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DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

~~CONFIDENTIAL~~ September 11, 1973

MEMORANDUM FOR: Mr. Richard Erb

SUBJECT: Working Group on Proposed Economic Mission to Saudi Arabia

Attached are drafts of the briefing papers received to date. I would appreciate if general comments and suggested changes could be forwarded to me in Room 5100 of the Treasury Department.

The Working Group will meet again on September 14 at 2:30 P.M., in Room 4426 of the Treasury Department, to discuss draft papers and determine additional work which may be necessary.

Robert G. Pelikan

Attachments

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NATIONAL ARCHIVES AND RECORDS ADMINISTRATION
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β Prospects for the Saudi Economy

Saudi Arabia has no economic problems in the usual sense of the term nor is it likely to have any for the foreseeable future. The government is, however, being confronted with the felt need to rethink its development strategy to take account of the extraordinary increase in Saudi oil production and revenues that have occurred in the past three years.

As recently as 1970 the Saudis felt it necessary to cut back development and defense spending in order to conserve foreign exchange and to accumulate reserves. This concern was short lived. In 1971 oil revenues, boosted by expanding oil output and rising per barrel revenues, rose 69% and in 1972 grew another 42%.

Saudi Oil Revenues

Million US $

1967	1968	1969	1970	1971	1972	1973 (est.)
909	927	949	1,150	1,945	2,779	5,200

If present trends continue, Saudi revenues will approach $8 billion in 1975.

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In the changing situation of the last few years the Saudis have not been able to meet even their relatively modest planned spending levels, particularly for economic development. A major factor has been a shortage of skilled workers and managers. But more importantly the idea that massive development spending was both possible and desirable had not yet taken hold in Saudi decision making circles. King Faysal was still concerned with the implications of rapid development on the traditions and character of Saudi society.

This is now changing. The Saudis have increased their budget for the year beginning this past August by almost 70% compared to last year or from $3.6 billion to $6.2 billion. While actual spending is certain to fall short of plans the budget clearly indicates a determination to get development spending into high gear.

The Saudis can further increase their spending rapidly by concentrating on capital intensive industrial projects related to petroleum, and by making needed improvements in their defense capabilities. They cannot do this, however, without substantial help from the industrial west and especially the United States. Plans are underway to expand oil production and refining

capabilities and to improve the country's transport and communications facilities. Industrial plants that are to be built include a petrochemical plant, a sulphur plant, the second stage of a steel rolling mill, and a flour mill.

Defense spending accounts for nearly a third of the Saudi annual budget. Actual spending for defense has been close to the budgeted levels, reaching $800 to $850 million in 1972-73. The rapid increase in defense expenditures reflects the pent up demand caused by years of limited spending. In the last two years construction of land, air, and naval bases has been increased, and since early 1972, Jidda has ordered almost $1.1 billion of military equipment and technical assistance, mostly from the United Kingdom, the U.S. and France. Large follow-on orders for naval, air, and ground force materiel seem certain over the next few years.

It is not possible that spending will approach the rapidly rising revenues. There clearly are limits to the country's absorptive capacity. Even under the most generous assumptions, both military and development spending will fall far short of revenues if production

increases to 15 million b/d as Aramco planned only a year ago and especially if output reaches 20 million b/d in 1980 as Aramco now hopes. Clearly the economic incentive for the Saudis to go along with Aramco's production plans will have to involve spending outside the country. Actually we believe that for some time it would be difficult for the Saudis to spend at home -- even with substantial US help -- the revenues generated by the present level of oil production.

CIA/OER
10 September 1973

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F.1.

PROSPECTS OF SAUDI IMPORTS OF DEFENSE ITEMS AND SERVICES FROM THE UNITED STATES

Sales of defense items and related services to Saudi Arabia fall into two major categories: (1) the U.S. Government portion, arranged through the Foreign Military Sales Program; and (2) direct sales of goods and services to Saudi Arabia by U.S. commercial firms. The general evolution of these programs from 1965 is shown in the following table.

SALE OF MILITARY ITEMS TO SAUDI ARABIA
(DELIVERIES $ MILLIONS)

	1965	1966	1967	1968	1969	1979	1971	1972	1973	TOTAL 1965-73
FMS	5.8	9.2	68.9	43.4	59.7	11.9	11.3	14.4	91.0	315.6
Commercial	.9	14.9	33.6	35.5	6.3	12.7	8.2	5.1	(15.5)	132.7
TOTAL	6.7	24.1	102.5	78.9	66.0	24.6	19.5	19.5	106.5	448.3

Over the past nine years, Saudi Arabia has purchased an average of about $50 million worth of military goods and services from the United States each year, and this average figure is expected to be surpassed significantly during the next few years as the result of new and continuing programs. At the present time, approximately 700 U.S. civilians are employed by various defense-oriented contractors in Saudi Arabia in addition to the approximately 250 Department of Defense personnel associated with the military assistance program and other defense projects.

The magnitude of current and projected defense-related sales projects can best be presented in the form of a project-by-project review.

Current DoD Related Programs

1. Government-to-Government Programs

a. F-5 Program. In 1971, through U.S. Air Force FMS, contracts were signed for the delivery of 20 F-5B trainers (now all delivered) and 30 F-5E interceptors (to be delivered in 1974); and for the provision of contractor training, maintenance, supply support and construction of technical facilities. The program is scheduled to be completed in 1975 and the total cost is about $306 million. Northrop is the prime contractor.

b. Saudi Ordnance Corps Program. This multi-year program was begun in 1966 to modernize and standardize the Saudi Army's vehicle fleet and to give it a capability to maintain and repair vehicles and weapons. It was renewed for two years in 1972. This program, which has included the purchase of over 4,000 tactical and general purpose vehicles, has amounted to about $150 million. Some $40 million is earmarked for the next two years for services and an additional $59 million has been allocated for the purchase of new and rebuilt vehicles. The Corps of Engineers is the principal agent for the USG in carrying out the program and has contracted with Bendix for training and maintenance services.

c. Naval Expansion Program. In 1972, the U.S. Government agreed to assist the Saudis in expanding their small Navy by an additional 19 ships, construction of shore installations, and training. The details of this program are still under consideration by the Saudi Government; however, the total cost will be between $600 million and $800 million depending on which options are selected. This program will last until at least 1982.

d. National Guard Modernization. In March 1973, the U.S. Government undertook the project of modernizing two battle groups of the Saudi Arabian National Guard. The Corps of Engineers is responsible for construction of base facilities. A USG survey team is currently in Saudi Arabia to assess Guard requirements and to gather sufficient data to draw up the overall program plan. It is too early to give a precise figure as to program cost, but it will probably be about $300 million.

e. Military Cantonments. The Corps of Engineers is supervising the design and construction of three brigade sized military cantonments. One has been completed and a second nearly so; the prime contractor for these projects were non-U.S. firms. The third cantonment is in the design phase and it is estimated it will cost about $100 million.

2. Saudi Government-to-Contractor Programs

a. HAWK Missiles. Under contract with Raytheon, the Saudis purchased 10 batteries of HAWK missiles, training services and ground support equipment and facilities in 1966, with DoD guaranteeing a portion of the financing. With subsequent amendments, the total cost is nearly $250 million.

b. C-130 Transports. Since 1965, Lockheed has delivered 11 C-130s (and two Jet stars) along with maintenance services at a total cost of about $100 million. Four more C-130s and 4 KC-130s configured for aerial refueling have been ordered at a cost of about $54 million. DoD has guaranteed part of the financing.

c. Air Defense Ground Environment Contract. Early this year SAG signed a contract under which Lockheed assumes responsibility for the

operation, maintenance and training in connection with the radar and communications system (ground environment) manufactured and installed by a British firm.

3. Currently Projected DoD Related Programs

a. Advanced HAWK. Raytheon is currently negotiating a contract with the Saudis for the Advanced HAWK missile to replace the Basic HAWK. This contract, if signed, would probably amount to about $275 million. The Saudis have asked the U.S. Government to consider a Government-to-Government contract.

b. F-4 Phantoms. In May 1973 in response to a request from the Saudi Government the U.S. agreed in principle to sell the Saudis a limited number of F-4s. Negotiations have not yet begun; deliveries would not take place until approximately two years after a contract is signed.

c. National Military Academy. The Corps of Engineers is to design and supervise the construction of a National Military Academy the estimated cost of which is about $125-$140 million.

d. Other. The Saudi Government has shown some interest in providing military assistance to some of the states of the Arabian Peninsula (Oman and Yemen) which are facing problems of military defense against internal and external threats. It is possible that the Saudis may underwrite the transfer of a limited quantity of U.S. arms to their less affluent neighbors on the Peninsula, if the U.S. Government agrees.

4. Future Prospects

At the present time, Saudi Arabia buys more defense items and services from the United States than from any other country. Given a favorable

political climate, there is every reason to expect that this relationship will continue and that the level of imports will exceed previous average levels for at least the next few years. If the Saudis accept the proposed naval expansion program and if they decide to buy F-4 aircraft, it is probable that a high level of defense imports will be maintained for the next five to ten years.

Questions Saudis May Raise

1. Responsibility for Vendor Performance

Prince Sultan, Minister of Defense and Aviation, has informed Ambassador Thacher that it is now Saudi Government policy to seek some official assurance of vendor performance from the country of origin of military items. Such assurance might take the form of a government-to-government contract, or it could require an official U.S. Government appraisal of proposed contracts between the Saudi Government and American private firms. This is an official confirmation of a trend which has become increasingly apparent over the past few years. We are certain to be asked to clarify U.S. policy with regard to assurance of vendor performance and to specify how this policy would be applied to future sales.

2. Contractor Responsibilities in Case of Hostilities

American contractor personnel are intimately associated with the maintenance, training, and, in certain cases, operation of a variety of Saudi defense programs. The question of whether or not U.S. contractor personnel would continue to carry out their duties in the event of hostilities between Saudi Arabia and another country has never been answered by the U.S. Government to Saudi satisfaction. Most recently (1972) this was officially raised in connection with negotiations between Saudi Arabia and

Lockheed for the ground environment contract of the Saudi Air Defense System. At that time, Saudi Arabia was informed that there are no precise guidelines for such eventualities and the U.S. Government could not offer iron bound guarantees for performance by private American companies or personnel under emergency conditions. The Saudis may raise the question again.

Subjects We Should Raise

We should make clear to the Saudis that we wish to continue to sell defense items and services, and that we therefore welcome any suggestions which they may make for improving relations between vendors and the Saudi Government.

F.2. Prospects for Saudi Imports from the United States

Short Range Prospects

The prospects for continued growth of Saudi imports of goods and services from the United States are excellent. Saudi Arabia's rapidly expanding economy, strong foreign exchange position, large private commercial sector, low custom duties, absence of trade restrictions (except as they apply to pork products, alcohol, or firms on the Arab boycott), and heavy requirements for foreign technical and managerial skills make it a very attractive market for U.S. goods and services. Another advantage is customer preference. Since World War II, the U.S. has been Saudi Arabia's principal supplier and the Saudis over this period of time have been introduced to a wide range of American commodities.

The U.S. share of the Saudi import market has been as high as 25%; however, as a result of growing competition from Japan and Western European countries which are major consumers of Saudi oil, the U.S. share of the Saudi market declined to 18% during the 1966-70 period. Since 1970, the U.S. share has begun to rise again as a result of rapid expansion in the oil sector, two successive dollar devaluations, and belated recognition by American firms of the Saudi market's potential. In 1972 the U.S. share of the estimated $1.46 billion Saudi import market was nearly 24%.

Saudi Arabia is by far the United States' best customer in the Arab world. U.S. exports (fob) in 1972 exceeded $314 million and should reach $400 million in 1973. Industrial and power generating machinery normally accounts for at least one-fourth of U.S. sales followed by vehicles and parts (12%), aircraft and parts (12%), and foodstuffs (10%). Special category (defense equipment) items amounted to only 6% ($18.4 million) of 1972 exports although this percentage is expected to rise in the next few years with the acquisition by the Saudis of new weapons from the U.S. These figures do not include the sale of many services which are difficult to extrapolate from balance of payments information. There are a number of U.S. firms which provide maintenance, engineering, and training services which are estimated to have amounted to at least $45 million in 1972.

Saudi Import Dependency

International trade plays a dominant role in the Saudi economy because of oil production which accounts for well over half of Saudi Arabia's GNP. Petroleum exports provide over 90% of the Kingdom's foreign exchange earnings as well as its budgetary revenues. At the same time, because of Saudi Arabia's limited range of domestically manufactured consumer goods and meager agricultural resources, it depends very heavily on imported goods for consumption as well as development. As a rough rule of thumb, every dollar of public expenditure or private sector investment generates 70 cents worth of imported goods and services. Another rough standard of measure that can be used for long range projections is that the value of commodity imports annually is equal to about 28% of Saudi Arabia's GNP.[1]

While nascent efforts to diversify and industrialize the country will allow some consumer demands to be met locally, the economy is expected to become even more import-dependent over the next decade. In spite of the great strides in recent years, the Kingdom's basic infrastructure requirements remain enormous. A new development plan is under preparation. In all likelihood, it will call for extensive new outlays in the field of education (to help overcome the critical shortage in manpower skills), health, and communications. Here the requirements remain enormous and will involve the installation of new phone systems, construction of a secondary road network, new ports, new airfields, and an air traffic control system. As urban centers continue to grow, the need for more hotels, desalting plants for municipal water supply, electric generating facilities, cement production capacity, hospitals and clinics, sewer facilities, etc. will become urgent. These and many other requirements will have to be met through the use of foreign contractors and the importation of equipment and supplies.

Investment

At the present time, the rate of capital formation is about 25% of GNP and is likely to remain close to this level. About $1 billion was allocated in the last Saudi budget of $3.2 billion for programs to develop communications, transportation, agriculture, electric power, health and education facilities. Despite an expenditure lag, outlays for the same sectors have more than doubled in the record new $6.2 billion budget announced August 1. ARAMCO's capital expansion program

1. In the period from 1964-65 to 1971-72, the value of commodity imports as a percentage of GNP fluctuated between a narrow range of 25-32% with an annual average of 28.0%.

for new production and loading facilities, involves outlays of $300 million in 1972 and almost $500 million in 1973. These programs, especially ARAMCO's, have generated demands for a number of U.S. commodities. While ARAMCO's current investment program is unusually high and cannot be expected to remain at this level after 1975, new investment should come as the Saudi Government and the private sector move toward joint ventures in new manufacturing industries which make use of flared gas. A number of American companies are now actively looking into possible viable energy intensive industries in Saudi Arabia. U.S. firms are favored since they have the required high technology and marketing capabilities. This should lead to an even greater U.S. business presence in the Kingdom with consequent new markets for capital goods, technology, and management expertise from the U.S.

Long Range Prospects

As the Saudi population continues to grow (currently estimated at 5.15 million) and as personal income begins to rise rapidly, this will generate a host of new demands for imported consumer goods, especially for American food products which are very popular. Per capita personal income in 1972 is estimated to be close to $900 and could quadruple in the next decade. This quantum jump in personal income will also create large new demands for health services and housing which can only be filled by foreign contractors. The very presence of such contractors, many of them American, will in turn generate additional demands for import of U.S. industrial and consumer products.

Given the Kingdom's commitment to large development expenditures coupled with a continued high level of capital investment in the private sector and assuming continued reasonable growth in Saudi oil production, this should allow an annual GNP growth rate of 15-20% during the rest of the decade with a Saudi import market growing in the same proportion. Provided U.S. goods can remain competitive and that a significant effort is made by American firms with the support of the U.S. Government to give attention to the Saudi market, the U.S. should be able to retain 20-25% of the Saudi import market. With a Saudi import market projected to reach close to $7 billion by 1980, Saudi imports from the U.S. should amount to about $1.5 billion (see attached table). Provided

we are willing to make the competitive effort that is required, the demand for services (especially in the fields of maintenance, management, and training) should grow substantially. Conceivably, these services could be equal to 15-20% of the value of projected commodity imports.

Attachment:

Saudi Arabia - GNP and market projections

SAUDI ARABIA PROJECTIONS

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
GNP (in billions of 1972 dollars)[1]	3.2	3.9	5.0	7.2	9.2	11.0	13.5	16.0	18.5	21.0	24.0
Per Capita GNP (in 1972 dollars)[2]	660	790	1,000	1,400	1,735	2,000	2,400	2,760	3,100	3,420	3,800
Oil Production (millions bpd)	3.8	4.8	6.0	8.2	9.6	10.8	12.0	13.0	14.0	15.0	16.0
Imports (cif) ($ millions)	891	988	1,460	2,000	2,600	3,100	3,800	4,500	5,200	5,900	6,700
Imports from US (cif) ($ millions)[3]	155	180	346	440	572	682	836	990	1,144	1,298	1,474
US Share of Saudi market	18.4%	19.8%	23.7%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%

1. Saudi national accounts are prepared on the basis of the hijra fiscal year. Available national accounts information for the 1970-72 period has been adjusted to a calendar year basis.
2. Based on an estimated population of 5 million in 1972 with a population growth of 3% annually (2.5% representing natural population increase and 0.5% representing immigrants allowed to work and reside permanently in Saudi Arabia)
3. Imports from the US are calculated by taking US export figures (fob) and adding 10% to cover the cif/fob differential. Due to incomplete Saudi customs statistics, this method is also used by the Saudi Monetary Agency in calculating imports (cif) for balance of payments calculations.

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G.3 World Energy Requirements, 1970-2000:

Table 1 illustrates world energy requirements in quadrillion Btu for the 1970-2000 period. These requirements are based upon a summation of the energy requirements for North America, Japan, OECD, Europe, and the rest of the world. The energy requirements for these areas are detailed in the following pages. Table 2 is the equivalent in physical units of table 1.

Indications are of major shifts in relative fuel positions. This is illustrated in the following table showing percentages of total consumption of each fuel source:

Year	Coal	Oil	Natural Gas	Hydro & Nuclear
1970	34.4	42.9	20.4	2.2
1975	29.9	42.9	22.0	5.1
1980	25.4	43.7	22.4	8.2
1985	24.7	44.1	20.1	10.9
2000	22.7	38.8	14.0	24.3

(percentages may not add to 100 due to rounding)

The hydro and nuclear represents primarily nuclear. Thus from 1970 to 2000 oil will maintain its relative position, coal and natural gas will fall in their relative shares, and nuclear will gain tremendously.

Table 1 . World Energy Requirements in Quadrillion Btu, 1970 to 2000

	1970	1975	1980	1985	2000
Total Energy Requirements----------	194.6	253.4	330.4	407.7	689.3
Indigenous Production----------	194.6	253.4	330.4	407.7	689.3
Coal and lignite----------	67.0	75.8	84.2	101.0	157.1
Oil (incl. NGL)----------	83.5	108.8	144.6	179.8	267.8
Natural gas----------	39.8	55.8	74.3	82.3	96.7
Hydro & Nuclear----------	4.4	13.0	27.3	44.6	167.7

Table 2. World Energy Requirements in Physical Units
1970 to 2000

	1970	1975	1980	1985	2000
Total Energy Requirements					
Indigenous Production					
Coal and lignite ----------million short tons--	2,655.0	3,073.2	3,422.8	4,105.7	6,386.2
Oil (incl. NGL)----------million barrels----	17,333.0	22,586.7	30,018.7	37,326.1	55,594.8
Natural gas----------million cubic feet------	37,927.0	53,193.5	70,829.4	78,455.7	92,183.0
Hydro and Nuclear-------billion kilowatt hours---	42.7	126.3	265.3	433.4	1,629.7

North America

Table 3 illustrates, in quadrillion Btu, the possible energy requirements of North America through 2000 (where North America is defined as Canada and the United States). The forecast through 1985 was based on the Organization for Economic Co-Operation and Development (OECD), 1985 Forecasting Exercise. The 1985-2000 energy trend was based on extrapolation of the 1970-85 trend. The United States element of this forecast was drawn basically from the Department of the Interior report, "United States Energy Through the Year 2000." Table 4 is the physical unit equivalent to table 3.

Basically, the forecast shows an increasing dependence on nuclear power and oil to satisfy the energy needs of North America. The percentage of total requirements satisfied by each is:

	Requirements		Percent of total
Year	Nuclear power	Oil	oil imported
1970	neg.	43.2	21.6
1975	4.2	42.2	29.7
1980	8.0	42.1	39.5
1985	9.5	43.8	40.7
2000	25.8	37.9	60.7

The United States energy forecast will be developed in more detail in a separate section.

Table 3. North American Energy Requirements
in Quadrillion Btu, 1970 to 2000 1/

	1970	1975	1980	1985	2000
Total Energy Requirements----------	70.5	89.2	114.7	126.2	210.0
Indigenous Production----------	65.3	79.1	96.3	102.5	159.3
Coal and lignite----------	15.6	18.4	21.7	26.3	36.2
Oil (incl. NGL)----------	23.9	26.5	29.2	32.8	31.3
Natural gas----------	23.8	28.4	33.8	28.3	30.3
Hydro 2/ ----------	1.8	2.0	2.3	3.1	7.2
Nuclear----------	0.2	3.8	9.2	12.0	54.2
Net Imports 3/----------	5.2	9.8	18.4	23.7	50.7
Coal----------	-1.5	-1.6	- 1.7	-2.0	-4.2
Oil----------	6.6	11.2	19.1	22.6	48.4
Natural gas----------	0.1	0.3	1.0	3.0	6.5

1/ Based on OECD 1985 Forecasting Exercise and the U.S. Dept. of Interior report, "United States Energy through the Year 2000."

2/ Hydro converted at 80 percent efficiency.

3/ Negative figures refer to net exports.

Table 4. North American Energy Requirements in Physical Units, 1970 to 2000

Total Energy Requirements	1970	1975	1980	1985	2000
Indigenous production					
Coal and lignite-----million short tons---- ----	634.1	743.9	882.1	1,069.1	1,471.5
Oil (including NGL)------million barrels--------	4,103.5	4,551.7	5,034.5	5,655.2	5,396.6
Natural gas-------------million cubic feet------	23,800.0	28,400.0	33,800.0	28,300.0	30,300.0
Hydro----------billion kilowatt hours-----	174.9	194.4	223.5	301.3	699.7
Nuclear----------do----------	19.4	369.3	894.1	1,166.2	5,267.3
Net Imports					
Coal----------million short tons----------	-61.0	-65.0	-69.1	-81.3	-170.7
Oil----------million barrels----------	1,137.9	1,931.0	3,293.1	3,896.6	8,344.8
Natural gas----------million cubic feet---------	100.0	300.0	1,000.0	3,000.0	6,500.0

NOTE: Hydro converted at 80 percent efficiency.

Western Europe (OECD):

Table 5 illustrates, in quadrillion Btu, the possible energy requirements of Western Europe through 2000. The data through 1985 were from European Economic Community sources for the nine member nations, and from the OECD Secretariat for the other European countries. The nuclear power generation forecasts for the 1970-1985 period are based on information from the OECD Nuclear Energy Agency. The trend from 1985-2000 is an extrapolation of the 1970-2000 trend tempered with judgment. Table 6 is the physical unit equivalent to table 5.

Basically the forecast shows increasing dependence on nuclear power and oil to satisfy the energy needs of OECD Europe. The percentages of total requirements satisfied by each are:

	Requirements		Percent of total
Year	Nuclear power	Oil	oil imported
1970	neg.	59.4	96.4
1975	2.6	65.2	93.9
1980	7.3	62.8	83.4
1985	13.0	60.5	81.5
2000	25.9	54.4	75.0

Table 5 . Western Europe (OECD) Energy Requirements, in Quadrillion Btu, 1970 to 2000 1/

	1970	1975	1980	1985	2000
Total Energy Requirements	41.7	53.5	68.4	87.1	156.9
Indigenous production	16.4	18.9	29.7	40.4	87.7
Coal and lignite	10.9	9.1	7.6	7.3	7.0
Oil (including NGL)	.9	2.1	7.1	9.7	21.3
Natural gas	2.7	4.7	8.1	10.0	16.3
Hydro 2/	1.4	1.6	1.8	2.0	2.4
Nuclear	.4	1.4	5.0	11.4	40.7
Net imports	25.3	34.6	38.7	46.6	69.2
Coal	1.3	1.5	1.7	1.3	.7
Oil	23.9	32.8	35.9	43.0	64.1
Natural gas	.1	.3	1.0	2.3	4.4

1/ Based on OECD 1985 Forecasting Exercise.
2/ Hydro converted at 80 percent efficiency.

Table 6. Western Europe (OECD) Energy Requirements, in Physical Units, 1970 to 2000

Total Energy Requirements	1970	1975	1980	1985	2000
Indigenous Production					
Coal and Lignite------Million short tons--------	442.9	371.0	308.8	296.6	285.0
Oil (including NGL)---million barrels----------	155.2	365.0	1,224.2	1,672.5	3,672.4
Natural gas----------billion cubic feet--------	2,700.0	3,986.0	8,100.0	10,000.0	16,300.0
Hydro----------billion kilowatt-hours----	136.0	156.0	174.9	194.3	233.2
Nuclear----------do----------	38.9	136.0	485.8	1,107.5	3,955.3
Net Imports					
Coal----------million short tons----------	52.8	60.3	69.1	52.8	28.5
Oil----------million barrels----------	4,110.8	5,655.0	6,174.8	7,396.0	11,051.7
Natural gas------billion cubic feet----------	100.0	318.0	1,000.0	2,300.0	4,400.0

Japan:

Table 7 illustrates, in quadrillion Btu, the possible energy requirements of Japan through 2000. The forecast through 1985 was based on the OECD 1985 Forecasting Exercise and the Japanese Institute of Energy Economics, "Japan's Energy Supply and Demand Forecast." The trend from 1985-2000 is an extrapolation of the 1970-1985 trend, tempered with judgment. Table 8 is the physical unit equivalent to table 7.

Basically the forecast shows increasing dependence on nuclear power and oil to satisfy Japanese energy requirements. The percentages of total requirements satisfied by each are:

	Requirements		Percent of total
Year	Nuclear power	Oil	oil imported
1970	Neg.	71.6	100
1975	6.0	72.5	100
1980	6.2	73.2	100
1985	13.0	72.9	100
2000	29.8	44.3	100

Table 7. Japan Energy Requirements, in Quadrillion Btu
1970 to 2000 1/

	1970	1975	1980	1985	2000
Total Energy Requirements	10.6	16.4	25.4	33.7	68.1
Indigenous production	1.6	2.2	2.9	5.7	21.9
Coal	1.1	.8	.6	.6	.6
Oil	neg.	neg.	.1	.1	.1
Natural gas	.1	.1	.2	.1	.1
Hydro 2/	.3	.3	.4	.5	.8
Nuclear	neg.	1.0	1.6	4.4	20.3
Net Imports	9.0	14.2	22.6	28.0	46.2
Coal	1.4	2.3	3.7	2.4	0.6
Oil	7.6	11.9	18.6	24.6	30.2
Natural gas	neg.	neg.	.4	1.0	15.4

1/ Based on OECD 1985 Forecasting Exercise, and Japanese Institute of Energy Economics, "Japan's Energy Supply and Demand Forecast," March 1973.

2/ Hydro converted at 80 percent efficiency.

Table 8. Japan Energy Requirements in Physical Units, 1970 to 2000

	1970	1975	1980	1985	2000
Total Energy Requirements					
Indigenous production					
Coal----------million short tons----------	44.7	32.5	24.4	24.4	24.6
Oil----------million barrels----------	neg.	neg.	17.2	17.2	17.2
Natural gas ----billion cubic feet----------	100.0	100.0	200.0	100.0	100.0
Hydro----------billion kilowatt-hours----------	29.1	29.1	38.9	48.6	77.8
Nuclear----------do----------	--	97.2	155.2	426.8	1,972.8
Net Imports					
Coal----------million short tons----------	56.9	93.5	150.4	97.5	24.4
Oil---------- million barrels----------	1,310.3	2,051:7	3,206.9	4,241.4	5,206.9
Natural gas-----billion cubic feet----------	neg.	neg.	400.0	1,000.0	15,400.0

Rest of the World:

Table 9 illustrates, in quadrillion Btu, the possible energy requirements of the rest of the world, i.e., all of the world except North America, Japan, and OECD Europe, through 2000. It is based on extrapolation of present trends and judgment. Table 10 is the physical unit equivalent to Table 9.

Obviously, as Japan, North America, and OECD Europe are net importers of energy, then the rest of the world must be net exporters of energy. The following table illustrates the percent of production, consumption, and exports vis-a-vis world consumption:

Year	Production	Consumption	Surplus
1970	57.1	36.8	20.3
1975	60.4	37.2	23.2
1980	60.9	36.8	24.1
1985	63.5	39.4	24.1
2000	60.9	36.8	24.1

Table 9. Rest of the World Energy Requirements in Quadrillion Btu, 1970 to 2000 1/

	1970	1975	1980	1985	2000
Total Energy Requirements----------	71.8	94.3	121.9	160.8	254.3
Indigenous Production----------	111.3	153.2	201.5	259.1	420.4
Coal and lignite----------	39.4	47.5	54.3	66.8	113.3
Oil (incl. NGL)----------	58.7	80.2	108.2	137.2	215.1
Natural Gas----------	13.2	22.6	32.2	43.9	50.0
Hydro and Nuclear----------	.3	2.9	7.0	11.2	42.1
Net Imports----------	-39.5	-58.6	-79.7	-98.3	-166.1
Coal----------	-1.2	-2.2	-3.7	-1.7	+2.9
Oil----------	-38.1	-55.9	-73.6	-90.2	-142.9
Natural gas----------	-.2	- .6	-2.4	-6.3	-26.3

1/ Based on extrapolation of existing trends tempered with judgment.

Table 10. Rest of the World Energy Requirements in Physical Units, 1970 to 2000

Total Energy Requirements	1970	1975	1980	1985	2000
Indigenous Production					
Coal and lignite---------million short tons------	1,533.3	1,922.8	2,207.3	2,715.5	4,605.7
Oil (incl. NG.)-----------million barrels-------	13,074.3	17,655.7	23,742.8	29,981.3	46,508.6
Natural gas-------------million cubic feet------	11,327.0	19,993.5	28,729.4	40,055.7	45,483.0
Hydro and Nuclear----billion kilowatt hours-----	29.3	28.1	68.0	108.8	409.1
Net Imports					
Coal--------------------million short tons------	-48.7	-88.8	-150.4	-69.0	+117.8
Oil-------------------------million barrels------	-6,559.0	-9,637.7	-12,674.8	-15,534.0	-24,603.4
Natural gas-------------million cubic feet------	-200.0	-618.0	-2,400.0	-6,300.0	-26,300.0

United States Energy Requirements
1972-2000

The United States energy requirements were previously subsumed in the North American forecast. This section will provide more details on the future energy supply and demand for this country. This section is based on a recent study performed by the Department of the Interior. 1/

There is, of course, always some uncertainty about any forecast, and the uncertainty tends to increase the longer the time period covered. For fuels the uncertainty is much less for the period between the present and 1985, for we are essentially locked into our present patterns of energy consumption. After 1985 more options for altering our energy consumption patterns exist, and whether or not we exercise these options will decide our future pattern of energy consumption.

A. The Interior Department Consumption Forecast

For their projections, the Interior Department made assumptions about a number of socioeconomic factors. The most important of these were:

(a) Gross National Product (GNP): The annual average rate of growth assumed was 4.3 percent to 1980, and 4.0 percent thereafter.

(b) Population: The population growth rate was assumed to be approximately 1 percent. 2/

(c) Industrial Production: A 5 percent annual rate of growth of industrial production up to 1980 was assumed, and a 4.4 percent annual rate of growth thereafter.

(d) Fuel Availability: Supply limitations for fuels were explicitly taken into consideration making this a forecast of consumption, not demand.

1/ United States Energy Through the Year 2000, U. S. Department of Interior, December 1972.

2/ Population projection based on average of Series D & E projections contained in Bureau of Census publication P-25, No. 470, Nov. 1971. Recently released Census figures indicate that this value may be too high.

(e) Prices: Fuel prices, in real terms, were expected to rise faster than other commodity prices. Additionally, inter-commodity price relationships were expected to shift gradually, restructuring the relative price standings of the various fuels. The rate of increase in gaseous fuel prices is expected to be about 1.5 times greater than the increase for petroleum and 2.0 times the rate for coal.

(f) Technology: The major change in energy technology expected between now and 1985 is development of commercial technique for coal gasification and liquefaction, and control of sulfur oxide emissions. The major technological change expected between 1985 and 2000 is commercial introduction of the breeder reactor. Evolutionary increases in the efficiency of utilization of energy were assumed for the entire period.

(g) Lifestyle: The present slow trend toward a more service oriented economy is expected to continue.

(h) Energy Conservation: The potentials for conservation of energy were not factored into the forecast.

Based on these assumptions, the Interior Department developed the consumption forecasts shown in table 1. The table indicates that gross energy consumption was 72.1 quadrillion Btu in 1972, and is expected to rise to 117 quadrillion Btu in 1985 (an increase of 44.9 quadrillion Btu). It is further expected to increase to 191.9 quadrillion Btu by 2000 (an increase of 109.7 quadrillion Btu over 1972). Net energy consumption in the 1972-85 period, however, will increase to 140.1 quadrillion Btu by 2000, for an increase over 1972 of 80.7 quadrillion Btu. The difference between increases in gross and net energy represents the increasing conversion losses resulting from the increasing trend toward secondary sources of energy, primarily electrical power generation and synthetic gas production. United States gross and net energy consumption from 1947 to 2000 are graphically illustrated in figure 1.

Table 1 also indicates that the gross energy consumption per dollar of 1958 GNP is expected to decline. From the 91,300 Btu per dollar of GNP in 1972, it is expected to decline to 87,000 Btu in 1985, and 78,700 in 2000. This expected decline does not take into consideration any effects of energy conservation. The historical and projected energy/GNP ratio is illustrated in figure 2.

Net and gross per capita energy consumption are forecasted to rise from 345.3 million Btu per capita in 1972, gross energy per capita is expected to climb to 686.1 million Btu in 2000. Net energy per capita is expected to increase from 284.5 million Btu per capita in 1972 to 500.9 million Btu in 2000. Net and gross energy inputs per capita are illustrated in figure 3.

Table 1.-Selected United States economic and energy indicators; actual for 1972 and projected to the year 2000

	1972	1975	1980	1985	2000
Gross Energy Inputs (Quadrillion Btu) 1/	72.1	80.3	96.0	116.8	191.9
Net Energy Inputs (Quadrillion Btu) 2/	59.4	65.1	75.9	90.0	140.1
Population (million)	208.8	216.2	229.4	243.3	279.7
Gross National Product (Millions of 1958 dollars)	789.5	891	1,102	1,343	2,438
Energy/GNP Ratio (Thousands of Btu per 1958 dollars)	91.3	90.1	87.1	86.8	78.7
Gross Energy/Capita Ratio (Millions of Btu)	345.3	371.4	418.5	479.2	686.1
Net Energy/Capita (Millions of Btu)	284.5	301.2	330.8	369.9	500.9
Efficiency Factor (Percent) 3/	82.4	81.1	79.0	77.2	73.0

1/ Gross energy inputs refers to the total energy inputs to all sectors.
2/ Net energy inputs refers to the direct energy going to the Industrial, Transportation, and Household and Commercial sectors plus electrical energy converted on the basis of 3,412 Btu/kwhr.
3/ Refers to the overall efficiency of conversion of gross energy to the form used by the final consuming sectors. Equal to net energy/gross energy.

Source: Based on U.S. Energy Through the Year 2000, U.S.D.I., Dec. 1972.

UNITED STATES GROSS AND NET ENERGY CONSUMPTION
1947 - 2000
(QUADRILLION BTU's)

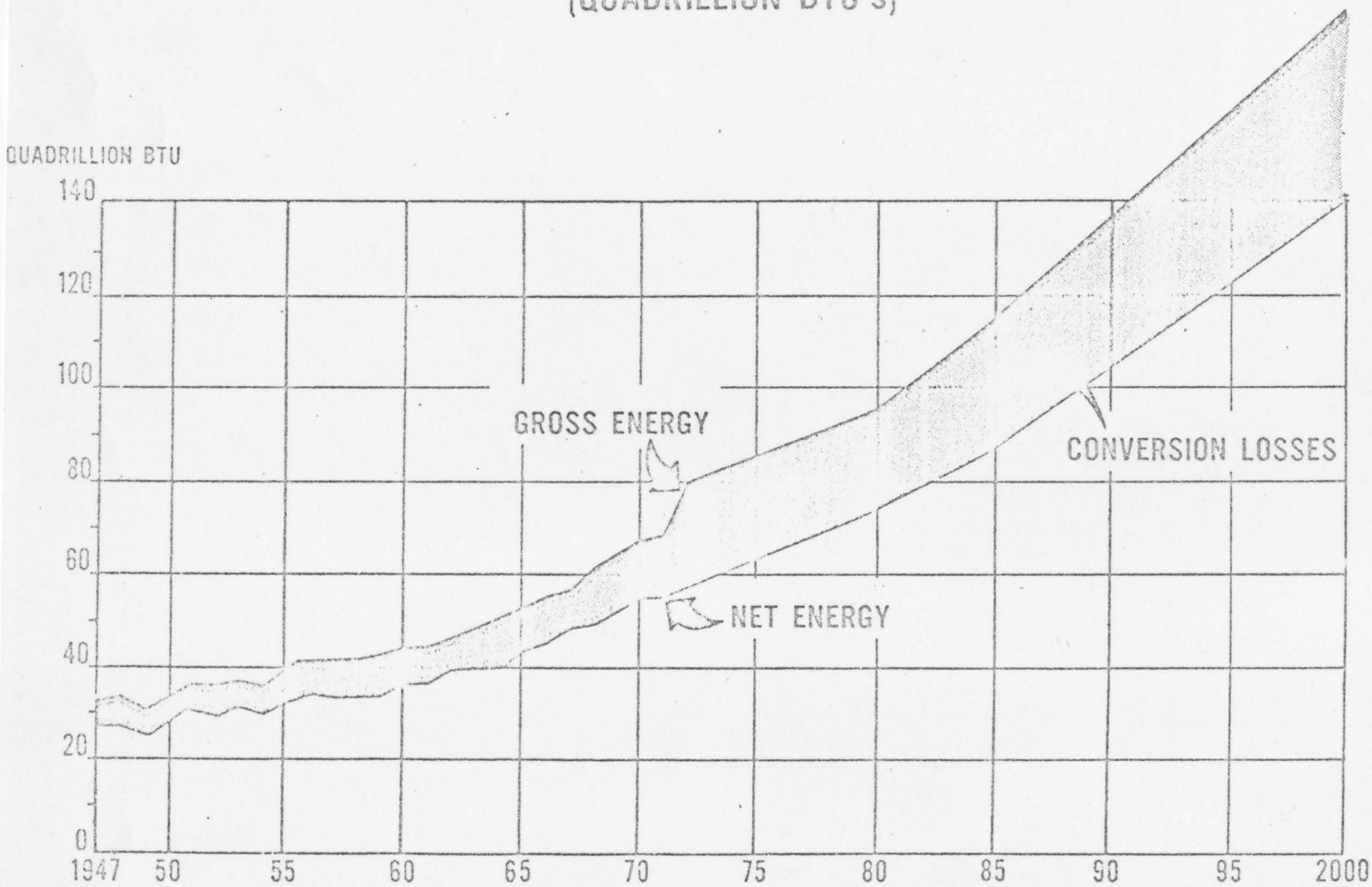

Figure 1

NOV 72

GROSS ENERGY CONSUMPTION PER DOLLAR OF 1958 GROSS NATIONAL PRODUCT 1947 - 2000

(THOUSANDS OF BTU's)

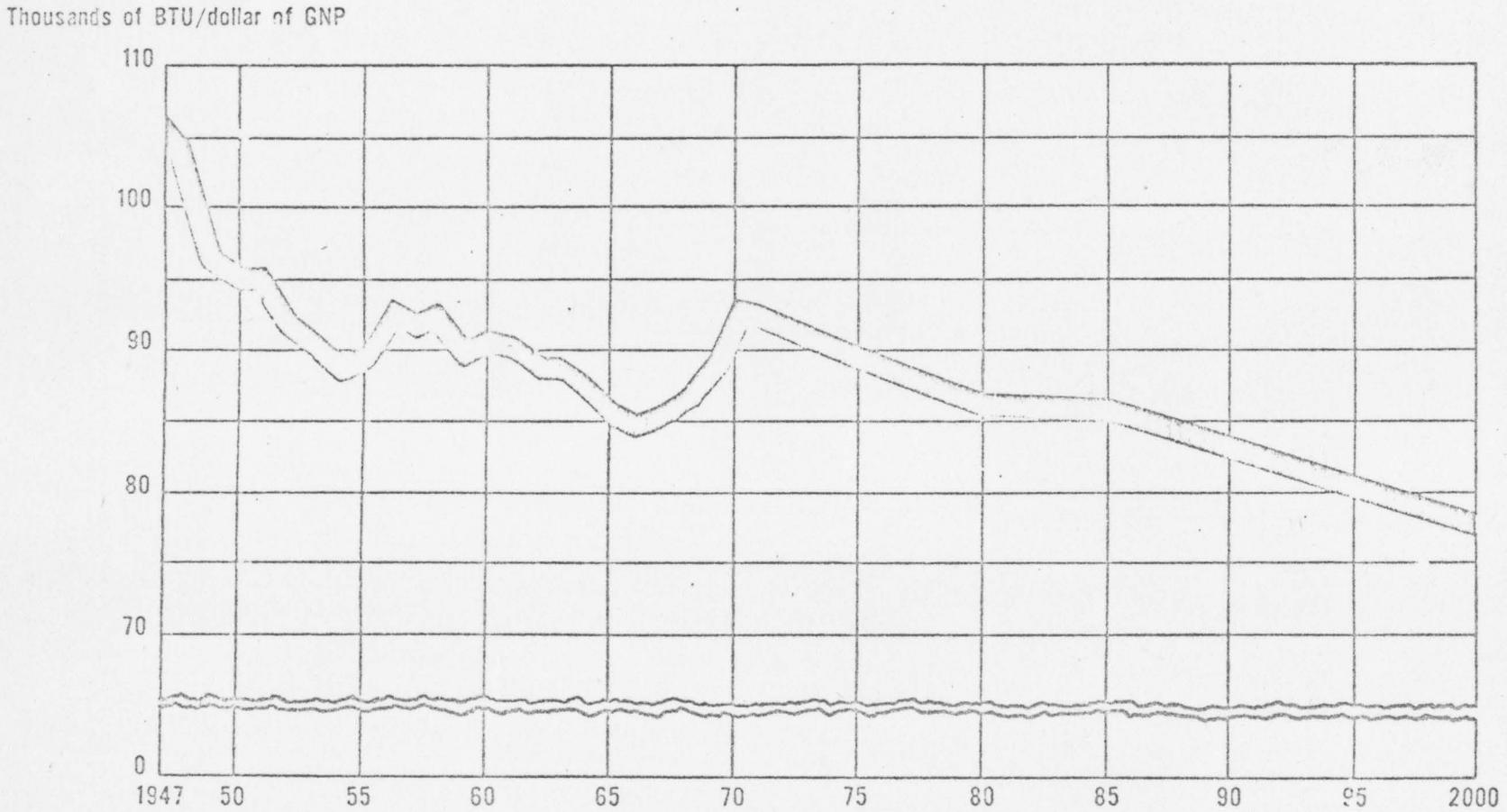

Figure 2

NOV 72

UNITED STATES NET AND GROSS ENERGY INPUTS PER CAPITA
1947 - 2000
(MILLIONS OF BTU's)

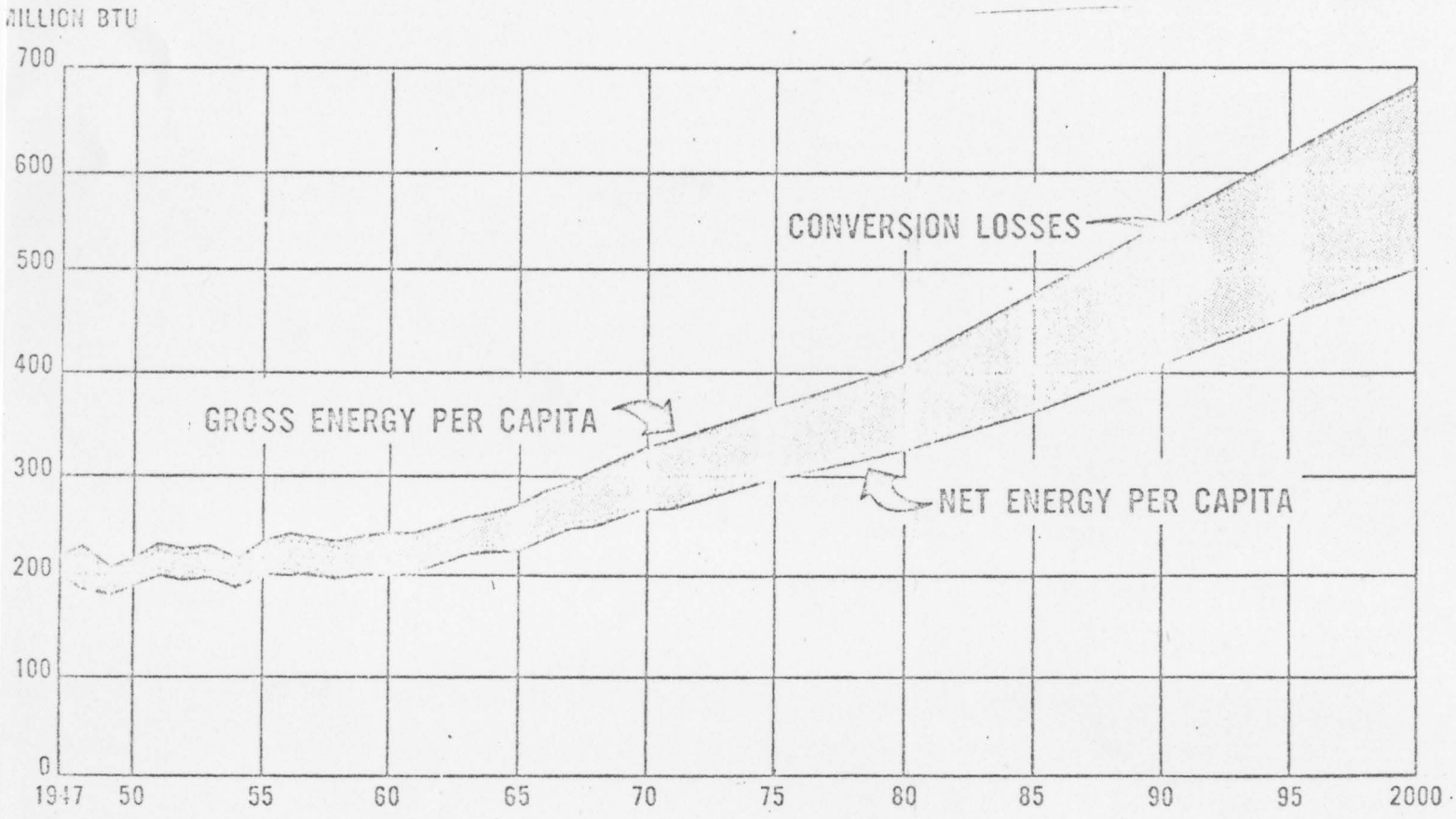

Figure 3

NOV 72

Table 2 shows energy consumption in the major consuming sectors. These figures refer only to direct energy consumption by the sectors; the sums therefore equal gross energy inputs. The table shows the increasing importance of electrical generation as a consuming sector. This factor is directly related to the rising loss of energy in the conversion process. Table 3 shows the net energy input to the economy, after electricity and synthetic gas are distributed to the final consuming sectors (Household and Commercial, Transportation, and Industrial).

These differences are the conversion losses and are illustrated in table 4. Total conversion losses are expected to rise from 12.9 quadrillion Btu (or 17.9 percent of total energy) in 1972 to 49.6 quadrillion Btu (or 25.9 percent of total energy) in 2000. The whole picture, combining sources and consuming sectors, is illustrated in table 5.

B. The Interior Department Supply Forecasts

Table 6 shows Interior's projection of energy mix by source through 2000. The importance of fossil fuels is apparent; in 1971 95.3 percent of energy consumption came from the fossil fuels, in 1985 they are expected to contribute 86.2 percent. The table also shows nuclear power's increasing contribution which by 2000 will reach over 25 percent of total energy inputs.

In discussing the adequacy of energy supplies, the Interior report noted that there are limitations to the capacity of these sources. For hydropower, (including pumped storage) there is some finite limit to development set by the availability of sites, and by environmental and economic considerations. The Interior projections for nuclear power are based on the scenario developed by the Atomic Energy Commission for the introduction of advanced reactors. Any significant problems encountered in the construction of nuclear powerplants and in supply of supporting services will require that fossil fuels take up the slack.

The major problems of energy resource supply are encountered in the fossil fuel sector. Coal resources appear adequate for the timeframe encompassed by this study. Problems do exist, however, vis-a-vis environmental and capital considerations. Domestic natural gas and petroleum will, however, have to be supplemented.

Table 7 shows expected domestic production of natural gas and the supplements which will be necessary to meed demand. The Interior report notes that achieving the indicated production of synthetic gas will require considerable effort. Further research and development will be necessary, capital for construction of plants must be forthcoming, and the environmental problems associated with coal mining must be solved.

Table 2. Direct Energy Consumption by Sector
(Quadrillion Btu)

Sector	1972 p/	Percent	1975	Percent	1980	Percent	1985	Percent	2000	Percent
Household & Commercial	14.7	20.4	15.9	19.8	17.5	18.2	19.0	16.3	21.9	11.4
Industrial	20.9	28.9	22.8	28.5	24.8	25.9	27.5	23.6	39.3	20.5
Transportation	18.0	25.0	19.1	23.8	22.8	23.8	27.1	23.2	42.6	22.2
Electrical Generation	18.5	25.7	22.4	27.9	30.0	31.2	40.4	34.6	80.4	41.9
Synthetic Gas	-	-	-	-	0.9	0.9	2.7	2.3	7.7	4.0
Total	72.1	100.0	80.3	100.0	96.0	100.0	116.7	100.0	191.9	100.0

p/ Preliminary

Table 3. Net Energy to Final Consuming Sector
(Quadrillion Btu)

Sector	1972 p/	Percent	1975	Percent	1980	Percent	1985	Percent	2000	Percent
Household & Commercial	18.2	30.5	20.2	31.0	23.9	31.4	27.7	30.9	39.6	28.3
Industrial	23.3	39.1	25.9	39.8	29.4	38.6	34.9	38.9	57.8	41.2
Transportation	18.1	30.4	19.1	29.3	22.9	30.1	27.1	30.2	42.7	30.5
Total	59.6	100.0	65.1	100.0	76.2	100.0	89.7	100.0	140.1	100.0

p/ Preliminary

Table 4.-Gross and net energy inputs to the U.S. economy, 1972 actual and projections to the year 2000. (All energy uses in Quadrillion Btu.)

	1972	1975	1980	1985	2000
Net Energy Consumption					
Non-fuel uses[1/]	4.2	4.6	5.4	6.3	10.8
Percent of total	5.8	5.7	5.6	5.4	5.6
Three-sector energy uses[2/]	55.0	60.5	70.7	83.4	129.3
Percent of total	76.3	75.4	73.6	71.5	67.4
Total Net Energy	59.2	65.1	76.1	89.7	140.1
Percent of total	82.1	81.2	79.2	76.9	73.0
Conversion Losses[3/]					
Electrical Sector	12.9	15.1	19.7	26.2	49.6
Percent of total	17.9	18.8	20.6	22.5	25.9
Synthetic Gas Sector	-	-	0.2	0.7	2.2
Percent of total	-	-	.2	.6	1.1
Total Conversion Losses	12.9	15.1	19.9	26.9	51.8
Percent of total	17.9	18.8	20.8	23.1	27.0
Total Gross Energy Input	72.1	80.2	96.0	116.6	191.9

1/ This refers primarily to asphalt and road oil in the residential and commercial sector, chemical feedstocks in the industrial sector, and lubes and greases in the transportation sector.

2/ The three sectors are the residential and commercial, industrial, and transportation. These are the end use of energy in the economy. Electrical production converted to Btu on the basis of 3,412 Btu/kwhr and synthetic gas converted on the basis of 1,000 Btu/cu.ft. are distributed among these sectors.

3/ Conversion losses refer to those losses caused by converting a primary energy source to a secondary energy source.

		Coal	Petroleum[2]	Natural gas[3]	Total fossil fuels	Nuclear power[4]	Hydro power[4]	Total gross energy inputs	Synthetic gas distributed[5]	Total four sector inputs
1972	Household & Commercial.	384	6,689	7,629	14,702	-	-	14,702	-	14,702
	Industrial.	4,457	5,686	10,723	20,724	-	-	20,866	-	20,866
	Transportation.	6	17,231	799	18,036	-	-	18,036	-	18,036
	Electric Generation .	7,581	3,206	4,157	14,913	606	2,937	18,489	-	18,489
	Synthetic Gas	-	-	-		-	-		-	-
	Total.	12,438	32,812	23,308	68,375	606	2,937	72,091		
1975	Household & Commercial.	325	6,950	8,660	15,935	-	-	15,935	-	15,935
	Industrial.	4,600	6,510	11,740	22,850	-	-	22,850	-	22,850
	Transportation.	-	18,050	1,020	19,070	-	-	19,070	-	19,070
	Electric Generation .	8,900	3,580	3,800	16,280	2,560	3,570	22,410	-	22,410
	Synthetic Gas	-	-	-	-	-	-	-	-	-
	Total.	13,825	35,090	25,220	74,135	2,560	3,570	80,265		
1980	Household & Commercial.	300	7,720	9,480	17,500	-	-	17,500	320	17,820
	Industrial.	4,750	7,590	12,500	24,840	-	-	24,840	380	25,220
	Transportation.	-	21,440	1,400	22,840	-	-	22,840	-	22,840
	Electric Generation .	10,660	5,000	3,600	19,260	6,720	3,990	29,970	-	29,970
	Synthetic Gas	430	440	-	870	-	-	870	(700)	-
	Total.	16,140	42,190	26,980	85,310	6,720	3,990	96,020		
1985	Household & Commercial.	100	8,800	10,060	18,960	-	-	18,960	940	19,900
	Industrial.	5,130	9,130	13,240	27,520	-	-	27,520	1,060	23,580
	Transportation.	-	25,450	1,640	27,090	-	-	27,090	-	27,090
	Electric Generation .	14,220	6,650	3,450	24,320	11,750	4,320	40,390	-	40,390
	Synthetic Gas	2,000	670	-	2,670	-	-	2,670	(2,000)	-
	Total.	21,470	50,700	28,390	100,560	11,750	4,320	116,630		
2000	Household & Commercial.	-	11,120	10,800	21,920	-	-	21,920	2,640	24,560
	Industrial.	6,700	14,660	17,940	39,300	-	-	39,300	2,860	42,160
	Transportation.	-	40,010	2,600	42,610	-	-	42,610	-	42,610
	Electric Generation .	17,520	5,040	2,640	25,200	49,230	5,950	80,380	-	80,380
	Synthetic Gas	7,140	550	-	7,690	-	-	7,690	(5,500)	-
	Total.	31,360	71,380	33,980	136,720	49,230	5,950	191,900		

1/ Gross energy is the total of inputs into the economy of the primary fuels (petroleum, natural gas, and coal, including derivatives, plus the generation of hydro and nuclear power (converted to equivalent energy inputs; see footnote 4/).

2/ Petroleum products, including still gas, liquified refinery gas, and natural gas liquids.

3/ Excludes natural gas liquids.

4/ Converted to theoretical energy inputs calculated from projected average heat rates expected in future.

5/ Converted on basis of 100 Btu/cu. ft.

Source: Based on Department of Interior Report, U.S. Energy Through the Year 2000 (December 1972).

Petroleum[2]	Natural gas[3]	Total fossil fuels	Nuclear power[4]	Hydro power[4]	Total gross energy inputs	Synthetic gas[5] distributed	Total four sector inputs	Utility elec. distributed	Total three sector inputs
6,689	7,629	14,702	-	-	14,702	-	14,702	3,449	18,151
5,686	10,723	20,724	-	-	20,866	-	20,866	2,465	23,331
17,231	799	18,036	-	-	18,036	-	18,036	18	18,054
3,206	4,157	14,913	606	2,937	18,489	-	18,489	(5,932)	-
-	-		-	-		-	-	-	-
32,812	23,308	68,375	606	2,937	72,091				
6,950	8,660	15,935	-	-	15,935	-	15,935	4,240	20,175
6,510	11,740	22,850	-	-	22,850	-	22,850	3,010	25,860
18,050	1,020	19,070	-	-	19,070	-	19,070	20	19,090
3,580	3,800	16,280	2,560	3,570	22,410	-	22,410	(7,270)	-
-	-	-	-	-	-	-	-	-	-
35,090	25,220	74,135	2,560	3,570	80,265				
7,720	9,480	17,500	-	-	17,500	320	17,820	6,040	23,860
7,590	12,500	24,840	-	-	24,840	380	25,220	4,170	29,390
21,440	1,400	22,840	-	-	22,840	-	22,840	30	22,870
5,000	3,600	19,260	6,720	3,990	29,970	-	29,970	(10,240)	-
440	-	870	-	-	870	(700)	-	-	-
42,190	26,980	85,310	6,720	3,990	96,020				
8,800	10,060	18,960	-	-	18,960	940	19,900	7,800	27,700
9,130	13,240	27,520	-	-	27,520	1,060	23,580	6,290	34,870
25,450	1,640	27,090	-	-	27,090	-	27,090	40	27,130
6,650	3,450	24,320	11,750	4,320	40,390	-	40,390	(14,130)	-
670	-	2,670	-	-	2,670	(2,000)	-	-	-
50,700	28,390	100,560	11,750	4,320	116,630				
11,120	10,800	21,920	-	-	21,920	2,640	24,560	15,070	39,630
14,660	17,940	39,300	-	-	39,300	2,860	42,160	15,620	57,780
40,010	2,600	42,610	-	-	42,610	-	42,610	50	42,660
5,040	2,640	25,200	49,230	5,950	80,380	-	80,380	(30,740)	-
550	-	7,690	-	-	7,690	(5,500)	-	-	-
71,380	33,980	136,720	49,230	5,950	191,900				

nputs into the economy of the primary fuels (petroleum, natural gas, and coal, including imports) or their
on of hydro and nuclear power (converted to equivalent energy inputs; see footnote 4).
still gas, liquified refinery gas, and natural gas liquids.

gy inputs calculated from projected average heat rates expected in future.
/cu. ft.
terior Report, U.S. Energy Through the Year 2000 (December 1972).

Table 6 .-United States consumption of energy resources by major sources, 1972, actual, with projections to the year 2000

	1972	1975	1980	1985	2000
Petroleum (includes natural gas liquids)					
Million barrels	5,960.1	6,340	7,615	9,140	12,985
Million barrels per day	16.3	17.4	20.9	25.0	35.6
Trillion Btu	32,812	35,090	42,190	50,700	71,380
Percent of gross energy inputs	45.5	43.8	43.9	43.5	37.2
Natural Gas					
Billion cubic feet	22,607	24,462	26,169	27,537	32,959
Trillion Btu	23,308	25,220	26,980	28,390	33,980
Percent of gross energy inputs	32.3	31.4	28.1	24.3	17.7
Coal (bituminous, anthracite, lignite)					
Thousand short tons	517,053	565,000	665,000	893,000	1,310,000
Trillion Btu	12,428	13,825	16,140	21,470	31,360
Percent of gross energy inputs	17.3	17.2	16.8	18.4	16.3
Hydropower					
Billion kilowatt-hours	280.2	350	420	470	700
Trillion Btu	2,937	3,570	3,990	4,320	5,950
Percent of gross energy inputs	4.1	4.4	4.2	3.7	3.1
Nuclear power					
Billion kilowatt-hours	56.9	240	630	1,130	5,470
Trillion Btu	606	2,560	6,720	11,750	49,230
Percent of gross energy inputs	.8	3.2	7.0	10.1	25.7
Total Gross Energy Inputs					
Trillion Btu	72,091	80,265	96,020	116,630	191,900

Source: Based on U.S. Energy Through the Year 2000, U.S. Department of the Interior, Dec. 1972

Supply problems are more acute for petroleum. Table 8 shows the expected domestic supply and the necessary supplementations. Until 1980, the supplemental supplies must come from increased oil imports and/or from incremental production from domestic conventional sources that may become available through new discoveries. Beyond 1980, supplemental supplies may also come from oil shale, coal liquefaction, and tar sands. Their contributions, however, will be dependent on the commercial development of new technologies.

Table 7. Natural Gas Supply
(trillion cubic feet)

	1972 p/	1975	1980	1985	2000
Domestic supply	21.6	22.0	22.3	21.8	21.1
Percent of total	96.0	89.8	82.9	74.1	57.9
Synthetic gas	-	-	0.7	2.0	5.5
Percent of total	-	-	2.6	6.6	13.9
Gas Imports 1/	1.0	2.5	3.9	5.7	10.8
Percent of total	4.0	10.2	14.5	19.3	28.2
Total	22.6	24.5	26.9	29.5	38.4

p/ Preliminary
1/ Includes LNG and pipeline imports

* * * *

Table 8. Petroleum Supply
(million barrels/day)

	1972 p/	1975	1980	1985	2000
Lower 48 States 1/	11.2	11.0	10.2	9.2	6.0
Percent of total	70.0	63.1	49.0	36.8	16.9
Alaskan North Slope	-	-	1.5	2.0	3.5
Percent of total	-	-	7.2	8.0	9.8
Synthetic liquids	-	-	-	0.5	1.0
Percent of total	-	-	-	2.0	2.8
Supplemental supplies	2/ 4.7	2/ 6.4	2/ 9.1	13.3	25.0
Percent of total	30.0	36.9	43.7	53.4	70.3
Total	15.9	17.4	20.8	25.0	35.5

p/ Preliminary
1/ Includes crude oil and natural gas liquids
2/ All imports

James Reddington 8/10/73 lg

U. S. Trade Restrictions on Imports of Hydrocarbons

There is no single regulatory scheme for control of U. S. imports of hydrocarbons. Different degrees of restriction and different devices are employed and the power to regulate imports lies with several government authorities. There are four categories of hydrocarbons imports according to the degree and origin of control:

-- free and fee-licensed imports governed by Presidential proclamations under the Oil Import Program, e.g. crude oil, oil products, liquid petroleum gas and natural gas liquids.

-- imports subject only to customs duties set by Congress outside the Oil Import Program, e.g. methanol and crude petrochemicals and derivatives.

-- duty-free imports requiring certification by the Federal Power Commission, e.g. overland natural gas and liquefield natural gas (and possibly petroleum products reformed into supplementary natural gas.)

-- wholly unrestricted imports, aromatics

Crude oil and products

General - This summary will highlight those features of the new control program of present or potential importance to U. S.-Saudi trade.

Since May 1, all volumetric quotas and customs tariffs on crude oil and products have been suspended and imports on outstanding allocations for 1973 may enter free of either tariff or license. The "free" allocations will not be fee-exempt indefinitely; the percentage of the allocations exempted will decline steadily to zero by 1980.

All imports other than a few qualifying for exemptions will be subject to a schedule of license fees which favors crude against products, particularly gasoline, and which has gradually increased fees during a 5-step period ending in November 1, 1975.

License fees: Imports of crude oil and oil products from Saudi Arabia (like imports from any foreign source) that entered in 1973 under an allocation will be relieved of the previously existing tariff (10 1/2¢ on crude oil) until these exempted crude and product allocations are fully phased-out. Additional imports from Saudi Arabia, including imports to replace those entered under the "free" allocations, will be charged the license fee at the level applying at the date of entry. Each year for 5 years a larger percentage of Saudi oil will be under license-fee, and each six-month period to November, 1975, the fees will be stepped-up.

All fees will increase but the differential between crude and products will also increase. Crude fees will be double the old tariff rate, rising to 21¢ per barrel, while products other than gasoline will nearly quadruple to 63¢ per barrel. Thus the differential between crude oil, and residual fuel oils and distillates will no longer be 5¢ per barrel but

42¢. The following schedule applies to imports from Saudi Arabia and all other foreign sources other than Canada (the step-up of fees on Canadian imports is delayed largely to November, 1975).

Schedule of License Fees
(cents per barrel)

Product	May 1 1973	Nov 1 1973	May 1 1974	Nov 1 1974	May 1 1975	Nov 1 1975
1. Crude Oil	10½	13	15½	18	21	21
2. Residual fuel oil, Unfinished oils, distillates and refinery products other than gasoline	15	20	30	42	52	63
3. Gasoline	52	54½	57	59½	63	63

The implication of this fee schedule, when fully implemented in late 1975, is that off-shore refining of Saudi crude into resid (for the Eastern heating market) and naphtha (for shipment to U. S. petrochemical or SNG plants) will not be as an attractive an investment for Saudi capital as under the quota program.

Refinery construction incentives. The higher fees on residual fuel oil and naphtha will serve as an indrect incentive to the construction of new or expanded refineries in the United States. This will be reinforced by a direct subsidy to new U. S. refineries in the form of a suspension of license fees for

75 percent of their throughput for 5 years. This feature, plus higher product fees, will decrease and perhaps reverse the present advantage enjoyed by off-shore refineries. (The suspension of license fees, however, does not apply to new SNG facilities feeding imported naphtha nor new petrochemical plants feeding imported feedstocks. There may later be a provision for some fee suspension for petrochemical plants.)

Puerto Rico

The operation of the Oil Import Program in Puerto Rico has been significantly amended with the advent of the license fee program, with the result that the Island is even a more attractive site for refinery investment than under the quota program. First, Western Hemisphere preference has been suspended and Saudi Arabia and other Eastern Hemisphere sources may compete on equal terms with Western sources. Also all imports of crude and unfinished oils into the Island under existing contractual agreements between the Commonwealth and the U. S. Interior Department or based on "historical" allocations will be exempt for a number of years. But, significantly, new refineries on the Island will enjoy the 75 percent fee exemption of Mainland refineries, and no fee or duty will be levied upon product shipment to theMainland. Thus refineries on Puerto Rico (and Mona Island) will enjoy a competitive edge upon non-U. S. flag Carribbean refinery sites in the Carribbean and the Maritime Provinces.

U. S. territories:

All refineries in the Virgin Islands, American Samoa, and Guam will receive fee-exempt allocations on the basis of crude oil processed into unfinished oils and finished products for the Mainland. New refineries on American Samoa and Guam may ship fee-exempt low sulfur residual fuel oil to District V (the Pacific Coast). Here again foreign investment may be attracted to refineries located in these territories which would have a preferred access to the U. S. market.

Desulphurized crude:

Under existing regulations, high sulfur crude oil, such as much of the oil of Saudi Arabia, that is desulpfurized outside the U. S. Customs territory is classified as a finished product and as such will be subject to the sharply stepped-up fees on such products. Several proposals have been made to exempt high sulfur crude that is desulfurized in the United States, or to apply a lower fee to imports of crude oil desulfurized abroad. No action has been taken on the latter proposal; one objection stated is that it not only encourages limited refining abroad but also lays the foundation for expanded foreign refining downstream into more finished products.

LPG's

Imports of liquid petroleum gases (ethane, propane and butane) from Eastern Hemisphere sources have recently been exempted from license fees. Propane and butane are two potential exports of Saudi Arabia to the United

States, as feedstocks for petrochemical or SNG plants.

Methanol, petrochemicals:

One way that gas might be exported from Saudi Arabia to the United States is by conversion to methanol for shipment to the United States, where it could be either burned directly or regasified for use as SNG. While methanol does not come within the Oil Import Program, it bears a 7.6¢ per gallon tariff. This is equivalent to $1.10/MCF of gas which is prohibitive of any use as a burner fuel or for SNG. Some consideration by staff has been given to proposing Congressional action to create an end-use exemption for methane imported for direct burning or regasification while maintaining the existing rate to protect the domestic chemical market against its use in manufacture of formaldhyde and solvents.

The SAG has shown interest in proposals of Houston Natural Gas and others to export methanol to the United States. This can be accomplished only if the tariff rate is suspended by Congress, or if the regasification plant is put in a Foreign Trade Zone.

Crude petrochemicals such as ethylene, propylene and butylene are imported under outstanding allocations as "unfinished oils" but additional imports will bear the stepped-up fees that apply to all products other than gasoline. These products are difficult to transport and require specialized tankers; it is not likely that Saudi Arabia will be interested in exporting these to the United States. But the first derivatives

of these crude petrochemicals, polyethylene, polypropylene, etc. are valuable products that could be easily shipped from the Persian Gulf. They bear tariff rates, which at the last stage reduction of the Kennedy Round , were considered sufficiently protective but with increased feedstock and particularly fuel costs at U. S. petrochemical facilities, the rates do not bar imports from Saudi Arabia.

LNG and SNG feedstocks:

The Federal Power Commission certifies imports of liquefield natural gas that is to be regasified and commingled with Interstate natural gas. (FPC exercises no jurisdiction on SNG distributed intrastate.) The primary concern of the FPC is in the political and economic security of the source of the gas (in determining which FPC consults State and Defense Departments). and in insuring an unreasonable cost to the consumer. The second decision of the FPC in the Columbia Natural Gas case in 1972, dealin with LNG from Algeria, the Commission required the interstate gas transmission companies to incrementally cost the LNG in sales to distributors but waived jurisdiction over the distributors and thus over the manner in which the commingled LNG is ultimately price to consumers. It required a demonstration that all alternative lower cost sources of additional gas had been explored and that certain curtailment procedures had been undertaken before certifying the importation ofLNG.

It is expected that any Saudi LNG export project would be required to be no higher in landed cost in the United States than LNG delivered in the same period from the Soviet Union, Algeria, Nigeria or elsewhere. No tariff or Oil Import Program restriction applies to LNG.

The FPC disclaims jurisdiction over synthetic gas production (but this opinion is being litigated) but claims jurisdiction at the point where SNG is commingled with interstate natural gas. The downstream jurisdiction has the effect, however, of giving the FPC indirect control over the price paid for imported naphtha that is reformed into SNG. Naphtha is also directly controlled by the license fee on naphtha as an unfinished oil. SNG producers are seeking an exemption or reduction of the license fee on naphtha to be reformed into SNG. Saudi Arabian officials have expressed interest in exporting naphtha directly to U. S. utilities to reform into SNG.

MAJOR NEW ENERGY PROJECTS UNDER DISCUSSION WITH THE U.S.S.R.

Summary

Active negotiation is underway covering two multi-billion dollar projects to develop the Siberian gas reserves, believed to be the world's largest. The signing of General Agreement between the Soviets and an American consortium for project "North Star" is expected this year. A General Agreement covering the other project, a U.S.-Japanese joint venture known as "Yakutsk", may be signed in the early part of next year. If approved, the projects, especially North Star, would make Soviet gas a viable alternative to imported gas from other sources after 1980.

Two major oil projects involving a U.S.-Japanese partnership to develop Soviet reserves in the Tyumen and Sakhalin regions are also under discussion. These are probably less significant, however, for the oil they might eventually produce, estimated at 5-800,000 barrels per day apiece, than for the potential which they and the Yakutsk gas project represent for future U.S.-Japanese cooperation in the energy field.

I. Gas Projects

A. Background

1. North Star -- The "North Star project, proposes piping gas 1600 miles from the Urengoy field in Northwest Siberia to a point west of Murmansk where the gas would be liquefied and shipped by cryogenic tankers to the

U.S. East Coast. The North Star project would supply 2 billion cubic feet per day (BCF/D) of gas to the U.S. market beginning in the early 1980's; in 1980, 2 BCF/D represent approximately 2% of the U.S. demand and 11% of the Northeastern market. Total investment costs for the project include $2.6 billion for 20 LNG tankers, $3.6 billion for Soviet based facilities (pipeline, liquefaction, plant), $300 million for U.S. facilities, for a total of $6.5 billion. U.S.S.R. local construction costs are estimated at an additional $1.5 billion. Tenneco, Inc., Texas Eastern Gas Transmission Co. and Brown and Root, Inc., have formed a consortium to promote the North Star project.

A protocol of intent, outlining the project, was signed on June 29, 1973. Discussions of technical issues, primarily relating to the pipeline route, continued over the summer. On August 21 consortium representatives went to Moscow to complete discussions of technical issues.

The negotiation of the remaining technical issues and General Agreement is expected to take place in mid-October when Deputy Minister of Foreign Trade Osipov visits Houston with a Soviet

technical team. Barring major obstacles, the General Agreement should be signed this year. The definitive contracts covering specifics would then be completed within 4-5 months.

2. Yakutsk -- The second project, known as the "Yakutsk" project, contemplates moving gas by pipeline 2000 miles from the Ust'-Vilyuy field in East Siberia to Nakhodka (near Vladivostok) where it would be liquefied and shipped to the U.S. West Coast. The Yakutsk project would provide 3 billion cubic feet per day, of which 1.0 BCF/D would be for the U.S. market, and 1.0 BCF/D would be for Soviet domestic consumption. Total investment cost for the Yakutsk project is approximately $7 billion; U.S. financing requirements will depend on the degree of Japanese participation. The Yakutsk project is being promoted by a consortium composed of El Paso Natural Gas Company, Occidental Petroleum Company and Bechtel Corporation.

Proven reserves in the Yakutsk field are currently inadequate for the size of the proposed project. Drilling to prove out additional reserves of 35 trillion cubic feet will require 2-3 years and approximately $150 million.

Although this project is at an earlier stage than North Star, a Protocol of Intent was signed on June 8, 1973. The period since signing has been used by the parties to obtain financing of exploratory drilling to prove out the reserves necessary to support the project. The parties are expected to obtain financing by year-end and successfully complete exploratory drilling within two-three years. Assuming no unforseen difficulties, the initial delivery of gas would begin in 1981-1982.

B. Implications

While these projects will require massive amounts of capital, it is highly improbable that the Saudis would choose to be the source of this capital, since they would in effect be financing their competitors. Moreover, the agreements covering these projects may, for reasons linked to balance of payments, require the U.S. and Japan to provide most of the financing.

While the projects have little value as a carrot, they may prove useful as a stick, particularly in the field of natural gas. The Saudis, like many oil producing countries, very much want to export the gas which they presently flare. Methanol conversion is a more probable process than liquefication, given the economics of Saudi gas and the distance to U.S. markets, but

B. methanol and LNG in the long run compete for the same customers. Soviet LNG, therefore, competes with Saudi gas.

If the North Star LNG project is completed, it will pose two forms of competition for Saudi gas: actual and potential. The actual competition should make itself felt in the late '70s; the potential competition, in the 80s.

The actual competition is the hard fact of 2 billion cubic feet per day of additional gas delivered to the U.S. market by 1980. This will satisfy approximately 10% of the Northeastern states' projected demand for gas, and accordingly result in reduction of demand for gas. Demand pressure, rather than supply cost, will be the primary determinant of imported gas cost in the 1970s, so long as flared gas, with zero economic cost, continues to be available abroad within proximity of coastal ports.

While Soviet gas will not be delivered until 1980, and daily delivery will not reach 2 billion cubic feet per day until 1981-82, its effect on the market will be felt earlier because of the lag time involved in gas import projects. Unlike petroleum, any major

new gas import project will require a considerable lead time for items such as government approvals, construction of LNG or methanol conversion plants and port facilities. The effect of this is that parties must look beyond the immediate demand to the demand which will exist after the lead time period. Thus, Soviet gas scheduled for delivery in the early 1980s would affect imported gas prices in the 70s.

Beyond whatever may be the effect on the market price of delivery of Siberian gas, North Star would represent the very concrete prospect of opening up what are believed to be the world's largest gas reserves -- the natural gas fields of the Tyumen oblast in Western Siberia. North Star will draw on part of the largest of the fields in this region -- the Urengoy. But this field is believed capable of sustaining several more projects of the size of North Star. In addition, there are a number of other major fields in the same region. Once North Star is completed, the technological problems inherent in arctic development will have been solved, and much of the infra-structure to support the field and pipeline would be in place. Further development of the substantial remaining reserves would thereafter be less expensive and more certain.

While Siberian gas is expensive by 1973 standards, it may be quite reasonable by the 1980s. Moreover, it is known to be available in quantities that could justify substantial long-term investment.

These facts may be worthwhile bringing out in discussions with Saudi leaders. Soviet gas is likely to be competitive with Saudi gas in the late 1970s and perhaps preferable in the 1980s. It is, moreover, available in quantities which could justify investment through the end of this century. Therefore, not only would any decision by the U.S. to purchase Saudi gas be discretionary, but, in light of some of the advantages of joint Soviet-U.S. development, a decision to purchase gas which is otherwise flared could properly be viewed as an act of good will which the Saudis might choose to reciprocate in some other manner.

II. Oil

A. Background

Two major projects involving U.S. development of Soviet oil reserves are under discussion. In both cases, the U.S. is in partnership with Japan and is the junior partner, with an equity share that may approximate 20%. Most, possibly all, of the oil from these projects will be delivered to Japan.

The "Tyumen" project proposes to pipe 40 million tons per year of oil per day from the Tyumen oil fields to Irkutsk, by existing pipeline, and then on to Nakhodka by a new, 2600 mile pipeline. The oil would then be shipped to Japan and, possibly, the U.S.

This project has been recently delayed by the U.S.S.R. which is having second thoughts about whether the proposed exports will leave adequate supplies for rising domestic and Eastern European demand.

The U.S.S.R. has proposed a cutback to 25 million tons per year, a change which the Japanese find unacceptable. A possible alternative is further exploration to prove out additional reserves in the Tyumen fields.

The second project is the exploration of the Sakhalin region, a project which has been under discussion between the U.S.S.R. and the Japanese since 1966. In July, 1973, Gulf oil and its Japanese partners signed a general agreement with the Soviets covering two offshore leases in the Sakhalin region. Assuming the final proposals are accepted, geophysical operations could begin in the Spring of 1974. The estimated $200 million in credits needed for the drilling will be provided by the Japanese.

Soviets have estimated offshore reserves at 30 to 45 billion barrels at water depths of up to 650 feet. A Japanese team accompanied by a Gulf representative made a preliminary survey and found the prospects promising, but shifting ice and tides will make drilling difficult, and expensive.

B. Implications

The opening up of the Tyumen and Sakhalin fields to the West is an encouraging prospect. It is one more major source of oil outside the mid-East. But the fields are not sufficiently large, nor the projects sufficiently certain, to have a major impact on Saudi Arabia. Furthermore, since most or all of the oil will go to Japan, the U.S. only benefits indirectly, through the reduction of the demands of a competitor for oil on the world markets.

What may be of greater interest is that in these East-West oil projects, as well as the Yakutsk gas project, the competitors are acting as partners. Specifically, the two potentially largest consumers of imported energy, the U.S. and Japan, have elected to agree on allocation of fuel rather than compete. In the long run, these projects may be more significant for the element of U.S.-Japanese cooperation than for the actual oil produced.

C.6/7 International Cooperation on Energy

The international oil situation has changed significantly over the past year. These changes have heightened the concern consuming countries have about the security of their oil supply. They have also put into sharper focus the need for intensified international cooperation to deal not only with short run concerns but with the longer run energy requirements of the world.

The developments of the past year may be summarized as follows:

The worldwide supply situation has become tight and is becoming increasingly focused on the Persian Gulf area. Competition between buyers has contributed towards continuing rising prices.

The structure of international markets is changing. For example, the participation agreements that will ultimately result in 51 per cent control for Saudi Arabia and other Gulf producers and the Iranian/Consortium agreement have shifted control away from the international oil companies and towards the producer country governemnts.

Price schedules have been further revised as a result of changes in currency parities and there has been a substantial increase in prices paid for oil by buyers to whom availability of crude is often more important than its price.

Both consuming and producing countries have better come to recognize that the world's hydrocarbon resources are finite and valuable and must be husbanded carefully if future shortages are to be avoided.

President Nixon in his Energy Messages of this year has spelled out the policy of the United States in dealing with the energy problems. These messages concentrated on an assessment of our domestic requirements and resources and proposed a series of domestic measures to meet our needs for clean and reliable energy sources in the decades ahead. This concentration on domestic policies was based on the realization that our primary response to the energy challenge must lie in the pursuit of national policies and measures to more fully and more rapidly develop existing energy resources within the United States and its offshore areas as well as new energy technologies while utilizing energy resources in the most frugal manner.

At the same time, the President directed a comprehensive effort to develop cooperation with other nations in sharing the impact of possible energy shortages in the short run and in working to develop new sources of energy. He also reiterated the policy of the United States to maintain cooperative relations with oil exporting countries.

The US and other consuming countries have a natural interest in the development of an effective continuing mechanism for sharing the loss of oil in an emergency or in times of chronic shortage. Along with the collateral questions of storage and rationing, sharing has been and continues to be under intensive study in Washington and in other major consuming country capitals. The US favors participation by all parties in some sort of emergency sharing scheme based on oil imports carried over international waters.

The issues involved in the matter of supply sharing are complex and difficult. The major consuming countries are studying the issues within the framework of the Organization for Economic Cooperational Development (OECD). The essence of a sharing arrangement is that it be equitable. Among the criteria being considered in this connection is the measures countries are taking to help themselves through stockpiling or production and the burdens that these measures involve. Then there is the question of the extent to which rationing or demand curtailment is to be a part of the scheme. Countries participating in an import sharing arrangement also should have petroleum stocks and standby rationing arrangements available to support their participation. Each of these are mutually supportive means of reducing vulnerability to supply interruptions. Studies

are being made to determine how stockpiling and rationing steps can best be reflected in the commitment to absorb the burden of curtailed supplies so as to provide incentives to stockpile and so as to induce or compensate for rationing.

A second area for international collaboration is in research and development. Consuming and producing countries must increasingly direct their combined efforts toward longer term measures to develop energy conserving technologies and to increase energy supplies and to diversify their resources.

International cooperation in research and development projects can best be handled through specific arrangements between two or more countries which are directly sponsoring specific research programs and have specific technological assets to contribute to those programs. There is today a reasonable amount of international cooperation in energy technologies on which the world can build a more comprehensive program. For example, the US has had long-standing cooperative programs with a number of countries in the nuclear reactor field. We have bilateral research projects with other countries in coal technology, in geothermal energy, in magnethogydrodynamics, thermal and hydro power stations, power transmission technology, and solar and geothermal energy.

A common task is to enlarge and expand the scope and

and scale of international R&D cooperation. International cooperation in the development of new energy technologies holds great promise. Research and development will be the basis for the long-term solutions to the world's energy problems. Cooperative bilateral and multilateral R&D projects between nations can avoid duplication, reduce costs and help hasten the day when long-term solutions will be attained.

Particular attention should be paid to international cooperation at an industrial level. Experience has shown that as technologies approach a commercial stage, cooperation at a government-to-governemnt level becomes more difficult. Cooperation at the industrial level is, therefore, expecially pertinent to those technologies that might provide nearer-term solutions to energy needs. Cooperative efforts, whether between industry and governments or between companies or between governments, will for the most part be developed ad hoc depending on the priorities, the technologies, the budgets, the scientific assessments and the objectives of the particular parties. The OECD can contribute significantly to stimulating and guiding this process, and the US has urged that it assume this role. Cooperation with the major oil producing countries in energy

R&D is also a goal of the United States.

The need for international cooperation in energy goes far beyond collaboration on research and development. In the more complex and delicate areas of price and supply, measures for international cooperation must be designed to include oil producing as well as consuming nations. Cooperation among consuming nations is also necessary but it must not seem to be or become confrontation with producer nations.

One possible area of cooperation relates to the growing financial resources of oil-producing countries. This general subject of the financial implications of the energy problem is one which is frequently attended by more rhetoric than clarity of thought. Governments need to understand better the financial implications of the energy problem so as to offer constructive responses. As Secretary Shultz suggested to the International Monetary Conference of the American Bankers Association meeting in Paris recently the international banking community has an unprecedented opportunity to develop the techniques which will facilitate the investments of oil-producingstates so as to transform their national oil assets to other types of earning assets.

There can be important commercial opportunities in cooperation with the oil-producing countries in the use of their financial resources, their raw materials and their relatively inexpensive energy to develop industry, markets and jobs for their people. Consuming countries must work with the oil-producing states to meet these needs in ways that bring about and sustain the willingness of these countries to produce the oil the consumers of the world will require through the next two decades. The companies that comprise the international oil industry no longer have complete control over production to meet the demand requirements of their customers as they see them. They now must have the agreement of their new partners in management -- the producer governments. Already some producing governments have set a limit on production and others may be finding mounting financial reserves less and less attractive in assuring their long-term future.

The more industrialized nations should be ready to assist producing nations in their desire to marry their vital oil with the equally valuable technology, engineering, management and markets of other countries in order to reap lasting benefits for their peoples during this one, brief generation when they are in a highly favored market position. The major industrialized countries know their desires for

the location of high energy using export industries in their countries. We can all help, not only in providing the plants, but also in marketing the product of those plants.

All nations want this process to develop into cooperative endeavors that result in mutually beneficial multilateral flows of oil and money adequate to meet the great needs of a peaceful, prosperous, less wasteful and more conserving world and guarantee the long-term viability of the producer countries' economies -- even after today's tight oil market has eased.

In the US view producer as well as consumer nations have a clear and vital stake to cooperate to find additional sources of hydrocarbons to bring them to market in a prudent and orderly manner to minimize waste in their use and to bring on supplementary sources of energy at a rate and in a way which will maintain the prosperity of the oil-rich nations as their wasting hydrocarbon assets diminish. If together with the producing nations consuming nations focus attention on these common objectives we will improve the prospects for constructive cooperation and minimize the risk of confrontation.

The world's immediate and urgent need is for more oil. We should all recognize the remarkable role played by

commercial firms and enterprises of all nationalities in finding, developing, transporting and marketing petroleum around the world. The US believes it to be in the interest of both producer and consumer nations to encourage the oil industry to invest its talents, experience and capital in the quest for more oil.

The US believes that the long-term interests of both consumer and producer nations will be served best by an open system in which all those capable of finding, developing and marketing oil resources can have an opportunity to do so. Nationalization, without prompt, adequate, effective compensation by producing nations, bilateral deals between producing and consuming governments and anything else that dries up capital and freezes out experienced oil organizations will be counterproductive to all.

The US is under no illusions about the ability of consuming countries to reverse the trend toward greater government participation in oil-producing operations and has not urged this course despite occasionally heard suggestions to the contrary. We believe that assumption of a negotiating role by consumer governments would weaken the role of the companies and destroy the very useful buffer role played by the companies increasing the risk of government-to-government confrontation with oil producers.

However, we also believe as well that governments should discourage the purchase of oil from nationalized properties which have not been adequately compensated.

How do consuming nations deal with the mutual problem of destructive competition for oil supplies? Competition per se is not bad and we obviously do not wish to pursue a policy of eliminating competition. However, consumer countries have a legitimate need to exercise care to avoid steps which merely bid up prices without expanding supply as would result from a scramble for exclusive supply or investment arrangements.

The United States has refrained from entering into special bilateral agreements for special supply or market access arrangements with oil-producing states. We have felt that to do this could have stimulated other nations to seek similar arrangements and destabilized the contractual business structures between producer governments, international oil companies and all the elements which make up the distribution channels through which crude oil has so effectively been brought out of the ground to bunkers and gas stations. We believe it is not in the individual and collective interest of consuming or producing governments to seek exclusive bilateral oil supply arrangements. The

policies of each government in this regard will depend in large measure on the postures of other consuming and producing governments.

The world requires that consumer countries intensify consultation among themselves and with producer nations on their policies and avoid misunderstandings of each other's positions which could lead to a competitive scramble for exclusive arrangements. At the same time we all have a common concern lest this kind of increased consultation activity be seen to be leading to a consumer country confrontation with producer countries. We have urged and consumer questions are proceeding pragmatically, without fanfare, to build on our present institutions.

We need to proceed with care and deliberation to build a foundation for international cooperation designed to meet the world's constructively to build a structure of international cooperation with producers and consumers alike.