

The West and the energy crisis of 1973–8

Simultaneous Egyptian and Syrian attacks on advanced Israeli positions on October 6, 1973 coincided with a scheduled OPEC meeting in Vienna on October 8. The Arab assault, launched as Jews celebrated the high holy day, Yom Kippur, precipitated a protracted energy crisis, the causes of which are still debated and the consequences of which are still being sorted out. This chapter describes the varied responses of OECD-Europe, the USA, and Japan to a sudden and steep rise in the price of oil, a temporary embargo and resultant oil scarcity, and gnawing uncertainty about the security of oil supplies. The chapter concludes as Moslem fundamentalists in Iran overthrew the Shah's government, sending the Shah into exile in July, 1979, and thereby precipitating an astounding jump in oil prices. The following chapter employs the same time frame to investigate the impact of these events on the Soviet bloc and on the producing and non-producing LDCs.

The OPEC price hikes and the OAPEC embargo

OPEC officials wending their way to Vienna in early October were firmly resolved to set prices above those established at the Tripoli and Teheran meetings by producer fiat. The Yom Kippur War presented a propitious moment for OPEC to jack prices up without negotiation or consultation with the MNOCs or their governments. The energy supply and demand predicament of the industrialized states assured the success of OPEC's price decisions and encouraged the Organization of Arab Petroleum Exporting Countries (OAPEC) to impose an oil embargo on October 17, 1973.

As energy use in the West became ever more intensive and ever more oil based, reliance upon energy imports intensified. Net energy imports as a percentage of total primary energy requirements (TPER) for the USA, Japan, and OECD-Europe stood at 17, 93, and 65, respectively (Table 6.2). Oil composed the bulk of those imports. Together, those three markets received 1,373 million metric tons of oil in 1973, or 83 percent of world imports (Table 6.3). As Table 7.1 indicates for 1973, oil provided well over half of TPER in OECD-Europe and Japan and 44 percent in the USA.

Had this oil been obtained from many sources, each supplying but a small proportion of overall demand, the West would have been less vulnerable to OPEC and OAPEC pressure. Table 7.2 identifies the key regions from which the West obtained its oil. It appears that the USA drew from more diverse and less insecure producers than its OECD associates. But, as it happened, that offered little protection. In the USA, the world's largest energy and oil producer (in 1973), output from aging domestic fields declined between 1970 and 1973 while TPER and oil's share of TPER rose (Table 7.1). American crude oil imports soared from 67 mmt in 1970 to 164 mmt in 1973. Members of OPEC supplied 74 percent of the latter tonnage. OPEC sellers dominated western European and Japanese markets even more completely. Europe drew 89 percent of its crude and Japan 80 percent from OPEC which provided 64 percent of world supply.

Surging western demand for oil, particularly in the USA where both oil and natural gas production exceeded discoveries, created the moment for OPEC price action. Supplies were tight and transportation fully employed in 1973. The West evinced no capacity for united resistance to an OPEC price increase. The producing states were convinced that the MNOCs would not object to higher prices and would follow orders. The Yom Kippur War, then, did not cause a price increase but did, in association with the OAPEC embargo, cause a higher price to be selected. The West had no choice but to acquiesce to the OPEC price. Readily available alternatives to petroleum did not exist.¹

The political might of oil was used by OAPEC to punish the friends of Israel. On October 17, OAPEC announced a production cutback of 5 percent each month until Israel both withdrew from the territories seized in 1967 and agreed to recognize Palestinian rights. The next day, Saudi Arabia, the erstwhile friend of the USA, reduced oil production by 10 percent and imposed a total embargo on the USA which, by then, had undertaken the resupply of Israel's armed forces. Libya followed suit. Saudi Arabia then reduced production by 25 percent. By October 22, OAPEC's members had joined Saudi Arabia in the embargo and

Table 7.1 TPER and fuel mix of industrialized states, 1970-87

	TPER*	% Solid fuels	% Oil	% Natural gas	% Hydro	% Nuclear	% Net imports to TPER
USA							
1970	1563	21	42	33	4	<1	9
1973	1742	21	44	30	4	1	17
1979	1916	25	45	25	3	3	21
1985	1792	24 ¹	40	25	5	6	12
1987	1840	24	43	23	4	6	16
Japan							
1970	282	23	69	1	7	<1	86
1973	340	17	75	1	5	<1	93
1979	377	15	70	5	6	5	90
1985	372	20	55	10	6	9	84
1986 ⁴	380	18	56	10	5	11	86
OECD-Europe							
1970	1044	30	57	6	7	1	63
1973	1197	23	59	10	6	1	65
1979	1286	22	54	14	7	3	54
1985	1236	20	46	16	8	10	40
1986 ⁴	1277	20	44	15	7	11	40
USSR ¹							
1970	789	38	35	22	4	<1	
1973	874	36	37	23	4	na	
1979	1134	30	38	27	4 ²	1 ²	
1985	1376	26	33	35	4	3	

* Million metric tons oil equivalent

¹ 28 percent in 1984² 1980³ The Soviets were net exporters⁴ EstimatesSources: IEA, *Energy Balances Of OECD Countries, 1970/1982*, Paris OECD/IEA (1984), pp. 387-9, 404; *ibid.*, 1983/1984, pp. 16-17, 76-7, 120-1, 135; BP *Statistical Review of World Energy, 1981, 1982, 1984, 1986, passim*; IEA, *Coal Information 1987*, Paris: OECD/IEA (1987), *passim*.

production slashes. Also subject to the embargo were the Netherlands, Portugal, Canada, Rhodesia, and South Africa.

The aggressive Saudi response should not have taken the USA by surprise. In April, 1973, the Saudi government had warned the Nixon administration that oil would be used politically against the USA if it persisted in favoring Israel over the Arabs. The Aramco partners, trying to distance themselves from America's commitment to Israel, publicly criticized Israel's Arab policies. But the Nixon administration, preoccupied with the Watergate scandal, dismissed the Saudi warning as a bluff. American foreign policy in the Persian Gulf rested on the assumption that the Soviet menace tied Saudi Arabia and Iran so firmly to the USA that neither could afford to weaken their protector. American policy makers shared the belief that Saudi self-interest and, by extension, Arab Persian Gulf self-interest, precluded radical action on behalf of anti-Zionism. The USA was wrong. As Al-Sowayegh asserts, the Arab world was less concerned with the Soviets than with Israel and the Palestinians.²

Oil withdrawals by the OAPEC states declined from 19.8 million barrels daily* in September 1973 to 15.5 mbd in December. After subtracting from this loss the increased production of the non-Arab producers, the net loss approximated 3.5 mbd. The non-embargoed industrialized nations suffered supply deficiencies along with the embargo's targets. The 5-month embargo denied the USA about 25 mmt, or 8 percent of 1973 crude imports while domestic production fell from 480 mmt in 1972 to 444 mmt in 1974. This loss sufficed to cause real oil shortages in America.

Diminished production, distribution inefficiencies, and MNOC decisions combined to deny normal supplies of oil to most western European nations and to Japan. While France was not included in the embargo, minimally reduced shipments were experienced as the MNOCs diverted some oil intended for France to embargoed markets. France complained mightily of discrimination and blamed oil difficulties on the machinations of foreign oil companies. Oil scarcity was more onerous in Germany than in France or the UK. MNOCs and the independents delivered 12 mmt less to Germany in 1974 than in 1973, a reduction of 8 percent. Japan, reliant upon a few producing countries and a few Anglo-American oil firms for most of her oil, was in a precarious position. Japan's largest producing firm, the Arabian Oil Company, like Aramco, was forced by Saudi Arabia to reduce production. The MNOCs, too, notified Japanese refineries of a diminution in crude

* Multiply by 50 to obtain the metric ton equivalent for twelve months.

Table 7.2 Sources of oil for industrialized states, 1973-85 (percent)

	1973	1979	1982	1985
<i>USA</i>				
Net imports (mmt)	305	420	249	248
Middle East	13	25	15	8
North Africa	6	15	5	4
Latin America	43	30	41	41
Canada	21	5	9	15
All others	17	25	30	32
<i>OECD-Europe</i>				
Net imports (mmt)	776	647	466	412
Middle East	68	66	49	35
North Africa	16	14	16	20
West Africa	7	8	7	12
Soviet Bloc	6	9	16	20
All others	3	3	12	13
<i>Japan</i>				
Net imports (mmt)	292	276	206	202
Middle East*	76	74	66	64
Southeast Asia	19	21	21	19
Western hemisphere and China	3	4	11	13
All others	2	1	2	4

* Includes North Africa

Source: *BP Statistical Review of World Oil Industry, 1970-86.*

deliveries. The foreign MNOCs delivered a larger proportion of available crude to their Japanese affiliates than to Japanese owned firms.³

Arab oil politics elicited immediate diplomatic responses from the beleaguered OECD states. To curry favor with the Arabs, both the European Community and Japan hurriedly assured the world of their sympathy for Palestinian rights. An EC meeting in November, 1973 called upon Israel to withdraw her troops from Egyptian lands seized in late October and early November, a demand seconded by Japan in December. Both EC and Japan, in keeping with a 1967 United Nations' resolution, stated that Israel should withdraw from the lands conquered in 1967. The EC also undertook joint meetings with the Arabs, culminating in a 1974 gathering with the Arab League and the Palestinian Liberation Organization (PLO). In return, OAPEC exempted Japan and EC members from the production cutbacks of November and December. Neither was the USA wholly immobile. Despite its scream of blackmail, the USA pressed Israel to reach an immediate accord with Egypt, permitting the Sadat government to retire from the field with some honor. As a result of this subtle American shift, the OAPEC states, excepting Libya and Syria, ended the embargo in March 1974.⁴

The pro-Arab maneuvering of EC and Japan secured fewer benefits than the initiation of direct bargaining for oil supplies with the governments of the producing states.

As intended, the production cuts and an effective embargo shocked the industrialized states. Panicky buyers, unassured by their governments or the oil companies, imagined the disappearance of oil from local markets. But the psychological consequences of the embargo had evaporated by 1974 or 1975. The impact of the price weapon lasted longer and had greater effect. National economies had hardly accommodated to the first round of price increases when the Iranian Revolution precipitated an even more extreme ratcheting upwards of oil prices in 1979-80. The price increases of 1973 and following years were programmed by OPEC; western panic rather than OPEC design precipitated the price explosion of 1979-80.

Opinions regarding OPEC's prices from 1973 through 1978 range from the wildly accusative which cast OPEC in the role of an arrogant price gouging cartel blamable for all the ills—inflation, in particular—of the 1970s to those essentially absolving OPEC of all responsibility for the economic maladjustments of that decade.⁵ Most analysts avoid the polar positions, recognizing western and OPEC responsibility for unstable and, in many LDCs, damaged national economies. But even on the middle ground, disagreements abound regarding the motivation of OPEC. Some emphasize profit maximization objectives and others focus on political goals. Still others have concluded that OPEC, the USA, and the MNOCs conspired to raise prices to serve the profit maximization objectives of OPEC and the MNOCs and to weaken the competitive position of western Europe and Japan *vis-à-vis* the USA.⁶ These interpretations will be explored in Chapter 8. To provide context for the ensuing discussion of the energy crisis in the OECD states, I merely mention at this point a set of goals to which OPEC's members seemed to adhere.⁷

OPEC and OAPEC cannot be considered truly distinct bodies. The key members of OAPEC were equally important to OPEC. The pursuit of higher oil incomes for development purposes and anti-Zionist political goals were not mutually exclusive. OAPEC wielded its oil weapon while driving prices up through OPEC. Prices soared without linkage to either proven reserves or costs of production. These price hikes reflected:

1. A producer assessment of the true value of crude to users.
2. Producer insistence that oil prices move with the inflated costs of imports from the industrial nations.
3. Producer intention to gain compensation for earlier losses resulting

from MNOC price and production authority and the relatively weak bargaining power of the producers.

4. A compromise between producers such as Iran, desirous of the highest possible price, and Saudi Arabia which sought to avoid price increases that severely damaged the West or that stimulated active conservation and/or the search for alternative fuels.
5. Internal political rather than market forces.

Prior to the oil price revolution of late 1973, a gnawing inflationary pressure troubled the economies of the industrialized states. In western Europe, annual rates of inflation during the 1960s had been held, for the most part, under 5 and even 4 percent. By 1972, however, the rate exceeded 5 percent and surpassed 6 in France and 7 in Britain. In the USA, the wage and price controls of the Nixon administration temporarily checked inflation. Wage increases and a buoyant consumer demand in Europe coupled with a contracting surplus of raw materials and a 70 percent increase in crude oil prices between 1970 and the summer of 1973 thrust general prices upward. These trends were exacerbated in the USA by large annual domestic budgetary deficits, rising interest rates, and, spurred by an increase in the exchange value of the dollar, a swelling balance of trade deficits. Inflation rates in both Germany and Japan reached higher levels than in the USA. Unlike America, however, industrial expansion continued in the former Axis partners and unemployment rates advanced less severely. Higher wages in Germany and Japan were justified by improved productivity and the successful marketing of technologically advanced goods and services in international markets. In the USA, and in the UK, France, and Italy as well, soaring wages accompanied industrial stagnation or decline and the loss of foreign markets. Both Germany and Japan demonstrated greater capability in redirecting industrial emphases and thus proved more resilient when confronted by the OPEC price hikes than the American, British, French, or Italian economies. None of the latter could so easily counter the blow of rising import bills by throwing their export sectors into higher gear.⁸

Table 7.3 encapsulates the course and volatility of oil price changes during the years since 1973. Posted prices (OPEC's official prices) quadrupled from August 1973 to 1975. A second price revolution followed between 1978 and 1981. A third period of instability commenced in 1986 with prices plunging as low as \$9 and then gradually rising to a somewhat stable level during 1989.

The striking oil price bargains enjoyed by the West during the 1960s ended in 1973. Until then the net cost of oil imports comprised a small, if unavoidable, part of the total import bill. In Germany which, alone

Table 7.3 Oil prices, 1973-88

Date	Annual average regular gasoline prices			
	Posted crude price (\$ bbl)	UK (Pence per UK gallon)	USA (Cents per US gallon)	Germany (Cents per US gallon)
August 1, 1973	3.07	36	40	150
October 16, 1973	5.12			
1974*	11.25	52	53	
1975	12.38	72	57	
1978	12.70	75	63	195
1979	24.00	116	86	209
1980	32.00	128	119	253
1981	34.00	145	131	
1983	29.00	180	116	
1985	28.00		112	
1986	14.00		86	
1986 low	9.00			
1987†	18.00		90	
1988	18.00			

* Year end prices

† Saudi Arabian light

Sources: G. Jenkins, *Oil Economists' Handbook 1985*, London: Applied Science Publishers Ltd (1985), p. 20; De Golyer and MacNaughton, *Twentieth Century Petroleum Statistics 1986*, Dallas, Tex.: De Golyer and MacNaughton (1986), pp. 13, 41; Energy Information Administration, *Monthly Energy Review November 1987*, Washington, D.C.: USDOE (1988), p. 96; Congressional Quarterly, *Energy Policy*, 2nd edn, Washington, D.C.: CQ (1981), p. 43; L.R. Brown *et al.*, *State of the World 1988*, Washington, D.C.: W.W. Norton (1988), p. 26; *Lawrence Journal World*, March 10, 1988.

of the major OECD-European states, maintained a positive current accounts balance, the oil bill was hardly noticed. The staggering oil price advances of 1973-1975 worsened the trade deficits of the UK, France, Italy, and the USA while transforming a favorable balance in Japan to a negative balance.

Imported oil as a percentage of the value of all imports climbed swiftly between 1972 and 1975. In 1972, that percentage rested under 9 in Germany, France, and Britain and at 12 percent in energy poor Italy. By 1975, oil's share had reached 22 percent in Italy, 18 percent in France, 15 in Britain, and 14 in Germany. In Japan, in 1974, imported oil accounted for 32 percent of the import bill. Translated into dollars this meant that the Japanese oil import bill rose from \$4.4 billion in 1972 to \$24 billion in 1975. The US oil import tab leaped from \$3.3 billion in 1970 to \$27 billion in 1975. By 1978, the annual import bill of over \$35 billion represented 20 percent of the cost of American imports that had more than doubled in value since 1973.⁹

The economic consequences of the oil price explosion while varying

in detail and duration within OECD were most severe from 1973 through 1975. Current accounts deficits fostered deflationary policies designed to reduce the currency drain. The ensuing economic slowdown, especially in such energy intensive industries as chemicals and steel, pushed unemployment within OECD from 11 million in 1973 to above 18 million in 1976. The contraction of the US economy was attested to by negative growth in 1974 and 1975, declining growth in productivity rates between 1973 and 1978, and unemployment rates that rose from 5 percent in 1973 to over 8 percent in 1975. Rising oil prices in the industrialized states further exaggerated existing cost-push inflationary pressures by impelling consumer prices upward to levels far exceeding actual new costs of production and distribution. Consumer prices in Japan rose by as much as 30-35 percent in both 1974 and 1975. Italy's 6 percent rate of inflation in 1972 jumped to an average of 18 percent for 1974 and 1975. The British faced 24 percent inflation in 1974, three times higher than in 1972. France, also, experienced double-digit inflation in 1974 and 1975. Since wage increases rarely matched the rate of inflation, the real wages of workers stagnated or declined, resisting improvement until the mid-1980s.

Excepting Germany, which contained inflation and sustained a favorable balance of trade, economic malaise, characterized by recession and inflation, belabored the industrial world in 1974 and 1975. Many billions of dollars were drained from the oil importing countries by the oil exporting countries. The global value of OPEC's oil exports in 1978 reached the stupendous sum of \$136 billion, compared with \$15 billion in 1970. The European Community contributed 30 percent of this increase, the USA, 22 percent, and Japan, 17 percent. The three, together, paid out \$83 billion more for oil in 1978 than in 1970. Japan's fuel imports consumed 5 percent of gross domestic product in 1975. OPEC received 4 percent of Japan's GDP, OPEC captured 3 percent of the GDP of the EC-9 and 1 percent of US GDP. Money shifted in extraordinary amounts to states with limited spending ability, at least in the short-term. Chapter 8 will discuss the employment of those petrodollars, a portion of which the oil producing countries returned to the industrialized importing nations in the form of investments.

The siphoning from the industrialized states of tens of billions of dollars, most of which languished in savings in 1973 and 1974, contributed to a severe contraction of spending, causing reduced inventories, investment, and production, and spawning high unemployment. These developments, instead of forcing prices down were accompanied by galloping energy and other costs that propelled prices skyward. The term "stagflation" was coined to describe this strange amalgam of industrial recession and inflation.¹⁰

The inflationary pressures directly attributable to huge increases in oil prices terminated in 1975, with stable oil prices holding into 1978. The levels attained by 1975, justifiable in the opinion of OPEC, had intensified inflation and had retarded economic growth. However, as Alnasrawi convincingly argues, OPEC alone cannot be blamed for stagflation. Western economic difficulties, particularly American and British, and widespread import dependence were entirely self-inflicted, exposing the unshielded West and the even more vulnerable oil importing LDCs to the full force of OPEC's prices. The stability of pre-1970 prices ended. The MNOCs, formerly the price managers, were replaced by a cohort of oil producers with widely divergent interests but joined in OPEC. While not the only cause of stagflation, OPEC was the prime mover in 1973-5.¹¹

The embargo and price revolution signaled the final transfer to the leading oil producers of control over their oil industries. The powerful MNOCs, and the larger independents as well, were casualties of a forced structural transformation of the international oil industry. Chapter 8 offers a more elaborate discussion of the transformed functions of the MNOCs. Here several questions are posed that relate to the effects of the energy crisis on the industrialized states and their MNOCs.

Under the regime of the MNOCs, the oil supply of the West seemed assured. After 1973, however, the national companies of producing states encroached upon or assumed the functions of the MNOCs as principal lifters. What role would the MNOCs play in exploration and development? How would their enormous investment potential and technological expertise be utilized? Would they respond to the political risks of Middle Eastern oil operations by withdrawing to more stable, if more costly, oil fields? Producer governments harbored downstream ambitions. How successfully would the producing states penetrate refining and marketing sectors? The MNOCs confronted not only the producing state oil firms but new or revitalized consumer state companies. Importing states exhibited distrustful or skeptical attitudes toward the policies of the MNOCs and demanded that they serve national interests. Did the MNOCs possess sufficient acumen to serve their own interests as well as those of producer and consumer governments?

The crisis of 1973 encouraged government intervention in energy that went beyond the formation of state energy companies. Rising oil prices enhanced the value of other forms of energy. Was it possible for consumer states to loosen the OPEC stranglehold through the substitution of coal, natural gas, nuclear power, or other forms of energy? Did effective fuel substitution require state intervention? Were supply side solutions adequate or was it imperative that the consuming states

shave total energy use by practicing conservation? Were western nations politically capable of responding forcefully and purposefully to the energy challenge, including the possibility of irreversible environmental damage posed by their own voracious appetite for energy?

The coordination of western energy policies

Scarcity of oil in the ground formed no part of the crisis of 1973–5. The producing states contained sufficient reserves to supply global demand into the twenty-first century. The OAPEC embargo caused temporary inconvenience and demonstrated the ability of united producing states to disrupt oil flows. The OPEC price increases were enduring and costly. Cast into oblivion were western assumptions about the security and cost of oil. While the response of the West to the two-pronged assault of the producers varied from state to state, they continued, for the most part, to embrace similar energy objectives.

Critical to each nation was strengthening security of energy supplies. This encompassed relations with traditional suppliers, the foremost of which were the source of current problems, active efforts to exploit domestic energy sources, and the development of new and more secure sources of overseas oil. Dependence upon unstable and/or hostile suppliers could be reduced; the volume of oil imports could be cut. This required either replacement by some other fuel or a diminution of TPER or some combination of both. Diversification of the internal energy mix, earlier recognized in the abstract as desirable, emerged after 1973 as a “new” policy objective. The crisis also thrust into prominence an appreciation, long taken for granted because of plentiful and cheap energy, that the energy sector was vital to national economic stability and growth. Higher costs of energy affected the competitiveness of industries in world markets.¹²

Within OECD this congruence in broad energy policy goals was filtered through and supported or constrained by the political configuration, resource endowment, and current economic strength of each nation. Unique national situations also seriously impaired western cooperative endeavors through such existing institutions as the European Community, expanded to nine states in 1973, OECD, and NATO. National attitudes, egocentrism and jealousies, leaders reflecting the collective limitations of their constituents, all obstructed the formulation of collective responses to protect the developed consumer states from new disruptions of supply or to dull the price power of the producers. The International Energy Agency (IEA) did emerge in 1974 as an autonomous organization housed within OECD, but its usefulness has still to be tested.

The producer campaign gave birth to two cooperative approaches to the western energy dilemma. An aggressive anti-OPEC strategy, reflecting the US proclivity to label OPEC as the author of its economic woes, underlay a US proposal to create an international energy organization among the industrialized importers that would confront producer power with consumer power. Europe and Japan drew back, however, from the adversarial nature of the US initiative. The European states, and France in particular, preferred a conciliatory approach to OPEC and the Arab states. EC envisioned the development of a special relationship with Arab producers, one that would buffer them from the taint of America’s pro-Israel policies and, perhaps, undermine the dominant position of the USA in Iran and Saudi Arabia.¹³

A conference attended by the USA, Canada, Norway, Japan, and the EC states in February 1974 revealed profound disagreements over suitable policies. The USA advocated the application of collective pressure against OPEC and opposed individual national arrangements with the producers that would further weaken the MNOCs. The EC bloc regarded this position as self-serving. France, intensely nationalistic and a welcome host for the virus of anti-Americanism, refused to sign an initial communique and ultimately eschewed membership in IEA. While this diluted the collective influence of EC in IEA, French objections forced the USA to moderate its demands and mute its public expressions of hostility to OPEC. The USA won the adoption of a plan to share oil among IEA members during an oil supply emergency. France seized upon this scheme to justify its refusal to join. In truth, France, jealously guarding a narrow conception of national sovereignty, rarely accepted the lead of any other state. Norway, about to become an oil producer, displayed no enthusiasm for oil sharing and chose a partial rather than full membership in IEA. With an EC–Arab dialogue already in progress, the USA agreed to a non-confrontational approach to OPEC by the new organization. In November 1974, IEA was constituted as a part of OECD. In 1975, IEA met with OPEC and accomplished nothing; thereafter, OPEC ignored IEA.

IEA has played no discernible role in international energy affairs. The oil crisis management system has not been applied. For the most part, IEA functions as an information dispenser and as a voice of persuasion, preaching oil import reduction and advocating realistic domestic energy prices, conservation, fuel switching, nuclear development, and vigorous energy R&D. IEA’s members pledged in 1975, and frequently thereafter, to pursue those goals. They were only honor bound to do so. During the 1980s, the utter indifference of successive American administrations towards IEA’s objectives further obscured its relevance.

EC courted the Arab states but gained little thereby. Neither did the

evolution of the European–Arab discussions into conferences between the EC and the lesser developed nations—the so-called North–South dialogue—produce more than mutual recrimination. The oil producing countries, led by the OPEC states, presumed to speak for the LDCs and defined the agenda to include all natural resources, LDC indebtedness, and economic development. The South's demands, in European eyes, were unreasonable. So acrimonious did the talks become that OPEC, in 1975, threatened to raise prices unless Europe adopted the Arab position, the gist of which would guarantee the commodity prices of exporters, and thus their incomes, and liberalize the extension of credit to LDCs while easing up on debt collection. Meetings continued under UN auspices but the developed and underdeveloped states were unable to reach a consensus. An international treaty was signed in 1982 to regulate the uses of the deep seabed but American, German, and Japanese refusal to sign thwarted implementation.¹⁴

The European Community has been unsuccessful, in the opinions of El-Agraa and Kohl, in fashioning a significant role in international energy decision making. A common energy policy failed to emerge after 1973. Norway, a key North Sea producer, rejected membership in 1973. Britain, the major North Sea oil and gas producer and achieving energy self-sufficiency in 1981, uncovered few reasons to shape its energy policies in conformity with Community wishes. The energy policies of members with significant energy resources and technological strength fostered national rather than collective goals. Members competed rather than cooperated in developing nuclear energy, despite Euratom. Britain and the Netherlands adopted oil and gas production and price policies that aroused the resentment of their Community partners. The oil crisis of 1979 generated mere reiterations of previously announced objectives. Grayson, writing in 1981, doubted that future EC energy initiatives would amount to much.¹⁵ National interests subdued collective energy interests.

Alone among the multi-state energy organizations, OPEC possessed the power to influence events. Of the western energy organizations, the International Atomic Energy Agency (IAEA) appeared to be the most active because of its responsibility to verify the peaceful uses of nuclear materials moving across national boundaries. But the IAEA does not formulate broad energy policies. Policies after 1973, as before, originated with the separate states. Although the developed states shared energy policy objectives, the detailed agenda of any one nation frequently clashed with that of other nations. American price controls on domestic oil encouraged consumption and rising levels of oil imports after 1973, thereby supporting OPEC's high prices. In the view of other OECD members, US price controls damaged their interests.

National responses to the energy crisis

The OECD nations were acutely vulnerable to an oil action by the Persian Gulf and North African producers, the suppliers of 80 percent of OECD-Europe's oil imports, 74 percent of Japan's, and 40 percent of America's (Table 7.2). Prior to 1973, the industrialized states had recognized the implicit danger of heavy oil import dependence (Tables 6.2 and 6.3), but low prices and plentiful oil dissipated any sense of urgency to moderate that dependence. More compelling was the commitment to sustained economic growth. The embargo and price increases shattered assumptions about security and constant economic growth. Continued reliance upon the MNOCs now seemed foolhardy to Europeans and Japanese. The risks attending production ventures in the Middle East and other LDCs became glaringly apparent. Among political goals, the containment of inflation assumed paramountcy. The beguiling lure of nuclear energy, the renewed attractiveness of coal, the production of North Sea oil and gas became critical agenda items in various OECD states. Conservation and renewable energy, even in the short-term more promising sources of energy than the fossil fuels, struggled, mostly unsuccessfully, for a prominent place on the agenda.

In one sphere, that of American foreign policy, American objectives remained constant. America's OECD partners, many also members of NATO or otherwise linked to the USA in military pacts, evidenced a willingness to alter attitudes and policies toward the Soviet bloc and the Arab states. The USA held staunchly to its own truths. From the Nixon Doctrine to the Carter Doctrine, America clung tenaciously to the conviction that the Soviet Union threatened the stability of the Middle East. Nixon's reliance on surrogate powers to stave off the Soviets disintegrated in 1979 when the Shah's power crumbled, while Carter's promise to intervene unilaterally to protect the Persian Gulf was meaningless.¹⁶ American military power and diplomacy proved impotent against implacable Arab hatred of Israel, strident nationalism, and such manifestations of violence and chaos as the Lebanese imbroglio, the Iran–Iraq War, and the West Bank Palestinian rebellion of early 1988. Western oil ventures faced multiple risks in the Middle Eastern tinderbox. It behooved the importing states and their oil companies to reassess the costs of maintaining production in the region.

According to Luciani's calculations, the 10 largest MNOCs (the Seven Sisters plus Amoco, CFP, and Elf) controlled 73 percent of Middle Eastern/North African production in 1972. By 1980, they had direct access to but 47 percent, the bulk of which they received under contract from producing state oil companies. Concomitantly, MNOC ownership of non-Communist world production fell from almost 70 percent in 1973

to under 50 percent by 1980. National firms handled a rising share of production, processing, and marketing. Given the risks inherent in Middle Eastern operations, BP, Gulf, and Elf virtually abandoned the region while RDS cut back sharply the scale of its operations (Table 8.6). The Aramco partners, all US firms, continued to invest in Saudi Arabia, believing it relatively secure and unlikely to proceed arbitrarily against them.¹⁷

The advanced importing states, after 1973, extended their authority over the domestic oil industry. Italy's ENI and France's CFP antedated the energy crisis. In addition, France, in 1976, formed Elf-Aquitaine through an amalgamation of firms. New state companies, Norway's Statoil (1973) and the British National Oil Company (1976) were created to protect national security and assure the state a fair share of the proceeds from North Sea oil production. Both firms were endowed with offshore oil properties, engaged in joint ventures with private firms, and refined and marketed oil. Germany, too, experimented in 1974 with an amorphous sort of national oil company but when it failed to advance German interests it was terminated in 1979. Britain also turned away from state control when the government of Prime Minister Thatcher succeeded in privatizing both BNOG and the British Gas Corporation.¹⁸

To assess the performance of the state owned firms requires identification of their official objectives. Three goals seem paramount: to strengthen the security of oil supply, to gain preferential treatment from producing states, and to reduce substantially MNOG shares of domestic markets. ENI dominated the Italian market only because RDS, BP, and Exxon withdrew. ENI consistently operated at a loss and was dependent upon the MNOGs and the USSR for a large portion of its crude. ENI did not win particular favor from the producing states. French oil companies lost direct access to Middle Eastern oil during the 1970s while dependence upon that region for oil continued unabated. After 1978, revolution and war virtually dried up the flow of oil from Iran and Iraq, forcing French companies to search for supplies in less chaotic areas. The goal of a 50 percent share of the domestic market for state firms was abandoned in 1978. Statoil and BNOG owned safe oil. By most accounts they performed satisfactorily. But did they better serve the national interest than the private firms would have, functioning under a regulatory agency with no hands-on role? Labour created BNOG: Socialists. Statoil. Evaluations of both depend upon the ideological eye of the beholder.¹⁹ French, Italian, and German vulnerability to sudden supply disruptions in the late 1980s remained acute. Britain and Norway enjoy energy self-sufficiency for some finite period of time only because of the North Sea.

For a steady flow of crude, America relied upon its special relation-

ship with Iran and Saudi Arabia and the private firms operating there and in such other producing areas as Latin America, Canada, and Nigeria. European efforts to improve oil security by initiating government to government contacts with Saudi Arabia and Iran yielded little oil above that covered by existing contracts with the Iranian National Oil Company and Saudi Arabia's Petromin. While Aramco in Saudi Arabia, the Iranian Consortium, and the BP-Gulf partnership in Kuwait experienced severe contraction in controlled liftings, these firms continued to receive most of the oil that the Gulf states did not process or market themselves.²⁰

Changes in the location of world energy reserves and centers of world production into the 1980s were insufficiently remarkable to augur a more secure energy future for the industrialized states. The TPER of the USA, Japan, and OECD-Europe declined by 5 percent between 1979 and 1985; global TPER climbed 7 percent. Oil as a proportion of global TPER fell from 46 percent in 1975 to 38 percent in 1985, a reduction reflected in the energy use patterns of the industrialized states (Table 7.1). A commensurate increase in the use of coal, natural gas, nuclear, and hydropower accompanied oil's decline. But this modest alteration hardly justified complacency regarding future fuel supplies in the economically advanced states.

Oil remained the premier fuel. Production in 1985 matched that of 1973. Virtually the same countries in 1985 produced a portion of world oil similar to that of 1973 and earlier (Tables 7.4 and 4.4). New producing areas in the North Sea and Alaska offered but temporary relief. North Sea reserves of 3 billion metric tons (bmt) were a mere seven times greater than annual oil consumption in OECD-Europe. Alaska added 1.4 bmt to US reserves, the equivalent of two years of domestic consumption. Moreover, the declining volume of Middle Eastern and North African production after 1979 reflected conscious policy rather than depleted reserves. OPEC's members sat on more than 60 percent of world reserves in the late 1980s. Middle Eastern states controlled over 50 percent of reserves. This oil is far cheaper to produce than offshore oil or oil from other fields in the western hemisphere.²¹

The oil price advances of 1973-4 and 1979-80 induced a flurry of oil exploration and development ventures in areas other than the Middle East. New oil from the North Sea or Alaska cost anywhere from 15 to 30 times more to produce than Middle Eastern oil, but with prices 60 to 80 times greater than the cost of production, the new oil reaped large profits. Global reserves, however, remained quite stable, rising but 2 or 3 percent from 1973 to 1979 and not at all during the 1980s.

Substantial oil discoveries in Latin America after 1975 added over 7 bmt to regional reserves by 1985. Mexico owned 6 bmt of this increase

and Venezuela, 1 bmt. Mexico elected to accelerate production, lifting 47 mmt more in 1979 than in 1973; Venezuela's production fell by 52 mmt (Table 7.4). Latin American output rose by only 11 mmt over those years and its share of world oil exports remained at about 10 percent.

The most significant long-term trend in world oil production occurred after 1979. Middle Eastern producers substantially reduced output while Britain, Norway, and Mexico raised the volume of their liftings (Table 7.4). OPEC producers husbanded their reserves. Saudi Arabia, with 24 percent of global reserves in 1986, contained 141 years of production at 1986 levels; Britain's North Sea fields, contributing less than 1 percent to world reserves, would last for less than a decade at current withdrawal rates, as would US reserves.²²

Regions considered secure by OECD states yielded only marginal additions to natural gas reserves. US gas reserves continued to fall while no large finds augmented western Europe's reserves. During the 1970s, the USSR and Iran discovered new fields which gave the Soviets some

Table 7.4 World crude oil production, 1973-87 (million metric tons)

	1973	1978	1979	1980	1985	1987
World	2829	3078	3156	3049	2828	2767
USSR	430	568	593	612	607	590
USA	467	441	433	436	455	415
Saudi Arabia*	372	409	488	490	165	231
UK and Norway	2	73	97	108	165	123 ¹
Mexico	27	62	74	98	137	127
China	51	102	108	107	127	134
Iran*	297	264	154	84	114	122
Brunei [†]	15	21	27	25	93	
Venezuela*	171	110	119	110	86	86
Canada	90	67	76	72	79	75
Nigeria*	104	97	117	105	75	64
Iraq*	102	127	176	84	73	102
Indonesia*	68	83	82	80	67	66
United Arab Emirates*	77	93	77	87	59	75
Libya*	110	100	105	93	53	49
Algeria*	56	56	61	58	50	32
Kuwait*	140	96	112	71	48	61
Egypt	8	23	27	30	45	
Above % of World production	91	91	93	90	88	83

* OPEC states

[†] Includes Malaysia

¹ UK only

Sources: De Golyer and MacNaughton, *Twentieth Century Petroleum Statistics 1986*. Dallas, Tex.: De Golyer and MacNaughton (1986), pp. 4-11; Energy Information Administration, *Monthly Energy Review November 1987*. Washington, D.C.: USDOE (1988), pp. 112-13.

35 to 40 percent of global reserves and Iran 20 to 25 percent. Iran contains more natural gas than all of North America, as do the Arab Persian Gulf states. But Middle Eastern gas is of little use to Europe or the USA. Indeed, flaring wastes over 60 percent of the gas produced. Earlier expectations of a large liquefied natural gas trade did not materialize, except to Japan where LNG imports substituted for oil in electric generation. Soviet gas exports to western Europe filled a rising demand.²³

The security of OECD's future supply of oil and natural gas remains problematic, in spite of the reduced rate of energy use achieved since 1979. Since the mid-1970s, OECD states have rapidly depleted their safest sources of oil. Adequate reserves of natural gas exist, particularly in western Europe, but that fuel cannot substitute for oil in road transportation. Coal use has not contributed to a diminution in gas or oil use while nuclear, even under the most favorable conditions imaginable, will not displace fossil fuels in the production of electricity. This suggests that the West did not use to advantage the time gained by its temporary access to secure oil and gas by reducing its reliance on those potentially scarce fuels. As the 1980s ended, the West's energy position remained fragile.

During the 1960s, the dominant position of western MNOCs in the oil fields of the non-Communist world assured, or so the West believed, an uninterrupted supply of energy to the cheapest price. But even while the oil spigot ran freely, not every nation hewed undeviatingly to the cheapness standard. France opened its doors to cheap oil, at the expense of the coal industry, but neither Britain nor Germany could afford simply to abandon coal, their sole domestic source of energy. Various forms of subsidization buffered those large coal industries against the full effects of oil and gas competition, a protection persisting in Britain even as North Sea oil and gas penetrated the domestic market. Simultaneously, the West committed substantial funds to develop nuclear power, despite the absence of accurate cost data and reliable safety procedures. The incongruities characteristic of pre-embargo fuel policies extended into the post-embargo years.

The supply side reaction of the West

Western European nations and the USA (Japan will be treated separately) responded to the price and supply shock of 1973 with policies that I would label as minimally incremental. Each state operated within parameters set by a particular energy endowment and a unique political structure and style. Each aimed to diversify its internal energy mix by

reducing oil imports through the substitution of indigenous forms of energy and/or fuels obtained from producers more reliable than the Arab states. Simultaneously, several European states launched diplomatic initiatives to placate Arab producers and, hopefully, to foster with them a special state-to-state relationship through the medium of national oil companies. The USA relied upon its Persian Gulf security role to maintain the flow of oil from Iran and Saudi Arabia. Soaring oil prices aggravated inflation and worsened trade imbalances. The pricing of energy products posed a complex dilemma: allowing an uninhibited market driven rise in domestic prices risked a political backlash; artificially restricting prices might obstruct energy exploration while encouraging habitual use.

Supply considerations dominated the energy strategies of the USA and western Europe, and Japan as well, from 1973 through 1979. In addition, the governments of the USA, Britain, Italy, and France employed price controls to moderate inflation while Germany permitted oil prices to rise to market levels, necessitating concomitant increases in regulated electricity and natural gas prices. US price regulations prevented product prices from increasing as sharply as they did in western Europe. Most commentators agree that controlled prices in the USA retarded the discovery of new oil and gas, stimulated energy consumption, thereby serving the purposes of OPEC, and excited the hostility of America's OECD partners.²⁴

Of the major OECD members, France acted most directly to curb oil imports. Impelled by security considerations as well as by a high current accounts deficit in 1974, which could not be alleviated by larger exports, France imposed, in 1975, a ceiling on the value of allowable oil imports. Germany, on the other hand, while offering some incentives to improve the efficiency of energy use, essentially allowed home demand to determine the level of oil imports. In contrast to France, Britain, Italy, and the USA, Germany's comprehensive industrial policies encouraged a rapid acceleration of exports, the earnings of which paid the higher cost of oil imports. In Germany, as Ikenberry explains it, energy policy formed an integral part of industrial policy. In America, the crisis produced, in November 1973, the misleading rhetoric of President Nixon's "Project Independence," an impossible scheme to "meet America's energy needs from America's own energy resources" by 1980.²⁵ Thereafter, a hotchpotch of energy legislation achieved little. Most significantly, Presidents Nixon and Ford failed to win legislation to decontrol oil and gas prices and to tax imported oil.²⁶

The volume of oil imports after 1973, displayed in Table 7.5, attests to the success or failure of each nation's effort to reduce oil imports. Note, however, that a reduction of oil imports was not synonymous

Table 7.5 Net national crude oil and product imports, 1973–85 (million metric tons)

	1973	1977	1978	1979	1980	1984	1985
USA	305	432	409	420	337		248
Japan	292	279	270	284	253	217	
OECD-Europe	776	657	648	647	589		413
West Germany*	151	143	144	151	138		95
Britain	117	53	42	26	7	-37	
Italy	131	115	118	123	109	92	
France	130	117	116	126	109	68	

* Gross imports

Sources: De Golyer and MacNaughton, *Twentieth Century Petroleum Statistics*, 1986, Dallas, Tex.; De Golyer and MacNaughton (1986), pp. 60–1; *BP Statistical review of the world oil industry*, issues, 1970–85, *passim*; IEA, *Energy Statistics, 1971–1981*, Paris; OECD/IEA (1983), pp. 311–31, 343–53, 626–38, 1983–1984 (1984), pp. 51–3; IEA, *Energy Balances of OECD Countries, 1970/1982*, Paris; OECD/IEA (1984), pp. 387–9, 404.

with resolution of the energy crisis. Over the period, 1973–7, net American oil imports rose by 38 percent, French imports declined by 13 percent, and German imports fell by 5 percent. Britain's import dependence was dramatically reduced after 1975 when North Sea oil arrived. By 1978, domestic oil filled in excess of one-half of British demand while oil consumption had dropped by 11 percent. Britain achieved self-sufficiency in 1981. TPER dropped more rapidly than in other industrialized nations, not as a consequence of a programmed effort but due rather to a stagnant economy. Both TPER and net import dependence in the USA steadily advanced from 1973 to 1979 (Table 7.1). In Germany, net import dependence remained unchanged through the 1970s while TPER rose modestly, both trends reflecting Germany's willingness to pay for more expensive energy. French TPER also grew, but at a much slower rate than during the 1960s. Import dependence was essentially unchanged because of rising coal and natural gas imports.²⁷ In short, TPER trends reveal no purposeful campaign among the above states to reduce energy use; instead they sought to substitute other fuels for oil. Conservation, from 1973 to 1978, was not identified as an essential new source of energy.

The supply side policies implemented by the industrial states aimed at increasing the use of coal and/or natural gas and expanding nuclear power, objectives not easily accomplished. Resource constraints, institutional structures, environmental concerns, interest group politics, and domestic energy use habits frustrated the fulfillment of energy supply goals, particularly in nations that lacked access to new and plentiful sources of energy.

The role of coal

The large coal industries of Britain and Germany suffered severely from oil competition during the 1960s (Table 6.6). Production in America reached its nadir during the early 1960s and then rebounded. But, the industry was burdened by large overcapacity and, by the early 1970s, was constrained by stiff environmental laws (Table 6.11).

Theoretically, high oil prices enhanced the value of coal as an available and lower cost substitute for oil, and of gas in America, as a boiler fuel in power plants and industry. In the coal producing nations, post-embargo energy plans were partly predicated upon a resurgent coal industry. Projections of electricity consumption through the 1970s optimistically employed as their guide the 6 to 8 percent annual growth rates of the 1960s which, if accurate, would create a demand requiring additional coal and nuclear generation.

In America, the Nixon and Ford administrations counted on vastly increased coal production to reduce oil imports swiftly. Ford called for 250 new coal mines that would add 125 mmt to US coal production which equaled 655 mmt in 1975, already 55 mmt higher than output in 1973. President Carter, in 1977, established the goal of 1 bmt by the 1980s. Not to be outdone, the Economic Commission for Europe, in 1978, anticipated a doubling of US coal production to 1.2 bmt by 1985. Even more incredibly, the World Coal Study (1980) predicted 2 billion short tons by the year 2000.

Somewhat less wild projections for production in Germany and the UK assumed a production in 1980 at least equal to 1973. However, in both countries and in EC as a whole, coal production declined through 1978, rose from 1979 to 1981, and commenced to slip again. Of the numerous factors that precluded achievement of coal production objectives, environmental opposition, infrastructure deterioration of the coal industry, a rash of nuclear plant openings, and falling rates of growth in electricity consumption were telling.²⁸

In Europe and the USA during the 1970s, a body of environmental protection and health and safety laws added substantially to the costs of coal mining and coal use. Federal legislation in Germany regulated coal-burning emissions and water quality. German environmental groups concentrated on nuclear power rather than on coal mining and burning. In contrast, bitter political fights ensued in the USA over legislation designed to prevent and correct abuses of land and water by underground and surface mining. Proposals to regulate strip mining precipitated a battle royal. When finally passed in 1977, despite two previous presidential vetoes, the Surface Mining Control and Reclamation Act

increased the cost of producing the low sulfur coals of America's western mines. Similar struggles erupted over efforts to reduce the emission of various solid and gaseous pollutants during coal combustion. Emission control laws doubled the time consumed in siting and constructing a coal-fired power plant. Other laws mandated the application of state-of-the-art anti-pollution equipment. This legislation added to the cost of construction. Environmental objections, including heightened concern over acid rain, clashed with the equally compelling need to prohibit or strictly limit the production of electricity by natural gas and oil.

Necessary environmental laws were constantly subjected to the oblique assault of governments committed to increased energy production as the solution to the energy crisis. The German government and the Nixon and Ford administrations in America resisted the imposition of stricter environmental standards and sought to dilute existing rules. President Reagan undermined environmental defenses, virtually nullifying, for instance, the effectiveness of the strip mining law. The Reagan, Thatcher, and Kohl governments denied responsibility for the export of and damage caused by acid rain. Also, those leaders ardently supported nuclear power.²⁹

The coal industry of Great Britain declined precipitously after 1955

Table 7.6 Coal production in world and selected nations, 1973–86 (million metric tons)

	1973	1977	1980	1982	1984	1985	1986
World	3029		3733	3903	4113	4359	4399
USA	599	697	753	838	896	886	807
UK	130	106	130	125	51	105	104
West Germany	222	215	225	224	212	210	201
USSR	615	665 ¹	653	647	642	647	670
East Germany*	246		258	276	296	312	315
Poland	195	234	230	210	243	250	255
China [†]	398	550	620	641	789	845	873
Australia	88		105	128	138	156	169
India	81		114	136	153	158	168
South Africa	62		116	144	163	174	181

* Brown coal only

[†] Hard coal only

¹ 1978

Sources: W.A. Rosenbaum, *Energy, Politics, and Public Policy*, 2nd edn, Washington, D.C.: CQ Press (1987), pp. 166–7; *BP Statistical Review of World Energy*, issues, 1970–86; IEA, *Energy Statistics, 1971–1981*, Paris: OECD/IEA (1983), pp. 332–52, 643–8, 1983–1984 (1984), pp. 54–6; IEA, *Coal Information 1985*, Paris: OECD/IEA (1985), pp. 48, 432–3 and 1987 (1987), pp. 53–4.

(Tables 4.4 and 7.6). In Germany, a steeper fall was prevented by increased coal use in electric generation. Rising electric generation in America fostered a revival of the coal industry. The coal industries of Britain and Germany, however, were plagued by great overcapacity and only maintained by government subventions.

Electric power plants in Europe consumed about two-thirds of total coal production, and in the USA above 80 percent. Coal industries had received niggardly capital inputs during the 1960s. Archaic plant, hostile miner unions, deteriorating transport and, in the USA, outdated deep sea coal ports obstructed coal industry exploitation of the tantalizing market opportunities created by the energy crisis. Britain, in 1974, announced a £600 million investment plan for coal, but by 1982, coal output fell short of the 1973 figure and slid again in 1985. In Britain especially, but in Germany and France as well, the coal industry suffered from decisions made in the 1960s to shift from coal to oil and gas as power plant boiler fuels and to nuclear plants. Apparently shut off from power markets, coal companies and coal governing boards laid no plans to expand or modernize during the 1970s. Reversing this proved impossible. German coal production exceeded 210 mmt only because electric rate payers helped pay for utility coal use and because the utilities earned subsidies when they agreed to burn a stipulated tonnage over a number of years. Increased imports, not greater local production, satisfied expanded coal demand in Europe.³⁰

The great coal bonanza anticipated in 1973 never materialized in Europe and appeared to have run its course in America by 1984. Sharply falling oil prices after 1985 and heightened concern about the environmental impact of coal burning dimmed the economic luster of coal. Rising production in the USA was solely the consequence of the electric industry shift from oil and gas to coal, a process beginning during the 1950s and accelerating after 1973 — by 1985, electric plants consumed 85 percent of US coal output. The inability of Europe's coal industries to fill demand encouraged a modestly expanded international coal trade after 1973. But World Coal Study projections for substantial increases in the coal trade during the 1980s were very inaccurate. America hardly needed a 2 bmt output to fill foreign orders that peaked in 1981 at over 100 mmt and dropped to 80 mmt by 1986. Total world coal exports accounted for but 9 percent of world production. Ten nations, led by the USA, Australia, Poland, Russia, and South Africa provided more than 95 percent of all exports. Japan purchased the largest share of imported coal. Coal imports of EC countries amounted to over 70 mmt annually during the early 1980s, a small volume but reflecting the failure of European coal industries to satisfy demand. American and South African coal undersold British coal in Europe, and in Britain as well.³¹

Turning toward natural gas

Natural gas offered OECD-Europe an efficient replacement for coal and oil in such uses as space heating and cooking and industrial heat processes. From 1970 through 1985, natural gas provided a rising proportion of TPER (Table 7.1). Growth in France, Germany, and Italy matched that of OECD-Europe. For the Netherlands, with its domestic gas fields, the share of gas in TPER fluctuated around 50 percent from 1975 into the mid-1980s. North Sea gas permitted the UK to expand gas use from 5 percent of TPER in 1970 to 24 percent in 1985. While gas use rose in Europe, it declined in the USA (Table 7.1). Natural gas reserves depleted during the late 1970s were not restored thereafter. Supply problems intensified after 1969, reaching crisis proportions in some areas by 1979 and necessitating the curtailment of gas supply to some users and the prohibition of new gas hookups.

Natural gas exports from Holland's Groningen field commenced during the 1960s. With the discovery of North Sea gas, new supplies became available to Europeans. Such was the rise in gas consumption in western Europe — 74 billion cubic meters (bcm) in 1970 and 230 bcm* in 1985 — that imports from the USSR and Algeria grew in importance after the mid-1970s. The international gas trade centered in western Europe which received 52 percent of world imports. Japan and the USA, each receiving a comparable volume, accounted for another 30 percent. The USSR, Netherlands, and Norway shared 68 percent of world exports.³²

During the 1970s and early 1980s, natural gas prices lagged behind oil prices so that gas competed favorably against a range of energy alternatives. Because of price controls, this held true in the USA as well, but scarcity ruled out an augmented role for natural gas. Each western European nation sought to increase the share of natural gas in its energy mix. Ideological preferences determined the structures that evolved to produce, transmit, and distribute the fuel. The North Sea producers delegated authority to administer gas production and transmission to national firms which operated through contracts with MNOCs. Phillips Petroleum operated oil and gas terminals for Statoil while a joint venture between RDS, Esso, and the Dutch government performed those functions. Gaz de France and Italy's ENI controlled their domestic markets. MNOCs dominated the German gas industry. RDS and Esso owned large shares in Ruhrgas, the giant gas utility which distributed 67 percent of domestic gas requirements. Ruhrgas, Thysingas, and other German utilities negotiated directly with Gasunie of

* Roughly 200 million metric tons oil equivalent.

Holland and Statoil regarding volume, prices, and duration of contract.

In the early 1970s, the British decision to prohibit exports of natural gas and the Dutch decision to conserve its gas fields and not to renew old contracts or let new ones diminished potential supply. Importers such as Germany, France, and Italy seeking gas as a substitute for oil, increasingly turned to the USSR and to North Africa. Only in 1981, in response to falling government revenues, did the Dutch reverse their export policy and initiate a search for new North Sea gas. By 1981, Soviet and North African gas provided about 30 percent of French imports. Soviet natural gas composed 30 percent of German natural gas imports and, by 1990, might exceed 50 percent. Russian gas provided one-third of total Italian gas consumption and may rise to 40 percent by 1990. By the mid-1980s, Soviet gas was a better bargain than Dutch or Norwegian gas.³³

Soviet gas rode a rising tide and North African an ebb tide in western Europe.³⁴ Europeans considered the Soviets a reliable supplier of reasonably priced gas. Algeria's persistent efforts to reopen negotiations on the price of committed gas and even to unilaterally abrogate contracts earned for it a reputation of unreliability. With Soviet gas available and Holland once again an active gas merchant, Europeans turned away from LNG, a very expensive fuel and dangerous to transport and handle.³⁵

US natural gas production and reserves each declined by about 25 percent from 1972 to 1985. Vietor and the contributors to the Goodwin volume identify federal and state price controls as the culprit. But fears of monopolistic pricing by gas producers, often subsidiaries of the major oil companies, and the large pipeline companies thwarted full federal deregulation until the 1980s. Obtaining gas from Canada, Mexico, and Algeria proved difficult. Each producer demanded the most lucrative deal. Negotiations with Algeria were abrogated between 1979 and 1981 because of Algeria's price demands. Similarly, in 1978 and 1979, disagreements over price prompted the USA to break off talks with Mexico. Under the best of circumstances, those sources could fill but an infinitesimal portion of domestic gas demand. Adjustments in gas use, however, did augment the gas available to residential and commercial users and to certain industries. Federal laws promoted nuclear power and conversion of electric plants from oil and gas to coal while prohibiting, in 1978, the use of gas as a boiler fuel in industry. As a result, power plant consumption of natural gas remained stable at 17 percent of gas production after 1973. In contrast, electric power in Japan took 57 percent of supply in 1985. American industries reduced their gas use, consuming 43 percent in 1985, compared with one-half in 1973, amounting to a 4 billion cubic feet cutback.³⁶

From 1973 through 1979, US gas use declined by 8 percent; from 1979 through 1985, as deregulation took effect and prices rose, gas use declined by 6 percent. This diminution seemed more the consequence of economic slowdown, doubts regarding adequate supplies, and, after 1985, cheaper oil than a product of federal policies. Since 1979, savings have been no more substantial than before 1979. Estimated reserves continued to decline despite higher prices.

Significant relief from reliance upon foreign oil, the centerpiece of post-embargo energy policy, required: the discovery of large domestic oil and/or gas reserves; a vast expansion of coal use; significant additions of nuclear power; the commercial development of renewable forms of energy; conservation. Domestically owned oil and gas carried Britain to energy self-sufficiency by 1975. Substituting gas for oil reduced Holland's net energy imports from 78 percent of TPER in 1968 to under 10 after 1975.³⁷ Germany, France, Italy, and the USA lacked the domestic fossil fuels necessary for massive fuel substitution. In Germany and the USA, strong environmental interest groups slowed the rush to coal. Among available domestic resources, nuclear power beckoned in 1973 as the fastest way to reduce fossil fuel use in the power industry.

Nuclear power, a Faustian bargain?

The ebullient mood of nuclear power adherents turned sour during the 1970s while the role projected for the technology in 1973 fell far short of expectations. In 1973, OECD predicted an installed nuclear capacity for all members of 500 GW* by 1985 and 1,000 GW by 1990. In 1983, the capacity of operating plants within OECD equaled 142 GW with 169 GW ordered or under construction. Although well below OECD projections, a total capacity of 311 GW, if those in process came on line, represented a significant productive capacity (see Table 6.5). However, only part of the 169 GW in process materialized.

In the USA, the utilities canceled 116 nuclear plants with a capacity of 130 GW between 1970 and 1984 while no new orders were announced after 1979. Between 1975 and 1987, Germany ordered only two nuclear plants and suspended construction on eight others. From 1967 to 1978, Britain ordered no new reactors but then ordered five in 1980. Between 1978 and 1987, Austria, Sweden, Denmark, Italy, and Holland abandoned the nuclear alternative. In 1970, Italy laid plans for 100 plants; in 1988, two of the three plants built were shut down. Switzerland, in

*GW = Gigawatt = 10,000,000,000 watts.

1988, elected to phase out the technology. Of the industrialized powers, only France and the Soviet Union (even after the Chernobyl disaster of April 26, 1986) evinced an unswerving dedication to nuclear energy.

As of 1986, nuclear power provided some 11 percent of TPER in OECD and generated 28 percent of electricity. In the USA, those figures were, respectively, 6 and 16 percent. France, by 1988, derived over 70 percent of electricity from some fifty nuclear power plants, and Belgium over 60 percent. Switzerland and Germany depended upon nuclear for about one-third of electric output, the UK about one-fifth. With the exception of France, these 1986 figures reflect very slow growth since the late 1970s.³⁸

Within a decade, then, nuclear power ceased to be a viable option in America and much of western Europe. The extravagant promises of the nuclear industry and its powerful government supporters were buried under the realities of cost inflation and justifiable uncertainty regarding the safety of the technology.

"Two, four, six, eight, we don't want to radiate," chanted the anti-nuclear throng gathered on the Mall in Washington, DC, in 1978. One hundred thousand demonstrators crowded into Bonn in 1980 to protest against nuclear technology. Much had gone awry for the nuclear industry. Prior to the embargo, the cost of nuclear plants escalated to mind-boggling heights. Electric utilities, especially in the USA, risked their financial health by encumbering themselves with such capital obligations. In the USA, as Table 7.7 indicates, final costs greatly exceeded initial cost estimates. Plants finished during the late 1980s will be burdened by cost overruns of 500 to 1,000 percent. If these plants generate, ratepayers will shoulder the final costs.

A recent mass mailing by the US Council for Energy Awareness, a nuclear advocacy organization, alleged that "... *right now, extremists are working in over a dozen states and in Congress to shut down all the nuclear power plants in America.*" The nuclear industry in America blames cost overruns on the regulatory stranglehold of the federal government and on uninformed and ideologically driven radicals who dominate the environmental movement and command a broad constituency within a general public ignorant of the true facts. This self-justifying stance contains a mite of truth. In the USA, Germany, and elsewhere some of the more vociferous opponents of nuclear energy are simply anti-technology and/or dedicated to restructuring thoroughly the social order. But, it seems fair to say, most Americans and western Europeans are comfortable with and receptive to advanced technologies. Nuclear technology, however, makes their gorge rise. While experts endlessly debate the cost competitiveness of nuclear versus coal generated electricity and arrive at diametrically opposed conclusions,

Table 7.7 Nuclear plant cost inflation in USA (\$ million)

	Projected cost	Actual cost
Diablo Canyon, Calif.	450	4400
Shoreham, N.Y.*	241	4000
Marble Hill, Ind.*	1400	7000
Midland, Mich.	267	4400
Seabrook, N.H.	973	5800
Trojan, Ore.	235	4600
Grand Gulf, Miss.	300	2800

* Abandoned or non-operative

Source: *Time*, February 13, 1984, pp. 34-42.

a large segment of the general public deems the technology too risky and associates it with the proliferation of nuclear weapons.³⁹

That such negative attitudes, as measured in numerous public opinion polls, attained their current political effectiveness can be partially attributed to the disingenuousness of industry and government spokespersons since the birth of the industry. Despite a history of frequent plant accidents and shutdowns, including the near reactor meltdown at Three Mile Island in America in March 1979 and the fearsome reactor explosion at Chernobyl in the Soviet Ukraine in April 1986, reactor manufacturers and governments deny the dangers implicit in this technology. The US Council for Energy Awareness, in 1988, insisted that "nuclear energy is a safe, clean way to generate electricity." The Council assured Americans that nuclear plants "have a whole series of multiple backup safety systems to prevent accidents." Yet studies in America, Sweden, and Germany in 1987 estimated at 70 percent the probability of an accident such as Chernobyl occurring within the next five or six years.⁴⁰

Equally erosive of the nuclear cause are the unresolved problems of nuclear waste disposal and the decommissioning of aged plants. The cost of burying an abandoned plant could equal the original cost. What will be done with irradiated material that remains lethal for thousands of years? The states of the federal republics of Germany and the USA have forcefully resisted the deposit of nuclear wastes within their territories. States, communities, and private groups have rendered ineffective national laws designed to locate waste disposal sites. "Put it somewhere else, not in my backyard" expressed the attitude of those dwelling in proximity to possible nuclear waste dumps. Faced with cost escalation, public fears of nuclear accidents, irresolution regarding waste disposal, and lower than predicted rates of growth in electricity demand, it is not surprising that nations in Europe and the utilities in America withdrew from the market for nuclear plants. A General

Electric official conceded in 1988 "that the domestic nuclear market for new plants has disappeared, with no hope of return in the foreseeable future."⁴¹

France persists as a world leader in nuclear technology, particularly the fast breeder reactor. Anti-nuclear opposition in France is ineffectual due to a highly centralized governmental structure comfortably insulated from such dissent. The Conservative Party in Britain and the Christian Democratic Union in Germany, victorious in elections in 1987, reaffirmed their commitment to nuclear power. In both nations, the opposition advocated the abandonment of the technology. Prime Minister Thatcher's government announced a twenty-five-year program of nuclear and coal-fired power plant construction estimated to cost £70 to £100 billion. Thatcher and Chancellor Kohl regard nuclear as indispensable to future economic growth, and both hope to capitalize on this revival through overseas sales of reactors.⁴²

Central to the success of these programs are the development of reliable waste disposal methods and the safety of a new generation of reactors. Britain, Germany, and France are gambling on a future technological quick-fix.

In spring 1987, British newspapers reported a much higher incidence of leukemia among children living near nuclear reactors than among children living at a distance. If the causal nexus is corroborated, does the need for power outweigh such a clear and present danger? Some argue that achieving the greater good of the many justifies the occasional suffering of the few. They embrace the "Faustian bargain." Many people had, by 1988, rejected a Faustian bargain with the technology. Chernobyl warned that a nuclear mishap spread suffering among more than a few and among people far removed from the site.⁴³

Nuclear power has not emerged as the dominant source of energy in the western world. Those nations now retreating from the technology cannot be applauded for a wise choice. While rejecting nuclear for the moment, few nations have made provisions for alternatives to fossil fuels.

Conservation, a low priority

The leading industrial states have cavalierly ignored the most obvious new source of non-polluting, reliable, and safe energy, that derived from using less—conservation. A second source, equally untapped, is renewable energy: solar, water, biomass, the wind. Writing of West Germany, Lucas opines that "to say that support for renewable energy . . . is lukewarm would be something of an exaggeration."⁴⁴ Considered

exotic, few nations supported the research and development necessary to derive even marginal value from conservation or renewables.⁴⁵

Between 1973 and 1979, western Europe and the USA focused attention on increasing the supply of energy and on substituting other fuels for oil. TPER in the USA rose uninhibitedly. Americans used an additional 174 million metric tons oil equivalent (mmtoe) during those years, or just under half of total Japanese TPER in 1979 (Table 7.1). Equally damaging, the USA became even more dependent upon foreign oil. OECD-Europe compiled an only slightly better record. Europeans used more energy in 1979 than in 1973, but did reduce net oil imports by 16 percent (Table 7.5). More effective conservation occurred after the second price shock in 1979. Thereafter, prices, aided by policies, worked to reduce energy use and improve efficiency of use, at least until 1984 when tumbling oil prices sparked a renewed upward march of energy consumption. In 1985, US and OECD-Europe TPER surpassed that of 1973.

Shifting to indigenous energy reserves reduced western European net energy import dependence after 1973 and, in America, after 1979 (Table 7.1). In Europe, natural gas and nuclear power, and in America, coal and nuclear power, substituted for oil. Europe's conversion to natural gas entailed risks even if local resources were well-husbanded. Switching from oil to gas, both purchased from foreign suppliers, at best temporarily alleviated the supply problem.⁴⁶

Laws in the USA mandating slower driving speeds (changed to a higher speed in 1987) and improved gas mileage for automobiles (made less effective by President Reagan) provide some evidence for those who claim success for energy conservation. Proof abounds that industry adopted energy saving techniques. In the USA—and in western Europe and Japan—one unit of GDP required less energy to produce in 1980 than in 1973 (Table 7.8). The improved gasoline efficiency of new cars after 1973 moderated American oil consumption into the 1980s. But, in both Europe and America, bigger and more powerful cars reappeared after 1986. Automobile advertisements no longer emphasized better gas mileage.⁴⁷

Economic stagnation reduced energy use in Britain. Investment in conservation fell far short of investment in the North Sea, nuclear power, and coal mines. Investment in R&D for conservation and renewables totaled £9 million in 1980–1 compared with at least £346 million in all other energy industries. The German Ministry of Economics proposed a conservation program in 1974 but it was rejected as detrimental to economic growth. Rising prices served as the sole conservationist weapon. The federal and state governments offered limited financial incentives to improve the energy efficiency of buildings, but

Table 7.8 US dollars of GDP produced per energy input, 1970-86*

	1970	1973	1980	1984	1985	1986 ¹
USA	1227	1266	1418	1602	1693	1747
Japan	2386	2391	2902	3272	3440	3455
Germany	2618	2610	2980	3196	3243	3285
UK	2136	2261	2653	2924	2905	2922
France	3038	2998	3378	3582	3572	3499
Italy	2528	2472	2805	2960	2937	3010
OECD-Europe	2581	2552	2849	3038	3059	3088

* GDP divided by TPER (mtoc)

¹ EstimatedSources: IEA, *Energy Balances of OECD Countries, 1983-84*, Paris: OECD/IEA, *passim*; IEA, *Coal Information 1987*, Paris: OECD/IEA (1987), *passim*.

reducing speed limits and increasing the fuel performance of autos were unachievable due to opposition from drivers and auto manufacturers. Increased supplies remained the central objective of the government. In 1980-1, the German coal industry received DM15 billion in federal subsidies; conservation schemes received about DM1 billion in each year, 1978-82. In 1977 and 1978, the French government rejected a series of broad conservation proposals, but the Iranian Revolution compelled some rethinking and the acceptance of some measures. Still, French subsidies to an uneconomic coal industry exceeded investments in conservation by four times. In the absence of broad and effective conservation measures, it is no wonder that energy use in western Europe climbed as energy prices fell after 1984.⁴⁸

Price regulation in the USA held energy prices below world market levels, thus encouraging energy use and partly negating the effects of conservation measures applied to private transportation. Rising prices in Europe inhibited increased energy use but were unaccompanied by government incentives to save energy. Consumers in America and Europe adjusted rapidly to the higher prices and failed to discard old energy use habits. Energy intensive industries responded more permanently to higher prices, learning to produce more without added energy inputs. Industry led the way as the price crunch of 1979 catalyzed a more dynamic conservationist thrust. But, prior to that watershed event, neither Americans nor Europeans imbibed a conservationist élan.

Japan and the first energy shock

Japan, with the poorest energy endowment and the highest import dependence of the industrialized states, responded quickly and pointedly

Table 7.9 Total energy import bill, 1970-87 (\$ billion)

	USA	Japan	EEC
1970	3	3	10
1973	8		
1975	27	24	56
1976	33	29	67
1977	44	29	71
1978	44	41	112
1979	65	64	162
1980	87	65	153
1985	56	43	124
1986	40	37	94
1987	44		

Sources: UN, *1983 International Trade Statistics Yearbook, vol. 1. Trade by Country*, New York: UN (1985), pp. 1086-7; OECD, *Foreign Trade by Commodities. Imports. vol. 2. 1985 and 1986*, Paris: OECD (1986), p. 146; Energy Information Administration, *Monthly Energy Review November 1987*, Washington, D.C.: USDOE (1988), p. 13.

to the price increases and supply disruptions of 1973-4. Even before that crisis, the Japanese government devised strategies to improve energy security. Mentioned earlier were efforts to bring more oil and other natural resources under Japanese control, reduce dependence upon MNOCs, and diversify the sources of oil imports by investing in non-Middle Eastern oil fields. Tables 6.2, 6.3, and 7.2 suggest only limited success in achieving those goals both before and after 1973.

The oil price increases terminated more than a decade of export-led economic growth and exacerbated prior inflationary trends. To pay for energy imports, Japan gave up some 6 percent of GDP during both the first and second energy crises, compared with about 2 percent for the USA and 3 percent for West Germany. Table 7.9 presents the cost of energy imports in current dollars. As a proportion of the entire import bill, energy imports in Japan reached 46 percent in 1980 and 34 percent in the USA. For the latter, an energy import bill of \$87 billion produced a trade deficit of \$24 billion; for Japan, energy imports caused a deficit of \$11 billion.⁴⁹

To combat this debilitating trend, the USA did little until 1979. Japan acted first to contain inflation and, then, to address the energy dilemma by improving energy use efficiency, de-emphasizing energy intensive industries, diversifying the sources of oil, and reducing the role of oil in the energy mix. While unmitigated success escaped them, the Japanese had something to show for their efforts by 1979.⁵⁰

Inflation, already approaching 15 percent before the oil crisis, jumped to about 30 percent in 1974 and 1975. Targeting inflation as the most pressing threat, the government curtailed monetary growth, reduced spending, imposed lower wage settlements on labor, and inveighed

against high interest rates. Inflation fell to under 10 percent by 1977 at the cost of slower rates of economic growth. Industrial policies paralleled fiscal policies. Like Germany, Japanese economic growth was export-led. The energy crisis weakened such heavy industries as iron and steel and petrochemicals, currently facing stiff competition from such places as South Korea. Rather swiftly, Japan shifted its industrial focus from high energy intensive industries to less resource intensive and higher technology intensive industries. Along with Germany, Japan re-energized its quest for international markets, counting on larger earnings from exports of electrical equipment and lightweight, fuel efficient cars, as examples, to pay the added cost of imported fuels. Favored industries benefited from government research support; the nuclear industry was most favored.⁵¹

Japan's energy-specific policies employed conservation, particularly after 1979, and technological change to reduce overall energy consumption and lower oil imports. The substitution of nuclear power and liquefied natural gas (LNG) for oil received high priority. As in the USA and Germany, Japan prohibited new orders for oil-fired electric plants. Fiscal incentives were employed to encourage industry to conserve energy. But, as with Germany, the Japanese government manifest reluctance to deal rigorously with consumption in the private transportation and residential-commercial sectors. As auto use increased, so, too, did gasoline consumption. Residential-commercial energy use marched ahead until 1980. Between 1973 and 1980, Japanese electricity production advanced by 23 percent while consumption in the residential-commercial sector rose by 50 percent, spurred on by the sale of air conditioners and domestic appliances. Shibata considers Japanese energy policies cautious and unimaginative.⁵²

Greater attention was directed toward assuring supply than at conserving energy. Efforts to achieve greater control over oil through the medium of Japanese oil companies were no more rewarding than in earlier years. Table 7.2 indicates a somewhat diminished reliance upon Middle Eastern oil, but 64 percent from that region—40 percent from the Arab producers—confirms persisting vulnerability. Imports of Japanese developed crude never exceeded 10 percent from 1970 to 1985. Indeed, Japan's oil supply became less secure. In 1972, eight major oil companies delivered 75 percent of total imports. During the next decade, the MNOCs were replaced as the dominant suppliers, but by producing governments rather than by Japanese firms. By 1982, producing governments provided 47 percent of imports compared with 41 percent for the MNOCs.

A trade agreement with China in 1978 in which Japanese technology was exchanged for oil and coal provided little of either and resulted in

the cancellation of contracts in 1981. In 1985, China provided about 7 percent of Japanese oil imports. Investments there, however, and in Malaysia as well, may bear fruit in the future, as does participation in Indonesian energy development.⁵³

Greater quantitative success has been achieved in replacing coal- and oil-fired power plants with nuclear and LNG. Despite LNG's very high cost, Japan imports a large volume because it is environmentally acceptable. While the number of gas customers has expanded rapidly, power plants consume some 75 percent of LNG. Coal is environmentally unacceptable; oil can no longer be burned in power plants. Japan contains very little natural gas. Thus, Tokyo Electric Power has entered long-term contracts for LNG from Alaska, Brunei and Indonesia, Abu Dhabi, and Malaysia. LNG provided 5 percent of TPER in 1979 and 10 percent in 1985 (Table 7.1). It provides over 20 percent of electric power. Nuclear provides 21 percent (Table 6.5; see Table 7.1).

Indifference to conservation meant that only LNG and nuclear power were available to meet the demand for household energy and for electric power. As an earlier section emphasized, the costs of and risks attending nuclear power were substantial. Despite awareness of such disadvantages, Japan developed a fully self-sufficient nuclear complex, complete with the domestic manufacture of all components, fuel reprocessing, and a breeder reactor. Whereas ninety-seven contracts in the USA were canceled after 1975, thirty new Japanese reactors were planned or under construction at the end of 1986, with a total capacity larger than that on-line in 1986. By 1984, nuclear generation produced 63 percent more electricity than in 1980, meeting some five-sevenths of the increased electric demand over that period.

The industry and its government sponsors confront, however, ardent political opposition from both socialists and environmental groups, linked in a configuration similar to the anti-nuclear movement in Germany. Operating reactors, numbering thirty-four in 1986, concentrated in such densely populated areas as Tokyo-Yokohama and Osaka-Kyoto. Few Japanese were far removed from a reactor; few reactors were far removed from an earthquake fault. Stringent construction and safety regulations have prevented a Three Mile Island-type accident. Frequent shutdowns, however, plagued the industry. As in America and Europe, no long-term plans have been formulated for the secure storage of nuclear wastes. Information emanating from nuclear officialdom glibly overlooked the waste problem.⁵⁴

Energy consumption in Japan rose from 1973 through 1979, fell from 1979 to 1982, and renewed its upward movement thereafter. However, oil consumption and oil imports fell (Table 7.5). Energy use efficiency in Japanese industry registered impressive advances. In 1980, the

petrochemical industry consumed 84 percent of the energy burned per unit of output in 1973; steel consumed 43 percent. Other industries ranged between those two marks.⁵⁵ The data in Table 7.8 attests to the superior performance of Japan.

Despite the progressive record, Japan remains highly dependent upon Middle Eastern oil. Diversifying the fuel mix by substituting LNG required the acceptance of high costs and acknowledged dangers in transporting and processing the volatile fuel. Nuclear plants produce electricity at lower costs than LNG and other fuels. But the long-term viability of nuclear power remains clouded. From the embargo through 1979, *per capita* consumption of energy in Japan rose slightly while TPER registered an 11 percent gain. The Iranian price shock induced a modest reduction of 9 percent through 1982. By 1985, TPER was again 10 percent above that of 1973 (Table 7.1).

Constraints on energy policy formulation

The energy crisis of 1973-4 only temporarily disrupted the flow of oil to the industrialized democracies. World crude output dipped by 5 percent from 1974 to 1975 and then rose by 11 percent between 1975 and 1980. Although OPEC's production stabilized after 1975, output from Saudi Arabia and the North Sea added 131 mmt to available supply between 1973 and 1980. Oil was available (Table 7.4).

Immediate and lasting consequences attended the oil price increases (Table 7.3). Throughout OECD, annual rates of economic growth slowed and even became negative in 1974 and 1975, the annual rate of inflation climbed, along with unemployment, and, with the exception of West Germany, balance of payments deficits accumulated. By 1978, none of the OECD states had recaptured the growth position of 1972-3. The Iranian price shock occasioned renewed disarray, but markedly less so in Japan and Germany than in the USA, Britain, Italy, or France.⁵⁶

Not surprisingly, political constraints and ideological predilections shaped the policy responses of the industrialized democracies to the supply and price squeeze. Each of the governments, its leadership vulnerable to the ebb and flow of electoral results, marched to the tune of influential constituencies peculiar to each country.

Motorists and household consumers of electricity and gas cast many votes. The USA, Germany, Italy, France, Britain, and Japan cushioned those interests against the full force of surging oil prices. The posted price of crude advanced by 680 percent from 1973 to 1979; retail gasoline prices in Germany rose by 32 percent; in USA, by 115 percent; in

France, by 138 percent; and in the UK, by 226 percent (Table 7.3). The tax portion of retail prices in the USA changed scarcely at all. French, British, and Italian gasoline taxes were raised but at a rate much below the rise in posted prices.⁵⁷ Treating drivers and householders tenderly undoubtedly salvaged votes but such expedient politics also dampened the conservationist effects of rising prices.

Political fragmentation in Italy and America precluded the formulation of a workable energy policy. Italy scrapped its ill-conceived nuclear program without devising a viable alternative. In Britain, Labour governments relied on state companies to manage North Sea energy development, but dealt irresolutely with nuclear power. Prime Minister Thatcher's regime privatized the state oil and gas companies and, while planning to sell the assets of the Central Electricity Generating Board by 1991 and British Coal by 1993, firmly committed Britain to a nuclear future. The ideological incantations of left, center, and right in France were suffused by nationalistic emotions. The abandonment of NATO, the articulation of a pro-Arab-anti-Zionist position, dialogues with the Arabs, the rejection of IEA membership, refusal to accept nuclear non-proliferation accords reflected a pervasive nationalism, personified in the memory of Charles de Gaulle. France's nuclear complex and her *force de frappe* of nuclear weapons are displayed as triumphs of autonomy. Thus, the Socialist government of 1981, owing some part of its electoral success to its anti-nuclear promises, adopted the essence of its opponent's nuclear program. The rhetoric of German center-right governments expressed an unabashed devotion to free enterprise and market driven solutions to the energy crisis. In fact, Germany relied heavily on the policies and cooperation of powerful cartel-like utility combines and the central commercial banks. Federal and state governments, in America as well, regulated, subsidized, and otherwise intruded in energy affairs. Lucas perceives the "great firms as the initiators of policy" in Germany.⁵⁸ Understandably, they focused on nuclear development and other supply side solutions.⁵⁹

The USA lacks a center of power and never was this more true than during the 1970s. Powerful and diverse constituencies competed for political preference and economic gain. People and organizations blended into myriad interest groups. Their common refrain demanded government intervention on their behalf while opposing, in the name of free enterprise, government favoritism toward other groups. Presidents Nixon, Ford, and Carter, successively, occupied the White House between 1973 and 1980. None succeeded in wringing approval for their comprehensive energy plans from the thoroughly Balkanized Congress.

Prior to the Iranian crisis, the USA may well deserve the lowest

grade for its energy policy response, but the marks of its OECD partners were not much better. The USA proved unwilling to plug the dike against oil imports which, in 1979, were 100 mmt greater than in 1973. The non-producing OECD states maintained their imports at a stable level after 1973 (Table 7.5). Just as elements within the US government blamed OPEC, Germany, and Japan for American balance of payments difficulties, so did the larger OECD states attribute economic instability and high oil prices to American oil imports. The Iranian crisis impelled the USA to cooperate with Japan and the EC nations in jointly reducing oil imports. A scheme to that effect was announced at the Bonn and Tokyo summit meetings of 1978 and 1979 and reconfirmed at the Venice meeting in 1980. Even before those meetings, President Carter labored to win congressional approval for the deregulation of oil and natural gas prices.⁶⁰

Assigning the scapegoat role to the USA was as unjustifiable as it was for the USA to reproach Germany and Japan for America's industrial weakness. Each industrial state applied supply side solutions to the crisis. Indeed, the USA adopted more diverse and stringent conservation measures than its critics. To be sure, other measures, particularly price controls, canceled out the full effects of the conservation laws. Guilty of indifference to conservation and the use of renewable energy, the USA and its allies pushed full steam ahead to discover new sources of oil and to expand nuclear power. But, America's pluralistic politics and the federal system permitted a robust anti-nuclear coalition to block expansion even as consumer interests obstructed the abandonment of controlled oil prices and defeated efforts to raise taxes on imported oil. Political fragmentation and executive weakness stifled efforts by Carter to pull together a broadly based constituency favoring conservation. The governments of western Europe fared no better.

European governments and IEA correctly chided the USA for irresponsibly neglecting to stem the flow of oil imports. America's critics were no less supply driven. The IEA, in the mid-1970s, displayed annoyance at Norway's decision to maintain moderate North Sea oil production and not produce immediately from new fields. The frustrated importers contended that this forced them to pay more for oil.⁶¹ At that time, those importers had no conservation policies in place.

One half of the reduction in oil imports accomplished in OECD-Europe from 1973 to 1977 were attributable to Great Britain and her North Sea oil (Table 7.5). The remainder occurred because of stagnant economies. Thereafter, increased natural gas use and nuclear power made possible a diminution of oil imports. Conservation, arousing no enthusiasm, contributed but marginally to the slackening of European energy use. Politically influential utilities, whether private or state

owned, sought greater not lesser sales, more not fewer appliances in households. Convincing people to burn less energy yielded no political gain to politicians accustomed to promising the best of all possible worlds at half price. As Rosenbaum wisely observes, "President Carter's advocacy of energy conservation as duty, sacrifice, and discipline added the stigma of moral obligation to conservation's other unfortunate implications. Conservation should not seem to require for its success a nation of Calvinists."⁶²

So, the leaders of market driven democracies acted predictably, scurrying after new, expensive, and, frequently, dangerous sources of energy and loath to confess the shortcomings of their policies. Diversifying the domestic energy mix resolved few problems. Each of the fuels substituted for oil harbored serious drawbacks. In 1979, Carter, embarrassed by the negative reception of fellow citizens to his call for energy conservation, quickly turned to an \$88 billion scheme to produce synthetic fuel. Big money and giant technology legitimated such programs.⁶³

Notes

1. For the above two paragraphs: H. Maull, *Energy, Minerals, and Western Security*, Baltimore: The Johns Hopkins University Press (1984), p. 108; De Golyer and MacNaughton, *Twentieth Century Petroleum Statistics 1986*, Dallas: De Golyer and MacNaughton (1986), p. 60; International Energy Agency, *Energy Policies and Programmes of the IEA Countries, 1985 Review*, Paris: OECD/IEA (1986), p. 38; P. Odell, *Oil and World Power*, 7th edn, Harmondsworth, Middlesex: Penguin (1983), pp. 112–13; C. Tugendadt and A. Hamilton, *Oil, the biggest business*, London: Methuen (1975).
2. For the above two paragraphs: Congressional Quarterly, Inc., *Energy Policy*, Washington, DC: Congressional Quarterly, Inc. (1981), p. 15; C.P. Bradley, *Recent United States Policy in the Persian Gulf: (1971–1982)*, Grantham, N.H.: Tompson & Rutter (1982), pp. 47–51; E.W. Chester, *United States Oil Policy and Diplomacy: A Twentieth Century Overview*, Westport, Conn.: Greenwood Press (1983), pp. 246–8; USHR Committee on Foreign Affairs, Subcommittee on the Near East, *The United States and the Persian Gulf, September 29, 1972*, 92nd Congress, 2nd session, Washington, DC: USGPO (1972), pp. 7–9; A. Al-Sowayegh, *Arab Petropolitics*, London: Croom Helm (1984), pp. 71–80, 123–9.
3. For the above two paragraphs: A.D. Johany, *The Myth of the OPEC Cartel: The Role of Saudi Arabia*, New York: Wiley (1980), p. 48; De Golyer and MacNaughton, 1986, p. 5; M.T. Hatch, *Politics and Nuclear Power: Energy Policy in Western Europe*, Lexington, Ky.: The University Press of Kentucky (1986), pp. 40–1; H. Mendershausen, *Coping with the Oil Crisis: French and German Experiences*, Baltimore: The Johns Hopkins University Press for Resources for the Future (1976), pp. 71,