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COMMUNITY ELECTRICITY SUPPLIES AND THE USE OF FUEL IN POWER STATIONS

(Communication from the Commission to the Council)

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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL

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I. INTRODUCTION

1. Member States foresee a growth in electricity consumption between 1979 and 1990 of 4.3 % p.a. (1), corresponding to an economic growth of 3.1-3.2 % p.a.
2. If Member States' forecasts of nuclear and solid fuel capacity could be achieved, it would be possible to provide over 75 % of primary energy requirements for electricity production in 1990 from these two sources and the Council guidelines of June 1980 (70-75 %) would be attained.
3. If electricity demand were to grow by less than 4.3 % p.a. a likely consequence would (unfortunately) be a reduction in the rate of ordering of new coal-fired power stations and a failure to achieve nuclear targets. It is unlikely that power station oil consumption would be much lower in 1990. So the conclusions of this paper would still apply. If however electricity demand rises above forecasts, the paper's conclusions would be substantially re-inforced.

II. THE NUCLEAR PROGRAMME

4. Member States now forecast that some 125 GW of nuclear power station capacity will be in operation by the end of 1990, in comparison with 33 GW in December 1980. The Commission believes on an initial assessment that a substantial risk exists that actual nuclear capacity in 1990 will be below 100 GW. An analysis of the nuclear programme is in Annex 1 to this paper.
5. The Community pays a high price for delays in nuclear programmes :
 - oil-produced electricity costs 50 % more than nuclear electricity (*);
 - oil mostly means adverse foreign exchange costs (a delay in bringing into operation 1 GW of nuclear plant may lead to a need for up to 1.3 m.t.o.e. of oil in a year (**)).

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(1) Electricity consumption in the Community (EUR 9) grew as follows :
1970-1973 : 6.3 % p.a.
1974-1980 : 3.2 % p.a.

(*) on base load comparison

(**) which at present will cost 315 million U.S. dollars

6. In order to facilitate public acceptance of nuclear investment the Commission will continue to ensure the application of the Articles of the Euratom Treaty dealing with health protection; it will pursue research and development in the nuclear field, especially the storage of nuclear waste, both at the Joint Research Centre and through contract research; and in general it will increase the coherence of all its actions on nuclear safety.

III. CONVENTIONAL POWER STATIONS

7. New coal-fired power stations are now the principal conventional method of meeting the growing demand for electricity. Solid fuel power station capacity is expected to grow from some 112 GW in 1980 to about 156 GW in 1990. It is no longer economic to build new oil-fired or natural gas power stations. Their construction is in any case restricted by Council directives adopted in 1975. Furthermore, most suitable sites for hydro-electric power plant have already been developed. Annex 2 and 3 of this paper give forecasts for conventional power station capacity and fuel use in the Community in 1990.
8. The Commission believes that it is vital that every Member State should make a further re-examination of the detailed requirements for solid fuel electricity production capacity and, in particular, the amount of new plant to be ordered and the case for, and economics of, conversion to solid fuel of existing oil-based plant. There are potential investments in this field which, although strategically desirable, are difficult to justify on the basis of traditional economic and commercial criteria. Measures need to be taken to ensure that the necessary investment is made on grounds of energy strategy.

IV. OIL CONSUMPTION

9. Consumption of oil in power stations, which in 1979 was some 67 million t.o.e., is likely to rise to some 71 m.t.o.e. in 1985 and may not be much less in 1990 than at present. This is because new plant ordered before the 1975 directive on oil power stations is now coming into use.

10. The greatest cause for concern on current estimates of electricity generation patterns in 1990 is to be found in Italy, the Netherlands and Ireland (see Annex 3). A worrying level of dependence on oil for electricity generation is evident; the disadvantage to these three Member States in increased cost of electricity, attributable to this reliance on oil, will be severe. The long term aim should be to achieve less than 10 % dependence on oil for the production of electricity since if oil supplies became critically difficult a shortfall of up to 10 % for electricity could be sustainable.

V. CONCLUSIONS

11. Use of oil for electricity production in the 1980's will be too high. It is regrettably true that much of the past heavy investment in oil-fuelled power stations must now be regarded as wasted investment. To continue to rely upon oil for more than a small percentage of electricity generation at best perpetuates high electricity costs; at worst it risks inability to meet electricity demand should oil shortages develop. It would be prudent individually and collectively to aim as soon as possible at less than 10 % dependence on oil for the production of electricity.
12. Unless urgent and determined measures are taken, considerable cause for concern exists over the likely dependence in 1990, in particular, of Ireland, Italy and the Netherlands on oil for electricity generation; the cost of electricity in these countries will accordingly be significantly higher than is desirable and security of supply will be vulnerable.
13. When nuclear capacity can be constructed, it provides by a clear margin the most economic means of base-load electricity production per kWh (save for a few cases where increased recourse to hydro-electric or lignite plant is available). Except for France, the Member States which already have nuclear power stations need to ensure a timely increase in the rate of ordering nuclear plant within the next three years,

so that the current forecasts for 1990 may be achieved and preferably exceeded. Those Member States which do not have a nuclear programme should consider the case for a change of policy as soon as possible.

14. Member States should reconsider, and keep under constant review, the conversion of existing oil-burning plant to coal wherever technically feasible, and the ordering of new solid-fuel burning plant as early as possible. New studies should be put in hand at national and Community level on the case for advance ordering of nuclear and coal-fired plant in anticipation of electricity demand growing beyond levels already forecast. If economic activity took an upturn in the next few years, the corresponding increase of electricity demand would in many cases mainly be met by increasing oil generated electricity production.
15. Fresh consideration should be given to extending inter-connection within the Community of electrical networks, particularly where this would help alleviate the heavy reliance in parts of the Community on oil for electricity production. The possibilities of further penetration of non-oil generated electricity in substitution for applications where oil is presently used should also be studied.
16. Member States should consider in detail, individually and together with the Commission, the nature of all obstacles to the achievement of these aims. The further action required at Community level should be considered in the context of the overall review of energy programmes and investment.

CURRENT PLANS AND PROSPECTS FOR THE DEVELOPMENT OF NUCLEAR POWER STATION
CAPACITY IN THE COMMUNITY

I. THE PROGRAMME

1. The current position and estimates for nuclear capacity in Member States are as follows :

GW(net)

Country	Situation 30.9.80 (1)			Situation end-1990
	In service	Under construction	Firm orders	Member States' forecasts (2)
Germany (F.R.)	8,6	12,0	-	30,0
Belgium	1,7	3,8	-	6,8
France	12,6	33,0	4,8	64,5
Italy	1,4	2,0	2,0	7,8
Netherlands	0,5	-	-	0,5
United Kingdom	6,5	6,5	-	14,8
Greece	-	-	-	0,6
COMMUNITY	31,3	57,3	6,8	125,0

(1) Source : Information from Member States

(2) Source : Data on 1990 Energy Programmes submitted to the Commission, August to October 1980

2. As shown, some 57 GW of nuclear power station capacity is under construction in the Community and a further 6,8 GW has been ordered. It is clear that on a realistic view of current construction times, siting difficulties, and authorisation delays, a further 30 GW must be firmly ordered quickly so that work can begin on site in or before 1983; only in this way will a programme of up to 125 GW in operation by 1990 be achieved.

3. Whilst Member States anticipate a nuclear production capacity of 125 GW in operation by the end of 1990, the Commission believes on an initial assessment that a substantial risk exists that actual achievement will not reach this level and could be below 100 GW. The situation in each Member State is summarised in the following paragraphs.

II. PLANS AND PROSPECTS IN THE MEMBER STATES

Federal Republic of Germany

4. No firm decisions have so far been taken in Germany concerning the nuclear capacity currently projected. Such decisions are dependent on the outcome of current discussions on future energy policy which are attempting to take account of economic, ecological and social factors.
5. Forecasts of nuclear power station capacity have been progressively lowered in recent years and something close to a de facto moratorium on further ordering of new stations has existed.
6. New political determination will be needed at federal and länder level to carry through a programme of 30 GW in the period to 1990.

Belgium

7. The nuclear programme provides for a total of 5,450 MW in operation by 1984. A white paper by the Ministry of Economic Affairs has suggested that two additional power stations of 1000 MW each may be constructed by the years 1989 and 1991. Discussion in Parliament is envisaged, before a firm decision is taken. The Government has in effect however postponed

authorisation of this additional plant and real difficulties can be anticipated in reaching agreement on its timely authorisation.

France

8. France's nuclear programme currently provides for the ordering of some 5 GW per year. In 1980 32 units of 900 MW each and 10 units of 1300 MW each were under construction, and from this programme some 6400 MW was brought into initial operation in 1980. In addition, the Fast Breeder Reactor at Creys-Melville, constructed in collaboration with Germany (F.R.) and Italy, should be commissioned in 1983. This type of station is expected, after 1985, to be ordered at the possible rate of 2 units of 1300 MW each every three years.
9. The result of this programme is expected to be that, by 1985, some 55 % of electricity production will be from nuclear plant, rising to 75 % by the year 1990.
10. If nuclear production falls below its forecast level of 73 million t.o.e., the main explanation will be that annual growth of demand for electricity proves to be lower than is now anticipated. It will not mean that oil consumption in power stations will rise in compensation.

Italy

11. Continued opposition at regional and local commune level to the acceptance or designation of any power station sites, but particularly for nuclear power stations, had led the Italian Government to modify its power station programme by reducing, in the medium term, the number of nuclear units and providing for an increased recourse to coal. The choice of coal has been necessary in order to cover the capacity deficits arising from accumulated delays in the nuclear programme, even though coal does not offer the same economic advantages as nuclear.
12. Against this background, the most favourable hypothesis (i.e. supposing the immediate resolution of siting problems) is that 10 GW of nuclear capacity over and above that already in service or under

construction could be in service by 1990 or shortly after (3 units in 1988, 4 in 1989 and 3 in or after 1990).

13. However, opposition persists and it must be expected that the regularity of the programme may be disturbed. Such continued disturbance would aggravate the current problem of the level of available production capacity, particularly in the medium term.

Furthermore, work on the only power station under construction was delayed by legal action. The Commission does not believe that further nuclear plant can be authorised and successfully brought into operation by 1990, unless very determined steps are taken in the national interest to overcome the difficulties raised by local and regional authorities and by environmentalists. Similar difficulties will also need to be overcome for coal fired power stations

Netherlands

14. The Netherlands Government has published a Discussion Note "Energy Policy - Part 3 - Fuel input to Power Stations" as a proposal to Parliament. This document covers the procedures which will determine whether new nuclear plant can be envisaged before 1990. The Government hopes to take a decision, by 1983 at the earliest, after a two-year public debate on nuclear energy starting in 1981, to construct 3 nuclear power stations of 1000 MW each in the next 10 years. Five possible sites have been identified.

United Kingdom

15. Construction of two AGR stations at Heysham and Torness (1250 MW each) has been authorized by the U.K. Government and work on these is in progress. The Government has accepted advice that at least one new nuclear power station order a year for 10 years is a reasonable prospect against which the nuclear and power plant industries can plan.
16. The Government has also made clear its wish that, subject to the necessary consents and safety clearances, a PWR should be the next nuclear power station order after the two AGR stations. Construction of this could begin on site (Sizewell, Suffolk) in 1983. A public enquiry in 1982 is anticipated.

17. The programme from 1982 therefore could amount to some 15 000 MW. Decisions on the choice of reactor for later orders are to be taken in due course.
18. The forecast growth of electricity demand in the medium term is however now so low that urgency to implement the programme may recede. Completion of the proposed P.W.R. station of some 1100 MW by the end of 1990 is becoming an increasingly ambitious objective.

Ireland

19. The Government is currently studying a possible nuclear programme and a nuclear power station of some 650 MW has been proposed at Carnsore Point. A Government Inter-Departmental Committee to assess the proposal from the environmental, financial and energy viewpoints has been appointed but has not yet reported. Thereafter it is intended to hold a Tribunal of Inquiry. Even if approved, it is not anticipated that a nuclear power station will be in service before 1993/4.

Luxembourg

20. There are no proposals for nuclear plant in Luxembourg, where in any case three-quarters of electricity consumption is imported.

Denmark

21. Denmark has no nuclear programme and, although the option has not been ruled out, the political climate is at present such that no decision on nuclear development seems likely in the near future.

Greece

22. The electricity plan provides for a 600 MW nuclear plant which is not now expected to be in operation before 1989. Although at least two potential sites have been identified, firm decisions on siting and reactor type are not expected before 1982. No licensing procedure currently exists. It must be open to doubt whether nuclear plant will be in service by 1990.

III. FINANCING OF NUCLEAR CONSTRUCTION

23. Despite the relatively high capital costs of nuclear construction, the economics of electricity production from nuclear plant are so favourable that there are few financial obstacles to the continued expansion of nuclear capacity. The existence of the Euratom loan scheme has proved a useful method of assisting the financing of nuclear investment and the Commission does not consider that further financial instruments are warranted at the present time.

IV. PUBLIC ATTITUDE TOWARDS NUCLEAR POWER

24. Public apprehension about the safety aspects of nuclear power has been the greatest single factor in achieving a lower growth of nuclear capacity than energy and economic considerations would have dictated. The Community as a whole pays a high price for delays in nuclear construction :

- oil generated electricity costs much more than nuclear (1);
- delayed investment suffers cost inflation,
- oil mostly means adverse foreign exchange costs (every 1 GW of nuclear can save some 1.3 Mt of oil per year costing some \$ 315 M/year).

25. These economic factors together with the adverse political consequences of avoidable dependence upon imported oil need to be brought out in public discussion.

V. NUCLEAR PLANT MANUFACTURING CAPACITY

26. Current nuclear plant manufacturing and industrial capacity in the Community is greatly in excess of forecast requirements for new nuclear power stations in the Community. This construction capability with its related specialised technical and industrial skills will suffer if a steady flow of orders is not available.

(1) If any new oil-fired power stations were brought into service in the mid-1980's in the Community their average electricity production cost per Kwh is estimated to be 64 % greater than that from new nuclear plant, under base-load conditions. The average electricity production cost per Kwh from new coal-fired power stations brought into operation in 1985 is similarly estimated at 42 % higher than from nuclear plant.

SOLID FUEL BURNING ELECTRICITY PRODUCTION CAPACITY
IN THE COMMUNITY

SITUATION AND FORECASTS FOR 1990

(As at 30 September 1980)

GW (net)

	D	F	I	NL	L	B	UK	IRL	DK	G	TOTAL
in service	40.5	12.2	4.4	1.3	0.1	2.1	44.7	0.5	4.1	2.0	111.9
under construction	6.2	1.8	2.0	0.9	-	0.6	1.9	0.6	0.7	1.2	15.9
firm orders	1.7	0.6	1.8	-	-	-	-	0.6	-	0.6	5.3
forecast in 1990 ⁽¹⁾	53.7	13.1	24.2	3.0	0.1	2.8	42.9	2.1	8.7	5.9	156.5

Note : Data is for hard coal, lignite and peat burning plant. Single or dual-firing.

(1) This forecast includes plant to be converted or reconverted to solid fuel burning and plant not yet ordered

NON-NUCLEAR AND NON SOLID FUEL POWER STATION CAPACITY IN THE COMMUNITYAs at end-1979⁽¹⁾

GW(net)

	D	F	I	NL	L	B	UK	Irl	Den	G	Total
Hydro ⁽²⁾	6,4	19,1	16,0	-	1,2	0,5	2,5	0,5	-	1,4	47,6
Oil ⁽³⁾	14,7	11,3	14,6	1,1	-	2,1	18,1	1,7	2,6	1,4	67,6
Other ⁽⁴⁾	11,5	5,6	8,5	14,1	0,2	3,9	-	0,2	-	-	44,0

As at end-1990 ⁽⁵⁾

Hydro ⁽²⁾	7,5	25,9	24,1	-	1,2	1,3	4,1	0,5	-	4,3	68,9
Oil ⁽³⁾	15,0	10,9	21,7	0,4	-	1,7	24,5	2,3	1,7	1,2	79,4
Other ⁽⁴⁾	14,0	6,2	10,5	14,5	0,2	3,4	1,2	0,4	-	-	50,4

(1) Source : Estimations by the Commission's services

(2) Including pumped storage and geothermal

(3) Single firing

(4) Other plant without solid fuel capability

(5) Source : Member States' data on energy programmes and estimations by the Commission's services

TABLE 1 - OIL CONSUMPTION FOR ELECTRICITY PRODUCTION - Mtoe

ANNEX 3

	EUR 10	D	F	I	NL	B	L	UK	IRL	DK	G
1973	76,2	9,9	15,6	19,5	1,7	5,1	0,1	18,7	1,2	2,9	1,5
1979	66,8	6,5	11,8	22,0	4,8	4,0	0,05	12,1	1,7	1,9	2,0
1985	69,7/71,2	6,8	4,9	34,4	5,4/6,2	2,7/0,9	-	10,4/12,8	2,3	1,6	1,3
1990	57,2/63,7	4,9	4,0	23,9/29,4	6,2/6,0	2,4	-	10,4/11,6	2,6	1,8	1,0

TABLE 2 - SHARE OF OIL IN ENERGY INPUTS (*) FOR ELECTRICITY PRODUCTION - %

1979	24	8	27	68	34	33	15	17	65	34	39
1985	20	7	7	71	35/38	19/6	-	14	59	22	15
1990	14/15	4	4	40/45	38/33	14	-	13/14	50	20	8

TABLE 3 - SHARE OF NUCLEAR + SOLID FUELS IN ENERGY INPUTS (*) FOR ELECTRICITY PRODUCTION - %

1979	60	72	56	12	14	50	39	82	25	66	55
1985	68	79	83	16	27/25	67/69	43	85/82	23	78	81
1990	77	85	89	48/44	33/41	73	43	86	37	80	88

Notes : Sources : 1973 and 1979 figures : EUROSTAT

1985 and 1990 figures : 1980 National programmes review, including 125 GW of nuclear plant in 1990

(*) : Primary hydro-electric energy included in energy inputs at 3600 Kjoules (860 Kcal.)/kWh

