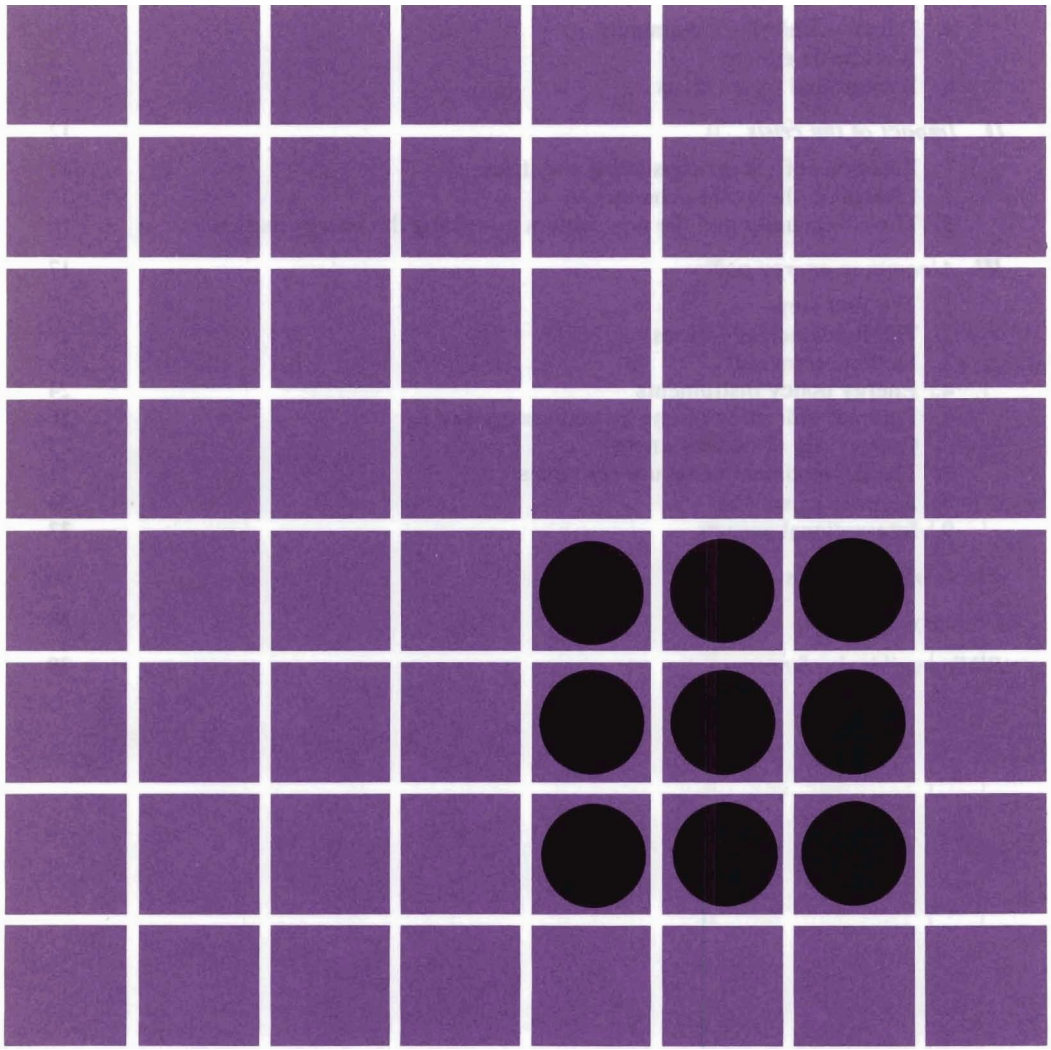
The European Community and the energy problem



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Contents

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The European Community and the energy problem

Introduction

Belgium, Denmark, the Federal Republic of Germany, France, Ireland, Italy, Luxembourg, the Netherlands and the United Kingdom as members of the European Community share a common economic and social destiny; they also share a common interest in energy for, as countries with energy-based economies, their future prosperity depends upon continuing availability of this essential commodity.

The Community's 250 million citizens already enjoy standards of living among the highest in the world and if they are to maintain and improve living and working conditions they will require a regular, stable and adequate supply of energy at reasonable prices.

The Community used to be relatively self-sufficient as regards its energy supplies, but over the last twenty years it has gradually come to depend, as a whole, on imports—especially of oil—for almost 60% of its needs.

To begin with, this imported energy encouraged economic development and social progress within the Community countries, because of the low prices and regular deliveries.

But the oil crisis of the winter of 1973-74 dramatically changed the situation. The oil price increase brought an abrupt end to the era of cheap oil while the oil embargo demonstrated clearly that regular supplies could no longer be taken for granted.

The oil crisis, although precipitated by the resumption of hostilities in the Middle East, was in fact the culmination of a gradual change in the world energy scene: the emergence of a seller's market in which oil producers were in a position to determine unilaterally questions of price and supply.

The writing had been on the wall for some considerable time before the crisis actually broke and as early as 1962 those responsible for directing Community affairs had warned of the need for a common energy policy and had defined its scope and content.

When it came the crisis could not but make the need for such a policy more imperative for it demonstrated clearly the vulnerability of the economy of Western Europe to supply restrictions and also to sharp increases in energy prices. Furthermore, it emphasized the ineffectiveness of isolated or uncoordinated national reactions, as well the dangers of an absence of solidarity among the oil-consuming countries. Lastly, it showed the need for changing the pattern of supply so as to reduce dependence on imports: greater energy conservation, more intensive use of indigenous resources and the development of sources other than oil. Some of these sources have a promising long-term potential, such as solar or geothermal

energy, but can make only a limited contribution in the short and medium term; others, like nuclear energy, are in a position to make a more substantial contribution in the short term.

It must, however, be clearly realized that no discovery and no technical innovation—whether it be energy from nuclear fission, North Sea oil or gas, the possible underground gasification of coal, or even controlled thermonuclear fusion—can by itself solve the problem. Moreover, even a very intensive effort to increase self-sufficiency in the Community's energy supplies will not dispense with the need, during the foreseeable future, of having considerable recourse to imports.

The key to the future as regards energy, for the European Community as for any other developed geopolitical entity, lies in diversification: diversified requirements must be met by technically and geographically diversified sources of supply. It is, moreover, absolutely essential to normalize trade relations with the producing countries.

The mere spontaneous action of economic forces on the energy market quite clearly cannot guarantee the attainment of these objectives. It is necessary to have a policy, concentrated on energy but encompassing various facets: market organization, research and development, international relations, finance, etc.

The number and diversity of the economic and social factors which determine an energy policy or on which the latter may have repercussions mean that, in order to respect the unity of the Common Market and eventually achieve economic and monetary union, such a policy must be a common one. Moreover, the measures to be taken must be compatible with all common policies developed by the European Community. Solidarity allows the Member States to cope with problems beyond their individual capabilities and reduces the risk of duplication in research and investment while making it possible to share the cost of certain large-scale operations.

A common policy also makes it possible to take advantage of the economic and political strength of an entity of 250 million inhabitants in negotiations with the multinational oil companies, with other importing countries and even in the dialogue with the oil-producing countries.

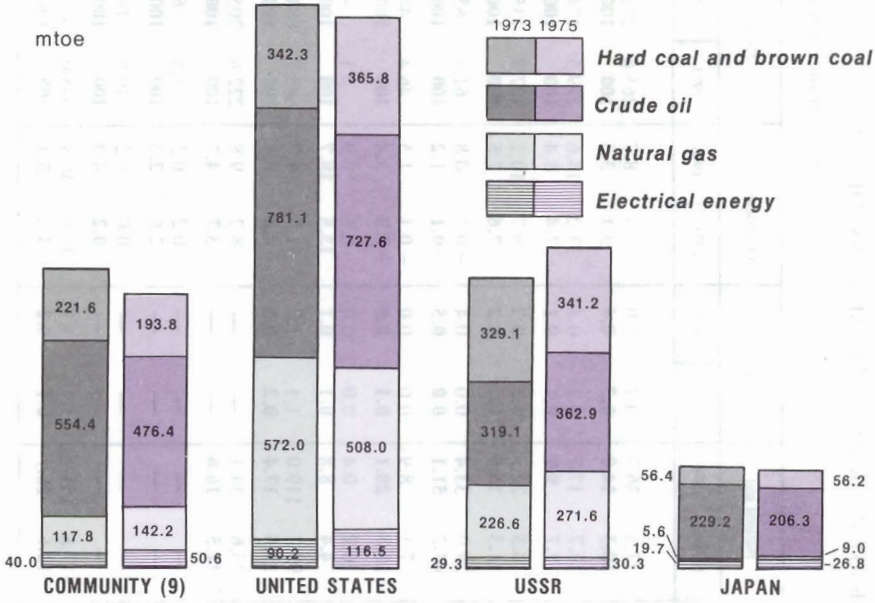
However, a common energy policy is not a prefabricated system which can be imposed as a whole and at one stroke. Member States' energy situations differ widely and flexibility is therefore required—flexibility which will undoubtedly produce uncertainties and surprises.

The common policy is gradually being formulated through a series of decisions by the institutions of the Community, arrived at successively in the spheres in which a common attitude is considered feasible and advantageous, or urgent. However slow and unspectacular this painstaking implementation may appear, it must, nevertheless, be emphasized that the continuous inspiration for this work comes from a set of principles and objectives which form a coherent framework for future progress.

I. Market trends before the crisis

With particular regard to Western Europe and more specifically the countries of the European Community, these trends exhibited the following features:

SHARE OF THE VARIOUS SOURCES OF PRIMARY ENERGY IN GROSS INTERNAL CONSUMPTION



Source : Eurostat

INTERNATIONAL COMPARISONS

(1975,%)

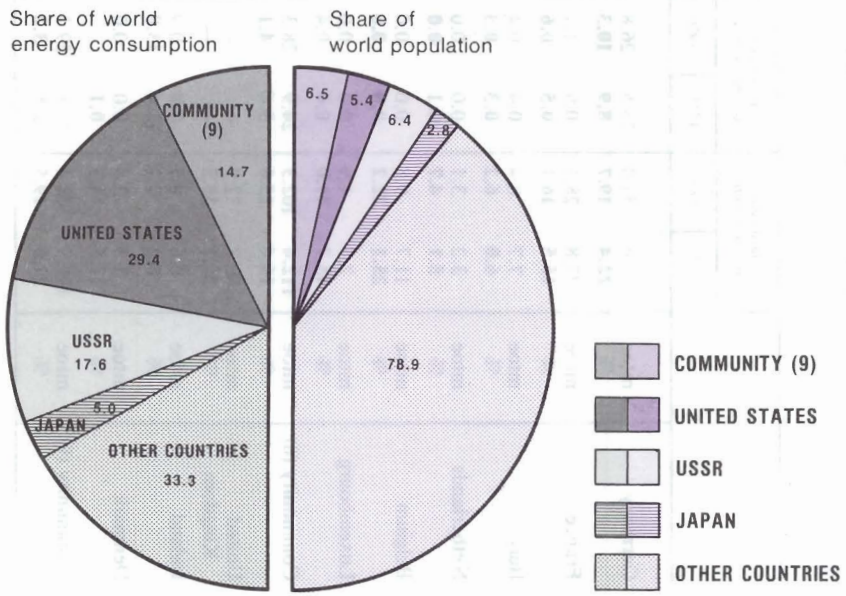


Table 1

SHARE OF THE VARIOUS SOURCES OF PRIMARY ENERGY IN GROSS INTERNAL CONSUMPTION

toe = ton oil equivalent

		Hard coal and equivalent		Brown coal and equivalent		Oil and equivalent		Natural gas		Other fuels		Electrical energy		Total	
		1973	1976	1973	1976	1973	1976	1973	1976	1973	1976	1973	1976	1973	1976
Germany	mtoe	59.6	51.0	23.5	26.8	145.9	136.8	27.4	36.7	0.7	1.0	8.3	8.7	265.6	261.0
	%	**22.4**	**19.7**	**8.9**	**10.3**	**55.0**	**52.3**	**10.3**	**14.0**	**0.3**	**0.4**	**3.1**	**3.3**	**100**	**100**
France	mtoe	27.8	28.1	0.9	1.1	123.6	113.3	13.7	17.2	0.1	0.1	13.2	14.6	179.5	174.5
	%	**15.5**	**16.1**	**0.5**	**0.6**	**68.8**	**64.9**	**7.7**	**9.9**	**0.1**	**0.1**	**7.4**	**8.4**	**100**	**100**
Italy	mtoe	7.7	8.4	0.4	0.4	95.3	93.4	14.5	22.5	0.3	0.2	9.7	10.2	127.7	135.0
	%	**6.0**	**6.2**	**0.3**	**0.3**	**74.6**	**69.2**	**11.3**	**16.6**	**0.2**	**0.2**	**7.6**	**7.5**	**100**	**100**
Netherlands	mtoe	3.2	3.1	0.0	0.0	29.3	27.8	29.0	33.4	0.0	0.4	−0.1	0.8	61.4	65.5
	%	**5.1**	**4.7**	**0.1**	**0.0**	**47.7**	**42.5**	**47.2**	**51.1**	**0.0**	**0.5**	**−0.1**	**1.2**	**100**	**100**
Belgium	mtoe	11.7	9.8	0.0	0.0	27.5	24.0	7.3	8.9	0.0	0.0	−0.1	1.5	46.4	44.2
	%	**25.1**	**22.2**	**0.0**	**0.0**	**59.3**	**54.3**	**15.8**	**20.1**	**0.1**	**0.0**	**−0.3**	**3.4**	**100**	**100**
Luxembourg	mtoe	2.5	1.9	0.0	0.0	1.8	1.4	0.2	0.4	0.0	0.0	0.6	0.9	5.1	4.6
	%	**48.7**	**41.0**	**0.4**	**0.4**	**32.9**	**31.0**	**4.4**	**8.8**	**0.1**	**0.1**	**13.5**	**18.7**	**100**	**100**
Community (6)	mtoe	112.4	102.3	24.9	28.3	423.2	396.7	92.2	119.0	1.1	1.7	31.7	36.7	685.7	684.7
	%	**16.4**	**15.0**	**3.6**	**4.1**	**61.7**	**57.8**	**13.5**	**17.4**	**0.2**	**0.3**	**4.6**	**5.4**	**100**	**100**
United Kingdom	mtoe	80.7	72.9	—	—	108.2	88.9	25.6	34.1	—	—	8.2	9.8	222.6	205.6
	%	**36.2**	**35.5**	**—**	**—**	**48.6**	**43.2**	**11.5**	**16.6**	**—**	**—**	**3.7**	**4.7**	**100**	**100**
Ireland	mtoe	0.6	0.5	0.8	0.9	5.5	5.1	—	—	—	—	0.2	0.2	7.1	6.7
	%	**8.2**	**7.2**	**11.4**	**13.8**	**77.8**	**76.7**	**—**	**—**	**—**	**—**	**2.6**	**2.3**	**100**	**100**
Denmark	mtoe	2.3	2.8	0.0	0.0	17.3	16.1	—	—	—	—	−0.0	0.2	19.6	19.0
	%	**11.5**	**14.5**	**0.1**		**88.6**	**84.6**	**—**	**—**	**—**	**—**	**−0.2**	**0.9**	**100**	**100**
Community (9)	mtoe	195.9	178.4	25.8	29.2	554.4	506.9	117.8	153.1	1.1	1.7	40.0	46.8	935.0	916.1
	%	**21.0**	**19.5**	**2.8**	**3.2**	**59.2**	**55.3**	**12.6**	**16.7**	**0.1**	**0.2**	**4.3**	**5.1**	**100**	**100**

Source: Eurostat.

1. Volumes

In the course of the period—something under a quarter of a century—running from the early 1950s to the last years before the crisis, demand for energy—already high compared with the world average—increased very sharply. In the industrialized countries, primary energy consumption increased generally by more than 100% and, by 1973, the nine Community Member States had a combined energy consumption of almost 1 000 million tonnes oil equivalent (mtoe). At that time, there were no signs of demand saturation in Europe or of a decline in growth. The European Commission was still forecasting a doubling of energy requirements in fifteen years and estimated total requirements for 1985 at some 1 800 mtoe.

2. Supply structure

This boom in primary energy consumption was accompanied by radical changes in the patterns of supply. Immediately after the Second World War more than 80% of the total energy requirements of the countries which now form the European Community were met by solid fuels (coal and lignite), while oil accounted for only about one-tenth of the total. The relative proportions have now become quite different.

By 1973, solid fuels covered scarely more than one-fifth of total requirements (23%), whereas oil accounted for nearly three-fifths (59%), natural gas—a source recently established in Europe—accounted for over 12%, and hydroelectric, geothermal and nuclear energy accounted for the balance (just over 40%).

It has, therefore, been hydrocarbon fuels (oil and natural gas) that have made the rapid growth in consumption possible. In addition, the uses to which petroleum products are put have been extended considerably. Whereas in the past they were used mainly as fuel, they are now increasingly used to produce heat (heating, furnaces, electricity, etc.) and as raw materials for the petrochemical industry.

In 1973 it was generally thought that the pattern of energy supplies would continue to follow much the same trends. According to the forecasts drawn up by the European Commission at the end of 1972:

— solid fuels would continue to decline in importance, their share falling to some 10% by 1985;

— oil and natural gas would increase their share still further, accounting respectively for 64% and 15% of energy requirements in 1985;

— hydroelectric and geothermal energy would be of even less importance, covering only 2% of requirements, while nuclear energy would increase its share from 1.4% in 1973 to some 9% by 1985.

The changing pattern of Community energy consumption has been accompanied by a change in the ratio between energy produced in the Community and imported energy. The Community has always been poor in oil resources and, despite the recent North Sea discoveries, demand for oil has remained markedly higher than internal production.

The increase in consumption was covered chiefly by imported oil; consequently, whereas energy imports accounted for scarcely 10% of Community supplies around 1950, they have now come to constitute over 60% of the Nine's total energy supplies. Furthermore, accord-

ing to the forecasts made in 1973, it did not appear that this degree of dependence on external supplies was likely to decrease. The expected contribution from the North Sea, in the form of oil and gas, would have been partly offset by an increase in imports of coal, natural gas and nuclear fuel.

3. Prices

During the first half of the period between the end of the Second World War and the advent of the energy crisis, Community energy prices were governed largely by the price of coal—at that time still the largest source of energy. Independently of the systems of aid to the coal industry, which moreover varied widely from one country to another, the general policy was that coal should not be priced out of the energy market and so high price levels for other sources of energy and, in particular, those of imported energy—especially oil—were maintained so as to protect indigenous coal and allow it to compete favourably.

During the 1960s, however, after coal had declined in importance, there was a change of policy, and it became more advantageous to allow imported energy to compete more freely on the energy market—even if this meant increasing aid to coal, accompanied by a planned cutback in production.

From that time onwards, and to an increasing extent, the energy market, particularly within the Community, came to be dominated by the price of oil products.

From 1960 to 1970, however, the world oil market was characterized by an abundance of supplies and, consequently, low and stable prices; it was a buyer's market in which, in real terms, the prices, if anything, tended to fall. Moreover, because it was available at low prices, oil was able to capture the lion's share of the increase in demand.

During this period, the Community benefited from the active competition which prevailed on the oil market and, consequently, on the energy market as a whole. Indeed, our overall energy supplies were considerably cheaper than would have been the case if oil had not been in a position to cover the increase in demand at low prices and thus to influence the price of other energy sources.

But the relative fall in prices also had the effect of speeding up the cutback in coal and of slowing down the development of nuclear energy.

4. Effects within the Community

The Community's energy supply pattern has therefore undergone a change, the major features of which have been a drop in the relative importance of solid fuels, greater use of liquid and gaseous fuels and increased dependence on imported fuel, principally oil.

This change has had important results within the Community.

First, it has brought closer together national situations which had previously differed fairly widely. Among the countries now belonging to the European Community, a distinction used to exist between, on the one hand, the energy-producing countries (i.e. mainly those producing coal) such as the United Kingdom, the Federal Republic of Germany, Belgium, France and (to a lesser extent) the Netherlands, and, on the other, the mainly energy-

consuming countries of Italy, Denmark, Ireland and Luxembourg. This distinction was somewhat blurred, as the producing countries were already importing energy—particularly oil—while some consumer countries could rely on a certain amount of national production (hydroelectric power, peat and so on). Nevertheless, a real distinction did exist some twenty years ago, and influenced consumer behaviour.

As a result of the cutback in coal production which affected all the producing countries, albeit to differing extents, and the constant increase in demand which reduced the relative share of internal energy sources, all the Community countries became net importers of energy—the amount varying between half their supplies and almost their entire requirements.

Furthermore, the shift from coal to oil has had an impact on the regional distribution of industry within the Community. Originally based in the coalfields, industry was still, immediately after the Second World War, concentrated mainly in the coal-producing central areas of north-western Europe. Oil, which was imported mainly by sea, reached Europe and the Community via the seaports. Related activities (e.g. refining) and those attracted by the difference in transport costs (petrochemicals and various other industries) have therefore provided opportunities for industrial development in coastal regions. At the same time, the cutback in coal production has given rise to problems in regions where coal-mining was an important activity or which were the traditional centres of important consuming industries.

5. *Worldwide effects*

The change in the energy supply pattern has also had considerable international repercussions.

In the first place, the discovery of large, easily-extracted deposits of low-cost oil in the Middle East led to a ready availability of cheap oil supplies during the period 1960-1970. However—and this illustrates the influence of purely political factors—the decision taken by President Eisenhower in 1958 to restrict imports of crude oil into the United States led to the greater part of available resources in the Middle East being diverted towards Europe and Japan, making these great industrialized regions largely dependent for their supplies on a small number of countries located in or around a politically and militarily unstable zone. Thus the shift towards oil had major repercussions on the strategic situation and geopolitical relations on a worldwide scale.

In the economic context, the world oil industry has also undergone profound change. Until some ten years ago, the major international oil companies, which because of their highly integrated structure control all activities connected with oil (prospecting, production, transport, refining, storage and distribution), were still in a position to regulate the volume of oil production and the conditions for marketing for the great majority of exporting countries and most of the importing countries.

This position has gradually changed as a result of action taken both by the governments of the oil-exporting countries and by those of certain importing countries.

In 1960, for example, the Organization of Petroleum Exporting Countries (OPEC) was set up and, by coordinating the action of those countries, strengthened their position. As far

back as 1965, as the earliest concrete manifestation of this new development in the balance of strength, the Libyan Government, using the threat of an imposed cutback in production, brought about a change in the fiscal arrangements applying to concession companies operating within its territory.

It was in this way too that, in certain importing countries, mainly in Western Europe, the public authorities aided the creation or expansion of national petroleum companies whose integrated activities, including production and marketing, were to extend far beyond the borders of their countries of origin.

Lastly, these changes have had repercussions on the inter-relationships between the United States on the one hand and Europe and Japan on the other, and also on their relationships *vis-à-vis* the rest of the world.

The United States are able to satisfy almost all their energy needs from domestic production, or at any rate from the American continent, so that for a long time the country has enjoyed price advantages over its industrial competitors. American coal has always benefited from very favourable mining conditions, and Europe used to obtain oil mainly from Venezuela at prices based on the cost to the United States plus the cost of transport.

But from the moment when Europe was able to draw increasing supplies from the Middle East and North Africa—regions which are much closer to Europe than to the United States and have low production costs—the situation was bound to be reversed gradually. Japan also benefited from this trend, and in their turn the two major regions which are the industrial competitors of the United States were able to take advantage of lower energy prices. This inevitably had an impact on competitive conditions between the United States on the one hand and Europe and Japan on the other, and also influenced economic, financial and monetary developments.

Particularly towards the end of the 1960s, Europe and Japan thus had a more rapid and more sustained economic development than the United States.

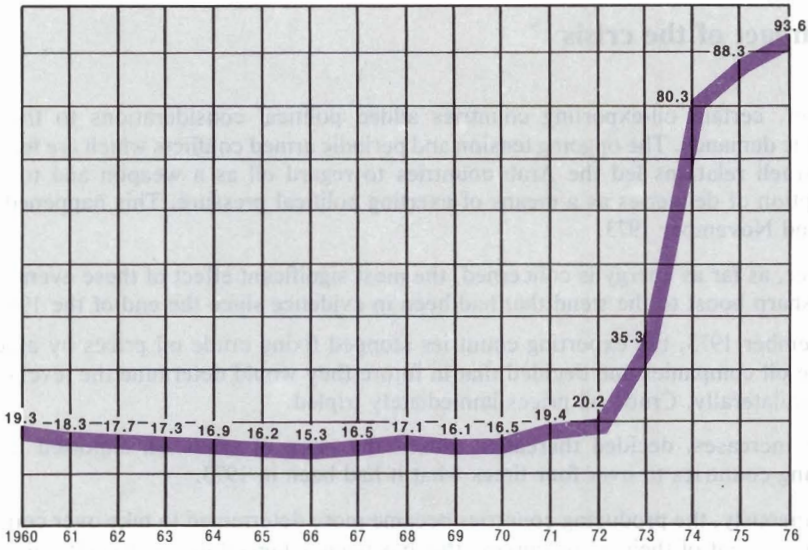
6. *Background to the crisis*

The situation in fact began to change towards the end of 1969. At that time the world demand for energy, especially oil, was increasing at a constant rate and rather more rapidly than the producing companies had foreseen. A poor level of investment in some areas—particularly transport—together with difficulties and delays in the development of new resources, especially for environmental reasons (e.g. Alaska), combined with a high level of demand from Europe and Japan and expanding purchases by the United States, turned a buyer's market into a seller's market.

The exporting countries, grouped together under the banner of OPEC, realizing the advantage to be gained from this new situation, pursued a concerted policy to obtain simultaneously an increase in their oil revenues, certain guarantees to maintain the real value of these revenues and, in short, greater control of the economic management and exploitation of their oil resources, with a view to achieving the most efficient operation possible.

In economic terms, oil is both a source of revenue (often almost the only one) and a development instrument for the exporting countries. Among the exporting countries of

PRICE PER TON OF OIL IMPORTED INTO THE COMMUNITY
(in dollars)



North Africa and the Middle East, which together supply about 80% of the Community's imported oil, two groups must be distinguished.

First there are the countries such as Algeria, Iran and perhaps Iraq which, because of their population structure and geography, have an assured potential for agriculture and industrial development. In these countries, oil revenues are invested mainly in infrastructures and in capital goods purchased from Europe or America.

The other countries can do little but invest their oil revenues abroad, and these investments, for the most part short-term, constitute floating masses of capital which accentuate the monetary fluctuations in currency parities—an effect which becomes more marked as their volume increases.

Whichever category they belong to, these countries have an interest in protecting their revenue from losses in real value and purchasing power brought about by inflation. Some exporting countries are, moreover, seriously considering reducing the rate of increase of their production in order both to husband reserves—which, though very substantial in the Middle East, are not inexhaustible—and to allow the capital represented by this oil to appreciate in value underground to a greater extent and at a faster rate than the same capital would if invested anywhere else.

Action taken by the exporting countries since 1970 has reflected these three legitimate concerns and has given rise to the 1971 Teheran and Tripoli agreements on price increases,

a number of agreements on price adjustments after major currency fluctuations, the 1972 New York and Vienna agreements on participation and also several nationalization measures.

II. Impact of the crisis

However, certain oil-exporting countries added political considerations to the purely economic demands. The ongoing tension and periodic armed conflicts which are features of Arab-Israeli relations led the Arab countries to regard oil as a weapon and to use the interruption of deliveries as a means of exerting political pressure. This happened in October and November 1973.

However, as far as energy is concerned, the most significant effect of these events was to give a sharp boost to the trend that had been in evidence since the end of the 1960s.

In December 1973, the exporting countries stopped fixing crude oil prices by agreement with the oil companies and decided that in future they would determine the level of these prices unilaterally. Crude oil prices immediately tripled.

Further increases, decided thereafter, raised the price of crude oil exported from the producing countries to over four times what it had been in 1973.

Simultaneously, the producing countries became more determined to take over completely the management of their oil resources; this has been achieved in the majority of cases.

1. Reactions of the oil-consuming countries

As a result of the situation provoked by the oil crisis, the President of the United States held a conference in Washington in February 1974; those taking part included—in addition to the Community as such and all its Member States—the United States, Canada, Japan and Norway.

Thereafter, however, France, which had expressed certain reservations with regard to the guidelines adopted, did not take part in the Energy Coordination Group set up by the conference. The work of this Group led, on the one hand, to an international agreement on energy and, on the other, to the establishment of the International Energy Agency (IEA) within the framework of OECD.

In essence, this agreement covers a vast programme of cooperation which includes:

— ensuring, in the event of an oil supply crisis, a common level of self-sufficiency in oil supplies, common measures to restrict demand and measures for the sharing of all available oil;

— the establishment of an information system covering the international oil market;

— the establishment and implementation of a programme of long-term cooperation, with the object of reducing dependence on oil imports;

— the encouragement of cooperation with the producing countries and with the other oil-consuming countries.

Although it was not associated with the work of the Coordination Group, the Commission of the European Communities was consulted as to its results, and stressed the need for all Member States, whether or not they were parties to the agreement, to formulate a common energy policy rapidly and in specific detail. Moreover, it insisted that the Member States which were parties to the agreement should take the requisite measures to ensure that the solidarity of the Community and the rules of the Treaties should be respected in the event of the supply-sharing system envisaged by the agreement being implemented.

Although the Community as such is not a member of the International Energy Agency, the Commission of the European Communities has been participating in its work since the end of 1974, fulfilling a dual role of coordination, on the one hand with regard to the views of its Member States and on the other with regard to the action of the Agency and that of the Community.

The work carried out by the Agency comprises, in particular:

— establishment and implementation of a programme of long-term cooperation on the development of resources and economical use of energy, including energy R & D;

— examination of national programmes for energy conservation, including the development of new sources or new resources;

— improvement of the information system covering the oil and gas markets;

— creation of a statistical data centre for energy;

— establishment of a mechanism for the restriction of demand and the sharing of oil resources in the event of supply difficulties.

As regards the Community, the oil crisis and its implications were examined at the Summit Conference held in Copenhagen on 14 and 15 December 1973. It was agreed that the Community needed to take effective measures for an energy policy immediately, and to facilitate its formulation and implementation it was decided to create a new body—the Energy Committee. Composed of representatives of the Member States, under the chairmanship of a member of the Commission, the Committee is responsible for ensuring the coordinated implementation by Member States of the measures adopted by the Community, providing for the exchange of information and consultation between Member States and the Commission with regard to supply conditions and foreseeable developments in the supply situation, and also assisting the Commission in the formulation of its proposals.

2. Effects on the world economy

The oil crisis was followed by the most serious economic recession since the war.

It cannot, of course, be asserted that the oil crisis was the direct and sole cause of the recession but it would, however, be impossible to deny that it was a major contributing factor.

The sharp increase in oil prices at the end of 1973 strongly stimulated inflation throughout the world. Within the European Community, the average annual rate for the last three years has been around 12%. However, the situation differs markedly from one country to another, the extremes being represented by the Federal Republic of Germany, with an annual rate of between 4 and 6%, and the United Kingdom, Ireland or Italy, where the annual rate has been around 20%. At all events, inflation on this scale, above all, the

measures taken to combat it, are incompatible with a regular and sustained economic expansion.

The quadrupling of oil prices also helped to convert the traditional balance-of-payments surplus of the industrialized countries into a deficit, and to aggravate the already large deficit of the developing countries that were not oil producers. The beneficiaries of the trend were, quite evidently, the OPEC countries; the scale of their new-found wealth can be gauged from the fact that, after satisfying all their own requirements—it has been pointed out above that the situation in this respect varies greatly from one country to another—they are left with an annual surplus of 30 or 40 thousand million dollars. Since 1973, therefore, some 100 to 120 thousand million dollars have been withdrawn from the funds available to stimulate international trade.

The economic recession has been characterized by international balance-of-payments problems and a sharp decline in world trade. A vicious circle has, moreover, been created in which declining exports have led to a decrease in industrial activity and, in turn, a reduction in imports.

The transfer of wealth provoked by the increase in oil prices has had other effects. The amount thus siphoned-off by the oil-exporting countries from the revenue of the importing countries has affected the spending of the citizens of these countries and their savings, i.e. their standard of living and rate of capital formation, and also consumption and investment. The vast increase in oil prices generated fears of catastrophic consequences at the beginning of 1974. The actual effects have been less disastrous than expected because the oil-exporting countries have to some extent re-lent, through their investments to certain industrialized countries which were their principal customers, a proportion of the sums which the latter had to raise to pay the enormous cost of their oil imports. This, however, does not affect the fact that the reduction in current spending and investment in these countries has affected their level of industrial and economic activity.

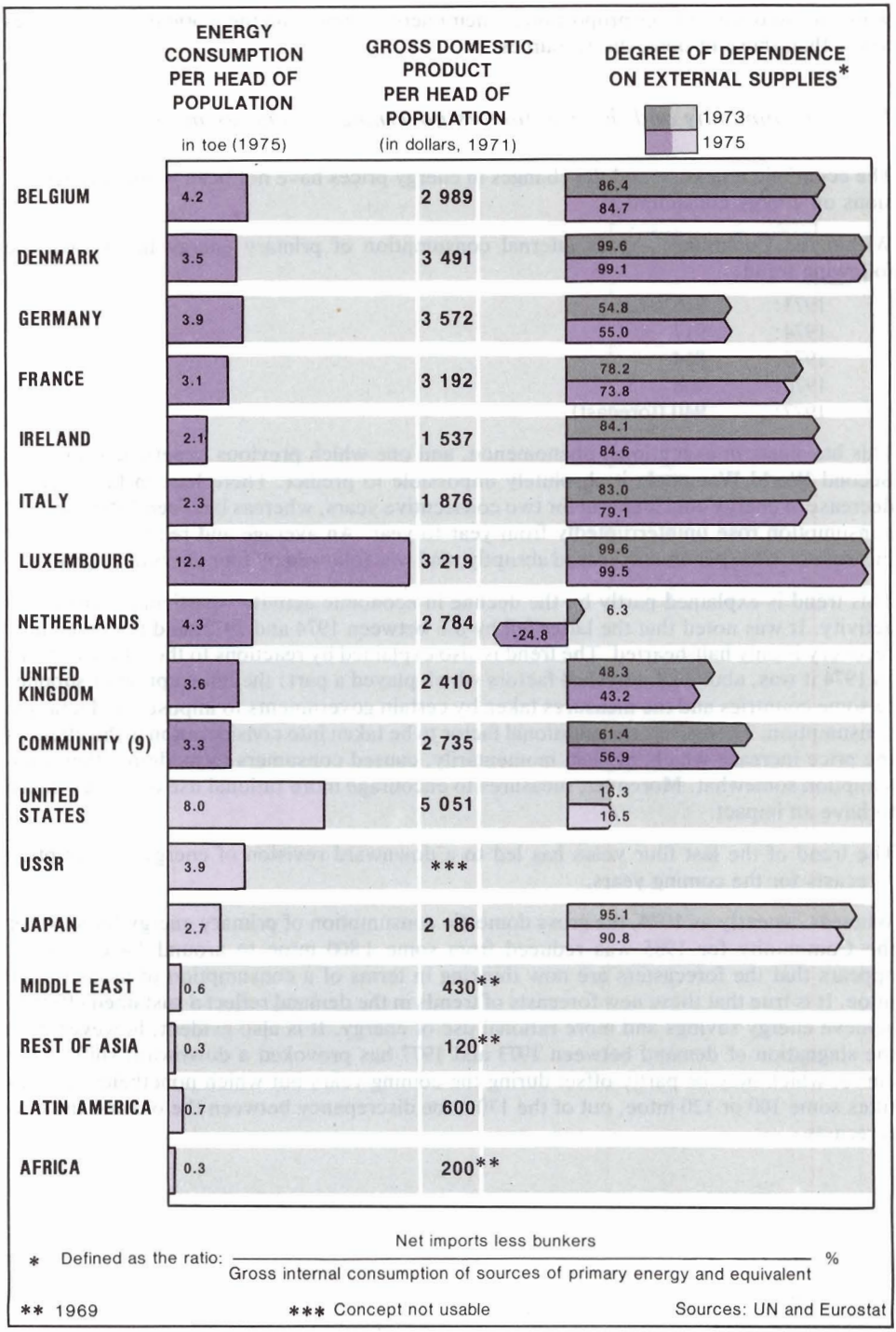
For instance, within the European Community industrial production dropped by 8% between 1974 and 1975. Moreover, the overall gross domestic product declined by 2.2% during the same period, whereas ever since the war it had maintained a continuous and sustained rate of growth. Even though there was some recovery at the beginning of 1976, this faded during the second half of the year, and since then economic expansion has not regained its previous momentum.

This trend has been accompanied by a rise in unemployment, and the number of unemployed increased from some 3.5 million at the end of 1974 to 5 million in 1975 and subsequently, after a slight drop in early 1976, to 5.5 million.

As far as the Third World countries which are not oil producers are concerned, their situation has become extremely critical, because their foreign debt burden, which was already very high, has been almost doubled by the increase in the price of an energy source which constitutes an essential element of their economic development.

It is therefore evident that, although the increase in oil prices has certainly not been the only cause of the worldwide economic recession, it has nevertheless constituted the principal factor in its outbreak, which has stirred into activity other latent forces which otherwise would perhaps have remained under control.

The increase in oil prices has had yet another effect: the European Community and Japan have now lost the competitive advantage that they had over the United States when they



* Defined as the ratio: $\frac{\text{Net imports less bunkers}}{\text{Gross internal consumption of sources of primary energy and equivalent}}$ %

** 1969 *** Concept not usable Sources: UN and Eurostat

were able to obtain a large proportion of their energy supplies on the world market at prices lower than those of domestic resources.

3. The Community and the new factors governing the energy market

The economic recession and the changes in energy prices have not been without repercussions on energy consumption.

Within the Community, gross internal consumption of primary energy has shown the following trend:

1973:	936 mtoe
1974:	917
1975:	864
1976:	908
1977:	940 (forecast)

This has been an exceptional phenomenon, and one which previous experience since the Second World War made it absolutely impossible to predict. There has, in fact, been a decrease in energy consumption for two consecutive years, whereas between 1950 and 1973 consumption rose uninterruptedly from year to year. An average and relatively constant increase of 4.5% per annum ceased abruptly, and was followed by four years of stagnation.

This trend is explained partly by the decline in economic activity—particularly industrial activity. It was noted that the latter fell by 8% between 1974 and 1975, and that even now recovery is only half-hearted. The trend is also explained by reactions to the oil crisis itself. In 1974 it was, above all, physical factors which played a part: the interruption of supplies to some countries and the measures taken by certain governments to impose a reduction in consumption. Thereafter, the additional factor to be taken into consideration is the effect of the price increase which, at least momentarily, caused consumers to moderate their consumption somewhat. Moreover, measures to encourage more rational use of energy began to have an impact.

The trend of the last four years has led to a downward revision of energy consumption forecasts for the coming years.

Whereas, as early as 1974, the gross domestic consumption of primary energy forecast for the Community for 1985 was reduced from some 1 800 mtoe to around 1 450 mtoe, it appears that the forecasters are now thinking in terms of a consumption of around 1 280 mtoe. It is true that these new forecasts of trends in the demand reflect a sustained effort to achieve energy savings and more rational use of energy. It is also evident, however, that the stagnation of demand between 1973 and 1977 has provoked a downward shift of the curve, which may be partly offset during the coming years but which nonetheless constitutes some 100 or 120 mtoe, out of the 170 mtoe discrepancy between the old and the new forecasts.

III. A common energy policy

Even before the outbreak of the energy crisis the Community had attempted to formulate and to implement a common energy policy. However, the measures forced upon the governments of the Member States by the threatening situation of late 1973 and early 1974 were conceived and adopted haphazardly and without much coordination or solidarity, which reduced their effectiveness and endangered the process of building Europe.

On the other hand, it is now more apparent than ever that the creation of a common energy policy is a fundamental factor in the creation of European unity, and that the measures to be taken inside the Community and also the positions to be adopted on the international scene will carry far more weight and be far more effective if they are taken jointly on behalf of a group of industrialized countries with 250 million inhabitants than if they are the outcome of separate and discordant policies.

1. The first steps

The Community has been working towards a common energy policy for a long time.

Even though there is no mention of such a policy in the European Treaties, a working party on energy adopted, in June 1962, a memorandum on energy policy which was designed to achieve the free circulation of energy within the Common Market and which included detailed provisions regarding the diversification of external supplies, aid to Community production (principally that of coal), the rapid development of nuclear energy, storage, taxation and import regulations. This memorandum constituted, in fact, the first outline of a real energy policy for the Community.

Thereafter, further efforts were made by the European Commission, which in December 1968 submitted to the Council of Ministers its 'First guidelines for a Community energy policy'. This was followed by two Communications: 'Necessary progress in Community energy policy' (October 1972) and 'Guidelines and priority actions for Community energy policy' (April 1973). These last two programmes defined more closely the problems caused by the new situation on the world energy market.

Lastly, as a result of the events of late 1973, the Commission submitted to the Council, in May 1974, a Communication based on the current situation and entitled 'Towards a new energy policy strategy for the Community', together with several concrete proposals. This was followed by further proposals and by communications, either general in character or referring to particular sectors which, together, form a complete and consistent programme for a future Community energy policy.

2. The fundamental options

The guidelines for an energy policy proposed by the Commission were based on certain fundamental options.

In the first place, it was recognized that assuring the Community's short, medium and long-term energy needs now constitutes a major problem which cannot be solved simply by

voluntary or imposed curbs on energy consumption whether by agricultural, industrial, commercial or domestic consumers.

It is, in fact, clear that people's legitimate aspirations to achieve an improvement in the 'quality of life' is not, at the moment, accompanied by any willingness to renounce the 'quantity' of goods and services which they wish to have at their disposal.

Consequently there is a need to ensure a supply of energy which will make it possible to pursue the goals of economic growth. Thus it is essential not only to make vigorous efforts to save energy and improve energy efficiency but also to develop new energy sources.

In the past, a close relationship has been observed between economic growth and energy consumption. In future, however, given more rational use of energy and energy savings, it should be possible to maintain sustained economic growth rates without stepping up primary energy consumption to the same degree.

Forecasts by the Member States indicate that, during the period 1976-1985, the Community should be able to achieve a 4.2% per annum growth in its gross domestic product with an average annual increase in primary energy consumption of around 3.3%.

Energy must be supplied in sufficient quantity, but must also be available at favourable and stable prices, in secure conditions. As far as possible it must be free from possible threats of interruption of deliveries or arbitrary and drastic price increases. It is, therefore, necessary to seek to achieve a high degree of independence at acceptable prices.

This implies that efforts should be made to make the most of the internal resources of the Community and of those which are characterized by a high degree of security of supply. It also calls for the development of new energy sources or of new techniques of extraction, recovery, conservation, utilization, etc.—bearing in mind that no innovation and no existing procedure is exempt, in its technical, economic and financial aspects, from uncertainties, obstacles and risks which cannot all or always be foreseen.

But two extreme attitudes must be avoided: on the one hand, blind faith in science's ability to find a satisfactory solution—a 'technical fix'—in good time; and, on the other hand, opposition to new techniques as long as the uncertainties have not been completely eliminated and the risks entirely avoided. The result would be paralysis, stagnation and even perhaps a regression which would jeopardize the results achieved so far, hamper development and finally lead to an economic and social decline with repercussions which might be more serious than those of using new techniques.

The sensible and only acceptable attitude consists in making a sustained effort of research, development and promotion devoted to the various promising techniques and, among these, primarily to those which present the least risks and to those which consume the smallest amount of the valuable and limited resources available for mankind's use. It is also important that, in addition to bringing a new technique to the stage of development, this research should also be devoted to identifying the short or long-term risks and dangers and to finding solutions thereto.

The trend towards more satisfactory energy supply for the Community must, therefore, be directed at diversification, and no one source or form of energy should be allowed to enjoy a position of monopoly or quasi-monopoly. The leading position of coal and the great importance of oil must not be replaced tomorrow by any other equivalent dominance by, for example, nuclear energy. In future, all economically exploitable sources and techniques

can and must play their part, in a balanced situation which will develop with time, in accordance with their individual characteristics and merits.

It must also be borne in mind that these research and development efforts and this requisite diversification, even though they may contribute to reducing dependence on external supplies, will not lead to a more or less complete self-sufficiency.

It is, moreover, essential to maintain a place for energy in international trade. Some energy sources, particularly oil, constitute for the countries that produce them an important resource, and sometimes almost the only one. Those countries which cannot put it to profitable use on their own territory find in its export their sole or principal means of subsistence and development.

It is therefore necessary to ensure the establishment between the importing and the exporting countries, which are closely dependent on each other, of a system of mutually profitable economic and financial relationships guaranteeing, on equitable and stable terms, essential supplies of energy to the former and the financial and technical means of development to the latter.

These options, which already form the basis of the Community's 'new strategy', are also the basis of a Communication on the implementation of the guidelines established by the European Summit Conference held in Rome in December 1975. This Communication was submitted to the Council in January 1976; in it the Commission reiterated its earlier proposals, and outlined other proposals which were developed in the course of 1976 and 1977.

3. Medium-term aims

The Commission considered, in the circumstances, that the time had come to set out specific *objectives* for a Community energy policy rather than simply make *forecasts* for the future. A draft Resolution, outlining the target for the Community's supply pattern for 1985, was therefore submitted to the Council, which adopted it on 17 December 1974. The main aim of the Resolution was to reduce the Community's dependence on imported energy, which stood at 61% in 1973, to about 50% by 1985. Such a reduction would make for greater security of energy supplies and reduce the burden which the increased price of imported energy had placed on the economy and on the balance of payments. The overall pattern of demand for primary energy in 1985 would then look like this, as compared with the earlier forecasts:

— solid fuels	17% instead of 10%
— oil	47% instead of 64%
— natural gas	20% instead of 15%
— hydroelectric and geothermal energy	3% instead of 2%
— nuclear energy	13% instead of 9%

Thus, oil imports would be reduced by maintaining coal production at current levels, and encouraging the development of other sources of energy and a more rapid development of nuclear energy as a source of electricity. Finally, and this is another important aim, these proportions would apply to a volume of consumption substantially reduced by a more efficient use of energy.

However, events on the whole have certainly not followed this pattern.

Although in 1976 the Community's oil imports were reduced by 7.5% and energy consumption decreased by 2.5% compared with 1973 (despite a slight increase in gross domestic product) it is undeniable that this favourable trend was due largely to various extraneous factors.

At present, in fact, the Community energy situation is continuing to deteriorate. A further increase in oil prices imposed at the beginning of 1977 will cost an additional 2.5 thousand million u.a.[1] per year, and the increase in imports of oil from OPEC countries has given rise to serious problems. Indeed, world demand for oil could increase by one-third in the course of the next decade, and there are no grounds for asserting that the producing countries will be interested in producing as much as this or that they will consent to do so. This situation is likely to exercise a strong upward pressure on prices, which may not be restrained for long by the present moderation of certain oil-producing countries and which could cause a serious decline in world economic growth.

With regard to the future of nuclear energy, the latest information is alarming. If nuclear capacity in 1985 is limited to the 90 GWe currently forecast, the energy deficit could only be made up by increasing oil imports, which at current prices would cost 60 000 million dollars per year.

If, moreover, the energy programmes of the Member States as they appeared in mid-1977 are viewed as a whole, it seems that the real situation will not reflect the aims decided upon in 1974. Dependence on imported oil, accounting for 51-52% of consumption, would be greater than the 47% envisaged as a common objective. This is explained by the less optimistic forecasts with regard to natural gas (17-18% instead of 20%) and the fact that the shift to nuclear energy will be less rapid than forecast (11% instead of 13%).

It must be remembered that these percentages refer to an overall consumption estimated at 1 280 mtoe, as against the 1 450 mtoe forecast in 1974; this reduction is, in turn, explained by the economic recession and by efforts on the energy savings front.

In a Communication dealing with the energy situation of the Community submitted in February 1977, the Commission emphasized the serious implications of current trends. Unless the Community succeeded in improving these energy forecasts, the Commission argued, it 'would have to face not only the danger of permanent insecurity, but also the possibility that in the coming years important decisions in the spheres of economic and social policy might be dictated by constraints operating in the energy sector'.

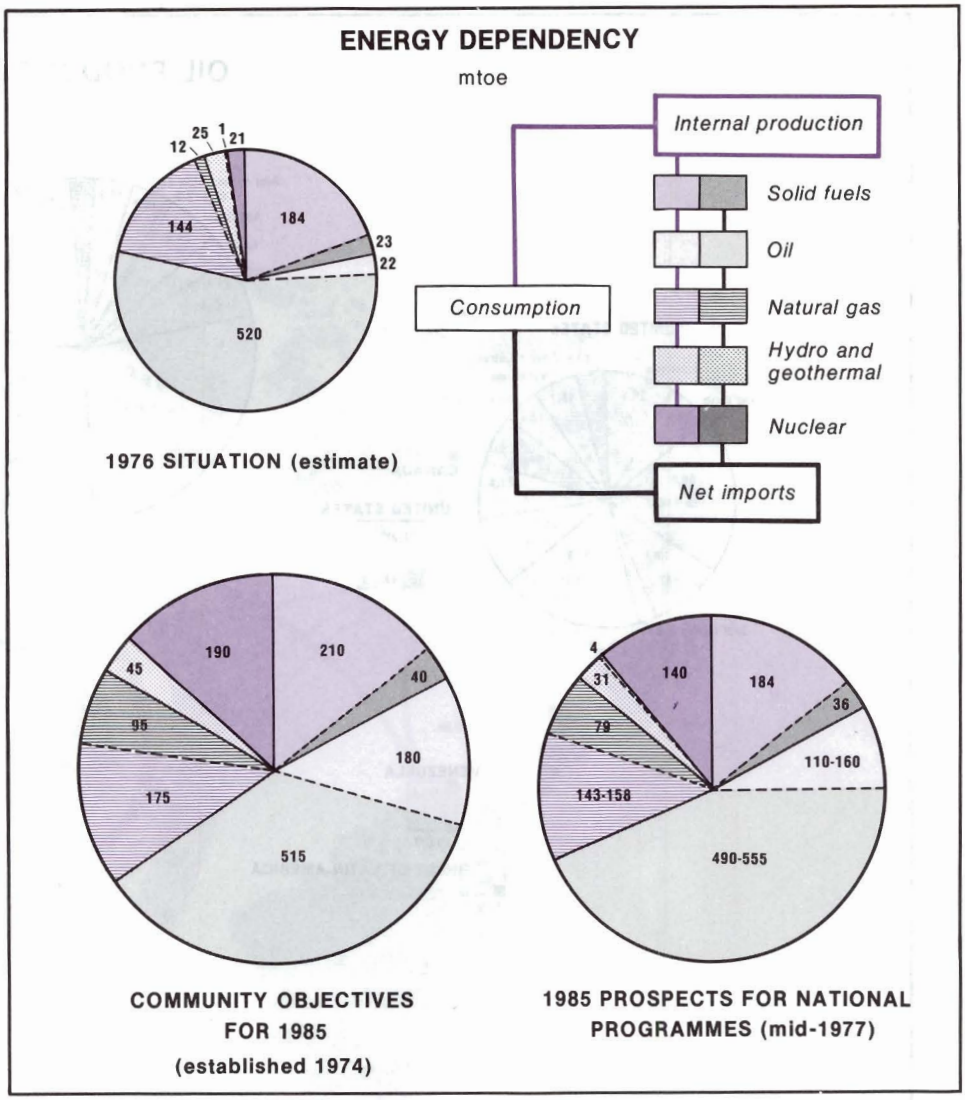
The aims set out in 1974 therefore remain entirely valid, and both the Community and the Member States must maximize their efforts to ensure that by 1985, overall dependence on imported energy is not more than 50% and that oil covers less than half the requirements.

In specific terms, in order to ensure continuous economic growth without this involving a dangerous increase in oil imports, the Community must:

— with regard to energy savings, develop a more dynamic and effective programme for the rational use of energy;

— with regard to coal, develop a programme ensuring an increase in its use and the achievement of a substantial domestic production in satisfactory economic conditions;

[1] 1 u.a. = BFR 50 / DKR 7.50 / DM 3.66 / FF 5.50 / LIT 625 / HFL 3.62 / UKL 0.40.

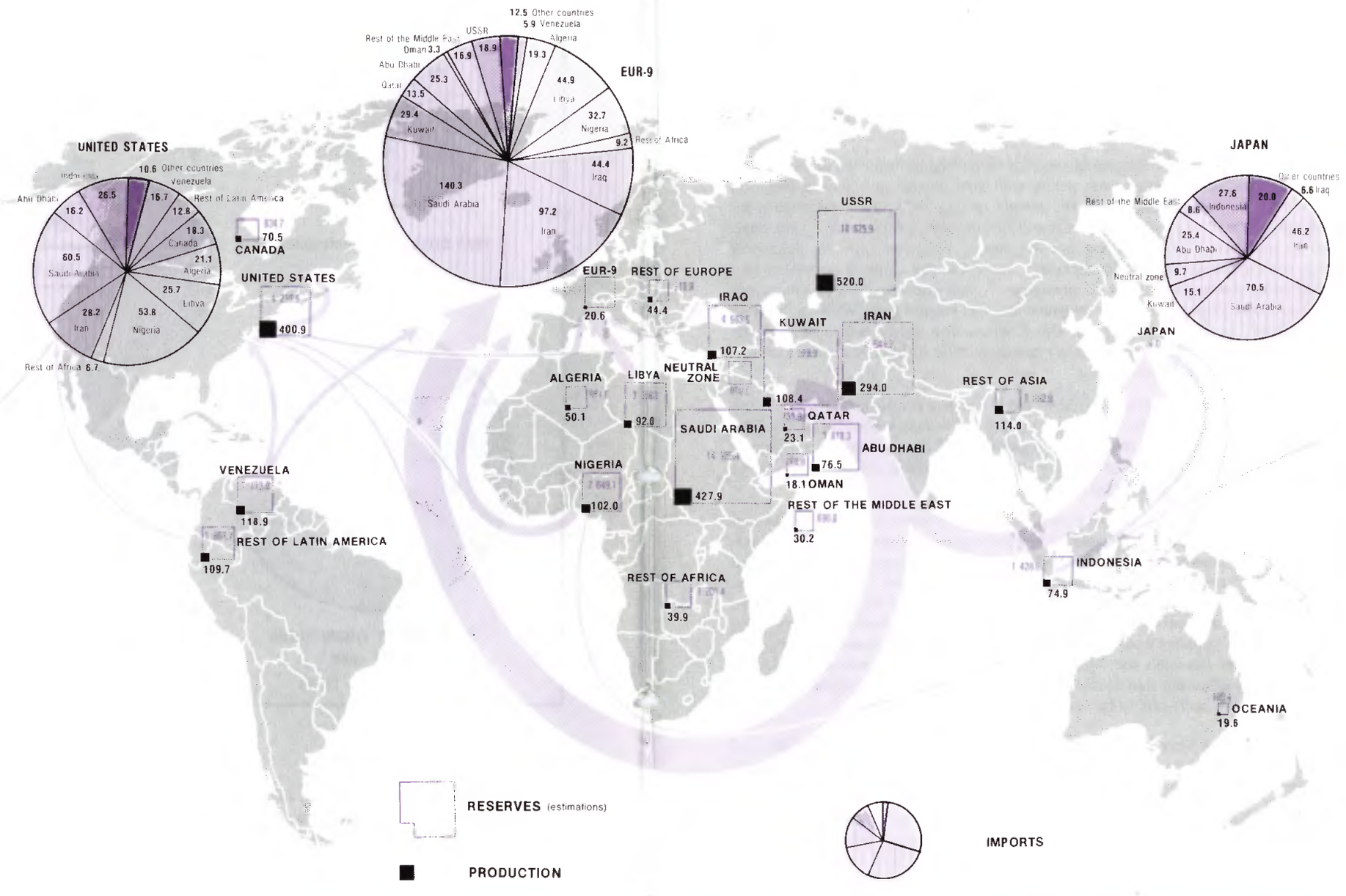


— with regard to nuclear energy, take the measures necessary to encourage its development, while at the same time solving the problems that may arise, particularly as regards safety—ranging from prospecting for uranium to the disposal of radioactive wastes;

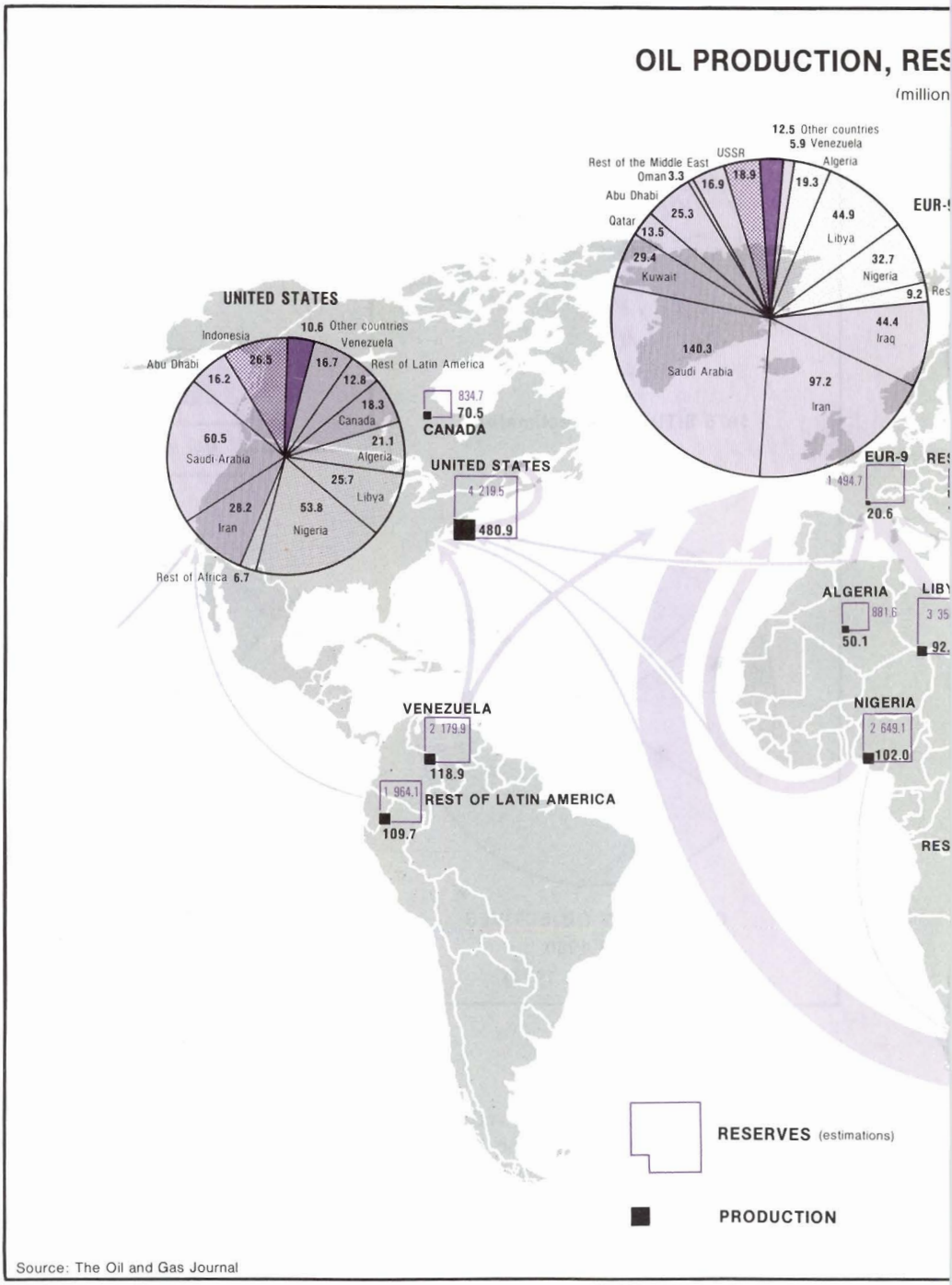
— with regard to new energy sources, develop an intensified programme of research, development and promotion.

OIL PRODUCTION, RESERVES AND IMPORTS

(millions of tons, 1976)



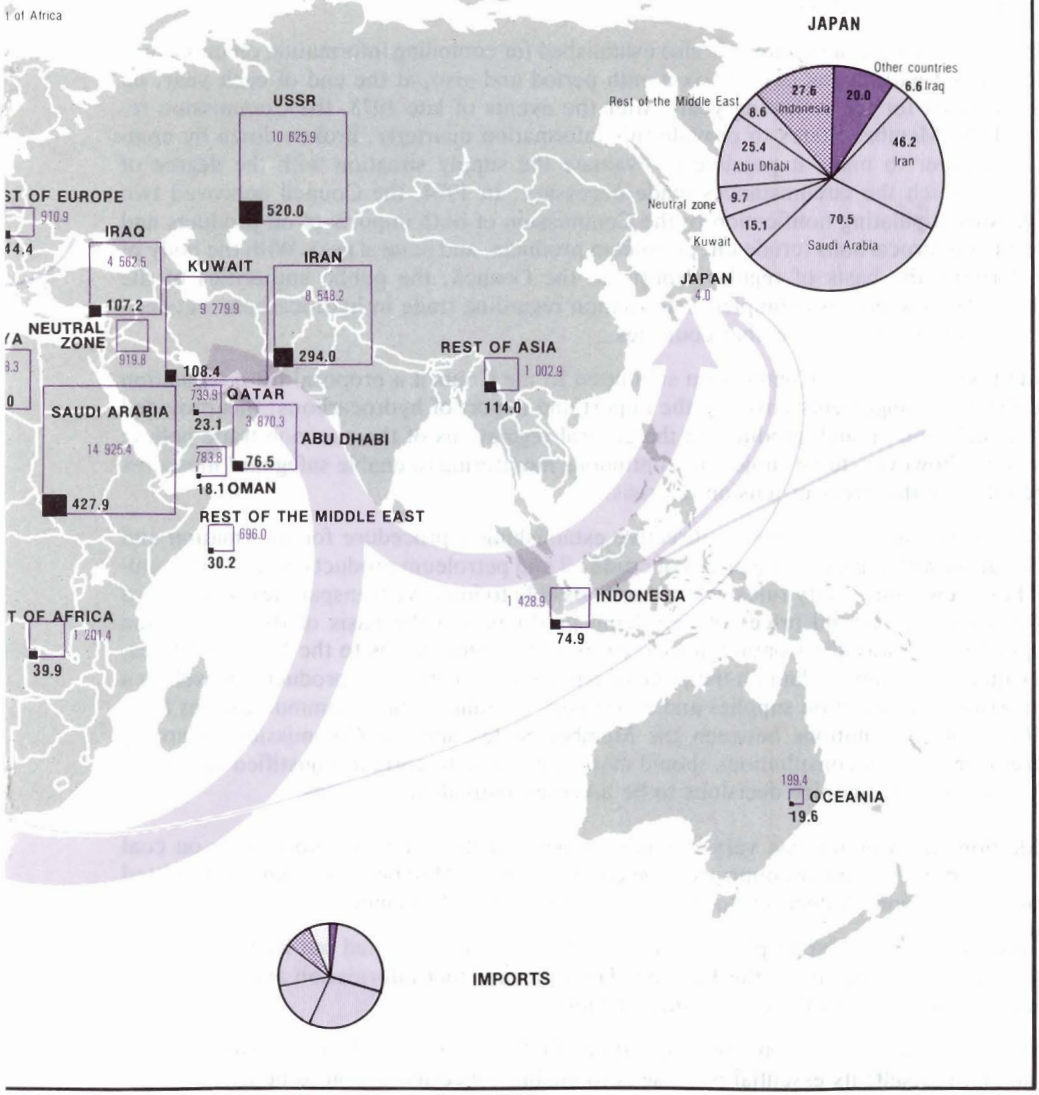
Source: The Oil and Gas Journal



Source: The Oil and Gas Journal

SERVES AND IMPORTS

s of tons, 1976)



4. *Energy policy instruments*

Among the instruments needed for the formulation and implementation of an energy policy, the most important are information and knowledge of trends in the energy market and the oil market in particular, about which both the majority of the Member States and the Commission possessed, until recently, only a limited amount of data.

As long ago as 1972, the Council adopted measures designed to give the Commission—in addition to the information of this kind compiled for the coal and nuclear sectors as a result of the ECSC and Euratom Treaties—information on planned investment in the oil, natural gas and electricity sectors.

About the same time, a system was also established for compiling information on imports of crude oil and natural gas in each six-month period and also, at the end of each year, on those forecast for the following year. After the events of late 1973, the Commission requested the Member States to provide this information quarterly, broken down by company, in order to make it possible to evaluate the supply situation with the degree of accuracy which the circumstances made necessary. In 1974, the Council approved two regulations stipulating notification to the Commission of both imports of oil products and exports of hydrocarbons (crude oil, petroleum products, and natural gas). With the body of data forming the basis of regular reports to the Council, the public authorities of the Community now possess complete information regarding trade in hydrocarbons between the Community and non-member countries.

In addition, in 1974 the Commission submitted to the Council a proposal for a regulation establishing arrangements covering the import and export of hydrocarbons; this provided for the inclusion of such products in the general regulations of the common trade policy; they were, however, to be subject to continuous monitoring to enable safeguard measures to be taken in the event of tension or crisis.

The Council also later adopted a directive establishing a procedure for information and consultation with regard to the prices of crude oil and petroleum products in the Community. These new Community rules will make it possible to improve transparency with regard to the market costs and prices of petroleum products. On the basis of the information compiled in this way the Commission prepares and communicates to the Member States, every quarter, summary data on the price of crude oil and petroleum products, as well as a comparison of costs of oil supplies and ex-refinery revenues. These communications form the basis of consultations between the Member States and the Commission regarding market trends; such consultations should make it possible to correct unjustified variations in prices and to harmonize decisions to be taken by individual countries.

In addition, the Council has very recently recognized the need for information on coal imports from non-member countries to be compiled in the Member States and transmitted to the Commission. A decision to this effect was taken in November 1977.

The coal monitoring system plus the nuclear fuel monitoring carried out by the Euratom Supply Agency set up under the Euratom Treaty means that information available to the Community now covers the entire range of fuels.

In the view of the Commission, the compilation of information on facts and trends is clearly not an end in itself; its essential purpose is to enable concerted action to be taken by the

national public authorities and by the Community institutions to ensure the implementation of common political guidelines. Moreover, as regards both trade and prices this concerted action is not confined to the public authorities, for the Commission is in constant touch with the trade sectors, and in particular with the oil companies which supply the Community, with the major transport and gas distribution industries and with coal and electricity producers.

In addition, the Commission has submitted to the Council two proposals: one seeks to establish a body for concerted action by the Community in the siting of power stations, while the other proposes a procedure for consultation at Community level for power stations liable to affect the territory of another Member State.

The implementation of an energy policy also entails measures of direct intervention and, in particular, the possibility of giving financial support to certain activities. In order to improve the Community's self-sufficiency, it is necessary to increase internal production so as to cover a growing proportion of energy requirements. The majority of energy-producing installations—oil wells, coal-mines, refineries, power stations, etc.—require constant investment. In order to effect the desired changes, the energy sector will, therefore, have a massive and continuing requirement for capital investment.

This gives rise to two problems: that of finding the vast amounts of capital required, and that of ensuring that the investments made do not find their profitability threatened by a decrease, possibly deliberate, in the price of imported energy and the shift in consumption patterns which could result.

As regards the first problem, the ECSC Treaty makes it possible to finance industrial loans to the coal sector by borrowing, and this system has been in operation since the establishment of the European Coal and Steel Community. The same possibility exists in the nuclear sector, as a result of the Euratom Treaty, and proposals in this sphere were made for many years by the Commission; however, it was not until 1977 that the Council authorized the Commission to raise capital for on-lending to financing the construction of nuclear power stations and industrial installations for fuel recycling. The Council has authorized the Commission to negotiate loans up to an initial sum of 500 million European units of account[1].

The Commission hopes to increase the borrowing capacity of the Community in the spheres where it already exists, and to extend it to other sectors: oil, gas, new energy sources, and techniques for conserving energy. It also hopes to finance loans and loan guarantees for investment projects through its general budget, even when this entails a risk of loss, as long as the risk is well-defined, limited and fully justified in each particular case.

With regard to measures designed to protect investments, the Commission categorically emphasizes the need for the adoption of a minimum safeguard price for oil, and also the signing of long-term contracts between Member States in a position to export energy and those they would thus undertake to supply.

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[1] 1 E.u.a. (february 1978) = BFR/LFR 40,1924 / DKR 7,01307 / DM 2,59338 / FF 5,82906 / LIT 1064,46 / HFL 2,77819 / UKL 0.629926.

Energy policy also ties in with industrial policy. The coal and nuclear industries, for example, have for a long time been a source of concern to the Community institutions. More recently, the Commission has concentrated its attention on the oil-refining sector, where surplus capacity and an imbalance between supply and demand for certain products are causing problems at a time when competition from exports of oil products from the oil-producing countries is on the increase. In order to obviate these difficulties, the Commission proposes to intensify its surveillance of this sector and to guide its future development essentially by means of mechanisms of information and consultation between all interested parties, both inside and outside the Community.

5. Rational utilization of energy and energy saving

One of the principal aims of energy policy is that of providing the consumer with the quantity of energy that he desires, in the most appropriate form, and using for this purpose the smallest possible amount of primary energy. This implies the elimination of waste, the reduction of losses and the improvement of conversion and utilization efficiency—in short, the rational use of energy and the achievement of energy savings. In December 1974 the Council adopted a Commission proposal for a Community action programme, the aim of which was to help achieve a 15% reduction in primary energy demand in 1985, as compared to what the total would be without this action. There was no question, therefore, of this measure affecting usable energy or impeding economic growth or social progress. The matter is of considerable importance, since it is a question of some 240 million mtoe, or at current prices, some 20 000 million dollars. The programme envisages both a procedure and a number of urgent measures in the domestic and tertiary sectors, and also in those of transport, manufacturing industries and energy industries. The Council, which confined itself to taking note of the measures envisaged, invited the Commission to submit to it concrete proposals, particularly short-term ones, and to present progress reports on the achievement of the principal aims.

Among the aims of energy policy rational utilization of energy and energy savings are top priority, since by narrowing the scope of the problem they facilitate its solution.

Moreover everyone is responsible, since everybody can and should, in various ways, contribute to effecting economies in energy. However, the public authorities are responsible for provoking awareness of this need among domestic, agricultural, industrial and other consumers, and for modifying the legal and economic structures in order to combat wastage, losses and unsatisfactory yields.

Under the terms of the programme, in March 1976 the Council adopted five recommendations on concrete measures for the rational utilization of energy; these cover incentives for the thermal insulation of buildings, efficient operation of heating installations in existing buildings, improvement in driver behaviour in order to reduce the fuel consumption of road vehicles, the promotion of public urban transport and, lastly, the operation of electrical household appliances.

Following a communication submitted at the beginning of 1977, which emphasized the importance and urgency of intensifying the implementation of the Community programme, in May of the same year the Commission submitted to the Council a new series of measures relating to:

— a programme designed to reduce the consumption of energy for space heating through the modernization of existing buildings: better insulation and improvement of installations;

— the operation of heat-generators, and also the insulation of the heat distribution system in new buildings (adopted in December 1977);

— the regulation of heating, the production of hot water for purposes of hygiene, and measurement of heat levels in new buildings;

— the rational use of energy in industrial enterprises;

— the establishment of national consultant bodies, with a view to promoting the combined production of electrical energy and heat for district heating or industry (recommendations covering the last three points were adopted in October 1977).

At the same time, the Commission proposed to the Council the initiation of a system of financial aid for demonstration projects on energy savings. The purpose of a demonstration project is to reduce the uncertainties regarding the commercial and economic viability of a given technique.

By helping the introduction of new processes onto the market, projects of this kind constitute a natural extension of research and development programmes. The financial aid given them by the Community in addition to any possible assistance from the Member States must, therefore, be assessed in conjunction with the national and Community research and development programmes.

The Commission would also like to see greater sharing of national experience in the rational use of energy, in order to select the most effective methods of energy saving, to coordinate national action and to determine the way in which the Community can best contribute to encouraging such action.

6. Greater use of nuclear energy

The importance of the atom for Europe's energy supplies was recognized as early as 1957 in what was known as the report of the 'Three Wise Men'. According to this report, nuclear energy should, after an interval of about ten years, that is to say from 1967 onwards, have begun to relieve the Community of the burden of oil imports, thus improving its supply structure and its overall situation.

The subsequent favourable conditions obtaining in the energy market—abundance of oil supplies and favourable prices—sharply reduced the Community's effort in this and discouraged the development of a greater use of nuclear energy.

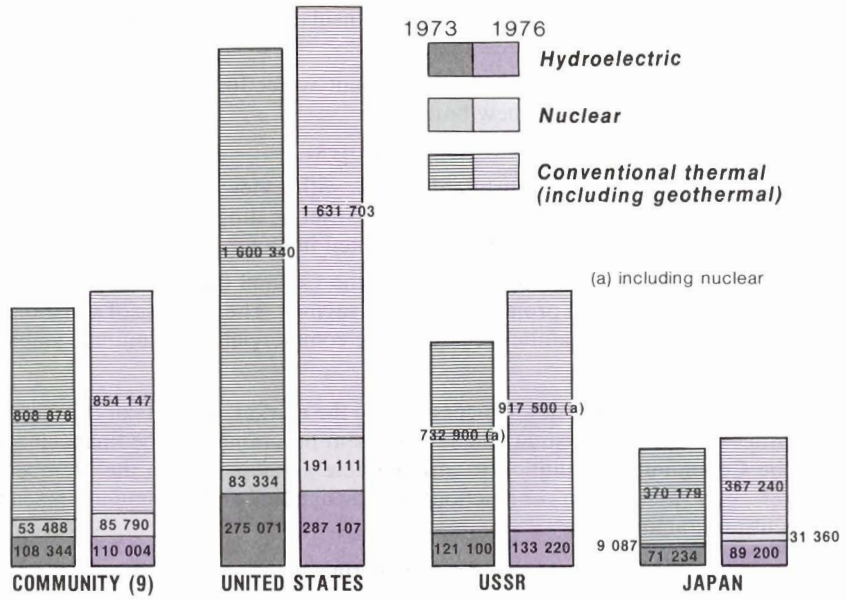
It took the 1973 crisis to bring nuclear energy once again into the foreground among the sources which can be used to replace imported oil.

The minimum objective established in 1974 was to have available, in 1985, nuclear power stations with a total installed capacity of 160 GWe, or, for example, 160 units with an average rating of 1 000 MWe. This would account for more than one-third of total production of electricity and cover some 13% of total energy consumption.

But as the impact of the oil crisis wore off and demand for energy stagnated, nuclear programmes throughout the Community lost their momentum and the likelihood of the 1985

ELECTRICAL ENERGY: NET PRODUCTION BROKEN DOWN BY SOURCE

(GWh or millions kWh)



(Source: Eurostat)

objective being achieved became increasingly remote. The latest estimate for installed capacity is a mere 90 GWe—a shortfall of 70 HWe on the 1974 forecast and the energy equivalent of 90 million tonnes of oil per year.

This trend is, no doubt, due partly to a certain apparent easing of the tensions affecting the energy market. It is, however, above all attributable to the very real difficulties encountered in the development of nuclear energy.

Although nuclear power stations produce electricity at a lower cost than conventional thermal power stations, they are extremely costly to build, and large-scale programmes require very considerable quantities of capital, which in the present economic situation presents serious problems. Of course, the Community can make use of its credit, as a borrower on the world capital market, to facilitate through loans the acquisition of the sums needed for investment in nuclear projects.

A further difficulty lies in the supply of nuclear fuels. For a long time it was thought that, although these fuels would have to be largely imported, their supply did not entail risks comparable to those which affect oil deliveries. However, the Commission has considered it necessary to draw up a policy for the supply of nuclear fuel; the aims of such a policy would be to ensure the availability of sufficient quantities of natural uranium at reasonable prices, and also of capacity for the enrichment and reprocessing of spent fuels, while at the same time promoting European industry in these sectors.

Table 2

ELECTRICAL ENERGY: NET PRODUCTION BROKEN DOWN BY SOURCE (GWh)

		Hydroelectric	Nuclear	Conventional thermal						Grand total
				Hard coal	Brown coal	Oil products	Natural gas	Gas, derivates thereof and other fuels	Total	
Germany	1973	15 272	11 153	96 953	68 977	40 541	33 836	13 416	253 723	280 148
	1976	13 820	22 846	88 833	88 897	32 293	53 501	13 159	276 683	313 349
France	1973	47 543	13 969	26 592	663	69 003	9 674	7 036	112 968	174 480
	1976	48 647	15 033	45 963	890	67 578	9 964	6 812	131 207	194 887
Italy	1973	38 901	2 973	1 737	1 114	84 189	4 221	3 649	94 910	139 103
	1976	40 704	3 612	3 344	1 179	87 823	13 224	3 946	109 516	156 214
Netherlands	1973	—	1 015	1 459	—	6 173	40 018	1 562	49 212	50 227
	1976	—	3 661	2 425	—	4 277	42 391	2 927	52 020	55 681
Belgium	1973	615	68	4 873	—	20 345	9 240	3 980	38 438	39 121
	1976	331	9 485	7 634	—	15 928	8 850	2 773	35 185	45 001
Luxembourg	1973	826	—	12	—	369	136	762	1 279	2 105
	1976	510	—	2	—	232	409	325	968	1 478
United Kingdom	1973	4 524	24 310	164 158	—	64 835	3 573	1 479	234 045	262 879
	1976	5 092	31 153	168 726	—	45 033	7 008	943	221 710	257 955
Ireland	1973	639	—	70	1 627 (Peat)	4 626	—	—	6 323	6 962
	1976	885	—	70	2 013 (Peat)	5 198	—	—	7 281	8 166
Denmark	1973	24	—	6 423	—	11 557	—	—	17 980	18 004
	1976	15	—	8 802	—	10 775	—	—	19 577	19 592
Community (9)	1973	108 344	53 488	302 277	72 381	301 638	100 698	31 884	808 878	973 029*
	1976	110 004	85 790	325 799	92 979	269 137	135 347	30 885	854 147	1 052 323*

* Including geothermal production in Italy (2 319 in 1973, 2 382 in 1976).

Source: Eurostat.

This expansion is now taking place with regard to the enrichment of uranium, and several installations for isotope separation are under construction in the Community. Efforts are also being made to develop prospecting for natural uranium within Community territory. The situation with regard to the reprocessing of irradiated fuels is, on the other hand, the cause of much concern and it requires coordinated promotion at Community level, together with the measures needed to ensure the compatibility of this reprocessing with safety and the protection of the environment on the one hand, and the exclusively peaceful use of nuclear energy on the other.

However, the supply of fuel to nuclear power situations will still be dependent on external supplies; for some years to come in the case of enriched uranium and over a long period in the case of natural uranium. Moreover, growing concern by exporters of nuclear fuel and technology about the problem of nuclear proliferation is likely to mean that exports will be increasingly subject to safeguards and political considerations. The problems arising from this are at present the subject of negotiations directed towards solving the question of international security and at the same time obviating possible obstacles to the development of nuclear industries within the Community. It may be recalled in this connection that the Community has for nearly twenty years had its own system of nuclear safeguards, which is now incorporated into that of the International Atomic Energy Agency (IAEA).

However, for some time past the chief of these obstacles has been public reluctance to accept expansion to the nuclear industry, because of the possible hazards to workers in such installations, to the population in their vicinity and the environment.

The Community has been engaged since 1958 in a programme of action in the sphere of public health protection against radiation, both in the field of research and in that of regulations and continuous efforts are being made to improve the design of nuclear installations and their methods of operation, from the point of view of safety and protection of the environment. Today, moreover, both the safety record and the level of safety in the nuclear industry are markedly superior to those of many other sectors of industry.

The Commission also has the firm intention of doing everything in its power to ensure that this degree of safety is maintained in the course of the industrialization of nuclear energy.

With this end in view, the Commission recently proposed the establishment of a twelve-year (1978-1990) Community plan covering all aspects of the problems arising from radioactive waste. This plan envisages, principally, coordinated development of research into the conditions in which the waste from nuclear power stations can be disposed of in the safest possible manner for almost unlimited periods, and also the identification, at Community level, of the sites offering the best guarantees in this respect.

Within the context of its action programme on the environment, the Commission is also formulating measures designed to ensure that the decommissioning and dismantling of nuclear installations at the end of their economic activity is fully compatible with the requirements of safety and of protection of the environment.

Lastly, the research programmes broadly reflect these varied concerns for the safety of workers and the surrounding population and the protection of the environment.

In November 1977 and January 1978 the Commission organized meetings to explain to representatives of public opinion the various aspects of the nuclear problem and to carry out any objective investigation into the conditions to be fulfilled if there is to be greater recourse to nuclear energy in the Community.

In the sphere of research, in addition to the safety of reactors and protection against ionizing radiation, the Commission is also making efforts to encourage the development of new types of reactor which will be more economical and make more efficient use of nuclear fuel, and also to extend the applications of nuclear energy.

In this connection, the Commission has recently commented on fast-breeder reactors (FBRs)—the new generation of nuclear reactors which make it possible to extract much more energy from fissile fuels than the present reactors.

The Commission observed that, in the context of a persistent and increasingly rapid deterioration in the Community's hydrocarbon supply position after the year 2000, it is important to maintain and, if possible, increase the proportionate share of nuclear fission in the energy balance of the Community during the first half of the next century. It considers, therefore, that the Community and its Member States must make efforts to make fast-breeder reactors available for electricity producers on a commercial basis during the 1990s. However, this necessitates a considerable effort to perfect FBR technology and, above all, to ensure safe working conditions and the protection of the environment. It is on these two aspects that the Community's efforts must principally be concentrated.

7. The development of secure resources

After long being the major, and almost the sole, source of energy supply for the Community, coal rapidly declined in importance after 1960. Until the crisis, European coal policy was based principally on a progressive cutback in production, within the limits imposed by regional requirements and the problems of employment.

The upheaval that occurred in 1973 led, firstly, to a reappraisal of coal policy, with a view to halting the decline in output, and maintaining the level of production at around 250 million tonnes between now and 1985. Accompanied by increased production of lignite and higher coal imports, this policy will mean that in 1985 solid fuels will provide a larger share than was previously forecast (17% instead of 10%) of energy supplies, and this will reduce oil imports.

However, the aim thus defined in 1974 does not appear easy to achieve. The coal industry was faced with a difficult situation in 1975 owing to the low level of demand and, despite the increase in energy prices, its financial position deteriorated in 1976, since cost increase outpaced earnings. It is, therefore, more necessary than ever to aid the Community's coalfields financially; consequently, at the beginning of 1976 the Commission formulated a new set of Community arrangements covering intervention by the Member States in favour of the coal industry. Furthermore, it was decided to continue unchanged the uniform system of aid to coking coal and coke, which is designed to maintain a sizeable production of coking coal within the Community in order to ensure a relatively independent supply for the European iron and steel industry.

With regard to market outlets, in late 1976 the Commission proposed measures designed to encourage the use of coal for the production of electricity by granting subsidies to assist the construction of modern coal-fired power stations. It also took steps to establish a mechanism for creating buffer stocks of coal.

Monitoring of coal imports has also been introduced, in order to ascertain market trends more accurately and rapidly. Furthermore, research into coal technology carried out for the past few years will be maintained in the future.

Today, coal is no longer the Community's only resource, and urgent efforts must be made to develop the considerable resources of oil and gas existing within the territory of the Community and, in particular, under the North Sea. Community oil production would thus be increased to 180 million tonnes in 1985, and that of natural gas to 175 mtoe, or even more. In order to maintain this effort, the Community grants financial assistance to Community research and development projects on new techniques for the prospecting and exploitation of hydrocarbons in particularly difficult areas such as the North Sea. Two successive annual allocations of aid representing just over 80 million units of account have been granted so far, covering about fifty projects. Now it is intended to extend the scope of action of this system to common projects concerning prospecting for hydrocarbon fuels with a view to encouraging the discovery of secure resources.

The Community also proposes to increase purchases of natural gas from non-member countries. Like the increase in coal imports, these purchases will have the advantage, if not of alleviating the balance-of-payments situation, then at least of diversifying the types and sources of external supplies. It is also necessary to make the best possible use of available resources. In addition to its programme for the rational use of energy, the Community has decided to restrict the use of natural gas and petroleum products in power stations, in order to reserve available hydrocarbon fuels for those uses in which they offer a specific advantage or for those in which, as in the case of vehicle fuels, they do not at the moment have any substitute.

However important and indispensable they may be, the solutions which a policy based on voluntary cooperation may bring to energy supply problems are subject to limitations which can be overcome only by technological progress. The implementation of an overall Community strategy in the energy sector therefore makes the continuation of Community research programmes particularly necessary.

In addition to those actions already under way, in respect of coal, hydrocarbons and nuclear fission and fusion, since 1975 the Commission has been developing programmes relating to:

— energy conservation by improving production techniques;

— production and use of hydrogen as a new source of energy;

— use of solar energy;

— use of geothermal energy;

— energy systems modelling.

In 1976, the Community devoted just over 100 million units of acoount to the entire programme of energy research and development. It must, however, be observed that, although this represented an increase over the previous year, this total still constitutes only 8% of the expenditure on energy research and development incurred by the Member States.

Moreover, it is not sufficient merely to make discoveries. The Commission proposes, therefore, to give financial assistance to projects for the exploitation of sources of energy other than oil. This involves the encouragement on an industrial or semi-industrial scale of

techniques and processes which have been proved scientifically feasible but whose technical and economic viability has yet to be demonstrated. In this programme, all the new sources are taken into consideration, but the greatest emphasis is placed on projects for the exploitation of geothermal deposits, as well as on the gasification and liquefaction of coal.

The most promising research project at present under way is that relating to controlled thermonuclear fusion. This project, which has been under consideration for a long time, was finally decided upon in October 1977 when, after two years of discussion, the Council of Ministers agreed to entrust its realization to the Culham Research Laboratory in the United Kingdom.

This project, which has been named JET (Joint European Torus) will be jointly financed. Its aim will be research into the production of energy for the next century by nuclear fusion using deuterium and lithium, raw materials which are available in almost unlimited quantities.

If all the technical problems can be resolved, JET, which is a most promising project, may ensure for Europe the new energy which is so urgently required.

8. Security of supplies

The majority of the measures described above are designed to increase security of supplies, directly or indirectly. However, they do not protect the market from all fluctuations. It is therefore necessary to organize storage arrangements which constitute a buffer against the effect of accidental or deliberate interruptions in supplies, providing, in the case of deliberate interruptions, a certain capability for resistance to economic or political pressures applied by the suppliers.

The Community has for a long time had a regulation providing for the obligatory storage of oil and oil products; the level of this is fixed, at present, at 90 days' consumption.

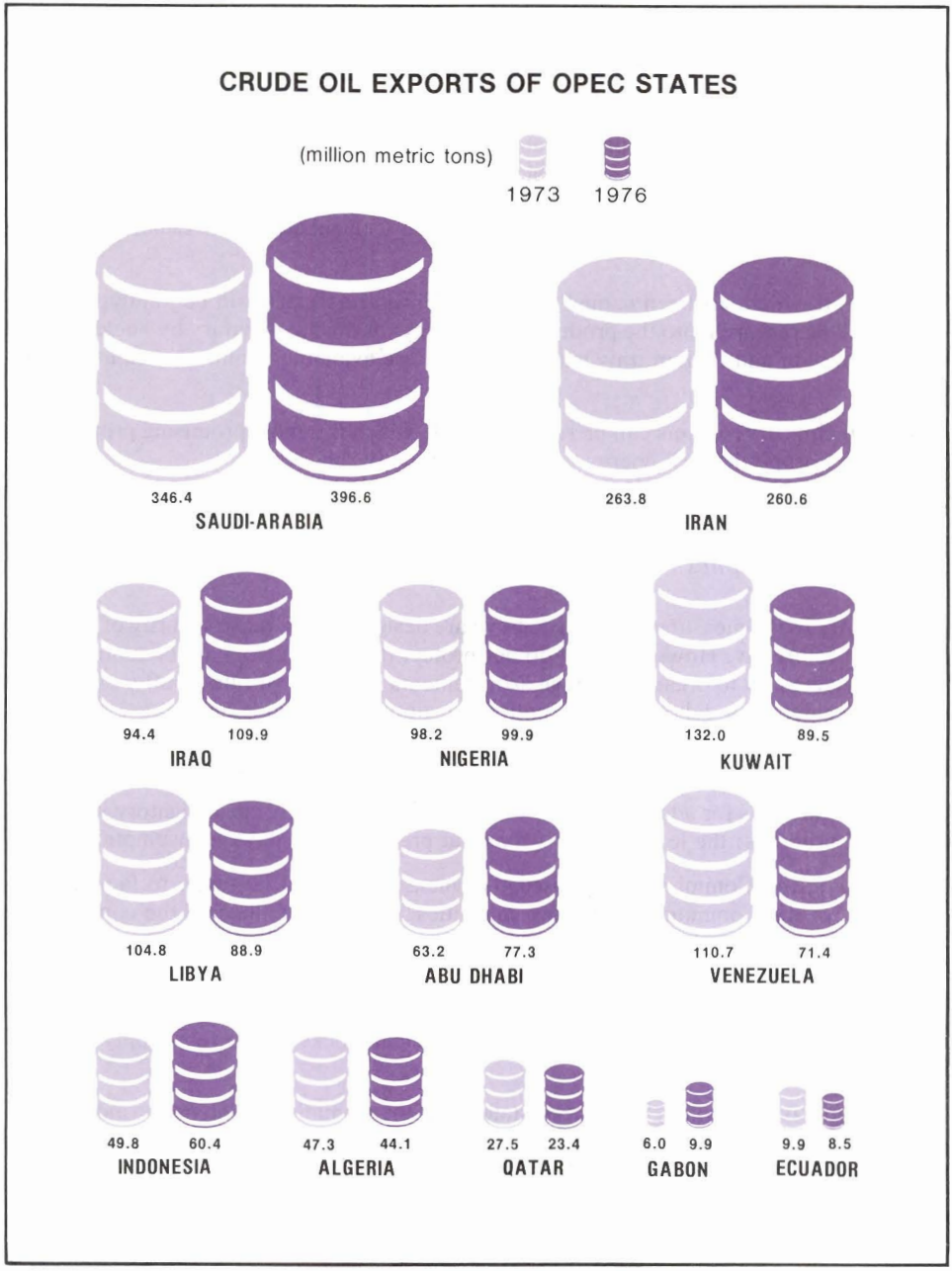
In May 1977, the Commission proposed that measures should be taken to facilitate optimum use of the Community's existing capacities, and also to alleviate the considerable burden represented by the financing of storage capacity, especially in the case of small and medium-scale companies.

Moreover, as from the beginning of 1978 the Member States will ensure that electricity producers maintain in thermal power stations sufficient stocks to ensure a supply of power for at least thirty days.

As far as coal is concerned, it has been stated that the Commission intends to aid storage; even though this is principally a measure to smooth out fluctuations in sales, these stocks will also contribute to security of supplies.

9. International aspects

The importance of external supplies in the Community's energy supply pattern has resulted in international relations becoming an essential factor in energy policy.


CRUDE OIL EXPORTS OF OPEC STATES
(million metric tons)
1973
1976
346.4
396.6
SAUDI-ARABIA
263.8
260.6
IRAN
94.4
109.9
IRAQ
98.2
99.9
NIGERIA
132.0
89.5
KUWAIT
104.8
88.9
LIBYA
63.2
77.3
ABU DHABI
110.7
71.4
VENEZUELA
49.8
60.4
INDONESIA
47.3
44.1
ALGERIA
27.5
23.4
QATAR
6.0
9.9
GABON
9.9
8.5
ECUADOR

It was observed above that the Commission participates in the work of the International Energy Agency, as in the other activities of OECD in the sphere of energy.

Within the context of this cooperation between the oil-consuming countries, the Council has established general guidelines for international cooperation in the development of energy resources:

— the oil-consuming countries mutually recognize each other's right to free access to energy resources;

— they agree to refrain from all discrimination towards the consumers of Community partner States, with regard to prices and conditions of access to energy resources;

— they will establish by common agreement a system of objectives for the production and conservation of energy, designed to constitute guidelines for their national policies;

— they will establish a procedure for the regular evaluation of progress achieved and obstacles encountered in the application of these principles and the pursuit of these objectives;

— within the context of cooperation in the development of alternative energy sources, the countries concerned will share the costs incurred in proportion to the benefits which they will derive from these activities.

Lastly, the importing countries which are members of the Agency have considered the question of sharing out the available resources among themselves as effectively as possible in the event of supply difficulties. The Community, for its part, decided in February 1977 to regulate trade in crude oil and oil products between the Member States in the case of supply difficulties, so that the mechanisms established by the Agency can function without contravening Community regulations. Measures designed to restrict Community consumption in the same circumstances were agreed in November 1977.

The energy crisis led to various attempts to initiate a 'dialogue' between the oil-producing and oil-consuming countries. A preparatory meeting devoted entirely to energy was held in Paris in April 1975, and proved to be a failure, because the developing countries requested that the discussion should not be confined to this subject and drew attention to the whole range of problems arising from the deterioration in their economic situation.

After it was finally agreed to broaden the scope of the discussion in this manner, the Conference on International Economic Cooperation was held in Paris, from December 1975 to June 1977.

The 'North-South Dialogue' so begun was not without difficulties, and the final report includes almost as many points of disagreement as of agreement. As regards energy, the points of agreement were very general in character:

— a conclusion and a recommendation regarding supplies, on a commercial basis, subject to the obligation to maintain purchasing power;

— recognition of the finite nature of oil and gas resources, and the transition from a mixture of energy supplies based on oil to more permanent and renewable sources of energy;

— the need for conservation and increasingly efficient use of energy;

— the need to develop all forms of energy;

— general conclusions and recommendations for national action and international cooperation in the sphere of energy.

Recently, the Community has initiated further contacts: a Euro-Arab dialogue is in progress, but so far it has discussed only one specific problem in the sphere of energy — refining and petrochemicals.

It must be observed that, in these discussions, the Community normally tends to promote its own interests, but at the same time it makes every effort to understand and to take account of those of the other parties, since a balanced situation bestowing mutual advantages is the best guarantee of a long-term stability in international relations.

Finally, it should be recalled that international discussions have been initiated on the problems of nuclear energy and, in particular, trade in fissile material, as a result of measures recently proposed by the United States. In view of the importance of nuclear energy to the Community, both the Community and the Member States must adopt, in this connection, united and coordinated positions.

Final considerations

In spite of the unanimous agreement on the need, in present circumstances, to formulate and implement an energy policy within the context of the European Community, the detailed preparation of this policy appears to be very laborious and progress very slow.

There are frequently long delays between the submission of proposals by the Commission and the decisions of the Council. The Community often reacts too late to the rapid development of circumstances, and the delay is sometimes so great that proposals become out of date before being adopted. Moreover, often the Member States, being conscious of this delay, are led to take unilateral action, in some respects as a precaution, which makes agreement on the measures proposed more difficult, if not impossible. Consequently there are still gaps in Community energy policy.

The blame for this situation is frequently attributed to the absence, on the part of the Member States, of sufficient political will to encourage European integration in the sphere of energy.

It must, however, be understood that this is an extremely complex sphere, involving both technical and economic problems, and a tangled web of causes and effects relating to scientific research, technological development, economic growth, social progress, international relations, and commercial and financial equilibrium, not to mention repercussions on the environment. Moreover, the Member States display differences in attitude which themselves tend to create differences in national situations and in 'political philosophy', or even the degree of progress of their own national energy policies. Lastly, energy policy must continually adapt itself to current developments, and past experience has shown that these are at times subject to dramatic changes.

Nevertheless, an attempt to take an overall view of Community energy policy, even in the form of a rapid survey such as that given here, makes it clear that the principles formulated,

the aims adopted, the measures already taken and those which will be implemented in the near future, all form an impressive and coherent overall picture.

Although there may not yet be any sign in actual events of the 'grand design' of a common energy policy, enough 'small steps' have already been taken to consolidate the progress achieved so far and to lay the foundations for further progress.

Glossary

• **Toe: ton oil equivalent.** This unit makes it possible to express in comparable fashion and hence to totalize the different energy sources in terms of their equivalent calorific values. The standard used is the calorific value of one ton of oil.

1 toe = 1×10^7 kcal or 10 million kilocalories
1 mtoe = 1 million toe = 1×10^{13} kcal.

• **Tce: ton coal equivalent.** Another unit of equivalence: based on coal

1 tce = 7×10^6 kcal or 7 million kilocalories, or 0.7 toe.
1 mtce = 1 million tce = 7×10^{12} kcal.

• **Calorie:** quantity of heat required to raise the temperature of 1 gramme of water by 1 degree C.
1 kilocalorie or kcal = 1 000 calories

• **Kilowatt or (kW):** unit of power equal to 1 000 watts. It is used in particular for electricity; in this case the term is the electric kilowatt or kWe.

There are many other multiples of the watt, including:
— the electric Megawatt or MWe = 1×10^3 kWe = one thousand electric kilowatts,
— the electric Gigawatt or GWe = 1×10^6 kWe = one million electric kilowatts.

• **Kilowatt-hour or kWh:** unit of energy equivalent to the energy supplied during one hour by a machine with a power output of one kilowatt.

The more usual multiples are:
— the Gigawatt-hour or GWh = 1×10^6 kWh = 1 million kilowatt/hour,
— the Terawatt-hour or TWh = 1×10^9 kWh = 1 thousand million kilowatt/hour.

• **Primary energy:** energy obtained directly from nature. The following are examples of primary energy:
— fossil fuels: coal, crude oil, natural gas, brown coal/lignite, peat;
— hydroelectric energy;
— geothermal energy (hot water or steam sources);
— tidal energy;
— wind energy;
— solar energy;
— nuclear energy (produced by controlled reactions in the nucleus of the atoms of certain substances).

In certain cases, these forms of energy may be used directly (e.g. coal burnt in the hearth) or else transformed (e.g. coal burnt in a power station to produce electricity).

• **Secondary energy:** energy resulting from a transformation process. A typical example is electricity which is generated in thermal power stations by transforming fossil fuels (however, some electricity is generated directly in hydroelectric and geothermal plants).

Nuclear energy is difficult to classify because so far it has been generated in the form of electricity by processing fossil matter (uranium, thorium, plutonium). It is generally classified as primary energy.

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