

COMMISSION OF THE EUROPEAN COMMUNITIES

The Energy Situation in the Community

Situation 1977

Outlook 1978

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This report analyses the energy situation in the Community in 1977 and comments on the outlook for 1978.

A sluggish demand for energy which it is estimated increased within the Community by only 1.1% in 1977 was mainly a result of low economic growth -- with GDP rising by about 2% -- and to some extent a reflection of a continuing energy conservation effort. The comparison between the estimates for 1977 and those for the previous year (1976: energy + 6%; GDP + 4.8%) seems to indicate a more marked reaction of energy demand to the slowing down of the growth in economic activity. The relationship between the growth in the demand for energy and economic growth for 1977 should not, in any case, be interpreted as an indication of a long term trend; this relationship established for the two years 1976 and 1977 taken together approximates, however, to unity.

In 1977 oil demand dropped by 2% and the consumption of coal declined by about 3%. On the other hand, natural gas consumption rose by 6% and electricity demand increased by 3.4%.

The economic outlook for 1978 is of growth in GDP of around 3% -- still below the 4.5-5% annual target for the Community in the medium-term. Energy demand is likely to grow by about 3%, with the demand for oil rising by 2% and natural gas by 9.9% (reflecting increased availability). The demand for electricity is expected to rise by about 3.9%. However the demand for coal is expected to increase only marginally owing to the difficult market situation.

Some 3,300 MWe of nuclear capacity were added to the Community network in 1977, the total nuclear capacity of the Community thus reaching 22,400 MWe. In 1978 the total nuclear park is expected to exceed 27,000 MWe. The nuclear contribution to total electricity production which reached 10% in 1977, could rise to about 12% of total electricity production in 1978.

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ENERGY DEMAND

A sluggish demand for energy which it is estimated increased within the Community by only 1.1 % in 1977 was mainly a result of low economic growth - with GDP rising by about 2 % - and to some extent a reflection of a continuing energy conservation effort. The comparison between the estimates for 1977 and those for the previous year (1976 : energy + 6%; GDP + 4.8%) seems to indicate a more marked reaction of energy demand to the slowing down or the growth in economic activity. The relationship between the growth in the demand for energy and economic growth for 1977 should not, in any case, be interpreted as an indication of a long term trend; this relationship established for the two years 1976 and 1977 taken together approximates, however, to unity.

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OIL

Consumption outside the State trading countries is estimated to have risen by about 3 % in 1977, increases of above 5 % in the USA and Japan having more than offset the reduction in consumption in the Community.

The demand for OPEC oil, however, rose by only 1 - 2 %, because much of the increase in consumption was covered by new production

in the North Sea, Alaska, and other non-OPEC areas. nevertheless increased by nearly 12% (40 million tons) to million tons in 1977.

It is expected that consumption outside the State trading countries will rise by about 3% in 1978. The increase in consumption will be covered by a further rise in production outside the OPEC countries, whose exports may consequently change little in 1978. (Appendix 2).

It is foreseen that the supply of crude oil will remain abundant in 1978, although the production of some major crude oils will be reduced. Saudi Arabia for example has re-imposed for 1978/9 a production ceiling of 8.5 m.b/d. (420 million tons) against 9.2 m.b/d. (460 million tons) produced in 1977, and several other producers have announced, or are contemplating, reductions in the permitted level of production.

The State selling price of the OPEC reference crude, Arabian Light, was raised by 10% during 1977. On average, crude oil prices rose by about 9%, because the premia for low-sulphur crude oils declined in response to rising production of crudes of this type in the North Sea and Alaska, while the prices of the heavier Middle Eastern crudes also remained weak because of the low level of demand in the principal consuming regions. In December 1977, the OPEC members met in Caracas to review prices for 1978, but decided to leave them unchanged.

In the European Community the consumption of oil products (including ocean bunkers) was about 530 million tons in 1977 as compared with 540 million tons in 1976. Demand for automotive fuel continued to grow and the fall in consumption was due almost entirely to the reduced demand for fuel oil especially in power station use, where the share of nuclear and hydraulic power rose sharply.

E.E.C. crude oil production reached 47.4 million tons in 1977 (10% of consumption) compared with 21 million tons in 1976. This increase in indigenous production, combined with the fall in consumption, reduced import requirements from about 519 million tons to 485 million tons. Because crude oil prices were about 9% higher however, the estimated total cost of imports rose from \$ 46,900 million to \$ 49,250 million.

Average product prices rose slightly in 1977 from the 1976 level but, at the year end, were little changed from those of January. Refiners' margins were further reduced.

Demand is forecast by the Member States to increase by about 2% in 1978 to 540 million tons. With EEC crude oil production expected to reach 85 million tons, the net import requirement would be of the order of 455 million tons, about 6% below 1977 and 24% below 1973.

NATURAL GAS

In 1977 gross internal production of natural gas within the Community rose to about 182 thousand million m³ (144.2 Mio toe). In thermal equivalent, this quantity represents an increase of 1.5% over 1976, which represents the lowest annual growth rate recorded in the Community since the big gas discoveries at the beginning of the 1960's. Imports from third countries rose by 34% and represented 10.5% of the total natural gas supplies of the Community.

The growth in gross internal consumption was of the order of 6%, considerably higher than the rise of about 1.1% estimated for total inland consumption of energy. Thus the share of natural gas in the overall energy supply reached about 17.5%.

The past year was marked by several significant developments. Gas from Ekofisk reached the market in September, the delay being due to technical factors. At the same time, the UK received its first supplies from the Frigg field (a joint UK - Norwegian field).

Several important contracts have been signed with Algeria by European companies, often grouped in consortia. In total these contracts have reached some 37 thousand million m³ (28.5 million toe) per annum.

In addition to the gas pipeline envisaged to link Algeria to the north of Italy, an important gas pipeline is under construction in the Federal Republic of Germany for the fulfilment of a contract signed by Gaz de France, Ruhrgas and the Austrian company OMV with Iran in 1975. Three LNG terminals are planned or are under construction in the Community whereas the project for a fourth one still requires some administrative authorizations. Finally, there are various projects concerning the development of underground storage capacity; at least fifteen locations are under construction or development within the Community.

In 1978, the same rate of growth in production is expected as was achieved in 1977. In order to meet a growth in demand of about 9.9%, imports should reach a new level, their part in the supply of natural gas reaching 18.7%.

Natural gas prices remain below the price of heavy fuel oil due to pricing systems which result in a price differential in favour of natural gas approximating to about 10% on average.

COAL

Coal consumption in the Community in 1977 amounted to about 250 mtce (174.2 Mio toe) a 3% drop from 1976 due to the depressed state of the steel industry.

For the first time, electricity generation represented the largest market for coal in the Community in 1976, with coke manufacture, primarily for the steel industry, dropping to second place. In 1977, the power station market increased its lead through a further slight rise in coal-burn, while the continuing depression in the steel industry and mounting coke producers' stocks forced a further 10% drop in coal consumption by coke ovens.

Coal consumption for electricity generation in 1977 of about 121 mtce (84.7 Mio toe) represents something like a 2% rise over 1976. This should be seen in conjunction with the previous year's increase of 18% due partly to a severe shortage of water for hydro-electric generation.

However, in spite of this overall rise of some 20% in coal-burn for electricity generation over 2 years, there remains a gross imbalance between the different Member States. Over 90% of all coal burned in power stations in the Community in 1977 was used in just three countries: the United Kingdom (53%), Germany (28%) and France (13%).

The drop in the steel industry's requirements in the form of coal or coke over the past three years does not mean that this quantity has found its way into electricity generation. The reason lies in high production costs, and hence high prices, of most Community coking coal compared to those of power station coal available on the world market. The situation is further aggravated by the fact that while the Ruhr area is by far the largest producer of coking coal in the Community, much of the increase in coal-fired electricity generation has taken place in regions more cheaply and conveniently supplied by sea than from North-West Germany.

These factors caused a steep rise in coal imports from third countries over the same period. In spite of their already unprecedentedly high level the year before, they rose by a further 2% to nearly 45 mtce (31.5 Mio toe) in 1977.

General industry, though not a large consumer of coal and coke, has proved a comparatively stable one at about 15.5 mtce (10.9 Mio toe) in 1976 and 17.5 mtce (12.3 Mio toe) in 1977. On the other hand, the domestic solid fuel market, although still almost twice as large, shows a continuing tendency to contract at between 7% and 9% each year.

Coal production in the Community in 1977 of about 218 mtce (152 Mio toe) was roughly 4% lower than the previous year. In the United Kingdom, France and Belgium, most indigenous output was absorbed inside the country.

On the other hand, production in Germany, traditionally a supplier of coking coal and coke to the steel industries of other member countries as well as its own, could not be fully disposed of in

1977 for the third year in succession. This is more serious than appears, as production had already been kept at some 10% below capacity in view of the market situation.

The outlook for 1978 is one of little change in coal consumption but there could be a start to some substitution of third country coal by Community coal on the supply side, although the bridging of the price gap for substantial quantities of Community coal is likely to prove extremely difficult without new Community measures. Very high stocks due to the prolonged recession in the steel industry makes this an urgent matter for the German coal producers. Furthermore, some additional British coal, involving a much smaller price difference, might become available for sale to other Community countries as a result of the introduction of effective new productivity incentives in the United Kingdom coal industry.

ELECTRICITY

(i) Electricity demand

In 1977 electricity demand in the Community increased by about 3.4%. The results were particularly influenced by the depressed development of the second half of the year.

In 1978 electricity consumption is expected to show an only marginally higher growth rate of 3.9%.

Demand in the households and other services sector which rose by 6.1% in 1977 continues to be much more buoyant than demand by industry, which grew by 0.7% only, a situation which reflects the Community's general economic position (Appendix 3).

Growth of 6% in domestic and commercial consumption of electricity in 1978 is forecast; for industry the expectation is an increase of only 1.8%.

(ii) Conventional thermal power stations

In 1977 there was some decline in oil-burn by power stations, 57 Mio toe as compared with 63 Mio toe the year before. There was also a modest decline in use of natural gas in power station boilers in 1977. These changes were brought about by conditions which favoured an increase in hydro-electric generation over that achieved in 1976, by an increase in nuclear production and by a less than expected growth in electricity demand.

In 1978 oil and gas-burn are expected to return towards a somewhat higher level since hydro-electric production might fall to normal levels and because of the significant recent completion of oil and gas-fired power stations ordered before the autumn 1973 crisis (Appendix 4).

(iii) Nuclear energy

Only some 3,300 MWe of nuclear capacity were added to the Community network in 1977, that is less than half of what was estimated a year before.

The plants that came into operation are: the two first PWR units (890 MW) installed at Fessenheim (France), the first reactor of a plant built at Ohu on the Isar in the Federal Republic of Germany (PWR 870 MW) and the AGR No.2 reactor at Hunterston (625 MW), which is the fourth unit of this type to be linked to the UK network.

The total nuclear capacity of the Community thus reached 22,400 MWe at the end of 1977.

Electricity production (gross) from nuclear plants in the Community reached about 113 TWh (26 Mio toe) in 1977, an increase of 20% on 1976. The nuclear contribution to total electricity production thus reached 10%.

For 1978 the only plants coming into operation should be firstly, those whose completion was delayed last year, namely, the reactors at Caorso (Italy 864 MW), and Bugey 2 (France 925 MW) and Unterweser and Philippsburg (Federal Republic of Germany), respectively 1,230 and 864 MW; additionally, the third reactor unit at Bugey (France) could also be operational in the course of the year. The total nuclear park would thus exceed 27,000 MWe.

The initial operation in 1978 of units in the course of construction could increase gross production to around 145 TWh (33 Mio toe); in this case nuclear energy could be supplying about 12% of total electricity production within the Community.

NUCLEAR FUELS

During 1977 no important transactions took place in the natural uranium market. This was due to the following:

- (a) to the relatively slack situation among users who, as a result of cumulative delays with regard to the coming-into-operation of nuclear plants and to the slowing down in the achievement of nuclear programmes, hold sufficient stocks of uranium to cover their needs;
- (b) to the high level of prices which led users to draw out their purchases, in the hope of a more favourable trend in prices;
- (c) to the embargo imposed on uranium supplies by certain large producing countries.

The raising of the embargo imposed by Canada should lead to a resumption of commercial transactions during 1978. In fact an agreement, which updates the Euratom/Canada agreement of 1959, was reached between Euratom and Canada in January 1978. This agreement brings to an end the embargo on exports of Canadian uranium to Community countries, the delivery of which was interrupted in January 1977.

Table 1

Inland Consumption of Primary Energy in the Community

	1975		1976		1977 (estim.)		1978 (forecast)	
	Mio toe	%	Mio toe	%	Mio toe	%	Mio toe	%
Hard coal	167.1	19.3	178.4	19.5	174.2	18.8	177.1	18.6
Lignite	26.7	3.1	29.2	3.2	26.9	2.9	25.6	2.7
Oil	476.4	55.1	506.9	55.3	497.0	53.7	507.5	53.2
Natural Gas	142.2	16.4	153.1	16.7	162.3	17.5	178.4	18.7
Nuclear energy	19.5	2.3	21.9	2.4	26.1	2.8	33.0	3.5
Hydro, geothermal (& others)	32.6	3.8	26.6	2.9	39.8	4.3	31.9	3.3
Total	864.5	100.0	916.1	100.0	926.3	100.0	953.5	100.0

Table 2

Percentage Variations in G.D.P. and Energy Consumption

	1976 - 1975	1977 - 1976 (estim.)	1978 - 1977 (forecast)
Gross Domestic Product	+ 4.8	+ 2.0	+ 3.0
Energy Inland Consumption:	+ 6.0	+ 1.1	+ 2.9
of which:			
- Oil	+ 6.4	- 2.0	+ 2.0
- Solid fuels	+ 7.1	- 3.1	+ 0.8
- Natural gas	+ 7.7	+ 6.0	+ 9.9
- Nuclear energy	+12.3	+19.2	+26.4
- Hydro, geothermal, & others	-18.4	+49.6	-19.8

Source: 1975, 1976 and partly 1977: SOEC; other 1977 and 1978: D.G.XVII (CCE).

Table 3
Energy supply in the Community (Mio toe)

	1975		1976		1977		1978	
	Prod.	Net imports *	Prod.	Net imports *	Prod.	Net imports *	Prod.	Net imports *
Solid fuels	191.9	26.4	186.6	28.3	178.2	26.5	176.9	25.0
Oil	12.0	484.1	21.3	518.6	47.4	484.9	85.0	455.0
Natural gas	134.3	9.0	142.1	12.6	144.2	16.9	146.6	32.5
Primary electricity etc.	48.6	3.6	47.4	1.1	61.9	4.0	63.4	1.5
Total	386.8	523.1	397.4	560.6	431.7	532.3	471.9	514.0

* Imports minus exports.

Source: 1975, 1976 and partly 1977: SOEC; other 1977 and 1978: D.G.XVII (CCE).

Appendix 2

EL 7, USA AND JAPAN: OIL IMPORT REQUIREMENTS 1976-78

Millions of tonnes

	1976	1977	% \pm 77/76	1978	% \pm 78/77
<u>Consumption</u> (inc. bunkers)					
EEC	540	530	- 2.0	540	+ 2.0
USA	850	895	+ 5.3	930	+ 3.9
JAPAN	265	280	+ 5.7	290	+ 3.6
	1655	1705	+ 3.0	1760	+ 3.2
<u>Production</u>					
EEC	21	47		85	
USA	510	515		555	
	531	562	+ 5.8	640	+13.9
<u>Imports</u>					
EEC	519	485	- 6.6	455	- 6.2
USA	340	380	+11.8	375	- 1.3
JAPAN	265	280	+ 5.7	290	+ 3.6
	1124	1145	+ 1.9	1120	- 2.2

Note: Estimate of import requirements excludes imports for stock piling in the USA and JAPAN.

Sources: EEC: Eurostat and Commission forecasts.

USA: Chase Manhattan and Independent Petroleum Association of America.

JAPAN: Petroleum Association of Japan.

FINAL CONSUMPTION OF ELECTRICITY IN THE COMMUNITY

	TWh			Increase (%)		
	1976	1977 (1)	1978 (2)	1976/75	1977/76	1978/77
Industry (except the energy sector)	459.4	462.4	470.5	+ 8.5	+ 0.7	+ 1.8
Transport	24.5	25.0	25.5	+ 3.4	+ 1.9	+ 2.0
Households, commerce, handicrafts, etc.	459.7	487.9	517.3	+ 5.7	+ 6.1	+ 6.0
TOTAL	943.6	975.3	1013.3	+ 7.0	+ 3.4	+ 3.9

- (1) Estimates.
(2) Forecasts.

Appendix 4

ESTIMATED ELECTRICITY GENERATED IN THE COMMUNITY IN 1977 AND 1978

Breakdown by energy sources

	Production generated - TWh - (latest estimates)			Breakdown in % (latest estimates)			Increase in %	
	1976 (1)	1977 (2)	1978 (3)	1976	1977	1978	1977/76	1978/77
TOTAL GROSS PRODUCTION	1114.1	1135.5	1190.8	100	100	100	+ 1.9	+ 4.9
HYDROELECTRIC Total	111.3	154.6	137.0	10.5	13.6	11.5	+ 39.0	- 11.4
from:								
- natural flow	105.2	148.8	129.3	9.9	13.1	10.9	+ 41.4	- 13.1
- pumped storage	6.0	5.8	7.7	0.6	0.5	0.6	- 3.4	+ 32.9
GEO THERMAL	2.5	2.5	2.7	0.2	0.2	0.2	- 0.9	+ 8.0
NUCLEAR	93.9	112.9	144.7	8.1	10.0	12.2	+ 20.2	+ 28.2
CONVENTIONAL THERMAL	906.4	865.5	906.0	81.2	76.2	76.1	- 4.5	+ 4.7

- (1) Actual.
- (2) Estimates.
- (3) Forecasts.

TOTAL FUEL CONSUMPTION OF CONVENTIONAL POWER STATIONS FOR
GENERATION OF ELECTRICITY AND OF COMMERCIAL HEAT 1976 -78

COMMUNITY

	Million toe			Per cent		
	1976 (1)	1977 (2)	1978 (3)	1976	1977	1978
Petroleum products (non gaseous)	63.3	57.0	62.2	29.8	28.3	29.7
Hard coal	82.9	84.6	86.6	39.0	41.9	41.4
Lignite and peat	26.1	23.8	23.0	12.3	11.8	11.0
Natural gas	31.5	27.8	29.0	14.8	13.8	13.8
Derivative gases (and other fuels)	8.7	8.5	8.6	4.1	4.2	4.1
All fuels	212.5	201.7	209.6	100.0	100.0	100.0

- (1) Actual.
(2) Estimates.
(3) Forecasts.

BFR
20

DKR
3,50

DM
1,30

FF
3

LIT
550

HFL
1,40

UKL
0,35

USD
0,65



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