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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL
ON NATURAL GAS

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SUMMARY AND CONCLUSIONS

1. Following an earlier Communication on natural gas,¹ the Commission was asked by the Council to follow the evolution of the Community's natural gas situation, with particular reference to security of supply, in consultation with Member States. In this context, the Commission made two Communications to the Council in the course of 1984.²
2. The recent, favourable outcome of negotiations for the supply of 20 billion cubic metres per annum from the Norwegian Troll and Sleipner fields³ represents a milestone in the long-term supply of the Community and its security, and its importance should be clearly stressed. In addition, two years on from the previous Communication, the time is ripe to bring to the Council's attention certain key points, detailed in paragraphs 12-13, regarding the Community's natural gas supply outlook and the security of supply situation.
3. Concerning security measures, the Commission has based its findings on detailed analyses developed within the Commission but checked out and discussed at regular intervals within the group of Member States' experts.
4. The Commission has, in addition, examined the contribution of the European gas network to security of supply. Work undertaken by Cometec-Gaz, the economic research committee of the European gas industry, proved helpful in this respect.
5. It should be noted that this is the first Communication on natural gas to embrace the Community of Twelve following the accession of Spain and Portugal on 1 January 1986.
6. The broad conclusions of the report are set out in paragraphs 7-11 below while paragraphs 12-13 detail the key points for consideration by the Council. The full report is in paragraphs 14-66.

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7. There is at present considerable uncertainty regarding future developments in the energy field. The sharp fall in oil prices at the beginning of the year and the nuclear accident at Chernobyl have been major contributors to this. The Community's energy objectives for the year 1995 aim to maintain the present share of natural gas in total energy demand. In view of the long term planning horizons of gas supply, it is appropriate to look to the end of the century and beyond. A number of factors can be identified which could lead to higher-than-expected demand in this period. If these factors materialise, one might expect natural gas to take a somewhat higher share of total energy demand than the present 18% level by around 2000.

1 COM(82)653 final

2 COM(84)120 final, COM(84)583

3 At the time of writing, the governments concerned have given their approval, and the project has been sent to the Norwegian Parliament for its approval.

8. Ample supplies of natural gas are available to the Community well into the next century. Two long term trends can be discerned. First, natural gas supplies will become increasingly costly as the more difficult and less accessible reserves are developed within the Community itself, and growing imports are required from sources further afield. Secondly, as indigenous supplies are expected to decline, the Community will become increasingly dependent upon imports.
9. In recent years natural gas has played an important rôle in diversifying the Community's energy supply and reducing dependence on oil in general, and oil imports in particular. An increased share of natural gas in total energy demand beyond the present 18% might in the future mitigate any tendency to increased dependence on oil imports due to low oil prices. Low oil prices carry the risk, in the absence of offsetting policy adjustments, of reducing exploration and development within the Community which in turn could lead to increased import dependence.
10. The new Norwegian sales contracts with four Community countries, announced in June 1986, amounting to 20 billion cubic metres⁴ in 2000 and beyond, mean that a significant share of the Community's gas will come from an OECD source of supply well into the next century. Thus, although the level of non-OECD imports as a proportion of total Community consumption may rise from 21% to around 27% by 1990, thereafter it should remain stable to the end of the century.
11. Studies carried out by the Commission, together with Member States' experts, indicate that for the period 1986-1990 existing and planned security measures, when applied on a Community-wide basis to those countries on the European continent which are interconnected, should be sufficient to deal effectively with an interruption of supply from any individual import source for at least nine months. The contribution of the gas grid to the Community's security of supply is significant. Further integration of the grid is considered desirable for economic as well as supply security reasons. A link between the United Kingdom (25% of the Community gas market) and the Continent would be an important achievement in this respect. The Commission will continue to work closely with Member States' gas experts and the gas industry to monitor the further developments of the gas network and all other security aspects.

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12. The Commission invites the Council to **take note** of the following points:
 - i) Existing Member States' projections indicate that natural gas should maintain its share of total energy demand to the end of the century, in line with the Community energy objectives for 1995.

⁴ Federal Republic of Germany 8 billion cubic metres (bcm) p.a.
France 6 bcm (with an option for a further 2 bcm) p.a.
Belgium 2 bcm p.a.
Netherlands 2 bcm p.a.

- ii) An increase in this share in the longer term could contribute further to the Community's diversification of energy sources, and help reduce any tendency to increased dependence on oil imports arising from low oil prices.
- iii) It is premature, before the consequences of low oil prices and the nuclear accident at Chernobyl have been more fully evaluated, to make a decision as to whether or not any of the Community's legal provisions relating to fuel use in power stations should be reviewed.
- iv) The Community's gas supply structure is sufficiently diversified until the turn of the century. The new Norwegian supply contracts with the gas companies of four Community countries will make a significant contribution towards the Community's security of supply well into the next century.
- v) The supply security outlook has improved considerably since previous security studies were undertaken by the Commission and Member States in 1982. Not only have import expectations decreased over this period but underground storage in 1990 should be around 20% more than was foreseen four years ago.
- vi) The Commission will examine whether the way Community gas supply is organised could present any constraints to the development of a common market in natural gas.

13. The Commission invites the Council to **approve** the following conclusions:

- i) Levels of indigenous Community production should be maintained as far as possible into the future. Low oil prices over a prolonged period would tend to reduce exploration and development which, in turn, would diminish Community production levels. Member States should, therefore, consider ways and means of encouraging gas producers to continue making the investments necessary to sustain adequate levels of exploration and development.
- ii) A fully integrated grid is a necessary condition for the development of a truly common market for natural gas. For this reason, as well as for security of supply:
 - a) the Community and Member States should encourage and, where possible, facilitate further integration, and
 - b) the gas industry should, as new supply contracts are made, continue the process of integrating the European gas grid. In this respect the proposed transportation of the new Norwegian gas supplies for France and Belgium via a new North Sea pipeline to Zeebrugge in Belgium is to be welcomed.
- iii) Full cross-border co-operation between Member States' gas companies, in times of supply interruption, is an essential condition for an acceptable level of supply security at Community level and should be encouraged.

- iv) The Commission, together with Member States' experts, should continue to follow closely security and other developments related to the Community's gas supply, to ensure that they are consistent with Community energy policy aims, and where this is not the case, to suggest appropriate action.

I. NATURAL GAS DEMAND PROSPECTS IN THE COMMUNITY

i) Past and present demand

14. Demand for natural gas in the Community grew year by year in the 1970s, from 62 mtoe in 1970 to a peak of 173 mtoe in 1979. The share of natural gas in the Community's energy balance also increased rapidly, rising from 7% of total primary energy demand at the start of the decade to nearly 18% by the end. The years 1980-82 saw a fall in demand for natural gas, along with demand for energy in general.
15. Demand picked up again in the years 1983-1985 due to increased demand for energy in total and renewed market penetration by natural gas. Growth has occurred mainly in the domestic and services sectors which now account for nearly 50% of the Community gas market. In contrast, despite some recovery over the last couple of years, demand by industry, currently accounting for some 28% of the gas market, has not yet returned to the 1980 level when demand in this sector peaked. In 1985 more natural gas was consumed in the Community than ever before (181 mtoe) and the share of natural gas in the Community's energy balance had risen to over 19% (EUR 10) (see appendices 1, 2 and 3).

ii) Future demand - projections

16. Natural gas demand forecasts for the period to the end of the century have been progressively scaled down since the beginning of the 1980s. With Community natural gas consumption already standing at 181 mtoe, the latest projections by Member States for the years 1990 and 2000 (appendices 4 and 5) provide for only limited growth to 1990 with prospects for very moderate growth or even decline thereafter. It could be argued that these projections underestimate the growth potential of natural gas in the years ahead, a line which is developed further below.
17. There is considerable uncertainty concerning future demand for energy in general including natural gas. The rapid fall in crude oil prices in recent months has called into question earlier energy demand forecasts and there is now uncertainty over both the possible duration of the new low oil price regime and its effect in terms of overall energy consumption and on demand for particular fuels. Moreover, the nuclear accident at Chernobyl in the Soviet Union may cause some countries to rethink their nuclear programmes which could well impact on demand for alternative fuels such as natural gas.

iii) Future demand - factors which could play a rôle

18. Total energy demand

Further growth in demand for natural gas can come about either through substitution for other fuels or as a result of an increase in demand for energy as a whole. The Commission published last year a detailed study, entitled "Energy 2000" in which it was foreseen that overall energy demand would increase slowly, on average 0.9% per annum, to the end of the century. In the reference case, natural gas was expected to maintain a steady share of the total market at around 18%, whilst in all of the study's other scenarios natural gas increased its share.

19. It is reasonable to assume, however, despite continuing improvements in energy efficiency, that overall energy demand could be higher in the event of low energy prices continuing in the short-medium term. Moreover, due to its linkage with the price of oil products, natural gas could be expected, at least in the medium term, to take a significant share of any additional demand for energy inspired by continuing low oil prices. Some work carried out within the Commission on the possible implications of low oil prices indicates that in the event of low oil prices continuing to 1990 (\$15/bbl crude oil price), natural gas demand could increase by some 4-11% (8-21 mtoe) compared with an overall increase in energy demand of 3-7% over that period. Beyond 1990 there are still greater uncertainties but similar tendencies are possible.

20. Interfuel competition

Much of the rapid growth in natural gas demand experienced in the 1970s was the result of substitution for other fuels, especially oil products. Natural gas played and continues to play an important part in reducing the Community's dependence on oil, and in particular imported oil. The fact that natural gas was and is able to do this is of course a function of relative prices and the intrinsic advantages enjoyed by natural gas over other fuels. In the future, certainly if oil prices were to remain low, natural gas might have more difficulty in continuing to replace oil products.

21. On the other hand, relatively low oil and hence gas prices, give natural gas an opportunity to gain market share at the expense of coal in the industrial sector and electricity in the residential and commercial markets. With low prices and plentiful supplies available, natural gas use for power generation may become increasingly attractive in some countries. This could lead to suggestions for changes in the Community⁶ directive on the use of natural gas in public power stations. However, the Commission considers it premature to make a decision as to whether or not any of the Community's legal provisions relating to fuel use in power stations should be reviewed.

22. Environmental regulation

The use of natural gas, due to its generally negligible sulphur content, could contribute to the achievement of the Community's objective to reduce sulphur dioxide emissions, in particular as far as smaller combustion installations are concerned. In the future, significant investments will be required to adhere to strict environmental regulations concerning atmospheric pollution by sulphur dioxide from the use of fossil fuels. In this respect natural gas could gain a comparative advantage with respect to oil and coal.

23. Technological developments

There already exist new technologies which could significantly alter the way gas is used and the quantities consumed. Fuel cells and combined cycle power generation, for example, offer efficient and environmentally-attractive means of producing electricity which could in the longer term lead to greater use of natural gas in power generation. A new area of demand for natural gas could open up in the transportation sector with the use of compressed natural gas (CNG) or the production of synthetic liquid fuels, such as gasoline, from

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Council directive 75/404/EEC

natural gas. Both technologies are proven but at the present time remain expensive in relation to traditional technologies. Rising energy prices could, however, make their wider development viable in the very long term.

24. Organisational change

It is possible that developments in the way gas supply is organised could increase natural gas demand in the next few years. Traditionally the supply of natural gas has been based on long-term contracts of around 20-25 years between buyers and producers. In the United States a more dynamic and flexible market has evolved in which supply contracts have become on average shorter. Natural gas is frequently transported by pipeline companies on behalf of third parties (common carriage) and a spot market now accounts for around 17% of total natural gas sales in the United States.

25. In the Community, long-term contracts between relatively few buyers and sellers remain the rule. There are indications, however, which point to change. In the United Kingdom, for example, statutory common carriage provisions were introduced in 1982 and strengthened in subsequent legislation, whilst in Italy there are proposals on common carriage before Parliament. The extension of common carriage to other Member States, together with any development towards a spot market, could influence demand for natural gas in Europe. The amortisation of large parts of the Community gas transportation infrastructure in the coming years should reduce transportation costs and may, as a result, encourage a more flexible approach to natural gas trading in general and common carriage in particular.

26. With developments of this kind in mind, and taking into account the prospects for further integration of the Community gas grid described in chapter III, the Commission will examine whether the way Community gas supply is organised could present any constraints to the Community's objective to achieve an internal market by 1992 as endorsed by the European Council.

iv) Implications

27. Natural gas has played an essential rôle in diversifying the Community's energy supply and reducing dependence on oil, especially imported oil. Some work undertaken within the Commission on the possible effects of low oil prices shows that if crude oil prices remained at a level of \$15/bbl over the next five years, net oil import dependence could, assuming unchanged policies, rise from the present 32% of Community energy supply to 35-38% in the medium term. Against this background, it is important that natural gas continues to maintain at least its present share in total energy demand. An increased share beyond the current 18% (EUR 12) might mitigate any tendency to increased dependence on oil imports due to low oil prices.

28. Under existing projections (appendices 4 and 5), the natural gas share of total Community energy demand is anticipated to remain stable. From the discussion in this chapter, it is clear that there are a number of factors which could lead to higher rather than lower natural gas demand levels. In terms of market share, one might expect natural gas to capture a higher portion of total primary energy demand than the present level of 18% in the long term.

29. However, it is difficult to see natural gas gaining a significantly higher share without radical changes occurring. Such changes could come about in the area of pricing, for example a break in the traditional link between gas and oil prices, in technology with the opening up of natural gas use, for example for transportation purposes, or in the institutional structure of the gas industry, for example in the development of more flexible trading arrangements.

II. SUPPLY SIDE DEVELOPMENTS TO 2000 AND BEYOND

i) Reserves

30. Despite several years of considerable indigenous production, Community gas reserves continue to increase and now stand at 2880 mtoe. The reserves/production ratio at 21 years is the highest it has been in recent years. In addition, the Community's three principal third-country suppliers, Norway, the Soviet Union and Algeria, between them possess nearly 50% of the world's proven reserves.

ii) Supplies

31. Concerning future supplies to the Community, the situation has been significantly changed by the agreement in May of major contracts for the sale of Norwegian gas to several Community countries. Under the contracts, it is expected that deliveries will commence in 1993, rise to a plateau level of around 18 mtoe⁷ in 2000 and terminate in 2020. Depending on actual levels of demand in the 1990s, it could mean that indigenous supplies and imports already contracted are sufficient to meet demand in the Community until the turn of the century. As contracted deliveries from Algeria and the Soviet Union tail off thereafter, and Community production is expected to decline, new import contracts will be concluded for the period beyond 2000.
32. Although ample supplies of natural gas are available to the Community well into the next century, two long term trends can be discerned in the Community's supply situation. First of all, natural gas supplies will become increasingly costly as the more difficult and less accessible reserves are developed within the Community itself, and growing imports are required from sources further afield. Secondly, as indigenous supplies are expected to decline, the Community will become increasingly dependent upon imports from third countries.
33. These are two long term tendencies which may develop sooner or later depending on such factors as demand for natural gas in the Community, new discoveries and price trends etc. However, a period of continued low oil prices could have a significant effect in this respect. In the space of a few months we have already seen oil and gas producers in the Community and elsewhere sharply pruning exploration and development expenditures, many by around 30%. Whilst this may not have an effect on gas developments already underway, if continued, there may be shortages of indigenous natural gas coming on stream in the 1990s. This could, therefore, increase the rate at which the Community becomes dependent upon external supplies as well as the extent of that dependence.

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18 mtoe = c. 20 bcm and includes 2 bcm for which France has an option.

34. It is essential that low oil prices should not reduce the level of gas (and oil) exploration and development to unacceptable levels. Member States should consider ways and means of encouraging gas producers to continue making the investments necessary to sustain adequate levels of exploration and development. Consideration could be given to easing the burden of taxation on producers in return for specific guarantees from the producers to maintain levels of investment in exploration and development in the countries concerned.

iii) Imports

35. In 1985 the main third country suppliers to the Community were Norway, the Soviet Union and Algeria with 22.1, 21.0 and 15.9 mtoe of exports respectively (appendix 3). These three countries will continue to supply the vast bulk of the Community's imports to the turn of the century.

36. **Norway**

There are several factors in Norway's favour as a Community supplier. Norway has substantial reserves of natural gas (2,700 mtoe) and on various occasions, the Norwegian government has said publicly that natural gas will gradually take up a higher share than oil in Norway's future hydrocarbon production.

37. The new contracts for the sale of Norwegian gas referred to above mean that Norway will remain a major supplier of natural gas to the Community well into the next century. Under these contracts, a total of around 400 mtoe will be produced over a period of 27 years from the Sleipner and Troll fields and possibly others. This quantity, however, represents less than one third of the combined reserves of these two fields alone. In addition, to bring these fields on stream, a new pipeline system will be developed, not only connecting the fields with onshore terminals but linking the fields themselves. Norway will therefore have considerable potential to increase further exports to the Community and may be keen to do so in order to improve returns on the substantial investment in infrastructure which will be necessary.

38. **Algeria**

Algeria, too, has large reserves of natural gas (2,750 mtoe) which represent around two thirds of the country's total oil and gas reserves. Algerian exports to the Community have in recent years increased rapidly and, under existing contracts, Algeria will remain a major supplier to the Community until at least the turn of the century. In addition, it is estimated that Algeria will have spare capacity in installed infrastructure which would permit additional exports of around 11 mtoe in 1990. Algeria has therefore considerable further potential as a Community supplier due to its favourable location, close to the Community's southern borders, large natural gas reserves and spare export capacity. Moreover, the country will, to a large extent, depend on the foreign currency earnings from gas sales to finance the infrastructure necessary to facilitate economic growth.

39. However, natural gas demand for Algeria's internal use is expected to grow considerably in coming years and this could be a constraining influence on Algerian export potential. Furthermore, if this potential is to be realised, in the form of new or extended export contracts, flexibility of the kind recently shown by Algeria's competitors, Norway and the Soviet Union, will be required in the conduct of Algeria's

existing export contracts with Community gas companies. If this proves to be the case, Algeria can be expected to share in any higher-than-expected Community gas demand in the longer term, and to prolong its exports to the Community well beyond the turn of the century.

40. Soviet Union

The Soviet Union is the world's biggest producer and consumer of natural gas and possesses 40% of the world's natural gas reserves (33,500 mtoe, equivalent to over ten times Community reserves). By 1990 the Soviet Union will have become the Community's largest third country supplier, providing 32 mtoe or some 16% of the natural gas consumed in the Community. This will, however, probably represent no more than 5% of total Soviet natural gas production in that year. It is estimated that at this time the Soviet Union will have spare capacity in installed infrastructure which would allow additional exports to Western Europe of some 20 mtoe. The Soviet Union can make available large additional quantities of natural gas to Western Europe in a relatively short period of time and competitively priced. It has therefore very considerable export potential. There is, in addition, the Soviet need for hard currency, especially at a time when its revenues from oil exports have diminished.

41. Taking all these factors into account one can appreciate the strong competitive position of the Soviet Union as a supplier of new or extended volumes to the Community. However, with Soviet oil production continuing to fall behind target and the uncertainty caused to the Soviet nuclear programme by the accident at Chernobyl, there might be a possibility that increased domestic and Comecon demand for natural gas could curb Soviet export potential.

42. Other third country suppliers

Other potential Community suppliers in the Middle East, Africa, North and South America are likely to find it difficult to find a foothold in the Community market before the year 2000. LNG schemes may not easily compete with pipeline projects over the next few years although it is always possible that advances in LNG technology could change the picture. Long distance pipeline projects, on the other hand, can carry risks of another kind, especially in cases where one or more international borders are crossed en route. A period of sustained low oil prices would not in any case favour new, long distance gas export projects. The situation could change, however, beyond the turn of the century as new imports are required and the Community, becoming increasingly reliant on imported supplies, may wish to consider new sources of supply to increase diversification. In view of the long lead times of many of the projects from more remote sources, the Commission will give continued attention to long term supply possibilities.

III. SECURITY OF SUPPLY

43. The term "security of supply" is open to different interpretations and it is important to define one's interest in a given context. The interest at Community level stems from concern over dependence on external sources of supply and the possibility of a major interruption of supply from one or more of those sources.

44. The means available to ensure, as far as possible, a secure supply may be classified as follows :
- i) a balanced or diversified supply structure,
 - ii) an appropriate mix of "security measures" to cope with a major interruption, and
 - iii) an integrated gas grid to provide the basis for a co-ordinated response by Member States' gas companies.

The first of these must be considered prior to the conclusion of supply contracts and, as a result of the long term nature of the gas business, will mean considering supply options up to 30 years ahead. Once supplies are fixed, it is necessary to have measures in place, such as underground storage, to deal with possible interruption of supplies which could occur at any time. An integrated gas network is essential for Member States' gas companies to come to one another's assistance and share supplies in the event of interruption. Each of these aspects will be considered in turn.

i) Diversification of supply sources

45. In the early part of 1985, Dutch supply contracts to Community partners were prolonged beyond the turn of the century to the period 2005-2010, representing a significant extension of the Netherlands contribution to Community security of supply. Dutch supplies are expected to account for around 23% of total Community consumption in 2000. Other Community producers are expected to maintain a significant contribution to supplies over this period (appendices 4 and 5).
46. The conclusion of sales contracts to supply substantial quantities of Norwegian gas to four Community countries until the year 2020 is of great importance. It means that a significant share of the Community's gas imports - around 26% in 2000 - will come from an OECD source of supply well into the next century. It is, moreover, possible that by contracting additional tranches at later stages, natural gas from Norway could account for a still larger share of Community gas imports in the early years of the next century.
47. Community dependence on imports is expected to rise from the present 33% to around 40% by 1990. If demand were to remain reasonably stable to the end of the century, as anticipated in Member States' projections (appendices 4 and 5), import dependence, too, would stay in the order of 40%. However, if demand were to increase above these levels, as suggested it could in chapter I, import dependence might be expected to rise accordingly. In the longer term, beyond 2000, it is likely that import dependence will increase beyond 40% as the Community's own gas supplies are expected to decline.
48. From the contracted imports shown in appendices 4 and 5 it can be seen that the Community's imported supply pattern is reasonably diversified to the turn of the century. The USSR will become the leading third country supplier by 1990 but the level of non-OECD imports as a proportion of total Community consumption will remain stable at around 27% between 1990 and 2000.
49. As far as future supplies are concerned, the period of greatest significance now lies beyond the turn of the century, from 2000 to 2020. It is for this period that the Community's main suppliers will

be looking to renew, extend or expand existing contracts. At the present time, import contracts with Norway are foreseen which will extend as far as the second decade of the next century. These contracts together with possible additional supplies from Norway, will provide a secure base on which to contract other new supplies needed by the Community for the next century. There may be an opportunity to diversify still further by contracting supplies from new sources such as the Middle East and West Africa.

ii) Security measures to cope with interruption

50. An adequately diversified supply structure is a corner stone in ensuring, as far as possible, security of supply. Equally necessary is the provision of measures to be employed in the event of a supply disruption. Such measures include underground storage, flexibility of supply from both indigenous production and imports, and interruptible sales contracts.
51. The Commission's previous security study,⁸ carried out jointly with Member States in 1982, indicated that for the year 1990 the Community could cope with a major interruption in supplies - 25% over a period of six months - with the minimum of repercussion for final consumers. After discussion of this, the Council of Energy Ministers asked the Commission to continue following the security situation in consultation with Member States. Since this study, the Commission has continued, at regular intervals, to analyse and discuss security within the group of Member States' gas experts. Recently, the International Energy Agency published a study on natural gas⁹ which stressed the need for continued attention to all aspects of security including regional co-operation.
52. The latest work undertaken within the Community's group of gas experts takes into account the effect of individual security measures, that is underground storage, the use of interruptible contracts and flexibility of indigenous production, on overall security. With a view to the reliability of the analysis, a prudent approach was adopted with regard to the various assumptions used. For example, the demand and supply conditions prevailing in the winter were taken. This is the time of year when demand is at its highest and therefore the period when a supply interruption would be most severely felt. The year 1990 was taken as a horizon year, import dependence having risen to around 40% by that time, as it is the latest year for which detailed information on underground storage is available.
53. These studies indicate that for the period 1986-1990 existing and planned security measures, when applied on a Community-wide basis, to those countries on the European continent which are interconnected¹⁰, should be sufficient to deal effectively with an interruption of supply from any individual import source for at least nine months. However, full cross-border co-operation between Member States' gas industries is an essential condition. Of the security measures employed, underground

8 Summarised in COM(82)653 final

9 "Natural Gas Prospects", IEA May 1986

10 Federal Republic of Germany, France, Italy, Netherlands, Belgium, Luxembourg, Denmark.

storage would provide around two thirds of this security whilst the remaining security requirement would come from indigenous production flexibility and the systematic use of interruptible contracts.

54. In addition, it should be noted that Spain is not as yet included in this analysis. In 1985 it was decided to expand Spain's existing regional infrastructure and to develop a national network. Because of this and Spain's continuing high dependence on external supplies, appropriate security measures, in particular underground storage, will need to be developed. Planned security measures in Spain will be included in the ongoing security analysis within the above-mentioned Community's group of gas experts.
55. When the same analysis is carried out **on the basis of the information available in 1982**, the year when the Commission's previous security study was undertaken, it is clear that the security situation has improved considerably. Not only have import expectations decreased over the past four years, but underground storage in 1990 should be around 20% more than was foreseen four years ago. In addition to the other security measures mentioned above, total volumes of available underground storage should represent around 140 days of non-OECD imported supplies in 1990.

iii) The gas grid

56. The gas grid should be seen as more than simply a means of transporting gas between two points. It has an important contribution to make in terms of security of supply. In addition, the structure of the grid helps determine the allocation of natural gas resources within the Community and therefore has an important economic function as well. In an endeavour to assess the contribution of the European network to security of supply, the Commission has evaluated work on this subject recently carried out at its request by Cometec-Gaz, the economic research committee of the European gas industry. The Commission wishes to express its appreciation of Cometec's assistance in this matter.

57. **The contribution of the European network to security of supply**

Development of transmission lines is a function of commercial decisions. New pipelines are only constructed where there is sufficient volume of natural gas contractually committed to justify them. The European grid testifies to the co-operation and support which the gas companies of various countries give to one another. The joint operations of the major international trunk lines exemplify this co-operation. For example the TENP line which runs from the Dutch border through the Federal Republic of Germany and Switzerland to Italy is a joint venture by SNAM of Italy and Ruhrgas of the Federal Republic. Moreover, the various networks are compatible with one another to a high degree and, technically, the interconnected grids may be considered as one system.

58. The gas network contributes to security of supply through various features of its design, including standby and back-up facilities, routing and interconnections, capacity of the system and storage. One of the main features of the grid is its flexibility. Import lines are connected with the main indigenous fields as well as storage, in order to make supply sources totally interchangeable. If supplies from a given source are interrupted, the pipeline built for the transmission of this gas can be used for the transportation of gas from other sources in the grid.

59. In the past, disruptions have been coped with using the flexibility inherent in the systems. Disruptions in 1981 and April 1986 temporarily halted North Sea gas deliveries to the Federal Republic of Germany. The problem was overcome by transporting gas from southern Germany to the north, into areas which normally received North Sea gas. On a European scale, the inter-linked grid offers similar flexibility. If, for example, there were major disruptions on the east-west axes, the technology of the system would permit gas flows to be diverted from the north-south axes (and vice versa). Natural gas from France, for example, could be sent directly from France through the MEGAL line to the German network. No technical impediment exists to the implementation of gas re-routing within an acceptable time period. Moreover, the various gas companies involved express a readiness to co-operate if the need arises, as they have done in the past, and the system provides the means.

60. Further integration

Whilst making a significant contribution towards the Community's security of supply, the grid undoubtedly makes another important contribution as well, in the field of economics. The integration of the European gas grid, to the extent that has so far been achieved, provides buyers and sellers with more options than they would otherwise have enjoyed. Moreover, the interconnections allow economies to be made in the transportation of natural gas, and enable exchange deals between buyers which avoid unnecessary and costly physical transfers of gas over long distances.

61. Further integration of the network will continue to be primarily a function of the commercial and operational requirements of the gas industry. A fully integrated grid is, however, a necessary condition for the development of a truly common market for natural gas. For this reason, as well as for security of supply, the Community should encourage and where possible, facilitate further integration.

62. There are three Community countries which have developed natural gas supply systems but which to date remain isolated from the grids of neighbouring countries, the United Kingdom, Spain and Ireland. The United Kingdom in particular has large reserves of natural gas which, in the event of a link with the Continent could make a significant contribution to the Community's overall security of supply. The gas industry in the Republic of Ireland is actively examining, among other options, a pipeline link with the United Kingdom and in Spain, the gas industry is studying the possibility of connecting up with the French network.

63. The security of the natural gas systems planned in Greece and Portugal will be significantly strengthened if these systems at some point in the future can be integrated in the European gas grid.

64. Looking ahead, to the 1990s and beyond, it is the Commission's view that the new Norwegian supply contracts (described in chapter II) could indeed provide a basis for further, and possibly full integration of the Community grid. New infrastructure will be constructed in the North Sea providing a pipeline network, linking gas fields to landing points. A new 1,100 kilometre pipeline is proposed in the North Sea which will transport gas from the Troll and Sleipner fields to Zeebrugge in Belgium. These two fields will also be connected to the existing pipeline system which transports Norwegian gas to Emden in the Federal Republic of Germany. In addition, there are other gas fields in

the Norwegian sector of the North Sea awaiting development as well as fields further north and the prospect of new discoveries. Several Community countries, not presently importing Norwegian supplies, may in the future wish to take supplies from Norway, thus enhancing their overall security of supply. Spain and Ireland, at present isolated from the rest of the Community grid, could be among them. The United Kingdom - the largest single Community gas market - will at some point in the future need to consider renewed imports, possibly from Norway.

65. When planning possible future supply contracts with Norway - and indeed with other suppliers as well - the gas companies and governments concerned should, for the reasons mentioned above, give a high priority to the possibility of further interconnections. In particular a link between the United Kingdom and the Continent would be a significant step forward. The decision in March 1986 by the United Kingdom government to allow gas exports, subject to case-by-case consideration, is an important development in this respect.

iv) Future monitoring

66. The Commission will, in any event, continue to work closely with Member States' experts and the gas industry to monitor further developments of the system, to ensure that they are in line with Community policy aims and, where this is not the case, to suggest appropriate action. This will be the more important if, as suggested in chapter I, the conditions are such that natural gas increases its share of total energy demand in the years ahead.

APPENDIX 1

GROWTH OF NATURAL GAS AS A PROPORTION OF TOTAL ENERGY CONSUMED IN THE COMMUNITY

mtoe

	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971
Gross inland energy consumption	942	912	887	886	912	946	986	941	913	916	861	914	933	920	875
Natural gas consumption	181	175	165	158	166	169	173	161	154	150	140	132	116	103	80

Share of natural gas %	19.2	19.1	18.6	17.8	18.2	17.9	17.5	17.1	16.9	16.4	16.3	14.4	12.4	11.2	9.1
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COMMUNITY NATURAL GAS DEMAND BY SECTOR

	Gross inland consumption		Transformation in electric power stations		Industry		Residential and commercial		Final non-energy consumption		Other *	
	mtoe	%	mtoe	%	mtoe	%	mtoe	%	mtoe	%	mtoe	%
1973	115.8	100	23.5	20.3	41.7	36.0	35.6	30.7	5.9	5.1	9.1	7.9
1975	139.7	100	31.5	22.5	46.1	33.0	49.2	35.2	6.0	4.4	6.9	4.9
1980	169.4	100	24.8	14.6	55.1	32.5	75.2	44.4	7.8	4.6	6.5	3.9
1981	165.9	100	20.5	12.4	52.9	31.9	76.7	46.2	8.5	5.1	7.3	4.4
1982	158.3	100	19.9	12.6	50.3	31.8	75.2	47.5	7.0	4.4	5.9	3.7
1983	165.4	100	21.8	13.2	45.6	27.5	78.0	47.2	12.2	7.4	7.8	4.7
1984	174.6	100	24.4	14.0	49.3	28.2	81.4	46.6	13.9	8.0	5.6	3.2

* transportation, losses, etc.

Source: Eurostat

COMMUNITY NATURAL GAS SUPPLIES 1985*

mtoe

COUNTRY	Total Natural Gas Consumption	Indigenous Production	Intra Community Trade (Exp. - Imp. +)	Contracted Imports from Third Countries					Natural Gas Imports from Third Countries as:	
				TOTAL	Algeria	Libya	Norway	USSR	% of Natural Gas Consumption	% of Total Energy Consumption
Federal Republic of Germany	40.1	11.5	+ 14.5	15.7	-	-	5.3	10.4	39.2	5.9
France	25.0	4.6	+ 6.0	14.9	6.9	-	2.4	5.6	59.6	7.7
Italy	27.2	11.7	+ 3.8	12.1	6.8	0.3	-	5.0	44.5	9.3
Netherlands	32.3	59.5	- 28.2	1.6	-	-	1.6	-	5.0	2.7
Belgium	7.3	-	+ 3.6	3.7	2.2	-	1.5	-	50.7	8.7
Luxembourg	0.3	-	+ 0.3	-	-	-	-	-	-	-
United Kingdom	46.4	35.1	-	11.3	-	-	11.3	-	24.4	5.6
Ireland	1.9	1.9	-	-	-	-	-	-	-	-
Denmark	0.6	1.0	-	-	-	-	-	-	-	-
Greece	0.1	0.1	-	-	-	-	-	-	-	-
EUR 10	181.2	125.4	0	59.3	15.9	0.3	22.1	21.0	32.7	6.3
Spain	2.3	0.2	-	2.1	1.4	0.7	-	-	91.3	3.1
Portugal	-	-	-	-	-	-	-	-	-	-

* Provisional balance 1985 - Eurostat 3/86

COMMUNITY NATURAL GAS SUPPLIES 1990

mtoe

COUNTRY	Total Gas Consumption	Indigenous Production	Intra Community Trade (Exp. - Imp. +)	Contracted Imports from Third Countries				Natural Gas Imports from Third Countries as:	
				TOTAL	Algeria	Norway	USSR	% of Natural Gas Consumption	% of Total Energy Consumption
Federal Republic of Germany	46.0	13.0	+ 14.0	19.0	-	6.0	13.0	41.3	7.3
France	25.0	3.0	+ 2.5	20.2	8.4	3.8	8.0	80.8	9.6
Italy	32.3	10.0	+ 3.7	20.8	10.0	-	10.8	64.4	14.8
Netherlands	28.8	50.0	- 23.1	1.9	-	1.9	-	6.6	3.1
Belgium	7.5	-	+ 3.0	4.5	2.7 *	1.8	-	60.0	10.2
Luxembourg	0.3	-	+ 0.3	-	-	-	-	-	-
United Kingdom	49.4	38.5	-	10.9	-	10.9	-	22.1	5.2
Ireland	1.6	1.6	-	-	-	-	-	-	-
Denmark	1.9	2.8	- 0.4	-	-	-	-	-	-
Greece	1.5	0.1	-	-	-	-	-	-	-
Spain	4.8	1.9	-	3.0	3.0	-	-	62.5	3.7
Portugal	-	-	-	-	-	-	-	-	-
EUR 12	199.1	120.9	0	80.3	24.1	24.4	31.8	40.3	7.5

* Under renegotiation; figure shown is the balance between total consumption and supplies from other sources

COMMUNITY NATURAL GAS SUPPLIES 2000

mtoe

COUNTRY	Total Natural Gas Consumption	Indigenous Production	Intra Community Trade (Exp. - Imp. +)	Contracted Imports from Third Countries			
				TOTAL	Algeria	Norway	USSR
Federal Republic of Germany	44.7	12.7	+ 12.3	19.7	-	7.1 *	12.6
France	18.0-29.0	1.0	+ 3.8	21.6	4.5	7.9 **	9.2
Italy	34.7	10.0	+ 3.3	20.8	10.0	-	10.8
Netherlands	26.9	46.7	- 22.0	2.2	-	2.2 *	-
Belgium	7.9	-	+ 3.0	4.9	2.9 ***	2.0 *	-
Luxembourg	0.4	-	-	-	-	-	-
United Kingdom	49.4	49.4	-	-	-	-	-
Ireland	3.2	1.6	-	-	-	-	-
Denmark	1.9	4.5	- 0.4	-	-	-	-
Greece	2.6	0.1	-	-	-	-	-
Spain	5.3	1.5	-	3.7	3.7	-	-
Portugal	-	-	-	-	-	-	-
EUR 12	195.0-206.0	127.5	0	72.9	21.1	19.2	32.6

* Includes Norwegian supply contracts announced June 1986

** Includes c. 1.75 mtoe (2 bcm) optional supply

*** Under renegotiation; figure shown is the balance between total consumption and supplies from other sources