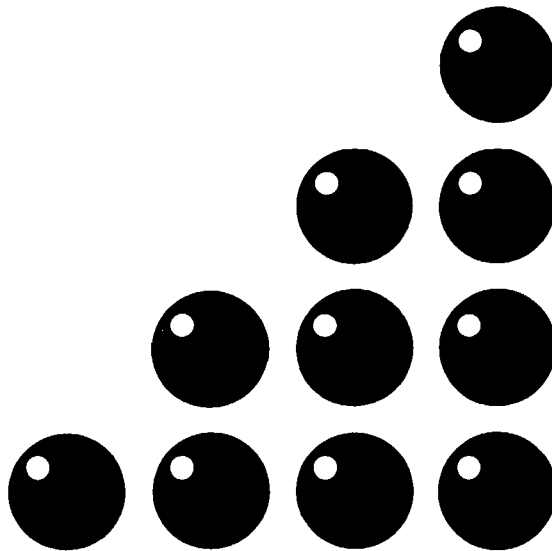


# THE EUROPEAN COMMUNITY AND THE ENERGY PROBLEM

---



## In the same collection

---

Education of migrant worker's children in the European Community (*out of print*)  
The European Community and nuclear safety (*out of print*)  
The protection of workers in multinational companies (*out of print*)  
The European Community's external trade (*out of print*)  
Teacher training in the European Community (*out of print*)  
The elimination of non-tariff barriers to intra-Community trade (*out of print*)  
The European Community's competition policy (*out of print*)  
The European Community and the developing countries (*out of print*)  
Worker participation in Europe (*out of print*)  
The European Community's environmental policy (*out of print*)  
The consumer in the European Community (*out of print*)  
25 years of European Community External Relations  
The second enlargement of the European Community  
The Community and its regions (*third edition*)  
Cultural action in the European Community  
The Customs Union (*second edition*)  
The European Community's research policy  
The European Community and vocational training  
The Court of Justice of the European Communities (*second edition*)  
The European Community's transport policy  
The social policy of the European Community (*second edition*)  
The economic and monetary union (*second edition*)  
The European Community's financial system (*third edition*)  
The European Community's legal system  
The economy of the European Community  
Freedom of movement for persons in the European Community

(continuation on third page of cover)

---

Originating department:  
Division IX/C/11 — Coordination and preparation of publications

# The European Community and the energy problem

Third edition

Manuscript completed in November 1982

This publication is also available in the following languages:

DA	ISBN 92-825-3396-4	EF og energien
DE	ISBN 92-825-3397-2	Die Europäische Gemeinschaft und die Energiefrage
GR	ISBN 92-825-3398-0	Ἡ Εὐρωπαϊκὴ Κοινότητα καὶ τὸ πρόβλημα τῆς ἐνέργειας
FR	ISBN 92-825-3400-6	La Communauté européenne et le problème de l'énergie
IT	ISBN 92-825-3401-4	La Comunità europea e il problema dell'energia
NL	ISBN 92-825-3402-2	De Europese Gemeenschap en het energievraagstuk

Cataloguing data can be found at the end of this publication

Luxembourg: Office for Official Publications of the European Communities, 1983

ISBN 92-825-3399-9

Catalogue number: CB-NC-83-001-EN-C

Reproduction in whole or in part of the contents of this publication is free, provided the source is acknowledged

*Printed in the FR of Germany*

# Contents

Introduction .....	5
<b>I — The market before the crisis (1950-73) .....</b>	<b>7</b>
1. Volumes .....	7
2. Supply structure .....	7
3. Prices .....	10
4. Effects within the Community .....	11
5. World-wide effects .....	12
6. Harbingers of crisis .....	13
<b>II — Impact of the crisis .....</b>	<b>17</b>
1. Cause and recent trends .....	17
2. Reactions of the oil-consuming countries .....	19
3. Effects on the world economy .....	20
4. The Community and the new factors governing the energy market .....	22
<b>III — An energy policy for the Community .....</b>	<b>23</b>
1. The first steps towards the first achievements .....	23
2. The fundamental options .....	24
3. Strategy: objectives and priorities .....	26
4. Policy instruments .....	31
5. Rational use and saving of energy .....	36
6. The development of alternative resources .....	39
7. Security of supply .....	46
8. International aspects .....	47
<b>Final considerations .....</b>	<b>51</b>
<i>Glossary</i> .....	53
<i>Further reading</i> .....	55

# Introduction

Belgium, Denmark, the Federal Republic of Germany, France, Greece, Ireland, Italy, Luxembourg, the Netherlands and the United Kingdom as members of the European Community share a common economic and social destiny.

The Community's 272 million citizens already enjoy an average standard 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.

Energy is a determining factor in the operation and development of a modern economy.

Most of the Community used to be relatively self-sufficient in energy, but over the last 30 years has gradually come to depend, as a whole, on imports — especially of oil — to cover much of its needs; total imports exceeded 64% in 1973 and are still over 47% in 1982.

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

But in the final quarter of 1973 and, once again in 1979-80, there were serious disruptions whose effects are still being felt. However, this 'energy crisis' was only apparently precipitated by the political and military events which marked its beginning. Instead, its roots are to be found in the market patterns throughout the previous decades.

As early as 1962 the European institutions became aware of the need to control developments more effectively and outlined an energy policy for the Community.

The 'energy crisis' could only make the need for such a policy more imperative for it demonstrated clearly the vulnerability of the economy of Western Europe to interruptions or restrictions of supply and also to sharp increases in energy prices. Furthermore, it emphasized the ineffectiveness of isolated or uncoordinated national reactions, as well as 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.

It must, however, be clearly realized that no discovery or 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 in no way remove the need for considerable imports in the foreseeable future.

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 policy measures 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 or have repercussions on the energy situation mean that, in order to respect the unity of the common market and achieve economic and monetary union, national energy policies shall converge towards an energy policy which, by collective discipline aimed at attaining common objectives, shall ensure equivalent efforts and results throughout the territory of the European Community.

Unity on policy is essential if that policy is to be effective, since it alone allows the Member States to cope with problems beyond their individual capabilities and reduces the risk of duplication in research and investment. It enables the Member States to enjoy the advantages of a large market and share the cost of certain major projects. Such a policy makes it possible, finally, to take advantage of the economic and political strength of an entity of more than 270 million inhabitants in relations with the multinational oil companies, with other importing countries and even in the dialogue with the oil-producing countries.

But a European 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 in adjusting to developments which will undoubtedly contain uncertainties and surprises.

Community 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.

This implementation process may seem slow and unspectacular, but it is also realistic and practical. It is rule-of-thumb in appearance only, since it is consistently based on a body of clearly recognized principles and objectives and, from now on, will apply an overall energy strategy which, in accordance with well-defined priorities, will direct the Community as it progresses.

## I — The market before the crisis (1950-73)

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

### 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 Member States then forming the Community had a combined energy consumption of almost 1 000 million tonnes of 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 15 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.

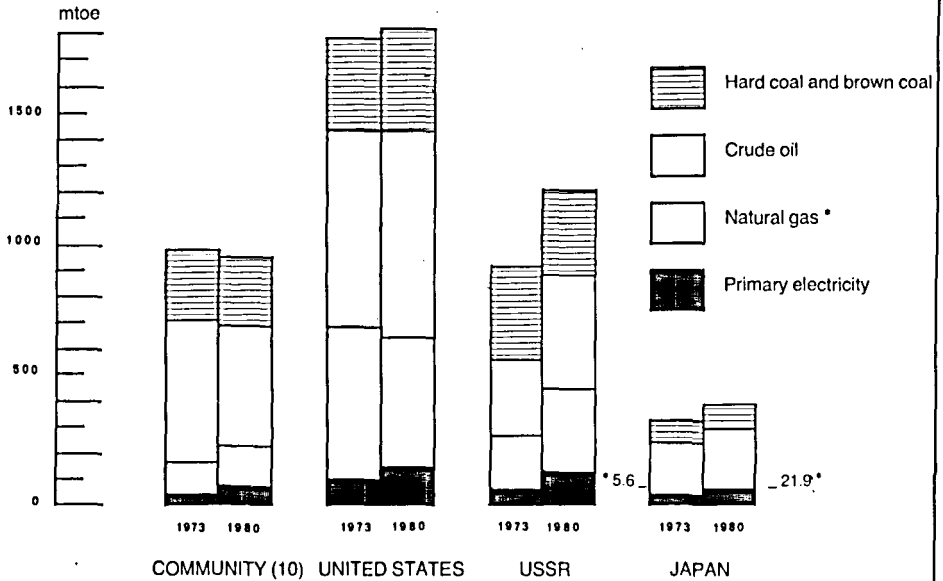
Immediately after the Second World War more than 80% of the total energy requirements of the countries which now form the European Community were met by solid fuels (coal and lignite), while oil accounted for only about one-tenth of the total. By 1973, however, solid fuels covered scarcely more than one fifth of total requirement (23%), whereas oil accounted for nearly 3/5 (59%), and natural gas — a source recently established in Europe — accounted for over 12%, and hydroelectric, geothermal and nuclear energy accounted for the balance (just over 4%).

It was, therefore, hydrocarbon fuels (oil and natural gas) that made the rapid growth in consumption possible. In addition, the uses to which petroleum products are put have been extended considerably.

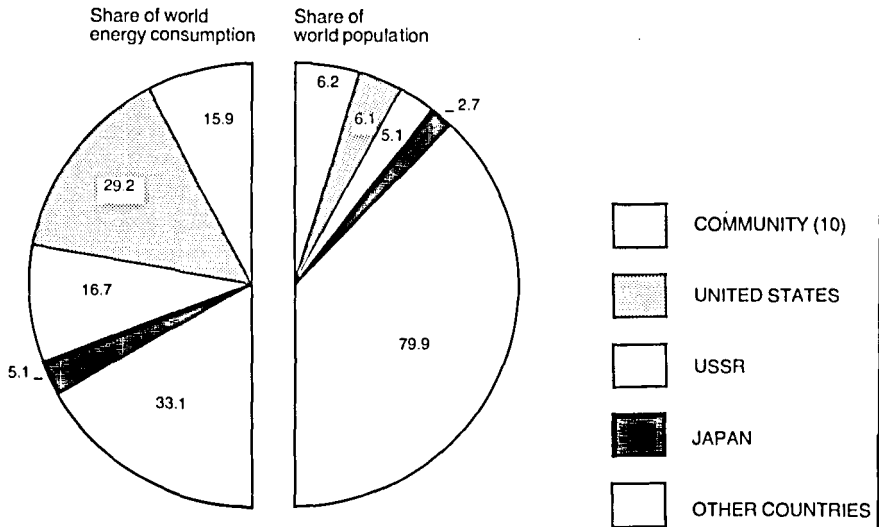
Whereas in the past they were used mainly as motor fuels, they have been increasingly used to produce thermal heat (heating, furnaces, electricity, etc.) and as raw materials for the petrochemical industry.



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



### INTERNATIONAL COMPARISONS (1979 in %)



Share of the various sources of primary energy in gross consumption  
(toe: tonnes of oil equivalent)

		Hard coal and equivalent		Brown coal and equivalent		Oil and equivalent		Natural gas		Other fuels		Electrical energy		Total	
		1973	1981	1973	1981	1973	1981	1973	1981	1973	1981	1973	1981	1973	1981
BR Deutschland	mtoe	59.6	55.5	23.6	30.1	145.9	114.1	27.4	41.8	0.7	1.0	8.3	15.7	265.6	258.2
	%	22.4	21.5	8.9	11.7	55.0	44.2	10.3	16.2	0.3	0.4	3.1	6.0	100	100
France	mtoe	27.8	28.0	0.9	1.0	123.6	95.8	13.7	21.6	0.1	0.1	13.2	32.8	179.5	179.3
	%	15.5	15.6	0.5	0.5	68.8	53.4	7.7	12.1	0.1	0.1	7.4	18.3	100	100
Italia	mtoe	7.7	11.5	0.4	0.3	95.3	91.0	14.5	22.2	0.3	0.2	9.7	5.6	127.7	130.8
	%	6.0	8.8	0.3	0.2	74.6	69.6	11.3	17.0	0.2	0.1	7.6	4.3	100	100
Nederland	mtoe	3.2	4.1	0.0	—	29.3	27.0	29.0	28.9	0.0	0.3	— 0.1	0.9	61.4	61.2
	%	5.1	6.7	0.1	—	47.7	44.1	47.2	47.2	0.0	0.5	— 0.1	1.5	100	100
Belgique/België	mtoe	11.7	11.1	0.0	—	27.5	20.8	7.3	8.3	0.0	—	— 0.1	3.3	46.4	43.5
	%	25.1	25.5	0.0	—	59.3	47.8	15.8	19.1	0.1	—	— 0.3	7.6	100	100
Luxembourg	mtoe	2.5	1.5	0.0	—	1.8	1.1	0.2	0.3	1.1	—	0.6	0.3	5.1	3.2
	%	48.7	46.9	0.4	—	32.9	34.3	4.4	9.4	0.1	—	13.5	0.4	100	100
United Kingdom	mtoe	80.7	67.2	—	—	108.2	72.5	25.6	40.5	—	—	8.2	11.1	222.6	191.3
	%	36.2	35.1	—	—	48.6	37.9	11.5	21.2	—	—	3.7	5.8	100	100
Ireland	mtoe	0.6	0.9	0.8	0.9	5.5	5.1	—	1.1	—	—	0.2	0.1	7.1	8.1
	%	8.2	11.1	11.4	11.1	77.8	63.0	—	13.6	—	—	2.6	1.2	100	100
Danmark	mtoe	2.3	5.1	0.0	—	17.3	11.5	—	—	—	—	— 0.0	0.6	19.6	17.2
	%	11.5	29.6	0.1	—	88.6	66.9	—	—	—	—	— 0.2	3.5	100	100
Hellas	mtoe	—	0.2	—	3.1	—	10.9	—	—	—	—	—	0.3	—	14.5
	%	—	1.4	—	21.4	—	75.2	—	—	—	—	—	2.1	—	100
EUR 10	mtoe	195.9	185.0	25.8	35.6	554.4	449.6	117.8	164.8	1.1	1.7	40.0	70.6	935.0	907.3
	%	21.0	20.4	2.8	3.9	59.2	49.5	12.6	18.2	0.1	0.2	4.3	7.8	100	100

Source: Eurostat

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;
- oil and natural gas would increase their share still further;
- hydroelectric and geothermal energy would be of even less importance, covering only 2% of requirements, while nuclear energy would increase its share considerably.

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 long been poor in oil resources. Even today, despite the recent North Sea discoveries, these are enough only to meet part of the demand and will be able to do so only for a limited period. 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 total energy supplies of the Member States in 1973.

Furthermore, according to the forecasts made before the crisis of 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 onset 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 on 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; indeed, in real terms, 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: it was indeed possible for the Community to secure its energy supplies at very advantageous prices, as oil was able to cover the increase in demand at low prices and thus 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 a short time ago between, on the one hand, the energy-producing countries (i. e. mainly those producing oil) such as the Federal Republic of Germany, France, the United Kingdom and (to a lesser extent) Belgium and the Netherlands, and, on the other, the mainly energy-consuming countries: Denmark, Greece, Ireland, Italy 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 25 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 had become net importers of energy by the 1970s — the amount varying in 1973 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 industries consuming large quantities of coal.

Finally, the oil-refining industry has developed its operating installations in step with a sustained growth in demand for petroleum products. The early action required in respect of

investment projects with lead-times running into several years was to result in an aggregate capacity which was very large even before the crisis; once the crisis had arrived, this capacity proved very much in excess of needs, thus threatening the viability of the refining industry.

## 5. *World-wide 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 1960-70. 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 and geopolitical situation on a world-wide scale.

In the economic context, the world oil industry has also undergone profound change. Up to the end of the 1960s, 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 both 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 oil 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 interrelationships 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 enjoyed faster and more sustained economic growth than the United States.

## 6. *Harbingers of 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 the world market from a buyer's into a seller's market.

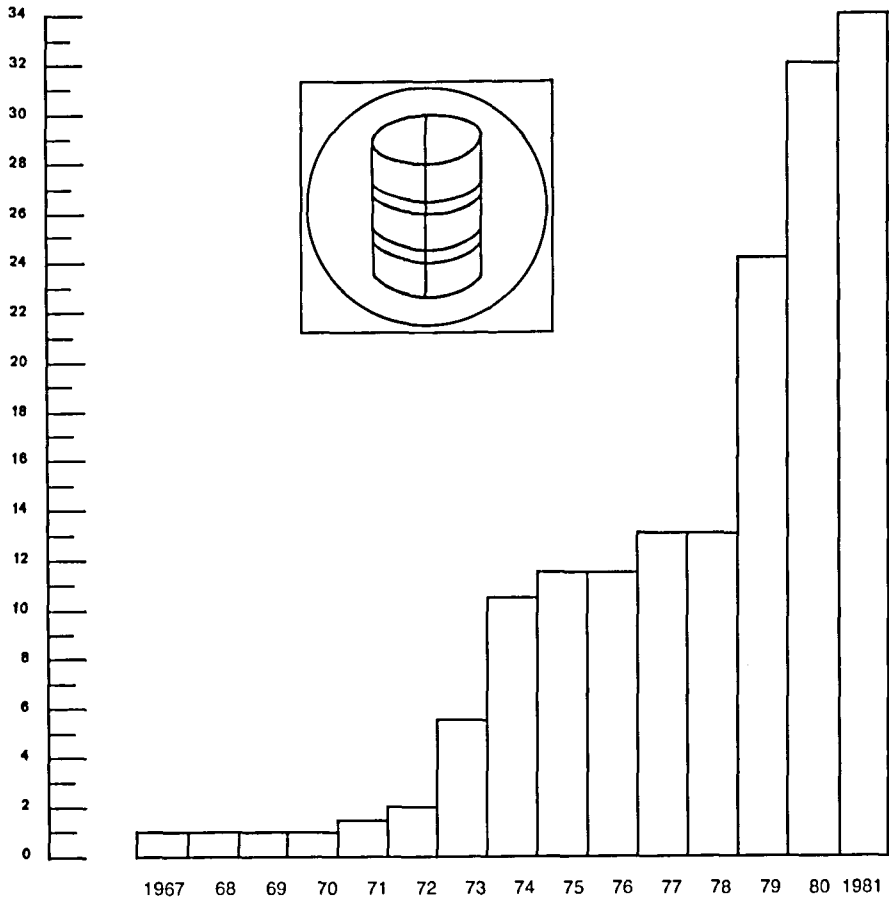
The exporting countries, grouped together under the banner of OPEC, realizing the advantage to be gained from this new situation, tried to pursue a concerted policy for obtaining an increase in their oil revenues and certain guarantees for maintaining the real value of those revenues, in a world context characterized by major currency fluctuations, notably the floating exchange-rate of the US dollar, the currency used in oil transactions. These countries have also tried to control the economic and technical 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 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 agricultural and industrial development. In these countries, oil revenues are invested mainly in infrastructures and in capital goods purchased from Europe or America.

The remaining countries, on the other hand, can transfer their surplus earnings from oil only to their current expenditures and investments, mostly doing so in the short term. This at vari-

DEVELOPMENT OF CRUDE OIL PRICES  
 Crude oil acquisition costs\* for the producing companies  
 (Arabian Light 34° API — dollars per barrel)



\* At the end of the year.

Market price

ous moments in the past has resulted in floating volumes of capital whose considerable mobility has accentuated, or even provoked, dangerous monetary fluctuations.

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 have wondered, moreover, whether they should reduce 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 that this oil represents 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 legitimate concerns and has given rise to the 1971 Tehran 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.

Market trends in recent years, which have seen a significant reduction in world-wide demand for oil, make it more difficult to pursue some of these objectives and may even compromise some aspects of them.



Page 17 in the original is blank.

## II — Impact of the crisis

### 1. *Cause and recent trends*

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 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.

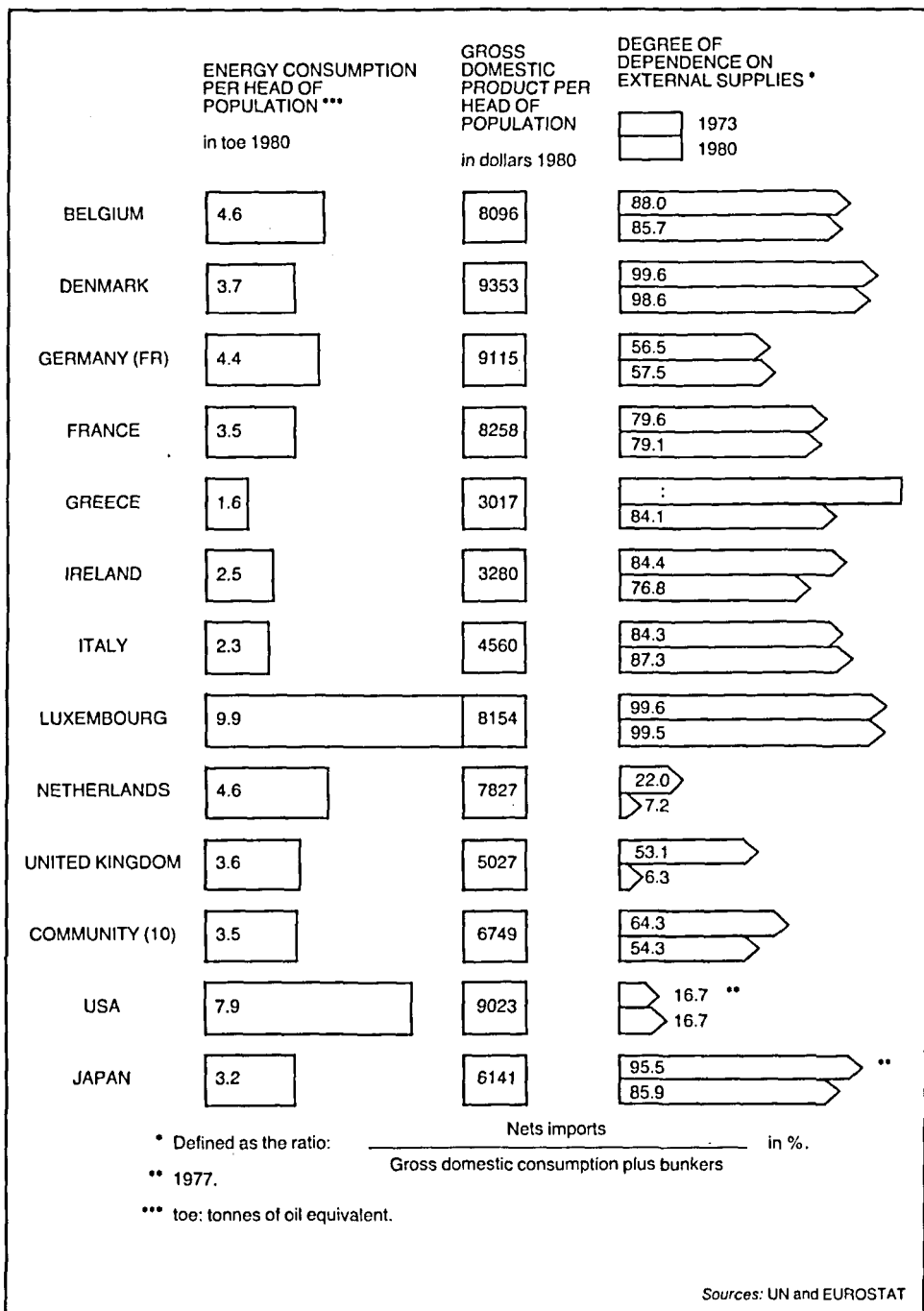
In December 1973, the exporting countries stopped fixing crude oil prices by agreement with the oil companies and decided that in future they would determine the level of these prices unilaterally. Crude oil prices immediately tripled, then increased again shortly afterwards so that in January 1974 the price of crude oil exported from the producing countries was 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.

We shall see that the abrupt rise in crude oil prices has had serious effects on the level of economic activity. These effects, in their turn, have restricted energy consumption. This trend, coupled with the measures taken to save energy and reduce imports ensured for the Community a relatively secure supply situation up to the end of 1978. The general rate of inflation and the depreciation of the dollar cushioned the effect of the oil price rise, bringing it to and maintaining it at a level equivalent to or even lower than that of January 1974 in constant prices, despite further rises.

However, tension did return to the world oil market in 1979. In the first six months of that year, the crisis in Iran resulted in a slight supply shortfall which, amplified immediately by precautionary stockbuilding on a massive scale, caused spot market prices to rise. The Organization of Petroleum Exporting Countries (OPEC) then decided to increase crude oil prices, further raising them in stages to an average in 1980 of double the December 1978 level.

Thereafter, the oil supply situation became slightly more normal, and in 1982 the world-market price of crude oil even fell somewhat as a result. For the Community, however, the favourable consequences of this relaxation were largely offset by the considerable appreciation of the dollar in relation to European currencies.



## 2. *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 reservations about some of the guidelines adopted, did not take part in the Energy Coordination Group set up by the conference. The work of this Group led to an international agreement on energy and to the establishment of the International Energy Agency (IEA) within the framework of the Organization for Economic Cooperation and Development (OECD).

In essence, the agreement covers an extensive programme of cooperation which includes:

- ensuring, in the event of oil supply difficulties, 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 about 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 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.

The Council drew up regulations along these lines for the reduction of energy consumption and on intra-Community trade in oil.

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. The Commission has the dual role of coordinating (a) the views of its Member States and (b) the action of the Agency and that of the Community.

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

- (i) the establishment and implementation of a programme of long-term cooperation on the development of resources and economical use of energy, including energy R&D;
- (ii) the examination of national programmes for energy conservation, including the development of new sources and resources;
- (iii) the improvement of the information system covering the oil and gas markets;
- (iv) the creation of a statistical data centre for energy;

- (v) the establishment of a mechanism for the restriction of demand and the sharing of oil resources in the event of supply difficulties.

Progress towards agreement and cooperation between the energy-consuming countries largely depends on market trends: efforts slacken when the difficulties diminish, only to re-intensify when the situation again turns critical. The tensions which reappeared in 1979 have, however, led to one advance: at their summit meeting in Tokyo in June 1979 the Heads of State or Government of the United States, Canada, Japan, and the European Community agreed on a common strategy to restrict oil consumption and accelerate the development of other energy sources. In practical terms, these countries have committed themselves to maintain their oil imports for the next five years at the 1978 or 1979 level, to practise a realistic oil-pricing policy, to promote energy savings, to encourage the production and utilization of coal and, finally, to take coordinated measures to develop those energy sources which can serve as alternatives to oil.

The achievement of the first of these commitments was facilitated by the big rise in prices in 1979-80; energy consumption was curbed and oil imports rapidly fell below the target set in Tokyo.

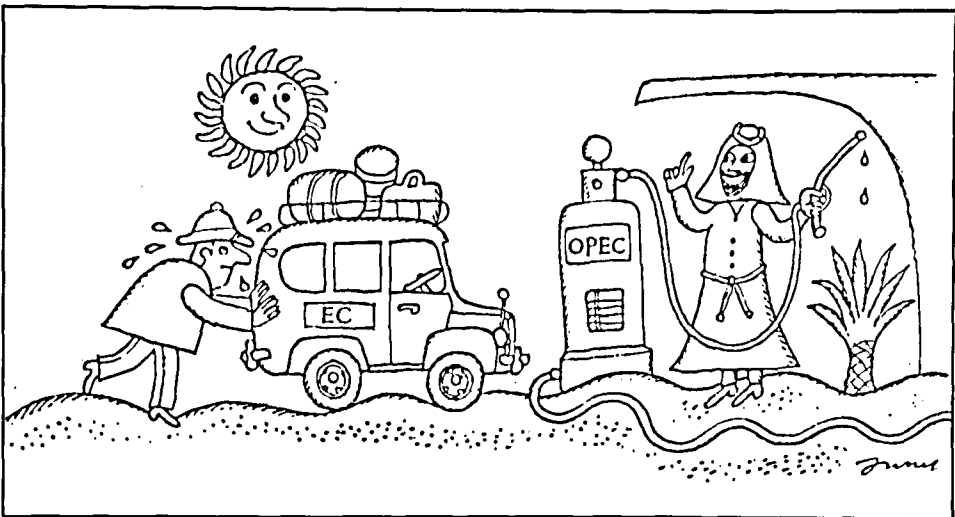
As for the Community, it has reaffirmed on several occasions that it would stick to the above commitments and, on 16 March 1982, the Council again underlined its determination to resist the temptation of taking the easy way out which might arise now that the supply situation was easing and oil prices falling.

### 3. *Effects on the world economy*

The two successive oil-price shocks of 1973-74 and 1979-80 which took the price of a barrel of crude oil from less than USD 3 to nearly USD 36 have obviously had considerable economic consequences. However, although these two price rises were of similar magnitude in real terms, their economic results were not strictly comparable since they took place in different circumstances. In 1973, when production-capacity utilization rates were high, the very large increases in the price of non-energy raw materials and the rise in the dollar *vis-à-vis* European currencies reinforced the inflationary effects of the oil-price shock. The rise in prices within the Community went up from an average of less than 4% in the 1960s to about 12% for 1973, 1974 and 1975, with a wide range of increase from country to country: rates of 15% to 20% were recorded in Italy, Ireland and Greece, whereas Germany managed to limit the rate to about 7%. The different reactions of the oil-importing countries, expressed notably in the economic policies implemented and the different behaviour of economic operators, lent powerful support to the deflationary effect of the oil-price shock, and the world economy went into its first recession since the war. Community GDP fell in volume terms by more than 1% in 1975.

The quadrupling of the price of oil in 1973-74 also resulted in a spectacular reversal of the industrialized countries' balance of payments, but still more so in the case of the non-oil-producing countries, which finally bore the brunt of the OPEC surplus. As well as causing considerable monetary disruption such changes had a restrictive effect through the lasting contraction of world trade which resulted.

The second oil-price shock came when the world economy, without having adapted sufficiently to the constraints arising from the new energy situation, was again growing, albeit at a slower rate than in the 1970s. Thus the average growth rate for the Community in the period 1976-79 was 3.5% compared with 5% for the period 1960-70. As the economic situation was different — under-utilization of production capacity, stagnation or a fall in the prices of several raw materials, better coordination of economic policies — the effects of the second oil-price shock were more successfully controlled in the short term, and it was possible to avoid a recession in 1979 and 1980. However, in contrast to what happened after 1975, the crisis is lasting longer in most economies: the average rate of growth for the three years 1980, 1981 and 1982 is slightly less than 1% for the OECD countries, nearly 0.8% for the Ten, 0% for the United States and about 3% for Japan. In addition, the employment situation, which got seriously worse in 1975 as a result of the recession, has only deteriorated further: the number



out of work in the Community went up from 3.5 million in 1974 to 5 million in 1975 and passed the 10 million mark by the end of 1981. Naturally, the successive rises in the price of oil are not the sole cause of the deterioration in the general economic situation, and efforts to adjust to the energy constraints have been kept up. Thus energy consumption per unit of GDP at 1970 prices and exchange rates fell from an index of 99.9 in 1979 to 88.7 in 1982, and the consumption of oil per unit in GDP also fell from an index of 96.1 to 75.8 over the same period. Such modifications clearly entail much structural, and hence lasting, change, which makes it possible to hope that in the medium term the return to economic growth will not be hampered by another energy crisis. Nevertheless, the deterioration in the economic situation of the weakest countries, in particular of the non-oil-producing countries, is becoming more and more dramatic: their external debt has reached an exceptionally high level, which may create anxiety lest a financial crisis result from the energy crisis. The resulting freeze on the process of development is already prolonging, by its effects on world trade, the economic crisis situation and aggravating the problems of competition and the tendency towards protectionism appearing around the world.

#### 4. *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 consumption of primary energy has shown the following trend (mtoe):

1973: 969	1978: 969
1974: 941	1979: 1 012
1975: 890	1980: 970
1976: 947	1981: 934 (provisional)
1977: 942	1982: 930 (estimate)

This has been an exceptional phenomenon, and one which previous experience since the Second World War made it absolutely impossible to predict. Whereas, from 1950 to 1973, energy consumption grew continuously every year, it has since fallen twice, in two consecutive years each time — with a slight upturn between each decline. An average and relatively constant increase of 4.5% per annum broke off abruptly and was followed by eight years of stagnation, bringing energy consumption in 1981, and probably in 1982 as well, to some 3.5% below the 1973 level.

This trend is explained partly by the decline in economic activity — particularly industrial activity. It was noted that the latter fell at certain times and that even now recovery is only half-hearted. The trend is also explained by the features of 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 factors to be taken into consideration are the effect of the price increase, which caused consumers to moderate their consumption somewhat, and of measures to encourage more rational use, which are also beginning to have an impact, as structures and consumption habits gradually adjust to the new market situation.

The trend of recent 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 — a figure often cited before the crisis — to around 1 450 mtoe, it now appears that it will not exceed 1 100 mtoe, and will be below 1 200 mtoe in 1990.

The hoped-for economic revival should mean an increase in energy consumption, which will prove modest (as expected) only if a greater effort is made to save energy and use it more rationally.

### III — An energy policy for the Community

Even before the energy crisis the Community had attempted to formulate and 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 convergence of national policies and the creation of a common energy policy are fundamental factors 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 270 million inhabitants than if they are the outcome of separate and discordant policies.

#### *1. The first steps towards the first achievements*

The Community has been working towards an 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 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.

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.

In May 1974 the Commission submitted to the Council a communication based on the current situation and entitled 'Towards a new energy policy strategy for the Community'.

The Commission also proposed to the Council objectives for 1985 concerning the Community's supply structure which were approved in December 1974. A set of concrete proposals and a series of general or sectoral communications formulated to suit the observed developments were put forward as an aid to achieving these objectives.

The tension which reappeared in 1979 and the difficult and irregular progress towards the objectives for 1985 prompted the Commission to take stock in June 1979 in a communication to the Council entitled 'Energy objectives of the Community for 1990 and convergence of policies of the Member States'.

Given the gravity of the situation in early 1980, the Commission drew up a communication, for discussion by the European Council of 27 and 28 April, entitled 'Energy — A Community initiative'; this noted a disquieting gap between what had been done and what remained to be done to work out and implement an effective energy policy. So as to reduce the gap and render the Community able to meet the serious threats to its present and future energy supplies more effectively, the Commission sent the Council on 30 September 1981 a communication on the development of an energy strategy for the Community.

This basic document and the various sectoral analyses supplementing it — prices and investment, coal, natural gas, nuclear energy, rational use — set out the framework for the Commission's action and the Community's progress towards a strengthening of energy policy.

It should also be noted that, since the crisis began in 1973, these energy problems have almost always appeared on the agenda at European Councils, the summit meetings of the Heads of State or Government of the Member States.

## *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 ensuring the Community's short, medium and long-term energy supply now constitutes a major problem which cannot be solved simply by voluntary or imposed curbs on the consumption of energy finally made available to 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' are not, at the moment, accompanied by any willingness to renounce the 'quantity' of goods and services which they wish to have.

The desire to ensure a supply of energy which will make it possible to pursue economic growth and social progress is, however, perfectly reconcilable with the objective of reducing the difference between the quantities of primary energy introduced into the economic system and the quantities of useful energy made available to the consumer. To achieve this, vigorous efforts must be made to save energy, improve efficiency and prevent miscellaneous losses.

In the past, a close relationship has been observed between economic growth and energy consumption. This relationship must be ended if it is intended to carry into the future an economic growth which is compatible with the prospect of dearer and less abundant energy supplies.

The work of a group of experts asked by the Commission to examine the implications of more rapid progress towards an energy-efficient society showed that gradual dissociation between economic growth and the growth in energy consumption is possible and that our societies are able to meet the energy challenge without jeopardizing the values, traditions, economic well-being and social progress which their members desire.

Energy must be supplied reliably, as well as in sufficient quantity. Prices must be such that the Community is economically competitive on the world market. Consequently, supplies must be protected from the threat of interruption and arbitrary and sudden price rises. The aim should therefore be to seek a high degree of self-sufficiency at price levels which are compatible with satisfactory economic conditions.

This implies that efforts should be made to make the most of the internal resources of the Community and of those with 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.

However, it must be borne in mind that no innovation and no existing process is exempt in its technical, economic, ecological or financial aspects from uncertainties, obstacles and risks which cannot all or always be foreseen.

Two extreme attitudes must be avoided: a blind faith in science's ability to find a satisfactory solution — a 'technical fix' — in good time, and opposition to new techniques as long as the uncertainties have not been completely eliminated and the risks entirely ruled out. 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. As far as possible, energy policy must therefore take into account the desire to protect the environment, ensure safe utilization and conserve resources.

The trend towards a more satisfactory energy supply structure for the Community must also 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. Technology does not make everything possible, and economics are against some substitution processes.

It is, moreover, essential and desirable 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, developed for the first time in 1974, have inspired the communications and proposals which the Commission has drawn up since. Implicitly or explicitly, they also remain the basis of the 'Energy objectives for 1990' and the 'Energy strategy for the Community' drawn up in September 1981.

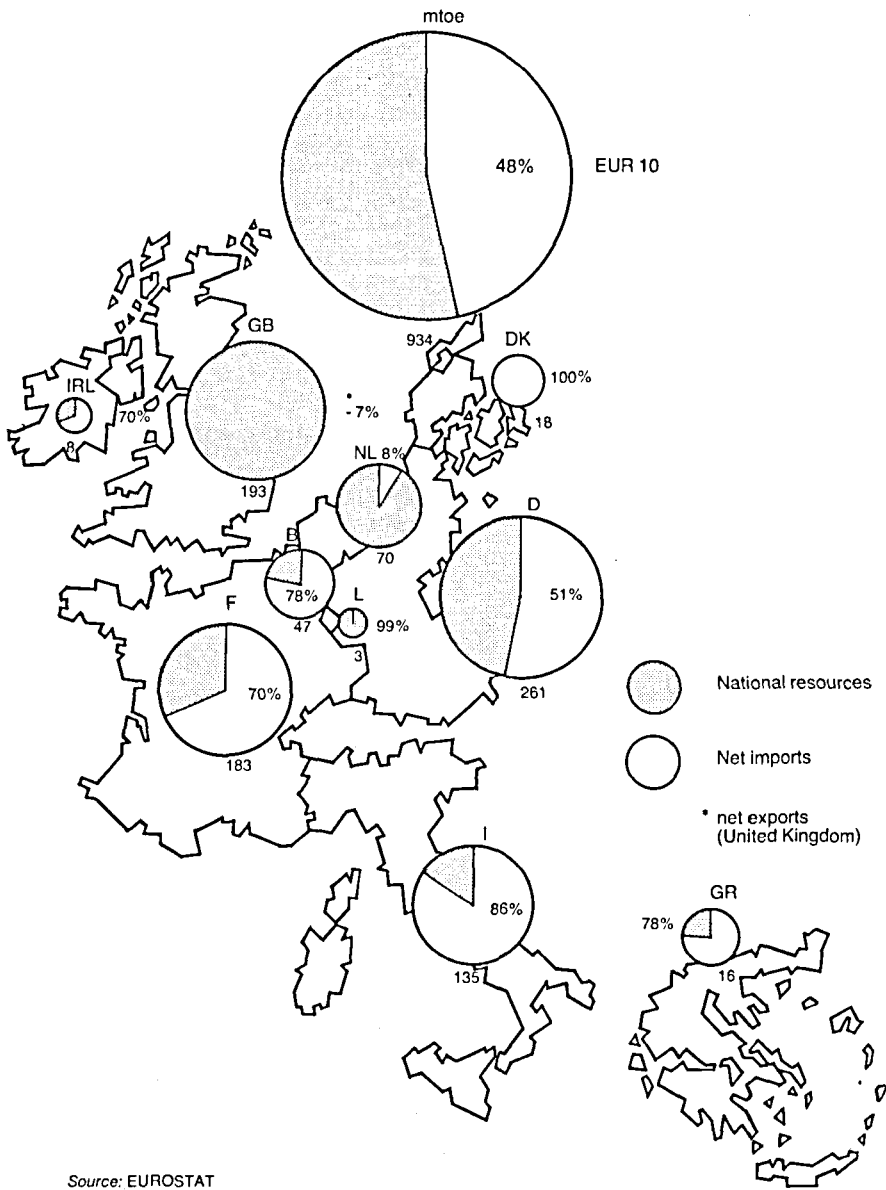
### *3. Strategy: objectives and priorities*

A policy implies objectives. One year after the oil crisis broke in 1973, the Council adopted initial objectives regarding the Community's supply structure for 1985. The main aim was to reduce dependence on imported energy from the 1973 level of 64% to about 50%. This was to make for greater security of energy supplies and reduce the burden which the increased price of imported energy placed on the economy and the balance of payments.

But the 1985 deadline is approaching and — as the effects of policy options and energy investment do not make themselves felt for around 10 years — decisions now or in the near future will barely affect 1985 but determine the Community's energy situation around 1990.

In June 1980, therefore, the Council issued a set of guidelines on energy policy objectives for 1990. The prospects of enlargement indicate that the Community of 1990 will probably no longer be the same as it is today: Portugal and Spain will probably have joined the ten current members. The new objectives are, however, in keeping with the situation: the economic and energy structures of the future member countries are as sensitive to the consequences of adverse trends on the world oil market as those of the current Member States.

# ENERGY DEPENDENCY 1981



Source: EUROSTAT

Efforts to ensure convergence within the framework of a common strategy will therefore be essential for the new countries too.

The guidelines adopted for 1990 are as follows:

- to reduce to 0.7 or less the average ratio for the whole Community of the rate of growth in gross primary energy consumption to the rate of growth of the gross domestic product;
- to reduce oil consumption in the Community to a level of about 40% of gross primary energy consumption;
- to cover 70 to 75% of primary energy requirements for the production of electricity by means of solid fuels and nuclear energy;
- to encourage the use of renewable energy sources so as to increase their contribution to the Community's energy supplies;
- to pursue an energy-pricing policy aimed at achieving Community energy objectives.

These various recommendations are in keeping with the Community's three basic concerns, which are:

- (i) to dissociate economic growth and growth in energy consumption;
- (ii) to place a ceiling on oil imports;
- (iii) to prepare a more satisfactory energy supply for the more distant future.

The elements of the energy balance have developed more or less in accordance with these broad outlines.

From 1973 to 1981 energy consumption did not increase; it even fell slightly, whereas the gross domestic product increased in volume by about 16%. Although this trend is explained largely by the persistence of a relatively low level of economic activity, it is nevertheless certain that rational energy-utilization policies and reactions in the economy to price rises have also had an influence.

The pattern of total demand has changed as indicated in the following table, which also sets out the alterations to the forecasts for 1985 and 1990.

	Solid fuel	Oil	Natural Gas	Nuclear power	Hydro and geothermal	Other
<i>Situation 1973</i>	23	59	12	1	3	—
<i>Situation 1981</i>	23.6	51.0	17.6	6.0	1.3	0.2
<i>1985</i>						
1972 forecast	10	64	15	9	2	—
1974 objective	17	47	20	13	3	—
Current forecast	21.8	49.1	18.5	8.8	1.2	0.6
<i>1990</i>						
Current objective	24.7	42.4	18.1	12.5	1.1	1.2

(%)

It will be seen, for instance, that if total consumption remains below forecast, solid fuel takes a larger share than initially estimated; nuclear power's contribution, however, is too small.

Progress has been made in reducing dependence on external supplies: 64% in 1973, a little under 50% in 1981. Oil's share of total energy consumption, for the same period, has fallen from 63% to 51% and should continue to do so in the years ahead.

Natural gas also appears likely to meet the objectives.

Nuclear energy programmes, however, are behind schedule, and it is only around 1990 that the figures previously contemplated will be achieved.

These various trends affect oil imports, which dropped by almost one third between 1973 and 1981, but their level is still high (358 million tonnes).

The situation is still worrying. Although the quantitative supply difficulties on the oil market in the first half of 1979 have cleared up and prices have eased somewhat during 1982, the outlook is still very uncertain.

World consumption is falling, but OPEC is still having difficulty establishing a consistent line on the level of the crude oil price and the volume of production.

Despite the positive result of the attempts to reduce and redirect the demand for energy, the Community remains the leading oil importer in the world and is hence exposed to the risks of interrupted supplies and increases in prices.

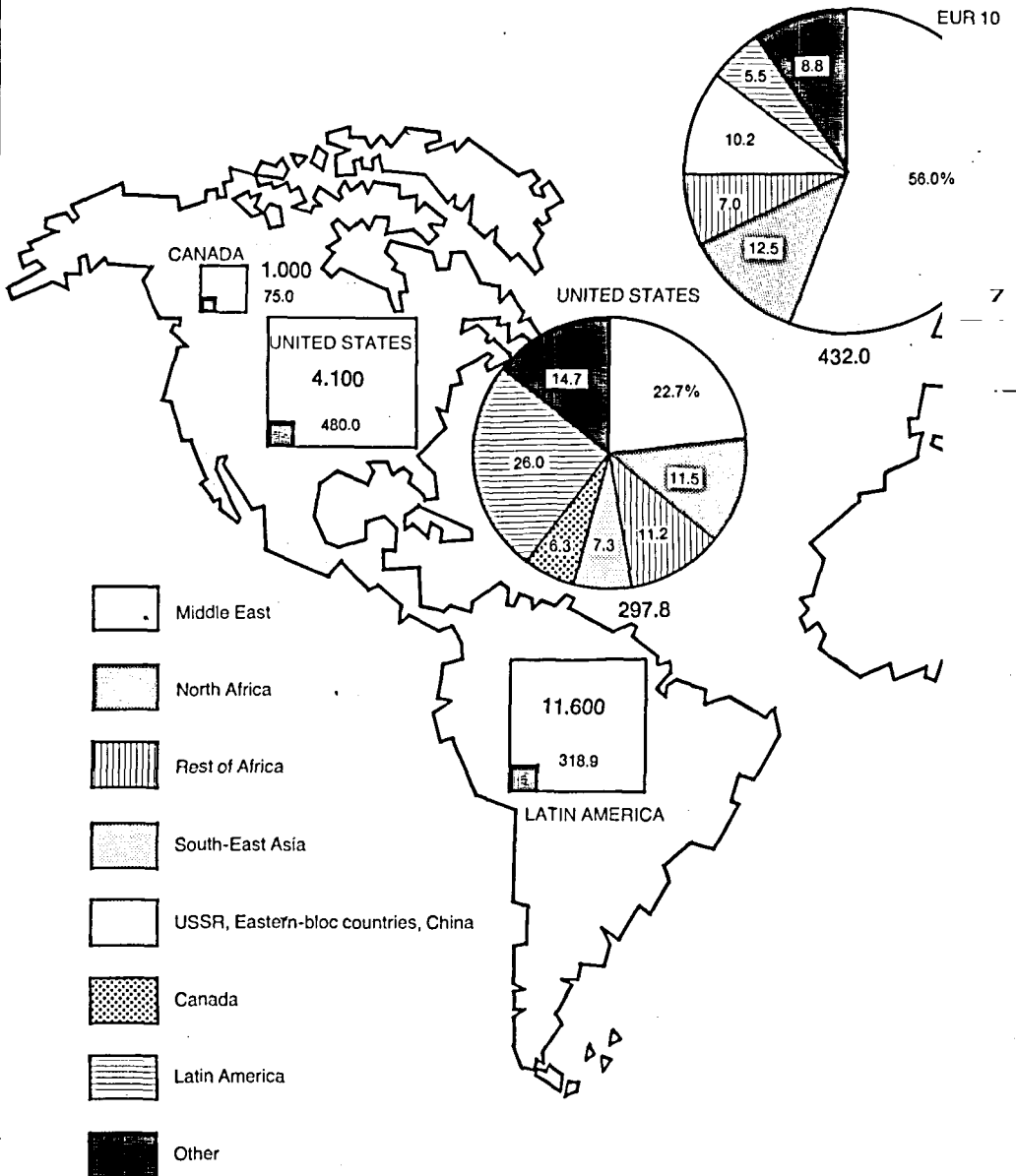
In view of this the Commission, in its communication to the Council of 30 September 1981 concerning the development of an energy strategy, sets out the framework of action which will make it possible for the Community to reduce the effects of its vulnerability with regard to energy more effectively and more quickly. To this end, adjustments must be carried out on both the demand side (energy saving and rational use) and the supply side (diversification). The success of the steps to be taken within the Community to carry out the necessary adjustments is closely linked to the external aspects, and the industrialized nations will have to co-operate in order to reduce oil dependence.

In addition, the solution of the serious problems experienced by many developing countries because they import oil requires vigorous action on a large scale, in which the Community can and must play an important role.

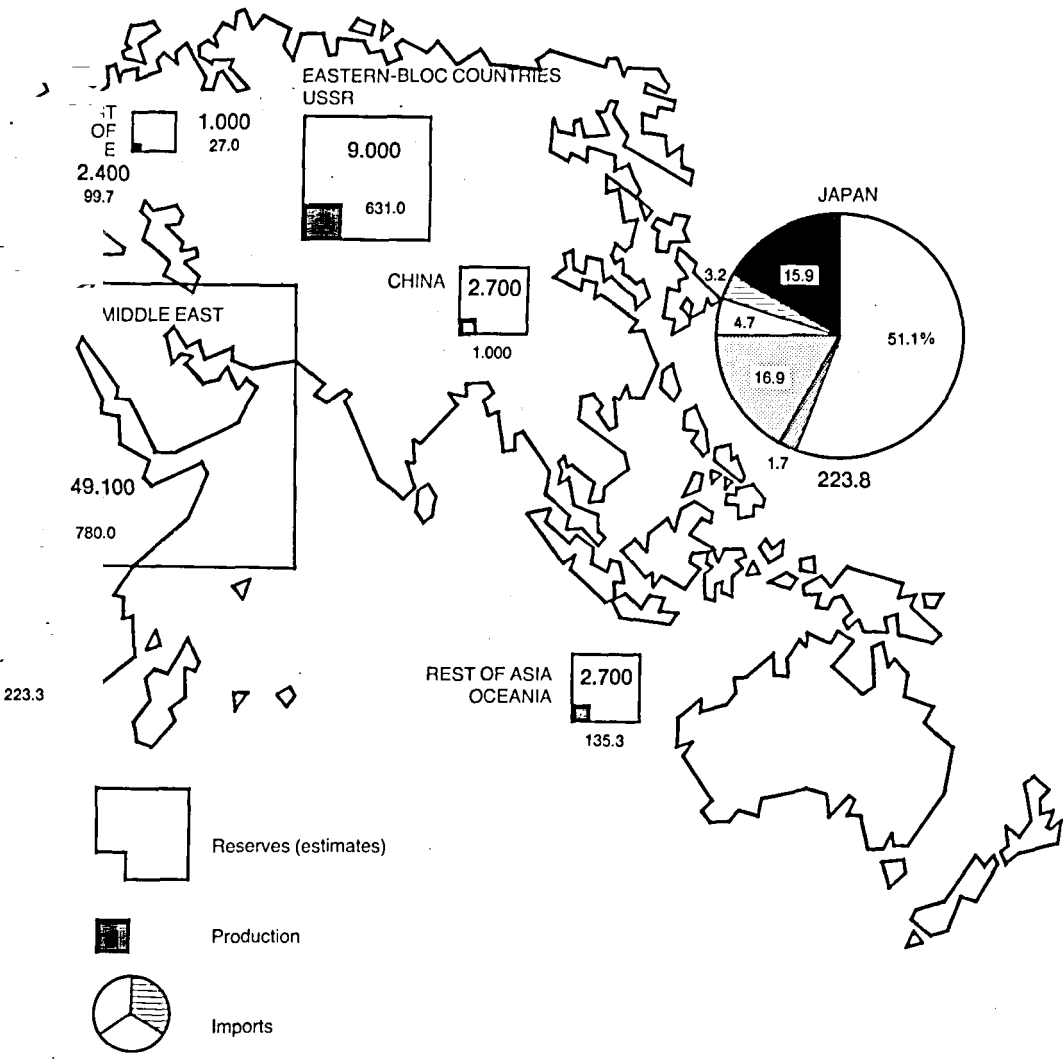
Although this process of change poses new challenges, it also raises new hopes, since the energy transition will have very wide-ranging consequences for Community industry which, by creating scope for developing and applying new technology, will help to rejuvenate the industrial base.

The energy strategy proposed by the Commission is essentially forward-looking: instead of just reacting to events, the Community must henceforth prepare the ground as well as possible for the adjustments which the likeliest development of the market will bring and minimize the economic and social consequences of that development.

OIL PROD



D IMPORTS





The energy objectives of the Community should be continually updated and taken into account in the policies of the Member States, so that a common discipline may be observed. First and foremost, therefore, the Commission's role should be a guiding and monitoring one. The Commission will also operate independently in certain fields, where the Treaties so allow or where there is no other way of achieving the common objectives, or again where such action is more effective than national measures.

In certain cases, such Community measures will require financial resources which will have to be increased as the situation requires.

There are five priorities for common action:

1. Achieving an adequate level of investment in alternatives to oil and in the *more rational use of energy*. Such investment will have to be directed first to energy saving and substitution, since it will reduce the importance of oil in the pattern of consumption and have a favourable effect on economic activity and employment. The Community's responsibility in this area is linked to that which it has in medium-term economic policy;
2. The development of a common approach to energy pricing and taxation. The aim here is to achieve realistic prices, i. e. they should correspond to costs and market conditions in the long-term.

Accordingly, ways of making prices and tariffs more transparent will be sought. A joint effort at adjusting oil taxation to the Community's energy and economic policies should also be undertaken;

3. The adoption of measures to give practical form to Community solidarity so as to prevent destabilization of the market. Steps must be taken to see that even a very limited reduction in the supply of oil should not cause *disproportionate changes* in its price. Such measures will strengthen Community solidarity and supplement existing arrangements for times of serious supply difficulties. Security of supplies is a question which also arises, albeit in different terms, in respect of the other sources of energy, and the Community must give its attention to this;
4. The reinforcement of common policies for research, development and technological demonstration. Innovation is an essential element in the energy strategy. Through its financial measures and coordinating activity, the Community makes R&D and technological demonstration *more effective* still. Better and fuller use must be made of the Community's potential in this sector;
5. The preparation of common approaches and initiatives in external energy relations. The Community, which alone provides the Member States with the necessary means of expression at world level, must establish with supplier countries a framework of relations that will ensure stability of supplies.

Regarding energy cooperation with the developing countries, the Commission intends fully to exploit the possibilities provided by the Lomé Convention and increase its efforts in favour of those countries.

## 4. Policy instruments

### (a) Knowledge of the facts

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 used to possess hardly any 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.

After the events of late 1973, the Commission requested the Member States to provide quarterly information by company on imports of crude oil and natural gas 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).

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 are designed to ensure 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. The Commission also publishes a weekly bulletin giving the indicative levels for the pre-tax prices of the main petroleum products consumed in the Community.

Because of the alarming development of the situation the monitoring of oil imports was stepped up in the second half of 1979 by subjecting transactions to registration providing information about the conditions in which they are conducted.

This system is still operative, its continuation being justified by the continuing uncertainty on the market and by the desire for better price transparency.

In November 1977, the governments of the Member States decided to compile information on coal imports from non-member countries and forward it to the Commission.

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 all energy trade with non-member countries.

In the Commission's view the compilation of information on facts and trends is clearly not an end in itself; its essential purpose is to enable concerted planning 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 planning 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, with the agreement of the Council, has organized a procedure for the reciprocal exchange of information at Community level on the siting of power stations. The Commission has also proposed the introduction of a Community consultation procedure for power stations liable to affect the territory of another Member State, but this proposal has not so far been adopted by the Council.

### **(b) Financial support**

The implementation of an energy policy also entails measures of direct intervention and, in particular, the possibility of giving financial support to certain activities.

The surest way of reducing dependence on external supplies is through a combination of rising internal production and more efficient use of energy. Both, however, require considerable investment, whether for opening new generating plant or for the widespread, long-term introduction of processes which will ensure more rational use.

To carry out the desired transformation, the energy industry will continuously require large amounts of capital.

National programmes for 1981-90 are currently estimated at 500 000 million ECU,<sup>1</sup> 80% of it for energy production and 20% for rational use.

This figure is believed to represent some 9% of total gross fixed capital formation, i.e. total investment, as against 6.8% during the previous decade. The situation differs considerably, however, from one Member State to another, and the first results appear to be somewhat behind schedule.

This investment must therefore be supported and encouraged, so that the programmes are not only completed but, in some cases, even stepped up.

The requisite support should go first to investment designed to increase the efficiency with which energy is used, currently a sphere accounting for only one fifth of planned energy investment.

Without neglecting investment on the supply side — the subject of considerable effort — it must be emphasized that investment in rational use has many favourable consequences for economic revival: slimming of the energy bill, improved international competitiveness of

---

<sup>1</sup> 1 ECU (1 September 1982) = BFR/LFR 45.2251; DKR 8.24985; DM 2.35805; FF 6.62402; LIT 1 329.54; HFL 2.57814; UKL 0.549885; IRL 0.685961; DR 66.8224.

firms, creation of a specific market for energy-saving devices and technology, job creation, rapid payback of the capital employed, etc.

What, under these circumstances, are the obstacles to expanding the investment effort? Evidently, the necessary capital has to be found. In addition, the economic and psychological conditions have to be created which will make it possible to overcome the lack of enthusiasm with which this type of investment is still too often regarded by firms, despite its clear advantages in terms of private and public interest.

The future trend of energy prices is a major reason for such reticence: any likelihood of a fall, even slight or temporary, puts a brake on investment decisions, in respect of both supply and demand. The uncertainties surrounding the forward trend for the consumer prices of the various forms of energy must therefore be removed: a realistic pricing policy, based on long-term cost trends, will help to do this.

As to the availability of investment capital, the ECSC Treaty has allowed the High Authority, since the inception of the Coal and Steel Community, to finance industrial loans to the coal industry by borrowing.

The same possibility exists in the nuclear sector, under the Euratom Treaty, but it was not until 1977 that the Council authorized the Commission to raise capital for on-lending to finance the construction of nuclear power stations and industrial installations for the fuel cycle. The Commission borrows up to the limit of the loan applications it receives. Initially, the Council authorized a first instalment of on-lending which amounted to 500 million ECU, subsequently increased to a total of 2 000 million ECU.

More generally, the Council authorized the Commission in October 1978 to raise loans in order to promote investment in the Community. This is the system commonly known as the New Community Instrument for Borrowing and Lending (NCI). Under this decision, an instalment of 500 million ECU was authorized in May 1979 so that loans could be granted to finance investment projects in infrastructure and the energy sector. A new instalment of 1 000 million ECU was authorized in May 1982 covering infrastructure financing, investment by small and medium-sized enterprises and, in particular, finance for investment in the rational use of energy.

In addition to these measures, the European Investment Bank is extremely active in the energy field, which from 1958 to 1981 absorbed 36% of financing provided by it. Without going into detail here — a fuller discussion will be found below under the relevant headings — it should also be noted that, independently of its R&D action, the Community grants financial support to many projects which in various fields seem likely to speed up the rate at which technological innovations find industrial and commercial applications.

These projects cover the technology of oil and gas exploitation, uranium prospecting, coal gasification and liquefaction, the demonstration of potential energy savings and the exploitation of renewable sources such as solar and geothermal energy.

The Commission is trying to persuade the Council substantially to increase the funds available for this type of action. Proposals have also been put forward for encouraging certain categories of investment in the rational use of energy by means of interest relief grants.

### (c) Regulation

Another way in which the Community can act is through directives or recommendations which, directly or through national legislation, affect the energy market or that for production and operational equipment. Various instances can be found, notably with regard to the rational use of energy: insulation of buildings, performance or labelling of powered appliances, etc.

As regards prices, a Council recommendation sets out the basic principles for aligning electricity tariff structures in the Member States in order to improve the transparency and cohesion of price systems and encourage the rational utilization of electricity.

### (d) The industrial aspects

Energy policy also ties in with industrial policy. The coal and nuclear industries, for example, have long been a source of concern to the Community institutions. More recently, the Commission has directed its attention to the oil-refining sector, where surpluses 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 proposed 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 use and saving of energy*

Rational use covers all measures designed:

- (i) to achieve savings so that all forms of energy may be used as economically as possible;
- (ii) to obtain better use of primary energy;
- (iii) to encourage the substitution of other forms of energy for oil in satisfactory economic circumstances.

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 creating 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 low efficiency.

There is a great deal at stake: the modest target of a 10% reduction in energy consumption is equivalent to some 100 million tonnes of oil equivalent per annum, roughly the present production from the North Sea or a hundred large nuclear power stations.

In December 1974 the Council adopted a Community action programme, the aim of which was to achieve a 15% reduction in primary energy demand by 1985.

### **(a) Recommendations and directives: support for demonstration projects**

Under this programme, the Council adopted in March 1976 five recommendations on concrete measures for the rational utilization of energy. These cover:

- (i) incentives for the thermal insulation of buildings;
- (ii) efficient operation of heating installations in existing buildings;
- (iii) improvements in driver behaviour in order to reduce the fuel consumption of road vehicles;
- (iv) the promotion of urban public transport;
- (v) the operation of electrical appliances.

Following a communication submitted in early 1977, which emphasized the importance and urgency of intensifying the implementation of the Community programme, new recommendations on the following subjects have been added:

- (i) the regulation of heating, the production of running hot water, and heat metering in new buildings;
- (ii) the rational use of energy in industrial enterprises;
- (iii) the establishment of national consultant bodies with a view to promoting combined heat and power for district heating or industry;
- (iv) the reduction of energy requirements by improving the thermal efficiency of buildings.

The Council also adopted several directives on:

- (i) the performance of heat-generators and the insulation of the heat distribution system in new buildings;
- (ii) the indication by labelling of the energy consumption of domestic appliances.

The appliances were selected in accordance with the following criteria: amount of energy consumed, speed of market penetration and whether standards for measuring their energy consumption have been adopted by the European standardization bodies.

Having periodically reviewed progress so far by the Member States and by the Community, the Commission has found that satisfactory progress has been made since 1974 compared with other industrialized countries.

However, the rate of progress and even the extent to which the recommendations adopted by the Council have been implemented still vary considerably from one Member State to another and so there is still considerable energy-saving potential in the Community.

In the long term, it should be possible to save 15 to 20% of the energy now used in industry, about 15% of that used by transport and more still of that used in the domestic and tertiary sectors.

In June 1980 the Council recommended the Member States to adopt, if they had not already done so, programmes covering all consumption sectors and pricing policies which would encourage rational utilization. The Member States were invited to promote the introduction of consultancy and technical assistance services, notably for small and medium-sized enter-

prises. These services would centre around a new and original method: the 'energy bus' developed jointly by Canada and the Community. By this means firms can work out basic energy balances, identify possible savings and obtain practical advice on the spot.

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, coordinate national action and determine the way in which the Community can best encourage such action.

Furthermore, under the Regulation adopted in June 1978, the Commission is granting financial aid to demonstration projects on energy saving. The purpose of demonstration projects is to reduce the uncertainties attached to the commercial and economic viability of a given technique. The aid granted to date covers more than 150 projects and amounts to over 80 million ECU. The experience gained from supporting demonstration projects has been positive, even if it is a little early to pronounce on the technical results of the projects, only a few of which have been completed. The potential demand indicated by the replies to the calls for projects shows the need for such an action and the advisability of increasing the financial resources allocated to it.

By helping to bring 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 will, therefore, be assessed in conjunction with national and Community research and development programmes.

Finally, the Commission asked two teams of independent experts to study wider problems of energy saving. The first report, already alluded to, was published in July 1979 under the title 'For low-energy growth'. The second, which was completed in April 1981, is entitled 'Investment and employment in a low-energy society'. These reports provide the basis for a general strategy for the rational use of energy in the Community.

## **(b) Investment in the rational use of energy**

Results so far with regard to energy saving have generally needed only small investments or a change in behaviour. 'Second-generation' savings, however, often require bigger, or less obviously profitable investments. This type of investment was analysed in a communication from the Commission to the Council (February 1982) on investment in the rational use of energy.

In spite of a fall in energy imports over the last few years, the Community's economy is still heavily dependent on external oil supplies, and even a slight recovery would be constrained by this if the necessary structural adjustments for improved regulation of demand are not carried out.

Investment in rational use, which is currently only 0.4% of Community GDP, should be raised to 0.7% in 1985 and about 1% in 1990. In absolute terms, the sums involved would rise from 7 to 8 000 million ECU in 1980, to 19 000 million ECU in 1985 and about 25 000 million ECU around 1990, i.e. they would be tripled.

This effort would improve the international competitiveness of firms by making them more energy-efficient. It would open up markets for industry and reduce some of the restrictions on growth. Many jobs would be created as a result.

Consequently, the Commission is proposing various practical measures for resolving the difficulties surrounding investment decisions. It is suggesting, for instance, that interesting initiatives taken from now on by one or more Member States be made open to the Community as a whole, and that Community action as such should be taken to support national measures; in particular, this would mean improving financial channels and agreements, offering finance which is better suited to the needs of small and medium-sized firms and of households, preventing the Community market from being compartmentalized (or remedying such a situation), encouraging the decentralization of decision-making on the rational use of energy and promoting training and information in this field.

In July 1982, the Council adopted a recommendation inviting the Member States to take similar measures if they had not already done so.

The Commission also identifies certain investment projects of particular interest, such as the utilization of waste materials, heat waste, and district heating networks. A proposal for a regulation on the granting of interest relief with a view to stimulating such investment was put to the Council in September 1982.

## *6. The development of alternative resources*

### *(a) Coal*

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 to reappraisal of this policy, with a view to halting the decline in output.

Among the objectives adopted in 1974 was the maintenance, in 1985, of the pre-1973 production level. It is now clear, in the light of the subsequent fall in production and the lower-than-expected growth in total consumption that it will probably not be possible to reach this objective.

However, Community production, together with an increase of coal imports, would still enable solid fuel to play a major role in 1990: about one fifth of energy supplies. With nuclear energy, coal is one of the main substitutes for oil in the centralized generation of heat.

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 between 1976 and 1979, since cost increases 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 coordinating at Community level national policies for, and intervention on behalf of, the coal industry. Furthermore, the common system of aids for coking coal, 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, has been adapted and extended on several occasions, the last being in April 1982, the changes remaining in force until the end of 1983.

As regards the potential substitution of coal for oil in the industrial heat sector, the Commission takes the view, having studied the determining factors, that market forces and technical development will result in greater use being made of coal in this area. The rate of conversion, however, may be slower for economic and ecological reasons than is desirable from an energy-policy point of view. Measures must therefore be found to accelerate this development and change the consumption patterns of Community industry with a view to freeing the latter from the oil constraint.

The Commission is also trying to promote the marketing of solid-fuel liquefaction and gasification techniques.

Monitoring of coal imports has also been introduced, in order to ascertain market trends more accurately and rapidly. In addition, the research into coal technology pursued in recent years will be maintained in the future.

As a follow-up to these endeavours and achievements, the Commission, in its communication of 10 February 1982, redefined the role for coal in the Community's energy strategy, the aim being to increase its use, even if that were to mean importing more. Coal reserves are vast, and their geographical distribution is such that, unlike petroleum, there is an alternative to dependence.

However, the consumption of coal has not gone up since 1973. There are many reasons for this: the nature of coal as a fuel, the uncertainty surrounding price movements and the security of supplies, and the role of coal in the energy policy of the Member States. Measures should be taken to remove these obstacles as far as possible and overcome the environmental problems.

To improve the prospects for consumption, the Commission proposes that:

- (i) prices should be made more transparent;
- (ii) investment in coal-fired plant should be encouraged throughout industry, in public buildings and district heating schemes;
- (iii) research, development and demonstration activities should be stepped up, so as to create more scope for the utilization of coal.

In addition, the coal industry's situation should be improved. At present, of the Community's total production some 50 to 60 million tonnes (20 to 25%) are profitable, some 140 to 150 million tonnes (60 to 65%) are not profitable under present market conditions and about 40 million tonnes (15%) cannot be produced competitively at all. A healthy Community industry is in the interests both of consumers and workers. The coal industry's situation can be improved by continued modernization and rationalization, the progressive closure of mines which

are no longer economic and the opening-up of new, economic, production capacity. The Commission accordingly intends to continue to support modernization and rationalization. It will also continue to carry out its responsibilities regarding the retraining of miners and any other social problem which may arise. The long-term situation of the industry would be improved by concentrating national aid measures on the promotion of structural change and improving productivity.

Finally, the expected increase in coal imports is bound to have certain consequences. In the coming years much of the extra demand for coal will be met by imports, which may increase by a factor of three or four over the next 20 years. In this respect, the major producers of the industrialized world will remain the Community's principle source of imported coal.

Regular talks should be held between the Community and those producers so as to improve the general understanding of market trends and reduce the danger of unnecessary tension in a period of real or threatened shortage.

It is also to be desired that European companies engaged in supplying coal should take action (e.g. by setting up a trade association) to ensure that information about short-term market trends and longer-term prospects, potential problems and their possible solutions should be exchanged on a regular basis.

Finally, the Community's increasing dependence on external sources of supply requires that the current policy with regard to stocks must be modified to provide means of dealing with any serious shortage of coal.

## **(b) Natural gas and Community oil**

Today, coal is no longer the Community's only resource, and efforts on a wide scale must be made to develop the Community's considerable resources of oil and gas — under the North Sea in particular. Community oil production reached 101 million tonnes in 1981, and that of natural gas 125 mtoe. Their respective situations are somewhat different however: oil production still has a little room to expand, whereas natural gas production is tending to fall. Consequently, everything must be done to maximize the exploitation of the fields discovered and ensure that dwindling reserves are replaced by fresh discoveries, the objective being to achieve and permanently maintain the highest possible level of production. It is therefore hoped to achieve 125 million tonnes of oil a year in 1990 and almost the same volume of natural gas.

In order to maintain this effort, the Community grants financial assistance to Community research and development projects using new techniques for prospecting for and exploiting hydrocarbons in particularly difficult areas such as the North Sea. Eight successive annual allocations of aid have been granted since 1973: about 240 million ECU on a total of 242 projects, with total investment exceeding 600 million ECU.

As part of its programme on the rational use of energy, the Community is restricting 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, there is currently no substitute.

Recent developments concerning natural gas prompted the Commission in February 1982 to propose various measures designed to make supplies more secure within the context of the energy strategy for the Community. The new contracts recently concluded by Member States for deliveries of gas from Algeria and the USSR indicate that the volume of imports will be going up, from 28% of the present total supply to possibly as much as 36% by 1985 and more than 45% by 1990. This increased dependence on external supplies means that better guarantees must be sought for the stability of the Community's overall supply. The Commission is therefore advocating amongst other things, and aside from the expansion of Community exploration and production mentioned above, that sources of imports be diversified, additional storage and reserve production capacity be set up, encouragement be given to research into the production of natural gas substitutes and, finally, that the capacity of the Community's transport grid be expanded.

### (c) Nuclear energy

The importance of the atom for Europe's energy supplies was acknowledged back in 1957 in the report by the 'Three wise men' which as its title indicated made the development of this new energy source 'an objective for Euratom' and hence a major objective of European energy policy. According to that report, nuclear energy after an interval of about 10 years, that is from 1967 onwards, would begin to relieve the Community of the burden of oil imports thus improving its supply structure and its overall position.

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 curbed the development of nuclear energy utilization. It took the 1973 oil 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 have accounted for more than one third of total production of electricity and covered some 13% of total energy consumption.

But as the impact of the oil crisis wore off, nuclear programmes lost their momentum and the likelihood of the objective being achieved became increasingly remote. Current figures and estimates for nuclear capacity and production are less than half the target set in 1974: this shortfall is equivalent to around 100 million tonnes of oil a year, but the effect of this delay is cushioned by the fact that the increase in electricity consumption is lower than forecast.

Thus, the objective of achieving in 1985 a nuclear contribution of more than one third of electricity production should now be reached before 1990, when it is expected that nuclear-generated electricity will account for about 38% of the total. This evolution, nevertheless, is too slow when set against the possibilities inherent in nuclear energy for reaching a balanced energy supply. The delay is due partly to the fact that the effort, firmly intended when supply difficulties began to be felt, is beginning to seem less urgent and even less warranted now that the tensions in the market are becoming slightly less acute.

Although nuclear power stations produce electricity at a lower cost than conventional thermal power stations, they are extremely expensive to build, and large-scale programmes require

very considerable quantities of capital, which in the present economic situation gives rise to serious problems. The Community is now able to use 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: since 1977 it has earmarked more than 800 million ECU in appropriations, and the Commission has managed to get the financial resources available for this purpose doubled.

A further difficulty lies in the supply of nuclear fuels. It is generally thought that although these fuels would have to be largely imported, their supply does not entail risks comparable to those which affect oil deliveries. However, the Commission has considered it necessary to formulate 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 enrichment and for reprocessing of spent fuels, while at the same time strengthening European industry in these sectors.

This expansion has now taken place with regard to the enrichment of uranium: several installations for isotope separation are in service in the Community. Action has also been taken since 1976 to develop uranium prospecting within the Community by means of financial aid to projects undertaken in the Member States. To date, 34 projects have been supported and together have received about 27.5 million ECU.

However, the supply of fuel to nuclear power situations will still be largely dependent in future on external supplies of natural uranium. Moreover, concern about the problem of nuclear proliferation means that exports are subject to political considerations inspired *inter alia* by concern over non-proliferation of nuclear weapons. An attempt is being made through negotiations to solve this question of international security and at the same time to obviate possible obstacles to the development of nuclear industries within the Community. It may be recalled in this connection that for more than 20 years the Community has had its own system of nuclear safeguards, which is now coordinated with that of the International Atomic Energy Agency (IAEA).

However, for some time past the chief obstacle has been public reluctance to accept expansion of the nuclear industry, because of the possible hazards to workers in such installations, to the population in their vicinity and to the environment. These hazards must nevertheless be compared objectively with those associated with other forms of energy production.

This distrust has been deepened by the accident which occurred in March 1979 at the nuclear power station at Three Mile Island, near Harrisburg, in the United States, which resulted from a highly improbable series of component failures, chance circumstances and, in particular, human errors and insufficiently strict operating procedures. However, this accident had no serious consequences for the staff, the general public or the environment.

The Community has been engaged since 1958 in a programme of action in the sphere of public health protection against radiation. In both the field of research and that of regulations 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.

Nevertheless, the Commission 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. The accident at Three Mile Island shows, for example, that safety, protection and detection devices must be used more rapidly and more effectively. In addition, there should be frequent inspections of equipment, and teams should be given improved training for both the normal course of operations and the action to be taken in the event of incidents or accidents. Finally, there should be better preparation of emergency plans to cope quickly and effectively with an accident, irrespective of how serious it is.

But nuclear safety is not restricted to the operation of power-station reactors: it must also cover all the industrial stages of the fuel cycle. The problems raised by radioactive waste must be dealt with. A plan drawn up by the Commission aims to step up research into conditions in which radioactive waste can be disposed of in the safest possible manner for, in some cases, almost unlimited periods, and also the identification, at Community level, of the sites offering the best guarantees in this respect.

There is also a Community research project designed to ensure that the dismantling of nuclear installations at the end of their economic life is fully compatible with safety and environmental protection requirements.

In conclusion, the Community research programmes broadly reflect therefore, these varied concerns for the safety of workers and the surrounding population and the protection of the environment.

However, Community research is also seeking to extend the applications of nuclear energy and encourage the development of new types of reactor which will be more economical and make more efficient use of nuclear fuel. These are fast-breeder reactors (FBRs) — a new type of nuclear reactor which makes it possible to extract much more energy from fissile fuels than do current reactors.

With the prospect 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. Fast-breeder reactors should therefore be available for electricity generation on a commercial basis during the 1990s. A considerable effort will be required, however, to develop the technology and, above all, to ensure safe working methods and the protection of the environment.

Increased use of nuclear energy still requires better information for the public on all these aspects and the Commission is making its contribution. In November 1977 and early 1978 it organized meetings to explain to representatives of public opinion the various aspects of the nuclear problem and to carry out an objective investigation into the conditions to be fulfilled if nuclear energy is to fit harmoniously into the Community's future energy supply.

All the activity and achievements on these many fronts will be continued and expanded in future. The 'energy strategy' guiding the Commission's action from now on was supplemented on 10 February 1982 by a 'nuclear section' which reiterates nuclear energy's contribution to the present, and especially the future, security of the Community's energy supplies. The main

advantages of nuclear energy are stressed: low cost per kWh, creation of added value and of jobs, easy storage for large volumes of fuel, alleviation of the balance of payments, etc.

The task therefore is to encourage the optimum development of nuclear energy. To this end, the Community's actions in the coming years should be organized on the following lines:

- (i) a more detailed analysis of the economic aspects of nuclear energy in a Community context, to include notably the regular publication of target programmes;
- (ii) a new approach to the problems of supplying the Community with nuclear fuels;
- (iii) the rapid creation of provisional fuel-storage capacity pending the introduction, on an economically and technically sound basis, of the requisite reprocessing capacity in the Community;
- (iv) improved arrangements for applying the system of safeguards;
- (v) a strengthening and a broadening of the very important action carried out hitherto by the Community concerning the safety of installations, protection against ionizing radiations and the management and storage of radioactive waste;
- (vi) a larger contribution by the Community to the essential task of providing public opinion with complete, objective information on all aspects of nuclear energy.

#### **(d) New and renewable sources of energy**

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

In addition to the projects already under way, in respect of coal, hydrocarbons and nuclear fission and fusion, since 1975 the Commission has been running research projects in the fields of energy saving and new and renewable energy sources.

A second research and development programme for the energy sector was adopted for the four-year period 1979-83. The total amount comes to 105 million EUA, almost double that of the first programme, and although the same fields are covered there is a very distinct shift towards solar energy and energy saving. The Community devoted just over 100 million EUA to its entire programme of energy research and development in 1976, nearly 200 million in 1978 and almost 300 million ECU in 1982. This considerable increase in Community action is accompanied by a parallel increase in the action of the relatively constant Member States: the amount spent by the Community as such represents approximately 8% — on a relatively constant basis — of total public expenditure on energy research in the Community.

Moreover, it is not sufficient merely to make discoveries. The Commission therefore gives financial assistance to demonstration projects for 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. Alongside the aid granted to demonstration projects in the field of energy saving, financial support is given to projects to exploit alternative energy sources.

The following have received support so far:

- (i) some 40 projects relating to the exploitation of geothermal energy: 28 million ECU in financial support as against about 300 million invested;
- (ii) about 70 projects relating to solar energy: 23 million ECU in financial support as against some 80 million invested;
- (iii) a dozen projects on the liquefaction and gasification of coal, 75 million ECU in financial support as against more than 225 million invested already in the initial stages.

The current contribution of renewable energy sources to the Community's energy balance is low: 1.5% in 1980, attributable primarily to hydroelectric power and geothermal energy. The efforts undertaken to increase this contribution should bear fruit by 1990, providing they are actively pursued and the new sources are not made less competitive by a fall in the price of conventional energy. With these reservations, renewable energy's share by volume could double to 2.3% of supply, the increase resulting from solar energy and biomass, while hydroelectric power and geothermal energy remain more or less at their current levels.

One research and development project of particular importance 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 Nuclear Research Establishment in the United Kingdom. This project, which has been named JET (Joint European Torus) will be jointly conducted and financed. If all the technical problems can be resolved, JET, which is a most promising project, may represent a decisive step towards the production of energy from deuterium and lithium, raw materials which are available in almost unlimited quantities. At present, it appears that the fusion of light atoms may, along with solar energy, make a major contribution to the energy supply in the third millenium if it can be mastered industrially.

## *7. Security of supply*

Most of the measures described above are designed to increase the 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, based on the figures for the previous year. In February 1982, however, as a temporary precaution, the Commission proposed to keep 1980 as the reference year, lest the recent fall in oil consumption should reduce the volume of emergency stocks by too much.

Moreover, since the beginning of 1978 the Member States have ensured that electricity producers maintain in thermal power stations sufficient stocks to ensure a supply of power for at least 30 days. The Community has also given itself the means to ensure that the trade flows between the Member States are maintained if there is an accidental interruption in certain oil

supplies and that the burden resulting from the shortage is evenly shared. A decision of February 1977 regulates trade in crude oil and petroleum products between the Member States in the event of supply difficulties. A decision of November 1977 permits a harmonized reduction of energy consumption throughout the Community in the same circumstances. A directive of July 1973 calls for the coordination of the measures to be taken by the Member States to make withdrawals from stocks, restrict consumption and regulate prices in order to avoid any abnormal increases. The Commission is also trying to improve the organization of mutual assistance between Member States in a period of tension on the oil market.

In October 1981, the Council stressed the advisability of taking, in conjunction with the other industrialized countries, the measures needed to ensure that limited shortages in the supply of oil do not have undesirable effects for the world economy on the market and on prices.

It is scarcely possible to predict what form exactly any shortages might take, in future, and in each case appropriate solutions can only be devised in the actual circumstances.

Nevertheless, the Council decided in October 1981, and confirmed in March 1982, that it would implement a procedure making rapid action by the Community possible if circumstances so required. It also produced a list of measures from among which it reserved the right to select those which the Member States should apply, under the Commission's supervision.

## 8. *International aspects*

International relations are an essential factor in energy policy, since much of the Community's energy is supplied from outside.

As regards relations between the oil-consuming countries, the Council has established general guidelines for international cooperation in the development of energy resources:

- (i) the oil-consuming countries mutually recognize each other's right to free access to energy resources;
- (ii) 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;
- (iii) 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;
- (iv) they will establish a procedure for the regular review of progress and of obstacles encountered in the application of these principles and the pursuit of these objectives;
- (v) 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.

It is in this spirit that the Commission participates in the work of the International Energy Agency, as in other OECD activities in the energy sphere. 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. These measures dovetail with those taken by the Community to cope with supply difficulties.



The Community is also taking part in the consultation procedure which was set up between the major industrialized countries at the Western summit conferences. At the Tokyo summit in June 1979, the United States, Canada and Japan moved into line with Europe by pegging oil imports at the current level. The countries attending the conference also confirmed their common determination to save energy, develop alternative sources of energy and fight against speculative price increases.

Energy was again at the centre of discussions at the Western summit in Venice in June 1980, preceded by a European Council held a few days before in the same city. In the declaration issued at the end of the summit the participants stressed the need to 'break the existing link between economic growth and consumption of oil' by conserving more oil and substantially increasing production and use of alternative energy sources.

The energy crisis also led to various attempts to initiate a 'dialogue' between the oil-producing and oil-consuming countries. The Community began the 'Euro-Arab dialogue' in 1974 in which the problems of the oil refining industry were examined in the context of the Commission's work on industrialization. At world level, a meeting preparatory to a dialogue between industrialized and developing countries, devoted entirely to energy, 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.

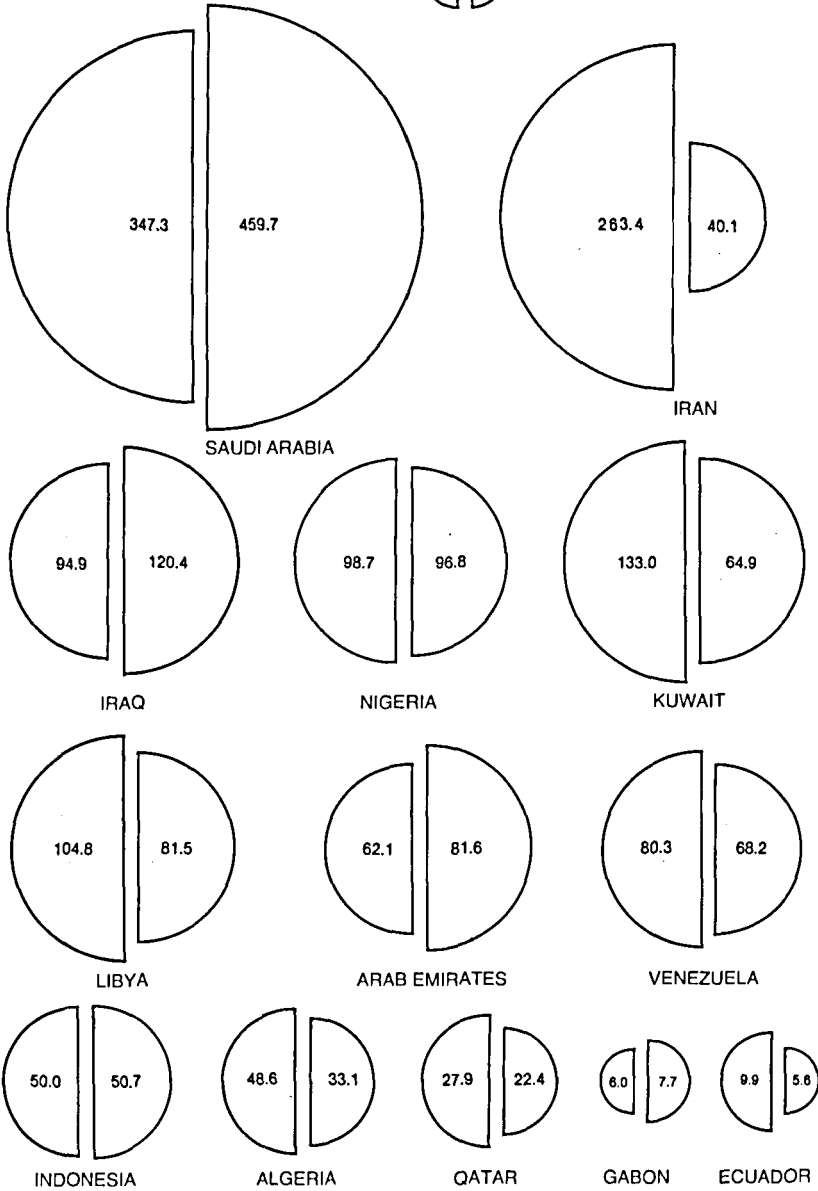
The 'North-South dialogue' so begun was not without difficulties, and the final report included almost as many points of disagreement as of agreement. As regards energy, the points of agreement were very general in character:

- (i) a stable and suitable supply of energy is essential for prosperity and progress in all countries;
- (ii) all countries must help to see that adequate energy resources are available;
- (iii) the finite nature of oil and gas resources is acknowledged, as is the need for a transition from an oil-based supply to more permanent and renewable sources of energy;
- (iv) it is necessary to save energy and use it more rationally;
- (v) to achieve these objectives, national measures are needed, as are international cooperation in the energy field and a development programme.

As regards East-West relations, the United Nations Economic Commission for Europe is the appropriate setting for implementing the Final Act of the Helsinki Conference on Security and Cooperation in Europe as regards energy. A new body called the 'Group of Senior Advisers to ECE Governments on Energy' was set up for this purpose at the 34th meeting of the ECE, and the Community takes part in its discussions. 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.

CRUDE OIL EXPORTS OF OPEC STATES  
(million tonnes)

1973  1980



A United Nations Conference on New and Renewable Sources of Energy was held in Nairobi in August 1981. These sources (solar, geothermal, hydro, wind power, biomass, etc.) as has been seen are going to meet an increasing share of energy supply. In the shorter term, however, they are to play a privileged role in the energy supply and economic expansion for the Third World. Hence the Community, which is devoting to their development the sustained effort described above, has incorporated action of this kind into its traditional policy of co-operation with the developing countries. Its participation in the conference and the measures resulting therefrom is also centred on the advantages of new and renewable sources with regard to promoting the transition to a less oil-dependent world economy and to removing the obstacles to the economic development of the Third World resulting from the high cost of energy.

Under the Lomé Convention, which succeeded the Yaoundé Convention, the Community has taken up special responsibilities towards the countries of Africa, the Caribbean and the Pacific (the ACP countries) which are parties to this Convention. The latter provides for Community measures to develop the mining and energy potential of the ACP countries and, at the same time, to diversify its own sources of supply for minerals and energy.

It should be remembered, finally, that international discussions were initiated in 1977 on the problems of nuclear energy and, in particular, on the problems raised by the nuclear fuel cycle (enrichment, reprocessing, waste, etc.) as a result of measures recently proposed by the United States.

The conclusion of this vast international exercise lasting more than two years was clear, notably with regard to the highly industrialized regions of the world which depend heavily on imported energy supplies: the option of developing the reprocessing of irradiated fuels and the fast-breeding reactor must be kept open.

## 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 preparation of this policy may appear 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, the Member States, being conscious of this delay, are often 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.

The search for greater convergence between national energy policies is complicated by the gravity of the economic and financial repercussions of the vicissitudes on the energy market and the diversity of the economic measures adopted to cope with them.

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 national economic or energy policies.

Lastly, as we have seen, energy policy must continually adapt itself to current developments, and is not exempt from drastic upheavals or 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 agreed, the aims adopted, the measures already taken and those which will be implemented in the near future in accordance with a well-defined strategy already form an impressive and coherent whole.

Regular contacts within the Council between those responsible for energy at national level ensure that the problems facing each country are more fully understood and increasingly allow the Community to speak with one voice in international energy forums.

Even if still imperfectly applied, Community policy orientations form an acknowledged frame of reference for national measures and the activity of economic operators. Security of supply, which is a major concern, is taking the practical form of joint protective measures and increasing control of consumption.

Although it is still too early to say that the European Community now has an energy policy as such, in the full sense of the term, enough measures have already been taken, enough 'small steps' accomplished, to consolidate the progress achieved so far and to lay the foundations for further progress.

## Glossary

● **Toe: tonnes of 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 tonne of oil.

1 toe =  $1 \times 10^7$  kcal or 10 million kilocalories.

1 mtce = 1 million toe =  $1 \times 10^{11}$  kcal.

● **Tce: tonnes of coal equivalent.** Another unit of equivalence: based on coal.

1 tce =  $7 \times 10^6$  kcal or 7 million kilocalories, or 0.7 toe.

1 mtce = 1 million tce =  $7 \times 10^{12}$  kcal.

● **Calorie:** quantity of heat required to raise the temperature of 1 gram of water by 1°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 =  $1 \times 10^3$  kWe = one thousand electric kilowatts,

the electric Gigawatt or GWe =  $1 \times 10^6$  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 =  $1 \times 10^6$  kWh = 1 million kilowatt/hour,

the Terawatt-hour or TWh =  $1 \times 10^9$  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 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 fissile materials (uranium, thorium, plutonium). It is generally classified as primary energy.

- *Arabian light 34° API:*

API (American Petroleum Institute) density: the scale employed to express the density of the oil; formula for converting API density into decimal density (at a temperature of 60°F, i.e. 15.56°C):

$$\text{API density degrees} = \frac{141.5}{\text{decimal density}} - 131.5$$

(e.g. Arabian light 34° API = decimal density 0.8550)

## *Further reading*

### **General**

This study is based exclusively on documents of the Commission of the European Communities and on the legal texts emanating from the Communities published in the *Official Journal of the European Communities*.

To avoid an excessively long list of bibliographical references to documents and legal texts dating from before 1 July 1981, the reader is invited to refer to *Bibliography on energy* published by the Commission of the European Communities under the catalogue number CB-AK-81-A02-EN-0.

General Report on the Activities of the Communities (annual)  
Chapter 'Energy policy'

Bulletin of the European Communities — Commission (monthly)  
Chapter 'Energy policy'

The energy situation in the Community  
Situation and outlook (annual)

Energy statistics. Yearbook — Eurostat, Luxembourg

### **III. 1 and 2**

The development of an energy strategy for the Community  
(Communication from the Commission to the Council)  
Stencilled doc. No COM(81)540 final of 1 October 1981

### **III. 3**

Review of Member States' energy policy programmes and progress towards 1990 objectives  
(Communication from the Commission to the Council)  
Stencilled doc. No COM(82)326 final of 10 June 1982

### **III. 4**

Council Recommendation of 27 October 1981 on electricity tariff structures in the Community  
OJ L 337, 24. 11. 1981



### III. 5

Investment in the rational use of energy

(Communication from the Commission to the Council and Council Recommendation)

Stencilled doc. No COM(82)24 final of 10 February 1982 and OJ L 247, 23. 8. 1982

### III. 6

The role for coal in Community energy strategy

(Communication from the Commission to the Council)

Stencilled doc. No COM(82)31 final of 10 February 1982

Measures to enhance the security of natural gas supplies to the Community

(Communication from the Commission to the Council)

Stencilled doc. No COM(82)45 final of 15 February 1982

An energy strategy for the Community — the nuclear aspects

(Communication from the Commission to the Council)

Stencilled doc. No COM(82)36 final of 9 February 1982

Measures to limit the effects of a limited shortfall in oil supply

(Communication from the Commission to the Council)

Stencilled doc. No COM(81)533 final of 30 September 1981

# EUROPEAN COMMUNITIES - INFORMATION

Commission of the European Communities. Rue de la Loi 200, 1049 Bruxelles

**Informationskontorer - Presse- und Informationsbüros - Γραφεία Τύπου και Πληροφοριών -  
Information offices - Bureaux de presse et d'information - Uffici stampa e informazione -  
Voorlichtingsbureaus**

---

## BELGIQUE — BELGIË

Rue Archimède 73 -  
Archimedesstraat 73  
1040 Bruxelles — 1040 Brussel  
Tél. : 235 11 11

## DANMARK

Gammel Torv 4  
Postbox 144  
1004 København K  
Tlf. : 14 41 40/14 55 12

## BR DEUTSCHLAND

Zitelmannstraße 22  
5300 Bonn  
Tel. : 23 80 41  
Kurfürstendamm 102  
1000 Berlin 31  
Tel. : 8 92 40 28

## ΕΛΛΑΣ

Ὁδὸς Βασιλίσσης Σοφίας, 2  
Καὶ Ἡρώδου Ἀττικοῦ  
Ἀθήνα 134  
τηλ. : 743 982/743 983/743 984

## FRANCE

61, rue des Belles-Feuilles  
75782 Paris Cedex 16  
Tél. : 501 58 85

## IRELAND

39 Molesworth Street  
Dublin 2  
Tel. : 71 22 44

## ITALIA

Via Poli, 29  
00187 Roma  
Tel. : 678 97 22  
Corso Magenta 61  
20123 Milano  
Tel. 805 92 09

## GRAND-DUCHÉ DE LUXEMBOURG

Centre européen  
Bâtiment Jean Monnet B/O  
L-2920 Luxembourg  
Tél. : 43011

## NEDERLAND

Lange Voorhout 29  
Den Haag  
Tel. : 46 93 26

## UNITED KINGDOM

20, Kensington Palace Gardens  
London W8 4QQ  
Tel. : 727 8090

Windsor House  
9/15 Bedford Street  
Belfast  
Tel. : 40708

4 Cathedral Road  
Cardiff CF1 9SG  
Tel. : 37 1631

7 Alva Street  
Edinburgh EH2 4PH  
Tel. : 225 2058

## ESPAÑA

Calle de Serrano 41  
5A Planta-Madrid 1  
Tel. : 474 11 87

## PORTUGAL

35, rua do Sacramento à Lapa  
1200 Lisboa  
Tel. : 66 75 96

## TÜRKIYE

13, Bogaz Sokak  
Kavaklıdere  
Ankara  
Tel. : 27 61 45/27 61 46

## SCHWEIZ - SUISSE - SVIZZERA

Case postale 195  
37-39, rue de Vermont  
1211 Genève 20  
Tél. : 34 97 50

## UNITED STATES

2100 M Street, NW  
Suite 707  
Washington, DC 20037  
Tel. : 862 95 00

1 Dag Hammarskjöld Plaza  
245 East 47th Street  
New York, NY 10017  
Tel. : 371 38 04

## CANADA

Inn of the Provinces  
Office Tower  
Suite 1110  
Sparks' Street 350  
Ottawa, Ont. K1R 7S8  
Tel. : 238 64 64

## AMERICA LATINA

Avda Ricardo Lyon 1177  
Santiago de Chile 9  
Chile  
Adresse postale : Casilla 10093  
Tel. : 25 05 55

Quinta Bienvenida  
Valle Arriba  
Calle Colibri  
Distrito Sucre  
Caracas  
Venezuela  
Tel. : 91 47 07

## NIPPON

Kowa 25 Building  
8-7 Sanbancho  
Chiyoda-Ku  
Tokyo 102  
Tel. : 239 04 41

## ASIA

Thai Military Bank Building  
34 Phya Thai Road  
Bangkok  
Thailand  
Tel. : 282 14 52

---

European Communities — Commission

**The European Community and the energy problem**

*Third edition*

Luxembourg: Office for Official Publications of the European Communities

1983 — 56 p. — 16.2 x 22.9 cm

European Documentation series — 1/1983

DA, DE, GR, EN, FR, IT, NL

ISBN 92-825-3399-9

Catalogue number: CB-NC-83-001-EN-C

**This brochure gives a detailed account of the national and international economic aspects before and during the energy crisis. It describes the need for a common energy policy, the initial achievements and the way in which reactions to the energy crisis have developed.**

## In the same collection (continued)

---

An education policy for Europe (*second edition*)  
The European Community's industrial strategy  
The agricultural policy of the European Community (*third edition*)

## Brochures for businessmen\* (in the same collection)

Grants and loans from the European Community  
Public supply contracts in the European Community

## Others publications for the general public

Working together — The institutions of the European Community — By E. Noël, Secretary-General of the Commission of the European Communities  
Steps to European unity — Community progress to date: a chronology  
European File — Each month two topics of current European events  
Bulletin of the European Communities — A monthly survey covering milestones in the building of Europe  
Basic statistics — Published annually, an essential statistical guide to the Community  
Colour map — The European Community, Member States, regions and administrative units  
The European Community as a publisher — Extract from our catalogue of publications

---

\* The brochures for business cannot be obtained on subscription. They are available at the information offices (see list of addresses).

---

# EN

---

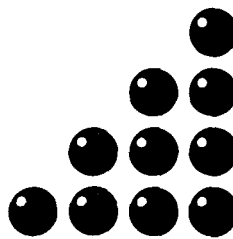
Energy is a determining factor in the operation and development of a modern economy. Over the past 20 years the European Community, most of whose Member States used to be relatively self-sufficient as regards energy supply, has gradually become dependent — as a whole and to a considerable extent — on outside supplies, primarily of oil.

Since 1973 there have been frequent disturbances, which have increasingly affected the quantities supplied and the prices charged. The standard of living of 270 million citizens of the European Community is now threatened.

The effect of the energy crisis has simply been to highlight more starkly than ever the need for a common energy policy. To this day, no such policy exists.

This brochure sets out the need for a common policy. It contains the basic information concerning the energy sector for both the world and for the Community.

The first steps towards introducing a common energy policy have been taken, and the basic options have been decided upon at the highest level of the European Community. But it will still be necessary to marshal and deploy a large number of instruments if the European Community is to be enabled to guarantee its future energy supplies.



---

ISBN 92-825-3399-9



OFFICE FOR OFFICIAL PUBLICATIONS  
OF THE EUROPEAN COMMUNITIES

L-2985 Luxembourg



9 789282 533994