

THE OIL CRISIS: THIS TIME THE WOLF IS HERE

By James E. Akins

OIL experts, economists and government officials who have attempted in recent years to predict future demand and prices for oil have had only marginally better success than those who foretell the advent of earthquakes or the second coming of the Messiah. The recent records of those who have told us we were running out of petroleum and gas are an example. Oil shortages were predicted in the 1920s, again in the late thirties, and after the Second World War. None occurred, and supply forecasters went to the other extreme: past predictions of shortages had been wrong, they reasoned, therefore all such future predictions must be wrong and we could count on an ample supply of oil for as long as we would need it.

It was the popular, almost universal theory of the 1960s—still vigorously defended today by a few of its early proponents—that this abundant supply of oil, whose cost of production was very low, and which was found in all corners of the earth, would soon be sold at its “proper” economic price—apparently \$1.00 per barrel or less—and for some time it was confidently predicted that this price would prevail in the Persian Gulf by 1970.

As late as February 1970, President Nixon’s Task Force on Oil Imports assumed that world price rises would be modest and that the United States could remain essentially self-sufficient in oil. It projected a demand in the United States in 1980 of around 18.5 million barrels per day of oil; of this only five million barrels per day would need to be imported, and most of this could come from the Western Hemisphere. The Task Force did not favor a complete freeing of imports, but thought that the quota system for imports was inefficient and should be replaced by tariffs (a recommendation eventually rejected by the President). Most important, recognizing the danger of importing large quantities of oil from outside the Western Hemisphere, the Task Force recommended that imports from the Eastern Hemisphere should be limited to ten percent of total national oil consumption. If this level should be approached—and the Task Force thought it would not be before the mid-1980s—then barriers should be raised. In fact, as soon as the level of Eastern Hemi-

sphere imports reached *five* percent of total consumption, "the volumetric limits on imports from the Western Hemisphere should be expanded proportionately to forestall such excess imports," i.e. Canadian and Venezuelan oil could largely take the place of Middle East oil above five percent of U.S. consumption.

These projections were spectacularly wrong. Total imports this very year, 1973, will be well over six million barrels per day—substantially above the level the Task Force predicted for 1980. Imports from the Eastern Hemisphere constituted 15 percent of consumption in 1972, and are expected to rise in 1973 to 20 percent of a total consumption that will already be around 17 million barrels.

The errors of the Task Force were not those of isolated academics, as its critics were (and still are) wont to charge. The staff based its projections on information provided by the major oil companies, by the National Petroleum Council and by the Department of the Interior. There were two main reasons for their errors. Perhaps both should have been avoided, but as always, hindsight is clear and uncluttered. The first error was an uncritical acceptance of oil company and well owners' estimates of the capacity of their own domestic producing wells. These were almost always exaggerated. The second was the ignoring, or at least the deēmphasis, of the decline in natural gas supplies and its effect on oil demand. We were, by 1970, already consuming far more gas than we were finding, and demand for gas continued to grow unabated, while domestic gas production leveled off (1973 production will actually be below that of 1972). The unsatisfied demand for gas was, of course, a real demand for energy. It could be covered only by oil—in fact, only by imported oil.

During 1970 the effect of drawing down natural gas reserves became fully apparent, at least to the State Department, which converted the shortfall to oil equivalents and added it to projected oil demand. The resulting estimate was that by 1980 the United States would consume 24 million barrels of oil a day, that domestic production would cover only half of this, and that two-thirds or more of the imports (or about 35 percent of total consumption) would, of necessity, come from the Eastern Hemisphere.

These figures were not immediately accepted as a new insight; they were, in fact, attacked as alarmist or provocative when first

made public. And the Department's sins were compounded by its making public, during 1970, an estimate that oil prices in the Persian Gulf (then somewhat less than \$2.00 per barrel) would rise by 1980 to a level equal to the cost of alternate sources of energy, i.e. to \$4.50 in the Persian Gulf or an even \$5.00 landed in the U.S. Gulf of Mexico.¹ These figures were used in testimony in the House and Senate and in various public speeches, both because they were honestly believed to be reasonable judgments and because it seemed essential to alert the Congress and the public to the impending dimensions of the problem. They were (and still are by some) considered even more provocative than the supply-demand projections.

It is not my main purpose to defend these and other actions by the Department of State. They can be best judged in a context badly needed for its own sake, that of the best possible assessment of the basic facts of the world oil situation as it affects the United States. Have the startling changes in prediction and experience in the last three years been an aberration? Have the Department and others been crying wolf unnecessarily, or is the "oil crisis" a reality? If it is, what can the United States and other countries do to live bearably with it?

II

The place to start is with world oil reserves, those that are "proven" or sure, those that appear "probable" of early discovery and development at reasonable cost, and those that might be called "secondary"—conceivable or involving special cost or technology.

Figures on proven reserves of oil would be more useful if the companies involved did not generally understate them, usually for tax purposes, and if governments did not use them for political purposes. Those governments with large reserves tend to understate them in order to reduce the envy of their neighbors; those with smaller reserves and large populations tend to greet every new discovery as the cure for all present and future economic ills. Nonetheless, there are a few figures which it is probably safe to accept.

Proven reserves in the non-Communist world today amount

¹ In terms of currency value, all price and tax figures used in this article are in "current dollars," i.e. dollars at their value in the given year. Dollar values after 1972 are projected at an assumed inflation rate of 3.5 percent per year.

roughly to 500 billion barrels.² On present trends, world demand (exclusive of the Soviet Union and China) will rise by 1980 to 85 million barrels per day—compared to an actual 39 million barrels per day in 1970.³ Consumption between now and 1980 would then total 200 billion barrels, and even if no more oil were found—a most unlikely eventuality—the remaining 300 billion barrels would be ten years' supply at the 1980 consumption level, about the ratio of reserves to production that has historically applied to U.S. domestic oil.

Those who feel no concern about oil availability cite this comparison. And indeed it is agreed on all sides that there is no question of a physical shortage of fuel in the world, up to 1980 or 1985, at costs of production comparable to today's. But to sustain the view that physical supply and cost are decisive, one must assume that the world's oil is distributed, if not uniformly, at least so that adequate amounts will always be available to all users, in all circumstances and at reasonable prices. This is an assumption that has never been well founded. To begin with, at least 300 billion of these proven 500 billion barrels are in the Arab countries of the Middle East and North Africa.

Far more important is that the world's probable reserves, those which must still be found to make up for the consumption of the coming decades, will also be in the Middle East on any presently realistic prediction. This is not for want of effort by the major oil companies to find new sources of supply. In fact, 95 percent of their exploration activities (as opposed to development of discoveries already proven) are now outside the Middle East. Bluntly, the companies have little incentive to explore in the Middle East, for they already have all the reserves they can use before the dates presently set for the expiration of their concessions. Instead they are active on a large scale in Indonesia, in Australia, in the Canadian and American Arctic, in the North Sea—wherever there are sedimentary basins. The results have not been encouraging.

² Calculations here and throughout this article omit the U.S.S.R. and China, which appear likely to be roughly self-sufficient at least in this time-frame. Other Communist countries will probably be importing most if not all of their oil from non-Communist sources by the end of this decade.

³ This estimate of 1980 world demand is that of the Department of State. Its principal components are: United States, 24 million barrels per day; Western Europe, 28 million; Japan, 14 million; others, 19 million. Compare the 1971 estimates of Walter J. Levy, "Oil Power," *Foreign Affairs*, July 1971. Mr. Levy estimated world demand at 67 million barrels per day in 1980, with the United States taking 21, Western Europe 23, and Japan 10.

In the first flush of activity in Indonesia, the State Department projected, in its internal working papers, a production of five million barrels per day in 1980 in that country. When oil was found in Prudhoe Bay, in the Arctic, one famed economist stated that the world's oil center had shifted permanently from the Persian Gulf to the north coast of the North American continent. Another economist, in a meeting of oil experts and oil company executives, said in 1970 that the North Sea discoveries would free Europe forever from dependence on the Middle East. All of this was wishful thinking. It would certainly make us more comfortable if true, but alas, all these "facts" have had to be revised. Indonesia, we now hope, will produce two or three million barrels per day by 1980; Alaska, if we are lucky (and if the courts approve the pipeline), will only enable the United States to keep national production levels at those of 1972 (12 million barrels per day). And the North Sea, important as it is, will produce no more than 15 percent of Europe's requirements in 1980; phrased differently, if North Sea production then reaches three million barrels per day this amount will cover two years of Europe's intervening *growth* in demand—leaving Europe still dependent on the Middle East not only for its basic demand but for future growth.

The world's oil reserve picture is even more startling when looked at in detail, for the oil is not distributed uniformly even through the Arab world. Jordan, Lebanon, Tunisia, Morocco and Yemen have virtually none; Egypt has little, Algeria and Libya somewhat more; but the giant reserves are concentrated in the countries of the Persian Gulf: the Federation of Arab Emirates, Kuwait, Iran, Iraq and, by far the most important, Saudi Arabia. The proven reserves of Saudi Arabia are frequently listed as 150 billion barrels, but this is almost certainly too low. One company with extensive experience in that country believes that the present proven reserves are over twice that figure. And the probable reserves could double the figure again.

True, the above picture takes no account of the enormous quantities of shale or coal in the United States, the tar sands of Canada or the heavy oils of Venezuela. The proven and probable reserve figures used above are only those which can be recovered easily by present technology and at costs near today's world prices. Let us come back later to what might be called the "secondary reserves" of shale and heavy oils.

III

That most of the world's proven oil reserves are in Arab hands is now known to the dullest observer. That the probable reserves are concentrated even more heavily in the Middle East must also be the judgment of anyone who is willing to look at the evidence. And that relations between the United States and the Arab countries are not generally cordial should be clear to any newspaper reader. Even King Faisal of Saudi Arabia, who has said repeatedly that he wishes to be a friend of the United States and who believes that communism is a mortal danger to the Arabs, insists to every visitor that U.S. policy in the Middle East, which he characterizes as pro-Israeli, will ultimately drive all Arabs into the Communist camp, and that this policy will bring disaster on all America's remaining Arab friends, as earlier Anglo-American policies did to Nuri Said of Iraq. Others in the Middle East frame their predictions in a different but almost equally menacing vein, in terms of a growth of radical anti-Americanism, manifesting itself in behavior that may at times be irrational.

King Faisal has also said repeatedly that the Arabs should not, and that he himself would not, allow oil to be used as a political weapon. But on this issue it seems all too likely that his is an isolated voice. In 1972, other Arabs in responsible or influential positions made no less than 15 different threats to use oil as a weapon against their "enemies." Almost all of them singled out the United States as the prime enemy.

These threats have been well publicized; the common response among Americans has been: "They need us as much as we need them"; or "They can't drink the oil"; or "Boycotts never work." But before we accept these facile responses, let us examine the facts more carefully. First of all, let us dispose of the straw man of a total cut-off of all oil supplies, which some Arab governments, at least, could not survive. Apart from threats made during the negotiations of December 1970, no Arab has ever taken such a position, and Arab representatives took it at that time, in concert with other governments, for economic bargaining purposes, not for political reasons.

Rather, the usual Arab political threat is to deny oil to the Arabs' enemies, while supplies would continue to their friends. In such a case, the producing countries would still have a considerable income under almost any assumption—unless we could

assume complete Western and Japanese solidarity, including a complete blocking of Arab bank accounts and an effective blocking of deliveries of essential supplies to the Arabs by the Communist countries—in other words, something close to a war embargo. We must recognize that most of the threats are directed against Americans alone. Many of our allies and all others would be allowed to import Arab oil.

In the 1967 Six Day War a boycott was imposed against the United States on the basis of the false accusation that it had participated with Israeli planes in the attack on Cairo. The charge was quickly disproven, although the boycott lasted for over a month. It was then lifted through the efforts of Saudi Arabia, and its effects never became bothersome. We were then importing considerably less than a half-million barrels per day of oil from the Arab countries, and this was easily made up from other sources.

Today the situation would be wholly different, and tomorrow worse still. By 1980 the United States could be importing as much as eight million barrels of oil a day from the Middle East; some oil companies think it will be close to 11 million. Suppose that for some reason, political or economic, a boycott is then imposed—which, if the Middle East problem is not solved by that time, cannot be called a frivolous or unlikely hypothesis. The question we must face now, before we allow ourselves to get into such a position, is what would be our response? The choices would be difficult and limited: we could try to break the boycott through military means, i.e. war; we could accede to the wishes of the oil suppliers; or we could accept what would surely be severe damage to our economy, possibly amounting to collapse. Europe and Japan might conceivably face, or be asked by us to face, the same problems at the same time. Would their responses be in line with ours?

Moreover, a collective Arab boycott is not the only conceivable political threat. Until now the world has enjoyed the luxury of considerable surplus production capacity, relative to total demand. Now that has changed. The United States now has no spare capacity and within the next few years, assuming other producer governments and companies do not invest in huge added capacity, the production of *any one* of seven countries—Saudi Arabia, Iran, Iraq, the Federation of Arab Emirates, Kuwait, Libya or Venezuela—will be larger than the combined spare ca-

capacity of the rest of the world. In other words, the loss of the production of any one of these countries could cause a temporary but significant world oil shortage; the loss of any two could cause a crisis and quite possibly a panic among the consumers.

No, the threat to use oil as a political weapon must be taken seriously. The vulnerability of the advanced countries is too great and too plainly evident—and is about to extend to the United States.

IV

So much for political nightmares. Closer to immediate reality, indeed already upon us, is the question of the economic leverage of the oil-producing countries, 90 percent of whose reserves are now represented in the 11-nation Organization of Petroleum Exporting Countries (OPEC).⁴ Even if there should be no overtly political interference with the flow of oil, the OPEC group now has formidable economic power and has shown itself willing to use it to the full. Will OPEC hold together, to raise prices and conceivably to limit output? Or will it break apart, as producer cartels have historically done where the product is substantially the same from one member and place to another?

The answers require, first, a review of the history of OPEC. In 1958 and 1959, the international oil companies reduced their posted prices and tax payments because of a world surplus of oil. In reaction, Venezuela, Iran and Saudi Arabia took the lead in forming OPEC in 1960 with the avowed purpose of restoring the 1958 price level. They did not succeed, as the world surplus of oil continued and the OPEC countries were unable to agree on a formula for prorationing to limit output. Venezuela, then the largest producer, thought that historical levels of production should be used as the base, Iran favored national population, and Saudi Arabia and Kuwait thought production should be on the basis of proven reserves. Disunity seemed to prevail, and the new organization was belittled by many.

OPEC was not a joke, however. Its pressures did contribute to the fact that the companies never again reduced posted prices, and it was able to achieve new methods of calculating taxes and royalties which added slightly to the revenues of producer gov-

⁴ OPEC currently comprises four non-Arab states—Iran, Venezuela, Indonesia and Nigeria—and seven Arab states: Kuwait, Saudi Arabia, Iraq, Abu Dhabi, Qatar, Libya, and Algeria.

ernments. Its third and perhaps most important success is not generally known. In the early 1960s, most OPEC countries needed more income and pressed their concessionary companies to produce more oil—even at the expense of production in other OPEC countries. The companies responded in each case that they could not increase production unless the government gave tax rebates. So far as I know, the temptation to undercut its partners was not accepted by any major OPEC country—and I doubt by any minor one. In other words, the organization maintained its solidarity in a period of a buyers' market, and at a time when member-countries, save Venezuela, regarded their reserves as infinite and were generally eager for unrestricted growth in production.

Then, in mid-1967, came the closing of the Suez Canal in the Six Day War. The ensuing oil "shortage" was of course one caused by transport, but the effects were the same as an actual shortage of crude oil. Rapid steps were taken to increase tanker capacity, and the consumer noticed only slightly higher oil prices. But the increase in tanker rates put Libya in a special position by reason of its location. Production there was stepped up rapidly to meet European demand. Libya, in the short run, seemed the ideal answer to all the world's oil problems.

The "short run" was shorter than most had assumed. King Idris was overthrown in September 1969 by Colonel Qaddafi, a fanatic anti-Communist, but also a zealous pro-Arab, who considered Israel and the United States, which he characterized as the sole supporter of Israel, as even greater dangers to Arabism than was communism.

Early in 1970 Qaddafi and his colleagues moved to cut back oil production (then at almost four million barrels a day) for conservation reasons. New and extreme strains were also placed on the tanker market by the closing of the pipeline from Iraq, in a dispute over transit fees, and by the cutting of the Trans-Arabian line. Although most of the losses were made up, reserve stocks in Europe were drawn down. In this situation, the Libyan government demanded, in the spring of 1970, a large increase in tax payments on its oil. After an arduous round of discussions the international companies operating in Libya yielded one by one.

It seemed at the time, and still does, that they had little choice. Libya had \$2 billion in currency reserves; its demands were not unreasonable; its officials could not be corrupted or convinced;

and most important, Libyan oil could not be made up elsewhere. The Libyans, it should be noted, did not threaten to cut off oil deliveries to the consumer countries; their only threat was not to allow the *companies* to have the oil unless they paid the higher taxes.

Europeans, at this time, were almost unaware of what was happening and would have been totally unprepared if oil had been cut off. During the negotiations, a top official of a major oil company seriously urged the American government to dare the Libyans to nationalize; if they did, the Europeans would then be told they would have to tighten their belts, while Libya, according to this theory, would be forced to yield soon because it could not dispose of its oil. When it was noted that Libya's currency reserves could keep the government at current expenditure and import levels for four years, the company official stated his assumption that all of this would be blocked by all the European and American central banks. It was an assumption hardly likely to be realized.

But the main reason for not following this course was the fact that the loss of all oil from Libya alone would have meant the drawing down of more than half of the European oil reserves within a year. It seemed unlikely, indeed inconceivable, that France, Germany, Spain or Italy would have allowed that to happen; especially as the goal would apparently have been only to protect the Anglo-Saxon oil monopoly, which they had long sought to break. To have tried to explain to them that they would themselves suffer in the long run, would have been less than futile. We in the State Department had no doubt whatever at that time, and for those particular reasons, that the Europeans would have made their own deals with the Libyans; that they would have paid the higher taxes Libya demanded and that the Anglo-Saxon oil companies' sojourn in Libya would have ended. As for the possibility of using force (actually suggested since by a handful of imperialists *manqués*), suffice it that it was never for a moment considered.

I dwell on the 1970 Libyan demands and their success, primarily because they demonstrated, like a flash of lightning in a summer sky, what the new situation was; to be sure, it was Europe that was extraordinarily vulnerable and extraordinarily oblivious, the United States as a consumer was not yet affected, and the fact that the companies caught in the middle were American

and British made for misunderstanding and some bad feeling in the European consuming countries. But these points were incidental to the fundamental fact, which was that a threat to withhold oil could now be effectively employed to produce higher prices. Hindsight suggestions as to how that threat might have been countered, either by the companies or by the American or other governments, seem to me quite unrealistic, and the charge that the State Department by inaction was to blame for creating a new monster is, in simple terms, nonsense. The Libyans were competent men in a strong position; they played their hand straight, and found it a winning one.

So, in the course of 1970, Persian Gulf taxes were raised toward the new Libyan level, and at the end of 1970 Libya made it a complete spiral by a second wave of demands to "balance" the new Persian Gulf prices. In the course of this eventful year, the Department of State necessarily became deeply involved, consulting constantly with the companies and holding frequent meetings with the Libyans in particular, though never as participants or negotiators. Better informed itself, the Department was soon able to keep European governments abreast of OPEC actions, and in due course to help persuade the companies that they should do so directly—so that since 1971 relations between the companies and the European consuming countries have generally been smooth. We have not heard in the last two years any echo of what was said by one European minister in 1967: "American companies brutally conquered our market; if they do not keep us supplied at all times, they will be expelled."

Toward the end of 1970, the producers consolidated new tax demands through OPEC, and began to act as a single group and more stridently. Every OPEC member, with the exception of Indonesia, either made public statements or (more convincingly) told the companies privately that if their demands were not met, all oil production would be stopped and the companies would then have to face the wrath of the consuming countries. An OPEC resolution in December laid down a 15-day time limit for acceptance and called for "concerted and simultaneous action by all member countries" if the negotiations failed. Meeting with the companies on January 11, 1971, the Libyan Deputy Prime Minister left no doubt that what was meant was a cut-off of all oil production. The same message was conveyed directly and through official channels to the American and British gov-

ernments by two rulers of friendly countries.

The demand for increased revenues, while alarming, had been an economic matter which would not traditionally have engaged the American government. The threats to cut off oil, however, brought the Department of State inevitably into an active and public role. First, Justice Department action was obtained to permit the companies to form a common negotiating front—not be picked off one by one as had happened in Libya. And, in mid-January, following a meeting with the chief executives of the oil companies, Under Secretary John Irwin was dispatched to present American official concerns to the Shah of Iran, the King of Saudi Arabia, and the Ruler of Kuwait. In these talks, Secretary Irwin explained that the United States took very seriously threats to cut off oil deliveries to America or her allies, and that any country which took such action would find its relations with the United States severely and adversely affected. In reply, all three monarchs assured him that the “threats” had been misunderstood, that they were directed solely against the companies, and that the oil would be made available to consumers even if the negotiations with the companies broke down. Later threats by the producing countries were in this sense—a form of pressure on the companies, but not a threat of total nondelivery.⁵

In addition, Secretary Irwin requested an extension of the deadline for negotiations and an assurance that agreements reached with the companies would be honored for their full terms. Both requests were agreed to. The negotiations then continued, and the settlement reached at Tehran in February 1971 provided for tax increases equal to about half the initial OPEC demands: these increases meant a rise of 45 cents per barrel in the Gulf price and of 80 cents in Libya, with a schedule for further increases through 1975.

There was jubilation in OPEC. The triumph and the demon-

⁵ The OPEC position was codified in Resolution XXII. 131 (1971); the American view on threats to cut off deliveries has been reiterated on many occasions since, most recently by the author in September 1972. It has been suggested that American representatives virtually invited the threat of cut-off and thus built up OPEC's bargaining position, specifically through statements at a meeting of OECD in Paris on January 20, 1971. (See M. A. Adelman, *The World Petroleum Market*, Baltimore: John Hopkins University Press, 1972, pp. 254-5; also the same author's "Is the Oil Shortage Real?," *Foreign Policy*, Winter 1972-73, pp. 80-81.) By January 20, however, as the above chronology shows, the threats had already been made; thereafter, on American representations, they were modified. As for the thought that the OPEC countries needed to be told how damaging a withholding could be, this seems to me to belong to a bygone view of the capacity of leaders in less-developed countries.

stration of power seemed complete. But there was also, in the circumstances, some satisfaction in the industrialized countries represented in the Organisation for Economic Co-operation and Development (OECD). None had been in any position to hold out against the threat of even a brief suspension, for despite discussions since the Libyan episode, the level of reserves in Europe was still low. The underlying bargaining position of the European consumers was weak, and they knew it full well. Thus, there was genuine relief that the agreement appeared to promise assured prices for a substantial period, and that the consumer, because of lower tanker rates and increased company efficiency, would still be paying less for his petroleum in constant dollars than he had in 1958. In fact, after the OPEC settlement, prices to the retail consumer in Europe, including taxes levied in the consumer countries, went up only three to five percent, while one country, Italy, actually offset the increase by reducing her excise taxes by the same amount.

There was satisfaction, too, with the American role and with the fact that the major consuming countries had been consulted at all stages. The Italians, however, raised for the first time the suggestion that the consuming countries might in future have to play a greater and more direct role in negotiations; this position has since gained adherents in OECD.

Here it should be noted that, if the industrialized consumers were fairly well pleased with the outcome, it was quite otherwise with the underdeveloped consuming countries, which had counted on declining real fuel prices to sustain their economic growth. This group at once expressed alarm, and at least one key country, India, was unable to absorb the increase and was forced to cut back petroleum purchases proportionately. This possibility had been foreseen in the negotiations, and the question of a lower or differential tax for sales to underdeveloped nations had been broached with various OPEC countries, specifically Iran, Saudi Arabia, Kuwait and Venezuela. The idea was rejected, on the technical ground that it might lead to circumvention and resale, more broadly on the plea that the producing countries themselves were underdeveloped. If Europe, America or Japan were concerned about the welfare of India or Colombia or Tanzania, it was argued, they had the means to assist them. The issue has lain dormant since; it is sometimes still raised by Asian, African and Latin American states—without response.

v

In spite of the upheavals in the oil world of the last two years, the Tehran OPEC agreements have been both successful and stable. I say that with tongue only partially in cheek. The main agreements were on taxes and on the posted prices of oil. These have not been changed. The OPEC countries insist that the agreements only covered these matters. When currency values were changed by the Smithsonian accord of 1971, the Tehran agreements were interpreted, under a supplemental Geneva agreement of 1972, to provide for a proportionate increase in payments to the producers. The same kind of increase will presumably result from the recent 1973 U.S. devaluation.

Yet OPEC dissatisfaction was not long in manifesting itself. Various members, in the next half year, started looking at the figures more harshly. They could see large and growing incomes for their governments and were generally pleased. But they could also see that their income per barrel was still low—especially when compared with the excise taxes which Europe levies on its fuel. Much more important, indeed of overwhelming importance to the changing world oil picture, was that the OPEC countries, for the first time, began to recognize and discuss openly the fact that their reserves were exhaustible and should be conserved.

At the Arab Oil Congress in Algiers in May-June 1972, OPEC was castigated for having been too soft, for having yielded too easily and readily to company and consumer government pressures. The OPEC "triumph" thus lasted in the eyes of many Arab observers a scant 15 months. And the idea began to take root that it was important to maximize present revenues but without exhausting what was now perceived to be a wasting asset.

In this mood, the OPEC countries turned their attention in mid-1972 to the question of participation, i.e. a defined percentage share in the producing operations and assets of the international companies. At once there was a sharp difference of view on whether this issue had been laid aside, at least until 1976, by the Tehran agreements. The producer governments took the position that participation was an old demand in no sense relinquished at Tehran, and indeed that the companies had been told explicitly that it would be raised as soon as the price issue had been settled. The company position was that participation had not been discussed and that the Tehran agreements guaranteed the existing

concessions in their present form for the full five-year period. Possibly the case was one of an ambiguity that neither side had wished to clarify. Undoubtedly there had been mention of participation, but each side preferred to leave the meeting undisturbed by possible conflicting interpretations.

From a careful study of the Tehran agreements, the State Department concluded that the company position was correct. The OPEC argument, that there was an inherent right to renegotiate the concessions whenever circumstances changed, seemed to us contrary to both Western and Islamic jurisprudence.⁶ Accordingly, our ambassadors made representations in Iran, Saudi Arabia and Kuwait, but were met by reiteration that participation was an issue totally outside the Tehran agreements, and that the companies "knew" before those agreements were signed that participation would be next on the agenda of talks.

Participation was also discussed in the OECD, but it was of limited interest, being viewed as an issue between the Anglo-Saxon oil companies and the producing governments. Perhaps the companies were being partially nationalized, but the OPEC countries had given renewed assurances that prices would remain the same. At best, therefore, participation would mean nothing to the consumer countries. At worst, it would mean only a few cents a barrel increased cost.

At any rate, the companies did enter long negotiations on participation. In these the United States played one major role, forcefully noting that it would have to consider compensation based on "book value" as confiscation. In the discussions, it was pointed out that many of the OPEC countries themselves would soon be investing large sums abroad; any principle that meant in practice no compensation might later apply to their own investments. Ultimately, the issue was resolved by a new compensation formula, based on many complex factors. Face was thus saved on all sides.

The agreements reached in Riyadh by the end of 1972 provided for the producing governments to acquire percentage shares starting at 25 percent and working up gradually to 51 percent,

⁶ It may be pointed out here that a surprisingly large number of oil company officials were already examining the possibility of offering a new relationship to the oil producers. The day of traditional concessions, they saw, had clearly ended and a dramatic new offer to the producers might guarantee another generation of tranquility, as ARAMCO's offer of the 50-50 profit split in the early 1950s had done. This view did not prevail, and participation was only discussed when OPEC demanded that it be discussed.

or an assumption of control, by 1982. The companies were far from pleased, although the arrangements did give them and the consuming countries a basis for continuing. Within three years, the producing governments will be permitted to take their full 25 percent of the oil, and it seems likely that if existing market conditions continue the governments will be able to dispose of their rising percentages, including the 51 percent to which they will be entitled in 1982. The effect, of course, will be to further increase the return to the producing governments, at least to the extent of the present margin of profit of the companies' own production operations.

At this writing, there are several developments which could reopen the Riyadh agreements. One is the Iranian demand for total ownership and management of its oil resources now, i.e. for a conversion of the companies into long-term buyers of Iranian oil. Another would be the "success" of the Iraqi nationalization of Kirkuk fields—and by this I mean little or no compensation for the fields and unrestricted freedom in selling the oil; the third would be the yielding of the companies in Libya to government demands for 50 percent participation now. It cannot be said that any one of these would surely result in the reopening of the Riyadh agreements in their present form. But resisting change at this point will not be easy or even desirable.

Regardless of what happens to the current agreements, the companies will continue to play a major role in transporting, refining and distributing oil. And they very likely will also play the major role in oil production for the next ten years. Predictions for longer than ten years in the energy field are daring, but the companies probably have even a much longer life than that. It seems doubtful that the national oil companies of the present OPEC will look for oil in third countries; this action will be left to the Western companies.

In sum, the international companies will probably go on playing an active role in finding, developing and marketing oil for as long as it is used as a fuel or as a raw material. But in this role the companies may increasingly find themselves minority partners of both producer and consumer governments—and they must reconcile themselves to the probability that their role in negotiating with the OPEC countries will in the future be more circumscribed than it has been until now.

The idea was first expressed, I believe, by the Italians, that

the oil companies should be turned into "regulated utilities"; that consumer governments must have the right to set the prices the companies pay for crude and the prices they can charge for products; and that consumer governments will then allow the companies a fair return on their investment. This has long horrified most of the top company management, and I have no doubt that it would be an undesirable method of finding and developing oil. But there is no doubt that this concept too is finding more adherents in the consuming countries. How the companies react to these pressures, and what they offer as alternatives, will to a large extent determine their future form and their future activities.

VI

As can be seen, OPEC has moved hard and fast in the last three years. One result has been to reduce the position of the companies and to make bargaining more and more a political matter between governments. In economic terms, moreover, the series of agreements create a new price situation which is defined through 1975 only, and thereafter subject to renewed demands and changes.

What, then, is the likely picture of Middle East and North African production and revenue, taking into account reasonable projections of demand in Europe, Japan, and other consuming areas, plus the added share of American consumption that cannot be met through domestic U.S. production?

The Tehran and subsequent OPEC agreements raised the average 1970 tax of around \$.80 per barrel in a single jump to around \$1.25 per barrel in 1971, with provisions for further annual increases to around \$1.80 in 1975. There was no noticeable inhibiting effect on consumption: while some less-developed countries reduced their imports, the imports of the industrialized nations, notably the United States, grew more rapidly than expected. Already in this current year 1973, the United States will be importing something over three million barrels per day from the Eastern Hemisphere. The total gross cost of all U.S. oil imports will exceed \$8 billion, although in our balance-of-payments accounts more than half of this will be offset by company remittances and increased exports generated through the purchases.

For 1975, a reasonable estimate of the situation, based on the tax rates flowing from the Tehran agreements and without taking

into account any further increases, would be as follows:

ESTIMATED PRODUCTION AND REVENUE, 1975

(Stated in thousands of barrels per day; billions of dollars annually)

<i>Middle East</i>	<i>Production</i>	<i>Revenue¹</i>
Iran	7,300	4.7
Saudi Arabia	8,500	5.4
Kuwait	3,500	2.2
Iraq	1,900	1.2
Abu Dhabi	2,300	1.5
Other Persian Gulf	1,800	1.0
Subtotal	25,300	16.0
 <i>North Africa</i>		
Libya	2,200	2.0
Algeria	1,200	1.1
Subtotal	3,400	3.1
Total	28,700	19.1

After 1976, of course, any estimate of taxes and prices becomes considerably more speculative. The 1970 State Department projection that prices would rise by 1980 to \$5.00 per barrel may now be on the low side: sources within OPEC are publicly discussing an increase of \$1.50 in taxes in 1976 alone, with "substantial" increases thereafter. If one takes, however, a \$5.00 American production cost as decisive for the delivered import price, and deducts company profits and cost of production and transport, the revenue to the producing countries would come to approximately \$3.50 per barrel in the Persian Gulf and \$4.25 per barrel in North Africa. At these levels, it is generally estimated that consumption would still rise roughly in the same way as had been projected prior to the latest round of price increases; this amounts to saying that a price of \$5.00 for delivered crude oil is still below the level that would cause any significant contraction in the use of oil in Europe, Japan or the United States. The startling fact is that world consumption within the next 12 years is now expected to exceed total world consumption of oil throughout history up to the present time.

On the basis of demand trends and the \$3.50/\$4.25 rates of return per barrel, the picture for 1980 would be as follows:

¹ These figures are based on the taxes and royalties in effect prior to the dollar devaluation of February 1973. If the 1972 Geneva agreements on currency revaluation apply, the income figures should be increased about 8.5 percent.

ESTIMATED PRODUCTION AND REVENUE, 1980

(Stated in thousands of barrels per day; billions of dollars annually)

<i>Middle East</i>	<i>Production</i>	<i>Revenue</i>
Iran	10,000	12.8
Saudi Arabia	20,000	25.6
Kuwait	4,000	5.0
Iraq	5,000	6.4
Abu Dhabi	4,000	5.0
Other Persian Gulf	2,000	3.2
Subtotal	45,000	58.0
<i>North Africa</i>		
Libya	2,000	3.1
Algeria	1,500	2.3
Subtotal	3,500	5.4
Total	48,500	63.4

It must be noted that the estimated production figures are higher than others cited elsewhere in this article. Iran, for example, has said its production will level off at eight million barrels per day; Kuwait has said its will be kept at three million. Iraq will have difficulty in realizing five million unless the Western climate changes, and the others will strain to meet six million. Yet the world with its present habits will need this quantity of oil unless there is a war or a major recession. The only alternative to a shortfall before 1980 will be Saudi Arabia, and its projected production of 20 million barrels per day (set by Minister of Petroleum Ahmad Zaki Yamani as a goal) already seems improbably high.

If production levels fall significantly short of these numbers, there could be a real supply crisis in the world, and competition among the consumers could drive prices even higher. In this and other respects, the projection for 1980 is of course subject to a substantial margin of error. But it does seem likely that the general picture is an accurate projection of current trends, with all that it implies for costs to consuming countries and revenues to the Middle East and North African producers.

VII

With the possible exception of Croesus, the world will never have seen anything quite like the wealth which is flowing and will continue to flow into the Persian Gulf. There have been and still are countries which are richer than any country in OPEC, but there is none which is so small, so inherently weak and which

has gained so much for so little activity of its own.

The cumulative OPEC income is even more startling than the annual figures. Let us ignore the income of Iran—for it will have no trouble absorbing funds in its vast development projects—and concentrate on the Arab countries. Their cumulative income from 1973 through 1980 will probably be over \$210 billion. Even assuming a 20 percent compounded growth in expenditures (and it should be pointed out that all of the main Arab producers except Algeria are not spending all of their present income; in some cases, they are spending less than half), their cumulative expenditures for this period would be well under \$100 billion. Capital accumulations therefore could be the balance—over \$100 billion by 1980. At eight percent, just the income from this enormous sum would be \$8 billion—larger than the current expenditures of Kuwait, Saudi Arabia and the Federation of Arab Emirates combined.

What will be done with this money will be a matter of crucial importance to the world. The first place for its use must certainly be in their own countries; the second must be the Arab world, which will not, as a whole, be capital-rich. At the Algiers Arab Oil Congress in mid-1972, the proposal was made that the Arabs should solve their "problem" in an inter-Arab agreement whereby the main producer nations would limit their income from oil to the 1972 tax structure. That is, as oil production went up, the increased payments at the 1972 rates would go to the producer governments, but all or at least part of any *increases* in payments per barrel over 1972 levels would go into an inter-Arab development bank for projects in the entire Arab world. This additional money would be, in a sense, unearned. Moreover, such action would be in perfect consonance with Islamic law practice, which demands twice as much *zakat* from income derived from lands fed by God-given rain as from lands irrigated by man.

It was interesting to note the enthusiasm with which this suggestion was accepted by the oil have-nots. It was much more gratifying to see the interest shown by some Kuwaitis, Iraqis and Libyans. Although it should be pointed out that interest shown by individuals is a long way from governmental acceptance of an idea, it must also be noted that both Kuwait and Saudi Arabia are already providing very substantial loans and gifts to other Arab countries.

Yet the sums we are talking about probably could not all be

absorbed in the next eight, ten or 20 years in the Arab world; at least for part of that time they could be more usefully invested in the developed world. And one of the main tasks of the producers will be to find adequate investment opportunities for their funds. This matter was discussed in the spring and summer of 1972 with Arab officials, who seemed interested in investing in the United States. In a Middle East Institute speech of September 29, 1972, I suggested that the enormous capital requirements of the oil and energy industry could be met only by large new infusions from the main capital-rich consuming countries (Germany and Japan), and from the producer countries themselves. I also suggested that Saudi Arabia, Kuwait and Iran might consider investing in the United States in other energy fields and even in non-energy-related industries. Sheikh Zaki Yamani of Saudi Arabia replied the following day that he strongly agreed with the suggestion of Arab investment in the "downstream" oil sector (refining, distribution, etc.), but did not believe Saudi Arabia would be interested in other types of investments.

In a recent meeting in Kuwait it was suggested that Arabs accumulate their money and simply float it from country to country, depending on how each country reacts to Arab problems. The difficulties of such an action are surely underrated, but the fact that it was considered and debated must give us some pause. Frankly, however, it is a problem I am convinced we will never face. I do not believe the Arabs will ever accumulate anything remotely approximating the figure of \$100 billion. Either they will spend the money at home or in the Arab world or they will find adequate investments for it abroad. If they do not, or cannot, they will very likely conclude that the oil had best stay in the ground—and this would cause a problem for the developed world far greater than the floating billions.

If finding a use for the money is of great importance to the Arabs, it is of even greater importance to us. There are many trained and sophisticated Arabs; there are Arab engineers who can run oil fields and there are Arab economists who can calculate the value of investments. There are also, unfortunately, Arabs who are venal, who are susceptible to flattery, who could quite easily be taken in by charlatans, and the sky over Riyadh today is black with vultures with great new get-richer-quicker plans under their wings. Whether an Arab is a Harvard Business

School graduate or an illiterate bedouin he strongly dislikes being cheated. If one grandiose project is sold to Saudi Arabia which fails to produce the ingots or pipes or widgets it is designed for; or if it produces them at costs far above the imported cost; or if the Saudi government buys into one shaky American concern which then fails, I seriously doubt that the reaction would be: "We've been had. Too bad. Let's try harder next time." It much more likely will be: "We're still not trained enough to deal with the Westerners. The oil can always be sold—as a raw material if not as a fuel. Let's not increase production further." Or worse: "Let's restrict production."

VIII

So far we have looked at the world oil reserve situation; at length at the recent history of bargaining by the producer countries through OPEC; at projections for the future; and at the situation of the producer countries in the light of all factors. It is time now to return to the question asked early in this article: Can OPEC hold together? The answer seems to me, if not certain, clear enough so that it would surely be foolhardy to bet on a contrary outcome for the next several years at least.

Repeated suggestions that OPEC would not notice its strength, if only the consumers did not refer to it, represent perhaps the single most pernicious fallacy in our past thinking on world oil. It assumes an unsophistication and ascribes an ignorance to the major producer countries, particularly the Arabs, but also Iran, Venezuela and the others which, for better or worse, has not existed in recent years—if it ever did. OPEC economists are fully as capable of making supply-demand calculations as are Western economists. And they reach the same conclusions.

OPEC cannot usefully be compared to other producer cartels. It controls a product which is irreplaceable in the short run, and is vitally necessary to the economies of every technologically advanced country. The main oil producers are not competing with each other for larger shares of the consumer market—as would be the case in other producer cartels. Probably the most important reason for OPEC solidarity is that the key countries, notably Kuwait, Saudi Arabia and Libya, do not need more income; they are unsure of how they could use it if they had it, and they fear the international consequences of acquiring too much wealth.

Almost as important is the recognition of all OPEC countries that their reserves are finite and must be conserved. These proven reserves are indeed very large. Yet, for example, Kuwait's 66 billion barrels today seem much less impressive to Kuwaitis themselves than they did a decade ago. Hence, Kuwait recently stopped expansion and plans to keep production at three million barrels per day. At this level, Kuwait will have oil for a couple of generations—but even this is a short period for a nation; and Kuwait's prospects of finding more oil are very small. Iran has stated that it will limit production to eight million barrels per day before the end of this decade; production will be held there for eight or ten years and then will decline. Increases in Iranian income from oil will only come from increases in taxes per barrel, and it counts on this. North Africa's reserves are not large enough to play a dominant role in world oil in 1980; and the rest of the world will produce whatever it can. This leaves for consideration two countries: Iraq, whose government does not encourage foreign investment and seems unable, on its own, to produce substantially greater quantities of oil; and Saudi Arabia, by far the most important.

In the last analysis, whether Saudi Arabia or any other OPEC country with large reserves would act to disrupt the market is a question of the behavior of men in control of national governments, affected by political factors as much as by theoretical economics. Thus, it is frequently noted by observers outside the area that from an economic standpoint an increase in present income should be vastly more useful than the discounted value of income deferred for 10–20 years—and that with other energy sources in prospect oil may not even command high prices in such future periods. To Arab countries, such arguments are simply not persuasive. In the personal experience of their leaders, past income has been wasted and even current income is not invested profitably. Moreover, just about every top official in OPEC, starting with Pérez Alfonso in Venezuela 20 years ago and including Zaki Yamani of Saudi Arabia today, is convinced that his country can sell its oil profitably in ten or 100 years as a raw material (primarily for petrochemicals) if not as a fuel.

The predictions of Western economists that competition in OPEC for larger shares of the market will soon bring down prices are read not only in the West but in OPEC countries. They merely increase the already firm determination to avoid

such a development. The producers may want to "maximize" their income but they also recognize that, until there are alternatives to oil as a fuel, this can be done most easily by raising prices. No OPEC country, no matter how great its wealth, is interested in "breaking" world oil prices.

It is difficult to see how these elements of self-interest would be changed or how any of the OPEC countries would act differently if they should now move quickly toward complete nationalization of the producing operations and assets of the Western companies. Bargaining directly with the consuming countries, the producing countries would still be just as disinclined as now to drive prices down; and needing no additional income, would not feel under pressure to increase their market shares.

The Kingdom of Saudi Arabia, without doubt, could destroy OPEC. It could produce oil in much greater quantities than it does today; it could drive the price of oil down to the mythical \$1.00 a barrel, and every OPEC country would be ruined. But Saudi Arabia would also ruin itself in the process. Using the economists' expression, Saudi Arabia would not "maximize" its income; it would only "maximize" its production, and even its enormous reserves would soon be exhausted. It is difficult to see what folly could possess Saudi Arabia to take such action; any consumer government that assumed that Saudi Arabia would (or could) do this without an internal revolution would be guilty of an even greater folly.

The "collapse" of OPEC would indeed seem a serious possibility on either of two conditions—if there were discoveries of vast new reserves in areas which could be kept outside OPEC, or if there were an unexpected breakthrough in the development of new energy sources. Both are unlikely to occur; and neither could, even if it occurred tomorrow, operate rapidly enough so that it would necessarily drive down oil prices in the next decade. The world cannot simply wait for or expect such a *deus ex machina* to solve its energy problems.

IX

This article up to now has dwelt almost exclusively on the strengths of the oil producers. The consumers are not without power of their own—or they would not be if they were united. So far they have not been, and they have as yet shown little inclination toward collective action in spite of repeated urgings

by the United States. In the fall 1969 meetings of the OECD oil committee, before the first OPEC crisis, the Department of State first raised with the EEC the possibility of a common approach to the energy problems we would all soon be facing. Assistant Secretary of State Philip Trezise, in the OECD meeting in Paris in May 1970, urged that energy problems be considered in a multilateral context, but got little positive response. The general attitude was that the United States was becoming vaguely hysterical as its import needs grew; the United States, they thought, worried too much about losing Arab oil. This was something they, the Europeans and Japanese, did not need to think about. Israel was a millstone around the neck of the United States; this was the U.S. choice; the Europeans and Japanese could make their accommodations with the Arabs. Restrictions on oil deliveries would apply only to the United States; its allies would have much less to worry about. Not every OECD member took this view; the U.S. position was always supported strongly by the United Kingdom, the Netherlands and a few others; but generally American fear of a cut-off of oil supplies was not widely shared.

In the course of the last two years attitudes have changed. Italy has gone through a rather traumatic experience in Libya; 50 percent of her oil company was nationalized before production began. And the French experience in Iraq went sour. France had taken a markedly pro-Arab position in the Arab-Israeli dispute; she had reached oil accords with Iraq which were the most favorable to the producing government of any agreement theretofore signed, and many Frenchmen looked forward to a new French oil empire in the Middle East. But the agreements with the French national company, ERAP, did not measure up to the new OPEC agreements and the Iraqis demanded renegotiation. This very likely will be achieved, and oil certainly will be produced by France in Iraq; but the French have found that the doctrine of changing circumstances is also applied to outspoken friends of the Arabs.

In the fall of 1971, the United States raised more formally with the Europeans and the Japanese the possibility of a joint approach to the energy problem; apart from a general expression of support for the companies in their dealings, no ideas were forthcoming. The subject of cooperation was raised again in the spring of 1972 with the same lack of response. Finally, in October

1972, in both Brussels and Paris, the Europeans and Japanese were told that the United States would need some indication, at least in principle, of their intentions. Did they prefer a purely autarkic approach, or did they think we should try (as the United States strongly preferred) to tackle our energy problems jointly? The European Community, speaking together for the first time replied that it too favored a coöperative approach. The Japanese reply was ambiguous but seemed to be inclined toward coöperation.

The United States has discussed at various times a two-pronged approach to consumer coöperation. The first would be coöperation among the major consumers to find new sources of hydrocarbons and to develop new forms of energy. This could be as simple as expanded exchanges of information, or could go as far as a supranational authority with power to direct research and allocate funds. We have not put any specific plan on the table but have indicated our willingness to discuss all possible approaches. The second and more difficult part would be the formation of an international authority to avoid cutthroat competition for available energy in times of shortage. Such competition could drive prices far higher than we can presently imagine. The producers, in such a case, would need still less production to maintain their incomes and could restrict production even further.

Such competition for oil, of course, has already begun. Various companies are trying to conclude long-term purchase contracts for oil with various OPEC countries. At least three governments have made overtures to Saudi Arabia with offers of attractive long-term contracts, since the Yamani offer of a special relationship to the United States made in his Middle East Institute speech of September 1972. Japan has recently concluded a deal with Abu Dhabi which went beyond the OPEC agreements; and small American companies are now offering the producers long-term contracts with equity participation in their firms. With OPEC production limitations in the future, or even with normal slow growth, with only Saudi Arabia and perhaps Iraq capable of substantial expansion, bidding for supplies could soon get out of hand, and the projected price of \$5.00 per barrel in 1980, or even a price of \$7.00, could seem conservative.

There was strong agreement in the OECD that a consumer organization (which all agreed should be formed) should not

be considered a challenge to OPEC; it would not be designed to drive prices down and certainly not to ruin the producers; it would only be designed to protect the consumers. It could even be used to bring the OPEC producers into closer ties with the consumers. Producer country investments in Europe (and possibly Japan) as well as in the United States should be encouraged. In September 1972 I stated the American position in these terms:

If consumers band together to search for new energy forms or to ration available energy in periods of shortages, this should cause no surprise or offense. If consumers encourage companies to resist further price increases, this should also cause no surprise. Many consumers already believe that the companies have not been adequately vigorous in resisting producer demands, as they could and usually did pass on to the consumer any tax increases. The producer governments have banded together in a well functioning organization. Their immediate adversaries are only the companies—an unequal contest.

Lastly, there is the possibility of some additional measures to build up reserve stocks for bargaining purposes. These are indeed badly needed for their own sake, in Europe and also in the United States. They could have some importance in future dealings with the OPEC countries, although it must be realized now that the enormous financial resources of the OPEC countries give them a considerable advantage in any endurance contest.

X

Consumer solidarity will be necessary if the present trend toward bidding up prices is to be halted. It will be indispensable if political or economic blackmail is to be successfully countered. There are various interpretations of what this means and how far the consumers could go or would want to go in a confrontation with the oil producers, particularly if the issue were exclusively one of oil prices.

In the long run, though, the only satisfactory position for the United States (and to a lesser extent for its main allies) must be the development of alternative energy sources. The United States is particularly blessed with large reserves of coal which can be converted to hydrocarbons, and of shale oil. The United States shares with all nations the possibility of developing geothermal energy, solar energy, and energy from nuclear fission and fusion. But the lead time is long for the development of all of them and some are still purely hypothetical.

Suggestions a few years ago for a vast program of development

of new energy sources received no support in the Congress or from the public. Yet, had the United States a few years ago been willing to accept the realities which became evident in 1967 or even in 1970, it might have started sooner on the development of Western Hemisphere hydrocarbons and domestic energy sources.

The potential is there. Venezuela probably has close to a trillion barrels of heavy oil in place, with at least ten percent recoverable by present technology; the United States has large reserves of oil tied up in shale, and coal which could be turned into hydrocarbons in almost unlimited quantities. And there are probably over 300 billion barrels of recoverable oil in the Athabaskan tar sands.

Let us not exaggerate all this, however. The shale, the heavy Venezuelan oil, and the tar sands all require capital investment on the scale of \$5-\$7 billion for each million barrels per day of capacity. Above all the lead time is long—perhaps 15 years, certainly eight—before significant production could be achieved from any of these sources.

On the diplomatic front, we have for years discussed an agreement with Canada which will permit free entry of Canadian oil into the United States. This has lost much meaning by now, for Canada is currently sending us all her surplus oil and has imposed export controls. But we still may reach agreement. We have also discussed a treaty with Venezuela which would permit the development of her heavy oils. We have proposed free entry of these oils into the United States in return for investment guarantees to the companies developing these oils.

Within the United States itself, a wide sweep of actions can be taken to increase domestic energy production and to use energy more efficiently. Finally, there is the question of controlling the rise in oil demand, through reasonable conservation actions. Such measures as the spread of effective mass-transit systems could do much to limit our present profligate use of energy for a host of marginal purposes.

No one action will solve our energy problem, much less that of the entire world. But taken together these steps—collaboration with other nations, the development of alternative energy sources, and controlling our consumption reasonably—could allow us to reduce our imports significantly below those projected in this article. This must surely be our immediate goal.

XI

To look simply at the world's oil reserves and conclude that they are sufficient to meet the world's needs can no longer be acceptable. We could allow ourselves such fatuities as long as we had large spare oil production capacity, and while our overseas imports were small. We can do so no longer. Our security and balance-of-payments problems are large and growing. Whether we focus on today, or 1980, or 1985, it is abundantly clear that we must move on a variety of fronts if we are to avoid a situation which could lead to or even force us into highly dangerous action.

Having argued throughout this article that the oil crisis is a reality that compels urgent action, let me end on a note of hope. The current energy problem will not be a long one in human terms. By the end of the century oil will probably lose its predominance as a fuel. The measures we have the capacity to take to protect ourselves by conserving energy and developing alternative sources of energy should enable us, our allies, and the producer nations as well, to get through the next 25 years reasonably smoothly. They might even bring us smiling into the bright new world of nuclear fusion when all energy problems will be solved. This final note would ring less hollow if we did not remember the firm conviction of the late 1940s that the last fossil fuel electricity generating plant would have been built by 1970; and that in this new golden age, the home use of electricity would not even be measured. It would be so cheap, we were told, that the manpower cost of reading meters would be greater than the cost of the energy which the homeowners conceivably could consume. But perhaps in 2000. . . .

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