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IMPROVING THE EFFICIENCY OF ELECTRICITY USE

(Communication from the Commission)

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BACKGROUND STATEMENT

The improvement of energy efficiency in all sectors of energy use and for all fuels is an established Community priority. The increasing share of electricity in final energy use, contributing to better industrial performance and higher standards of living, makes it important to ensure its efficient use.

There is substantial potential to improve the efficiency of electricity use. The benefits which would arise from the achievement of this potential justify a concerted programme of action throughout the Community. The Commission intends to draw up such a programme in consultation with Member States and with the help of the electricity supply industry. Such an initiative, if it is to be effective, will require a commitment by the Member States from the very beginning. This Communication sets out the case for an initiative and the institutional framework and the timetable for establishing an action programme.

Improving the Efficiency of Electricity Use

I - Introduction

1. This Communication presents the case for a concerted programme of action throughout the Community to exploit the significant potential for improved efficiency in the use of electricity. It invites the Council to endorse the Commission's intention to draw up such a programme with the help of the electricity supply industry and to transmit it to Council for approval during the second half of 1988 after consultation with experts from Member States.
2. The improvement of energy efficiency in all sectors of energy use and for all fuels is an established Community priority. In a Resolution on 16 September 1986 the Council called for a vigorous policy for energy saving and adopted the objective of achieving at least a further 20% improvement in the efficiency of final energy demand by 1995.
3. Electricity consumption accounts for about 17% of final energy demand in the Community and has been growing in the 1980's at about 3% a year, higher than the overall rate of growth in energy demand. By the end of this century electricity could account for well over 20% of final energy demand.
4. This likely growth in the share of electricity is not in itself a reason for concern. Indeed the growing use of electricity often reflects the introduction of more efficient and productive technologies, contributing to better industrial performance and higher standards of living. Electricity is also the vector through which solid fuels and nuclear power have greatly reduced the Community's dependence on imported oil, and will in future be the main vector for renewable energy production.

The growing role of electricity, however, makes it all the more important to ensure its efficient use.

5. The separate but related question of energy efficiency in the production of electricity will be discussed in a further communication in 1988.

II - The Case for an Initiative

6. The growing importance of electricity in final energy consumption has been outlined above. In more quantitative terms the Community of Ten's electricity needs grew by some 35% from 996 TWh¹ in 1975 to 1342 TWh in 1985. Over the same period there was a net increase in power station capacity of around 100 GW², with the entry into service of nearly 60 GW of nuclear capacity and some 20 GW of additional capacity for burning solid fuels. The additional electricity requirements involved by 1985 an increase in primary fuel use of some 85 million tons of oil equivalent (Mtoe).
7. By the end of the century annual electricity consumption in the now enlarged Community of Twelve could, on current economic trends, grow by as much as a further 600 TWh or 40%. If the Community's energy efficiency objective (a 20% improvement) were achieved in electricity use, already by the mid-1990's there could be savings of some 350 TWh a year. Such a saving should be technically feasible on the basis of technologies already in existence, although major efforts would be needed if the potential is to be exploited.
8. Even a 10% improvement in the efficiency of final electricity use would contribute significantly to the Community's energy efficiency objectives. By 2000 it would also mean:
 - a reduction in the Community's total primary energy requirements of about 45 Mtoe a year, or almost a million barrels of oil per day;
 - a reduction in consumers' electricity bills of up to 20 milliard ECU (1986 prices) per year;

¹ 1 Terawatt hour (TWh) = 10⁹ Kilowatt hours (KWh)

² 1 Gigawatt (GW) = 10⁶ KW

- avoided investment in over 40 GW of additional generating capacity, involving investment costs of 35-50 milliard ECU;
- such additional capacity would be largely either nuclear or fired by solid fuels. If, for example, half were plant burning solid fuels, there would also be savings in term of **atmospheric emissions** (about 125,000 tons a year of sulphur oxides, 200,000 tons a year of nitrogen oxides as well as substantial emissions of carbon dioxide) even from plant already fitted with expensive emission control equipment.

9. These are of course purely **illustrative** calculations based on a number of simplifying assumptions, notably in respect of the effects on the construction of new capacity, many of which would not be felt until the early years of the 21st century. But they do show clearly the potential scale of the spin-offs from improvements in the efficiency of electricity use. The rough estimates for investment and consumer expenditures in particular suggest that there could be a large potential for switching financial resources from supply-side investments to investments designed to improve the efficiency of electricity use, many of which would yield at least equivalent returns taking account of all the costs and benefits.

III - Areas of Potential Efficiency Gains

10. Areas which could make a major contribution to increased efficiency of electricity use include the following :
- . the use of electric motors of higher efficiency wherever economically feasible. (In seeking to reduce investment costs, industrial and household appliances all too often are equipped with poor performance, low price electric motors);
 - . matching electric motors to process requirements (electric motors are often oversized or kept spinning at a speed higher than necessary);

- . more widespread use of the most efficient designs of electrical equipment such as that needed for domestic, commercial and industrial washing, drying, cooling, freezing, heating, cooking and air-conditioning. (In the domestic sector alone the energy consumption of currently marketed washing machines varies by at least 40%, that of dishwashers by the same ratio, and that of freezers by up to 400%);
 - . more extensive recourse to the most efficient electric lighting. (The use of the latest fluorescent and high-intensity lamps can achieve the same performance with less than 25% of the energy consumption of incandescent lamps);
 - . more general application of the most up-to-date electrical and electronic control equipment, which would improve the performance and energy efficiency of processes based on other energies as well as electricity. Examples are : computer based control systems for all kinds of industrial processes and electrical and electronic control equipment for space heating and air-conditioning.
11. This is not an exhaustive list of the areas where potential for improving the efficiency of electricity use exists. Nor of course does it reflect the contribution to improved efficiency of energy use as a whole which could follow from the efficient use of electricity in new processes in substitution for other energies. Changing electricity consumption patterns as a result of improved efficiency can also have a favourable effect on overall primary energy use through a more even distribution of load on the electricity systems.

IV - The Roles of Public Authorities and the Electricity Supply Industries

12. There is an evident role for Governments and for public authorities in general in ensuring that the potential for improving the efficiency of energy use is exploited. Their action normally involves some combination of efforts to improve information to the consumer about state-of-the-art technology, to facilitate the

provision of **technical expertise** in energy savings (eg. energy audits, third-party financing arrangements), facilitating the **demonstration and commercialisation** of new techniques as well as promoting research and development, and cost-effective **financial incentives**. A further element is an appropriate system for **monitoring** the results of progress.

13. Actions of these kinds are already being taken within Member States, and they are contributing significantly to the improvements of energy efficiency across the board. The Commission believes that now there should be a particular focus on electricity use within their programmes. At the same time, however, there would be significant benefits from more **concerted action within a Community framework**, as a means of exchanging experience, achieving widespread dissemination of information and ensuring a common effort consistent with the Council's commitment to the Community's 1995 objective for energy efficiency.
14. The actions of public authorities - at regional, national and at Community level - would also be enhanced, however, by complementary actions by the **electricity supply industry** itself, who have both a high level of expertise and the closest and most direct relationship with the final consumer. For some European electricity utilities, activities to encourage improved efficiency in the application of electricity would represent a new departure. Others have already taken some steps along this road. But more could be done. Action in this field would be consistent with their public service role. The development by the utilities of effective strategies for promoting efficient electricity use should therefore be an integral part of a concerted programme of action across the Community.

V - Towards a Concerted Programme of Action

15. The development of a workable and effective programme requires an appropriate **institutional framework** and a **timetable**. Given the technical expertise and access to the consumer enjoyed by the electricity supply industry, the Commission intends to invite the industry - through UNIPEDE, the Union of European Electricity

Producers and Distributors - to assist it in drawing up such a programme. The programme should, in consultation also with Member States' experts, be drawn up by mid-1988.

16. Such an initiative, if it is to be effective, will require a commitment by Member States from the very beginning. At its next meeting, therefore, the Council is invited to conclude that :

. there exists substantial **potential** to improve the efficiency of electricity use;

. new emphasis should accordingly be placed on ensuring that this potential is **exploited**;

. there is a need for a **coherent programme of Community action in this field**, embracing the activities of Member Governments, the Community and the electricity supply industry;

. it is important that **the electricity supply industry** should assist the Commission in drawing up such a programme;

. the programme should be transmitted to the Council for discussion during the second half of 1988.

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