to happen. We think that higher energy prices should be considered as just one of the many factors which bear on the economic well-being of low-income groups. Surely, there are better ways to attack this problem than through a system which would explicitly tie tax rebates to the amount of energy consumed. The importance of consuming less energy is a message which must be received by all our citizens.

Other conservation methods—fiscal incentives for energy saving expenditures, tighter efficiency regulations covering construction and operation of energy-using devices, a judicious and limited application of end-use controls—must also be evaluated. The primary problem I have with such non-price-driven steps, though, is that many of them would result in important losses of individual freedom. Moreover, it is my judgment that much of what such methods would hope to accomplish would be a natural fall-out from realistic pricing of energy. However, barring such pricing, or some combination of the other conservation methods mentioned, an even more drastic and onerous alternative—rationing—could stare us in the face.

Question 3. Hypothetically, if we establish a successful conservation program, what would be some possible response by OPEC? Would they boost prices to keep revenues flowing? Would it drive a wedge between OPEC members?

Answer. Based on their public statements, OPEC nations would not be unhappy to see progress toward conservation in the United States and other consuming countries. At least by implication they have justified past price increases partly on the ground that energy is being wastefully consumed, and they have frequently stated their desire to prolong the life of reserves. If we were to show that we mean business about conservation, and take related steps to develop new energy sources, the posture of OPEC toward us would probably be affected. I doubt that anything short of a significant, unforeseen technological breakthrough in the development of a cheap energy source alternative would cause OPEC to lower prices, but serious conservation and alternate source development efforts might make them less adventuresome in raising prices.

Clearly, in the longer run we shall shift the balance with OPEC only to the extent that we get our own house in order. But once again, we should not expect too much too soon from conservation or any other specific step. Inevitably, for many years we shall be heavily dependent on OPEC oil. Indeed, Exxon's forecasts suggest that even with major future progress toward conservation in the United States, most OPEC countries will be producing at near capacity levels. Only Saudi Arabia is forecast to have the potential for substantial excess capacity, and this is the OPEC country least in need of expanded revenues. Therefore, although conservation will be a moderating force in our relations with OPEC, it will not seriously threaten that organization.

In closing, let me reiterate the belief I expressed previously, that while it is essential for the United States to take serious energy conservation steps, it is equally essential to improve the supply of domestic energy resources. Only by taking both parallel steps can this country's dependency on imported energy be reduced and a solid foundation for future prosperity be assured.

RESPONSE OF PAUL DAVIDSON TO ADDITIONAL WRITTEN QUESTIONS POSED BY THE MINORITY MEMBERS OF THE SUBCOMMITTEE ON ENERGY

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, D.C., January 26, 1977.

Prof. PAUL DAVIDSON,
Princeton, N.J.

DEAR PROFESSOR DAVIDSON: The Minority Members of the Subcommittee on Energy have requested that the enclosed questions be sent to you. The questions,

along with your answers, will be included in the record of the Subcommittee hearings which were held on January 13th.

We would appreciate your reply as soon as possible in order to insert the answers in the final transcript.

Thank you for your attention to this matter.

Sincerely yours,

JOHN R. STARK,
Executive Director.

Enclosure:

(1) Do you believe that a conservation program is needed to solve our energy problems? What should be the extent of this program?

(2) What methods should be employed to accomplish conservation (i.e., deregulation of gas and oil prices with tax rebates for low income groups, tax credits for "energy saving" expenditures, expanded research in the area of conservation, etc.)?

(3) Hypothetically, if we establish a successful conservation program, what would be some possible responses by OPEC? Would they boost prices to keep revenues flowing? Would it drive a wedge between OPEC members?

RUTGERS UNIVERSITY,
DEPARTMENT OF ECONOMICS AND ALLIED SCIENCES,
New Brunswick, N.J., February 4, 1977.

Mr. JOHN R. STARK,
Executive Director, Joint Economic Committee, Congress of the United States, Washington, D.C.

DEAR MR. STARK: I am in receipt of your letter of the 26th of January, 1977. In that letter you submitted questions that the minority members of the Subcommittee on Energy have requested that I respond to. My responses are as follows:

The question of conservation and the energy problem requires clarification before a precise answer can be given. First, what do we mean by conservation and secondly, what is the objective of a conservation program. I shall answer each of these questions in turn and in so doing I believe will respond to the minority question.

The term conservation has at least two possible definitions for any professional economist. One definition implies that the consumer will use less of the resource or product at any market price; in economic terms this implies an inward shift of the demand curve for the resource. The other use implies that the consumer uses less because of an increase in the market price of the resource. The second definition of conservation implies a movement up an unchanging demand curve for the resource. As the attached xerox copies of pages 59 through 67 of the 10th edition of Samuelson's best selling textbook on economics indicates the first form of conservation economists would refer to as a change in demand while the second form of conservation would be a change in the quantity demanded but not a change in the demand for the resource.

The dictionary definition of conservation does not help us in determining whether we mean conservation in the sense of a shift in the demand curve or conservation in the sense of a movement up a demand curve. Much of the confusion in economists and politicians minds occurs because some people are talking about shifting the demand curve while others are talking about movement along the demand curve.

A conservation program with shifts in demand curve would have different effects and would be augmented differently than a conservation program which merely requires an upward movement along an unchanging demand curve. Hence, before we decide on conservation as a desirable program we would realize that these are two different possible programs and that their impacts and their effects will be quite different, and thus we cannot decide on which conservation program we want until we have decided on what the goal of conservation should be.

For some conservation is an end in itself. Many environmentalists and others merely see the modern society as a prodigal economic system which wastes everything it utilizes. For those people conservation is desired as almost a religious objective, that is, it is believed that self-denial is in some sense good for the human soul. For such people conservation is an end all in itself a way of getting back to a simpler way of life, a more frugal way of life. Such people

would like to shift the demand curve for energy and many other products to the left so that at any market price (even very low ones) people would consume less and spend more time in spiritual contemplation and non-materialistic endeavors. In terms of energy a program to achieve such conservation might be closing gasoline stations on weekends so that people cannot make long trips on their leisure time (somewhat similar to one of the objectives of the so-called Blue Laws which prevent people from spending money in retail establishments on the Sabbath).

The other form of conservation is when people are induced to buy lower quantities of a resource because the market price has risen, i.e. a price induced movement up an unchanging demand curve. As I have suggested in my written statement to the Joint Economic Committee, if there was a Malthusian shortage of fossil fuels then the real costs of obtaining oil and natural gas would be rising and a market induced increase in price to limit purchases would be a normal economic response. When the prices rise people would buy less as some individuals whose incomes are low could not afford to maintain their present consumption of energy. Of course such a market induced reduction in the quantity demanded would not only limit purchases but would lead to a large redistribution of income and wealth between consumers and producers of energy. This is particularly true as long as the price elasticity of demand for resources is highly inelastic as it is at the present time for fossile fuels. Thus conservation via market price increases are likely to lead to very small decreases in the amount that consumers buy while leading to very large shifts in the distribution of real income and wealth between consumers and producers both domestically and internationally.

Whether we want a conservation program which shifts the demand curve to the left or merely induces a movement along an unchanging demand curve depends therefore upon what is the objective of our conservation program. As I have already suggested in my written statement, if the primary objective of the conservation program is to break the OPEC cartel and have the market price for fossil fuels more closely reflect the real costs of finding and producing these fuels, than neither form of conservation will be in an efficient method to achieve this objective. As I have already indicated the most efficient method of achieving the breakdown of the monopoly control over fossil fuels both domestically and internationally requires the ability to provide substitute energy resources at prices below the OPEC price. I have already suggested a 9 point energy program which would achieve such an objective. On the other hand, merely de-regulating wellhead prices and permitting the price of domestic fuels to rise to the monopolistic OPEC price will do nothing towards breaking up the cartel. If anything it will merely legitimize the current cartel price. Moreover, such a policy of de-regulation would merely lead to large windfall profits for the oil producers and land owners in the United States. Such a conservation program should not be adopted unless it is explicitly adopted as matter of national policy that the OPEC caretel cannot be broken and that we must pay the monopolistic price for fossil fuels. The history of the United States, however, suggests that we would not be willing to take such action if it was explicitly well known that de-regulation meant paying monopoly tribute forever to OPEC and foreign producers and land owners and American producers and land owners as well. Many years ago the United States government made a specific policy that we would spend millions for defense but not one penny for tribute to the pirates of Tripoli. At the present time the pirates from the same region of the world are attempting to extort tribute from the United States economy and it would seem to me that millions for defense but not a cent for tribute should be our objective again. We should not give in to the OPEC cartel. We are rich enough and strong enough that we can break the cartel if we are willing to adopt a number of policies that I have already suggested in my written statement.

If however the United States economy and the administration is unwilling to engage in the economic warfare which is necessary to break this powerful cartel, then it should be made clear to the American consumers that they are paying a monopoly tribute, that the shortage of natural gas and oil is a function of man-made control of the market and not the stinginess of nature. Moreover, if we are going to force the consumer to pay high prices on domestic production (which can be controlled by the government) then the increase in price should be done via a excise tax so that the revenues from these higher prices accrue to the United States Treasury and can be used for all citizens of the country and do not accrue merely to the land owners in our fossil fuel producing states.

In sum if the government decides on a program of conservation by moving up the demand curve for energy and inducing lower consumption by higher prices,

then a tax rather than a market price increase should be the method employed with the tax used for general revenue purposes rather than for allowing the higher price to accrue to producers and landowners in the fossil fuel states.

In line with this idea of higher prices it should be pointed out that it has been recognized by many economists advocating higher prices to induce "conservation" of energy, that the income redistribution effects are gigantic and that low income groups particularly would be hurt by such a monopoly tax. Therefore, these well meaning but misguided economists suggest that the tax should then be used to provide rebates for low income groups. However, if the price inelasticity is greater than zero it is merely because we are reducing the ability of some consumers to purchase as much fuel as they did before once their price rises. Most of the effect will be on the low income groups who will merely be priced out of the market. To then recycle this tax to the low income groups and allow them to enter into the market will merely frustrate the whole program because under such situation the price inelasticity will become even more inelastic than before as the income reduction effect of the higher price is not felt by the low income individual. As long as there is very little substitution of other energy resources for existing fossil fuels the ability of the consumer to move out of the high priced goods and into the low priced energy resources is exceedingly limited and it is only by removing income from the consumer that we will get any price sensitivity to greater energy prices.

What about the first form of conservation, i.e., a shift of the demand curve inward so that at any price consumers will buy less energy than before. Such an inward shift of the demand curve can be done by either programs which involve (a) limiting the number of hours when fossil fuels will be sold, e.g., by closing gasoline stations on weekends, (b) by non price rationing systems, (c) by requiring greater insulation in all homes and industries, etc. All of these will accomplish the effect of reducing the amount of energy per capita that will be consumed by the population at any price even if the prices of energy were to fall when and if the OPEC cartel is broken. I have no particular objection to instituting such policies but I don't see how such policies in and of themselves will lead to the breakup of the cartel.

Finally, if we were to establish a conservation program which raised prices in order to reduce consumer demand (i.e. move up an unchanging demand curve) it may encourage the OPEC cartel to raise their prices even further. The OPEC cartel does not know what is the maximum price it can extort from consumers of petroleum. This depends upon knowledge about income and price elasticity of demand which at the present time the OPEC cartel cannot be sure of. If we were to raise the domestic price of oil and gas by de-regulation and if the effect was very little price sensitivity on the part of consumers (i.e. a high price inelasticity of demand) then the OPEC cartel would have additional information suggesting that the market is still exploitable and they could raise prices. In a letter to the Economist magazine in January, 1977, Professor Henry Houthakker indicated that on the basis of his studies of the demand for fossil fuels that the OPEC cartel could double the real price of crude oil from consuming countries by 1980. If Professor Houthakker is correct then the cartel has not yet exercised its maximum monopoly power and consumers can still be exploited. Consequently, it becomes even more urgent that we enter into programs which alter the elasticity of demand facing the OPEC oil cartel. Conservation program, by itself, will not do this although it may be desirable for other reasons it certainly is not desirable as a way of solving the man-made energy problem that this country now faces. Until we understand the economic forces that are at work in the energy crisis problem, we are unlikely to get our economic policies to solve the problem correct. In my view the primary choice facing the United States Government is whether we break the cartel or we pay continuous tribute to these pirates of the Middle East. It is strictly a question of economic warfare and I believe that the answer can only be that we must design policies which break the cartel and not teach the American consumer to live with high price energy in order for the pirates of the Middle East to extract the tribute they demand for energy.

The economic war is not with nature. we are not running out of fossil fuels. The economic war is with producers and land owners who have found that they have been able to "corner the market" in fossil fuels and extort consuming nations in order to provide these nations with sources of mechanical energy.

Sincerely yours,

PAUL DAVIDSON,
Chairman.

Enclosure:

(From P. A. Samuelson's "Economics," 10th ed., McGraw-Hill, New York, 1976)

THE DEMAND SCHEDULE

Let us start with demand. It is commonly observed: The quantity of a good that people will buy at any one time depends on price; the *higher* the price charged for an article, the *less* the quantity of it people will be willing to buy; and. other things being equal, the lower its market price, the more units of it will be demanded.

Thus there exists at any one time a definite relation between the market price of a good (such as wheat) and the quantity demanded of that good. This relationship between price and quantity bought is called the "demand schedule," or "demand curve."

DEMAND SCHEDULE FOR WHEAT

	(1) PRICE ($ per bu.) P	(2) QUANTITY DEMANDED (million bu. per month) Q
A	$5	9
B	4	10
C	3	12
D	2	15
E	1	20

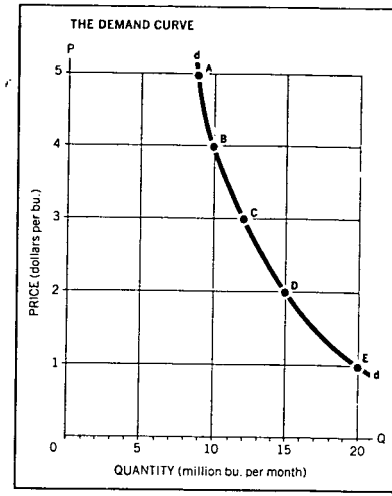


FIG. 4-1
A downward-sloping demand curve relates quantity to price
At each market price, there will be at any time a definite quantity of wheat that people will want to demand. At a lower price, the quantity demanded will go up—as more people substitute it for other goods and feel they can afford to gratify their less important wants for wheat. Compare table's *Q* and *P* at *A, B, C, D, E.*

In the figure, prices are measured on the vertical axis and quantities demanded on the horizontal axis. Each pair of *Q, P* numbers from the table is plotted here as a point, and a smooth curve passed through the points gives us the demand curve.

The fact that *dd* goes downward and to the right illustrates the very important "law of downward-sloping demand."

The table of Fig. 4-1 gives an example of a hypothetical demand schedule. At any price, such as $5 per bushel, there is a definite quantity of wheat that will be demanded by all the consumers in the market—in this case 9 (million) bushels per month. At a lower price, such as $4, the quantity bought is even greater, being 10 (million) units. At lower *P* of $3, quantity demanded is even greater still—namely 12 (million). By lowering *P* enough, we could coax out sales of more than 20 (million) units. From Fig. 4-1's table we can determine the *quantity demanded at any price,* by comparing Column (2) with Column (1).

THE DEMAND CURVE

The numerical data can be given a graphic interpretation also. The vertical scale in Fig. 4-1 represents the various alternative prices of wheat, measured in dollars per bushel. The horizontal scale measures the quantity of wheat (in terms of bushels) that will be demanded per month.

A city corner is located as soon as we know its street and avenue; a ship's position

is located as soon as we know its latitude and longitude. Similarly, to plot a point on this diagram, we must have two coordinate numbers: a price and a quantity. For our first point *A*, corresponding to $5 and 9 million bushels, we move upward 5 units and then over to the right 9 units. An orange dot marks the spot *A*. To get the next dot, at *B*, we go up only 4 units and over to the right 10 units. The last dot is shown by *E*. Through the dots we draw a smooth orange curve, marked *dd*.

This picturization of the demand schedule is called the "demand curve." Note that quantity and price are *inversely* related, *Q* going up when *P* goes down. The curve slopes downward, going from northwest to southeast. This important property is given a name: the *law of downward-sloping demand*. This law is true of practically all commodities: wheat, electric razors, cotton, Kellogg's cornflakes, and theater tickets.

The law of downward-sloping demand: **When the price of a good is raised (at the same time that all other things are held constant), less of it is demanded. Or, what is the same thing: If a greater quantity of a good is put on the market, then—other things being equal—it can be sold only at a lower price.**

REASONS FOR THE LAW OF DOWNWARD-SLOPING DEMAND

This law is in accordance with common sense and has been known in at least a vague way since the beginning of recorded history. The reasons for it are not hard to identify. When the price of wheat is sky-high, only rich men will be able to afford it; the poor will have to make do with coarse rye bread, just as they still must do in poorer lands. When the price is still high but not quite so high as before, persons of moderate means who also happen to have an especially great liking for white bread will now be coaxed into buying some wheat.

Thus a first reason for the validity of the law of downward-sloping demand comes from the fact that *lowering prices brings in new buyers.*

Not quite so obvious is a second, equally important, reason for the law's validity; namely, each reduction of price may coax out some *extra purchases by each of the good's consumers;* and—what is the same thing—a rise in price may cause any of us to buy less. Why does my quantity demanded tend to fall as price rises? For two main reasons. When the price of a good rises, I naturally try to *substitute* other goods for it (for example, rye for wheat or tea for coffee). Also, when a price goes up, I find myself really poorer than I was before; and I will naturally cut down on my consumption of most normal goods when I feel poorer and have less real *income.*

Here are further examples of cases where I buy more of a good as it becomes more plentiful and its price drops. When water is very dear, I demand only enough of it to drink. Then when its price drops, I buy some to wash with. At still lower prices, I resort to still other uses; finally, when it is really very cheap, I water flowers and use it lavishly for any possible purpose. (Note once again that someone poorer than I will probably begin to use water to wash his car only at a lower price than that at which I buy water for that purpose. Since market demand is the sum of all different people's demands, what does this mean? It means that even after *my* quantity demanded stops expanding very much with price decreases, the *total* bought in the market may still expand as new uses for new people come into effect.)

To confirm your understanding of the demand concept, imagine that there is an increase in demand for wheat brought about by a boom in people's incomes or by a great rise in the market price of competing corn, or simply by a change in people's tastes in favor of wheat. Show that this *shifts* the whole demand curve in Fig. 4-1 rightward, and hence upward; pencil in such a new orange curve and label it *d'd'* to distinguish it from the old *dd* curve. Note that such an increase in demand means that more will now be bought at each price—as can be verified by carefully reading off points from the new curve and filling in a new *Q* column for Fig. 4-1's table.

THE SUPPLY SCHEDULE

Let us now turn from demand to supply. The demand schedule related market prices and the amounts *consumers* wish to buy. How is the "supply schedule" defined?

By the *supply schedule*, or *curve*, is meant the relation between market prices and the amounts of the good that *producers* are willing to supply.

The table of Fig. 4-2 illustrates the supply schedule for wheat, and the diagram plots it as a supply curve. Unlike the falling demand curve, the *ss* supply curve for wheat *normally rises upward* and to the right, from southwest to northeast.

At a higher price of wheat, farmers will take acres out of corn cultivation and put them into wheat. In addition, each farmer can now afford the cost of more fertilizer, more labor, more machinery, and can now even afford to grow extra wheat on poorer land. All this tends to increase output at the higher prices offered.

SUPPLY SCHEDULE FOR WHEAT

	(1) POSSIBLE PRICES ($ per bu.) *P*	(2) QUANTITY SELLERS WILL SUPPLY (million bu. per month) *Q*
A	$5	18
B	4	16
C	3	12
D	2	7
E	1	0

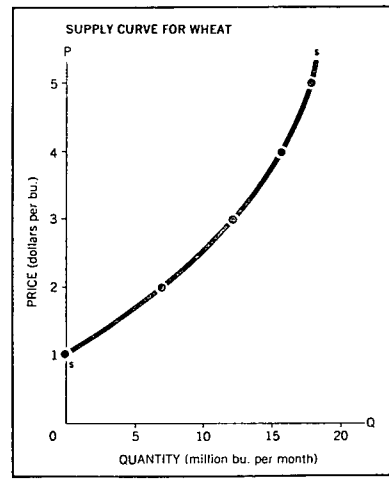


FIG. 4-2
The supply curve relates price to the quantity produced
The table lists, for each price, the quantity that producers will want to bring to market. The diagram plots the (*P*, *Q*) pair of numbers taken from the table as the indicated brown points. A smooth curve passed through these points gives the brown upward-sloping supply curve, ss.

As will be seen in Part Three, our old friend the law of diminishing returns provides one strong reason why the supply curve would slope upward. If society wants more wine, then more and more labor will have to be added to the same limited hill sites suitable for producing wine grapes. Even if this industry is too small to affect the general wage rate, each new man will—according to the law of diminishing returns—be adding less and less extra product; and hence the necessary cost to coax out additional product will have to rise. (Cost and returns are opposite sides of the same coin, as will be shown later.[1])

How shall we depict an increase in supply? An increase in supply means an increase in the amounts that will be supplied *at each different price*. Now if you pencil the new supply curve into Fig. 4-2, you will see that it has shifted *rightward;* but for an upward-sloping supply curve, this change means the new *s's'* curve will have shifted rightward and *downward* (not rightward and upward as in the case of a shifted downward-sloping demand curve). To verify that *s's'* does depict an increase in supply, fill in a new column in the table by reading off points from your new diagram carefully.

EQUILIBRIUM OF SUPPLY AND DEMAND

Let us now combine our analysis of demand and supply to see how competitive market price is determined. This is done in Fig. 4-3's table (page 64). Thus far, we have been considering all prices as possible. We have said, "If price is so and so, *Q* sales will be so and so; if *P* is such and such, *Q* will be such and such; and so forth." But to which level will price *actually* go? And how much will then be produced and consumed? The supply schedule alone cannot tell us. Neither can the demand schedule alone.

Let us do what an auctioneer would do, i.e., proceed by trial and error. Can situation *A* in the table, with wheat selling for $5 per bushel, prevail for any period of time? The answer is a clear "No." At $5, the producers will be supplying 18 (million) bushels to the market every month [Column (3)]. But the amount demanded by consumers will be only 9 (million) bushels per month [Column (2)]. *As stocks of wheat pile up, competitive sellers will cut the price a little.* Thus, as Column (4) shows, price will tend to fall downward. But it will not fall indefinitely to zero.

To understand this better, let us try the point *E* with price of only $1 per bushel. Can that price persist? Again, obviously not—for a comparison of Columns (2) and (3) shows that consumption will exceed production *at that price.* Storehouses will begin to empty, *disappointed demanders who can't get wheat will tend to bid up the too-low price.* This upward pressure on *P* is shown by Column (4)'s rising arrow.

We could go on to try other prices, but by now the answer is obvious:

The equilibrium price, i.e., the only price that can last, is that at which the amount *willingly* supplied and amount *willingly* demanded are equal. Competitive equilibrium must be *at the intersection point* of supply and demand curves.

[1] Although exceptions to the law of downward-sloping demand are few enough to be unimportant in practice, Part Three gives an interesting exception to the upward-sloping supply curve. Thus, suppose that a family farmer produces wheat and its price rises so much as to give him a much higher income. With wheat so lucrative, he is at first tempted to *substitute* some of his leisure time to produce more. But won't there reasonably come a time when he feels comfortably enough off at his *higher income* to be able to afford to take things easier, work less, and supply less *Q*?

SUPPLY AND DEMAND SCHEDULES FOR WHEAT

	(1) POSSIBLE PRICES ($ per bu.)	(2) QUANTITY DEMANDED (million bu. per month)	(3) QUANTITY SUPPLIED (million bu. per month)	(4) PRESSURE ON PRICE
A	$5	9	18	Downward
B	4	10	16	Downward
C	3	12	12	Neutral
D	2	15	7	Upward
E	1	20	0	Upward

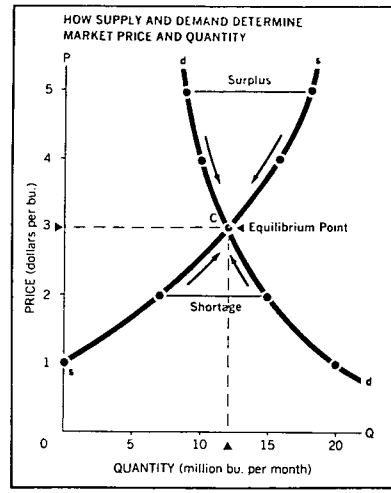


FIG. 4-3
Equilibrium price is at the intersection point where supply and demand match
Only at the equilibrium price of $3, shown in the green third row, will the amount supplied just match the amount demanded.

In the diagram, at the *C* equilibrium intersection (shown by the green dot), the amount supplied just matches the amount demanded. At any lower *P*, the excess amount demanded will force *P* back up; and at any *P* higher than the equilibrium, *P* will be forced back down to it.

Only at *C*, with a price of $3, will the amount demanded by consumers, 12 (million) bushels per month, exactly equal the amount supplied by producers, 12 (million). Price is at equilibrium, just as an olive at the bottom of a cocktail glass is at equilibrium, because there is no tendency for it to rise or fall. (Of course, this stationary price may not be reached at once. There may have to be an initial period of trial and error, of oscillation around the right level, before price finally settles down in balance.)

Figure 4-3's diagram shows the same equilibrium in pictorial form. The supply and demand curves, superimposed on the same diagram, cross at only one intersection point. This emphasized green point *C* represents the equilibrium price and quantity.

At a higher price, the green bar shows the *excess* of amount supplied over amount demanded. The arrows point downward to show the direction in which price will move because of the competition of excess *sellers*. At a price lower than the $3 equilibrium price, the green bar shows that amount demanded exceeds amount supplied. Consequently, the eager bidding of excess *buyers* requires us to point the arrow indicators upward to show the pressure that they are exerting on price. Only at the point *C* will there be a balancing of forces and a stationary maintainable price.

Such is the essence of the doctrine of supply and demand.

EFFECT OF A SHIFT IN SUPPLY OR DEMAND

Now we can put the supply-and-demand apparatus to work. Gregory King, an English writer of the seventeenth century, noticed that when the harvest was bad, food rose

. . price: and when it was plentiful, farmers got a lower price. Let us try to explain this common-sense fact by what happens in our diagrams.

Figure 4-4(a) shows how a spell of bad weather *reduces* the amount that farmers will supply at each and every market price and thereby raises the equilibrium point E. The ss curve has shifted to the left and has become $s's'$. The demand curve has not changed. Where does the new supply curve $s's'$ intersect dd? Plainly at E', the new equilibrium price where demand and the new reduced supply have again come into balance. Naturally, P has risen. And because of the law of downward-sloping demand, Q has gone down.

Suppose the supply curve, because of good weather and cheaper fertilizers, had *increased*, instead. Draw in a new green equilibrium E'' with lower P and higher Q.

Our apparatus will help us also analyze the effect of an increase in demand. Suppose that rising family incomes make everyone want more wheat. Then at each unchanged P, greater Q will now be demanded. The demand curve will shift rightward to $d'd'$. Figure 4-4(b) shows the resulting travel up the supply curve as enhanced demand raises competitive price (to the E' intersection).

TWO STUMBLING BLOCKS

It is well to pause here to consider two minor sources of possible confusion concerning supply and demand. These have puzzled students of economics in all generations. The first point deals with the important fact that in drawing up a demand schedule or

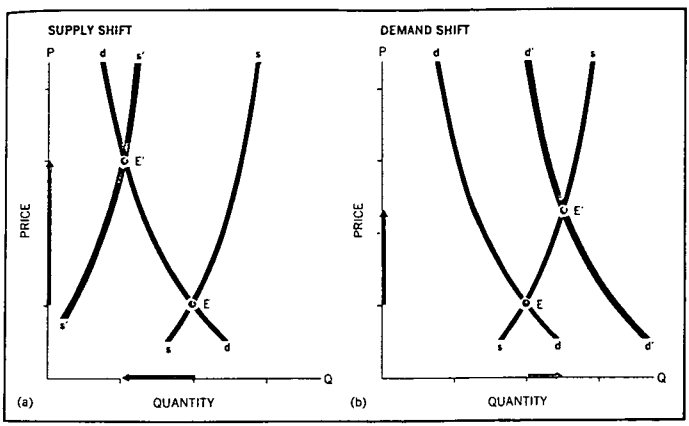


FIG. 4-4
When either supply or demand curve shifts, equilibrium price changes
(a) If supply shifts leftward for any reason, the equilibrium-price intersection will travel up the demand curve, giving higher P and lower Q.
(b) If demand increases, the equilibrium will travel up the supply curve.

curve, one always insists that "other things must be equal." The second deals with the exact sense in which demand and supply are equal in equilibrium.

"Other things equal" To draw up a demand schedule for wheat, we vary its price and observe what would happen to its quantity bought *at any one period of time in which no other factors are allowed to change so as to becloud our experiment.*

Specifically, this means that, as we change wheat's P, we must not at the same time change family income or the price of a competing product such as corn or anything else that would tend to *shift* the demand schedule for wheat. Why? Because, like any scientist who wants to isolate the effects of one causal factor, we must try to vary only *one* thing at a time. True enough, in economics we cannot perform controlled experiments in a laboratory, and we can rarely hold other things constant in making statistical observations of economic magnitudes. This limitation on our ability to experiment empirically in economics makes it all the more important *to be clear in our logical thinking*, so that we may hope to recognize and evaluate important *tendencies*—such as the effect of P on Q demanded—when *other* tendencies are likely to be impinging on the situation at the same time.

The case of demand shift back in Fig. 4-4(b) can illustrate this common fallacy based upon a failure to respect the rule. Other things must be held equal in defining a demand curve. Suppose that the supply curve shifts little or not at all. But suppose the demand curve shifts up to $d'd'$ in good times when jobs are plentiful and people have the incomes to buy more wheat; and suppose in the more depressed phase of the business cycle, demand always shifts down to dd. Now take a piece of graph paper and plot what would actually be recorded in the statistics of the wheat market.

In boom times, you would record the equilibrium point shown at green E', and in bad times, the equilibrium point E. Take a ruler and join the green points E and E' in Fig. 4-4(b). The fallacy to be avoided like the plague is expressed as follows: "I have disproved the law of downward-sloping demand; for note that when P was high, so too was Q—as shown by E'. And when P was lowered, instead of that change increasing Q, it actually lowered Q—as shown by E. My straight line joining E and E' represents an upward-sloping, not a downward-sloping, demand curve; so I have refuted a basic economic law."

Being alerted beforehand, one detects the fallacy in this argument. For at the same time that P went up, other things were *not* held constant; rather, income was also raised. The tendency for a rise in P to choke off purchases was more than masked by the countertendency of rising income to raise purchases. Instead of testing our economic law by moving *along* the demand curve, the beginner has measured changes that result from the *shift* of the demand curve.

Why is this bad scientific method? Because it leads to absurd results such as this: "On the basis of my revolutionary refutation of the law of downward-sloping demand, I confidently predict that, in the years when the harvest is especially big, wheat will sell for a higher rather than a lower price." Not only will such reasoning lead to absurd predictions that would lose fortunes for a speculator or a miller, but it also fails to recognize other important economic relationships—such as the fact that, when family incomes go up, demand curves for goods such as wheat tend to shift rightward.

Meaning of equilibrium The second stumbling block is a more subtle one, less likely to arise but not so easy to dispel. It is suggested by the following.

"How can you say that the equality of supply and demand determines a particular equilibrium price? For, after all, *the amount one man sells is precisely what another man buys*. The quantity bought must always equal the quantity sold, no matter what the price; for that matter, whether or not the market is in equilibrium, a statistician who records the Q bought and the Q sold will always find these necessarily identical, each being a different aspect of exactly the same transaction."

The answer to this must be phrased something like this:

You are quite right that measured Q bought and measured Q sold must be identical as recorded by a statistician. But the important question is this: At which P will the amount that consumers are *willing to go on buying* be just matched by the amount that producers are *willing to go on selling*? At such a price, where there is equality between the *scheduled* amounts that suppliers and demanders want to go on buying and selling, and only at such an equilibrium P, will there be no tendency for price to rise or fall.

At any other price, such as the case where P is above the intersection of supply and demand, it is a trivial fact that whatever goods change hands will show a statistical identity of measured amount bought and sold. But this measured identity does not in the least deny that suppliers are eager at so high a price to sell more than demanders will continue to buy; and that this excess of *scheduled supply* over *scheduled demand* will put downward pressure on price until it has finally reached that equilibrium level where the two curves intersect.

At that equilibrium intersection, and there alone, will everybody be happy: the auctioneer, the suppliers, the demanders—as well as the patient statistician, who always reports an identity between the measured amounts bought and sold.[2]

WHAT SUPPLY AND DEMAND ACCOMPLISHED: GENERAL EQUILIBRIUM

Having seen how supply and demand work, let us take stock of what has been accomplished. The scarce goods of society have been rationed out among the possible users of them. Who did the rationing: a board? a committee? No. The auctioneering mechanism of competitive market price did the rationing. It was a case of "rationing by the purse."

FOR WHOM goods are destined was *partially* determined by who was willing to pay for them. If you had the money votes, you got the wheat. If you did not, you went without. Or if you had the money votes, but preferred not to spend them on wheat, you did without. The most important needs or desires for goods—if backed by cash!—got fulfilled.

The WHAT question was being *partially* answered at the same time. The rise in market price was the signal to coax out a higher supply of wheat—the signal for other scarce resources to move into the wheat-production industry from alternative uses.

Even the How question was being *partially* decided in the background. For with wheat prices now high, farmers could afford expensive tractors and fertilizers and could bring poorer soils into use.

[2] A similar question of "measured identity" versus "scheduled intersection" can arise in the saving-investment discussion of income determination in Chapter 12.

FEBRUARY 22, 1977.

Hon. EDWARD M. KENNEDY,
Russell Office Building,
Washington, D.C.

DEAR SENATOR KENNEDY: I have received a copy of the letter dated January 27, from Mr. T. A. Burtis, President, Sun Company, to yourself, and to Representative Bolling.

After reading the letter, I had some useful conversation with one of Mr. Burtis' colleagues, and we agreed to stay in touch to discuss questions relating to the quota auction proposal.

Mr. Burtis' letter is very welcome. He stresses, as would I, the variety of crude oils needed by various refineries. If anything, he does not go far enough in stressing the need for a continuing programmed flow of any given type of crude. The economics of moving huge amounts of liquids dictate a premium for the largest smoothest flow, and a penalty for irregularity or interruption. Parenthetically, this is what oil executives almost invariably mis-label as "access", or "security", two very different subjects.

Mr. Burtis' concern is well founded, but his objection is not relevant to the proposed system. The government cannot perpetrate a logistical horror because it takes no logistical action, touches no oil. Nor does it intervene at any stage in the process of buying and selling oil. The parties make their own deals, as they do now.

Because I was much concerned with the need for a smooth flow, which requires term contracts, I proposed in the Challenge article that half the tickets issued in any given month be valid for a period of months; and that there be unlimited resale. It would be an improvement to maintain a small inventory of tickets valid for a year ahead. During each month some of these inventory tickets would be used up, and some new ones offered, keeping the inventory constant. The net number of newly issued tickets would be expected imports. This would relieve sellers of hand-to-mouth existence, and make forward buying easier. I would tentatively purpose an inventory not to exceed one month's imports.

It would be helpful, though not essential, that the cartel governments not bid for tickets for at least a brief period, to let an orderly routine be established, with tickets selling at near-zero. But once even one government began paying more than a few cents for tickets bought covertly, every other government would be under the gun of a decision-either buy tickets or lose your whole market in the United States. Of the countries producing low-sulfur crude oil, Algeria. Libya, Nigeria and Indonesia sell us respectively 53, 24, 56, and 38 percent of their production. Venezuela is mostly a heavy oil exporter, but we take (approximately) 45 percent of their crude oil production, though much in the form of products.

Some of these countries are in acute need for foreign exchange, and all would face drastic sudden losses of income. In the rest of the world, customers are fully committed, for the same basic reason, the economies of large scale smooth flow. Substantial sales outside the U.S. would risk catastrophic breaks in price. These countries' bargaining position would be weaker than their customers'. Because one or more governments would have created by buying tickets, the rising price would mean that the demand for tickets exceeded the supply. By the same token, governments would be offering more oil than the American refiners were asking.

But suppose that the bidder produced not light low-sulfur crude oil but heavy oil. He might not send more of his heavy oil to this country than refiners wanted, forcing down the price, but exchange his heavy for light crudes to sell here. This is the kind of swap referred to in my Challenge article. We can turn to our advantage the worldwide network of exchanges which oil companies use all the time to get the right oil at the right time and place.

The need for a smooth flow also explains why, absent the auction system, there is little chance of governments chiselling substantial amounts on the price. (They have chiselled by small amounts). Refiners are free to shop around only intermittently, for small marginal quantities. The proposed system would put up for frequent bargaining not the supply stream itself but the value of the whole supply stream, i.e. the whole revenue stream to the OPEC nations.

I take the opportunity to point out an error, as I consider it, in the testimony of Mr. Kauffmann of Exxon, who stated that governments with suspiciously big

increases in their exports would quickly be identified as cheaters. This might have been true in the past. But under current conditions, large fluctuations in output have become commonplace. It would take months before a large persistent upcreep would be visible. But in the meantime, governments who lost market share would have only one means of self-defense: buy tickets. By retaliating, they would break-up the pattern. This would be the start of normal cartel erosion. It's always the other fellow who started cutting prices. Under the auction system, there is no use canvassing the customers to see who really started it, because they have all paid the market price. The cheating has been for the benefit of the United States Treasury.

A word about the proportional tax on oil prices. It is easy to say that the sellers would just add the tax on to the price, but that would lessen their net revenues. Appendix 2 to my statement is only a formal way to demonstrate what the cartel nations have long recognized, and complained of: the more the consuming governments take, the less is left for them.

The more we can take back from the cartel countries, the more we improve "the reliability and integrity of U.S. crude supplies". The less money those people have, the less their power to embark on political adventures, production cutbacks, further price hikes, etc.

I request that this letter be placed in the record of your Subcommittee.

Respectfully yours,

M. A. ADELMAN,
Professor, Massachusetts Institute of Technology.

STATEMENT OF RAGAEI EL MALLAKH, DIRECTOR, INTERNATIONAL RESEARCH CENTER FOR ENERGY AND ECONOMIC DEVELOPMENT AND PROFESSOR OF ECONOMICS, UNIVERSITY OF COLORADO, BOULDER, COLO.

Pursuant to the request of Senator Edward Kennedy as Chairman of the Subcommittee on Energy to report on my recent trip to various OPEC states with particular attention to policy recommendations to the United States Government, I submit the following observations and assessments relevant to economic options and trends.

In January of this year, I was in Iran, Kuwait, and Saudi Arabia, at which time I had a lengthy private meeting with the Prime Minister of Iran, a substantive interview with the Kuwait Minister of Oil and the Undersecretary for Economic Affairs of that Ministry (both of whom happen to be my former students), and two sessions with the Saudi Arabian Petroleum Minister, among other oil, economic, and planning officials and cabinet ministers in the three countries. Most of the discussions surrounded the future of OPEC and its pricing system arising from the December 15–17, 1976 Doha (Qatar) price fixing conference where the majority of OPEC (originally 11 members) supported a 10 percent increase as of January 1, 1977, to be followed by a further rise of 5 percent in July. Saudi Arabia and the United Arab Emirates did not follow this decision.

THE 1976 DECEMBER OPEC PRICING DECISIONS: WHO AND WHAT

First, this movement to the two-tier system should not have been unexpected by the United States and other consumers. Since 1974 there have existed two rather distinct schools of thought on pricing within OPEC, subliminal at times and, prior to the Doha meeting, having been dealt with through compromise and negotiations when the difference surfaced openly for formal price decisions. Moreover, regardles of pronouncements, there has always been variation through de facto prices based upon differences in oil quality. The unanimity on price increases in the past was due overwhelmingly to the Saudi position enforceable

---

NOTE.—Professor El Mallakh is Editor of the Journal of Energy and Development and has specialized in energy, developmental, and Middle Eastern and African economics for over 20 years. A citizen of the United States, the author has held grants from the National Science Foundation, Social Science Research Council, and the Ford and Rockefeller Foundations. He has written over 80 articles, reviews, contributions to books, and such volumes as Economic Development and Regional Cooperation: Kuwait (Chicago University Press 1968, 1971) and Capital Investment in the Middle East: The Use of Surplus Funds for Regional Development (Praeger Publishers, forthcoming 1977). The latter study was drawn in part from findings of a project on "Implications of Regional Development in the Middle East for United States Trade, Capital Flows, and Balance of Payments."

by that country's massive petroleum reserves (144 billion barrels) and its cushion of surplus funds (reaching some $47 billion in 1976) which allow for a relatively wide range of output fluctuations. Thus, while Saudi Arabia has not produced 50 percent or more of total OPEC output in the past, it is capable of doing so allowing for a slight time lag for technical adjustments.

Those in OPEC favoring the 10 percent increase base their judgments on (1) the rate of inflation as calculated by OPEC's Economic Commission Board (ECB) over the past 15 months (to December 1976) at a 26 percent rise in the cost of OPEC imports, (2) that the 10 percent hike (to be raised an additional 5 percent in mid-1977) can be managed and absorbed without major difficulties by the world economy, and (3) the postponement of the North-South meeting which was scheduled for December 1976. The latter point was interpreted as an indication that the industrialized nations were not yet willing to give an adequate response to Third World needs.

In the Saudi case, it appears their view was conditioned more by an evaluation of the international economy which believed the 26 percent imported inflation rate figure too high. Equally significant in Saudi decision making seems to have been the worry that the world economy's recovery was insufficient to absorb or deal with a 10 percent oil price rise. Additionally, Saudi Arabia takes the North-South dialogue more seriously than its fellow OPEC members because it has been an initiator and prime mover in this relationship since 1974 and heavily involved in the selection of the country representatives to the sessions. The Saudis saw their moderation in the price increase as an incentive to the industrialized consumer nations to deal with Third World problems in a constructive and affirmative manner when (not, in the Saudi view, if) the Conference on International Economic Cooperation convenes. Finally, the Saudis visualize the use of moderation in oil pricing as a method to secure an ongoing initiative and concern by the United States in resolving the Middle Eastern political conflict and bringing peace to the region through such measures as a determined effort in a reconvened Geneva Conference. Obviously, Saudi Arabia sees its oil price moderation as a clear and positive signal to the new Carter Administration and expects some response to its attitude.

WHERE IS OPEC HEADED?

The impact of the OPEC December 1976 price increase has been muted in large part to date because of the extensive stockpiling in the fourth quarter of that year. The first quarter of 1977 has been marked by destocking, giving a distorted demand picture which will be short lived. For example, Iran's oil production plummeted from about 6 million barrels per day (b/d) in the last three months of 1976 to around 4 million b/d in the first half of January 1977; stockpiling pushed up the first statistic while destocking depressed the latter. Similarly, Kuwaiti output averaged 1.2 million b/d in January 1977 as compared with an average of 2.2 million b/d in 1976. It is expected, however, that more lifting will occur in Kuwait and Iran as a result of the return of a more normal demand situation arising from the decline in stocks of the consumer countries and the severe winter in the United States. Further, as the economic recovery in the West gathers momentum, petroleum demand is expected to continue to rise overall. With growing demand, the price "conflict" within OPEC should lessen and OPEC as a body is likely to be strengthened under conditions obtaining in a "seller's market."

Another factor pressuring against the two-tier system and pushing toward evolution of a single OPEC price is the difficulty with which production programming can be designed and implemented among the group of 11 countries announcing the 10 percent price increase to share the cutbacks in output and thereby balancing the rise in production from Saudi Arabia and the United Arab Emirates. It will be recalled that member countries such as Algeria and Libya have suffered little from the temporary effects of destocking in early 1977 due to the high demand for their type of crude (light gravity, low sulfur). Demand for this type of oil is increasing, particularly in the Eastern region of the United States. The brunt of output slashes has fallen on Kuwait, Iran, and Iraq. Moreover, the absorptive capacities or the need for oil-generated funds vary among the OPEC economies. Iran and Iraq are large absorbers while Kuwait, with its limited population and high capital reserves, is a low absorber.

The split which occurred at the Doha meeting has fueled the hopes of those who are awaiting the demise of OPEC, predicted as imminent by a number of individuals for some time. In my view, these hopes might be at least two decades premature. OPEC as an organization with significant clout in international

petroleum trade will be here to stay for a number of reasons. (1) The seller's market will continue and even be strengthened through the 1970s and 1980s. (2) Both Saudi Arabia and its major so-called price adversaries realize that their past solidarity within OPEC is responsible for their present position of power in the oil market and in the increased government-take per barrel. Moreover, OPEC was created to protect its members against abrupt price declines and, hence, levels of revenues as experienced in 1959–60. (3) Although Saudi Arabia may be able technologically to up production dramatically after 1977 to meet increases in world demand, it is questionable that this is seen as a long-term or viable option by that country. With sufficient capital reserves and confronted by difficulties in absorbing the funds generated at the 8.5 million b/d ceiling at pre-Doha prices, Saudi Arabia has a hard time justifying a sustained substantially higher level of exports. (4) Aside from economic opportunity costs involved in lifting oil now as compared to later (under conditions of greater scarcity), there are political considerations other than bailing out the consuming nations.

Many of Saudi Arabia and United Arab's Emirate's fellow OPEC members are also neighbors and regional stability is politically desirable. Thus, the pivotal OPEC state of Saudi Arabia must balance its own political position between the two (the West and OPEC members) and unless there are rewards for increased Saudi output along the lines noted earlier, the regional benefits of lowering production could be more alluring and defensible in Saudi policy-making circles. (5) Within OPEC, one should always bear in mind the argument is not over whether prices should go up or down, but rather over how much they should go up. OPEC's decisions have never been binding on its member governments; this has been a structural strength in that the body only can and does move on issues of strong mutual interest.[1]

U.S. POLICY OPTIONS AND REALITIES

The most powerful components of OPEC in terms of oil reserves, output, trade, and capital funds are Middle Eastern nations. Accordingly, not only our specific economic and political policy vis-a-vis a given country is important but that towards the region as a whole. Clearly of benefit to the United States and the other consuming nations are peace and stability in the area for (a) security of oil supply and (b) a healthy trade relationship to offset importers' balance-of-payments outflows. Specifically, there are a number of policy options open to the United States within the framework of the new global realities.

The first and most constructive attitude or approach for the United States is in facilitating the transfer of technology to OPEC and Middle Eastern countries, particularly in energy-intensive industries. The oil producer commitment to the development of alternative energy sources is not a "smoke screen" but one of necessity as exports of a depleting asset increase. Moreover, such countries as Saudi Arabia, United Arab Emirates, and Kuwait are basically one-product economies. Most recently France has concluded two cooperative agreements with Saudi Arabia following President Valery Giscard d'Estaing's visit in January 1977 for the development of solar energy and nuclear research for peaceful purposes.

Second, to create incentives for such low absorbers as Kuwait, Saudi Arabia, and United Arab Emirates to continue a high level of oil exports, a positive attitude toward OPEC and more specifically Arab producers' investment in the United States should be fostered. This would entail eliminating obstacles and discrimination, opening up money and equity markets to oil investors, and providing safeguards against political actions such as freezing assets of nations and other governments as has happened in the past.

Third, because of the balance-of-payments problem of the United States as petroleum imports rise (and could continue to do so for the next 15 to 20 years), trade also must be encouraged and expanded. The Middle East is the fastest growing single market in the world today, more important in dollar value than trade with the entire Soviet bloc. A vital export sector in the United States is directly reflected in a higher U.S. employment level. While American products and services have a good name and are admired in the Middle East, the United States is not in a competition-free vacuum there in the trade arena. French con-

[1] The sinister and powerful image of OPEC per se has been greatly exaggerated. For example, when visiting the Vienna headquarters, one is struck by the fact that the entire Economic Department's staff, including secretaries and file clerks, numbers less than a dozen persons. The body is, in fact, a representative of its individual members' power.

tracts with Saudi Arabia alone have risen from $8.6 million worth in 1973 to $1.6 billion worth in 1976.

Fourth, the United States national interest lies in orderly development and stability in the Middle East region. In the past two decades, the American reliance on Middle Eastern petroleum was primarily indirect; the scales now have tipped since the opening of the 1970s toward greater United States interdependence with that region as the Middle East has become the major source of needed direct oil imports. An interruption, upheaval, or war would mean a measurable negative impact on the U.S. economy and level of employment. The drawing together economically and politically of the key moderate countries of Iran, Egypt, and Saudi Arabia should be viewed and reacted to as a positive development because these three states account for about one-half of the population of the region, more than a quarter of the world's oil reserves, and the most critical in oil logistics (Egypt with the Suez Canal and the Sumed pipeline stands as the most important transit country). All three are definitely pro-West generally and pro-United States in particular and are pushing for their national development in cooperation with the industrialized West. An aspect of regionalism in the area is the mobility of capital funds; investment in the region by the oil states enhances political stability in the recipient countries and can also finance additional imports expanded potential markets for American products. Some serious consideration should be given to triangular arrangements with OPEC states where U.S. technology, skills, and equipment could be combined with an oil producer's funds for a project in a third country.

Fifth, as 1977 opens it should be abundantly clear that direct United States interests in the Middle East are so great that they can no longer be sidestepped or overlooked. Were there to erupt another military conflict along the lines of 1973 and the subsequent dislocations, the economic consequences, quite aside from the tragedy of human suffering, are unthinkable for all parties concerned. It is highly questionable that there could be a winner and almost certainly the United States would be the major loser. If our economy and energy system are so precariously balanced that a prolonged cold spell can so disrupt our national economic life, an interruption which would affect almost 30 percent of our oil needs would be a disaster. Moreover, the Middle Eastern and North African members of OPEC are emerging as the major sources from which the United States will be importing LNG (liquefied natural gas).

Sixth, our policies toward OPEC and its individual members could benefit from an attitude of greater *cooperation rather than confrontation.* Within the Middle East one discovers almost bewilderment over what is apparently American resentment and antagonism against the growing United States-Middle Eastern interdependence. Such an aura of hostility is largely absent in the relationship between the OPEC members (the Middle Eastern states in particular) and other major importers as Japan and the European consuming industrial countries, e.g., France, Germany, and the United Kingdom.

Seventh, the solution to *the United States energy problem* and, in fact, the global energy crisis, *involves three interrelated elements* or policies; (a) *conservation*, (b) *development* of new energy sources, and (c) *cooperation* with the suppliers of traditional energy sources. For example, scarcity has added immediacy to the conservation impetus; nonetheless, implementing significant conservation will require time. Cost and the availability of capital play important roles in the development of new energy sources; again, time is needed to evolve rational and commercially feasible alternatives. Thus, conservation and the development of new energy sources cannot be viewed as alternatives to cooperation with the major producers but rather as part of an overall medium and long-term strategy to meet the world's energy demands.

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, D.C., January 4, 1977.

To: Members, Subcommittee on Energy.
From: Edward M. Kennedy, Chairman.
Subject: "Energy Independence or Interdependence: The Agenda With OPEC"—Hearings, January 12 and 13, 1977.

The recent decision by Saudi Arabia and the United Arab Emirates to split with the 11 other members of the Organization of Petroleum Exporting Countries (OPEC) over the price of crude oil was as unexpected as the decisions by

OPEC in the early 1970s that radically transformed the international oil market and made the "energy crisis" a household word. Although OPEC's decision to operate with a two-tiered pricing system is not likely to have an economic impact comparable to the quadrupling of crude oil prices that occurred in 1973–74, it has opened up another period of considerable uncertainty and change on the world oil scene. The assumptions and predictions of most experts, in this country and abroad, about the likely behavior of OPEC at the Qatar meeting have once again been proved wrong. The policies that the United States and other oil importing countries should pursue in these changing conditions remain either unclear or in dispute.

In light of these circumstances, the hearings by the Subcommittee on Energy—"Energy Independence or Interdependence: The Agenda with OPEC"—scheduled for January 12 and 13 are most timely. With the experience and knowledge of the post-embargo period to draw on, we now are in an excellent position to make some basic judgments about this country's future international energy policies. The time for "muddling through" and "hoping for the best" has clearly ended.

This staff memorandum outlines some of the issues that are likely to arise in the upcoming hearings and it draws from much of the testimony and data that were developed in hearings by the Subcommittee in 1975 and 1976. It is hoped that the Subcommittee members will find this summary analysis useful in considering the testimony of the scheduled witnesses and in asking questions. Questions about this material can be directed to John Stewart or Sarah Jackson of the JEC staff.

The topic for each day of the hearings and the scheduled witnesses are as follows:

January 12—"The Future of OPEC: Will the Glue Hold?"—1318 Dirksen

Theodore H. Moran, Professor, Johns Hopkins School of Advanced International Studies, Washington, D.C.

Morris Adelman, Professor, Massachusetts Institute of Technology, Cambridge, Mass.

Mr. John H. Lichtblau, Executive Director, Petroleum Industry Research Foundation, Inc., New York, N.Y.

A. J. Meyer, Professor, Harvard University, Cambridge, Mass.

January 13—"Energy Independence or Interdependence: U.S. Policy Choices"—1202 Dirksen

Anne Carter, Professor, Brandeis University, Waltham, Mass.

John Sewell, Overseas Development Council, Washington, D.C.

Howard Kauffmann, President, The Exxon Corporation, New York, N.Y.

John Sawhill, President, New York University; former Administrator of the Federal Energy Administration.

Paul Davidson, Professor, Rutgers University, New Brunswick, N.J.

I. ENERGY INDEPENDENCE

Although the outlines of the energy crisis of 1973–74 had been visible for several years, the magnitude and rapidity of the changes precipitated by the OPEC price rise and the Arab oil embargo caught the U.S. Government, and just about everyone else, by surprise. In November 1973, as the effects of the embargo and the higher prices were beginning to hit home, President Nixon declared in a nationally-televised address that "Project Independence"—a combination of increased domestic drilling, the use of alternative fuels, and a massive expansion of nuclear power—would achieve self-sufficiency in energy for the United States by 1980. Since then, the goal of energy independence has undergone considerable redefinition by the Administration, although the concept has lingered as the underlying goal of U.S. energy policy. At present, the Federal Administration considers oil imports of no more than 6 million barrels per day by 1985 to constitute "energy independence".

The obstacles to pursuing a strategy that would leave the United States totally independent of foreign oil by 1985 are several: the extremely high cost of producing alternative synthetic fuels in commercial quantities (in general, the cost of synthetic fuels is about $10 per barrel more than OPEC oil); the environmental risks that such a crash program would entail; doubts about the wisdom of a policy that would "drain America first", leaving future generations without essential oil and gas for petrochemical processes; continuing technical and cost problems associated with a large-scale shift to nuclear energy; and the inevit-

able dependence of our allies in Europe and Japan on imported oil for their economics, regardless of United States sources in achieving energy self-sufficiency. Whether it is from the perspective of economic costs, technical problems, or international politics, the process of achieving "energy independence" involves a host of problems that are not likely to be resolved in the foreseeable future.

It is time to abandon the rhetoric of "energy independence" and get on with a more realistic effort that acknowledges the inevitability of U.S. dependence on foreign oil. At the same time, we should be far more diligent and imaginative in working toward international energy relationships that protect the vital interests of the United States, along with those of other indusrialized consuming nations. This effort will necessarily include our taking into account the interests of the oil-exporting countries and those of the developing nations.

Because the policy goals of the United States have not been grounded in the reality of energy interdependence, our international energy efforts in the aftermath of the oil revolution of 1973–74 have reflected great uncertainty and improvisation. We have threatened the military occupation of Arab oil fields and then backed off. We have proposed ambitious schemes to link together the technical ability and capital of the industrialized nations with the development of energy resources in the developing countries and had these proposals ignored. Most of the time, we have been content to rely on informal jawboning of oil exporting nations.

This record of missed opportunities and false starts is unacceptable. To improve it, we need to reach agreement on and then carry out a U.S. energy policy that addresses two fundamental questions:

What domestic energy policies can hold our dependence on foreign oil to minimum levels?

What international energy policies can move us in the direction of securing reliable sources of imported oil at reasonable prices?

This memorandum and the testimony at the upcoming Energy Subcommittee hearings will focus primarily on the second question.

II. THE FUTURE OF OPEC

The Western oil importing nations, led by the United States, have displayed a remarkable ability to misread and misunderstand the functioning of OPEC. In most instances, international energy experts have relied heavily on past events and prior OPEC behavior in their attempts to understand the cartel's present and future actions. For, example, the probability of massive price increases and an oil embargo were almost totally discounted in the early 1970s because OPEC had been unable to sustain such policies in the 1960s. This year it was assumed by most experts that the members of OPEC would unanimously support a single price for Saudi Arabian marker crude because the cartel had demonstrated surprising cohesiveness during the events of 1973–74 and in the face of the sharp decline in world demand for oil during the recession of 1974–75. On both occasions the experts were wrong. In the first instance they failed to appreciate the new cohesion that OPEC developed once the vulnerabilities of the Western consuming nations and the companies were exposed and a five-fold increase in government oil revenues was achieved. More recently the cohesiveness of 1973–1975 was simply taken for granted, despite the internal politics of the cartel itself and the conflicting economic pressures that motivate its individual members.

In weighing U.S. policy towards OPEC, several factors should be kept in mind. Despite ringing public pronouncements about producer solidarity, OPEC remains a loosely aligned group of 13 nations with widely varying political and economic interests. The oil resources to support these divergent policy objectives vary greatly from country to country. Cultural, religious, and social traditions also vary widely. To cite two of the more obvious examples: the interest of Iran, Nigeria, Venezuela, and Indonesia in generating maximum revenues in the short run before their limited oil reserves are exhausted is very different from Saudi Arabia's interest in securing stable markets for its mammoth reserves that will last well into the next century. Although the Arab members of OPEC view oil as a political weapon in their struggle with Israel in a way not shared by non-Arab members, there are also striking differences among Arab states as to how this weapon should best be used.

Sheik Ahmed Zaki Yamani, the Saudi Arabian minister of petroleum, gave some hint of these differences—both economic and political—in the aftermath of the Qatar meeting when he commented: . . . In the past they (other OPEC

states) used to decide for the Saudi crude and raise the price for it, and in the meantime they sell their crude at a much lower price. For instance, the Iraqis—they used to dump the market with their oil at a very low price, and other nations did the same. So what happened today is just the other side of the story . . ."

It is generally agreed that the cartel has never assigned explicit production shares among its members, a function traditionally believed to be essential in supporting a collusive cartel price. Instead, OPEC has relied on an informal system of production control, keyed to the amount of oil that companies are willing to lift, taking into account a variety of factors: contractual obligations, market demand, price differentials, and company policies.

These factors can combine in different ways to produce results that are not always to the liking of all OPEC states. Exports from individual countries often diverge conspicuously from OPEC's general pattern; there can be sudden production shifts, now in favor, now against, the interests of a particular country.

For example: Libyan exports fell 50% from May to November 1974 (1.95 MBPD or 0.96 MBPD), compared with an aggregate 7% decline in OPEC production during the same period. Subsequently, Libyan production rose from 1.4 MBPD in May 1975 to 2.1 MBPD in July; OPEC exports rose by 6.3% during the same period. Qatar production suffered a 50% decline in production between April and July 1975. Abu Dhabi production fell from 1.62 MBPD in July 1974 to 0.75 MBPD in July 1975. In contract, Iraq had a consistent increase in exports from May 1974 through October 1975, notwithstanding an aggregate decline in OPEC production during the same period.

These gyrations on the production of individual OPEC states suggest that while the cartel's informal prorationing system avoids the problem of deciding explicit production shares, it can also result in distinct winners and losers at any given point in time. As noted above, the market demand for particular types of crude oil, in combination with the pricing differentials that are set by individual countries (to reflect differences in sulfur content, density, distance from market, etc.) and other unknown factors, can shift buyers from one crude source to another. Efforts to agree on a common formula for setting price differentials have always bogged down at OPEC ministerial meetings.

A cautionary note, however, needs to be injected at this point. One should keep the impact of these marginal production shifts in perspective. Dr. Paul Frankel, chairman of Petroleum Economics Limited, London, in his testimony before the Energy Subcommittee last June observed: ". . . The collapsible extension of the main program can cover only a comparatively small part of the oil OPEC has to dispose of, or the oil which the offtakers have to take. . . . These ideas . . . suffer from the fact that the people, especially the economist, mistake the tail for the dog. That is to say, they look in a fascinated way at the movable fringe of the market, the spot sales, if you like, and forget that in an energy industry the overwhelming part of the operations must be planned and operationally executed over a long period with a great deal of advance planning because it cannot be done on an ad hoc basis. . . . The fringe operations are very important, but they have to be seen in the right context."

OPEC's recent decision to operate under a two-tiered system for pricing its marker crude, if it is sustained for any period of time, will complicate OPEC's system of production control. A major factor in OPEC's success to date has been the single price for marker crude; it was relatively simple to administer and easy to police. A two-tiered system complicates the pricing process and provides more opportunities for price shaving and special deals. In addition, Saudi Arabia's willingness to serve as the residual balancer of the cartel—that is, its ability to hold aggregate OPEC production to levels that support the marker crude's price level—is now in doubt; its apparent decision to increase production beyond the annual average of 8.5 MBPD will exert downward price pressure on higher-priced crudes and the loss of crude sales by other OPEC states.

Initial pricing decisions by other OPEC countries provide a range of increases, including a $1.38/barrel increase for high-quality Libyan crude, a $1.06/barrel increase for better-grade Nigerian crude, $.75/barrel for the principal Indonesian crude, and about a $.58/barrel increase by Saudi Arabia on its marker crude. Increases seem to be averaging about 8% or $1.00/barrel. It also appears likely that the additional 5% increase in July 1977 that was approved by the 11 higher-priced countries will be abandoned.

OPEC's two-tiered pricing system has also created a situation where it will be possible to assess the degree of competition that actually exists among the

multinational oil companies in purchasing OPEC crude, as well as their alleged role in setting production levels within individual producing countries. As noted above, the basic price differential between Saudi Arabian and UAE crude and that produced by the 11 other OPEC states is in the range of $.60/barrel. Assuming Saudi and UAE production increases, will oil companies buy as much of the lower priced crude as they can, and will they cut back their liftings of higher priced crude in other OPEC countries? If, on the other hand, oil companies continue to lift higher priced crude in order to preserve their access to crude agreements with OPEC states, it will provide important evidence of noncompetitive behavior by the companies and illustrate a willingness by the companies to perform the prorationing functions of the cartel.

(Note: This crucial question of the relationships between the companies and the OPEC countries is being analyzed in detail by the General Accounting Office at the request of the Energy Subcommittee and the full Joint Economic Committee. This report, when it is filed in late winter, will provide additional data and analysis for making a judgment about whether the oil companies are in league with the cartel, a charge which oil company witnesses before the Energy Subcommittee have denied.)

It is too early to know how OPEC will attempt to resolve these new sources of instability within the cartel, or even if the breach can be resolved. Political factors not related to the economics of international oil, particularly the success or failure of efforts to reach a negotiated settlement between Israel and the Arab states, will be very important in determining Saudi Arabia's future course. Decisions by the oil companies whether or not to seek out the cheaper Saudi Arabian and United Arab Emirates crude will also be crucial in determining how much of the higher-price crude is lifted.

It is, however, premature to predict the swift demise of OPEC in the sense of widespread price-cutting as a way of protecting production shares. Even if all other OPEC members reduced prices to make their crude more competitive with Saudi Arabia's, the world would still be paying in excess of $12 per barrel compared to $11.51 before the Qatar meeting. The common need of all OPEC members, even Saudi Arabia, for large oil revenues to support ambitious development projects will also work against any trend toward wholesale price-cutting, even while individual producing countries attempt to manipulate price differentials to their respective advantage. Finally, there still exists among the cartel members a clear memory of the low prices that prevailed before 1973 and the real gains of the price quadrupling that resulted; this recollection should work against any disintegration of the cartel in the short-run.

III. U.S. POLICY TOWARD OPEC

The most obvious lesson of Qatar is that the consumer nations should not regard OPEC as monolithic entity impervious to external political and economic pressure. The consuming nations need for OPEC oil is, to some degree, offset by the oil-exporting nations need for revenue, capital goods, and expertise that only the industrialized West and Japan can provide. The factors affecting the cohesion of the cartel are multiple and can be influenced in unexpected ways. As a result, the opportunities to pursue potential bargaining advantages may be enhanced by the internal divisions, now becoming more apparent, in the loosely structured OPEC cartel. But in formulating U.S. strategy toward the cartel, it makes little sense to think in terms of restoring the international oil system that existed prior to the oil revolution of the early 1970s. We must, instead, think in terms of a system that simultaneously takes account of certain fundamental interests of oil-importing nations, oil-exporting nations, and the developing nations.

A renewed effort of the United States to deal realistically with the problems of an energy-independent world must include a candid appraisal of the proper roles of the U.S. multinational oil companies. Historically, two assumptions have governed the relationships between the U.S. Government and the multinational oil companies in their overseas operations: first, that U.S. interests and those of American oil companies abroad were largely identical; and second, that the oil companies could be used as vehicles of U.S. foreign policy, especially in the Middle East. Whatever else may be said about the efficacy of these arrangements, the oil companies succeeded in acquiring the concessionary rights to large quantities of the world's oil and in delivering this oil at prices that declined in real terms during the 1950s and 1960s.

The oil revolution of the early 1970s stripped the companies of their power to impose prices on the OPEC states and either has eliminated, or soon will, their

equity interest in OPEC oil production. The companies, however, continue to provide most OPEC members with valuable managerial and technical services and their integrated operations are essential to the orderly disposition of a large, although declining, portion of OPEC crude oil and products. Moreover, decisions by the companies to buy and sell different grades of crude oil from individual countries, taking into account their contractual obligations and price differentials, seem to have provided OPEC with an informal prorationing system. The companies, for their part, have an obvious commercial interest in maintaining their access to OPEC crude on terms no worse than their competitors.

These emerging arrangements between companies and producing countries clearly have challenged the two assumptions of the pre-1970 era. No longer can it simply be assumed that the interests of the United States and those of the companies are identical, since the companies' continued access to OPEC crude depends, in some measure, on their willingness to operate in a manner consistent with the producing country's view of its own national interest. Whose interests, then, command the loyalty of the U.S. multinational oil companies? Are they those of their stockholders, their home country, or the host OPEC nation?

There is no simple answer to this question. Yet, there can be no serious argument with the proposition, as stated recently by the Federal Energy Administration, that: "the international arrangements governing the lifting and pricing of oil . . . although traditionally and largely a matter of private commercial concern, nevertheless may substantially affect United States energy interests and objectives regarding supply security as well as the price of imported oil. The increased control over international oil production and pricing on the part of OPEC governments in the early 1970's, and the oil embargo and subsequent petroleum price increases by the OPEC cartel, have generated increased public concern about the impact on U.S. national energy interests and objectives of the arrangements between private U.S. companies and foreign governments affecting international oil trade."

In testimony before the Subcommittee on Energy last June, Robert A. Krueger, author of an FEA-sponsored study on options for U.S. international energy policy, said: "Our report, which was released in February of 1975, indicated that there was a clear-cut need for a greater involvement, a greater presence, by the U.S. Government in the activities of U.S. firms in international petroleum transactions. . . . It was also very clear that the oil companies operating abroad, both the U.S. and foreign countries, and both the independents and majors, had become virtually hostages of the major producer nations and lacked the will and resources to resist their demands for higher prices and greater 'participation'. We concluded that 'the existing incentives for the companies do not assure that their behavior will be consistent with the national interests of the United States'."

The June hearings explored several proposals to increase the presence of the U.S. Government in international oil transactions, such as:

access by the Government to relevant information regarding present and future significant international petroleum arrangements;

power by the U.S. Government to review and approve such transactions that affect significant aspects of the national interest;

placement of a U.S. Government member on the board of directors of every oil company operating abroad; this group of government directors could then form a body in itself to give direction to U.S. oil policy abroad.

U.S. Government witnesses at the June hearings testified that no further governmental powers were needed; the existing process of informal consultation between government and company officials was satisfactory. However, on November 10, 1976, the Federal Energy Administration published in the Federal Register a "request for comment" on the need for "additional reporting requirements with respect to arrangements which U.S. oil companies and their subsidiaries have with producing governments and their oil companies." The FEA "request for comment" outlined a number of informational categories that could be covered, including reports on significant negotiations in progress between U.S. oil companies and producing countries (such as the present Aramco negotiations with Saudi Arabia). A number of comments were submitted to the FEA; at this writing, however, no further action has been taken. Nonetheless, the fact of the FEA's issuing the "request for comment" casts doubt on the Government's earlier testimony about the adequacy of the informal consultative process that is presently relied upon.

In addition to weighing the need for a greater Government presence in international oil transactions, Congress must also focus on the level of competition that exists among the companies themselves in their overseas operations, as well

as the relationship of the companies to the producing countries in supporting the OPEC price. At the June hearings, William J. Lamont, a Washington attorney, pointed to the integrated structure of the major international companies as resulting in an absence of effective competition and a desire by the companies to cooperate with the OPEC cartel in maintaining its collusive price level. Mr. Lamont said: ". . . The multinational companies and their allies in the OPEC countries have basically a control which we cannot directly shape as long as the organization of the oil markets remains what it is. No matter what we choose to do, no matter what strategies we seek to apply, we will run up against the basic fact that oil movements are now controlled by a series of markets in which buyers and sellers have virtually identical interests, as far as crude oil is concerned."

Lamont recommended restoration of competition through active enforcement of the antitrust laws in relation to both the domestic and international operations of U.S. oil companies. In the absence of a judicial remedy, Congress should require divestiture of the oil companies' vertically-integrated components.

James F. Flug, director and counsel of the Energy Action Committee, in a more recent comment on the OPEC meeting, wrote: "The most pervasive factor is that all of the customers of the OPEC countries are 'integrated' oil companies. That is, the refineries which buy and use the OPEC oil are not just refiners but also have heavy involvement in oil production both in the OPEC countries and elsewhere. Thus, when they make a decision as to where to buy crude oil and how much to pay, they cannot really act as 'independent' arm's-length buyers looking for the best buy. They have to take into account the interests of their production affiliates and frequently those interests are contrary to the interest of the refiners and the customers for refined oil products."

As discussed earlier in this memorandum, the new two-tiered pricing system provides an opportunity to assess the validity of this allegation.

In addition to the proposals for requiring a greater presence by the U.S. Government in international transactions of private oil companies, there is existing authority contained in the Energy Policy and Conservation Act (EPCA) for the U.S. Government to become the exclusive importer and purchaser of all or any part of the crude oil or petroleum products of foreign origin for resale in the United States. The President is also granted authority ot sell, on the basis of competitive bids, at a price above or below cost "if . . . such sales may result in progress toward a lower price for oil sold in international commerce." In essence, this provision would remove private oil companies as the direct purchasers of OPEC oil and substitute a sealed bid procedure managed by the U.S. Government. It would also permit below-cost resale by the Government as a way of creating suspicion and distrust among OPEC members that others might be cheating, hopefully initiating a proces of retaliatory price-cutting.

Professor Morris Adelman of the Massachusetts Institute of Technology has proposed a variation of the direct Government import authority: that is, selling import entitlements (or quota tickets) at public auction by sealed bids. As with direct Government purchases, the objective is to drive down the cost of imported oil by disrupting the cartel's informal pricing and prorationing system. In Adelman's view, the oil companies would be removed as the cartel's agents for determining production levels by individual countries, although the companies would continue to produce, transport, refine, and sell petroleum products. Producing governments, by bidding secretly for entitlement tickets, would find themselves competing with each other for access to U.S. markets. Severe erosion, not collapse of the cartel, would be the end result.

Given the recent fissures in OPEC solidarity, such a scheme—or use of the EPCA authority for direct governmental purchases—might be plausible. Others feel, however, that such a strategy would be the most likely way to reunify the cartel around a single world price. Questions have also been raised about the U.S. Government's ability to manage the complicated logistics of moving oil in the international market. And what would happen if the cartel simply refused to offer any oil for direct sale to the U.S. Government? Or if the cartel members coordinated their "secret" bids at $.50 above the world price? Would the U.S. be forced to back down?

The direct Government purchase authority could be used in a more limited way to acquire crude oil and refined products for the Strategic Petroleum Reserve, as authorized by the Energy Policy and Conservation Act. The Federal Energy Administration has recently proposed that the United States acqire and store, over a period of about 5 years, 500 million barrels of crude oil at the cost of about $8 billion. Direct purchase of this oil by the U.S. Government would be another

way to exacerbate the cartel's divisions at a time when certain OPEC countries may be looking for opportuntities to replace sales lost to Saudi Arabia and ready to offer discounts or other price incentives. Such a direct purchase arrangement could also be viewed as a first-step in the operations of a U.S. national oil corporation whose functions could be expanded subsequently, both domestically and abroad.

There are other policy choices open to the United States in pursuit of the goal of constraining OPEC's power to fix world energy prices. The United States, for example, could link the availability of capital goods, technical services, and the like to a willingness by OPEC governments to provide oil at below the world price, possibly in relation to acquiring oil for the Strategic Petroleum Reserve, as discussed above. Exploratory talks in the pre-Qatar period between U.S. representatives and individual OPEC governments were not encouraging. But the new dynamics of the international oil market caused by the OPEC split may have opened up opportunities that are now worth exploring.

The U.S. Government could also move toward a stronger presence in existing and developing private sector relationships with OPEC, stressing the benefits of industrialization and high technology that can only be obtained from the U.S. and other industrialized countries. The U.S.-Saudi and the U.S.-Iran Joint Economic Commissions, for example, provide forums for strengthening these bilateral relationships and, it is hoped, further reducing the common economic interests of the cartel. Specifically, the charters of these joint commissions could be enlarged to include dealings in hydrocarbon-related areas. Even though the hydrocarbon industries are the most intensive parts of the Saudi and Iranian five-year development plans, they presently are outside the bilateral arrangements represented in these joint commissions.

Hard bargaining by the U.S. with individual OPEC states, expanded bilateral economic relationships, and policy initiatives designed to achieve greater competition and lower oil prices are important parts of a more realistic international energy policy by the United States. But U.S. international energy policy cannot limit its focus to problems caused by United States dependence on foreign oil. OPEC's energy price increases have had a much more severe, and continuing, impact on the developing countries. In fact, the energy crisis of 1973–74 has forced a new awareness by the United States of the broader problem caused by the developing countries' struggle to survive economically.

Initially the U.S. relied on a strategy of confrontation in response to the quadrupling of world oil prices, including some veiled hints at the use of military power in dire circumstances. This approach soon proved hollow: the United States had little intention of occupying Arab oil fields and we obviously needed OPEC's oil. Moreover, in the absence of a common front among oil-importing industrial nations, it was evident that most of the goods and services we might withhold from OPEC could (and would) be sold by Japan and Western European allies.

Since then, the United States has adopted a different approach, consisting of two basic policies. First, we helped to create the International Energy Agency (IEA) of industrial states, which has adopted common oil-sharing arrangements for a time of crisis, created a "safety net" to relieve the balance of payments problems of countries hardest hit by high energy prices, provided for an information system on international oil markets to which all member nations contribute, evaluated the efforts of member countries to reduce energy consumption through conservation, and initiated a limited number of cooperative energy research and development projects.

Second, the United States shifted to a policy of seeking better relations with OPEC states as part of a broader effort to deal constructively with the problems of the developing countries. Secretary of State Kissinger first presented this approach at the Seventh Special Session on Development of the U.N. General Assembly in September 1975. This was followed up by the convening in ministerial session of a Conference on International Economic Cooperation (CIEC), consisting of 8 industrial states and 19 from the developing world, in Paris in December 1975. CIEC was also an outgrowth of a proposal by the French Government, and met the objectives of the proposals for a world energy conference, in November 1973.

This cooperative approach to dealing with the world's energy problems reflected three propositions: (a) that there is value in drawing the oil producers increasingly into the global economy, with real responsibilities as well as benefits; (b) that while direct confrontation would not work, the oil producers are dependent on a workable global economic system (dominated by the Western

industrial states, despite OPEC power over world oil prices); and (c) that the OPEC states also were championing (at least rhetorically) ideas long advocated by the Group of 77 developing countries—namely, the striking of a new economic deal, often called a New International Economic Order.

Following the first ministerial meeting of CIEC, its work devolved upon four commissions—energy, other raw materials, development, and finance. While the industrialized nations have focused their efforts on convincing OPEC participants of the need for more moderate oil pricing policies, OPEC has stressed the need for guaranteed returns for its diminishing oil resources.

Saudi Arabia, for example, has proposed a deal where OPEC would guarantee production levels of crude oil adequate to meet the requirements in exchange for Western assistance for improving the absorptive capacity of OPEC states and diversifying their production base, protection of OPEC financial assets committed to investments in industrialized countries, and full access to industrialized country markets for crude and petroleum products by eliminating import restrictions. If the issue of oil prices was made part of this package, the basis for serious negotiation might be established.

Other oil producers want an agreement—more like a traditional commodity agreement—whereby future oil price increases would be related to the price of manufactured goods these countries seek. Most industrialized countries have opposed this scheme as unworkable.

The developing countries at CIEC has pressed their demands in two areas: the great burden of debt on developing countries (exacerbated by a net energy bill of more than $35 billion last year); and the need to stabilize their income produced by the sale of commodities in the world market. Neither issue is simple; neither can be resolved easily; both are heavy with symbolic significance in terms of the willingness of industrial states to respond to the economic needs of developing nations. Yet, the creation of CIEC has changed the terms of the debate. There is less emphasis on political confrontation by the Group of 77 nations and the developing states have concentrated more on their objective than on the concrete means to achieve it—the objective of increasing and protecting income from the sale of commodities.

The final ministerial session of CIEC was postponed this past December in anticipation that a new U.S. Administration might provide new impetus for reaching a comprehensive agreement. But the barriers to success are considerable. In particular, the large grouping of countries—8 industrialized nations and 19 developing nations—make it difficult to table negotiable proposals. Maximum demands hold both camps together. Fissures are likely to develop if any nation initiates more forthcoming proposals. It has been suggested that a reduction in the number of participants or in the size of the agenda would be beneficial in hammering out an agreement.

It remains to be seen whether future oil-pricing decisions by OPEC can be linked realistically to progress at CIEC. But in view of the generally increasing importance to the global economy of commodity-exporting developing countries, there is merit in proceeding with CIEC, on a business-like basis, while also pursuing on other fronts ways to achieve greater price restraint on the part of OPEC.

CIEC is also one among several forums where the impact of higher energy prices on the developing countries can be dealt with. Higher oil prices will mean an inevitable reduction in capital formation and the rate of economic growth in the developing countries. OPEC and the Western industrialized nations cannot escape the problem of devising politically and economically feasible arrangements for increasing the flow of capital back to the less developed countries.

IV. WORLD SUPPLY AND DEMAND

The future political and economic leverage of OPEC will be greatly affected by the world's demand for oil in relation to the world's supply (Recall that it was the elimination of all excess production capacity outside of OPEC that set the stage for the oil revolution of 1973–74.) In an analysis that generated considerable interest and discussion, Walter J. Levy's London office suggested last July that the world demand for oil by mid-1977 would exhaust the margin of OPEC's unused capacity that is currently available. To meet this demand and avoid a world supply shortage. Levy's firm calculated that Saudi Arabia would have to raise its annual production ceiling of 8.5 MBPD to about 10.0 MBPD. The significance of this decision by Saudi Arabia was underlined in the Levy analysis: "Saudi Arabia's decision could give some indication of how its policy is emerging

on what will be the most important single energy issue over the next 15 years. This is whether the level of Saudi Arabia's output will be that dictated by its own needs or that dictated by the needs of its customers; or whether it tries to bring the two figures closer together—by using the price mechanism."

The possibility of a supply crunch in mid-1977 has not developed. Saudi Arabia, for the moment, seems to have decided the production issue in favor of its customers by signaling its intention of increasing production above the 8.5 MBPD level. Recovery from the worldwide recession of 1974–75 has not been as rapid as anticipated. Moreover, new production from the North Sea fields and the North Slope of Alaska in 1977 is expected to alleviate any further world supply shortages for the next 4 or 5 years, although some experts are more pessimistic on this score. The Saudis will continue to hold the key to adequate world supplies.

Even if one is correct in predicting an adequate level of petroleum production into the 1980s, the question of security of supply will remain for oil-importing countries. By the spring of 1976, imports by the United States from Arab oil-exporting states and Nigeria had risen to over 3 MBPD—nearly 64% of total U.S. imports—and this upward trend has continued. These figures underscore the fact that the United States and other oil-importing nations remain extremely vulnerable to external developments affecting security of supply. A shortfall might result from several circumstances short of an outright embargo. First, a decision by Saudi Arabia (possibly in the aftermath of a failure to reach an acceptable settlement with Israel) to reduce production to about 5 MBPD; second, abrupt political change in oil-exporting nations which clearly have the potential for internal upheaval; and third, disruption of trans-shipment and transportation facilities by natural causes, accident, war, revolution, or terrorism. The long supply chain from the oil-exporting nations on which the United States now depends is only as strong as the most fragile link, such as loading platform, a pumping station, or a pipeline.

These contingencies—plus the fact that world supplies may again run short in the early 1980s—make it essential for the United States to take every reasonable step that will reduce its vulnerability. Edward R. Fried and Charles L. Schultz, in their overview for Higher Oil Prices and the World Economy (Brookings, 1975), emphasize the important role of energy conservation in reducing U.S. dependence on OPEC: ". . . There appears to be more room for minimizing economic losses through conservation measures than through expansion of domestic sources of energy . . . Apart from new production from the North Sea and from the north slope of Alaska, the reliability of the projected increases in U.S. production of oil and gas incorporated in the FEA and OECD projections is subject to particularly large uncertainties. While still highly tentative, the most recent official reasssessments of potential supplies of oil in the United States have been substantially more pessimistic than earlier views. The pursuit of expansion of supplies remains highly desirable, even in the face of considerable uncertainty about results. But success in limiting the growth in world oil imports probably will depend heavily on measures to restrain consumption."

Congress in the past two years has passed a number of important measures to achieve greater efficiency in the end-use of energy, but the implementation of these programs by the exeecutive branch has been slow and, in some cases, half-hearted. The first step, then, in any serious effort to reduce U.S. energy consumption is to proceed with the vigorous implementation of those programs already on the books. Adequate funding of these programs for the remainder of fiscal year 1977, coupled with committed executive leadership, would constitute a solid beginning. Of course, it is also essential to proceed with the balanced and economically-viable development of domestic energy supplies, with particular attention to our massive coal reserves.

The danger of excessive dependence on foreign oil is only partially economic in nature. There is the equally important consideration of the political leverage gained by oil-exporting nations over the domestic and foreign policies of the United States through the threat of a supply cut-back or embargo. This economic and political leverage can be materially reduced through the existence of the Strategic Petroleum Reserve created by the Energy Policy and Conservation Act.

As noted earlier in this memorandum, the FEA has released its plans for designing, constructing and filling the storage and related facilities of the reserve. However, the relatively small size of the reserve (less than a 90-day supply at present import levels) and the absence of any regional or product storage, as

permitted by statute, make it a less effective tool than Congress envisioned when it passed the enabling legislation. Congress should address this issue explicitly before acceding to the FEA's plan.

Finally, the United States must take a more active role in stimulating the discovery and production of oil in non-OPEC countries. The more oil that is made available for purchase in the international market, the more difficulty individual OPEC nations will have in maintaining their respective production shares. Even though oil from non-OPEC sources will likely sell at world prices (just as North Sea oil is now selling), the added world capacity will greatly magnify the cartel's problems in holding world supply at levels needed to support a particular price level. Incentives to offer discounts and special deals will grow. Dilution of OPEC's political leverage will also take place.

For these reasons, it is very much in the interests of the United States to encourage the exploration and production of oil in non-OPEC countries (just as reduction in energy consumption in any oil-importing country will eventually benefit all such countries). There is the additional benefit that oil discovered in any non-OPEC developing country will greatly assist in that country's economic development, as well as benefitting the international economy generally.

Some of this exploration and production will be carried out by multinational oil companies seeking additional sources of crude oil. But the high capital investments that are needed, combined with a growing concern that successful exploration will lead to nationalization of the facilities, is likely to limit the extent of such private commercial activity.

These circumstances suggest the wisdom of the U.S. Government playing a more active role in developing oil reserves outside of OPEC. The International Energy Institute and the International Resources Bank, both proposed by Secretary Kissinger, were initial attempts to devise mechanisms for providing the technical assistance and financial support that developing countries will need to develop new sources of oil. Although these proposals have not been acted upon, the concern which motivated them is well-placed and further efforts should be made to develop multi-lateral instruments. A U.S. national oil corporation established to purchase or supervise oil imports could also be used to carry out bilateral arrangements. Use of the Export-Import Bank is another possibility that should be explored.

In summary, the OPEC split of December 1976 is no cause for rejoicing that the cartel is about to collapse, even though internal differences and tensions have been brought to the surface. Since imported oil is an unpleasant but necessary fact of life for the United States, a broad range of policies—domestic and international—must be pursued to limit this dependency: developing supplies and reducing consumption; promoting a competitive market; defining a proper role for U.S. multinational oil companies; increasing global economic cooperation at CIEC and elsewhere; working with the International Energy Agency; and exploiting weaknesses in OPEC's cohesion and common pricing (but short of a confrontation that would push OPEC back together.)