

COMMISSION OF THE EUROPEAN COMMUNITIES

The Energy Situation in the Community

Situation 1976

Outlook 1977

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CONTENTS

	<u>Page</u>
I. Summary	5
II. The Economic Situation	8
III. The Demand for Energy	9
IV. The Market Situation and Outlook	10
A. Petroleum	10
B. Natural Gas	16
C. Coal	19
D. Electricity	24
E. Nuclear Fuels	27

I. Summary

1976

- (1) An economic recovery in 1976 resulting in a rise in the Community's real gross domestic product of about 4 $\frac{1}{2}$ % led to a growth in energy demand of about 4.7 % as compared with 1975.
- (2) The growth in inland consumption of the main primary energy sources was as follows:

1976/75

Per cent

Oil	+ 5.5
Solid Fuels	+ 5.0
Gas	+ 7.5

- (3) There was a near-normal growth in electricity production of 8.0%, despite a fall in the supply of primary electricity of nearly 4% owing to severe drought conditions which hit hydro-electric production.
- (4) The supply of crude oil and products rose by 8.2% partly reflecting the build-up of stocks by some 5 million tons in anticipation of the OPEC price review in December.
- (5) Indigenous crude oil production doubled from 11 million tons to 22 million tons, i.e. equivalent to 4% of consumption.
- (6) The overall increase in the average f.o.b. costs of crude oil imports was of the order of \$25 - 30 per barrel, or 2.5 - 3%. C.i.f. costs increased rather more because of a strengthening of ocean freights in the final quarter.
- (7) Oil product prices at Rotterdam rose by some \$9 (10%) per ton on average, mostly due to the 26% increase in the price of heavy fuel oil which followed the reversal of a two year decline in demand.

- (8) Natural gas production rose by 5% and imports by 38%.
- (9) Coal production fell by about 4% to a level of 22.3 million t.c.e., reflecting principally falling productivity in the U.K. and short-time working in Germany in response to market conditions. Coal imports at 42 million tons were slightly higher than in 1975.
- (10) Increases in costs of production per ton of coal exceeded the rise in receipts with the exception of Germany where the reverse was the case.
- (11) Hard coal consumption rose by about 6% reaching 265 million t.c.e. Whereas demand from the steel industry rose far less than was expected, coal requirements for electricity generation reached the highest level since 1969. Rises in the list prices of Community coals have been progressively slackening.
- (12) Whereas producers' coal stocks rose only slightly in 1976, producers' coke stocks rose by some 5 million tons or 38% reflecting adverse demand conditions.
- (13) The production of nuclear electricity rose by 11%.
- (14) Additional nuclear capacity reached only 3,500 MWe, instead of 7,000 MWe as planned, owing to technical problems and delays.
- (15) The market for natural uranium was characterised by a relative scarcity of transactions and by a continuing rise in prices.

1977

- (1) The economic outlook for 1977 is most uncertain. A possible rate of growth in the Community's real gross domestic product of $3\frac{1}{2}\%$ could lead to a rise in energy consumption of the same order.
- (2) The variations in inland consumption of the main primary energy sources are estimated to be approximately:

1977/76

Per cent

Oil	+ 1.0
Solid Fuels	0
Natural Gas	+ 10.0 (reflecting increased availability)

- (3) Electricity production is expected to rise by 6.5%. In particular, the supply of primary electricity is estimated to grow by 25 per cent as a result of increased nuclear availability and a revival of hydro-electric production (on the assumption of 'normal' climatic conditions.)
- (4) Indigenous crude oil production is expected to reach at least 44 million tons which, after also allowing for drawing on stocks, should make possible a reduction in crude oil imports of 5%.
- (5) The proportion of Saudi Arabian crudes in Community imports is likely to increase following the relatively small increase in their prices and the temporary lifting of production ceilings. No major quality change is likely, however, because increased exports of Saudi medium and heavy crudes will be at the expense mainly of similar Iranian and Kuwaiti material.
- (6) A small overall growth in oil demand is expected, the anticipated increase in energy consumption being met largely by natural gas and primary electricity. The impact of the O.P.E.C. "two-tier" price increase on oil prices and consumption will probably be delayed, because of high crude and product stocks, until the second half-year.
- (7) Natural gas production is estimated to grow by 3.5%. Imports of natural gas are expected to rise significantly to 250 thousand Tcal (142 thousand Tcal in 1976).
- (8) Coal output for 1977 is expected to reach 230 million t.c.e., slightly above that of 1976. Imports could still reach, if not exceed, 46 million tons.
- (9) No marked changes are expected in 1977 in the level of investment in the coal industry in the U.K. and France but reduced investment is foreseen in Germany and particularly in Belgium.
- (10) Coal consumption is likely to remain at about the same level as in 1976. In the light of the market situation, there is no scope for price increases of Community coal.
- (11) Nuclear capacity should reach 24,600 MWe, with a production of electrical energy between 110 and 120 TWh, i.e. approximately 10% of total electricity production.

II. The Economic Situation

Since the middle of 1976, the recovery in economic activity in the Community has distinctly weakened. In most Member States both foreign and home demand have lost momentum. For 1976 as a whole the Community's real gross domestic product rose by about $4\frac{1}{2}\%$, compared with a fall of 2.3% in 1975. The recovery has only made limited inroads into the substantial spare capacity available and has at best checked the downward trend in total employment. Industrial production in the Community in 1976 is estimated to have risen by about 7%. The production of basic and consumer goods made the most important contribution to the recovery of industrial activity, while the output of investment goods has remained flat. The rise in consumer prices in 1976 as a whole seemed likely to exceed 10% for the Community on average, against $12\frac{1}{2}\%$ in 1975. On the external side, the Community's trade balance deteriorated strongly until the autumn.

The outlook for 1977 is most uncertain. Disparities in the situation from one country to another - aggravated by the different sensitivities to the recent increase in the price of oil - are bound to restrain the rate of economic growth for the Community as a whole. However, to the extent that the stabilization policies undertaken by the Member States in deficit bring positive results and that the trend of economic activity continues to improve in the surplus countries, both within and outside the Community, then the rate of growth of the real gross domestic product of the Community should be about $3\frac{1}{2}\%$ in 1977. The labour market will be all the more affected by the weakness of this expansion, since it will be largely due, in most Member States, to insufficient business investment. There is some reason to expect a slowing in inflation and an improvement of the external account, especially if the countries which meet the greatest difficulties in this respect manage to make substantial progress during the year.

III. The Demand for Energy 1)

The economic recovery within the Community in 1976 resulted in a growth in energy demand of about 5.0 per cent as compared with a decline of the same order in the previous year. The inland consumption of oil rose by 5.5 per cent and that of coal by 5.0 per cent; the demand for natural gas, which was available in increased quantity and still showed some price advantages, increased by 7.5 per cent. On the other hand, the supply of primary electricity fell by nearly 4 per cent as a result of severe drought conditions which hit hydroelectric production.

Total inland consumption of energy in 1976 reached 908 million tons of oil equivalent (m.t.o.e.), still below the level of Community consumption in 1973 (936 m.t.o.e.) The demand for oil reached about 502 $\frac{1}{2}$ m.t.o.e, equivalent to just over 55 per cent of total energy consumption. The consumption of coal and lignite, whilst rising to 204 m.t.o.e, accounted for the same percentage share of the energy market, 22.5 per cent, as in the previous year. Natural gas at 153 m.t.o.e increased its share further to about 17 per cent of total energy demand. The share of primary electricity in the total market fell from 6.0 per cent in 1975 to 5.0 per cent in 1976, reflecting the decline in hydro-electric production.

The slowing down in the pace of economic recovery expected for 1977 suggests a more restrained rate of growth in energy consumption estimated at 3.5 per cent for the year. A sustained effort of energy conservation will be required to limit growth to this order. Consumption of the principal fuels, oil and coal, is expected to be at similar levels to that of 1976. However, the consumption of natural gas is expected to rise by nearly 10 per cent, reflecting increased availability. The supply of primary electricity is estimated to grow by 25 per cent as a result of increased nuclear availability and a revival of hydro-electric production (on the assumption of 'normal' climatic conditions).

1) See Annexe 1 for relevant statistics.

IV. The Market Situation and Outlook

A. Petroleum

1. Supply

- (a) The supply of crude oil and products to the Community in 1976 is estimated to have increased by 8.2% over 1975, a considerably higher rate of increase than the estimated 5.0% rise in consumption. This difference reflects the build-up of stocks of crude oil and products by some 5 million tons (M.t) in anticipation of the OPEC price review in December. Indigenous crude oil production doubled from 11 M.t to 22 M.t., equivalent to 4% of consumption, while crude oil imports rose by 31 M.t. or 6.5%. In 1977 Community production is expected to reach at least 44 M.t. which, after allowing for stock changes, will make possible a reduction in crude oil imports to about 480 M.t., a figure of 5% lower than 1976.

The balance of external trade in oil products is thought to have changed little in 1976 from the deficit in 1975 of about 5.5 M.t. (which compared with surpluses 23 M.t. in 1973 and 12 M.t. in 1974) and no major change is foreseen for 1977. Likely improvement in Italy's external trade will be offset by the reduction of exports to the Scandinavian countries.

Table 1
EEC Supply/Demand 1975 - 1977 (Millions of tons)

<u>Supply</u>	1975	1976	1977
Crude Production	11	22	44
Imports: Crude	480 - 16.5%	511 + 6.5%	480 - 6.1%
Products (net)	<u>6</u>	<u>5</u>	<u>4</u>
Total Supply	497 - 13.4%	538 + 8.2%	528 - 1.9%
Stock Increase/(Decrease)	(11)	5	(12)
<u>Consumption</u>			
- total	508 - 8.0%	533 + 4.9%	540 + 1.3%
- Excluding bunkers	477	500	507
- Excluding bunkers own-use and loss	443	472	475

There were appreciable changes during 1976 in the composition of crude oil imports into the Community as refiners adapted their operations to the lighter structure of product demand. The proportion of heavier crudes imported continued to decline, most conspicuously Kuwait (31° API) which was a little more than 5% of EEC imports in Jan/June 1976 compared with 8% in the same period 1975. Imports of African crude in the same half-years rose from 18.5% to about 22%. There were also significant increases in purchases from Eastern Bloc countries and from Norway. Saudi Arabian crudes which were exported to USA in sharply rising quantities, declined slightly in the EEC crude stream from about 26.5% to close to 26%. The promised additional exports of Saudi medium and heavy crudes in 1977 are unlikely to affect significantly the average quality of EEC imports since they will displace similar Iranian and Kuwaiti crude oils.

In spite of the growth in demand for OPEC exports by some 12% in 1976, and the expected further increase in 1977, OPEC's crude production capacity, as defined by the technical and conservation ceilings set by individual producers, should be adequate to cover consumption in 1977 and some years thereafter. From late 1977 Alaskan production should, for a period of perhaps two years, keep U.S. import demand from growing beyond the estimated 1977 figure of about 8 million barrels a day.

Direct sales by producers (to buyers other than former concession holders) rose markedly in 1976. Both Iran and Kuwait reported direct sales exceeding 1 million b/d, and for OPEC as a whole the total appears to have been of the order of 5 million b/d. The objective announced by OPEC for 1977 is one-third of total production i.e. about 10 million b/d.

(b) North Sea oil - U.K. sector

In addition to the Argyll and Forties fields already producing in late 1975, five new fields came on-stream during 1976. Production in 1976, officially estimated in April as 15 - 20 million tonnes, is now likely to turn out at about 13 million tonnes. It is below the lower end of the bracket because of some down-time on one of the Forties platforms and delays in starting production in several other fields. There are said to be another seven fields waiting to come on-stream, two in 1977 and a further five in 1978. There seems no reason to doubt that the official estimates of

production will be reached, i.e. 35 - 45 million tonnes in 1977 and 55 - 70 million tonnes in 1978, but the lower figure is more probable for 1977. The award for the fifth licensing round was announced 9th Feb. 1977, offers of licenses being made in respect of 44 blocks to a total of 65 companies.

Norwegian sector

Oil production from the Norwegian sector in 1976 was 14 million tonnes, all from the Ekofisk fields. Estimated production from Ekofisk in 1977 is 21/23 million tonnes and it should rise to a maximum of 30 million tonnes in 1980. It will be supplemented from 1979 by oil production from the Norwegian sector of Statfjord, with gas production following in 1983. Maximum production of oil and gas from all Norwegian fields is now expected to level out at about 70 million tonnes in the mid to late '80's, of which 45 million tonnes should be oil.

(c) Crude Oil Prices

Although OPEC, at the Bali meeting in May 1976, decided against any general increase in the official crude oil prices, members were given greater discretion to revise quality differentials (in relation to Arabian Light) to reflect market realities, and there were in fact in 1976 substantial increases in the contract prices of some of the lighter crude oils in strong demand and, conversely, reductions in those of a number of important heavier crude oils, including Iranian Medium/Heavy and Kuwait. By the year-end differentials between light and heavy crudes had widened by as much as \$ 50-\$60 barrel in some cases.

Apart from these adjustments to quality differentials, spot market prices, and official prices when contract terms permitted, responded to the sharp increase in liftings which occurred in the months before the December OPEC price review.

As a result of higher demand and of the higher proportion and price of the lighter crudes, there was an overall increase in the average f.o.b. costs of crude oil imported into the Community of the order of \$25 - 30 per barrel, or 2.5 - 3%. C.i.f. costs increased rather more because of the strengthening of ocean freights in the last quarter.

For 1977 it is to be expected that the prices of heavier crude oil will strengthen somewhat as a result of the recovery in world fuel oil demand and particularly in imports by the U.S.A.

At the OPEC conference at Doha (Qatar) on 17 December 1976, eleven of the thirteen members of the organisation decided to raise crude oil prices by 10% on 1 January and another 5% on 1 July 1977. Saudi Arabia and the United Arab Emirates decided to limit the increment to only 5% for the whole of 1977. The real impact of these "two-tier" crude oil prices on the EEC economy will depend on each Member State's supply pattern, the latter probably being affected by the Saudi decision temporarily to lift restrictions on production. In the 1st half of 1976, 33.0% of total EEC imports were supplied by Saudi Arabia and the Emirates, 60.0% by the other OPEC members and 7% by non-OPEC producers.

2. Marine

Ocean freight rates, particularly those for very large crude carriers (VLCC's - over 160,000 DWT) remained generally depressed. The considerable increase in crude oil shipments had little effect upon the underlying trend because of the continuing very large surplus capacity available. In September VLCC spot rates for the voyage Persian Gulf-North West Europe (U.K.C.) were about WS 25, (1) little different from January/February in spite of a short-lived improvement in May. During the last quarter, however, spot freight rates responded to increased crude oil lifting in anticipation of the OPEC price review and reached WS 35 for PG-UKC (2), or $\pounds/75$ /bbl. A corresponding fall in rates is to be expected in the early months of 1977 as crude oil demand declines from the exceptional level of last quarter 1976.

Similar conditions of heavy excess capacity must be foreseen for 1977. Towards the year-end the rising volume of North Sea, and probably Alaskan, production as well as of transfers to the East Mediterranean by pipelines and through the Suez Canal, will further shift demand from the VLCC category towards smaller vessels more suited to short-haul operation.

3. Demand

(a) Consumption of products on Inland Markets

The general situation of the Community oil market in 1976 was of a rather uncertain and uneven growth in demand of which part was attributable to exceptional seasonal factors. Inland consumption of oil products in the Community is estimated to have risen by about 6.5% in 1976 to 472 million tons (8% below the level of 1973). Of this increase, which varied greatly from quarter to

(1) World Scale ref.

(2) Persian Gulf-United Kingdom/Continent.

quarter, the greater part, perhaps 4%, was due to the recovery of economic activity in some Member States; the remaining growth was due to relatively severe weather conditions, and to the increased use of fuel oil in power stations in France and Italy to make good the reduction in hydro-electric production (owing to drought conditions).

Growth trends differed greatly between Member States, from an average of 9 - 10% in Germany, France and the Netherlands, where the recovery in naphtha and fuel oil demand was very marked, to around zero for the U.K. and Italy, where the consumption of industrial fuels and feedstocks was little changed from 1975.

The prospect for 1977 is of a small overall growth in oil demand, the anticipated increase in energy consumption being met largely by natural gas and nuclear power. The consequent displacement of gasoil and fuel oil will cause a further shift in product composition towards the lighter products, reducing the share of fuel oil to about 30.3% from 33.1% in 1973:

Table 2

EEC: Inland Consumption by Product Groups 1973 - 7
(excl. bunkers & refinery own use/loss)

Product	1973		1975		1976 (est.)		1977 (est.)	
	M.t	%	M.t	%	M.t	%	M.t	%
Mogas	71.6	13.9	72.4	16.3	76.0	16.1	79.0	16.6
Naphtha	<u>41.7</u>	<u>8.1</u>	<u>32.1</u>	<u>7.3</u>	<u>36.0</u>	<u>7.6</u>	<u>39.0</u>	<u>8.2</u>
	113.3	22.0	104.5	23.6	112.0	23.7	118.0	24.8
M. Distillates	193.7	37.5	171.6	38.7	182.0	38.6	180.0	37.9
Residual fuel	171.2	33.1	140.4	31.7	147.0	31.1	146.0	30.7
Other	<u>38.1</u>	<u>7.4</u>	<u>26.6</u>	<u>6.0</u>	<u>31.0</u>	<u>6.6</u>	<u>31.0</u>	<u>6.6</u>
Total	<u>516.3</u>	100.0	<u>443.1</u>	100.0	<u>472.0</u>	100.0	<u>475.0</u>	100.0

(b) Product Prices

During 1976 average spot prices at Rotterdam (weighted by the product yield on primary distillation of Arabian Light crude oil) rose by \$9 to reach \$95 per ton in December, roughly equal to the c.i.f. cost of the crude and processing.

Table 3
Mean Rotterdam Barge Prices 1975 - 6 (\$ M.t.)

	Dec.1975	June 1976	Oct.1976	Dec.1976
Motor Gasoline Premium	138	163	148	145
Regular	131	143	137	134
Naphtha	129	134	125	124
Kerosine	125	119	123	124
Gasoil	105	106	111	112
Fuel Oil 3.5% S.	58	64	71	73
Average (weighted by crude yield)	86.0	92.4	94.4	95.0

By far the largest increase was in fuel oil prices which rose from the very depressed level of end 1975 by no less than 26%, in response to the upturn in domestic and export demand after two years of decline.

Although seasonal demand should sustain the prices of fuel oil and gasoil in early 1977, product prices generally are likely to be depressed for some months at least by the large stocks of crude oil and products built up before the December OPEC price review. Provided the economic recovery continues, however, the growing U.S. and Japanese demand for finished product imports, should ensure a rising trend in international prices, and hence in the Community's internal prices, in spite of the lack of growth foreseen in EEC oil consumption.

B. Natural Gas

1. Natural Gas Supply

(a) Production and reserves

Community production in 1976 fell short of December 1975 forecasts by 3% but represented a 5% increase over 1975 actual production.

The following table compares actual 1975 production with 1976 estimates and 1977 forecasts.

Table 4
Natural Gas Production - 1975, 1976 and 1977

	in thousand Tcal (GCV)			%	
	1975	1976(1)	1977(2)	1976/75	1977/76
Germany	160.0	161.9	167.0	+ 1.1	+ 3.1
France	68.6	65.8(3)	68.0	- 4.1	+ 3.3
Italy	133.4	143.3	130.0	+ 7.4	- 9.3
Netherlands	763.2	806.7	840.0	+ 5.7	+ 4.1
United Kingdom	340.5	365.3	390.0	+ 7.3	+ 6.8
Belgium	0.4	0.3	-	-	-
Community	1466.1	1543.2	1595.0	+ 5.3	+ 3.4

(1) Approx. figures.

(2) Forecasts.

(3) The figure for France is 4% below the original 1976 forecast. This however is due, not to any retrograde development in production capability, but to a prolonged strike of production workers in the Lacq province.

Apart from the French situation, all Member States have increased their production but, except in Italy and the U.K., the increases are not as large as had been planned.

For Italy the increase is greater than planned but, in this context, Italy is a rather special case. Many Italian gas fields are not in regular production but

are effectively used as storage. Because of this, considerable reserve capacity is available. It seems possible that some additional production from these fields may have proved necessary. The exact reasons for the high level of production shown will only become apparent when final data for 1976 become available. It is sufficient therefore, at present, to record that for 1977 the production level is expected to drop back towards the 1975 level.

The larger than planned increase in U.K. production reflects the meeting of demand growth with no new import projects yet coming into operation.

The lower than planned increases in other Member States reflects the arrival of new contractual imports into markets where recession has undoubtedly depressed demand to some degree and the growth in indigenous production has therefore been limited.

Proven Reserves at 1/1/76 stood at 3,705,400 million m³, sufficient to supply at 1975 levels for 21 years. Probable reserves could add a further 1,200,000 million m³, while possible estimates could increase availabilities still further, if satisfactory systems for commercialising associated gas are developed.

(b) Imports

As mentioned above, imports have increased considerably since 1975. The development for the Community as a whole is shown in the following table (in thousand of Tcal).

<u>Actual</u>	<u>Estimate</u>	<u>Forecasts</u>	
<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
102.3	141.7	250.0	350.0

If the 1978 forecast is achieved, between 17 and 18% of all natural gas supplies will be imported.

Considerable diversification is expected with supplies originating from: USSR, Norway, Iran (via USSR), Algeria and Libya. Already this diversity of supply is being used, through exchange deals, to help in the optimization of transmission systems and to maximize overall supply security.

2. Demand

Despite the recession in Member State economies and the drop in consumption levels for other fuels, natural gas demand has continued to grow even if not as fast as in

previous periods. It should also be noted that prices have been progressively revised upwards although not to quite the extent experienced in other energy sectors. Although for many users, gas still gives a price advantage, it is probable that conversion from other forms of energy to gas has been slowed down by the general economic climate in which all forms of capital investment have proved more difficult to undertake. Consequently, for the future, as economies climb out of recession, gas demand can be expected to increase both in line with normal demand growth and through an increase in user conversions from other fuels. The sectorial breakdown of demand is shown in the following table (in thousands of Tcals).

Table 5

	Actual	Est.	Forecast	% of Change	
	1975	1976	1977	1976/75	1977/76
Total demand of which:	1552	1665	1825	+ 7.3	+ 9.6
domestic	546	580	640	+ 6.2	+ 10.3
Power stations	349	345	360	- 1.1	+ 4.3
industry (1)	515	555	635	+ 7.8	+ 14.4
(1) Excluding non energy use in the chemical industry.					

C. Coal
 1. Coal Supply
 (a) Production

Table 6
Community Coal Production

(in 1000 Tce)

	1975 Actual	1976 Ests.	1977 Forecasts	Change in %	
				76/75	77/76
Belgium	6 788	6 600	6 580	- 2.7	- 0.3
Germany	93 688	90 600	90 000	- 3.3	- 0.7
France	20 439	19 900	19 000	- 2.6	- 4.5
Ireland	49	50	50	-	-
United Kingdom	116 054	106 200	112 500	- 8.5	+ 5.9
Community	237 021	223 350	228 130	- 5.8	+ 2.1

Community coal production in 1976 was about 223 mtce (248 m.metric tons), a drop of about 6% below 1975. At the beginning of 1976, production for the year had been forecast at about the same level as that for 1975 but this turned out to be over-optimistic.

The largest shortfall against forecasts was in the UK, where it was 6%, whereas it averaged 2% in the other coal producing member countries. The drop in UK output against the previous year would have been larger but for an increase in opencast and small private licensed mine production. In the case of Germany, short-time working in response to market conditions was the largest factor in the drop in output, while in the UK, it was mainly connected with falling productivity.

Current plans for Community coal output for 1977 are that this will be slightly above that of 1976 and amount to around 231 mtce.

Imports from Third Countries

Contrary to expectations, 1976 did not see a reversal of the rising import trend registered during the previous two years. Total imports from third countries in 1976 amounted to about 42. mt, compared to 41 mt the year before and to about 30 mt in 1973. Imports are expected to rise further in 1977 to between 46 and 49 mt.

2. Production Costs, Receipts and Investment

(a) Production Costs and Receipts

Whereas in 1975, increases in costs of production per ton were amply exceeded by rising receipts in Belgium, Germany and the UK and about matched in France, the situation developed differently in 1976 - during that year, the rise in receipts again exceeded increases in costs only in Germany whereas the reverse was the case in the three other main producing member countries.

As during the previous two years, production costs per ton in terms of national currencies rose faster in the UK in 1976 than in the other coal producing member countries. However, to compare production costs at any given moment between member countries, the UK figures require adjustment in the light of the depreciation of sterling against the currencies of the other coal producers.

Making due allowance for the difficulties inherent in determining and comparing true costs of production, it can, nevertheless, be established that costs of production of German coking coal make this broadly competitive with coal of comparable quality from outside the Community and that a proportion of British steam coal for electricity generation is competitive with other fuels including third country coal.

(b) Investment

In 1976, the UK maintained its lead in investment relative to current output at 2.8 u.a. per ton, followed by Germany with 2.1 u.a. per ton and by France and Belgium at 1.9 u.a. per ton. Total investment during the year amounted to 596 m.u.a.

Current forecasts for 1977 are that there will be no drastic changes in the UK and France but that reduced investment is to be expected in Germany and, particularly, in Belgium.

The high level of investment in the UK coal industry mirrors that country's faith in the possibility of exploiting its large, geologically favoured coal resources on terms which will continue to make it attractive to the power station market into the next decade and beyond. On the other hand, investment in the German coal industry, mainly in the Ruhr, in France, largely in Lorraine and in the Campine coalfield in Belgium, is based on the expectation of long-term demand for good coking coal at commensurate prices.

3. Prices

Since the large price increases in 1974, rises in the list prices of Community coals have been progressively slackening. In Germany, they remained stable in 1976 and certain decreases have been published in France.

Annexes 3 and 4 show price movements of selective comparable qualities of coal from various Community coalfields from January 1976 to January 1977, the first in national currencies and the second in US \$ to facilitate comparisons with prices of other forms of energy.

The medium price cif ARA for third country coking coal, the so-called indicative price calculated by the Commission, reached a peak of \$ 63.80 per metric ton in October 1975. Since then it has remained practically unchanged around \$63 for a total quantity of about 14 mt, although some importers have been able to secure coking coal in the spot market at cif prices of around \$50.

Electricity generating undertakings have been able to import third country steam coal at cif prices of around \$30 to \$33 per tce throughout most of 1976, but with a tendency to a rise of about \$ 5 at the end of the year.

In the light of the situation on the Community coal market, there is no scope for price increases of Community coal but the rise of \$5 in the cif price of third country steam coal apparent at the end of 1976 may be a precursor to further increases.

4. Demand

(a) Coal and Coke

In 1976, coal consumption rose to 265 mtce compared to 250 mtce in 1975. However, there were contradictory developments: the requirements of the steel industry recovered by much less than had been expected, whereas coal consumption for electricity generation far

exceeded forecasts and reached its highest level since 1969.

Table 7
Coal Consumption in the Community by Sectors

	1975 Actual	1976 Est.	1977 Forecasts	1976/75 %	1977/76 %
Coke-ovens	102 755	100 000	100 400	- 2.7	+ 0.4
Thermal power stations	100 766	120 885	119 900	+20.0	- 0.8
Iron and steel industry	2 674	2 865	2 950	+ 7.1	+ 3.0
Other industries	11 260	12 010	11 800	+ 6.7	- 1.8
Domestic heating	21 333	20 730	19 125	- 4.6	- 7.7
Briquettes	6 204	5 250	5 035	-15.4	- 4.1
Gasworks	1 830	1 370	1 265	-25.1	- 7.7
Consumption for production	2 520	2 015	1 975	-20.0	- 2.0
Others	538	250	235	-53.5	- 6.0
TOTAL	250 280	265 375	262 685	+ 6.0	- 1.0

In 1975 the steel industry suffered its most severe world-wide recession in 30 years, followed by some recovery in 1976. However, this proved weaker than had appeared initially because the revival in consumer demand in 1976 did not lead to a comparable rise in investment in capital goods and the Community's exports of steel and capital goods fared less well than those of some other countries, notably Japan.

While steel production in all member countries in 1976 showed an increase over the previous year, this was below expectations except in Italy and the United Kingdom, but against this must be set substantial shortfalls in Germany, Belgium and Luxembourg. As a result, total steel production in 1976 was below 135 mt, a rise of only 10 mt over 1975. The forecast for

steel production in 1977 is between 138 and 139 mt and for pig iron around 98 mt.

Two factors combine to make coke production highly inelastic in response to demand: the technical impossibility of extinguishing and then relighting coke batteries without largely rebuilding them and the fact that coke is less liable to lose its desired metallurgical properties during storage than coal. As a result, fluctuations in demand are reflected to a very much greater extent in fluctuating coke stocks than in coke production. In 1976, metallurgical coke production (some of it put to stock) required about 101 mt of coal and a roughly similar requirement is expected for 1977.

Coal consumption for electricity generation in 1976 was 121 mtce, a rise of 20% over previous years. This spectacular increase was due to a combination of diverse causes, the most important of which were some degree of economic revival, relatively high fuel oil prices, a shortage of water for hydro-electric generation and governmental measures. °

Although a repetition of last year's shortage of water for hydro-electric generation is unlikely, it is expected that coal consumption by power stations will even be slightly higher in 1977. The reasons are that the other factors operating last year which led to the rise in power station coal consumption are of a more than transitory nature and will be reinforced by deliberate policies.

(b) Lignite and Peat Demand

In 1976, lignite and peat consumption by power stations, mostly lignite in the Cologne/Aachen area of Germany, was about 35.6 mtce compared to a little over 32 mtce the previous year. This development exceeded forecasts by close on 2.0 mt, and consumption of the same order of magnitude is expected again for 1977.

5. Coal and Coke Stocks

Producers' coal stocks increased only slightly in 1976. However, for the reasons indicated, producers' stocks of coke rose by some 5 mt or 41%.

Coal stocks with electricity producers, an important factor in the Community's security of energy supplies, stood at around 35 mt at the end of 1976. Averaged over the whole Community (although, in fact, they were unevenly distributed), these represented about 4 months' supplies at last year's rate of consumption.

D. Electricity

1. Electricity supply

In 1976, the Community used 1100 TWh of electricity, representing almost entirely indigenous production (net imports from third countries contributed 1%).

There was a near-normal growth rate of 8.0% in production over 1975, the year in which an exceptional drop by 1.7% had been registered. On the other hand, net imports which tend to reflect the hydrological conditions in neighbouring third countries and variations in their inland demand, fell from 15 TWh in 1975 to 4 TWh in 1976.

On the production side, every Community country was able to mark a certain production growth in 1976 (from between 1.9% U.K. and 14.9% B), whereas in 1975 production had fallen off in each of them (from between - 0.4%, U.K. and - 4%, B; the decline of 28.6% in Luxembourg was chiefly explained by quite different reasons, like the growth of electricity imports).

In 1977, with imports at about the same level, production is expected to rise by 6.5% to rather more than 1,180 TWh.

(a) Hydroelectricity

The change in the Community's hydroelectric production from natural flow (i.e. excluding pumped storage) in recent years reflects almost exclusively the variations in hydrological conditions. Thus the drought experienced in 1976 caused gross hydroelectric production from natural flow to fall back to 107 TWh; the 1977 forecast, based on long-term average hydro conditions, is 122 TWh, which virtually corresponds to the 1975 level. In addition, 6.0 TWh of secondary production were derived in 1976 from pumped storage, after a low of 5.2 TWh in 1975, and new capacity additions are expected to lead to a production of 7.2 TWh by pumped-storage stations in 1977.

(b) Nuclear Energy

During 1976 the net production of nuclear electricity reached 86 TWh, representing an increase of 11% above the previous year. The additional capacity of the nuclear park within the Community reached only 3500 MWe (instead of 7000 MWe), certain plants not having been completed within the expected period owing to technical problems and delays. The new production plants comprise three units in Germany (Neckar-Westheim, Biblis B and Brunsbuttel)

and one unit in each of the A.G.R. reactor plants in the U.K. (Hunterstone and Hinkley Point). In the latter case, this is the first advanced gas reactor put into operation in the U.K. and three other plants of this type are under construction.

The year 1977 should see at first the coming into operation of units which were to be working in 1976, representing almost 3000 MWe; namely, the plant at Caorso (Italy), another at Fessenheim (France) as well as two other A.G.R. units in the U.K. Additionally foreseen are the coming into operation of one further unit at Bugey and the second unit at Fessenheim (France), as well as those at Philippsburg, Unterweser, and Isar. (FRG). Their addition within the foreseen period should bring total installed nuclear capacity within the Community to 24,600 MWe, and a production of electrical energy between 110 and 120 TWh, that is approximately 10% of total electricity production.

(c) Conventional Thermal Power Stations

The following table shows the estimates of fuel consumed in conventional power stations (including industrial producers' own plant) in the Community, assuming normal climatic and hydrological conditions in 1977. Figures for 1975 and 1976 are added for purposes of comparison.

Table 8

Total Fuel Consumption of Conventional Power Stations
for Generation of Electricity and of Commercial Heat

1975 - 1977: Community

	Million t.o.e.			Per cent		
	1975 Actual	1976 Est.	1977 Forecasts	1975	1976	1977
Petroleum products (non-gaseous)	61.5	62.4	63.0	31.5	29.5	29.7
Hard coal	70.5	84.6	83.9	36.1	39.9	39.6
Lignite and peat	23.5	24.9	23.6	12.0	11.8	11.2
Natural Gas	32.2	31.8	33.3	16.5	15.0	15.7
Derivative gases (and industry)	7.6	8.0	8.1	3.9	3.8	3.8
All Fuels	195.3	211.7	211.9	100.0	100.0	100.0

Whereas in 1976, it was chiefly hard coal, but also all other fuels except natural gas which contributed to the increase in conventional thermal production over 1975, the growth forecast for 1977 is expected to be covered chiefly by natural gas and, to a lower extent, by derivative gases and other products. Oil consumption for power generation, while having increased again in 1976, has not reached 1974 levels and should remain roughly stationary in 1977.

2. Demand

(a) Electricity Consumption

After two years of relative stagnation or slightly falling consumers' demand for electricity (+ 2.1% in 1974 and - 1.3% in 1975 against the preceding year), the recovery in 1976 has led to a 7.0% growth; a level of growth of 5.0% is forecast for 1977.

Overall demand in 1976 reached a level well above that of 1974. This was reflected in the industrial sector in particular, where a big reduction of 6.6% in 1975, was entirely offset. Consumption by the domestic and services sector (+ 4.4% in 1975) on the other hand, appears to have been less affected by the economic recession and continues to show a higher growth rate (+ 7.5% expected in 1976) than that of industry. This is the picture for the Community as a whole, despite a continuous slight downward trend in the U.K. since 1974, due mostly to conversions of thermal demand for off-peak electricity to natural gas and other fuels, resulting from tariff changes.

Table 9
Final Consumption of Electricity in the
Community

	TWh			Increase %		
	1975	1976 Est.	1977 Fore- casts	1975/74	1976/75	1977/76
Industry (except the energy sector)	423.8	453.0	475.0	-6.6	+ 6.8	+ 4.9
Transport	23.7	24.0	25.0	-0.6	+ 1.3	+ 4.2
Households, commerce, handicrafts, etc.	434.6	467.0	493.0	+4.4	+ 7.5	+ 5.6
Total	882.1	944.0	993.0	-1.3	+ 7.0	+ 5.2

(b) Electricity Prices

Short-term information on effective electricity prices is scarce, especially on a Community-wide basis. However, the data received appertaining to industrial sales for the period to mid-1976, generally show a clear slowing-down of price increases as compared with the situation in the preceding year. There are examples where, through a shift of consumption into off-peak periods, consumers have managed to obtain a reduction in electricity costs.

E. Nuclear Fuels

1. Natural uranium

The market for natural uranium in 1976 was characterised by a relative scarcity of transactions - which were almost exclusively "spot" purchases - and by a continuing rise in prices.

This development reflected on the one hand, a reticence by uranium producers, given the uncertainties relating to the development of nuclear programmes, to invest the considerable capital required to develop new mines, and on the other hand, to an expectation by electricity producers who, counting on a reduction in the market price of natural uranium, delayed the conclusion of long term supply agreements.

2. Uranium enrichment

During 1976 a new body for the enrichment of uranium - COREDIF - was launched; this body, like EURODIF, will use the gas diffusion process. Work continues on the construction of both the EURODIF and URENCO plants.

With regard to the price of separation work units supplied by the United States, the Energy Research and Development Agency (ERDA) announced on the 26th February 1976, a further price increase of separation work units, rising to \$67.25 for "requirements type contracts" as from 25th August 1976, and to \$59.05 for "fixed commitment contracts" as from 27th April 1976, rising further to \$61.30 as from 1st October, 1976.

Table 1

Inland Consumption of Primary Energy in the Community

	1974		1975		1976 (est.)		1977 forecast	
	Mio toe	%	Mio toe	%	Mio toe	%	Mio toe	%
Hard coal	189.8	20.7	167.1	19.3	175.0	19.3	177.0	18.8
Lignite	27.4	3.0	26.6	3.1	29.0	3.2	27.0	2.9
Oil	519.2	56.6	476.4	55.1	502.5	55.3	507.0	53.9
Natural Gas	134.4	14.7	142.2	16.5	153.0	16.9	168.0	17.9
Primary Electricity (& others)	46.3	5.0	52.0	6.0	48.5	5.3	61.0	6.5
Total	916.8	100.0	864.4	100.0	908.0	100.0	940.0	100.0

Table 2

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

	1975 - 1974	1976 (estim.)	1977 - 1976 forecast
Gross Domestic Product	- 2.4	+ 4.5	+ 3.5
Inland Consumption:			
- Energy	- 5.7	+ 4.7	+ 3.5
- Oil	- 8.3	+ 5.5	+ 0.9
- Solid Fuels	-10.8	+ 5.3	0
- Natural Gas	+ 5.6	+ 7.6	+ 9.8
- Primary Electricity 1)	+12.5	- 6.7	+25.7

1) Production plus or minus imports and exports.

PRODUCTION BY SOME OPEC MEMBERS 1973 -6

Thousands b/d

	1973	1974	1975	+ -%	1976	+ -%	Oct/Dec. 76	Dec. 76
Saudi Arabia	7596	8480	7075	-16.6	8580	+21.3	9273	9188
Abu-Dhabi	1304	1410	1371	- 2.8	1592	+16.1	1643	1649
S/Total	8900	9890	8446	-14.6	10172	+ 20.4	10916	10837
Iran	5861	6022	5350	-11.2	5883	+ 10.0	6604	6630
Kuwait	3020	2546	2084	-18.1	2150	+ 3.2	2898	3333
Iraq	2018	1971	2262	+14.8	2184	- 3.4	2833	3000
Other Middle East	1161	1144	1133	- 1.0	1260	+ 11.2	1262	1285
Total Middle East	20960	21573	19275	-10,7	21649	+ 12.3	24513	25085
African OPEC (Nigeria, Libya, Algeria)	5330	4785	4283	-10.5	5032	+ 11.7	5209	5350
OPEC	30989	30729	27192	-11.5	30462	+ 12.0	33631	34413

Listed pithead prices for Community coal at 15 January 1976, 1 April 1976 and 15 Jan.1977

(in national currencies/metric tons)

Categories	Types	Date	Ruhr DM	Aachen DM	Saar DM	Belgium bfrs	North France ffrs	Lothringen ffrs	South Wales £	Scottish £	North Yorkshire £
Anthracite	Nuts 3	15.1.1976	219.00	-	-	3.125	351.00	-	29.77	-	-
	20/30 mm	1.4.1976	219.00	-	-	3.125	381.00	-	34.20	-	-
	1½" x ¼"	15.1.1977	219.00	-	-	3.450	381.00	-	34.20	-	-
Lean coal	Nuts 3	15.1.1976	211.00	205.00	-	2.970	-	-	25.39	-	-
	20/30 mm	1.4.1976	211.00	205.00	-	2.970	-	-	29.13	-	-
	¾" - 1¼"	15.1.1977	211.00	205.00	-	3.350	-	-	29.13	-	-
Semi-bituminous	Nuts 4	15.1.1976	167.00	181.00	-	2.390	-	-	18.80	-	-
	10/20 mm	1.4.1976	167.00	181.00	-	2.390	-	-	-	-	-
	0" - ¾"	15.1.1977	167.00	181.00	-	-	-	-	-	-	-
Long Flame	Nuts 2	15.1.1976	155.50	-	176.00	2.450	-	216.00	19.39	22.54	19.49
	30/50 mm	1.4.1976	155.50	-	176.00	2.450	-	235.00	-	26.08	22.05
	1¼" - 3/8"	15.1.1977	155.50	-	176.00	2.450	-	235.00	-	26.08	22.05
Long Flame	Nuts 5	15.1.1976	157.50	-	173.00	2.450	-	192.00 (2)	-	20.96	17.52
	6/10 mm	1.4.1976	157.50	-	173.00	2.450	-	209.00 (3)	-	25.10	19.98
	0" - 1"	15.1.1977	157.50	-	173.00	2.450	-	209.00 (3)	-	25.10	19.98
Coking coal	Medium or high (4)	15.1.1976	165.50	167.50	180.00(4)	2.500	360.00	310.00 (4)	27.17(4)	23.43(4)	21.26(4)
	volatile	1.4.1976	165.50	167.50	180.00	2.500	320.00	338.00	33.27	27.07	25.10
		15.1.1977	165.50	167.50	180.00	2.500	320.00	338.00	33.27	27.07	25.10
Coke	Blast furnace	15.1.1976	258.00	257.00	286.00	3.700(1)	530.00	461.00	48.87	47.88	47.39
	¾" 40mm	1.4.1976	258.00	257.00	286.00	3.850	480.00	502.00	57.23	56.25	55.76
		15.1.1977	258.00	257.00	286.00	3.850	480.00	502.00	57.23	56.25	55.76
(1) Zeebrugge large graded coke.							(3) Power stations: 254.00 - 264.00.				
(2) Power stations: 232.90 - 241.56.							(4) High volatile.				

Annex 4

Listed pithead prices for Community coal at 15 January 1976, 1 April 1976 and 15 January 1977 (in \$ per metric ton) (1)(2)

Categories	Types	Date	Ruhr	Aachen	Saar	Belgium	North France	Lothrin- gen	South Wales	Scottish	North York- shire	Lowest Prices	Highest Prices	Differ- ence %
Anthracite	Nuts 3 20/30mm 3"-1 1/4"	15.1.1976	83.52	-	-	79.05	78.37	-	60.23	-	-	60.23	83.52	39
		1.4.1976	86.73	-	-	80.34	81.47	-	64.96	-	-	64.96	86.73	34
		15.1.1977	93.58	-	-	96.55	77.36	-	58.36	-	-	58.36	96.55	65
Lean coal	Nuts 3 20/30mm 3"-1 1/4"	15.1.1976	80.47	78.18	-	75.13	-	-	51.37	-	-	51.37	80.47	57
		1.4.1976	83.56	81.19	-	76.35	-	-	55.33	-	-	55.33	83.56	51
		15.1.1977	90.16	87.60	-	93.75	-	-	49.71	-	-	49.71	93.75	89
Semi- bituminous	Nuts 4 10/20mm 0 - 3/4"	15.1.1976	63.69	69.03	-	60.46	-	-	38.04	-	-	38.04	69.03	81
		1.4.1976	66.14	71.68	-	61.44	-	-	-	-	-	61.44	71.68	17
		15.1.1977	71.36	77.34	-	-	-	-	-	-	-	71.36	77.34	8
Long flame	Nuts 2 30/50mm 1 1/4" - 3/8"	15.1.1976	59.31	-	67.12	61.98	-	48.23	39.23	45.61	39.43	39.23	67.12	71
		1.4.1976	61.58	-	69.70	62.99	-	50.25	-	49.54	41.88	41.88	69.70	66
		15.1.1977	66.44	-	75.20	68.57	-	47.72	-	44.50	37.62	37.62	75.20	100
Long flame	Nuts 5 6/10mm 0-1"	15.1.1976	60.07	-	65.98	61.98	-	42.87(4)	-	42.41	35.45	35.45	65.98	86
		1.4.1976	62.38	-	68.52	62.99	-	44.69(5)	-	47.68	37.95	37.95	68.52	81
		15.1.1977	67.30	-	73.92	68.57	-	42.44(6)	-	42.83	34.09	34.09	73.92	117
Coking coal	Medium or high volatile	15.1.1976	63.12	63.88	68.65 ³⁾	63.24	80.38	69.21(3)	54.97 ³⁾	47.41 ³⁾	43.02 ³⁾	43.02	80.38	87
		1.4.1976	65.54	66.34	71.29	64.27	68.43	72.28	63.20	51.42	47.68	47.68	72.28	52
		15.1.1977	70.72	71.57	76.91	69.96	64.98	68.23	56.77	46.19	42.83	42.83	76.91	80
Coke	Blast furnace 1/2" 40mm	15.1.1976	98.39	98.01	109.07	93.60	118.33	102.93	96.88	98.88	95.88	93.60	118.33	26
		1.4.1976	102.18	101.78	113.27	98.98	102.64	107.35	108.71	106.85	105.92	98.98	113.27	14
		15.1.1977	110.24	109.82	122.21	107.75	97.46	101.93	97.65	95.98	95.14	95.14	122.21	28
1)	Dollar exchange rate	DM	Index	B.frs	Index	FF	Index	£	Index					
	2.1.1976	2.622	100	39.53	100	4 479	100	0.49	100					
	1.4.1976	2.525	96	38.89	98	4 676	104	0.52	106					
	4.1.1977	2.34	89	35.73	90	4 924	110	0.58	118					
2)	Prices are not adjusted for quality differences.													
3)	High volatile.													
4)	For power stations: 52.00 - 53.93 \$/metric ton.													
5)	For power stations: 54.31 - 56.45 \$/metric ton.													
6)	For power stations: 51.58 - 53.61 \$/metric ton.													

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The Energy Situation in the Community - Situation 1976 - Outlook 1977

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This report analyses the energy situation in the Community in 1976 and comments on the outlook for 1977.

An economic recovery in 1976 resulting in a rise in the Community's real gross domestic product of about 4½% led to a growth in energy demand of about 4.7% as compared with 1975.

The growth in inland consumption of the main primary energy sources was as follows: oil 5.5%, coal 5.0% and natural gas 7.5%.

There was a near-normal growth in electricity production of 8.0%, despite a fall in the supply of primary electricity of nearly 4% owing to severe drought conditions which hit hydroelectric production.

The economic outlook for 1977 is most uncertain. A possible rate of growth in the Community's real gross domestic product of 3½% could lead to a rise in energy consumption of the same order (940 million toe compared with 864 million toe in 1975).

A small overall growth in oil demand is expected, the anticipated increase in energy consumption being met largely by natural gas and primary electricity. The impact of the OPEC 'two-tier' price increase on oil prices and consumption will probably be delayed, because of high crude and product stocks, until the second half-year.

Natural gas production is estimated to grow by 3.5%. Imports of natural gas are expected to rise significantly to 250 thousand Tce (142 thousand Tce in 1976).

Nuclear capacity should reach 24 600 MWe, with a production of electrical energy between 110 and 120 TWh, i.e. approximately 10% of total electricity production.

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