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ENERGY IN EUROPE

LA ENERGÍA EN EUROPA

ENERGIE IN EUROPA

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ENERGY POLICIES AND
TRENDS IN THE EUROPEAN COMMUNITY

25

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PREFACE

A Word from the Editor

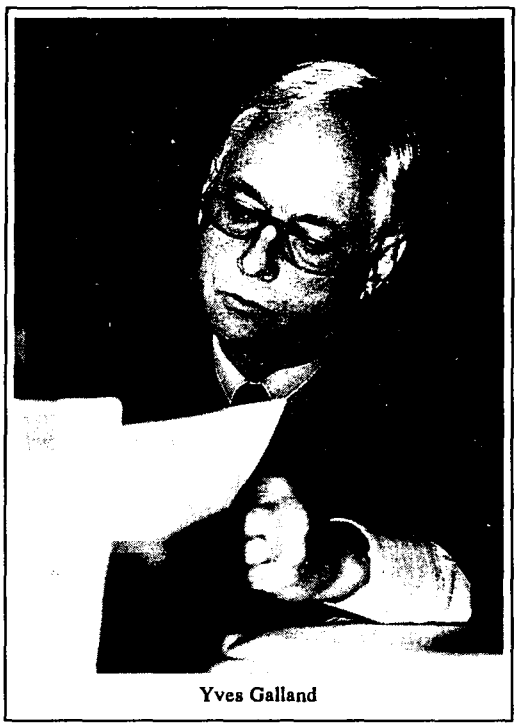
***Commissioner Papoutsis** announced at a meeting of the European Parliament's Committee for Research, Technological Development, and Energy in early June that **Mr C.S. Maniatopoulos** would leave his post officially on 30 June. In his 8 years as Director-General Mr Maniatopoulos led DG XVII inter alia in an especially close and constructive relationship with the European Parliament, and with its committee concerned with energy, research and technology in particular. It was thus particularly appropriate for the new Commissioner, who as is well known came to us at the beginning of this year from a background of long EP experience, to be able to express the Commission's appreciations of the DG's personal qualities and his stirling service.*

Mr Maniatopoulos led DG XVII through a period when Community energy policy responsibilities emerged from the stage of following markets and making recommendations, important as this was, to one involving much heavier burdens both in the areas of policy formulation and execution as well as in programme management. It is enough to refer to the long process of the completion of the internal energy market, starting at the beginning of the decade with the base Directives on Price Transparency for Electricity and Gas and on Transit Rules, up to the important developments of 1994 and 1995, including the progress at the June Council on the basis of the Commission's 'new approach'. From the 1986 Energy Policy Guidelines adopted by the Council in its Resolution of that year, to the latter's 1995 successor and its subject, the currently concluding Green Paper process and the coming White Paper which will form the Energy Policy input for the preparation of the IGC - about which much is said in this issue - has been a long but intellectually most stimulating journey (like another other admittely involving halts, frustrations, and occasionally bruises!) But its travellers are only now arriving at the most essential step of definition of the Union's and its Member States best options for energy policy choices lerading on far into the new century.

As is well known, the first Thermie programme (1990-94) involved the management of many hundreds of (many still) on-going projects over its five years and was the much more ambitious successor to hydrocarbons demonstration programmes which had begun in the mid-seventies. In the nineties DG XVII under Mr Maniatopoulos' leadership drew up, piloted where appropriate through Council, and itself managed the Altener, SAVE, and Synergy (international energy cooperation) programmes, as well as the activities in the field of Regional and Urban Energy Planning. In short the years 1987-95 were marked by steadily increasing responsibilities, and in many cases political sensitivity of the issues involved, for DG XVII and the other Commissions departments concerned by the many-facetted field of energy, characterised by so many overlapping areas of responsibility. The need for a firm but sensitive hand at the rudder was underlined as from 1991 with increasing involvement with the other Commission departments concerned in the process of initially assisting and now preparing the integration of the transitional economies of Central and Eastern Europe, daily involvement as the 'technical' Directorate-General with the PHARE and TACIS programmes being by no means the least of DG XVII's responsibilities. ◻

QUELLE POLITIQUE ÉNERGÉTIQUE POUR L'EUROPE ?

Yves Galland
Ministre Français de l'Industrie


Yves Galland

La France a soutenu l'initiative de la Commission de rédiger le Livre vert sur l'énergie en vue de pallier une absence de vision claire de ce que pourrait représenter une politique commune de l'énergie.

Sur les objectifs - ou plutôt les orientations - définis dans le Livre vert, il existe un large consensus : compétitivité, sécurité d'approvisionnement, protection de l'environnement, tels sont précisément les objectifs de la politique énergétique française. La France ne peut, de même, que se féliciter du cadre d'analyse du Livre vert, qui repose sur une étude du bilan et des perspectives énergétiques de l'Union européenne.

Par-delà ces orientations consensuelles, il semble important de définir une véritable stratégie énergétique à long terme pour l'Union Européenne. En effet, si le Livre vert jette les bases d'une réflexion commune, il ne propose pas d'objectifs chiffrés à un horizon donné, par exemple en matière de taux d'indépendance énergétique, de diversité des énergies, d'amélioration de l'efficacité énergétique ou de réduction des émissions de gaz carbonique. C'est d'ailleurs pourquoi nous parlons d'orientations plutôt que d'objectifs.

Ces objectifs et la définition des moyens propres à les atteindre, il appartient à l'ensemble des Etats-membres de les mettre en perspective, afin de constituer la trame d'une stratégie à long terme, qui réponde notamment à quelques interrogations essentielles :

• s'agissant de la sécurité d'approvisionnement, parle-t-on de sécurité à court ou à long terme ? Si l'on retient la préoccupation du long terme, il est clair, par exemple, que le charbon européen, peu compétitif et appelé à décliner, n'y contribue pas. Veut-on parler de compétitivité de marché ou de compétitivité durable ? Dans le domaine de l'électricité, par exemple, le marché a tendance à choisir spontanément les investissements à temps de retour les plus courts, comme les turbines à gaz, même si le gaz n'est pas l'énergie la plus compétitive pour produire de l'électricité en base, c'est-à-dire toute l'année. Au contraire, une approche plus volontariste, axée sur la compétitivité durable, conduit à privilégier l'énergie hydraulique, le nucléaire, voire le charbon importé, qui sont les énergies les moins onéreuses en base.

• en matière de lutte contre l'effet de serre, il semble que seule une action à long terme puisse être efficace. En outre, celle-ci ne peut déboucher de manière concrète en l'absence de réflexion approfondie sur les accises, la fiscalité et plus généralement sur les moyens d'orienter les choix vers les énergies les moins polluantes - les ENR et le nucléaire, qui n'émettent pas de CO_2.

De même, il paraitrait opportun que les partenaires européens complètent leurs échanges par une réflexion prospective visant à identifier les principaux défis qui menacent l'avenir énergétique de l'Europe et les moyens d'y faire face :

Comment enrayer la dépendance énergétique extérieure croissante de l'Europe, qui devrait passer en 15 ans de 50 % à 70 % ?
Peut-on se satisfaire d'une dépendance gazière extérieure fortement croissante, de 40 % actuellement à 70 % en 2010 et près de 80 % en 2020 ?
Si le boom gazier qui est envisagé par les études de la Commission conduit à un choc sur les prix, qui pourrait être, vers 2005, de l'ordre de 50 %, comment éviter alors un recours accru au pétrole du Moyen-Orient, un pétrole déjà largement sollicité par la demande américaine et qui le sera de plus en plus par les pays d'Asie, surtout si ceux-ci connaissent un choc charbonnier résultant de l'alignement du prix domestique du charbon sur les prix mondiaux ? N'y aurait-il pas alors risque de choc pétrolier ?
Plus généralement, l'Europe peut-elle se satisfaire d'une dépendance croissante vis-à-vis des hydrocarbures, pour l'essentiel importés, qui représentent déjà 68 % de sa consommation ?
A ce stade de la réflexion, on ne peut s'empêcher de formuler une critique de forme, sans préjuger des intentions de fond des auteurs du Livre vert : ce document d'orientation peut-il se contenter d'une mention succincte du nucléaire, qui représente pourtant une des rares énergies domestiques qu'il est possible de développer en Europe, un élément incontestable de diversification du bilan énergétique européen, une énergie fortement compétitive pour la production d'électricité en base et, de surcroît, non émettrice de gaz carbonique?
Au-delà de ces interrogations d'ordre technique, il est souhaitable d'évoquer les deux questions de principe sur lesquelles les partenaires européens devront progresser à brève échéance s'ils veulent progresser dans la construction d'une politique énergétique européenne. Nous voulons parler de la notion de marché intérieur et du principe de subsidiarité.
Le Livre vert part du principe de la prééminence du marché intérieur. La France souscrit pleinement à la nécessité d'assurer la satisfaction des besoins des utilisateurs individuels et industriels, au moindre coût, dans des conditions assurant la sécurité d'approvisionnement et la protection de l'environnement. La compétition est, en effet, facteur de progrès technique et constitue indéniablement un élément favorable pour les consommateurs industriels, soucieux d'opérer leur choix en tout liberté.
Par exemple, l'ouverture de monopole de production d'électricité peut contribuer à l'efficacité économique et à la transparence du système électrique européen.
Mais face aux risques et aux menaces à long terme qui viennent d'être évoqués ci-dessus, peut-on faire confiance exclusivement à la main invisible du marché
S'il est, pour la France, légitime de définir des objectifs européens de politique énergétique qui s'ajoutent ou dérogent aux lois du marché, comment peut-on compter principalement sur le marché pour les réaliser sans nier l'existence-même d'une politique énergétique spécifique ?
La référence à la prééminence du marché pose un autre problème : comment trouver un équilibre entre le marché, d'une part, et la notion de service public ou des missions d'intérêt économique général, d'autre part ? Cette notion existe dans la plupart des Etats-membres de l'Union. Selon leur histoire, leur organisation administrative, leur tradition économique, le champ du service public est plus ou moins vaste. Dans un même Etat, il a pu varier au cours du temps. En France, le concept de service public s'appuie sur quelques principes essentiels comme la continuité du service, l'égalité d'accès et de traitement des usagers, l'universalité du service. Cette organisation, en vigueur pour les énergies de réseau, a fait ses preuves. Elle peut, certes, s'améliorer et s'adapter au contexte européen. La France a d'ailleurs effectué des propositions en ce sens. Mais le concept de marché justifie-t-il une remise en cause totale de l'organisation économique de plusieurs Etats-membres ?
Il importe, à cet égard, de donner plus de substance au concept de mission d'intérêt économique général, qui me semble défini de manière restrictive dans le Livre vert. Cet exercice me semble devoir être mené de façon pragmatique, en prenant en compte la diversité des politiques énergétiques mises en oeuvre par les Etats-membres, diversité qui, comme l'a souligné la Commission dans le Livre vert, ne constitue pas un désavantage, mais une opportunité.
Dans le même esprit, il convient d'évoquer maintenant une autre dimension de la politique énergétique européenne : A quel niveau faut-il développer et mettre en oeuvre les orientations qu'elle définit ? En d'autres termes, comment faire jouer le concept de subsidiarité ?
A l'évidence, les actions à entreprendre peuvent se répartir entre trois niveaux : l'OCDE, l'Union Européenne et les Etats-membres. Quel est le niveau pertinent ?
La réponse est sans doute variable selon les secteurs. Ainsi, pour le charbon, le marché est mondial, il remplit parfaitement son rôle et aucune intervention n'est à envisager autrement que pour des raisons sociales et régionales liées à l'emploi. Pour le pétrole, il existe des procédures efficaces de crise qui sont gérées par l'AIE et qu'il ne parait pas utile de dupliquer.
En revanche, pour le gaz, le problème est clairement régional. Il existe, en effet, trois grands marchés gaziers dans le monde : le marché nord-américain, le marché européen et le marché asiatique. L'Europe constitue donc un niveau pertinent d'analyse pour le gaz naturel et la France ne peut que souhaiter que

s'engage au niveau de l'Union une réflexion à long terme sur les approvisionnements gaziers en Europe.
Dans le domaine du raffinage et des produits pétroliers, il existe des risques importants de délocalisation qui pourraient être induits par une ouverture trop grande du marché unique sur l'extérieur ou par des normes trop exigeantes en matière d'environnement, qui dissuaderaient les opérateurs d'engager en Europe des investissements de modernisation. C'est pourquoi il parait essentiel à la France que soit sauvegardé un espace européen de raffinage.
Pour le nucléaire, enfin, il faut que l'Europe défende nettement son industrie. Cela est vrai pour les biens d'équipement, qui subissent une concurrence importante américaine et japonaise. Cela l'est aussi pour l'enrichissement, où l'Europe dispose d'une industrie puissante et performante : il faut sur ce point éviter d'apporter de trop grandes perturbations au marché, par l'importation de régions voisines de matières nucléaires à des prix très inférieurs au prix du marché.
Convient-il de définir des outils communautaires supplémentaires ?
Oui en ce qui concerne l'analyse économique et prospective, qui mérite d'être renforcée au plan de l'Union. Il est en effet essentiel que les Etats-membres aient une vision commune de leur avenir et des risques et des impasses que celui-ci comporte.
Pour le reste, il est surtout important de recenser les outils existants et de parvenir à une meilleure coordination entre Etats sur des sujets tels que l'environnement, le marché intérieur, la fiscalité, la concurrence...
Il est clair qu'il existe un problème de sécurité sous-jacent à chacun des domaines de l'énergie. Serait-il possible de parvenir, à terme, à la mise en place de mécanismes semblables à ceux de la politique extérieure de sécurité commune (PESC), qui soient de type coopératif et non contraignant ? La question mérite au moins d'être posée.

Au total, il faut bien constater que le degré de convergence entre les politiques énergétiques nationales des Etats-membres reste assez limité. Celles-ci s'exercent dans des contextes beaucoup trop disparates pour pouvoir converger à brève échéance : il existe, en effet, une très grande diversité dans les situations énergétiques des pays, dans leurs ressources domestiques, leurs systèmes de production, de transport de distribution d'énergie, dans la structure de leur parc électrique, diversité qui s'explique par des raisons historiques, sociales, géographiques et géologiques et qui ne peut que s'accroître avec l'élargissement de l'Union à de nouveaux Etats.
Il faut donc absolument éviter de rechercher à tout prix un consensus artificiel et prématuré entre les pays-membres de l'Union. Il convient au contraire d'adopter une démarche beaucoup plus modeste et pragmatique au départ, la seule qui soit réaliste et susceptible de faire avancer les choses. La France recommande l'application du principe de subsidiarité, d'une part, en ce qui concerne la détermination par chacun des Etats-membres de sa politique énergétique, en fonction de ses spécificités, d'autre part pour ce qui est de la définition, par chacun d'eux, des missions d'intérêt économique général.
Au niveau communautaire, il faut mieux utiliser l'existant et développer une analyse économique prospective qui serait commune et qui permettrait d'aboutir à une vision unifiée des problèmes et des risques à long terme que pourrait rencontrer l'approvisionnement énergétique européen.
C'est à partir de cette vision claire et partagée de l'avenir que l'on pourra déterminer ce qu'il est réellement possible de faire ensemble. C'est de cette manière que nous parviendrons progressivement à une harmonisation des politiques énergétiques européennes. Il s'agira là d'une entreprise de longue haleine, il faudra beaucoup de temps pour y parvenir, mais c'est la seule façon réaliste d'avancer dans la direction d'une politique énergétique commune.

WHAT SORT OF ENERGY POLICY DOES EUROPE NEED ?

BY Yves Galland
French Industry Minister

France backed the Commission in its initiative of drafting a Green Paper on energy in order to offset the lack of a clear view of what a common energy policy might entail.

There is a broad consensus about the objectives - or rather the policy directions - set out in the Green Paper: competitiveness, security of supply, environmental protection. These are also the objectives of French energy policy. Likewise, France cannot but endorse the general analysis made in the Green Paper which is based on a study of the European Union's energy balance and prospects.

Above and beyond these policy directions, it is vital to define a proper long-term energy strategy for the European Union since, while the Green Paper provides a basis for discussion, it does not propose quantified targets for a given date, e.g. with regard to energy self-sufficiency, fuel diversity, energy efficiency or the reduction of carbon dioxide emissions. That is in fact why I have used the term "policy directions" rather than "objectives".

It falls to the Member States as a whole to put into perspective these objectives and the definition of appropriate ways of achieving them, in order to construct a long-term strategy in response to certain fundamental questions:

- When we talk about security of supply, do we mean short or long-term security? Looking to the long term, it is quite obvious, for example, that European coal, which is uncompetitive and on the decline, does not have a role to play. Are we thinking of market competitiveness or lasting competitiveness? Where electricity is concerned, for example, the market tends to favour investment with the shortest payback periods, e.g. gas turbines, even though gas is not the most competitive energy source for generating base-load electricity, day in day out throughout the year. However, a more proactive approach, based on lasting competitiveness, would favour hydroelectricity, nuclear power or imported coal, the cheapest base-load energy sources.
- Where the greenhouse effect is concerned, it would seem that only long-term measures will have a lasting effect, and these can only succeed in practice if careful consideration is given to excise duties, taxation, and other incentives for choosing the least polluting energy sources, namely new and renewable energy sources and nuclear power, which do not produce CO2.

Similarly, the European partners should go further than simply exchanging views and look ahead to the future in order to identify the main threats to Europe's energy balance, and how to meet these threats head on:

- How can Europe's growing dependence on external energy supplies, which is likely to rise from 50% to 70% in the next fifteen years, be curbed?
- Can we content ourselves with surging dependence on external gas supplies, rising from 40% at present to 70% in 2010 and nearly 80% in 2020 ?
- If the gas boom predicted by Commission studies results in a price hike, possibly of around 50% towards 2005, how can we then avoid greater recourse to Middle East oil, which is already much in demand in the United States and will be increasingly called upon by the Asian countries, especially if they experience a coal crisis as a result of the alignment of indigenous coal prices on world prices? Would there not then be another risk of an oil crisis?
- More generally, can Europe content itself with growing dependence on (mainly imported) oil and gas which already cover 68% of its consumption?
- At this stage in the deliberations, while not prejudging the underlying intentions of the authors of the Green Paper, a formal criticism has to be made: can this discussion document content itself with such a brief mention of nuclear power, which is actually one of the few indigenous energy sources which can be developed in Europe, and undeniably contributes to the diversification of Europe's energy balance, is a highly competitive energy source for bas-load electricity

generation and, what is more, does not produce carbon dioxide?

Moving away from these purely technical matters, we should consider two fundamental questions on which the European partners will have to make progress in the short term if they want to press ahead with the establishment of a European energy policy. I am referring to the concept of the internal market and the principle of subsidiarity.

The Green Paper sets out from the principle of the pre-eminence of the internal market. France quite agrees that the needs of individuals and industrial users should be satisfied at the lowest possible cost while meeting the requirements of security of supply and environmental protection since competition is a factor in technical progress and is undoubtedly beneficial for industrial consumers anxious to have complete freedom of choice.

For example, opening up the electricity generation monopoly can help to improve economic efficiency and the transparency of the European electricity system.

However, given the long-term threats and risks mentioned above, can we put our faith exclusively in the invisible hand of the market?

While France believes that it is legitimate to define European energy policy objectives, expecting them to be achieved mostly through the free play of market forces would be tantamount to denying the very existence of a specific energy policy designed to achieve those objectives where they do not fit in with the logic of the market.

Referring to the pre-eminence of the market raises another question: how can we establish a balance between the market on the one hand and the concept of public service or general economic interest obligations on the other? This concept exists in most European Union Member States. The concept of public service varies in scope depending on a country's history, administrative organization and economic traditions. In any given State it may vary with time. In France, the concept of public service is based on a few fundamental principles, such as continuity of service, equality of access and treatment for users and universality of service. This *modus operandi*, which applies to the grid energy sources, has proved its merits. Nevertheless, it can be improved upon and adapted to the European context. France has in fact made proposals to this effect. However, does the market concept justify completely calling into question the economic organization of a number of Member States?

In this respect, it is important that greater substance should be given to the concept of general economic interest obligations which, to my way of thinking, are defined restrictively in the Green Paper. I believe that there is a need for greater pragmatism here, taking into account the diversity of energy policies pursued by the Member States, which, as the Commission stresses in the Green Paper, is not a disadvantage but an opportunity.

By the same token, we should now consider another dimension of European energy policy. At what level should the policy directions defined be developed and implemented? In other words, how should the concept of subsidiarity be applied?

Clearly, the action to be taken can be divided between three levels: the OECD, the European Union, and the individual Member States. What is the appropriate level?

The answer will no doubt depend on the sector concerned. In the case of coal, for example, there is a world market which works admirably, and no intervention is needed other than for social or regional reasons to do with employment. Where oil is concerned, there are effective crisis procedures administered by the IEA, which do not need to be duplicated.

On the other hand, with gas the problem is clearly regional since there are three main gas markets in the world: the North American market, the European market and the Asian market. Europe is therefore an appropriate level at which to analyse natural gas, and France is quite happy that there should be long-term reflection at European level on gas supplies in Europe.

Where refining and oil products are concerned, there are major risks of relocation which could be sparked off by an excessive opening up of the single market to the outside or by excessively demanding environmental standards which might dissuade operators from investing in modernization in Europe. That is why France feels that it is essential that a European refining capacity should be safeguarded.

Last but not least, turning to nuclear power, it is essential that Europe should stand up for its industry. This is true of the capital goods involved, where there is keen American and Japanese competition. It also applies to enrichment, where Europe has a strong and efficient industry: in this connection, it is vital that the market should not be excessively disturbed as a result of nuclear materials being imported from neighbouring regions at prices way below market prices

Are additional Community instruments necessary?

Yes, where economic analysis and forward studies are concerned, which should be stepped up at European Union level since it is crucial that the Member States should have a common vision of their future and the risks and problems involved.

For the rest, the main thing is to take stock of the existing instruments and ensure better coordination between the Member States on matters such as the environment, the internal market, taxation, competition, etc.

It is quite obvious that the question of security underlies each component of the energy sector. Would it be possible to establish, ultimately, mechanisms similar to those of the common foreign and security policy (CFSP) which are cooperative and not binding? The question should at least be asked.

All in all, it has to be admitted that the degree of convergence between the domestic energy policies of the Member States remains rather limited. They are pursued in contexts which are much too disparate for them to be able to converge in the short term since there is a very great variety in terms of the energy situations in the individual countries, their indigenous resources, and their energy production, transport/transmission and distribution systems, and the structure of their electricity-generating facilities, a variety which is attributable to historical, social, geographical and geological factors and which can only increase with the enlargement of the European Union to include yet more States.

What we must therefore avoid at all costs is to seek an artificial and premature consensus between the European Union Member States. On the contrary, a much more modest and pragmatic approach is needed to begin with, this being the only realistic way of expediting matters. France recommends applying the principle of subsidiarity (a) to the determination by each Member State of its energy policy as a function of its specific features and (b) with regard to the definition by each of them of general economic interest obligations.

At Community level, better use should be made of what already exists and joint forward economic analysis should be carried out to ensure a uniform view of long-erm risks and problems that might be encountered in relation to Europe's energy supplies.

On the basis of this clear and common view of the future, we can determine what we really can do best together. In this way we can gradually harmonize European energy polices. It will be a long-term enterprise, but it is the only realistic way to make progress towards a common energy policy. ◻

FINLAND AND THE ENERGY CHALLENGES OF EUROPE

BY Antti Kalliomäki
Finnish Minister of Trade and Industry

The accession of Finland to the European Union required a number of difficult issues to be negotiated and solved before membership became possible. I am glad to say that energy did not belong to the problem areas. Emphasis and approach in our energy policy are very much the same as generally adopted in Europe and in the EU.

Finland, being heavily dependent on imported energy, has attached great importance to security issues. As my country is, at the same time, one of the most energy-intensive industrialized economies in the world, energy efficiency has always been a concern of the energy producers, users and the Government. Environment protection is taken very seriously due to the fragile arctic nature of the country. All these elements of energy policy are carried through in a market-oriented framework that is, I dare say, one of the most liberal ones in Europe.

Antti KALLIOMÄKI

Against this background one can understand that membership did not really change the substance of energy policy.The only major area where special arrangements were negotiated was nuclear fuel supply. There we wanted to ensure smooth transition to the new Euratom environment and to preserve diversity of supply.

We look forward to playing an active role in energy cooperation within the EU. We believe that it will also bring positive inputs to national energy policy. We also hope to be able to contribute constructively to EU activities in this field.

Below I will highlight some specific issues that currently are both on the Finnish and European energy policy agenda.

INTERNAL ENERGY MARKET

Energy pricing and markets in Finland have been gradually deregulated since the 1980s. In the early 1980s oil and coal imports were subject to import licences. Licences for electricity imports were removed only this year, and thus energy imports are no longer controlled by the Government.

Again until the early 1980s end-user prices for oil-products were regulated, but there are no longer any specific Government price controls in energy markets including electricity retailing and wholesaling. Energy prices are determined in general by the markets and the Government does not interfere in price setting or mechanisms.

Transmission prices of electricity are, however, kept under surveillance by a new electricity market regulator due to the monopoly nature of that business. Pricing for the network services has to be reasonable and fair, but without recourse to regulations, for instance on permissible rates of return.

The Finnish Electricity Act has undergone an overall revision, the aim of which has been further to liberalize power transmission at all voltages, i.e. local distribution lines included. Any producer can sell electricity to any end-user or retailer throughout the

whole nation. This is a real Third Party Access principle. Differentiation of operations and increased transparency of electricity prices and costs support that goal. The Act entered into force at the beginning of June 1995.

Finland has no statutory scheme for the planning of national electricity capacity. Permits are no longer required even for the very largest plants. Only nuclear and hydro power need licences under the particular legislation. Free competition is thus a fact in electricity generation. For land use, environmental protection and similar reasons, appropriate permits or licences are, of course, required.

It is therefore hardly surprising that Finland is in favour of internal electricity markets in Europe. We have supported the principle of negotiated TPA in the Council. We see that for a relatively small market like Finland, international cooperation and competition are both favourable and fruitful. We also see that further harmonisation of national rules and regulation would help to improve the functioning of the internal energy market. In the electricity and gas markets harmonisation has, however, much less importance in the competition field compared to such problems as remaining exclusive rights or restricted access to networks. Harmonisation can fine-tune the market but is not a pre-condition for trade. International trade has been with us for centuries but harmonisation is a relatively new idea.

Environment and Climate Change

In its energy report to Parliament in autumn 1993, the Finnish Government adopted goals for halting the growth of CO_2-emissions from energy production and use by the end of the '90s. Finland has been practising sustainable forestry for decades now, and consequently forests are expected to sequester increasing amounts of atmospheric carbon for at least the next 15 - 20 years. This means that even more carbon will be bound in the forests. Maintenance of this reservoir is an important part of Finland's climate policy.

Finland considers that implementation of effective policies and measures is a key to the fulfilment of these commitments. The main focus in Finland's climate strategy is to strengthen those emission reduction programmes that are already under way.

Firstly, in 1990 Finland became the first country in the world to adopt a carbon dioxide tax, and the system has gradually been improved since then. We should like to see this type of measure as an important element in the future negotiations on a protocol. We also supported the idea of an European CO_2-tax at the Essen summit.

The Finnish energy conservation programme aims at even more efficient end-use of energy in individual sectors. This would reduce consumption of energy by 10 - 15 % from the 1990-level by the year 2000.

The aim of the new bioenergy programme is to increase use of bioenergy by at least a quarter from the present level by the year 2005. At present, some 13 % of energy production in Finland is covered by biomass.

Technology programmes have now been under way for several years beginning in the 1980s, and in 1993 the government launched eight new energy technology development programmes, which focus on new and renewable energy technologies. We believe that solutions based on new technologies will have a major role in the future for achieving real emission reductions.

These are the main policies we have considered to be the most effective under Finnish conditions. However, there are great differences between the parties concerned, as regards their starting points, resources and capabilities.

The special features of Finnish energy production are the large shares of nuclear and hydro power, combined heat and power (CHP), district heating and biofuels. Therefore, specific emissions of CO_2 are also relatively low and our capacity to reduce them are limited in future. We expect that energy-related CO_2 emissions will increase up to 2000 by 25-30 %. In 1990, CO_2 emissions from Finnish energy production and consumption and industry totalled some 54 million tonnes.

Finland considers that the current commitments in articles 4.2 (a) and (b) of the Climate Convention are just a first step and that they are inadequate. We see the Berlin mandate as useful as the next step to start a process for negotiating a protocol. The future negotiations should focus on a wide range of instruments, tools and measures from which each country or a group of countries could choose the most suitable and cost-effective measures for their own circumstances. This should take into account differences in starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances.

Nuclear Energy and Nuclear Safety

Finland is one of the eight EU Member States whose electricity production is partly based on nuclear energy. The four existing power reactors with a total capacity of 2310 MWe were brought on line in the late 1970s and early 1980s. Today they satisfy about 30 % of Finland's electricity demand.

Both the two 445 MWe VVER units at Loviisa, operated by Imatran Voima Oy (IVO), and the two 710 MW BWR units at Olkiluoto, operated by Teollisuuden Voima Oy (TVO), have functioned

reliably and safely throughout their operational history. The average yearly load factors of the Finnish units have constantly been among the best in the world.

All attempts to construct additional nuclear power plants have run into political difficulties. The latest project, which was approved by the Government in March 1993, did not get the Parliament's approval, required under the Finnish nuclear legislation.

Finland is totally dependent on other countries for supplies of uranium as well as for conversion, enrichment and fuel fabrication services. The necessary security of supply has been achieved through diversification of sources. One of the aims in Finland's accession negotiations was to ensure that transition to the new supply environment existing in Euratom would take place smoothly and preserve this vital diversity of supplies.

Finland is one of the few countries which already has an operating repository for low and medium active nuclear wastes. A programme to find a site for final disposal of spent fuel elements before the year 2000 was also started in the early of the 1980s and is going on well. In December 1994 Parliament passed a law which definitively excluded the reprocessing option for fuel used in Finnish reactors by requiring direct disposal of this fuel in Finland. The same law also forbids disposal of foreign spent fuel and other nuclear wastes in Finland.

The expertise which has ensured the high level of nuclear safety in Finland, and especially that acquired through the adaptation of the two VVER reactors to western safety requirements, has also been used to provide assistance in upgrading existing reactors of this type in Russia itself, both bilaterally and through EU co-operation (TACIS etc ...)

EAST-WEST ENERGY COOPERATION

Like other western industrialized countries and multilateral organisations Finland has started programmes of cooperation and technical assistance in order to help development in the countries of the Former Soviet Union and those of Central and Eastern Europe.

The emphasis of the Finnish energy assistance programmes is on nuclear safety and energy conservation. The most important target countries are the Russian Federation and Estonia.

In early 1992 an agreement on cooperation with neighbouring areas was signed between Finland and the Russian Federation. The purpose of the agreement is to create a legislative framework for this cooperation as well as to encourage regional and local authorities in cross-border contacts.

In 1992 - 1994 Finland allocated FIM 30 million about ECU 5 million for bilateral cooperation in nuclear safety. The financing is planned to remain at about ECU 2 million a year for the next few years. In addition, Finland has joined the Nuclear Safety Account set up at the European Bank for Reconstruction and Development (EBRD).

Two major studies on energy planning and energy conservation in the Russian Federation have been completed. The Energy Plan for Karelia describes the past and future development trends in the society of this region, identifies the present energy demand and supply situation, and analyses the likely development of the economy and the energy sector up to the year 2015. The Energy Conservation Study on Nine Industrial and Energy Utility Plants in the Russian Federation deals with the energy consumption of major energy consuming plants, estimates energy conservation potentials and suggests technically and economically feasible measures for energy conservation.

In Estonia, the Finnish Ministry of Trade and Industry is financing a number of projects aiming at improved energy efficiency and better environmental performance in the energy sector.

Based on extensive trading relations with the countries of the Former Soviet Union, Finnish companies and organisations have good capabilities in dealing with these countries. As a new member of the European Union Finland is naturally willing to join forces with other Member States in helping third countries to develop their energy economies.

CONFERENCE ON EUROPEAN UNION ENERGY POLICY

Brussels, 22-23 June 1995

C. Papoutsis, Member of the Commission

This conference was held here by the 'Club de Bruxelles' organisation with the theme 'What should European Union Energy Policy Be?', and attracted attendance by over three hundred representatives from almost every branch of energy-related industry, and both public and private sector institutions, national, European, and International. This important event in fact was organised at the behest of DG XVII and set in the context of its Winter 1995 Green Paper on future EU energy policy[1]. The opening keynote addresses were by French Industry Minister Yves Galland and Commissioner Papoutsis; leading figures from industry and representative including environmental bodies, as well as senior Commission officials and members of the European Parliament, made for lively panel discussions. The full text of proceedings will be published in due course, but, alongside the article by Minister Galland which we are pleased to publish in this issue, Commissioner Papoutsis' address to the Conference is included in full below.

Mr President, Minister,
Ladies and Gentlemen,
I am very pleased to open today this important Conference, about Energy Policy. It provides an excellent opportunity to analyse the objectives of the Green Paper, and provide useful input for the forthcoming White Paper on Energy Policy.
The debate on energy policy and the Green Paper is also important in view of the need to discuss energy policy in the context of the Inter-Governmental Conference in 1996.
I would like to remind you that the Community has had an energy policy for some time. Until the middle of the last decade, the policy was largely driven by security of supply concern.
However, the progressive implementation of the internal market, and the emergence of environmental problems, have changed rather radically the context in which energy policy has to be developed. We also have to keep in mind that the geopolitical and economic context has also changed significantly outside the Union.
All these factors justify the launching of a broad debate among interested parties about the future of a european energy policy. The Green Paper has provided the basis of reflection, first of all, for the other institutions - European Parliament, Economic and social Committee and the Council. The resolution adopted by the Council on 1st June, under the capable presidency of Minister Galland, has provided a constructive basis for further policy development. But in parallel to the work of the institutions, I attach great importance to the views on the Green Paper of all the actors in the energy field-trade unions and environmental protection organisations.
A White Paper which will result from these discussions, has been announced, and I plan to make it available by the end of the year . This paper will have to achieve two main objectives.
Firstly, it has to propose broad policy orientations and to fix a long term work programme towards their implementation.
Secondly, the White Paper will contribute to the reflections in view of the Inter-Governmental Conference in 1996.
It is clear that energy is a field of mixed responsibility between the National and Community levels. Serious issues, such as our increasing dependence on energy imports, or global problems, such as environmental questions, will need to be faced by consistent policies at both levels.
As stated in the Green Paper, what we seek is <u>not</u> harmonisation of national policies. The goal is to foster globally efficiency of the measures taken,

[1] *COM(94) 659 fin, 11.01.95, published subsequently as a supplement to Energy in Europe (E,F,D, SP)*

through the joining of forces throughout the Community.

I am convinced that, although appropriate Community instruments already exist in the Treaties, they need to be aligned to energy policy and global economic requirements.

The convergence concept presented in the Green Paper seeks to promote a new relationship between national and Community policies.

The actors in the energy field, either private or public, are facing very important challenges. I am pleased that occasions like todays' Conference provides an opportunity to discuss these questions in depth.

Three objectives are identified in the Green Paper:

- *global competitiveness,*
- *security of supply and,*
- *protection of the environment.*

I hope each of these will be examined in length.

A first question we have to address is how our energy policy can reinforce the overall economic competitiveness of enterprises in the European Uion. And how can we ensure that technological developments contribute to this process.

Competitiveness is an essential element of the economic future of the Community. We all recognise the importance of competitiveness for maintaining jobs, welfare and quality of life. Energy policy cannot be considered outside this context, as an isolated case. The energy sector has to participate in the Community efforts towards improved competitiveness. Industry is rightly concerned with this question.

The White Paper on growth, competitiveness and employment already introduced the idea that the energy sector should, and can, participate in the improvement of the global competitiveness. The improvement of competitiveness will be achieved by implementing two instruments.

Firstly, a better functioning of the market, through both the simplification of community rules and the market integration. This means that we have to open up monopolies to competition, but at the same time ensure that there is adequate protection of the public service mission.

Secondly, technology development and its penetration into the markets are key parameters for improved competitiveness. The Green Paper describes the potential for technology to be exploited in producing energy, in consuming it and reducing accordingly the damaging impact on the environment.

I am convinced that more efficient technology is required in all energy sectors.

Continuing progress in this field would have positive impact on the energy balance of the Union, and also would mean a better position of our industries on international markets.

It is up to the private sector to continue its efforts towards this objective, Nevertheless, public authorities cannot waive their responsibility. Clearly Not all the technological development needs to be supported but there are many cases where it should be.

Unfavourable prices for example, - as it is presently the case for renewable energy sources - may endanger their potential to participate in the future energy supply of the Community; and that is where support for the develoment and penetration of the technology is important.

The 4th framework programme, Thermie II , SAVE II, and Altener are all Community Support Programmes which make a valid contribution towards the development, diffusion and penetration of technological advances.

Promotion of improvement of energy efficiency and the exploitation of new and renewable energy sources are also important if we are to narrow the gap between developed and less-developed regions of the Community. The pursuit of the social and economic cohesion objective, established in the Treaty, can also be achieved through an energy policy, which is aimed at improved competitiveness.

The second question that the Green Paper wants to address is how energy supply can be rendered more secure inside the European Union, especially to peripheral and isolated regions and those that are less developed.

Security of supply, as I said earlier, has always been a great concern, both for governments and for industry. For the citizens of the Community, security of supply means access to an uninterrupted flow of energy, of steady quality, at a fair and affordable price. This is highly dependent of the international market, since the Community presently imports half of its energy requirements.

The coal and oil markets are more international than the electricity and gas markets, which have more a regional nature. Nevertheless, all energy sources, except for renewable energy, are internationally traded.

External relations are essential in order to increase the economic inter-linkage between producing and consuming areas. Trade agreements and technical co-operation are based on the common interest between parties. The notion of security of supply is today a broader concept than simply a relationship between supplier and consumer. Without ignoring the need to have measures for crisis management, the emphasis today has shifted towards building sound relationships for the benefit of both partners.

Within the Community itself, it is necessary to secure energy supplies for peripheral or less developed regions at an acceptable price. Therefore, a favourable climate must be established, enabling economic actors

to take the risk of building the infrastructure required to provide energy. The Community can also participate through its policy of developing Trans European Networks for energy.

Moreover, these regions are endowed with new and renewable energy sources. The favourable conditions for developing renewables have to be exploited with incentives from public authorities. The systematic and serious development of renewables as well as the promotion of energy efficiency could make an important contribution towards reducing the Community dependency on imported energy.

The third issue addressed by the Green Paper is how European Union energy policy can integrate environmental concerns. This includes the aspect of how the European Union can assist public authorities in the promotion of energy efficiency.

Integration of environment concern in other policies is provided for by the Treaty. The question is how to achieve this in the most efficient way in the energy sector. The Green Paper states that a strategy for internalisation of environmental costs, using market based instruments, is the most efficient way.

Although some consequences on competitiveness are sometimes feared, we should recognise that internalisation of environmental or social costs, linked with energy prices, are also a way of providing an incentive to energy efficiency, by using more efficient technology, notable in the industrial sector. Incentives for the exploitation of renewable energy sources can also be provided in this way.

The single market, working in an integrated and efficient way, can play a role, as it will permit the industry to adapt production to needs. Such conditions may be beneficial to energy efficiency, since industrial investment is an important tool for progress in this respect.

As concerns the action areas of public authorities, the promotion of energy efficiency is one of the areas in the energy field for which there is policy concensus.

However, two external triggering factors are lacking :

- *higher energy prices, which could be an incentive to consumers, and*
- *the general economic conditions which would create a favourable climate for investments.*

Therefore, public intervention is still necessary. The use of economic instruments, including tax incentives, needs to be examined. A regulatory approach may in some cases also be needed, provided it is implemented in a way that does not hamper market functioning.

Finally, I would like to highlight two points : the necessity of international cooperation in the energy sector, and the importance of a clear role for the Community in energy policy.

International co-operation is probably the area of Community responsibility where a consensus will be the easiest to reach. Contributing to a favourable climate for investments through a persistent dialogue with energy producers is no longer contested. I would even say that, the role of the Commission has been fully recognised .

Facing challenges going beyond Community borders, such as the environmental questions or co-operation in technology transfer to developing countries, are also recognised as natural responsibilities for the Community. A political dialogue is also crucial in order to develop common ways of analyzing the situation and finding consistent solutions.

In the Union's programmes, international co-operation has been more and more taken into account. The question is : is it sufficient? I believe that new policy guidelines would have to focus on the major challenges facing the Union. Todays Conference will help - I hope - to identify these.

One of these challenges is clearly the global nature of the environment and how to handle it. Another challenge is to find the right balance in the energy sector between a fully free market system aiming at making profit, and the necessary public authorities involvement to secure an adequate service to the citizens.

I believe very strongly in the important role the European Union has to play in facing the challenges of energy policy.

We need to mobilise Community instruments, existing or new ones to be defined, in a coherent way in view to ensure market functioning and to bring added value to actions taken at national level. The implementation of these instruments does require to have common objectives at community level that will permit to achieve consistency and efficiency. Convergent approaches within Member States are essential to such objectives.

As a concluding remark, I would like to tell you that I'm in favour of an energy chapter within the Treaty. Considering the importance of energy for our economies, for the citizens of Europe and their welfare, I believe we need to give energy policy a framework in which it can be developed efficiently and effectively.

This, and all the other issues will be dealt in the White Paper, as a result of an in-depth reflection.

I wish you a fruitful debate over the next two days, and I will look forward to hearing the results of your discussion. ◻

MEETING OF THE ENERGY COUNCIL, 1 JUNE 1995

As many readers will have learnt from the Press, this meeting was a significant one especially concerning the very difficult matter of progress towards completion of the Internal Market in electricity. Common positions were also achieved by Council on Commission proposals concerning the Trans-European Energy Networks which go a long way towards accelerating progress in this vital area. In addition to articles on the central aspects of the single market file elsewhere in this issue, and of course the coverage in the keynote articles, we have therefore also taken the space to include the complete conclusions of the Council meeting as these were published in the Press Release following the meeting.

COMPLETION OF THE INTERNAL MARKET - ELECTRICITY

Following the modified proposals for Directives on setting up common rules for the internal gas and electricity market, after consultation of the European Parliament and of the Economic and Social Committee, and while confirming the conclusions adopted by the Council on November 1992 and November 1994, the Council:

1. REAFFIRMS the four points of agreement as identified in the 29 November 1994 Council conclusions, keeping in mind the need for further discussion and clarification with regard to market liberalization beyond the production sector and other aspects of the Directive, for instance that of harmonization and taking into account the fact that each of these 5 key topics should represent part of an overall agreed solution;

2. RECALLS that, in the above-mentioned conclusions of 29 November 1994, the Council requested further discussion on how to open the markets beyond the area of electricity production, especially on the question of the possible simultaneous introduction of a negotiated TPA and a so-called single-buyer system. In this context it agreed to verify that both approaches, in a spirit of reciprocity, lead to equivalent economic results and, therefore, to a directly comparable level in the opening of markets and to a directly comparable degree of access to electricity markets and that they conform to the provisions of the Treaty;

3. NOTES the Commission's working paper on the organization of the internal electricity market, following the request expressed by the Energy Council at its meeting on 29 November 1994;

4. CONFIRMS, in the light of this working paper, that one of the Directive's main objectives concerning the internal electricity market is to increase competition in the interests of all consumers, and that, to this end, European electricity systems must progressively take market mechanisms into account, allowing in particular for the situation of independent producers and eligible consumers, in the framework of flexible and pragmatic solutions which will:

- permit the performance of public service obligations imposed on electricity undertakings in the general economic interest, including objectives set by each Member State regarding security of supply and environmental protection. The implementation of these obligations, in accordance with the Treaty, and in particular with Article 90(2) thereof taken as a whole, will include, for those Member States which so wish, the implementation of long-term planning, as cited by the Commission and in line with the Council

conclusions of 30 November 1992, as being a means of ensuring these objectives. The development of trade must not be affected to an extent that would be contrary to the interests of the Community;

- take into consideration the principle of subsidiarity and the different situations and forms of organization in the various Member States in this sector as well as endogenous resource utilization;
- take into account the question of transitional arrangements, in accordance with the conclusions of the Council at its meeting on 30 November 1992;

5. CONSIDERS that the two systems, both within the European Community and within those countries of the European Community which so wish, can co-exist subject to certain conditions, intended to ensure reciprocity between the two systems and equivalent effects, being met as indicated in paragraph 2. There is agreement on the following points without prejudice to the discussions to be continued on these conditions, as indicated in paragraph 6:

- the single buyer must purchase electricity under objective conditions that guarantee in particular transparent transport prices and a total lack of discrimination;
- a system of authorizations granted to independent producers, based on transparent criteria, will be introduced along with competitive bidding procedures in the zone covered by the single buyer, while complying with the provisions of paragraph 4;
- within a single-buyer system, eligible consumers in accordance with the principle of equivalence referred to above, will be able to negotiate supply contracts abroad, while complying with the provisions of paragraph 4;
- the appropriate conditions for transparency in transport and distribution will be defined in both systems so as to guarantee that any sort of discrimination or predatory behaviour, in particular in intra-Community trade, is avoided;
- appropriate and effective regulatory and control mechanisms and mechanisms for the settlement of disputes will be introduced in both systems so as to avoid any abuse of a dominant position to the detriment in particular of consumers;
- in the single-buyer system, producers who are not bound by contract with the single buyer should be able to export their electricity via the network of the single buyer, provided that there is sufficient transport capacity on that network and that this is technically feasible;

6. CONSIDERS that further discussions are necessary on the following points:

- the building and use of direct lines;
- the question of the definition of independent producers;
- the question of the definition of all eligible consumers and of their rights and responsibilities;
- the concrete conditions for accepting or rejecting authorizations for independent producers in relation to planning and to the capacity of the system and the conditions under which independent producers may negociate supply contracts with eligible consumers;
- the question of possible quantitative limits on the electricity imported by eligible consumers;
- the issue of integrated companies in both systems, as regards production, transport and distribution, so as to avoid discrimination, cross-subsidization and unfair competition;
- the question of who will be responsible, in both systems, for the organization of the tender procedures;
- the detailed procedures as regards transitional periods and arrangements;
- the problem of stranded investments;
- the conclusions to be drawn in particular from the working document submitted on 11 May 1995 by the Commission on the specific nature of small systems, particularly small highly interconnected systems, in particular as regards the realization of direct lines;

7. INVITES the Permanent Representatives Committee to finalize its work on the basis of these conclusions to enable the Council to adopt a common position before the end of the year."

TRANS-EUROPEAN ENERGY NETWORKS

The Council approved its common positions on two proposals for Decisions concerning trans-European energy networks.

These are: a proposal laying down a series of guidelines, and another concerning measures aimed at creating a more favourable context for the development of those networks.

Once formally adopted after the texts have been finalized, the common positions will be forwarded to the European Parliament under the joint decision-making and cooperation procedures respectively.

1. THE FIRST COMMON POSITION defines the nature and scope of action by the Community on guidelines on trans-European energy networks. It establishes a series of guidelines covering the objectives, priorities and broad lines of action by the Community on trans-European energy networks. These guidelines identify projects of common interest on trans-European electricity and natural gas networks. An indicative list of projects of common interest mentioned in the text is attached.

With regard to the objectives, the Community should promote the interconnection, interoperability and development of trans-European energy networks and

access to such networks in accordance with current Community law, with the aim of:

- allowing effective operation of the internal market in general and of the internal energy market in particular while encouraging the rational production, distribution and utilization of energy resources and the enhancement of renewable energy resources, so as to reduce the cost of energy to the consumer and render the European economy more competitive;
- facilitating the development and reducing the isolation of the less-favoured regions of the Community, thereby helping to strengthen economic and social cohesion;
- strengthening the security of energy supplies, inter alia by means of closer relations with non-Community countries in the energy sector in their mutual interest, in particular in the framework of the European Energy Charter Treaty and cooperation agreements concluded by the Community.

The common position establishes the following priorities for action by the Community on trans-European energy networks:

- for electricity networks:

- the connection of isolated electricity networks to the interconnected European networks;
- the development of interconnections between Member States and of internal connections insofar as necessary in order to enhance these interconnections;
- the development of interconnections with non-Community countries in Europe and the Mediterranean region which contribute to improving the reliability and security of the Community's electricity supply networks or to adding to electricity supplies to the Community;

- for natural gas networks:

- the introduction of natural gas into new regions;
- the connection of isolated gas networks to the interconnected European networks, including the improvements needed to the existing networks for this purpose and the connection of the separate natural gas networks;
- increasing the transmission (gas delivery pipelines), reception and storage capacities needed to satisfy demand, and diversification of supply sources and routes for natural gas.

The broad lines of action by the Community on trans-European energy networks must be:

- the identification of projects of common interest;
- the creation of a more favourable context for development of these networks.

Any energy network project may be considered to be of common interest if it corresponds to the objectives and priorities set and displays potential economic viability taking economic, social and technical factors into account.

In this connection, the Council considers that the concept of viability includes not only the financial profitability of the projects but also other considerations such as the reliability and security of energy supplies, the strengthening of economic and social cohesion and protection of the environment in the Community.

A committee composed of the representatives of the Member States will assist the Commission in implementing the Decision, in particular with regard to updating the list of projects of common interest.

2. THE COMMON POSITION concerning a more favourable context for the realization of projects of common interest in connection with trans-European energy networks and for the interoperability of such networks on a Community-wide scale identifies the action to be taken to achieve those objectives.

The text therefore provides that the Community should promote as necessary:

- technical cooperation projects between the entity or entities responsible for the trans-European energy networks involved in the proper functioning of European interconnections;
- cooperation between Member States through mutual consultations with a view to facilitating implementation of the authorization procedures for the realization of projects on trans-European energy networks in order to reduce delays.

In close collaboration with the Member States concerned, the Commission should take all relevant initiatives for promoting the coordination of the activities in question.

As regards the creation of a more favourable financial context for the development of trans-European energy networks, the common position provides that the Community:

- may provide financial support as part of the action on trans-European energy networks. These measures would be adopted by the Commission in accordance with the provisions of the Council Regulation laying down general rules for the financing of trans-European networks;
- will take account of the projects of common interest in providing assistance from its Funds, instruments and financial programmes applicable to those networks, within the terms of their own rules and purposes.

A committee composed of the representatives of the Member States will assist the Commission in implementing the Decision.

GREEN PAPER "FOR A EUROPEAN UNION ENERGY POLICY" - COUNCIL RESOLUTION

1. CONSIDERS that the publication of the Commission Green Paper entitled "For a European

Union Energy Policy" published on 11 January 1995 is an important stage in the debate on a European Union energy policy;

2. NOTES with satisfaction the consultations on the Green Paper for a European Union energy policy organized with the Member States' energy authorities and with organizations representing energy operators and consumers within the Union;

3. RECALLS that, in conformity with its conclusions on 29 November 1994, improved competitiveness, strengthened security of supply, citizens' quality of life and enhanced protection of the environment, taking into account the obligations arising out of the Framework Convention on Climate Change, are main objectives to be considered in the context of energy policy: these objectives must also take into account the principle of subsidiarity and economic and social cohesion;

4. BELIEVES that any consideration of energy policy should be based on the following observations and principles:

- without prejudice to the role of the Member States and of industry, in line with the provisions of the Treaties, the European Community does have a number of powers which imply a common view on Member States' approaches within the Community;
- there is always major uncertainty regarding long-term economic forecasting for energy, against which background energy policy must be defined in the long term; this is why energy policy, to the extent that it is based on a long term approach, must define the general framework which would allow inter alia undertakings to incorporate this uncertainty into their investment choices;
- an appropriate institutional framework in the energy field must be established taking into consideration the need to complete the internal market and to respect the general principles of competition, as well as, wherever they exist and according to the conditions established by the Treaty, services of general economic interest;
- security of supply and satisfaction of energy needs on economically and environmentally acceptable terms presupposes in particular diversification and flexibility of supply and efficient use of energy in all sectors, as well as a research and technological development policy;
- means of transportation of fossil fuels and electricity, including networks, contribute to the security of European Union supplies and to the implementation of the internal energy market and must therefore be developed as appropriate;
- the clear link between energy policy and environmental and climatic protection makes it necessary to evaluate in depth the interrelation between environmental and energy policy initiatives;
- energy is a decisive long-term factor for the improvement of the competitiveness of European economies on which economic growth within the European Union is closely dependent;
- closer relations with third countries are imperative not only for the European Union's security of supply but also because energy cooperation may contribute to economic development and political stability;
- the influence energy decisions have on the fundamental parameters of economic and social cohesion necessitates taking into account as appropriate, in the elaboration of energy policy, actions and programmes in the energy sector, the objective of strengthening economic and social cohesion;

5. CONSIDERS that improved convergence of energy policies within the European Union must first consider use of existing Community instruments, should take into account the observations and principles mentioned above and should go towards:

- the incorporation of energy policies, including the completion of the internal market in natural gas and electricity, in the strategy for renewed growth, employment, competitiveness and cohesion within the European Union;
- regular assessment of the existing European Community legislation in the energy sector and where necessary repeal of those rules that are no longer needed;
- better alignment of energy and environmental goals and, to this effect, consideration and, to the extent necessary and practicable, development of instruments such as economic incentives, internalization of environmental costs and the dissemination of information;
- the development of the requisite energy infrastructure, in particular trans-European networks, where the need arises and on economically viable terms;
- closer relations with third countries in the field of energy and, if appropriate, e.g. with signatories of the European Charter Treaty and with the Mediterranean countries, the development of international agreements, thereby creating a necessary dialogue on the fundamental aspects of energy policy;
- the promotion of efficiency and conservation in the energy field, including for example transport savings and, where appropriate, combined heat and power production, and the promotion of new and renewable energy sources and indigenous resources, for the purposes of environmental protection and of reducing energy dependence on satisfactory economic terms;
- the evaluation of existing measures and consideration of measures to be introduced, where necessary, taking into account, as appropriate and inter

alia, the role of the International Energy Agency to the extent of its specific competence, concerning supplies, so as to cope with possible risks of a cut-off of supplies and to contribute to security of supplies in the long term;

- diversification of supplies for the purpose of bringing stability to the energy sector, taking account of all forms of energy production, subject to compliance with the provisions of the Treaty concerning safety, security and environmental protection,

6. CONSIDERS that the operation of the internal market requires the strengthening of consultation and cooperation between the Member States within the Community and the development of Community methods of analysis, in particular with respect to the functioning of market mechanisms, which could enlighten the Community decision-making process,
7. INVITES the Commission, when developing the White Paper, to continue its extensive consultations in particular with Member States."

Energy Efficiency of Household Refrigeration Appliances

The Council noted the progress of discussions on the proposal for a Directive on energy efficiency requirements for household electric refrigerators, freezers and their combinations.
The aim of the proposal, which is part of the SAVE programme, is to establish minimum standards of energy efficiency for the household appliances concerned, thus helping to reduce CO2 emissions.
After a discussion, the Council instructed the Permanent Representatives Committee to continue examining the proposal.

Examination of Community Law in the Energy Field

The Council took note of the information provided by the Commission on its work on simplifying Community law in the energy field.

Community Programme providing financial support for the promotion of European energy technology (1995-1998) ('THERMIE II')

The Council studied the proposal for a Regulation concerning a Community programme providing financial support for the promotion of European energy technology (1995-1998) ("THERMIE II").
It examined the Presidency's compromise proposal to use appropriations entered under the 1995 budget without prejudging further discussions on the programme, and suggestions made by certain delegations.
In conclusion, the Council instructed the Permanent Representatives Committee to continue examining the proposal in the light of its discussions.

European Energy Charter

The Council took note of the progress of proceedings in the context of the European Energy Charter.
Negotiations on the Energy Charter Treaty and the Energy Charter Protocol on energy efficiency and related environmental aspects were completed in 1994. Those documents were opened for signature in Lisbon on 17 December 1994. Fourty-five countries have signed to date. The Treaty is open for signature until 16 June 1995.
The second meeting of the Provisional Charter Conference was held in Brussels on 5 and 6 April 1995. The next Provisional Charter Conference is scheduled for September 1995.

Euro-Mediterranean Conference

The Council had before it a note from the Presidency on regional cooperation in the energy field in the context of the Euro-Mediterranean Conference in Barcelona.
The note's starting point is the finding that the European Union's security of supply in hydrocarbons involves the Mediterranean region as well as Eastern Europe. Energy is also an important development factor in countries where distribution management is complicated by the isolation of rural areas and urban growth.
After a discussion, the Presidency considered that any discussion of a Euro-Mediterranean partnership must attach considerable importance to energy problems, an important development factor in countries where the networks supply only a small percentage of the population and where distribution management is complicated by the isolation of rural areas and rapid urban growth.
The Presidency therefore asked the Commission to:

- examine the French Presidency's proposals in greater depth, taking account in particular of the conclusions of the Tunis Conference held in March 1995, with a view to the Barcelona Conference in November 1995;
- assign appropriate financial resources to the objectives identified, within the framework of the

financial resources to be allocated by the European Community to its framework programme for partnership with the countries of the Southern and Eastern Mediterranean.

INVESTMENTS OF INTEREST TO THE COMMUNITY

The Council took note of a Commission report to the Council, pursuant to Regulation 1056/72, on the collection of information concerning investments of interest to the Community in the petroleum, natural gas and electricity sectors, corresponding to existing or planned capacity or capacity under construction on 1 January 1993.

Table 1 : Trans-European Energy Networks

INDICATIVE LIST OF PROJECTS OF COMMON INTEREST : ELECTRICITY NETWORKS	
United Kingdom	Magee - Crytton - Moffat
Greece - Italy	Ipiros - Puglia
Germany - Denmark	Bjaeverskov - Bentwisch
France - Belgium	Moulaine - Aubange
France - Italy	Grande Ile - Piossasco
France - Spain	Cazaril - Aragon
Belgium - Luxembourg	Aubange - Bertrange
Spain - Portugal	Aldeadavila - Douro Int. Meson - Lindoso
Finland - Sweden	
Denmark : East-West link	
Netherlands : North-East region	Zwolle - Meeden - Eemshaven
France : Norht-East region	Sierrentz - Mulbach
Italy : North-South and East-West routes	15 partial projects
Spain	Bay in Biscary - Mediterranean route
Portugal : Improvements to the interconnection with Spain	Pego-Rio Major II Recarei - Doura Int.
Greece : East-West route	
Germany - Norway	including upgrading of grids
Italy - Switzerland	Gorlago - Robbia
Austria - Italy	Lienz - Sandrigo
Greece - Turkey	Thessaloniki - Hamitabat
Norway - Netherlands	including upgrading of grids
Spain - Morocco	Pinar - Melloussa
Baltic ring : Denmark, Sweden, Finland, Estonia	Latvia, Lithuania, Belarus, Poland, Germany
GAS NETWORKS	
Spain	Galicia, Estremadura, Andalucia, Valencia-South, Murcia, LNG Ferrol
Portugal	Setubal - Braga
Greece	Bulgaria-Athens, LNG Revithoussa

EU DISCUSSIONS ON THE INTERNAL ENERGY MARKET AND THE ROLE OF CONSUMERS

BY A. Klom , DG XVII
Unit for Completion of the Internal Market

The role of consumers, be they industrial or domestic, distribution companies or small enterprises, is not an issue forgotten in the context of the lengthy debates on the completion of the internal energy market, especially in the areas of electricity and natural gas. This article aims to explain a number of key issues which are under discussion in the debate on the completion of the internal energy market, and related to these the objective position of consumers. To be as topical as possible, it will focus specifically on the electricity market and the proposals belonging to that area, the aim being to clarify and explain the following issues:

- What have been the developments in the field of the internal market for energy over the past few years?
- What is Third Party Access or TPA ?
- What is the Single Buyer approach ?
- What is the position of domestic consumers ?
- What is the present state of affairs ?

THE INTERNAL MARKET FOR ENERGY - RECAPITULATION

In February 1992 the Commission adopted proposals for Council Directives for the internal market in electricity and for the internal market in natural gas. In January 1993 the Economic and Social Committee gave its opinion on these proposals; in November 1993 the European Parliament gave its opinion in first reading on the proposals, suggesting a large number of amendments. Taking account of a number of Parliament's amendments, but not all of them, and of discussions in the Council, the Commission amended its proposals in December 1993.

Since January 1994 discussions in the Council have focussed on the amended electricity proposal, the aim at present being to adopt a common position. As both proposals follow the so-called co-decision procedure, this means that after adoption of a common position by the Council, Parliament will have to give its opinion in second reading on the proposals. Only after this can Parliament and Council, together, formally adopt the Directives.

The Energy Council of May 1994, on the basis of the amended electricity proposal, identified five key issues to be solved in order for a common position were to be reached. The following Energy Council of November 1994 reached political agreement on four of the five issues, though formally no common position was adopted. These four key issues relate to public service obligations, procedures for new production capacity, the unbundling of accounts and the role of the network operator.

Disagreement still prevails on the fifth key issue, which in effect therefore the one is preventing the Council from arriving at a common position. This vital issue is that of access to the network, also called third party access (TPA).

WHAT IS THIRD PARTY ACCESS ?

The original proposal by the Commission introduced the concept of regulatory or mandatory third party access to electricity grids and to gas pipelines, as a means of achieving greater competition and liberalisation in these markets. This would entail generation companies having direct access to electricity consumers by means of transportation, against fair payment, of their supplies through the grid.

Faced with opposition in the Council and Parliament to mandatory TPA, the Commission in its amended proposal introduced the idea of negotiated third party access, as a compromise to meet the concerns expressed on this issue. In negotiated TPA producers of electricity can still get access to consumers via the electricity grid by means of negotiations with the network operator. These negotiations would deal with the tariff for transportation. The network operator, if

part of an integrated utility company, will have to be at least administratively independent, and will have to 'unbundle accounts' as regards production, transmission and distribution. This means that negotiations with the grid operator should be free and that Member States will have to ensure that they are conducted in good faith and that none of the parties abuses its negotiating position soustrating a succesful outcome of negotiations. The network operator may refuse access where he lacks the necessary transport capacity, or where fulfilling the contract in question would prevent him from carrying out public service obligations assigned to him by the Member State.

Should disputes arise in such negotiations, whether relating to the contract or to the negotiations themselves, then the parties will be able to go to a dispute settlement authority. Such an authority will be appointed by Member States and could be either an existing entity, such as an arbitration court or a competition authority, or could be newly established. However, direct appeal to Community law also remains possible before a court of law. The dispute settlement authority will have access to the unbundled accounts of the network operator and will this way be able to judge whether negotiations on the tariffs and the technical requirements of transmission are fair and reasonable or not.

The consumers involved in negotiated TPA will be on the one hand large industrial consumers with an annual consumption of 100 GWh of electricity or 25 million m3 of gas, and on the other hand distribution companies, without any restrictions as to their size or consumption.

The amended proposals of the Commission are part of the second phase of a three-phased approach to complete the internal energy market. The second phase will aim to establish a minimum level of liberalisation and opening-up of European electricity and gas markets. It will leave open the possibility for Member States individually to go beyond that minimum level by lowering eligibility threshholds for consumers. Based on the results of this second phase, the Commission will make proposals on the necessary measures for the third and final phase of liberalisation.

This multi-phased approach means that as things stand the consumers eligible for negotiated TPA would be final industrial consumers and distributors. The Commission's objective is that the advantages of liberalisation be passed on indirectly through distributors to domestic consumers and to small and medium-sized enterprises (SME's). This degree of opening up markets is not as for-reaching as can at present be found in some Member States. However, for the Union as a whole it will at least form a starting, minimum but common, level of opening of markets. In a later phase further liberalisation may be considered.

WHAT IS THE SINGLE BUYER APPROACH ?

During the course of discussions in the Council on the amended electricity proposals in 1994, France suggested the idea of a Single Buyer approach, as an alternative to the Commission's negotiated TPA. The idea was further developed by the French authorities, and in October of last year they presented a six-page document to Member States and the Commission entitled "Functions, Role and Tasks of the Sole Purchaser", which sets out the French proposal in detail.

The Single Buyer would be the only entity within the area of the network that it covers that would be allowed to buy and to sell electricity. All producers, on a competitive basis, would sell to the Single Buyer. New producers would be admitted to the area by calls for tender, to be organised by the Single Buyer, which would also have to cover offers of electricity from existing generation capacity in neighbouring countries. The Single Buyer would also fulfil all the tasks of the network operator, including day-to-day balancing of supply and demand and the management of interconnectors with other networks. The Single Buyer would be obliged to ensure security of supply, optimisation of investments, equal treatment between consumers and respect of the environment.

All consumers whether industrial consumers or distributors within the Single Buyer's area would have to buy their supplies from him. The Single Buyer purchasing will try to optimise its prices by his competitive. However, consumers would have the option to set up direct lines between themselves and producers outside the Single Buyer area, so as to able to import cheaper supplies. In addition, large industrial consumers could benefit economically from an import mechanism which would allow them to buy external supplies which are then resold to the Single Buyer network at the border of the system. The Single Buyer would buy in these external supplies at its own sales price minus a published transport tariff, subject to the same conditions as in negotiated TPA, namely availability of the necessay transport capacity and respect of public service obligations. Distributors under the French proposal would not be allowed to import.

Such a proposed system is quite different in organisation as compared to the Commission's amended proposal for negotiated TPA. Not only are there clear differences in the importing opportunities to be allowed for consumers, but also the internal system of the network is more closed as regards direct consumer access to production capacity. For large industrial consumers there will still be some possibilities to get access to external supplies of electricity, but for distributors, and through them for

SME's and domestic consumers, the Single Buyer will be the only supplier of electricity.

WHAT IS THE POSITION OF DOMESTIC CONSUMERS ?

In a negotiated TPA system distributors have full right of negotiated access to electricity networks and will be able to enter into supply contracts with domestic and external suppliers of electricity. Supply contracts would be negotiated, and access to the network would also be subject to negotiations. The network may refuse access on the grounds of endangerment of the fulfilment of public service obligations assigned to it by the Member State.

Member States may also impose public service obligations on distributors as regards security, regularity, quality and price of supplies. Such obligations can act as a shield for domestic consumers by ensuring essential services. Competition will of itself also *protect* consumer interests. Member States may determine the rights and obligations of distribution companies and of their customers. Furthermore Member States may also impose the obligation to supply consumers in a given area, and they may regulate tariffs, for instance to ensure equal treatment of consumers. These measures contribute to protection of the consumer's interest on the one hand, while on the other hand distributors may thereby indirectly, pass on the advantages of liberalisation to domestic consumers. Member States remain free to establish pricing policies and tariff regulations, within the framework of Community law.

Distributors, and indeed all other consumers, will have the right to establish direct lines between themselves and a producer for direct supply of electricity. Though this option of supplies through direct lines is not very likely, to be attractive for domestic consumers, it can offer advantages to distributors and SME's below the eligibility threshhold of 100 GWh who would be able in this way to contract competitive by priced supplies of electricity, which could be delivered by a direct line, bypassing the network.

In contrast to this, according to the French proposal for a Single Buyer system distributors could buy their supplies only from the Single Buyer. However, France has pointed out that this is not intrinsic to the Single Buyer system, but only to the particular French conception thereby. The Single Buyer would try to optimise its purchasing policy as regards the generators it has under contract, buying electricity according to an economic merit order and thus trying to purchase overall at the lowest possible price. Distributors would be offered an average, optimised, price for supplies by the Single Buyer. Domestic consumers would then be supplied by distributors on the basis of these 'averaged' and optimised supplies.

Both the Single Buyer and distributors would have to fulfil public service obligations. This would guarantee the quality, regularity and security of supplies to domestic consumers, as well as a number of other important concerns which France has not yet specified. However, a characteristic of the French proposal is that the Single Buyer would also ensure continuation of the pricing policy called "peréquation" or price-equalisation. This policy requires that homogenous categories of consumers throughout the whole of the territory covered by the network would have to pay the same price for the same supplies. This means that distributors would, in the French model, have to follow this policy in their sales to domestic consumers.

The possibility of establishing a direct line to a point of production would be an exception to the general rule according to the French proposal and in particular open to distributors, or domestic consumers.

The foregoing shows that the results of these two different approaches to liberalisation of the electricity market would be quite different for domestic consumers in both systems. As competitive forces are of less importance in the Single Buyer system consumer protection thanks to free market conditions would be less pronounced.

WHAT IS THE PRESENT STATE OF AFFAIRS ?

The November 1994 Energy Council which failed to reach agreement on the TPA/Single Buyer issue, requested the Commission to examine, and report to Council on, the consequences of side-by-side implementation of negotiated TPA and a so-called Single Buyer system for competition in general, for producers and for consumers. The Single Buyer system would have to be measured for compatibility with the EC Treaty and as regards the reciprocity between the two systems in terms of an equivalent degree both of opening of markets and of access to markets.

Given the onerous nature of this task, the Commission has given high priority to examination. To begin with, it commissioned a consultant, the Energiewirtschaftliches Institut (Institute of Energy Economics) of Cologne University to undertake a thorough technical analysis of the implications of coexistence and reciprocity between the two systems concerned.

Based on the input from this study, Commission services prepared a working paper on the issue of TPA/Single Buyer coexistence with the title "Commission Working paper on the organisation of the

Internal Electricity Market"[1]. This working paper was adopted on 22 March 1995 and subsequently sent to the Council as the Commission's response to its November 1994 request.

The working paper concluded that the French proposal for a Single Buyer system is not as such compatible with the EC Treaty and that it would not guarantee reciprocity between the two systems, nor equivalent economic results. However, in an attempt to break the deadlock in the Council on this issue, and based on the understanding that in the second phase of completion of the internal energy market flexible solutions will have to be found for harmonising Member States' different electricity industry structures in Member States, the Commision suggested a number of adaptions to the French proposal for a Single Buyer, which would ensure at compatibility with the Treaty and reciprocity between the two systems. In doing so the Commission has kept a close eye on the position of consumers in both systems, to ensure that neither in the negotiated TPA approach under a modified Single Buyer system, would consumers lose out on a fair chance to have access to a choice of competitive electricity supplies, offered either from within their or outside countries. With this in mind the Commission's adaptions to the Single Buyer system contribute to reciprocal opportunities for eligible consumers to find competitive supplies in the internal electricity market. In both systems eligible consumers would be large industrial consumers and distributors. As such, domestic consumers would also get a better chance in both systems to enjoy the advantages, albeit indirectly through distributors, of greater competition and liberalisation.To clarify where developments are now leading in this area, on the basis of the Commission working paper, discussions in the Council are continuing with the aim of finding a common position; the Council agreed in its November 1994 conclusions that this should be done before the end of 1995. To this end, the four key issues on which a political agreement was already reached in the Council in November 1994 will have to be transposed into legal language. However, for a common position to be reached in the Council, Member States still have to agree on the central issue of network access.

The Commission hopes that with the working paper it has prepared, and with the suggestions for adaptations to the Single Buyer system which it has put forward in that paper, it has made a substantial contribution to the process of finding common ground for an agreement on completing the internal electricity market. Once this point has been reached, and with the agreement of the European Parliament, European consumers can start looking forward in the not too distant future to a more open, competitive, secure and European market for electricity supplies.

1 *SEC (95)464 final, 22.03.95*

DIFFERENT APPROACHES TO ELECTRICITY LIBERALISATION

Can Negotiated Third Party Access and the Single Buyer Model coexist ?

BY A.M. Klom, DG XVII
Unit for Completion of the Internal Market

INTRODUCTION

On 29 November 1994 the Energy Council in its conclusions of the meeting invited the Commission to study the consequences of side-by-side introduction and application of the Commission's proposal for a negotiated third party access (TPA) system and the French proposal for a so-called Single Buyer system within the internal electricity market. The Council asked the Commission to verify whether these two approaches were equivalent in terms of economics, reciprocity and compatibility with the EC Treaty.
In addition, the Council expressed its conviction that the completion of the internal electricity market requires flexible solutions, which must be applied in a spirit of reciprocity between Member States. The following article aims to explain the context of these questions, and will attempt to clarify and summarize the response given by the Commission on this important issue.

THE CONTEXT OF THE DISCUSSION ON THE INTERNAL MARKET FOR ELECTRICITY

In 1989 the Commission mapped out a gradual approach for the achievement of the internal energy market. This approach consisted of a number of proposals based on four general principles: firstly the need for a gradual approach to enable the industry to adjust to its new environment; secondly subsidiarity to enable Member States to opt for the system best suited to their circumstances; thirdly the avoidance of excessive regulation; and fourthly a legislative approach based on Article 100A of the Treaty which entails a political dialogue with the Council, the Economic and Social Committee and the European Parliament.
The Commission opted for a three-phased approach. In a first phase in1990 and 1991 directives were adopted concerning electricity and gas transit in the Community and the transparency of prices charged to industrial consumers. A second phase involving greater liberalisation of the electricity sector, including the limited introduction of a system of third party access, was initiated in February 1992 with the proposals for directives for common rules for the internal market in electricity and in natural gas. A third phase, with greater liberalisation, will be considered on the basis of the results of the second phase.
The proposals under discussion since 1992 were amended by the Commission in December 1993 on the basis of the opinion in first reading of the Parliament, and based on the discussions of Member States in the Council. From the very beginning the Commission has taken a very open and cooperative approach on the subject of the gradual liberalisation of energy markets in Europe. When, during the course of discussions on the amended electricity proposal in 1994, France suggested the possibility of a Single Buyer model as an alternative to the Commission's proposal, the Commission took an open view to this concept as well. This then forms the background for the Council's request to ask the Commission to examine the side-by-side application of the two systems.
During the Energy Council meeting of 29 November 1994 overall agreement was reached on four elements in the amended electricity proposal. Since then the Council has tried to translate this political agreement into legal texts which can be used as the text of a common position of the Council, which the latter in its conclusions of 29 November 1994 undertook to adopt by the end of 1995. The four elements on which this agreement was reached deal with the issue of public service obligations, which may be imposed by Member States on electricity companies for the general economic interest. They cover there quirement of the unbundling of accounts in vertically-integrated companies for the activities of production, transmission and distribution. They cover the role and functioning of the network operator and they cover the procedures

for establishing new production capacity within a particular market.

EXAMINATION OF THE SINGLE BUYER SYSTEM

With these agreements in mind, and based on the request of the Council, the Commission has undertaken to study the consequences of a side-by-side application of a negotiated TPA and a Single Buyer system. Due to the fact that agreement had already been reached on the other issues it was important that the Commission make its examinations as quickly as possible, so as to enable the Council finally to complete its discussions and adopt a common position.

In a preparatory phase the Commission asked the *Energiewirtschaftliches Institut* (Institute of Energy Economics) of the University of Cologne to make a technical analysis of the questions under consideration. On the basis of this analysis inputs, the Commission made its own economic and legal analysis of the two systems involved.

The basis for the analysis is of course the examination of the two systems put forward. The negotiated TPA approach forms a system in which electricity producers can sell supplies directly to eligible consumers by means of negotiating access to the network. Negotiations with the network operator would deal with transport tariffs and conditions, and would be subject to a dispute settlement mechanism. Eligible consumers could shop around inside and outside the system for competitive electricity supplies, while the network operator is responsible for ensuring system security and the fulfilment of public service obligations.

The Single Buyer model, as originally proposed by France, is a system in which in principle only a single entity would buy and sell electricity. All producers would sell to the Single Buyer on a competitive basis; all consumers would buy from the Single Buyer against optimised prices. The Single Buyer would manage the network, undertake long-term planning and optimisation of investments, and would ensure respect of services of general economic interest. Direct contract negotiations are only foreseen for electricity imports managed via the Single Buyer.

The Commission's working paper, after describing both systems, looks at specific issues which become crucial if both systems were to be introduced simultaneously to the internal electricity market. The paper compares the internal organisations of the systems, analyses the negotiating of the contracts in each, it takes a specific look at the Single Buyer's behaviour and goes on to analyse the effect of parallel coexistence of direct lines and investments. To answer the question of compatibility with the EC Treaty a thorough legal analysis is added which, basing itself on the Treaty and on jurisprudence of the European Court of Justice, tries to disect the different elements of the Single Buyer concept and analyse their implications as regards the Treaty.

THE COMMISSION'S PROPOSAL

Based on the questions asked by the Council, the Commission reached the conclusion in its working paper that the Single Buyer model as proposed by France can be neither considered as equivalent to the Commission's proposal for negotiated TPA, nor provides for reciprocity, since it falls short of what is desirable and achievable from a competition point of view. A high degree of reciprocity could only be assured between the systems if certain basic adaptations were applied to the present Single Buyer model. Both systems must be based on a common and transparent definition as regards the categories of eligible consumers.The opening of the market would be achieved via the coverage of these eligible consumers.

As regards simultaneous introduction of both systems and their compatibility with the Treaty, it can be concluded that the Single Buyer system, in its present form with an internal monopoly structure, is to be considered as a measure of equivalent effect to a quantitative restriction on imports within the wearing of Article 30 of the EC Treaty. Furthermore, it should not contain obstacles to the freedom of establishment going beyond constraints imposed by public security.

The French proposal would result in all supplies and production being channelled de facto through the Single Buyer. A system which channels imports and exports through an intermediary is contrary to the principle of free movement of goods. Exclusive rights resulting in absolute control over imports, transmission and distribution are prima facie contrary to the basic Community principles of free movement and competition and cannot automatically be justified on public service grounds, but need to be analysed case by-case in order to ensure respect of the principle of proportionality.

Security of supply reasons could justify an exemption based on "public security" provided in article 36 of the EC Treaty. There is no evidence in the case law of the European Court of Justice leading to automatic suspension of the Treaty rules on free movement and competition. As the negotiated TPA system shows, security of supply and *public* service obligations can be met in a system more open to competition.

It is obvious that according to their different security of supply situations Member States organize electricity markets according to their needs. The Single Buyer system seeks to provide an organisation of the electricity market based on long-term system planning aiming at securing supply with central management of production, transport and distribution. Without

affecting the goal of this long term planning and security of supply, adaptations to the Single Buyer system would be necessary to ensure compatibility with the Treaty and for reasons of economic equivalence.

To ensure a maximum of reciprocity and compatibility with the Treaty, the Commission has suggested that the Single Buyer system should have to meet the following conditions. Firstly, in the case of the Single Buyer system eligible consumers should have the freedom to contract electricity supplies with external producers under the same conditions as and with domestic independent power producers.

Secondly, both systems could generate directly comparable and acceptable results if the import regime under the Single Buyer model is governed by an obligation on the Single Buyer to buy unlimited quantities of imported electricity under certain objective conditions, by transparency of tariffs for to use of the transmission system and thereby transparency of prices to be paid by the Single Buyer for imported electricity. Furthermore, electricity imports should only be subject to objective and justified constraints (i.e. lack of interconnected capacity or for public security reasons).

Thirdly, in order to ensure that the principles of objectivity, transparency and non-discrimination are respected, to guarantee that competition is not distorted, to avoid the risk of potential discrimination, and to achieve neutral and independent treatment, the Single Buyer, where it is part of an integrated undertaking, should be fully unbundled in terms of full separation of management and of information flows between its different activities, especially in terms of production and supply.

Fourthly, tendering procedures for new and additional production capacities, which are more restrictive in competition terms than authorisation systems, should only be organised and decided by public authorities or other independent entities appointed for this purpose.

Fifthly, to redress the imbalance between authorisation and tendering procedures, independent producers should, even under tendering systems, benefit from parallel authorisations to strengthen competitive forces. A transparent definition for independent producers in Single Buyer systems must be introduced, on the basis of quantitative capacity threshholds. In addition, autoproducers, export-producers and producers of power on the basis of renewables, waste and CHP, should also benefit from parallel authorisations to fulfil the need for their specific type of production capacity.

Finally, in the Single Buyer system all eligible consumers would need to have the freedom to construct and use direct lines for transactions with external producers and domestic independent producers (and vice versa for producers to supply eligible consumers) in accordance with article 7 of the amended proposal for a Directive of December 1993.

Only when the Single Buyer system meets these requirements can it be considered as compatible with the EC Treaty and providing reciprocity of economic results and opening of markets. Any parallel coexistence of two different systems within the same internal electricity market, based on flexible solutions, would have to ensure this as a minimum requirement for coexistence.

THE DIRECTION OF THE PRESENT DISCUSSIONS

The working paper containing the examination of the two systems does not form any new legislative proposal from the side of the Commission.The only proposals on the table for discussion are the amended proposals of the Commission of December 1993. The aim of the working paper is to respond to the November 1994 request of the Council and to provide new ideas to the Council in order to help the negotiations. The Commission favours rapid adoption and implementation of a Directive as the best means of achieving the internal electricity market. However, it does recognise the difficulties faced by some Member States, and therefore by means of the working paper is showing the way towards a negotiated solution. With this flexible approach the Commission is taking account of Member States' concerns such as flexibility, subsidiarity and energy security,while fully respecting the fact that Member States have different structures with regard to the organisation of the electricity sector.

The Council of energy ministers met on 1 June 1995 to discuss the working paper on the internal electricity market. During this meeting the Council followed the Commission in its basic conclusions of the working paper, namely that the two systems are so different that they only could coexist on the basis of certain defined conditions. However, as regards these conditions for coexistence the Council only reached political agreement on some of the conditions, being the obligation to buy for the Single Buyer, the parallel authorisation system, the possibility of TPA in Single Buyer systems for exports of electricity and the possibility for eligible consumers to enter into direct negotiations to import electricity. All other conditions were brought together in a list of issues which the Council will have to dicsuss during the Spanish Presidency. In short, it is clear that there is agreement on the principle of coexistence, but that only a few of the conditions have in fact been agreed on, and that many still have to be discussed.

The Commission is genuinely interested in encouraging a bridging solution to break through the current political deadlock in the Council. This is shown by the effort made through the working paper. Of course, if in spite of this effort, the Council does not reach a solution, then the Commission will have to use all the

powers and means at its disposal to bring about completion of the internal electricity market. As such the approach of the Commission in the working paper is a pragmatic one, which offers the chance of reaching realistic and tangible results in the forseeable future, dependent of course on the outcome of the Council's discusions.

REVISION OF COMMUNITY LEGISLATION IN THE ENERGY SECTOR

BY Anna Aguado, DG XVII
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The Brussels European Council of December 1993 stated the importance of starting an exercise aiming simplify or eliminate certain legislative acts which could adversly affect the activities of economic operators and particularly of small and medium enterprises.

On the same subject, the Commission White Paper on Growth, Competitiveness and Employment also indicates that Member States should pay special attention to the improvement of flexibility within their enterprises and in the labour market, both by eliminating excessive rigidities resulting from existing legislation and by greater mobility of workers.

In order to help to initiate the process, the Commission has set up an independent group of experts, the Molitor Group (after its chairman) to examine national and Community legislation in selected sectors, which might have a negative impact on economic development in the European Community. Energy was included amongst the sectors subject to scrutiny.

Taking into consideration that nevertheless, energy legislation will not be examined as its first priority by the Group, the Energy Council of 29 November 1994 invited the Commission to present a report on the revision of existing Community energy legislation, with proposals to simplify, update or eliminate legislation wherever necessary or possible.

In response to this invitation the Commission has started its own analysis of Community energy legislation in two areas : rational use of energy and oil. These areas had already been chosen during the German Presidency since some of the legislative acts concerned, adopted at different times, address similar topics.

The aim of the report being prepared is to give the Commission's opinion on the necessity or not to maintain legislative acts subject to revision. The need to repeal or not each of those legislative acts will be clearly justified both from legal and practical points of view.

On the basis of the results of this legal and practical analysis, the Commission will present formal proposals for the repeal of directives, regulations or decisions and for avoiding reference in the future to recommendations or resolutions which seem no longer relevant.

The Commission believes that this general exercise can lead to very positive results in terms of efficiency of EU Energy legislation and intends to continue this process of simplification as and where necessary.

In conducting this initiative, the Commission will ensure that full consistency is maintained at all time with the work of the MOLITOR Group in its work of reviewing the Community legislation.

TRANS-EUROPEAN ENERGY NETWORKS

BY Ian Gowans, DG XVII
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Since the appearance of the last article on this subject there have been several significant developments, both as regards the Commisssion's proposals for the energy networks and the work of the Christophersen Group, culminating in the submission of network projects for approval by the Essen European Council of December 1994.

As regards the Commission's proposals for guidelines and a more favourable context for energy network development, these were the subject of a common political position of the Council of Energy Ministers of the EU held in June 1995.

Projects of common interest identified under the guidelines will be candidates for aid to the carrying-out of feasibility studies, which will have to demonstrate their economic viability in the broad sense. There is also provision in the Financial Regulation for projects to be supported by means of interest rate rebates and loan guarantees. The "favourable context" proposal, for its part, will aim at fostering technical cooperation between the network bodies as well as cooperation in granting authorisations by the Member States concerned.

Given the favourable opinions of the European Parliament on these proposals (November 1994 for the Financial Regulation and May 1995 for the other proposals), followed by successful second readings, it should be possible for them finally to be adopted by the Council of Ministers in time for their implementation and the commitment of appropriations inthe second half of 1995.

As regards the appropriations, the Commission has sought provision for a total of 112 MECU for expenditure on energy networks, 1995-1999. The expenditure, together with that on the networks in the transport and telecommunications sectors, will be governed by the same Financial Regulation. This was the subject of a common position of the Council of Economic and Finance Ministers in April 1994 and an opinion of the European Parliament in November. It will, like the guidelines proposals, require a second reading by the European Parliament beforeit can be finally adopted by the Council later this year.

The situation as regards the priority energy projects identified by the Christophersen Group follows on from their examination by the Heads of State and Government at the European Council of Essen, to which the Christophersen Group had reported.[1] Council followed the main recommendations of the Christophersen Group on giving priority to the ten energy projects which were at the most advanced state of readiness. These ten priority energy projects have been followed up by the Commission and by the European Investment Bank. In line with the recommendations of the Christophersen Group adopted by the European Council at Essen, the Commission will in each year in December submit, after consultation with the Member States, a report to the European Council on progress on the Trans-European networks, and the priority projects in particular; it will forward this report to the European Parliament.

The ten priority energy projects are the following :

Electricity Interconnections

- a4 Greece - Italy
- b6 France - Italy
- b7 France - Spain
- b10 Spain - Portugal
- c2 Denmark : East-West

Natural gas projects

- e5 f6 Main pipelines system in Portugal and interconnections with N and S Spain
- e6 Greece
- f6 Spain : internal pipelines and LNG terminal : connections with Portugal
- h4 Algeria - Morocco - Spain
- h7 Russia - Belarus - Poland - EU : section in Germany

1 *The report has now been published as ISBN 92-826-8995-6 'Trans-European Networks', and may be obtained from the* Energy in Europe *office*

These priority projects face two broad categories of problems, financial and procedural.

As regards finance, the situation as at March 1995 was that the three overhead electricity connection projects (France-Italy, France-Spain and Spain-Portugal) faced no financing problems, but two other projects, Italy-Greece and east-West Denmark, did. Of the gas projects, the financing of those in Portugal had been finalised together with that of the two Spanish pipelines connecting with Portugal and the Tangier-Tarifa section of the pipeline from Algeria. For the section of that pipeline between Tarifa and Córdoba, as well as for the other gas projects and those in Greece and involving Eastern Europe, finance had not yet been tied up.

The second category of difficulty, that of technical and administrative procedural problems, faces four out of five of the electricity projects, and has delayed the commencement or progress of construction work. In fact, only the East-West Denmark project is to be affected by such problems. For the priority gas projects, procedural delays are less frequent; they concern environmental impact or problems in the granting of permission for gas to be used for electricity generation.

The Christophersen Group as such has ceased to exist, but work on the resolution of the problems affecting the ten priority projects, and on the three others on the Group's "B" list of less advanced projects, continues under the Group of Commissioners on Trans-European Networks which has been set up with Mr Kinnock as Chairman. The "B" list includes two electricity projects for connections between Austria and Italy and Norway and the Continent, and the more complex "Baltic Ring" project, which provides for several electricity interconnections between countries bordering that Sea ◻.

WAYS OF FINANCING COGENERATION PROJECTS IN THE EU : THE ATTRACTION OF THIRD PARTY FINANCING

Madrid, 3 March 1995

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This article aims at an overview of possible ways of financing cogeneration projects in the EU and suggests guidelines designed to ensure better penetration for cogeneration on the European energy market. The concept of Third Party Financing will be stressed throughout.

INTRODUCTION

It is generally accepted that western economies are now less vulnerable to the effects of possible oil crises as a result of policies pursued concerning energy savings, geographical diversification of supply, and fuel-switching.

On the other hand, economic growth in recent years has resulted in an increase in energy consumption. What is more, comparatively low prices have discouraged efforts to use energy more efficiently. The following question therefore arises: given the limited resources available, how can growth be encouraged while, at the same time, protecting the environment and not jeopardizing the security of energy supply?

- The first priority is to control energy demand by using energy more efficiently;
- The second priority is sound management of the quantities of energy available to satisfy the needs of growth. This entails a transfer of technological and financial resources to less well-off regions. The only real way to guarantee sustainable and cheap energy tomorrow is to encourage the spread of new technology financing techniques today.

One of the main obstacles to the development of innovative energy technologies is the availability of investment financing. When economic growth and energy prices are low, the market is slow to react to advanced energy technologies. A large range of ways of financing new investments are available on the market, and would-be investors have to chose from among them the most suitable financing method at any given time.

There are four major obstacles to investments in energy technologies:

- **Investors' unawareness of the best available energy technologies.** There are cost-effective technologies which can slash energy consumption. However, there is sometimes a lack of transparency worldwide, and cost-effective technologies may go virtually unnoticed in a particular country or sometimes even in an entire region;
- **No priority for energy audits in firms.** Since 1985, as a result of new priorities such as the need to cut staffing costs, electronic automation and falling energy prices, energy auditing to secure the best performance on the basis of the most recent technologies available is no longer a priority for firms;
- **No priority for investments in energy technologies.** The impact of an energy-related investment is insignificant compared with the total cost borne by firms (on average 12% of business costs). As a result, a big reduction in a firm's energy bill does not necessarily produce a substantial reduction in overall costs;
- **Financial restrictions in a period of low economic growth.** Firms are unwilling to mobilize capital to invest in energy-related technologies at a time when they have more pressing requirements, such as adjusting to a rather depressed economy. *It is therefore necessary to find financing techniques which will have little or no impact on a firm's balance-sheet.*

After dealing briefly with financial instruments which can facilitate penetration and application of efficient energy technologies in firms and also the rôle which the Commission plays, or may be able to play in the near future with regard to such instruments both within the EC and outside, a brief allusion in this context to the THERMIE and SAVE programmes will complete this overview.

FINANCIAL INSTRUMENTS

Although many of the financial instruments available are well known, it is probably useful to give a rundown of the various financial alternatives with which an investor may be faced, and to classify the EU resources available to overcome obstacles to the introduction of efficient energy technologies.

GRANT AID

Grants reduce investment costs and promote the financing of the remaining investment. There are several energy programmes which provide grants for private companies in order to encourage investment. In the case of the EU programmes (e.g. JOULE - THERMIE), the aim of the grants is not to improve a company's profit and loss accounts but instead to help it to overcome the technological and financial risks always associated with innovation (which, according to OECD and EC studies, is perceived as a way of meeting society's needs more effectively).
There are also national and regional programmes designed to provide grants for the private sector. In the case of some national and regional programmes, the grants given by way of financial support for projects are often nothing more than subsidies.

INCENTIVES

National incentives include tax relief and accelerated depreciation, among other measures for investments in innovative technologies (e.g. in France, Germany and Belgium). Interest rate subsidies and loan/equity guarantees may also be offered in order to reduce the risks associated with private sector investments in SMEs. At Community level, instruments have been developed to facilitate leasing arrangements, interest rate subsidies (which give private investors a cheaper source of financing and consequently increase the value of their investment) and guarantee funds.
It should be noted that all the motivations mentioned here depend more on regulatory and political aspects than on market forces.

SELF-FINANCING

A company which generates sufficient cash as a result of its activities can finance its investments internally without any recourse to the capital market. Internal cash flows remain the main source of funds for large companies. This type of financing is rarely available to SMEs and when it is the other obstacles mentioned remain. As a result, firms and *SMEs in particular will endeavour to obtain a complete package with a minimum of technological involvement and self-financing.*

EQUITY FINANCING

A rapidly growing company will find it hard to finance its growth and will need equity financing. Equity investment in new private companies is generally referred to as venture capital. In order to support the development of venture capital companies throughout Europe, the Commission has developed several instruments to facilitate SME access to financing and encourage joint ventures through proprietorial financing.

DEBT FINANCING

Companies may find debt financing attractive because the interest payments are (in most cases) tax-deductible: this reduces a company's tax burden and hence increases its value. However, there is a danger that excessive borrowing may result in financial difficulties.
Companies may often obtain debt financing at competitive rates (e.g. via the European Investment Bank (EIB) which operates on a non-profitmaking basis and finances companies by means of individual or global long-term loans).
However, equity financing and debt financing by companies (in particular SMEs) does not help to overcome the additional obstacles mentioned in the introduction, for which other financial instruments are necessary.

OTHER FINANCIAL INSTRUMENTS

Increasingly frequently mention is made of controlling demand and least-cost planning. Least-cost planning is a method of optimizing energy investments by considering supply-side and demand-side options for satisfying the growing demand for energy services: it compares costs in order to curb demand in line with the contribution of new supply possibilities. The concept originated in the United States where public services have realized that increasingly often it is financially more attractive to invest in very efficient equipment which reduces electricity consumption than to invest in new power stations: nowadays, it is much more cost-effective to save energy than to build new generating capacity.
The idea behind controlling demand is to help consumers to make cost-effective investments in energy-saving measures. Public services need to establish marketing strategies to sell conservation measures to millions of very different independent decision-makers: their aim now is to sell not energy but sell energy efficiency. The decisive factor in favour of the introduction of least-cost planning in Western Europe is the environment: energy efficiency causes less damage to the environment than energy consumption. The economic benefits are also

significant, not just for the public services but also for investors in general.
One way for utilities to develop an energy demand control policy is to incorporate into their structures an ESCO (Energy Service Company) to assess and install energy conservation measures in the customer's premises. ESCOs introduce energy-saving measures using third party financing techniques.

THIRD PARTY FINANCING

Third Party Financing was developed to help companies finance investment without affecting their balance-sheets. A user of efficient energy technologies does not finance the initial outlay. Instead, he reimburses the technology supplier by making payments related to the performance of the technology installed. Third party financing always includes technological assistance and in-house energy audits. The user therefore does not have to concern himself with technological considerations. The ESCO provides a combination of engineering, financial and marketing skills, carrying out detailed energy audits and chosing appropriate reliable technologies for making the planned energy savings.

General Definition
Third party investment is based on a contract whereby a private company or public institution enlists the services of an Energy Service Company (ESCO) which assumes responsibility for all phases of investments designed to increase energy efficiency.
The ESCO finances all investment costs (design, plans, materials, labour, commissioning, performance measurement and monitoring), and it is reimbursed the total cost of the investment but in proportion to the energy savings achieved. Financing covers the physical and non-physical part of the investment.

The benefits of Third party financing
• The services provided by a third party investment company
One way of overcoming the obstacles associated with energy efficiency investments is to call upon a specialized third party investment company specializing in long pay-back periods. It may offer to take over the entire financial investment but it also contributes its manpower resources and technical capabilities, and of course ensures risk management. A third party investment company will identify the investments needed in order to save energy and provide the customer with advice, services and the financial resources needed to carry out a project.
It will assume a number of responsibilities, including:
- economic and financial assessment of the project;
- financial arrangements and the provision of funds to make it possible to decide on investments rapidly;
- customer representation and safeguarding of customer interests;
- post-commissioning performance management.

• The financial benefits
Third party investment ensures total financing. The beneficiary preserves his equity and lines of credit. The investment does not generally appear as a commercial debt and in no way affects the customer's financial independence ratios. Cash-flow forecasts do not have to take account of the success or failure of the project. There is a direct link between the savings made as a result of the investments and the amount of the reimbursements, which is never the case with a conventional loan.
• Contractual guarantees
The third party investment company guarantees:
- the ceiling for the project completion budget; (excess amounts to be borne by the third party)
- the completion time;
- equipment performance throughout the duration of the project;
- permanent customer access to accounts and invoices relating to investments concerning him.

• Contract period
A maximum period is laid down by contract for the reimbursement. Any balance outstanding after the maximum project period is cancelled and must be taken over by the third party investment company. If the customer so wishes, early reimbursement of investments is permissible.

THE ROLE OF THE EU : HELPING TO OVERCOME THE FINANCIAL OBSTACLES

The European Commission has set up a number of targeted programmes and schemes designed to facilitate access to financing for particularly worthwhile projects.

GRANTS AND INCENTIVES

The Thermie and SAVE Programme
Europe's economic and industrial context, characterized by the internal market objective, demands a solid energy base. The Community's energy situation is still suffering from a lack of security, regional disparities and unresolved environmental problems. One solution to these problems is to develop and exploit new energy technologies. That is why the Council of the European Union has adopted a series of programmes for the promotion of energy technology in Europe, starting as early as 1974.
On 23 November 1994, the Council approved the latest initiative, the new JOULE-Thermie programme, a specific programme of RTD, including demonstration,

in the field of non-nuclear energy. The promotion and demonstration part of the programme is covered by Thermie of course which takes its name from the 1990-1994 programme which had similar objectives. For the first time, Thermie is included in the EU's RTD framework programme, thereby improving the links with the other R&D programmes. The new programme also includes a new activity concerning an overall energy RTD strategy with regard to energy-environment-economy inter-relationships. The Thermie programme will run from 1994 to 1998 with a total budget of ECU 532 million. Its main objectives are as follows:

- to improve energy efficiency on the supply side and on the demand side;
- to promote greater penetration of renewable energy sources;
- to encourage cleaner use of coal and other solid fuel;
- to maximize the exploitation of EU oil and gas resources.

The means used by Thermie are as follows:

- direct financial support for projects in the fields of rational use of energy, renewable energy sources and solid fuel;
- financial support for other activities, such as:
  - energy demonstration strategy,
  - dissemination of energy technology,
  - preparatory, flanking and support measures, and
  - SME technology stimulation.

Most of the other activities are carried out via the network of Organizations for the Promotion of Energy Technologies (OPETs) which at present consists of 49 private and public national and regional institutions in the Member States.

The SAVE programme is a five-year Community programme in the field of energy saving. It was launched in 1991 to help Member States to boost and coordinate their national energy efficiency programmes, the underlying idea being to have a comprehensive series of legislative measures supported by pilot projects and make a substantial effort to improve the flow of information between Member States and between the Community and other interested parties. A SAVE II programme with the same basic features is planned for the period from 1 January 1996 to 31 December 2000.

Specific third party financing initiatives

The EC encourages third party financing by financing the SAVE programme developed by DG XVII and the Technology Performance Financing (TPF) system developed by DG XIII under the SPRINT programme. In both cases, Thermie can contribute by selecting projects suitable for third party financing.

On 26 June 1992 the Commission submitted a proposal for a Directive under the SAVE programme containing a series of measures including the promotion of third party financing of investments in energy efficiency in the public sector, a measure which will have an impact on energy efficiency and hence CO2 emissions.

The Thermie Regulation gives the Commission the possibility of introducing other appropriate financial mechanisms if necessary, in accordance with the procedures laid down in the Regulation.

Given the clear need on the market for new financial instruments such as third party financing, Thermie (together with SAVE) has the task of *motivating and convincing all the parties involved in third party financing*. External investors (banks and other financial institutions), energy distribution companies, engineering companies and consultancies (potential ESCOs), equipment manufacturers/suppliers and technology users. The network of OPETs plays a key role in bringing participants together and promoting third party financing.

STRATEGIES FOR THE NEAR FUTURE

- Finding resources even to finance good investments is a constant problem in EC industry and in all the countries where Thermie activities are carried out. Financial institutions do not like taking risks and may demand a high rate of return on any type of financing.
- The Community can play an important role in facilitating companies' access to financing. It may:
  - help to make the technology market more transparent: with more information at their disposal, financial institutions will be able to make a better estimate of the risks and reduce the cost of their available funds;
  - reduce investment costs by offering grants for projects which are difficult to finance because of major technical and economic risks: reducing investment costs while preserving the profits generated by a project will increase its value;
  - facilitate companies' access to equity financing by stimulating the venture capital markets within and outside the EC;
  - stimulate other investments by providing loan guarantees, interest rate subsidies and other non-market-orientated schemes.
- It seems clear that third party financing is the most appropriate financial instrument for breaking down the barriers erected by market forces. Consequently, great efforts are being made to promote it. To this end, it is necessary
  - to derive greater benefit from the complementarity between SAVE and Thermie in order to promote third party financing activities, the role of Thermie being chiefly:

(i) to develop and/or promote innovative energy technologies which can be reproduced elsewhere, which generate major energy savings, and which have

a favourable environmental impact, through financial support for innovative or dissemination projects deriving from Community or national programmes;
(ii) to carry out vigorous promotional activities in order to encourage the application and market penetration of "ready for market" energy technologies with the same characteristics as the projects supported;
(iii) to disseminate and provide expertise with regard to energy-specific financial arrangements such as third party financing, basically through the network of OPETs. These activities should be targeted by country and adapted in the countries where there are no ESCOs.

- persuade the financial institutions to invest more in third party financing operations. Once third party financing has taken off, the financial institutions should become major players in the promotion of third party financing;
- to set up a network of third party financing companies (Energy Service Companies - ESCOs) incorporating financial institutions and if possible energy distributors;
- to promote joint ventures between several ESCOs at international level in the case of major projects or a series of similar projects in order to spread the risks between several companies or encourage the dissemination of successful initiatives;
- to use part of the Thermie fund in future to stimulate the degree of involvement of financial institutions and third party financing companies which have the task of promoting this product on the market.
- in a second stage, to examine together with national and multilateral financial institutions the possibility of extending third party financing to include all the countries where the Thermie programme can operate (Community, Latin America, Eastern Europe, CIF, Baltic States, etc.).

CONCLUSIONS

There are many reasons for combining efforts under SAVE and Thermie (and other related units/programmes) with regard to third party financing in order to ensure optimal cross-fertilization between the various Community programmes. More widespread application of this technique will not only help to achieve energy, environment and technology objectives, but also help to improve the employment situation in the European Union.
By way of conclusion, while cogeneration is undoubtedly a technology with a very promising future, it should never be forgotten that every project is a specific case and that major progress still needs to be made ...
Any decision in this connection must therefore be preceded by a technical and economic feasibility study covering the following factors:

- the price of the fuels used;
- the purchase price of top-up and standby electricity;
- the pay-back period;
- the price for selling the surplus electricity generated to the grid.

THE MARKET FOR SOLID FUELS IN THE COMMUNITY IN 1994 AND THE OUTLOOK FOR 1995

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The European Commission recently published its latest annual report on the Community market for solid fuels (hard coal, coking coal, lignite and peat) covering the most recent estimates from Member States' administrations for 1994 and the forecasts for the current year. This report is required under the terms of Article 46 of the ECSC Treaty which states that, to provide guidance on the course of action to be followed by all concerned, and to determine its own course of action, the European Commission must conduct a study of market and price trends.

Since three new Member States - Austria, Finland and Sweden - joined at the beginning of January 1995, homogeneous data was not available at the time of writing for inclusion in the report. Throughout the report, therefore, the terms "Community" or "European Union" refer to the 12 Member States as of the end of 1994, although there is a specific chapter included at the end presenting the main energy features of the new Member States.

For the Community, 1994 saw a relatively strong recovery of economic growth, with real GDP estimated to have grown by more than 2½% over the year as a whole. For the current year, GDP is expected to grow by around 3%. As a result, total energy demand may have risen by around 1½% during 1994, as compared to the previous year and, bearing in mind the current economic forecasts and assuming normal weather conditions, could increase further this year.

PRODUCTION OF SOLID FUELS IN THE COMMUNITY.

Production of hard coal in the Community continues to be affected, to varying degrees, by the policies to restructure, rationalize, modernize and improve competitiveness. Total production is expected to have decreased from 158.6 Mt in 1993 to 132 Mt in 1994, with the most significant changes occurring in the United Kingdom (where production is estimated to have fallen by nearly 28%, or 18.9 Mt), Germany (with a decrease of 10.4% or 6.6 Mt) and France (with a decrease of 13% or 1.1 Mt). Spain, on the other hand, may well have seen the increase in opencast production more than offsetting the decline in underground production, to the tune of some 0.1 Mt. Portugal closed its only hard coal mine during 1994.

In contrast, 1995 may well see one of the smallest variations in production since the early 1980's. Current estimates for Community production are for some 130.4 Mt, which would only be some 1.6 Mt lower than the 1994 figure. The most significant decreases are expected in the United Kingdom and Spain, each with a 3.3% drop (or 1.6 Mt and 0.6 Mt respectively). France and Germany, on the other hand, could see production increase by 0.6 Mt and 0.2 Mt respectively.

Lignite production in the Community in 1994 is estimated to have been some 284.0 Mt, which is 4.8% or 14.5 Mt less than in the previous year. This is due mainly to the lower production in Germany (13.5 Mt less) and Spain (2 Mt less), since Greece could have increased production by some 2.2 Mt. For 1995, the forecasts point to a further decline of some 5.3% or 15 Mt for the Community, to a new total of some 269 Mt. Once again, only Greece expects to significantly increase lignite production (by 1 Mt to reach 58 Mt), whilst Germany believes its production will continue to fall, by some 15.6 Mt, to a new low of 192.7 Mt.

Coke production is expected to continue to decline, with a 4.5% or 1.7 Mt drop to 37.7 Mt in 1994 and a further reduction of 1.8% or 0.7 Mt forecast for 1995, although the coke-production/nominal capacity ratio does appear to be improving as production capacity has been cut back sharper. With the steel industry absorbing about 90% of the coke available on the internal market and the continued structural and technological changes taking place in this industry (including the increased production of steel from

electric arc furnaces), it is not surprising that coke production is in continuous decline.

The annual average Community underground workforce, which fell by 27,900 during 1993, is expected to have fallen again during 1994 by some 18,800, or 15%, to a new low of around 106,700. Approximately half of these losses were in the United Kingdom, followed by Germany with one third. For 1995, job losses are forecast to be at a much more moderate pace, given that the period of intensive restructuring in the British coal industry is almost complete. Job losses could therefore be around 4,500 and be for mainly in Germany and Spain.

Productivity continues to increase, a logical consequence of the restructuring measures adopted in all the coal-producing Member States, which are concomitant with the closure of the least profitable and generally least efficient pits. For the Community as a whole, productivity rose from 762 kilograms per underground worker per hour in 1993 to 768 in 1994 and could increase to about 800 in 1995.

DEMAND FOR SOLID FUELS IN THE COMMUNITY.

The report highlights that the total demand for solid fuels, in terms of gross inland consumption, may have declined by 1% in the Community during 1994, compared to 1993. This is largely accounted for by the expected 5% decline in the demand for lignite since the demand for hard coal, in terms of consumption, may have actually increased by 1%. For 1995, current forecasts point to a similar trend; a modest recovery for hard coal and a further fall for lignite.

Deliveries of hard coal in the Community are expected to have fallen significantly to 259.7 Mt in 1994, down some 5.2% or 14.2 Mt compared to 1993. This is the third year of decline and represents the lowest figure seen in the Community. However, a closer analysis of these figures indicates that the United Kingdom alone has been largely responsible for this drop since if this country were excluded from the totals, then total inland deliveries during 1994 would have seen an increase of almost 2 Mt compared to the previous year.

It is also important to note that the decreases in deliveries have mainly affected the Community hard coal producing countries, with Spain the only exception.

Forecasts for 1995 point to a slight rise in internal hard coal deliveries in the Community to 260.8 Mt, an increase of 0.4% or 1.0 Mt. This would indicate an end to the period of decline which has led to a contraction of the market by 72 Mt since 1991.

When examining the estimates for actual consumption of hard coal for 1994, however, it is quickly evident that there has been a noticeable draw on the stocks at the power plants, of some 15 Mt. This would imply that actual consumption figures for 1994 could be broadly similar to those for 1993, and such a draw on stocks could be similarly repeated in 1995, thus maintaining a fairly stable level of hard coal consumption in the Community.

IMPORTS INTO THE COMMUNITY.

The report notes that, in 1994, imports of hard coal from non-Community countries are expected to have risen by 3.5% or 4 Mt, compared to the previous year, to a total of 120 Mt. Of this, some 26.5% are coking coals, with the rest being of thermal qualities (which have accounted for the principal increases).

In comparison with the previous year, Belgium saw the largest increase of 1.8 Mt, followed by Denmark with 1.5 Mt and the Netherlands with 1.1 Mt. Only in the United Kingdom and France did imports fall, by 1.9 Mt and 0.9 Mt respectively. In the United Kingdom this was a result of the increased penetration of gas, better performance by nuclear plants, and the concentration on reducing the huge stockpiles of coal. For France, the decline reflects that the good utilization rate of nuclear power plants and higher hydro-electricity production.

For 1995, Community coal imports could again increase, although more modestly, by 2.4 Mt to a total of 122.4 Mt. Most countries anticipate a slight increase in imports, with the biggest increase of 1.3 Mt forecast in Germany. However both the United Kingdom and the Netherlands expect a drop in imports (by 1 Mt and 0.4 Mt respectively).

On the supply side, the United States remained the major exporter to the Community with some 27% of the market in 1994, followed by South Africa with 23% and Australia with 17%. Whilst the picture is expected to be one of modest gains spread across most of the traditional suppliers, with gains for Australia, Poland and the United States (with an additional 1.7 Mt, 1.6 Mt and 1 Mt respectively), the CIS and Colombia are both expected to have seen sales the Community decline.

For 1995, no significant changes are anticipated amongst the suppliers, although South Africa and Poland are expected to show the biggest gains.

CIF (cost, insurance, freight) prices for both imported coking coal and imported steam coal during 1994, expressed in terms of US dollars, were on average some 4% lower than in the previous year. However, the tightening of the balance between offer and demand on the international market, after several years that have seen large surpluses on the market, and a significant rise in maritime freight rates, have led to considerable pressure on prices. With the recent

scarcity of coal on the spot markets, prices could increase during 1995, especially those for steam coals.

THE NEW MEMBER STATES.

The report then briefly gives an overview of the energy features of the three new Member States.

In **Austria**, coal accounts for some 13% of gross energy demand. Whilst there is no indigenous hard coal mining, Austria does have a declining lignite industry which currently produces some 0.5 Mtoe. A large proportion of the imported hard coal comes from Poland. For the production of electricity, some 65-70% is hydro, gas is responsible for 14% and solid fuels for 11%.

In **Finland**, hard coal accounts for some 13% of total energy demand, with another 19% accounted for by other solid fuels. Peat is the principal indigenous fuel as Finland does not produce coal or lignite. Most imported coal comes from Poland and Russia. As to electricity production, some 34% is nuclear, 26% is hydro, other solid fuels are responsible for 15% and hard coal for 14%

In **Sweden**, hard coal accounts for some 5.1% of total energy demand and under 2% of electricity generation. Hydro is responsible for 51% of Swedish electricity generation and nuclear nealy 44%, although the country is committed to phasing out nuclear power by the year 2010 if environmentally acceptable alternatives can be found.

Table 1 : Comparaison of the main features of the solid fuels market

	1993 actual	1994 estimates	1995 forecast	1994/1993 (%)**	1995/1994 (%)**
HARD COAL					
Resources					
- Production	158.6	132.0	130.4	-16.8	-1.2
- Recoveries	2.5	1.5	1.7	-38.6	7.5
- Imports from third countries	115.9	120.0	122.4	3.5	2.0
Total	**277.1**	**253.5**	**254.4**	**-8.5**	**0.4**
Deliveries					
- To coking plants	52.5	50.4	50.9	-4.0	0.9
- To power stations*	183.6	172.0	172.2	-6.3	0.1
- To others	37.9	37.3	37.7	-1.5	1.0
- Exports to third countries	0.4	0.3	0.3	-18.0	-5.2
Total	**274.3**	**260.0**	**261.0**	**-5.2**	**0.4**
COKE					
Resources					
- Production	39.4	37.7	37.0	-4.5	-1.8
- Imports from third countries	3.1	3.7	3.8	18.6	3.3
Total	**42.5**	**41.4**	**40.8**	**-2.8**	**-1.3**
Deliveries					
- To steel industry	37.1	39.4	38.3	6.2	-2.9
- Other deliveries within the Community	4.8	4.1	3.8	-14.4	-7.5
- Exports to third countries	0.7	0.7	0.6	1.0	-15.3
Total	**42.6**	**44.2**	**42.7**	**3.8**	**-3.6**
LIGNITE AND PEAT					
Resources					
- Production and imports	301.5	286.7	271.7	-4.9	-5.2
Deliveries					
- To briquetting plants	47.7	38.4	33.4	-19.6	-12.8
- To power stations	233.8	229.9	221.8	-1.6	-3.5
- Others (incl. exports to third countries)	20.0	18.8	16.5	-6.2	-12.2
Total	**301.5**	**287.1**	**271.7**	**-4.8**	**-5.3**

(!) Note that the sums may not add up due to rounding.

* Including industrial power stations

** The variations are calculated in kt

E.U. COAL-FIRED THERMOELECTRIC POWER PLANTS

Environmental Control

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FOREWORD

Fossil fuels burned in the production of electricity produce a variety of gases and particulates. If these gases and particulates are not captured by pollution control equipment they are released into the atmosphere.
Among the gases emitted during the burning of fossil fuels the most important are carbon dioxide (CO_2), sulphur dioxide (SO_2), and nitrogen oxides (NO_x).
Sulphur is an element that is present in almost all types of coal, although some kinds of coal contain more sulphur than others depending on the location of the coal mine and the type of coal being mined. The average percent of sulphur contained in coal ranges typically from 0.3% to 2.5%, exceeding in some cases 8%. During combustion the sulphur combines with oxygen to form SO_2 that, as it enters the atmosphere, mixing with oxygen and trace substances forms a variety of sulphur compounds. In addition, the presence of light, moisture, and other pollutants in the atmosphere may also be important in activating the complex changes that sulphur emissions undergo.

Table 1 : SO2 and NOx Overall Emission Ceiling for 'Existing' Large Combustion Plants

Member State	LCI SO_2 Emissions 1980	SO2 Emission Ceiling (Kton/y) and % Reduction Over Adjusted LCI Emissions 1980			LCI NO_x Emissions (as NO_2) 1980	NOx Emissions Ceilings (Kton/y) and % Reduction Over Adjusted LCI Emissions 1980	
	(kton)	1993	1998	2003	(kton)	1993	1998
Belgium	530	318 (-40)	212 (-60)	159 (-70)	110	88 (-20)	66 (-40)
Denmark	323	213 (-34)	141 (-56)	106 (-67)	124	121 (-3)	81 (-35)
France	1910	1146 (-40)	764 (-60)	573 (-70)	400	320 (-20)	240 (-40)
Germany	2225	1335 (-40)	890 (-60)	668 (-70)	870	696 (-20)	522 (-40)
Greece	303	320 (+6)	320 (+6)	320 (+6)	36	70 (+94)	70 (-94)
Ireland	99	124 (+25)	124 (+25)	124 (+25)	28	50 (+79)	50 (+79)
Italy	2450	1800 (-27)	1500 (-39)	900 (+63)	580	570 (-2)	428 (-26)
Luxembourg	3	1.8 (-40)	1.5 (-50)	1.5 (-50)	3	2.4 (-20)	1.8 (-40)
Netherlands	299	180 (-40)	120 (-60)	90 (-70))	122	98 (-20)	73 (-40)
Portugal	115	232 +102)	270 +135	206 (+79)	23	59 (+157)	64 (+178)
Spain	2290	2290 (-0)	1730 (-24)	1440 (-37)	366	368 (+1)	277 (-24)
UK	3883	3106 (-20)	2330 (-40)	1553 (-60)	1016	864 (-15)	711 (-30)

Nitrogen in the air combines during the combustion process with oxygen to generate NOx mainly at high temperature (1450÷1500 °C, O2 content and residence time being important factors) (Thermal NO_x). Nitrogen chemically combined in the coal is partially converted to nitrogen oxides being function of fuel type (Fuel NO_x). Further NOx production is generated by the reaction of hydrocarbon free radicals with nitrogen in the combustion air (Prompt NO_x).

Sulphur dioxide and nitrogen oxides are referred to as precursors to acid deposition, because they react with other chemicals in the atmosphere to form sulphuric acid and nitric acid, respectively. These two acids do not accumulate in the atmosphere, but are absorbed by rain droplets, thus discharging acid onto the earth in the form of "acid rain". In addition, sulphuric acid may form microscopic droplets that can be deposited directly onto the ground. This form of deposition, as well as the direct capture of sulphur dioxide by vegetation, is referred to as dry deposition.

The increased use of fossil fuels in recent years, as well extensive deforestation, has caused a build-up of carbon dioxide in the atmosphere. This increase of CO_2 causes the atmosphere to absorb infrared radiation reflected from the earth that would otherwise have been dissipated into space. This phenomenon, which could increase global temperatures, is called the "greenhouse" effect.

November 24 1988, the Council of the European Union adopted a "Directive (N°609) on the limitation of emissions of pollutants into the air from large combustion plants" that prescribed a series of limits for the progressive reduction of total annual emissions from existing large combustion plants.

A summary of the final emission limit standards and application phases of each Member States is reported in Table1.

To respond to the concerns of the European Union related to emissions of sulphur oxides and nitrogen oxides the Member States passed the respective environmental regulation prescribing the emission limit standards depending on the type of fuel burned and the combustion device used and defining the time limits for retrofitting applications.

EMISSION REDUCTION TECHNOLOGIES

Emission reduction is accomplished with different control technologies for the two pollutants considered, sulphur dioxide and nitrogen oxides. An overview will be given below of the available methods.

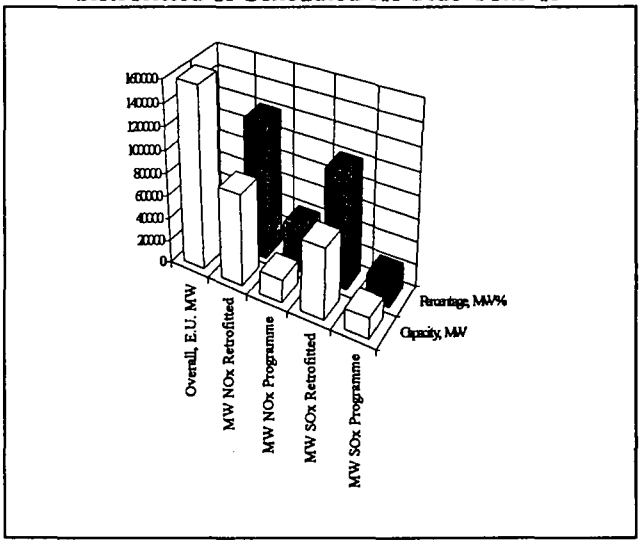
SO_2
- switch to coal with lower sulphur content or less polluting fuels, such as natural gas
- equipment for flue gas desulphurization (FGD), humid or dry
- boiler conversion to the fluidized-bed combustion (FBC) process or to the integrated-gassification combined cycle (IGCC), not yet in extensive use.

NO_x
- adoption of a low combustion temperature profile (NOx formation depends primarily on the flue gas temperature), using staged combustion, as Over Fire Air (OFA)
- use Low-NOx-Burners (LNB)
- Gas Reburning (GR), introducing CH4 in equivalent quantity of about 20% of the main fuel at a furnace level higher than that of the main burners [3-4]
- fluidized bed combustion (FBD).

In order to perform an analysis on the retrofit of E. U. coal-fired thermoelectric units to control flue gas pollutants such as NO_x and SO_2, information* on the activities and programmes of European coal-fired power plants were collected with the help of European utilities.

E.U. Coal-fired Thermoelectric Units Retrofitted or Scheduled for Flue Gas Control

Figure 1 : EU. Power Plant Capacity as MW Retrofitted or Scheduled for Flue Control



E.U. power plant capacity as MW retrofitted with or scheduled for de-NO_x and/or de-SO_x of the flue gas is shown in Figure 1 where the columns of the graph indicate the progress made in completing projects and organizing programmes expressed as power plant

capacities, while in Table 2 below the corresponding exact values for the environmental activities are reported:

Table 2 : De-Nox and de-SOx Retrofitting Activities

Technology	MW retrofitted	% MW retrofitted *	MW in programme	% MW in programme
de-NO_x	76073	48	18981	12
de-SO_x	58417	40	18593	12
* respect to the overall capacity of the Coal-fired Thermoelectric Units of 159642 MW				

The environmental control activities, shown in the above graph, has been especially developed in Germany and all the Member States are working the reduction of air pollutants progressively introducing their own environmental regulations and related application phases. The activities developed to date and future programmes of each Member State are evaluated using a statistical technique - the 'Weighted Average Retrofit (WAR)' - which summarizes the flue gas control adopted in the power plants, for each Member State, by means of the following formula:

$$\text{Weighted Average Retrofit} = \frac{\sum_{1} vi*MW(R)i}{\sum_{1} niMWi} \times 100$$

where:

i	denotes a coal-fired thermoelectric unit
v	the number of the retrofitted unit
n	the number of the unit i
MW(R)	the capacity of the retrofitted unit i
MW	the capacity of the unit i

The calculated values of the 'Weighted Average Retrofit' (WAR) are reported in Table 3. The 'WAR' summarizes the historical data of flue gas control activities and gives information to understand, statistically, the level of retrofitting (up to-day and future) of E.U. power plant park.

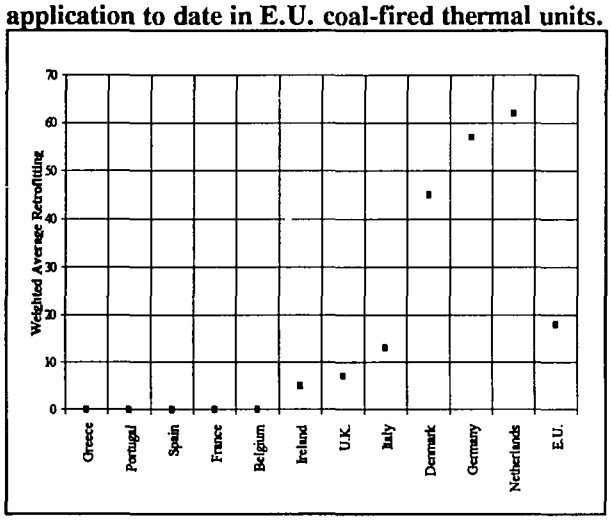
Table 3 : 'Weighted Average Retrofit' for Flue Gas Control of E.U. Coal-fired Thermoelectric Boilers (to date ans scheduled)

Member Stat	$\frac{\sum_{1} vi*MW(R)i}{\sum_{1} ni*MWi} \times 100$			
	de-Nox to-day	de-NOx progr.*	de-SOx to-day	de-SOx progr.*
Belgium	0.7	0.0	0.0	0.7
Denmark	45.2	0.3	7.5	0.0
France	0.5	0.0	1.2	1.3
Germany	56.3	0.02	59.7	0.02
Greece	0.0	7.1	0.0	2.1
Ireland	4.8	1.2	0.0	0.0
Italy	12.6	3.2	1.3	4.4
Netherlands	63.3	1.52	35.1	5.1
Portugal	0.0	38.9	0.0	4.1
Spain	0.0	0.1	0.0	1.1
UK	6.8	3.1	0.6	55.8
E.U.	17.6	0.9	11.6	0.9
* The figures de-NOx progr. and de-SOx progr. include both coal-fir				

The statistical order of WAR in adopting de-NOx flue gas equipment to date is reported in Figure 2 a showing the different level of Member State's activities:

- the Netherlands, Germany, and Denmark have almost completed the required reduction of nitrogen oxides (the time limits for the former German Democratic Republic are SO_2 from 1 January 1994 and NOx from 1 July 1996) due to implication in forest damage and increasing acidification of surface waters in North Europe

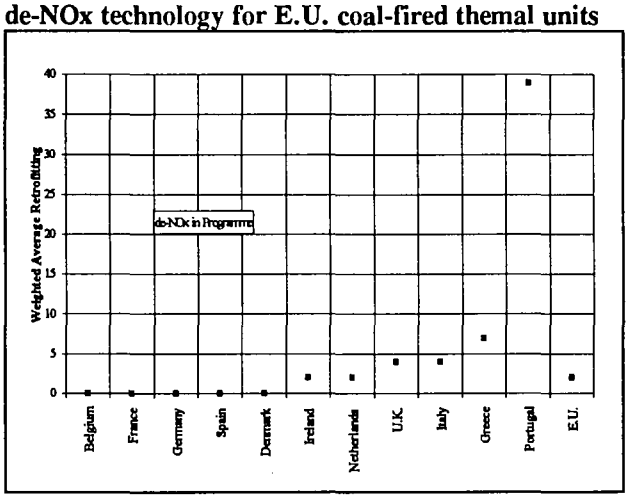
Figures 2a : 'Weighted average Retrofit' of de-NOx application to date in E.U. coal-fired thermal units.



• Italy, U.K., Ireland (although allowed by the Directive to increase NO_X emission), and Belgium started in adopting de-NO_X facilities with programmes less intensive compared to the Netherlands, Germany, and Denmark due to the lower percentage reduction prescribed by the 1988 Directive of the Council of the European Union. Meanwhile, the advanced technologies are deeply improved such as Low NOx Burners and Gas Reburning able to respect the required emission limits during combustion avoiding the adoption of the more expensive Selective Catalytic Reactors

• Greece, Portugal, and Spain have to starts in future being allowed to prolong and/or increase the current emissions (see Table 1).

Figures 2b : 'Weighted Average Retrofit' for sheduled de-NOx technology for E.U. coal-fired themal units



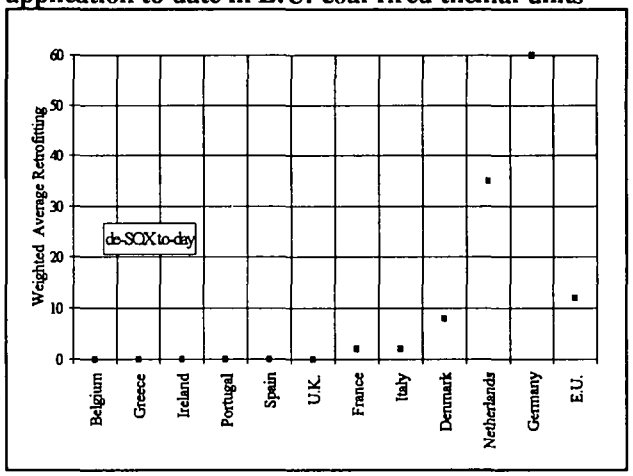
The trend of "WAR" for scheduled de-NOx equipment is shown in Figure 2 b giving the following information:

• Portugal will start with an intensive de-NOx project (from the year 2000)

• Greece will adopt de-NOx technologies in line with the limits reported in Table 1
either in terms of overall boiler capacity or as application time

• the other Member States will complete their own projects in the years 1995~2002 with few exception.

Figures 2c : 'Weighted Average Retrofit' of de-SOx application to date in E.U. coal-fired themal units

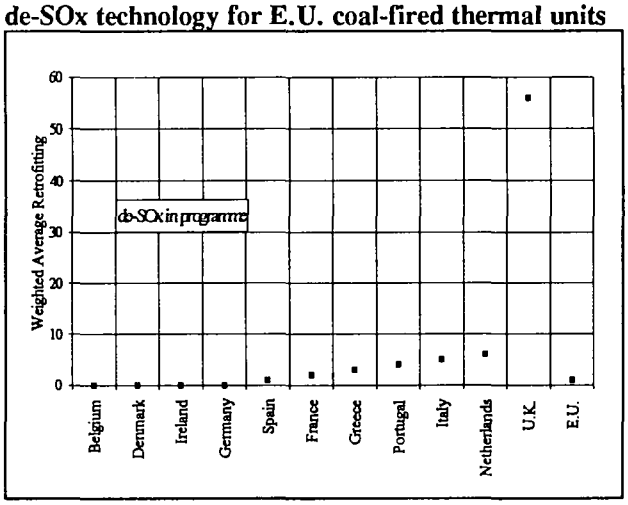


The "WAR" data given in Figure 2 c indicates the statistical behaviour of de-SOx technical systems applied to date by each Member State:

• Germany, Netherlands, and Denmark have been the most active in reducing SO2 emissions and have almost completed their overall projects
Italy, France, and U.K. have already adopted de-SOx systems respecting the required SO2 reduction indicated in Table 1.

• Belgium, Greece, Ireland, Portugal, and Spain had not yet adopted any flue gas desulphurization systems at the time the data were collected.

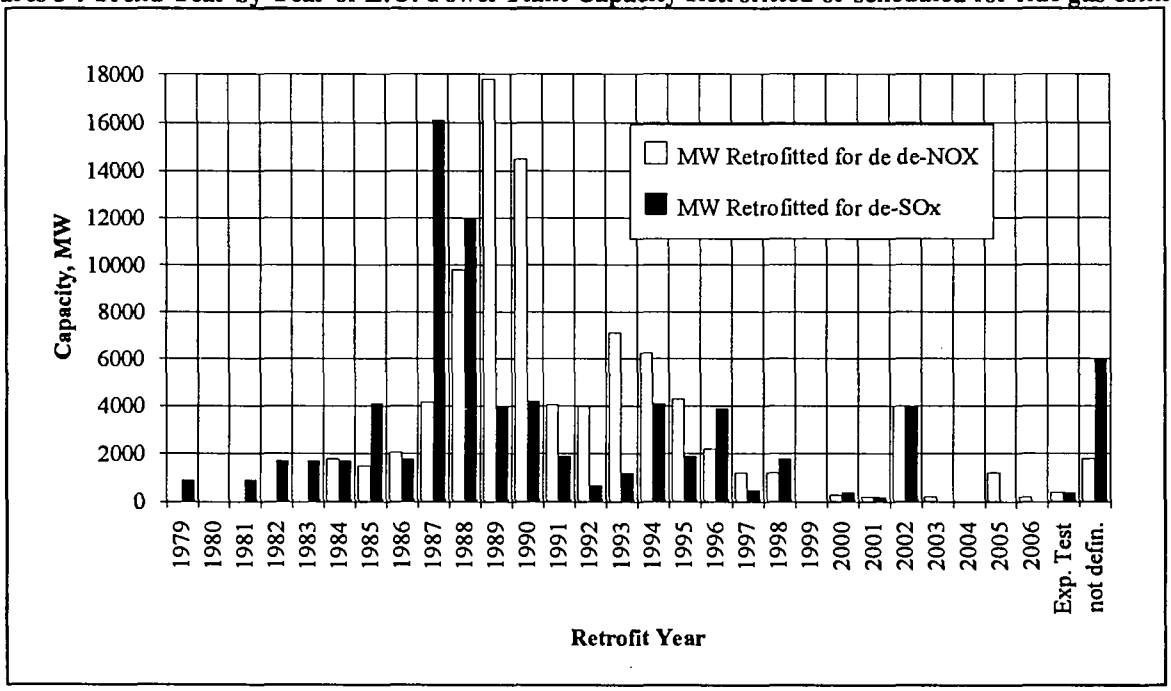
Figures 2d : 'Weighted Average Retrofit' of scheduled de-SOx technology for E.U. coal-fired thermal units



For future de-SOx activities the "WAR" data reported in Figure 2 d shows the major programme of the U.K., to be completed within the 2002, and the remaining activities of Netherlands, Italy, Portugal, Greece, France, and Spain.

To complete the scenario for the environmental retrofitting projects of the Member States in the European Union, the trend of de-NO_X and de-SO_X activities, expressed as capacity retrofitted year by year up to 2006, is shown in Figure 3. The maximum of the coal-fired boiler retrofit is concentrated in the years 1987~1990, mainly due to the time limits laid down by German, Dutch, and Danish environmental rules, while a second peak appears for the years 1992~1996 due to the group of Member States required to reduce the emission percentage to a level lower than of the three former countries, namely, Belgium, Italy and U.K. A third peak, the U.K. projects, is forecast around the year 2002 and represents the main tail of the environmental programme that will complete the major action promoted by the E.U. Council Directive.

Figures 3 : Trend Year by Year of E.U. Power Plant Capacity Retrofitted or scheduled for flue gas control



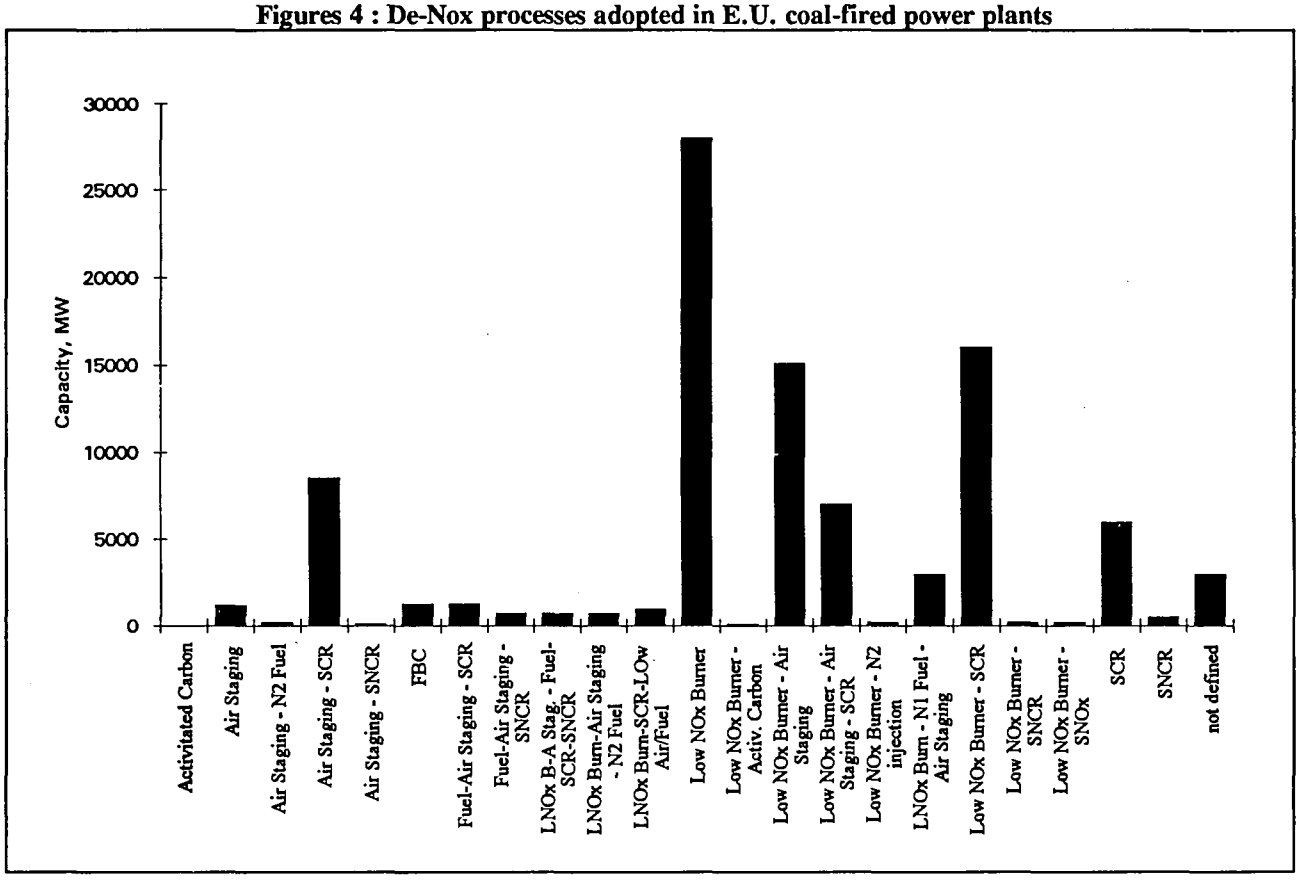
DE-NO_X AND DE-SO_X TECHNOLOGIES SELECTED IN E.U. COAL-FIRED THERMOELECTRIC PLANTS

De-NO_X and de-SO_X technologies employed in E.U. coal-fired thermoelectric plants were selected among those processes available and commercially mature in the early 1980s to comply with the environmental requirements of the E.U. Council Directive and the related environmental regulations of each Member State.

Generally utilities designed their own power plant retrofits performing adequate preliminary feasibility studies to ensure several decision-steps such as:

- site-specific alternative environmental technologies
- analysis evaluating the consequences of the projects examined on air quality, water quality, and solid waste disposal
- analysis evaluating the cost effectiveness of the environmental technologies to be adopted in the specific power plant considering firstly the retrofit installation investment, and operation and maintenance costs, and secondly the capacity, age, and efficiency of the existing boilers.

Figures 4 : De-Nox processes adopted in E.U. coal-fired power plants



Further, utilities were required to comply with the emission standards of their own Member State that are more or less strict compared to those of other Member States

Consequently, each utility was required to install environmental technologies able to remove a percentage of pollutants to the degree necessary to meet the most stringent standards that it faces. For example, if desulphurization standards require removal of 70+90 percent of sulphur dioxide emissions the utility must install a Flue Gas Desulphurization (FGD) unit; by contrast, if the percentage of SO_2 removal is less strict the utility install less expensive desulphurization systems such as switching the fuel to coal with a lower sulphur content.

The same considerations apply to nitrogen oxide emission control: the more stringent the standard limits, the more efficient must be the de-NO_x technology. Consequently the selection may range from a staged combustion process through Low NOx Burners to a SCR system as emission control requirement increase.

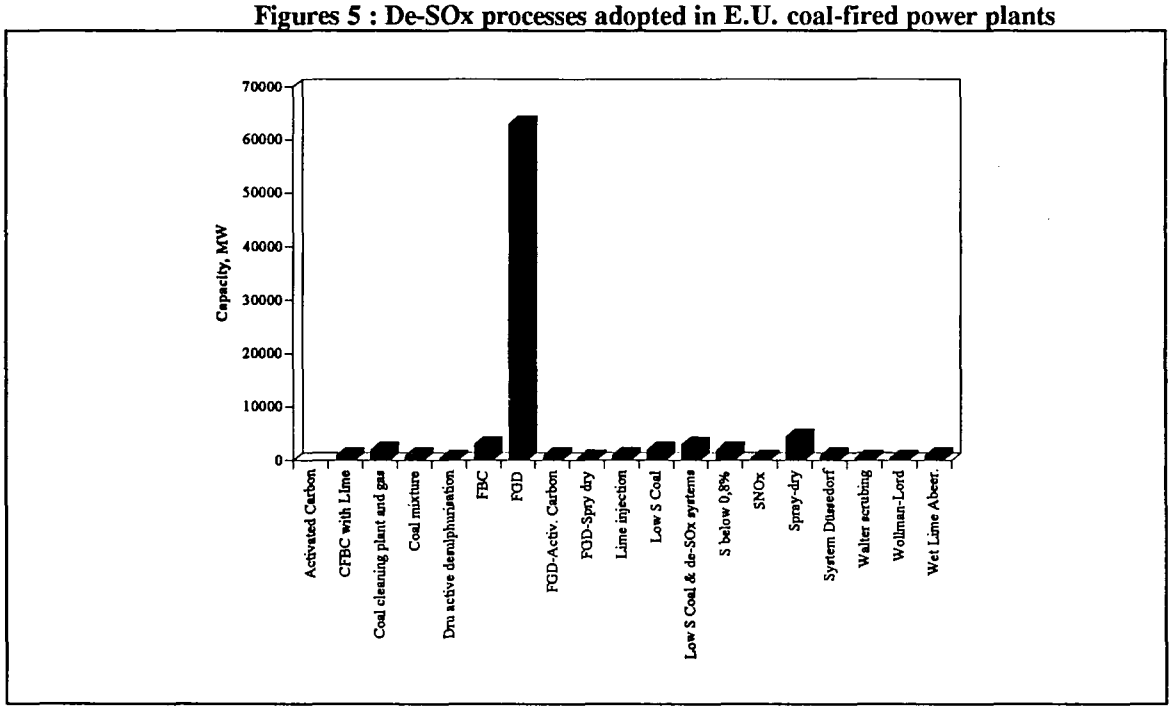
On the basis of the above concerns, the environmental processes adopted in E.U. Coal-fired power plants for NO_x and SO_2 emission control are shown in Figures 4 and 5: namely, the most widespread de-NO_x processes are based on the following systems or on combination of them:

	Process	MW Retrofitted
1.	Air Staging-SCR	8614
2.	Low NOx Burner	28370
3.	Low NOx Burner Air Staging	15611
4.	Low NOx Burner - Air Staging-SCR	7142
5.	SCR	6533
6.	Low NOx Burner - SCR	16565

while, the de-SO2 technology is based mainly on Flue Gas Desulphurization, as shown in the following Table:

	Process	MW Retrofitted
1.	FGD	63206
2.	Spray-dry	4158
3.	Low Sulph. Coal & de-Sox System	1400
4.	Low Sulphur Coal	1100
5.	Coal Cleaning and natural gas	1050

Figures 5 : De-SOx processes adopted in E.U. coal-fired power plants



CONCLUSION

In November 1988 the European Union formally agreed a Directive on the limitation of emission pollutants into the air from large combustion plants and the Member States passed their own Environmental Rules prescribing the emission standards and time limits for retrofitting.

~76000 MW of E.U. coal-fired power plants have been retrofitted to date for control of NOx emission and ~58500 MW for control of SOx emission; future programmes are designed to reduce the NOx and SOx emission for ~19000 MW and ~18600 MW, respectively, by the year 2002.

A statistical analysis was developed to evaluate the environmental activities of each Member State on the basis of information collected on 677 coal-fired thermoelectric units having an overall capacity of about 160000 MW.

As far as coal-fired power plants are concerned:

- Denmark, Germany and the Netherlands have almost completed their overall projects for de-NOx and de-SOx emission control
- France, Italy and U.K. respected the NOx and SOx reduction indicated by the Directive and have scheduled the remaining activities to be completed by the 2002
- other Member States being allowed to prolong and/or increase current emissions are going to start with their own environmental programmes.

The maximum rate of retrofit activities was developed in the years 1987+1990 and 1992+1995, while the maximum for future programmes is concentrated in the year 2002.

The environmental processes adopted in E.U. coal-fired power plants for NO_X and SO_X emission control are based on the following systems or combinations of them:

NOx Low NO_X Burner, Low NO_X Burner + SCR, Low NO_X Burner + Air Staging, Low NO_X Burner + Air Staging + SCR, Air Staging + SCR, and SCR

SOx FGD, Spray-dry, and other systems such as switching to coal with lower sulphur content

The reduction of emissions from coal-fired power plants may be increased by improving the total efficiency and thus reducing the emissions per unit of useful energy: to-day, this strategy is based on the adoption of advanced combustion technologies such as fluidized bed combustors and the integrated gasification combined cycle. These two advanced technologies are able to eliminate or reduce the two pollutants examined above to the emission limit values prescribed by the E.U.'s current environmental regulations [5-8].

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E.U. COAL-FIRED THERMOELECTRIC POWER PLANTS

Boiler Efficiency and Environmental Performances

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FOREWORD

Greater efficiency of coal-fired thermoelectric boilers is a key element for a number of energy targets such as higher conversion of coal to energy, better control of sulphur and nitrogen oxides, solid and liquid wastes, greenhouse gases, and other emissions resulting from coal use.

Efforts in improving coal-use efficiency can help to resolve the conflict between the necessary increase in coal use due to the increased energy demand and the legitimate growing concern about the related environmental impact.

Several repowering technologies, such as replacing the boiler with a new combustion configuration operating as a combined cycle by adding a gas turbine or by adopting new, cleaner, burners based on highly efficient coal combustion or gasification technology, are commercially available. By contrast the strategy of plant refurbishment - increasing life-time of the coal-fired units by 20 years - is less expensive than repowering and thus is generally preferred.

Potential global climate change due to increases in the concentration of greenhouse gases in the atmosphere has attracted considerable attention as an emerging environmental issue. Even if there are scientific uncertainties related to global climate change, the 'not regret' strategy implies that actions are necessary to reduce emissions of greenhouse gases. Increasing power generating efficiency is a key option in this strategy.

In order to perform an analysis of the efficiency of European Union (E. U.) coal-fired thermoelectric units and their impact on the environment, information on the characteristics of this power plants such as capacity, age, efficiency, operation, and boiler renewing/repowering were collected with valuable support of the European utility companies. Additional information on coal-fired generating units that are under construction or in various stages of planning were also acquired.

E. U. COAL-FIRED POWER PLANT

Historically, most of the electricity generation capacity in the E.U. has been based on coal-fired power plants. After the two oil shocks of 1973 and 1979, reduced availability of oil imports and increasing fuel oil costs made coal-fired generation even more important. In addition, utilities have either retrofitted existing oil-fired steam units to burn coal, or operated gas- and oil-fired boilers to meet peak-loads only. There are some exceptions where the large existing stock of oil-fired capacity obliged the utilities to continue using liquid fuel. Nevertheless, the new and future plants have been designed to burn coal.

Table 1 : Number and Total Capacity of Coal-fired Power Plants in the E.U. (existing and planned)

Member State	Existing		Project	
	N°	(MW)	N°	(MW)
Belgium	31	4000	2	775
Denmark	42	8156	3	945
France	36	11397	-	-
Germany	282	42217	1	553
Greece	21	4683	6	2210
Ireland	19	1340	-	-
Italy	41	10642	21	7650
Netherlands	11	4495	4	2140
Portugal	8	1714	3	995
Spain	40	11082	-	-
UK	146	39648	-	-
Overall EU	677	144374	40	15268

The stock of E.U. coal-fired power plant electricity generating is represented in Table 1 reporting number

and overall capacity (MW) of existing and planned boilers by Member State[1].
The coal-fired electricity generating capacity of about 160 GW installed in the European Union represents about the 64% of the total thermal capacity, and 52% and 39% respectively when hydroelectric and hydroelectric & nuclear capacities are included. These figures indicate the strategic importance of coal as source for thermoelectric production. Capacity at project status amounts to 15757 MW and represents a growth of about 10% of the existing thermoelectric coal-fired power plant capacity.
Table 2 reports the percentages by Member State of installed and at project status coal-fired generating capacity compared to the total internal energy sources (fuel oil, natural gas, hydro, nuclear and others). Figures are also given for the percentage of total E.U. existing and at project status coal-fired capacity. The figures show massive use of coal in absolute terms in Germany and U.K., medium in Italy, France, and Spain. It is also important to underline the high percentage of coal use in electricity generation in Denmark (99%), and Greece (71%) compared to other energy sources.

Table 2 : % by Member State of coal-fired electricity generating Capacity compared to E.U. capacity and other internal energy sources

Member State	EU %	Internal %
Belgium	3.0	33.8
Denmark	5.7	99.5
France	7.1	11.0
Germany	29.9	48.7
Greece	4.3	71.0
Italy	11.2	32.2
Netherlands	4.2	37.6
Portugal	1.7	39.6
Spain	6.9	26.4
UK	24.8	54.1

THERMAL UNIT AND CARBON DIOXIDE

The increased use of fossil fuels in recent years has caused not only an extensive deforestation but also a build-up of carbon dioxide in the atmosphere. This increase in CO_2 causes the atmosphere to absorb infrared radiation reflected from the earth that would otherwise have been dissipated into space. This phenomenon which could increase global temperatures, is known as the 'greenhouse' effect.

These potential increases in temperature are of concern because they could cause climatic changes, shift in agricultural zones, and partial melting of the polar ice caps resulting in flooding of coastal areas.
The CO_2 reduction from the power plants might mitigate this phenomenon, though significant uncertainties remain regarding global warming.
Reduction in power plant CO_2 release reduction by using of scrubbing systems is today the only foreseeable option, it is but so expensive that it can not be adopted in electrical utilities and in all other industrial sectors. However, carbon dioxide emissions can be reduced by increasing conversion efficiency of coal-fired thermal boilers in a number of ways:

- for plant repowering:

- cleaner-burners in highly efficient coal combustion systems that can reach efficiencies of up to 45%, a considerable improvement over conventional technologies with efficiencies in the 33-35 percent range

- for new plants:

- clean coal technologies such as pressurized fluidized bed and gasification technology in combined cycle [1-3] with gas turbine yielding efficiencies of up to 50% and possibly more with a more advanced cycle.

Due to the increased conversion efficiencies of these technologies, carbon dioxide emissions are reduced by 10 to 15 % for each 5-percentage-point improvement in conversion efficiency.
In order to evaluate the scope for reducing CO_2 emissions E.U. coal-fired thermoelectric plants have been analysed according to age, size and efficiency. The results are presented below.

TECHNOLOGIES FOR HIGH EFFICIENCY COAL CONVERSION IN THE E.U. POWER PLANTS

Today's new coal combustion processes have been developed at demonstration and commercial scale to satisfy the rapidly changing environmental, economic, and technical performance requirements being imposed on E.U. power plants.
The repowering of the existing E.U. power plants must satisfy stringent site selection and environmental requirements while producing electricity efficiently and with a high level of reliability. In other words, the new technologies to be applied to the selected existing power plants have to offer the potential for a cleaner environment and lower power costs by contributing to the solution of issues relating to acid rain, global climate change, future energy needs, and energy security.

1 At the timeof writing, the European Union still consisted of 12 Member States

Given the above mentioned requirements, the new technologies of interest to E.U. utilities can be placed in the following three categories:

• Advanced Combustion. New coal-fired technology [4-7] is based on the cyclone combustor concept, mainly developed in the USA. Coal is burned in a separate chamber outside the water-wall furnace and the hot combustion gases then pass into the boiler where the heat exchange takes place. The advantage is that the ash is kept out the furnace cavity and does not deposit on boiler tubes lowering heat transfer efficiency. Further, not having degradation of the boiler tubes' surface due to ash removal in the prechamber, boiler efficiency is enhanced over time.

Other new coal-fired technology able to reduce environmental emission is based on positioning air ports at designed level so that coal is combusted in stages and NO_X emission can be reduced by up to 70%÷80%. Injecting limestone into the combustion chamber also has the potential to reduce sulphur emission by up to 90%.

• Fluidized-bed Combustion. Fluidized-bed Combustion [8-10] can be either atmospheric (AFBC) or pressurized (PFBC - at pressures 6÷16 times higher than normal atmospheric). The pressurized fluidized-bed combustion offers potentially higher efficiency and less waste products than the atmospheric fluidized-bed process. Systematic improvements have modified the earlier design (bubbling- or circulating-bed) bubbling beds with solid recirculation, fluid beds with internal circulation, and hybrid designs combining several fluidization concepts.

Polluting emissions are reduced by controlling combustion parameters in order to maintain the flue gas temperature at 750÷900°C and by injecting sorbent as limestone: under these conditions the sulphur capture is enhanced (up to 93%) and NO_X emissions are reduced.

• Integrated Gasification Combined Cycle. The Integrated Gasification Combined Cycle (IGCC) process [11-14] basically consists of four steps:

- fuel gas formed by reacting coal with high-temperature steam and air or oxygen,
- fuel gas purification at room temperature (advanced systems are going to clean the hot gas),
- combustion of the clean gas and electricity generation via a gas turbine driven by the hot exhaust gases,
- the residual heat in the exhaust gases and from the gasifier is used in a conventional steam turbine generator to produce additional electricity.

The IGCC process is the cleanest and most efficient system: it is able to remove up to 99% of sulphur from coal (scrubbers in conventional plant typically remove 90%) and partly convert coal's nitrogen into ammonia removed subsequently by conventional chemical processes. NO_X produced in combustion with air are held to an acceptable level by staging the combustion process or by adding moisture to hold down the flame temperature.

Current efficiency levels may be increased and cost per unit of power lowered when the hot gas (over 1100°C) clean-up process (bed of zinc ferrite particles and others) is commercially assessed [15-16].

The Thermie programme of the Commission of the European Union has funded the 335 MW_e project in Puertellano, Spain, based on the PRENFLO coal gasification process. The main objectives of the programme are demonstration of the technical and economical feasibility of an IGCC plant while testing various types of coal from Europe and confirmation of the clean generation of electricity from coal. The gas desulphurization system leads to very low SO_2 contents in the flue gas and the mixing with nitrogen from the air separation unit also achieves very low NO_X emissions[17].

AGE OF E.U COAL-FIRED POWER PLANT

The design of coal-fired power plant has in the past been based on the general assumption that the technical and economical life would be of about 30 years. However several power plants now operating are 35÷40 years old.

The '30 years'expectation was that power plant units would be replaced with new units which would meet load requirements and through the use of technological improvements produce power at lower cost, and have higher availability and higher efficiency.

This expectation has not been fulfilled because of a number of factors such as low load growth, increasing construction costs, competing fuel, siting difficulties, and increasing uncertainty as to local authority regulatory approval.

Utilities have recognised that the potential lifetime of existing plant may be far in excess of the design assumption and that there can be numerous technical and economical advantages in continuing to operate these 'old' power plants.

Thus, extending the life of the power plants to reach as much as 50÷60 years service or longer could be economically advantageous. The aims for extending the life time might be as follows:

• extension or improvement of availability, reliability, and heat rate of power plant performance in an economically beneficial manner

• improvement of power plant safety, and environmental protection to meet new regulations

• increasing the thermal efficiency of coal-fired power plant so that the plants become as economically viable and as low on CO_2 emissions as new power plant designs.

The feasibility of extending the life of the E.U. coal-fired power plants to meet the above aims can be evaluated, using a statistical technique - the 'Weighted Average Age (WAA)'- to review the power plant status, for each Member State, by means of the following formula:

$$\text{Weighted Average Aged} = \frac{\sum_i \alpha i * MWi}{\sum_i MWi}$$

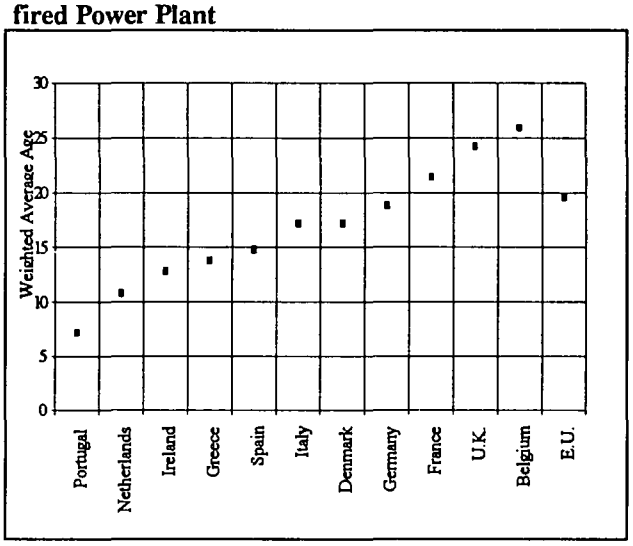
Where : - i denotes a coal-fired thermoelectric unit
- α the age of the unit i
- MW the capacity of the unit i

Table 3 : 'Weighted Average Age' of EU Coal-fired Power plants

Member State	$\frac{\Sigma i\ \alpha i * MWi}{\Sigma i\ MWi}$
Belgium	25.9
Denmark	17.2
France	21.4
Germany	18.8
Greece	13.8
Ireland	12.8
Italy	17.2
Netherlands	10.8
Portugal	7.2
Spain	14.8
UK	24.2
EU	19.6

The calculated values of the 'Weighted Average Age' (WAA) are given in Table 3. The 'WAA' synthesizes the historical data of power plant age and provides information for understanding, statistically, the level of obsolescence of power plant.
The 'WAA' data given in Figure 1 indicates statistically which Member States' power plants should have the most interest in extending the life of their coal-fired power plants, as one of the most cost-effective options for meeting their future energy requirements. The need to consider extending the life of coal-fired power plants increases from Portugal (installed capacity 1714 MW), Netherlands (4495 MW), Ireland (1340 MW), Greece (4683 MW), and Spain (11032 MW)- the 'WAA' varies in the range 7÷15 -; through Italy (10937 MW), Denmark (8156 MW), and Germany (47073 MW) - 'WAA' 15÷20 -; to France (11397 MW), U.K. (39548 MW), and Belgium (4000 MW) - 'WAA' 20÷26 -.

Figure 1 : 'Weighted Average Age' of E.U. Coal-fired Power Plant



The 'Weighted Average Age' has also been calculated using the power plant data separated into three classes:
- Over 30 years
- Between 20 and 30 Years
- Below 20 years

in order to provide more detailed information on the statistical level of obsolescence of the power plants in each Member State.

'WEIGHTED AVERAGE AGE' OF THREE AGE-RANGE CLASSES OF COAL-FIRED BOILERS

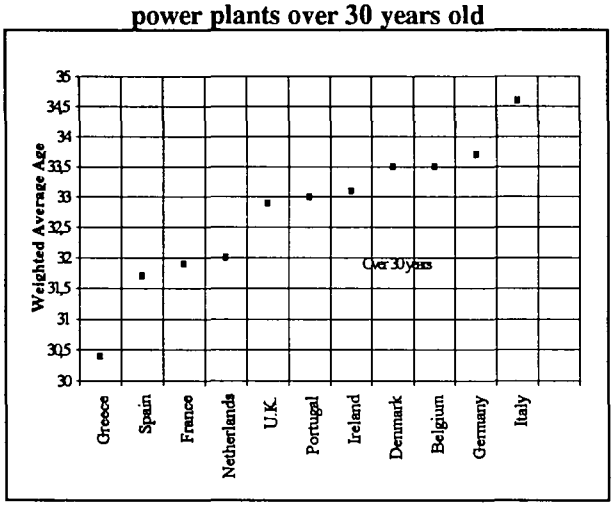
Table 4 : 'Weighted Average Age' of EU Coal-fired Power Plant Park Split Three Age-range classes

Member State	$\frac{\Sigma i\ \alpha i * MWi}{\Sigma i\ MWi}$		
	Over 30 years	20-30 years	below 20 years
Belgium	33,5	25,8	15,8
Denmark	33,5	24,6	9,2
France	31,9	24,6	10,0
Germany	33,7	24,4	9,7
Greece	30,4	24,4	10,5
Ireland	33,1	27,9	7,7
Italy	34,6	24,3	4,9
Netherlands	32,0	27,4	7,2
Portugal	33,0	27,5	5,0
Spain	31,7	24,1	11,7
UK	32,9	24,0	13,9
EU	33,3	24,3	14,2

The calculated values of the 'Weighted Average Age' of the three age-range classes are reported in Table 4, showing the differences in the statistical level of

obsolescence among the three classes and the previous overall evaluation due to the different industrial evolution of each Member State.
These differences are emphasised in Figure 2 which gives the 'WAA' for the over 30 years power plant life for each Member State. This shows that the 'WAAs' vary over the range 30÷35.

Figure 2 : 'Weighted Average Age' of coal-fired power plants over 30 years old



The order of the Member States and capacities concerned are reported in Table 5.

Table 5 : Member States and Power Plant Capacity

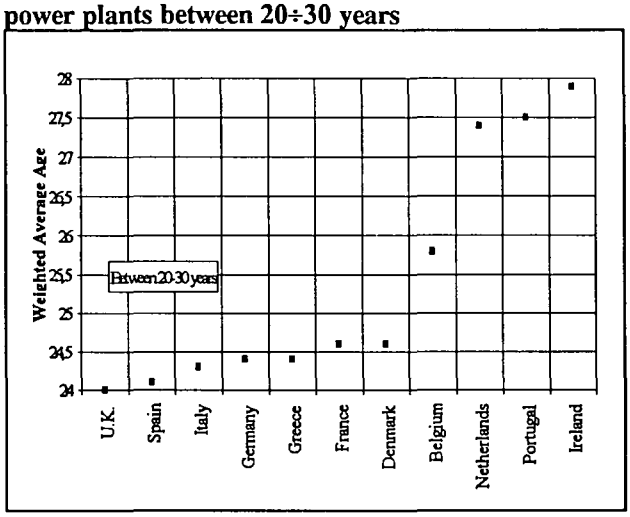
Member State	MW	Member State	MW
Greece	363	Ireland	185
Spain	209	Denmark	692
France	1080	Belgium	1243
Netherlands	125	Germany	8247
U.K.	7790	Italy	1133

Table 6 : Member State and Power Plant Capacity

Member State	MW	Member State	MW
U.K.	25828	Denmark	3158
Spain	2377	Belgium	1846
Italy	5213	Netherlands	655
Germany	15578	Portugal	100
Greece	700	Ireland	110
France	7299	E.U.	62864

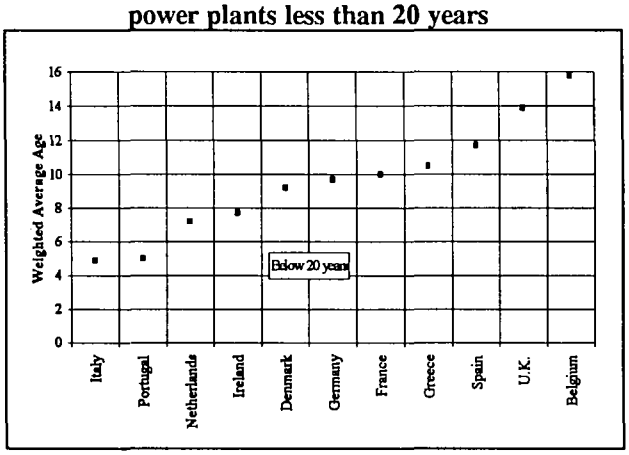
Figure 3 presents the Weighted Average Age for the class between 20÷30 years showing two plateaus, a lower one covering seven countries in the range 24÷26 and a higher range ('WAA'~28) covering power plants in Netherlands, Portugal, and Ireland constructed around 1965.

Figure 3 : 'Weighted Average Age' of coal-fired power plants between 20÷30 years



The order of the Member States and Power Plant capacities concerned are reported in Table 6.
The below '20 years old' class shows (Figure 4) 'WAAs' vary in the range 5÷16; these values indicate that the level depends on the years of installation of the new coal-fired units power plants in each Member State.

Figure 4 : 'Weighted Average Age' of coal-fired power plants less than 20 years



The order of the Member States and Power Plant capacities concerned are reported in Table 7.

Table 7 : Member States and Power Plant Capacity

Member State	MW	Member State	MW
Greece	3260	Ireland	1045
Spain	8446	Denmark	4306
France	3018	Belgium	911
Netherlands	3715	Germany	23248
U.K.	5930	Italy	4591
Portugal	1564	E.U.	60393

E.U. COAL-FIRED POWER PLANT SIZE

The 'Average Capacity per coal-fired thermal unit' for each Member State is given in the Table 8.

Table 8 : 'Average Capacity (MW) per Coal-fired thermal unit' for each Member State

Member State	Ratio	Member State	Ratio
Belgium	129	Italy	260
Denmark	194	Netherlands	409
France	317	Portugal	214
Germany	167	Spain	277
Greece	223	U.K.	272
Ireland	71	E.U.	213

The 'Average Capacity (MW) per coal-fired thermal unit', that varies between 71 of Ireland and 317 of France, is also an index of the power plant concentration or dispersion in the country. Although fuel conversion efficiency and economical electricity generation both increase with the unit size, utilities often prefer for management reasons, or due to local constraints, to install boilers of lower capacity.
To increase the efficiency and economy of the power plants, the new tendency has been to construct boilers of higher capacity as demonstrated by the 'Average Capacities (MW) per coal-fired boiler over 30 years, below 30 years and at project status' of single Member State reported in Table 9.

Table 9 : 'Average Capacity (MW) per Coal-fired Thermal Unit over, less than 30 years old and at projects Status' for each State Member

Member State	Ratio MW/Number boilers		
	over 30 y	Below 30 y	project
Belgium	86	160	388
Denmark	63	178	315
France	163	353	-
Germany	92	208	255
Greece	68	249	368
Ireland	16	110	-
Italy	103	279	404
Netherlands	125	437	535
Portugal	50	226	326
Spain	105	285	-
U.K.	95	438	-
E.U.	90	265	382

It is possible to note: e.g.,

- in Germany, due to the low 'Average Capacities' of the coal-fired thermal units over (92) and less than (208) 30 years old, there are plants at project status with an average capacity of 255 MW;
- in U.K., since the 'Average Capacity' of the plants over 30 years old is high (438), they consider unnecessary to plan new units;
- in Italy, due to the low 'Average Capacities' of the coal-fired thermal units over (103) and less than (279) 30 years old, they have planed plants with an average capacity of 444 MW;
- in France, since the 'Average Capacity' of boilers below (163) and over (353) 30 years old is high, there are no new units planned.

In other words, Member States with power plants of low capacity have been obliged to plan new units of high capacity to balance the reduced efficiency of existing units.

E.U. COAL-FIRED POWER PLANT EFFICIENCY

The efficiency of E.U. coal-fired thermal units varies between 19% and 44% within the collected available data[2] Table 10 presents the correlation for each range with the various parameters (number, average age and mean capacity of boilers).

Table 10 : E.U. Coal-fired Thermal Units : Efficiency versus Number, Average Age and Mean Capacity of Boilers

Efficiency Range %	N° Boiler	Average Age	Average Capacity, MW
19÷30	55	28	118
30÷35	190	26	221
35÷45	222	21	334

Low efficiency values correlate with old boilers of small capacity, while high efficiency values correspond to new thermal units of relative higher capacity, and, specifically to the characteristics of boilers with efficiency in the range 35÷45% probably due to the specific boiler design.
The variation of efficiency with boiler age and capacity is well illustrated in Figures 5 and 6, where the trend of thermal unit efficiency is correlated with capacity (MW) and year of first operation, respectively.
In the graphs the efficiency trend seems to be correlated positively with electricity generating capacity, negatively with the construction year approaching asymptotically, in both the cases, the

2 *The analysis of efficiency has not been performed on overall E.U. coal-fired boilers since data for this specific parameter are not available for all the existing 677 coal-fired thermal units, but only for 467. Nevertheless, due to the large quantity of the available data (69% of the total) the results of this analysis of the correlation between efficiency and various other parameters (capacity, age, and operation hours) of the coal-fired boilers may be considered statistically reliable.>:*

range 38÷42%. The scattering of the points from the mean in Figure 6 may be explained by the necessity in recent years to construct boilers of low capacity due to different factors such as site constraints or local limited electricity demand: in fact, in Figure 5, the distribution of the points related to efficiency versus capacity approaches the asymptote with a narrow range, while the area of boilers below 100 MW is particularly dense.

The analysis of Figures 5 and 6 and Table 10 indicates that the conventional design of thermoelectric units has reached the maximum conceptual development and further improvements in efficiency must be reached with new technologies to be applied in existing or new power plants.

Figure 5 : Trend of E.U. coal-fired boilers versus capacity

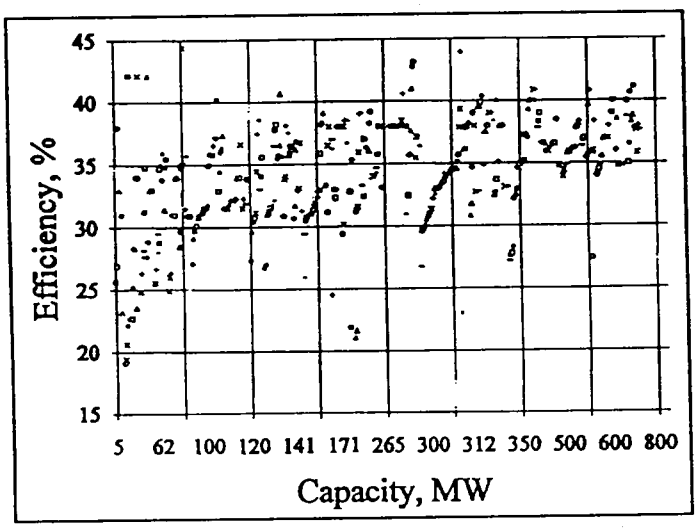
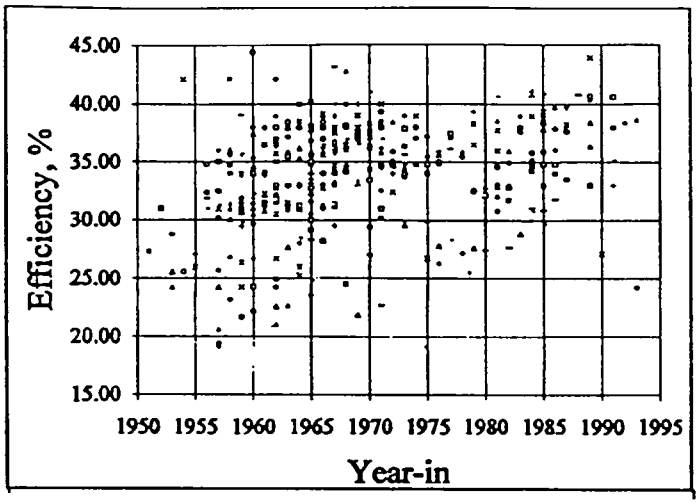


Figure 6 : Trend of E.U. coal-fired boilers versus year of first operation



PRIORITY IN REPOWERING EXISTING COAL-FIRED POWER PLANTS

To produce aggregates and averages for the coal-fired boiler efficiency of each Member State at capacity and age level, the statistical formula 'Weighted Average Efficiency (WAE)' is then applied to the E.U. coal-fired thermoelectric unit data, where:

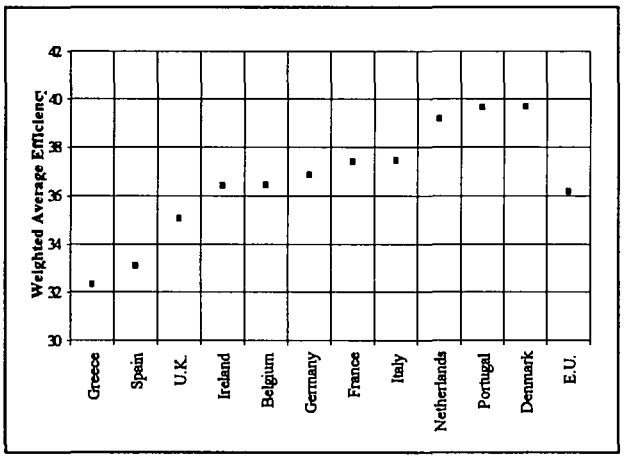
$$\text{Weighted Average Efficiency} = \frac{\sum_i \eta i * MWi * (1/Ai)}{\sum_i MWi * (1Ai)}$$

and : i denotes a coal-fired thermoelectric unit
η the efficiency of the unit i
MW the capacity of the unit i
A the age of the unit i

The calculated values of the 'Weighted Average Efficiency' are reported in Table 11 showing a range between 32÷40. The 'WAE' synthesizes the data of power plant efficiency and provides statistical information highlighting the comparative level of conversion of fuel into useful energy of E.U. coal-fired power plants. Furthermore, the best 'WAE' values averaging between 39 and 40 of some coal-fired power plants do represent a focal point for those Member States which are below this figure.

The statistical series in Figure 7 shows the priority that should be given by each Member State to repowering the coal-fired power plants in order to produce the maximum of useful energy and controlling the flue gas emission, specifically, greenhouse gases.

Figure 7 : Trend of 'Weighted Average Efficiency' of the E.U. coal-fired thermoelectric units



In order to define the priority index for repowering coal-fired boilers characterized by greater age and lower capacity, the 'WAE' formula has been applied on coal-fired boiler data subdivided in three classes of efficiency: namely, below 30%, between 30÷35% and over 35% (Table 12).

'WAE' for Efficiencies Below 30%

The result of this analysis indicates that the 'WAE' for efficiencies below 30% varies in the range 24÷30 indicating that the electrical productivity of the power plants is very low as to the capacity of the single boilers, while the age is high: repowering of the units is urgent in order to reach a mean threshold of efficiency to justify their life extension.

Table 12 : 'Weighted Average Efficiency' of E.U. Coal-fired Power Plant calculated in three Efficiency Classes : below 30%, 30÷35% and over 35%

Member State	$\frac{\sum i \eta i * MWi * (1/Age)}{\sum i\ MWi * (1Age)}$		
	Below 30%	30÷35%	Over 35%
Belgium	28.77	34.26	36.67
Denmark	34.07	33.81	40.12
France		34.01	38.02
Germany	24.69	33.20	38.21
Greece	28.46	32.01	35.12
Ireland	26.24		38.01
Italy		33.37	38.56
Netherlands			39.17
Portugal	28.17		39.93
Spain	27.58	33.24	35.65
U.K.	24.68	33.90	36.66
E.U.	26.22	33.38	37.98

In this class of efficiency the total capacity of the power plants is 6502 MW and average operating hours per year 4512. Due to the very low capacity (e.g. Belgium 53 MW, Denmark 160 MW, Ireland 425 MW, and Portugal 150 MW) and operating hours (e.g. Greece 2475 hour/year) of some Member State's boilers the repowering should focus o the boilers of the other Member States that have the following capacities:

- Germany, 1163 MW
- Spain, 2193 MW
- U.K., 680 MW

giving an overall capacity of 4036 MW. The efficiency improvement obtainable by coupling existing coal-fired thermal units with a gas turbine in combined cycle could reach value of 40%. Nevertheless, the advantages in electricity production and CO_2 reduction should be carefully evaluated by the three Member States because the savings may not be cost effective given the number of boilers and the related ratio capacity (MW)/number of boilers, that is:

Member State	N. Boiler	Ratio MW/N.boiler
Germany	12	97
Spain	7	313
U.K.	6	113

Instead, an advantageous strategy could be to combine repowering activities for coal-fired boilers of this efficiency class on two levels:

• retrofit of those boilers of adequate thermal capability with advanced combustion technologies such as cyclone combustors where the coal is burned in a separate chamber outside the furnace cavity (keeping the ash out of the boiler tubes) and simultaneously connected to a gas turbine in order to reach an overall efficiency up to 45÷50%

• promotion of new Integrated Gasification Combined Cycle (IGCC) projects, drawing on the experience and success of the Puertellano Plant, Spain, to be installed in existing sites providing a double advantage:

- utilization of existing sites for the IGCC process overcoming the constraint and uncertainty in having new sites approved by the local authority
- substitution of old plants having low efficiency (averaging 28% in Germany, Spain and U.K.) and high CO_2 emission with new plants with efficiency up to 50%.

'WAE' for the 30÷35% Efficiency Class

The 'WAE' for the 30÷35% efficiency class gives figures in a very narrow range (32÷34) indicating that coal-fired boilers are similar in capacity and year of construction.

A priority scale of the Member States which should repower their own electrical facilities can be obtained by submitting the power plants belonging to this efficiency class, given their comparative age and electrical capacity, to an analysis of parameters as total capacity, average operating hours per year, and ratio 'Capacity (MW)/Number of boilers'. The priority scale can be calculated by the formula as follows:

$$\text{Priority Scale} = \frac{MWi * Hi * Ri}{\Sigma i\ MWi * Hi * Ri} * 100$$

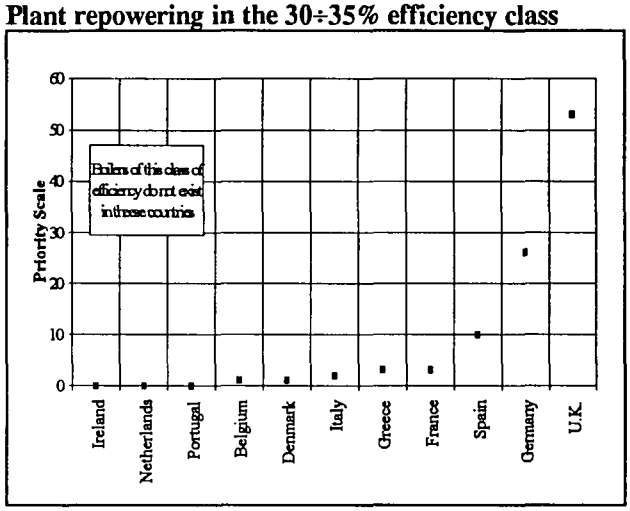
Where :

- i denotes a Member State
- MW the overall capacity of the Member State i
- H the power plant average operating hours of the Member State i
- R de ratio capacity (MW)/number of boilers of the Member State i

This priority scale gives information on the power plants for which increasing boiler efficiency provides a means of meeting future energy requirements and, at same time, reducing CO_2 emissions at European Union level: in fact, the prospects for an increase in energy production combined with a decline in CO_2 emissions are negligible or reasonable depending on whether capacity, operating hours, and boiler size of the power plants are low or high values, respectively.

The priority scale given in Figure 8 shows the Member States which may reconfigure as combined cycle plants by adding gas turbines to their own electric facilities more usefully.

Figure 8 : Trand of the Priority Scale in Power Plant repowering in the 30÷35% efficiency class



Therefore, the most probable Member State candidates for repowering in this efficiency class are U.K., Germany, and Spain with the following power plant capacity, operating hours and number of coal-fired thermal units:

Member State	Capacity MW	Operation Hours/Yrs	Number of boilers
U.K.	18625	5652	75
Germany	11805	5028	58
Spain	5300	6695	22

Other Member State candidates may be France and Italy with the following characteristic parameters :

Member State	Capacity MW	Operation Hours/Yrs	Number of boilers
France	1415	4607	6
Italy	1318	6695	11

The power plants, shown in the two above tables, repowered with a combined cycle can reach efficiencies of up to 55%.

In agreement with the priority scale other most important factors determining the need for new electric generating capability must be considered by Member States by analysing macro-economic factors, such as the Gross National Products and the cost of the fuel and electricity and peak demand and energy requirements.

'WAE' for Over 35% Efficiency Class

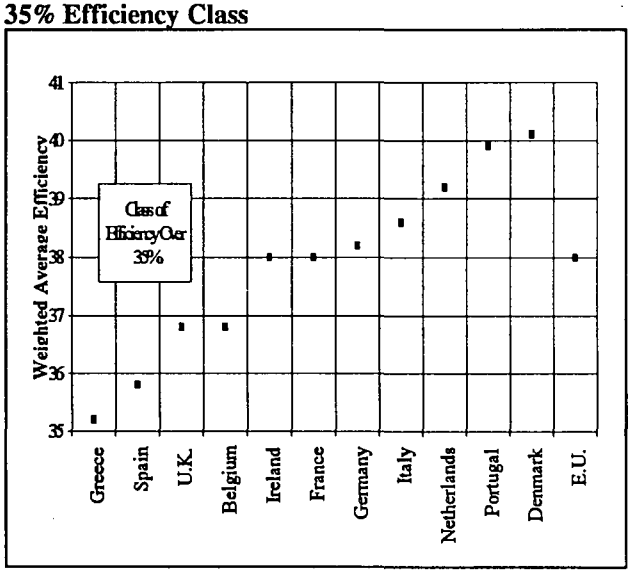
The 'WAE' for the over 30% efficiency class shows data in the high range 35÷40 due to the high capacity (MW) and recent year construction of single boilers coupled to efficient thermal conversion of the coal.

The overall capacity of this efficiency class is 79219 MW that is 1.5 times the total capacity of the other classes. The average size of the coal-fired thermoelectric units, expressed as ratio of total capacity (MW)/number of boilers, is 334, 1.5 and 2.8

times that of the classes below 30% and 30÷35%, respectively.
The 'WAE' statistical series derived from the data of the over 35% efficiency class given in Figure 9 indicates two levels of priority for the repowering of coal-fired boilers, namely below 37 and over 38. But the programme of retrofitting activity to improve the efficiency of the thermal Plants is difficult to define for a series of reasons:

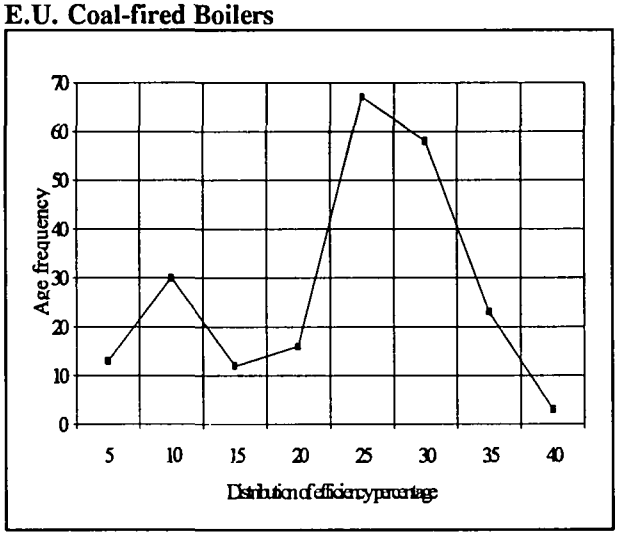
- the average age is 21 years with the frequency distribution of the boiler age, classified every five years, shown in the histogram in Figure 10. The coal-fired units exceeding thirty years account for a small proportion of the boilers in this class, ca. 12%. Utilities, keeping in view the life time of the boilers, can consider it economically advantageous to operate them far in excess thirty years.

Figure 9 : Behaviour of the "'Weighted Average Efficiency' of the Coal-fired Boilers of the Over 35% Efficiency Class



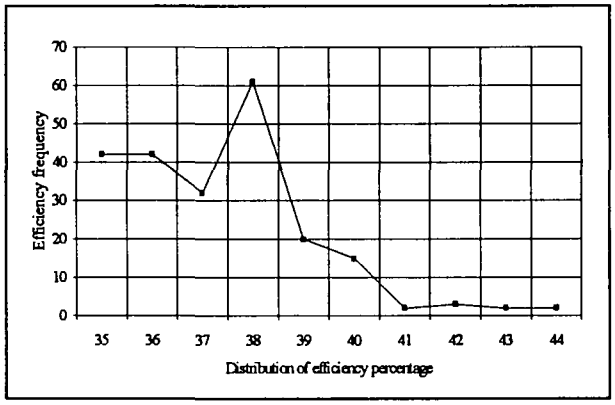
- average efficiency is 38% with the frequency distribution of the thermal conversion of the coal, classified every five per cent, shown in Figure 11. This efficiency level of coal-fired thermal units is the maximum potential for current conventional process design developments.

Figure 10 : Frequency distribution of the Age of E.U. Coal-fired Boilers



- the repowering of boilers of this class efficiency would be not as cost-effective as for the previous two efficiency class since the application of advanced combustion technologies and IGCC processes is a necessary substitution. In fact, the above new systems provide a means of satisfying a rising demand for electricity, while providing an environmental benefit.

Figure 11 : Frequency distribution of the Efficiency of E.U. Coal-fired Boilers



Potential Reduction of CO_2

Carbon dioxide emissions can be reduced by 10 to 15% for each 5-percentage-point improvement in conversion efficiency when adopting high coal conversion technologies, as previously reported.
Related to the 'WAE' calculated for the three different classes of boiler efficiency the hypothesis on Member State's potential candidates for repowering of their power plants, an evaluation of the maximum potential reduction of CO_2 can be performed as follows:

Carbon dioxide emissions from E.U. coal-fired Power Plants[3] in 1993 (1992 value reduced by 2%) result to be: CO_2 = 1165 Mt
and Carbon dioxide specific emissions per installed MW: $CO_2/MW = 6.3 \times 10^{-3}$ Mt

• Hypothesis for repowering the class of coal-fired boilers with an efficiency lower than 30%
Power plant candidates for repowering activities are found in Germany, Spain, and U.K.
- Overall capacity = 4036 MW
- average efficiency = 26.8%
- Current CO_2 emission = 25.3 Mt/y
- repowered efficiency = 50%
- CO_2 reduction emission = 11.7 ÷ 1706 Mt/y

• Hypothesis for repowering the class of coal-fired boilers with an efficiency between 30÷35%
Power Plant candidates for repowering activities are found in Germany, Spain, and U.K.
- Overall capacity = 35370 MW
- average efficiency = 32.7%
- Current CO_2 emission = 223.7 Mt/y
- repowered efficiency = 55%
- CO_2 reduction emission = 99.8 ÷ 149.6 Mt/y

A gradual repowering of about 20% per year of the coal-fired Power Plants will give a CO_2 reduction of about 22÷33 million t/year and would be a realistic goal for the E.U. coal-fired thermoelectric sector to attain.
Further reduction can be matched if power plants in France and Italy are included among the candidates, too. The additional CO_2 reduction are estimated to be 7.7÷11.6 million t/year.
E.U. coal-fired Power Plant generating electricity related to the collected data consists of 677 existing thermal units for a total capacity of 144347 MW and 40 thermal units at project status for a total capacity of 15268 MW.
The statistical analysis based on the 'Weighted Average Age', calculated on the aggregate and analytical (three age ranges) data for the boilers, gives an indication of the level of obsolescence of E.U. Power Plants and the need to extend the life of coal-fired thermal units.
The analysis based on the available efficiency data for 467 E.U. coal-fired thermoelectric units, indicates the following:
- an overall capacity of 122672 MW, with mean operating hours per year of 4983 and an average efficiency of 34%, ranging from 19 to 44%.

The statistical analysis based on the 'Weighted Average Efficiency' of the boilers classified in three efficiency range, namely below 30%, between 30÷35% and over 35%, gives an overview of E.U. coal-fired power plants, as follows:

below 30% range of efficiency

• 55 boilers with a total installed capacity of 6502 MW and mean operating hours per year of 4512, and efficiency ranging from 24 to 30%
• statistical candidates for repowering are situated in the following Member States:

Member State	N. Boilers	Overall MW	Operating Hours per Year
Germany	12	1163	5510
Spain	7	2193	5597
U.K.	6	680	3828

• the hypothesis on the repowering of the candidate power plants may be based on two strategy levels:
- boilers of related higher capacity and efficiency retrofitted with cyclone combustors and coupled in combined cycle with gas turbines with an increase in efficiency of up to 40÷45%
- promotion of the IGCC process in those plants having the oldest boilers with corresponding low capacity and efficiency in order to use existing sites and increase efficiency up to 50%.

30÷35% range of efficiency

• 190 boilers with a total installed capacity of 41951 MW, with mean operating hours per year of 4968, and efficiency ranging from 32 to 34%
• statistical candidates for repowering are situated in the following Member States:

Member State	N. Boilers	Overall MW	Operating Hours per Year
Germany	75	18625	5652
Spain	58	11805	5028
U.K.	22	5300	6695

• repowering hypothesis of the candidate Power Plants based on the adoption of combined cycle with gas turbines to reach efficiencies up to 55%.

over 35% range of efficiency

• 222 boilers of total installed MW equal to 74219, with mean operating hours per year of 4972 and efficiency ranging from 35 to 44%
• repowering should only be considered in the distant future for the following reasons:
- the average age of the boilers is 21 years and only 12% of the coal-fired units are older than thirty years. Generally, utilities keeping in view the life time of the boilers can consider it economical to operate them for much longer than thirty years.
- the (35÷44%) efficiency level is the maximum potential for conventionally-designed coal-fired thermal units
- the repowering of boilers in this efficiency class would be not cost-effective due to the relatively recent construction of the units and the higher coal conversion in producing electricity compared to boilers in two other efficiency class. Therefore, the application of

3 *Data from 'Energy in Europe' 1993 - Annual Energy Review - European Commission - Directorate-General for Energy (DG XVII). Special Issue, June 1994*

advanced combustion technologies should start with the first two efficiency classes examined above.

Related to the greenhouse gas effect, designing new power plants (to be installed on the oldest sites) with advanced combustion configurations such as pressurized fluidized bed and gasification technology in combination with gas turbines can add a further benefit to the environment due to the elimination of flue gas scrubbers. As already discussed the elimination of SO_2 in IGCC's and fluidized bed processes varies in the range from 90 to 99% allowing the discharge of the flue gas in the atmosphere without the use of de-SO_x scrubbers that actually add CO_2 to the air because via the chemical reaction with $CaCO_3$ and have negative effect on plant efficiency.

Related to the economy, the proposed advanced technologies for repowering E.U. coal-fired power plants require a higher level of investment than new conventional pulverized fuel thermal units, nevertheless they may be able to produce power at a lower cost per kWh for the following reasons:

- the electrical-thermal efficiency of up to 45÷55% reduces the specific kWh cost directly because conventional power plant efficiency generally range between 30÷40% depending on the age and size of the units
- the use of advanced technology, new materials and equipment resulting from the demonstration and optimisation at power plants (i.e. Puertellano project) facilitates the design and construction of the new installations
- although the reduction in CO_2 produced per MW is not a cost advantage, nevertheless it is a clear environmental target for the future and a concomitant economic advantage with the improvement in efficiency of the new technologies.

CO_2 reduction can be maximized at 111.5÷167.2 Mt/yr by repowering the boilers in the efficiency below 30% and 35÷40% ranges belonging to the Member States selected via the 'Weighted Average Efficiency' (CO_2 reduction increases to 119.2÷178.8 million t/year including France and Italy).

A gradual repowering of this 20% of the installed capacity would correspond to a CO_2 reduction of about 22÷33 million t/year (24÷36 million t/year including France and Italy).

It would be noted that the Commission has been requested to implement action related to this problem by the European Parliament Resolution of the 21 December 1993.

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ANALYSIS OF THE BEST WAY : MOX FUEL

The optimum route for disposal of surplus weapons grade plutonium

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INTRODUCTION

In the following presentation it is assumed that, under of the START agreements, warheads will be dismantled at a rate close to 2000 per year, freeing up a significant quantity of highly enriched uranium and weapons grade plutonium in the coming years to come.
From a technical standpoint, as far as the plutonium is concerned, disposal in the short term on a meaningful industrial scale represents a major problem for the countries concerned. But, to keep in long term storage large quantities of weapons grade plutonium can obviously not be recommended either. This would be at variance with the very spirit of the disarmament initiatives, to mention only one reason.

OPTIONS FOR DISPOSAL OF WEAPONS GRADE PLUTONIUM

Currently available technologies allow of two main options which can effectively prevent weapons grade plutonium from being used for illicit activities:

- Either to use it as nuclear fuel in civilian power plants thus to leaving the residual plutonium (which has not been fissioned) as reactor-grade plutonium associated with the fission products in the spent fuel. Progressive recovery of that plutonium can await later reprocessing at a stage when such fissile material may become attractive for civilian purposes; for example, around 30% of the plutonium recycled in a typical LWR[1] of 1000 MWe unit size, and loaded with one third MOX fuel will be burnt and the remainder ends up as residual reactor grade plutonium in the spent fuel
- or to dispose of it, after appropriate processing to render the material unusable for diversion. The most frequently proposed method is to blend the plutonium with fission products, to fabricate a kind of artificial high by active waste, vitrify this blend as it is done for fission products after reprocessing, and finally to dispose of it in a deep geological repository.

The US National Academy of Sciences has concluded in its study on weapons grade plutonium disposal that both options offer a comparable degree of security against to diversion.
However, it is also noted in this study that :

- if plutonium is burnt in reactors, its isotopic composition is greatly modified, rendering it definitely much less attractive if not useless for the production of nuclear explosives. This is the essential point, since under the other option the fission products would decay in some hundreds of years, after which the remaining radioactivity will of itself no larger provide any serious protection against diversion. Consequently, mixing weapons grade plutonium with fission products to form high by active waste cannot be considered to be a definitive solution;
- the use of plutonium in civilian power plants of course generates electricity, thus not only turning "swords into ploughshares" but adding an economic incentive to this option. Indeed, 100 tons of Pu recycled in LWRs represent 2000 TWh, or about one year's of electricity consumption in Europe.

In a previous presentation[2] we demonstrated that there is, not only for the non-proliferation considerations of the high cost of interim storage, every incentive to use surplus weapons grade plutonium as fuel as quickly as possible after it becomes available from the dismantlement of nuclear warheads.

1 *Light Water Reactor*

2 *Disposal of Surplus Separated Plutonium, Influence of Interim Storage of Plutonium, A. Decressin and E. Vanden Bemden, NATO International Scientific Exchange Programme, 16-19 Oct. 94, IPPE, Obninsk, Russia*

WHICH TYPES OF REACTORS COULD BE EFFICIENT USED

The fastest way to use weapons grade plutonium as fuel is to recycle it in existing power reactors such as LWRs and, perhaps, at a later stage, in fast neutron reactors (FNRs) which have still to be built. New reactor concepts may also be envisaged burning the plutonium stocks even more efficiently. But the time required for their development and industrial deployment could be longer than the time needed by conventional reactors to use the entire of the plutonium surplus forecasted to become available in the near future.

Indeed, Light Water Reactors of modern design can be fuelled with MOX for a substantial part of their cores (30% or even more) without major core modifications.

The first large commercial LWR power plants were loaded with MOX fuel in Germany in 1982 and in France in 1987; around 15 tons of plutonium have already been recycled in Europe to date. In the European Union close to 30 reactors will soon have been loaded with this fuel. Current MOX manufacture capacity is about 60 tons annually. Extension programmes are under way leading to a capacity of 400 tons by the year 2000, which would use around 15 tons of Pu/year.

In the USA, more than 100 LWRs are currently in operation and most of these are perfectly able to accept MOX as fuel at least up to 1/3 of the core.

In the Russian Federation, seven VVER-1000 produce electricity and it is expected that 10 to 15 additional PWRs could be connected to the grid by the year 2010.

In the Ukraine, ten VVER-1000 reactors are operating and five are under construction. All these reactors could certainly serve as plutonium burners when partially loaded, as a first step, with MOX fuel, close to 1/3 of the core. In a more distant future, new designs of LWR could permit operating with 100% MOX fuel cores.

Fast neutron reactors (FNRs) if built would certainly constitute more efficient plutonium burners. Their efficiency in this respect is around five times greater than that of LWRs (fuelled with 1/3 MOX). The future Russian fast reactor type BN 800, for instance, could be fuelled each year with 1.6 tons of plutonium, the first core 2,3 t plutonium[3].

However, as of today FNRs are still in the demonstration phase. In the USA, the fast reactor concept has never got beyond the experimental phase and nothing suggests that the intention exists to promote such development over the coming decades.

On its side, the Russian Federation plans progressively to load the BN 600 with plutonium, and the Russian authorities have announced that they envisage building three to four BN 800 fast reactors by the year 2010.

SCENARIOS FOR PLUTONIUM USE IN POWER REACTORS

For the use of weapons grade plutonium as fuel in civilian power plants, various scenarios can be selected involving different types of power reactors and plutonium recycling routes (fast or thermal recycling route). In our study, we have analysed certain scenarios with the view to examining the impact of the reactor type and the recycling route chosen on the total time needed to eliminate a given amount of weapons grade plutonium by irradiation and thus conversion into spent fuel elements.

Six scenarios have been studied (see table 1) involving:

- PWRs of current design and of 1000 MWe unit size loaded with one third of the core with MOX fuel
- Advanced Fast Neutron Reactors of 800 MWe unit size loaded with 100% MOX fuel, and
- Advanced PWRs of 1000 MWe unit size loaded with 100% MOX fuel.

The following assumptions have been adopted for annual loadings of weapons grade plutonium per reactor :

- 300 kg for 1000 MWe PWRs at 1/3 MOX;
- 900 kg for 1000 MWe PWRs at 100% MOX;
- 1500 kg for 800 MWe FNRs (First core 2500 kg weapons grade plutonium).

For the sake of comparison, it is assumed that the firm decision to go ahead with a given scenario is taken at the same date in all six cases. In order to cover a broad range of possibilities for each reactor type, three reference and three accelerated scenarios have been evaluated to see the effect of an increased number of reactors operating with MOX on the total time needed to eliminate a given amount of plutonium. The times have been calculated under the six scenarios needed to eliminate 50 tons and 100 tons respectively of weapons grade plutonium.

Before discussing the results, it has to be noted that even if it is assumed that the decision is taken at the same date to go ahead with a certain scenario, the point in time when the first MOX load is manufactured and loaded into the first reactor of the kind chosen in the scenario, will not be the same for each scenario. In practice this will depend on the availability both of the type of reactor of the recycling route chosen. In other words, a certain setting-up time has to be accounted for at the end of which the following conditions have to be fulfilled, among others:

3 *Utilization of Plutonium in Nuclear Power Industry of Russia - V.N. Mikhailov (Minatom, Russia) and al.*
Paper distributed at the International Policy Forum: Management and Disposition of Nuclear Weapon Material, March 8-11, 1994, Leesburg, Virginia, USA.

• the first reactor of the type considered in the scenario must be in industrial operation or brought into operation and capable of accepting MOX fuel on an industrial scale;
• the technology needed to manufacture MOX must be available;
• the sub-industries of the plutonium cycle must be available, licensed and operational (MOX fuel fabrication plants, specific MOX fuel transport systems the necessary psecial containers, etc.);
• all administrative conditions, including safeguards procedures laided down for MOX use have to be satisfied;
• the fuel for the first MOX load must have been supplied to the first power station involved in the scenario.

Taking all the above into consideration, the setting-up time will amount to at least 6 years, in the case that for instance, existing conventional LWRs with 1/3 MOX loadings are envisaged as plutonium burners.

If Fast Neutron Reactors (FNRs) were to chosen for the recycling of weapons grade plutonium, a minimum delay of 11 years would have to be assumed for the setting-up time, given that the first industrial FNR using plutonium still has to be built, licensed and industrially operated (in Russia, for instance, the BN 600 took 12 years from the start of construction to full operation, and the comparable period in the case of . Superphénix in France was 9 years).

If a new type of LWR has to be designed from scratch, built, licensed and industrially operated with 100% MOX cores, even longer setting-up time might have to be assumed, due to the fact that experience must probably first be gained with operation of these reactors with uranium fuel and/or MOX fuel but with fuel loads under than 100%.

Taking into account these considerations, effective recycling of plutonium in reactors would not begin earlier than perhaps 6 to 15 years following the firm decision taken to do so. If on the other hand, existing LWRs capable of being loaded with a third of the core with MOX fuel are to be deployed, wich shorter run-in time coulg be achieved. If FNRs or a new type of LWR capable of being loaded with 100% MOX fuel are envisaged, it is not necessary the case that subsequent reactors of that type could be built and operated following shortly upon the first one, since satisfactory experience would have to be gained with the first unit before operation or even construction of the following units.

DISCUSSION OF THE RESULTS

Taking into account all the constraints set out above, some general trends may be concluded from the scenarios examined :

• Once a firm decision has been taken to go ahead with a given scenario, the total times needed, including setting up time, for the disposal of 50 and 100 tons of weapons grade plutonium are 20 to 25 years and 25-35 years respectively.
• Within each category of scenarios, reference or accelerated, the difference in the results is small but increases with the quantity of weapons grade plutonium to be eliminated, the largest difference being 4 years:

This rather small difference may be attributed to:

• the inevitably slow and gradual start-up of the operational phase of the scenarios, meaning as from when plutonium is actually used in the power plants;
• the often major delays between the operation of the first unit to be built a new advanced reactor type and due to demonstration requirements;
• the longer setting-up time required if advanced reactor types are preferred, which is only partly compensated by their more efficient plutonium-burning characteristics.

Generally speaking it may be concluded from our analysis that there is no major interest in developing new exotic reactor concepts for the sole purpose of eliminating a given quantity of weapons grade plutonium in the order of 100 tons. In this case, the favourite option is to use existing reactors and those in an advanced stage of development in the country concerned as quickly as possible.

However, industrial approaches towards the problem could have an influence on the lead times of the scenarios and especially on the setting up times. Considering the state of MOX recycling development in Russia and in the USA for example, three possibilities could be envisaged:

• Use could be made of the existing technologies and the experience of countries where such technologies have been developed over many years. MOX fuel could be fabricated in these countries to the extent that non-committed capacity is available, or in additional MOX fabrication plants still to be built. Howerver transportation of weapons grade material is generally considered to be an issue fraught as the difficulties, at least from the public acceptance and therefore political point of view.
• Technology transfers on a commercial basis or industrial joint ventures between the specialized companies and the countries having surplus plutonium could be enhanced, with the aim of building and operating the MOX fuel fabrication plants, including

all necessary services and substructures, on the site where the plutonium is available.

- A third possibility is, of course, that the countries possessing weapons grade plutonium develop the necessary R&D and set up the chosen recycling routes on their own. Start-up and development of such national industrial programmes would probably take more time than in the previous cases. Indeed, such programmes often depend to a very large extent on government financing which, in general, takes more time than direct cooperation between partners, whose goal is to be commercially efficient and thus to obtain results as soon as possible.

Of these three industrial approaches, the second one could present many advantages, from the economic point of view, as it seems to be the most promising way to get rid of increasing amounts of weapons grade plutonium quickly. In this context, it is noted once again that in the European Union several countries have gained considerable experience in the fabrication and use of plutonium in nuclear power plants.

CONCLUSIONS

Disposal of weapons grade plutonium is a goal which should be achieved as quickly as possible and be performed safely and economically, the aim being also to preserve the energy resource it constitutes for the future. Using weapons grade plutonium as fuel for nuclear reactors appears to be the best solution.

In order to save time and therefore consequence money, it may be concluded from some scenarios involving different reactor types, that there is an economic incentive (time-saving) to use the weapons grade plutonium as fuel in existing LWRs, since this route offers the shortest time span.

Among the various possible industrial approaches, close and effective international industrial cooperation, including commercial know-how transfer agreements and industrial joint ventures, could advantageously be organized involving companies having long experience in the field of MOX fuel production and MOX fuel use in LWRs.

Table 1 : Scenarios : Number of reactors fuelled each year with MOX

	Reference scenarios			Accelerated scenarios		
Year	1a	2a	3a	1b	2b	3b
	1000 MWe PWRs 1/3 MOX	800 MWe FNRS	1000MWe PWRs 100 % MOX	1000 MWe PWRs 1/3 MOX	800 MWe FNRS	1000 MWe PWRs 100 % MOX
"do"						
1						
2						
3						
4						
5						
6	1(a)			1(a)		
7	2			2		
8	3			3		
9	4			4		
10	5			5		
11	6	1(b)	1(b)	7	(1)b	1(b)
12	7			9		2
13	8			11	2	3
14	9		2	13	3	5
15	10	2		15	4	7
16	11		3	17	5	9
17	12		4			
18	13	3	5			
19	14		6			
20	15	4	7	(c)	(c)	(c)
21	16		8			
22	17	5	9			
23						
24						
25						
26	(c)	(c)	(c)			

Table 2 : Time needed (ts + te) to achieve the scenario's objectives

Scenarios categories	time after "do" (years)	
	50t WGPu	100t WGPu
Reference scenarios		
1a : PWRs 1000 MWe 1/3 MOX	23	33
2a : FNRs BN 800 type	23	30
3a : PWRs 1000 MWe advanced design, 100 % MOX	23	29
Average time	**23**	**30**
Accelerated scenarios		
1b : PWRs 1000 MWe 1/3 MOX	21	30
2b : FNRs BN 800 type	20	27
3b : PWRs 1000 MWe advanced design, 100 % MOX	19	26
Average time	**20**	**28**

COMMUNITY NEWS

PROGRESS AT ENERGY COUNCIL MEETING, LUXEMBOURG, 1 JUNE 1995

This meeting of EU Ministers responsible for energy matters was chaired by the French Minister for Industry, Mr Yves Galland. The main points on the agenda of the Council were the amended proposal for a Directive on the completion of the internal electricity market[1], Trans-European networks in the energy sector, the Green paper "For an energy policy of the European Union"[2] and the proposal for a Council regulation concerning the "Thermie II" programme.

INTERNAL ELECTRICITY MARKET

The Council adopted conclusions accepting in principle the main lines of the Commission's working paper of 22 March 1995[3], i.e. the co-existence or simultaneous introduction and application of two systems: negotiated Third Party Access (TPA) to the network and a modified Single buyer model.
The Council, by adopting these conclusions, has opened the way for further discussions aimed at resolving the problems outstanding in this crucial area, and thus it is hoped, for a final decision before the end of the year, which would take the form of a common position to be proposed to the European Parliament.
Discussions were difficult, and the initial text, proposed by the French presidency as a compromise, had to be amended several times to satisfy positions and demands of a number of delegations (in particular the United Kingdom and France, Belgium, Germany, Greece, Italy, and Portugal also encounter problems).

Commissioner Papoutsis said at the final press conference that the outcome
of this Council represented a "positive development", although the Commission would have liked a text of conclusions with "less open points and more precise guidelines". Anyway, he added, these conclusions would at least allow the Commission to try to integrate the guidelines adopted by the Council. in its formal proposal (the 1993 amended proposal for a Council Directive whhich is of course still on the table). He declared himself satisfied with the fact that the Council has been ableto take on board the Commission's philisophy as regards simultaneous introduction and implementation of the two systems envisaged.
He again highlighted the Commission's aim of a common positiion in Council by the end of 1995, but added "we cannot foresee what could and can happen".

TRANS-EUROPEAN NETWORKS IN THE ENERGY SECTOR

The Council has adopted decisions laying down guidelines concerning the TENs in the energy sector, as well as one establishing a more favourable context for these networks. The Council adopted the two decisions by unanimity, as it also did to create a committee of type 'IIIA' for their implementation, under the 'comitology' rules. Commissioner Papoutsis expressed his satisfaction as these Council decisions were necessary to open the way for investments in a sector of strategic importance both for the Union and at Member State level.

GREEN PAPER ON ENERGY

The Council in adopting a resolution vis-à-vis the Commission's Green Paper "for a European Union Energy policy" delivered the contribution of the Member States themselves to the currently on-going public debate on the future energy policy of the
Union.

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1. For the full conclusions of the meeting, especially as the Internal Electricity Market, see the item earlier in this issue
2. doc. COM(94) 659 fin., 11.1.95, published in an amplified edition as a supplement (english, french, german, spanish) to Energy in Europe, *March 1995.*
3. doc. SEC(95) 464 fin., 22.03.95

On the basis of this contribution, and those of other institutions and interested parties (European Parliament, Economic & Social Committee, industry and other sector organisations, et al.) the Commission will prepare a White Paper concerning the future development of the Union's energy policy, which it should be in a position to adopt by the end of 1995.
During the final press conference, Commissioner Papoutsis stated that the Council's resolution is a very positive step which enables the Commission to include concrete proposals in the White Paper.

PROGRAMME THERMIE II

The Council decided to ask the Committee of Permanent Representatives once again to return to this file taking account of the Council's deliberations. Ministers have examined a compromise proposal from the Presidency which would enable the 30 Mecu of credits already earmarked in the 1995 budget without ptre-empting the Council's final decision as to the continuation of the programme. Readers will recall that the European Parliament decided last year to include these 30 Mecu in the 1995 budget, but the necessary legal basis for using the appropriations can only be created by Council decision.
All delegations, with the exception of UK and D supported the Presidency compromise. The UK delegation said that they could accept a solution consisting of financing only accompanying measures (in other words limiting the scope of Thermie II) to the tune of 10 Mecu per year only. A number of delegations - as Portugal, Italy, Spain and Greece - objected to this.
Commissioner Papoutsis stressed that only the Presidency's compromise solution was acceptable to the Commission that the UK's proposal was unacceptable because it would be at variance with earlier decisions of the Council itself and moreover with the powers of Parliament in its rôle as one of the arms of the budgetary authority. He said that any Council decision along the lines of the British proposal would set the scene for an inter-institutional conflict.
Nevertheless, as he said at the final press conference, a positive step forward had been made nevertheless. There had been a convergence of views, an acceptance of the principle of creating a legal basis for Thermie II, which could open the way for various alternative solutions for making good use of the 1995 appropriation of 30 Mecu.

OTHER BUSINESS

The Council was informed by the Commission of the progress of the work on Euro-Mediterranean cooperation in the energy sector, on the report on the revision of Community energy legislation (simplification, input to the work of the Molitor Group) and on the need to implement the European Energy Charter Treaty[4] by securing the functioning of the Charter secretariat and defining common priorities for cooperation within the framework of the Charter treaty.

THE COMMISSION PROPOSES A PLURIANNUAL PROGRAMME FOR INTERNATIONAL ENERGY COOPERATION SYNERGY

The Commission on 23 May 1995 adopted a proposal for a Regulation on the initiative of Commissioner Christos Papoutsis, concerning a multiannual programme of cooperation with non-Community countries in the energy field, to be known as the Synergy programme. This decision reflects the importance the Commission attaches to the whole field of international energy cooperation, since it involves the transformation of an operation that has been successfully conducted for several years on an annual basis, and indeed informally already well-known under the same name, into a proper programme. Synergy consists of cooperation and assistance to non-Community countries in the definition, formulation and implementation of energy policy
These activities will now be anchored in a medium-term strategy, since the programme is to run for five years (1996-2000). It is proposed to have a budget of MEcu 50. The objectives of the programme are:
- to promote sustainable development, notably by reducing emissions of greenhouse gases and of pollutants linked to energy consumption;
- to enhance security of supply;
- to improve energy efficiency.

4. See O.J. (L)380, 31.12.1995, p. 0024; Energy in Europe N° 24, p 50; The First European Energy Charter Treaty: Early Perspectives for Investors, DG XVII occasional brochure (SYNERGY programme), December 1994.

Once a multiannual indicative programme has been drawn up defining the objectives, guidelines and priorities for Community action, Synergy will implement annual action plans. Both the indicative multiannual programme and the annual plans will be drawn up in consultation with the Member States and the international funding agencies, and will supplement other Community cooperation programmes of a more general character covering specific geographical regions.

The activities to be carried out will take the form in particular of advice and support to the energy institutions of non-member countries, help in planning their energy resources, training in the various disciplines for management staff from these countries and seminars and conferences on the structured organization of energy relations between the Community and non-member countries. Particular attention will be devoted to transnational projects in regional groupings. Synergy will continue to support the process of creating a pan-European energy market set in train by the European Energy Charter. Consequently, it will continue to finance the Secretariat of the European Energy Charter, at least on a provisional basis. Several operations have already been planned for 1995: the opening in Sofia this autumn of an Energy Centre for the countries bordering the Black Sea, a region very rich in oil resources and of vital stragetic importance; technical assistance for the rehabilitation of the electricity network in Sarajevo; development in partnership with the countries of the Southern and South-East Mediterranean of a regional action plan on Euro-Mediterranean energy cooperation; organization of contacts between representatives of European industry and authorities and undertakings from Vietnam with a view to promoting cooperation between Europe and Vietnam, which is a highly promising emerging market, also in the oil and gas sectors.

Following the adoption by the Commission of the proposal on the Synergy programme, Commissioner Papoutsis declared: "The Community's high degree of dependence on non-member countries for its energy supplies, the role of energy in the stability of society in both the consumer and producer countries, and the growing problem of pollution due to the increase in consumption, above all in the developing countries, are major concerns. They make international energy cooperation a matter of vital importance for the European Union. The European Commission's purpose in proposing the Synergy programme is to meet these concerns with a specific tool designed to promote development model which is economical in energy. I am convinced that this programme, thanks its flexibility, its highly targeted operations and its capacity to enable for rapid action, will enhance the Commission's international influence in an area crucial to its economy and to those of its partners. It will also enhance Europe's economic presence in the markets of the countries undergoing rapid expansion, notably in Asia and Latin America

COMMISSION ADOPTS ENERGY LABELLING IMPLEMENTING DIRECTIVES FOR WASHING MACHINES AND DRIERS

On the basis of a proposal from Mr.Papoutsis, the Commission adopted, on 23 May, a directive which will, from April next year, lead to energy labels on all washing machines and driers on sale in the Community. The full colour labels will tell consumers of the relative energy efficiency of the washing machines and driers that they buy. The principal information on the label will be the 'energy efficiency class' of the washing machine or drier, on a scale from A (efficient) to G (inefficient). They will also be told about the maximum load, how noisy it is, and for washing machines, their water consumption, and how well they wash, and spin dry the clothes. Manufacturers' product brochures will also have to include this information, together with further details such as typical annual energy consumption, and programme time. Black and white copies of the labels are attached.

The label should encourage consumers to buy more efficient washing machines and driers, and so make substantial savings on their running costs. Over the lifetime of a washing machine or drier the cost of electricity to run it is comparable with its purchase price, while there are substantial differences in consumption between machines, so there is every reason for consumers to look for more efficient washing machines and driers. Informed customers, looking for energy efficient appliances should also encourage manufacturers to increase the efforts that they put into producing energy efficient machines.

The directives are the second and third to be adopted by the Commission under the Energy labelling Directive [5], which sets up a scheme for compulsory energy labelling of household appliances, including washing machine or driers and refrigerators. It forms part of the SAVE programme - an action programme in favour of greater energy efficiency in the Community.

5 Directive 92/75/EEC of 22 September 1992: OJ N° L 297, 13.10.1992,p.16

FOURTH INTERNATIONAL CONFERENCE ON ENERGY PUERTO LA CRUZ, 25-27 SEPTEMBER 1995

Under the patronage of the Commission

At the request of the Venezuelan authorities and on Commissioner Papoutsis's proposal, the Commission has decided to grant its patronage to the fourth international Conference on Energy which will be held to Puerto La Cruz in Venezuela from 25 to 27 September 1995.

An identical invitation was addressed to the Russian Federation which also accepted.

This fourth conference, in which Commissioner Papoutsis will take part, follows an initial ministerial meeting which took place in Paris on the initiative of both France and Venezuela in July 1991, a second meeting in July 1992 in Bergen (Norway), on the latter's initiativeas well as Egypt and Italy and finally the third meeting in Cartagena (Spain) on 19/20 September 1994 on the initiative of Spain, Algeria and Mexico. It was on the occasion of the latter conference that Venezuela proposed organizing the fourth meeting which will therefore be the first to take place in a producing developing country.

These conferences initiated following the Gulf war have the aim of conducting discussion at the ministerial level and discussions on the principal issues connected with the search for better stability and predictability of the international energy market, in particular through improvement of the producer-consumer dialogue in all its components (supply / demand, environment, trade, technology transfer prospects, etc.).

BUDAPEST CONFERENCE ON ATTRACTING FINANCE FOR ENERGY PROJECTS IN CENTRAL AND EASTERN COUNTRIES AND THE CIS

At the initiative of the European commission under its international energy cooperation programme Synergy a conference entitled "attracting finance for energy projects in Central and Eastern Europe and the CIS" was held in Budapest, Hungary, on 23-24 January 1995.

The aim of this conference was to bring together actors on the investment scene from both Western and Central and Eastern Europe as well as the CIS in order to analyse the obstacles and barriers to increasing investment in the energy sector. It emerges that any discussion on the climate for investment in the energy sector must start with an overview of the macro-economic climate and factors such as rates of inflation, interest rates, etc. These factors constitute boundary conditions for investment in the energy sector.

A clear and consistent energy policy is fundamental to restructuring and to attract investment in the field of energy. Such a policy must be transparent and ensure equal access to resources as well as non-discriminatory access to distribution and transit networks. European Union programmes such as TACIS, PHARE and SYNERGY have made a significant contribution, providing advice and technical assistance towards developing sound energy policies. This assistance has helped the partner countries to evaluate their priorities in terms of investment needs.

On the other hand, PHARE and TACIS act as catalysts which can bring together investors for projects in the energy field. The EBRD and the World bank have made numerous loans in this sector, largely on the basis of preparatory technical assistance work undertaken with the help of these programmes. However is it clear that there is considerable need to increase involvement of and lending by the commercial banks in the EU Member States, and also by the local banks in the CEEC and CIS.

Another important point discussed during the conference was the question of energy pricing. Setting prices at an economic level is a fundamental priority for increased investments in the energy sector. A further clear message from the Budapest conference is that it is necessary to take political decisions concerning the ownership of the energy supply utilities in order to attract financing on the scale required to meet the needs of the region.

Participants from Central and Eastern Europe and the CIS demonstrated that projects already exist in the energy sector which reflect the political will for the promotion of new investments in a reformed context based on an economic approach and market principles.

The clear message of the conference was that financial assistance for Central and Eastern Europe and the CIS should also include better coordination of all the tools which are available, including exchange of information between governments and the international institutions.The practical implementation of this could result in large scale investment projects developing the energy networks. To this end, the European Commission can provide its own assistance and instruments for further development by opening new frontiers in energy use and production.

The risks that energy prices will not keep pace with inflation or that policies in the field of energy supply will change, or that legislation is not adopted to comply with international obligations are often underestimated but is also of central importance for investors in the energy sector. Governments should reduce this risks.The Energy Charter Treaty will provide a crucial impact improving the climate for

investment in the energy sector by setting equal conditions for all investors, whether domestic or foreign.
The European Commission will continue its efforts to promote the development of efficient energy supply and demand infrastructure, seeking to reduce the risks inherent in financing energy investments and looking to the banking sectors of both Eastern and Western Europe.

EURO-MEDITERRANEAN ENERGY COOPERATION CONFERENCE TUNIS, 27-28 MARCH 1995

AN EVENT OF GREAT IMPORTANCE

• More than 200 high level participants, including a great number of Ministers, representing the energy sector of the European Union and of the Mediterranean region have met on the 27th and 28th March 1995, in Tunis to examine and further strengthen the energy links between the European Union and its Mediterranean partners.
• The Conference, inaugurated by Mr. Christos Papoutsis, Member of the European Commission responsible for Energy and Mr. Slaheddine Bouguerra, Minister of Industry of Tunisia and attended by senior officials, industrialists and experts of the energy sector, of the EU and of non EU Mediterranean countries was organised by the Directorate General for Energy of the European Commission, under its SYNERGY Programme and by the Ministry of Industry of Tunisia, in cooperation with the Agency for Energy Management of Tunisia and the National Technical University of Athens.
• The Conference was co-chaired by Mr. S. El-Golli, President of the Agency for Energy Management of Tunisia and by Mr. C.S. Maniatopoulos, General Director for Energy of the European Commission.

A TIMELY CONFERENCE IN THE HISTORY OF THE EURO-MEDITERRANEAN COOPERATION

• The Conference comes at a very particular point in the history of Euro-Mediterranean Cooperation. It follows the December 1994 European Council in Essen which has approved the general guidelines for future cooperation between the European Union and the countries of the Mediterranean Basin, covering three main fields:
- political and security issues
- economic and financial issues
- social and human issues

• The Conference comes before, and is actually part of the run-up to the Euro-Mediterranean Ministerial Conference in Barcelona, November 1994, which should reach agreement on a series of economic and political guidelines for Euro-Mediterranean Cooperation towards an action plan for the Euro-Mediterranean Partnership 1995-2000. The Conference also follows the economic Summit in Casablanca, October/November 1994

FURTHER STRENGTHENING OF THE COOPERATION

• The Conference considers that energy is a crucial factor of cooperation and of paramount strategic importance for the stability and economic development of the region as a whole. Even if some Mediterranean countries are producing energy for their own use or for exports to the European Union markets, most of them are characterised by a very high demographic development and a need for accelerated economic growth which could see their energy needs more than double in the next 25 years.
• The Conference, in full appreciation of the existing efforts made since the mid 70's, especially of the Mediterranean agreements of cooperation and the specific meetings concerning energy, like the Seminar in Fes, in 1990, for the promotion of the energy cooperation between the two sides of the Mediterranean basin, considers that more intensive endeavours are required to bring up energy links to a higher level beneficial to all partners.
• The present Conference was set up in order to reassess the energy situation and to identify new areas and priorities for regional energy cooperation.
• In this perspective and in order to examine the issues and prospects for Energy cooperation, the Conference was structured in five sessions.
- The first "Inaugural" session presented the programme of the Conference, identified the key points (complementarity, increase of the energy consumption, environment) and proposed the setting and the pursuit of the aims. A strong political support was unanimously offered by all parts interested in the further strengthening and the promotion of energy links among the countries of the Mediterranean Basin.
– The second "EU Energy Policies and Programmes" session provided information about the energy policies and the programmes of the EU and of non EU Mediterranean countries, insisted on the basic instruments of European cooperation (like the SYNERGY programme) and pointed out the need for secure energy supply, the importance of the European Energy Charter and the interdependence among the concerned parts.
– The third "Mediterranean Countries' Energy Policies and Perspectives" session permitted to proceed to a debate about all energy problems and prospects of

the region and to approach the energy policies and programmes adopted by the countries of Maghreb and Mashrek. The anticipated demographic and economic growth could produce a substantial increase of the energy demand. The attention was focused on the need to intensify the exploration / production of hydrocarbons, to assure the development of renewable energy sources, to encourage the rural energetisation and to promote energy efficiency as well as the larger penetration of natural gas in view of the protection of the environment. The need for improvement in the legislative context, necessary for business activities and the attraction of new investments, was also underlined.

– The fourth "Energy Cooperation in Specific Sectors" session, bordered on the energy cooperation in specific fields, namely "Oil and Gas", "Electricity", and "Renewable energy sources and energy efficiency". The discussions concerning oil and gas permitted to underline, once more, the remarkable complementarity between the two sides of the Mediterranean basin as for networks, provisions and markets. It was indicated that the Mediterranean countries need to improve their capacity to respond to possible risks of sea pollution; the introduction of "cleaner" combustibles, as the GPL, was, finally, pointed out. With regard to electricity, the conference put emphasis on the increasing role of natural gas for the production and on the necessity to establish new interconnections, certainly, this last point presupposes the political will of the concerned parts. The EU is ready to offer technical and financial aid for the accomplishment of these aims. In relation with the new and renewable energy sources and the energy efficient technologies, the Conference suggested the encouragement of the penetration of new technologies in the entire Mediterranean zone. It, therefore, recommended the organisation of more frequent meetings among institutions and experts of the northern and southern Mediterranean. Finally, it underlined the need to include the development of new and renewable energy sources in the priorities of the energy policies, and above all, to sweep aside the technical, administrative and juridical obstacles for the penetration of these energy sources in the market.

– The final session that consisted of a Panel Discussion, permitted to proceed to a long debate about the subjects previously approached and proposed a series of principal orientations for the future cooperation between the EU and the Mediterranean countries.

THE MAIN ORIENTATIONS OF THE CONFERENCE

• The Conference considers, in view of the Barcelona Conference, that stronger energy cooperation should be developed along the following axis:

In the domain of Energy Policy and in view of:

– promoting producer - consumer dialogue
– establishing a context for study towards development of coherent energy policies
– developing instruments of energy planning
– increasing energy trade
– securing private investment in the field of energy resources and networks

In the domain of Infrastructure and Networks, and in view of

– developing and interconnecting the energy networks around the Mediterranean Basin.

In the domain of Industrial Cooperation, and in view of

– promoting investments and partnership in the fields of new and renewable energy sources and energy efficient technologies, of exploration and production of hydrocarbons and of electricity production.

• In parallel, the Conference recommended the promotion of dissemination, information and formation concerning different aspects of energy policy and technology instruments as well as technological developments relative to the interaction between energy and environment, in the other part. Besides, the Conference suggested the association of the Mediterranean non-member of the EU countries with programmes of the energy RPT of the EU.

• Proposed actions

In view of a systematic and well balanced contribution of the energy chapter of the Barcelona Ministerial Conference, the European Commission has the intention to invite the non-member Mediterranean countries in a follow-up meeting, to be held in an EU country as early as possible. The meeting will produce a proposal of a precise Multi Annual Working Programme of cooperation based on the contributions by all interested parties. It will also propose objectives, methods and implementation structures for rendering energy cooperation a pillar to the stability, peace and prosperity in the Mediterranean region.

THERMIE'S MISSION IN BERLIN

The THERMIE Programme (1990-1994) had an important mission to carry out in Berlin on the occasion of the first Conference on Climate Change and related events such as Klima '95 Exhibition. As a key element of the EU's response to the issues of climate change, since it and its successor JOULE-Thermie, under the EU Fourth Framework Programme for RTD clearly helps to promote the role of clean energy technologies in meeting the target of stabilising CO_2 emissions. As well as demonstrating some of the technological advances that have been made, Thermie has helped to identify the barriers that are inhibiting

technological progress and how these barriers might be overcome.
Thermie will achieve these objectives not in isolation but in partnership with a range of other EC programmes, the most relevant of which is clearly Thermie's new partner, the JOULE R&D Programme for non-nuclear energy. Other EC programmes which are closely involved in the EU's response to climate change are the SAVE Programme, focusing not on the technology but rather providing the legal basis and technical standards that are needed to encourage the more efficient use of energy, and the Altener Programme which complements the renewable energy elements of Thermie by providing a framework within which these technologies can increase their contribution to the EU's energy supply. Other initiatives include the Synergy Programme which seeks to help Third Countries with the development of energy policy and institution building, the Regional Energy Programme which promotes a more integrated approach to efficient and environmentally-friendly energy planning, and the Environment Programme which supports research and development projects in the broad area of the environment.
All these EC programmes presented their environmentally-related activities for the first time on a common stand at the Klima '95 Exhibition in Berlin from 4 to 7 April 1995.

THERMIE : FRUITS OF EXPERIENCE

Thermie not only supports technological demonstration projects, but seeks to spread the word and encourage the uptake of successful projects through "Associated Measures" including the organisation of conferences, seminars and workshops, business missions, production of a wide range of publications including videos, press campaigns, etc. These measures are carried out throughout the European Union, in the countries of Central and Eastern Europe, the Newly Independent States and beyond.
From 1990 to 1994, the programme supported 726 energy technology projects in the EU Member States. A cost-benefit analysis of these Thermie projects anticipated that they would lead to significant reductions in CO_2 emissions in the EU as well as contributing to reductions in the emissions of other pollutants such as acid rain gases, volatile organic compounds, and carbon monoxide.

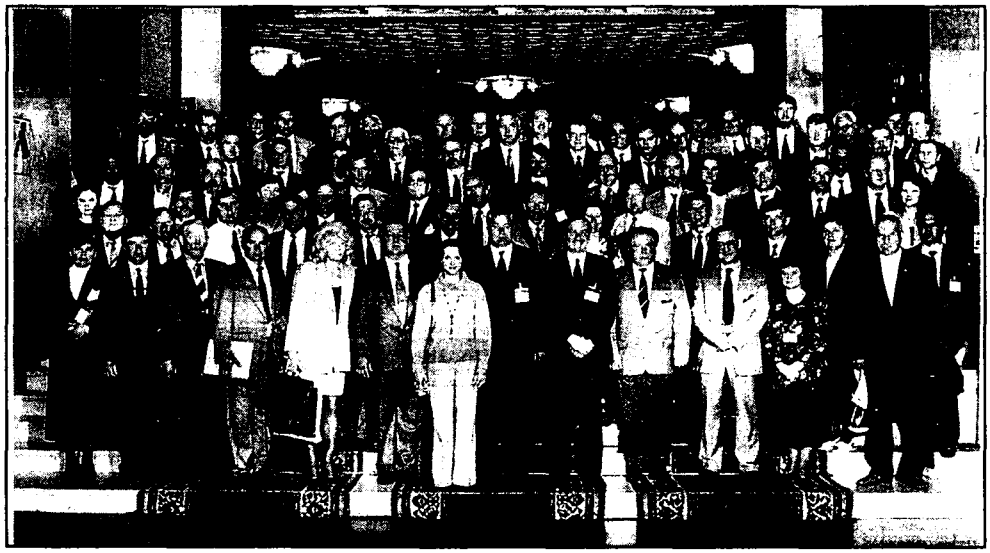
JOULE-THERMIE : WORKING TOGETHER FOR A BETTER ENVIRONMENT

The original Thermie Programme came to an end in 1994, although the projects supported from 1990 to 1994 and still underway are of course still being monitored and promoted. From 1 January 1995, the programme continues as the new Non-Nuclear Energy Programme, better known as JOULE-Thermie, under the European Community's Fourth Framework Programme for research, technological development and dissemination. This new programme brings together for the first time the research and development aspects of JOULE (managed by the Directorate-General for Science, Research and Development), with the demonstration and promotion initiatives of Thermie (managed by the Directorate-General for Energy).
This programme is a vital part of the EU's strategy for meeting the energy challenges we face today. Building on past successes, the JOULE-Thermie Programme will reduce the negative environmental impacts associated with the production and use of energy, help ensure lasting and reliable energy sources at affordable costs and will strengthen the technological basis of European industry.
Whether an approach involving incentives or legislation is used, developments in energy supply and the use of new, clean and efficient energy technologies are widely accepted to have an important role to play in reaching any targets that are set. Technology transfer at an appropriate level can also contribute to overcoming the differences between developed and developing countries.
Therefore, the Berlin Conference provided a clearly defined focus for the future initiatives of the JOULE-Thermie Programme which, in turn, is ideally placed to respond to the national and global challenges of climate change which have been identified.

EUROPEAN UNION - RUSSIA COAL INDUSTRY CONFERENCE MOSCOW, 21-23 JUNE 1995

The European Commission, Directorate General Energy and the Russian coal company Rosugol are organizing a conference on the theme "Coal in a Competitive Market", in Moscow, between 21 - 23 June.
The aim of the Conference is to provide an opportunity for the exchange of information and ideas as to how to promote the future demand for coal in Russia and other CIS countries. The conference is addressed to European and CIS industrialists, coal producers and consumers and politicial decision makers.
The potential benefit to participants from the European Union will be the opportunity to assess current conditions in the Russian coal sector, to establish contacts and to set up joint ventures.
The potential benefit to the Russian and other CIS participants will be a better awareness of market requirements and project financing as operated in a free

market economy, together with information on current trends in technology and the protection of the environment in the European Union.
In organizing this event the Commission wishes to extend its cooperation activities with Russia and other CIS countries to broader industry related areas. The Commission also wishes to underline its belief that the future of coal demand and consumption lies with the public acknowledgement that the environmental impacts of coal must be minimized and that, to achieve this, it is essential to provide the opportunity for technology transfer and industrial cooperation.
The Commission will be represented at the conference by Mr. José Sierra, Director, and his staff.
An important number of coal industry representatives from the European Union, the Central and Eastern European countries, Russian and other CIS countries are also going to participate in this event.



ENERGY POLICIES FOR A COMMON FUTURE SYNERGY PROGRAMME CONFERENCE FOR EXPERTS IN CENTRAL AND EASTERN EUROPEAN COUNTRIES BADEN, AUSTRIA, 29-30 JUNE 1995

This Conference organized jointly with the OÖESV (Upper Austria Energy Saving Association) brought together more than 130 experts, senior officials and decision makers from 30 countries In addition to the main EU programmes of priority concern to Central and Eastern Europe ("CEEC's") , the discussions covered a range of energy subjects from overall policy to specific financing issues and energy efficiency policy.
As readers will be aware, the DG XVII's Synergy programme for International Energy Cooperation seeks to contribute to long-term improvement of the international energy situation, and in so doing also to energy security for the EU itself.

WHITE BOOK ON THE INTERNAL MARKET :

Implementation of the White Book on the Internal Market in the field of energy is a priority. Assistance will be provided by the EU for this purpose. Synergy will organise a seminar on the subject within the next six months. Training of officials from CEEC will be of great importance, in if the effort to align the relevant legislation is to succeed. EU willl offer its support for this process.

Networks :
These constitute concrete examples of European integration and their interconnexion must therefore be suppported (for example interconnexion in 1995 of the *Centrel* (eastern) network with UCPTE). PHARE has reoriented its intervention towards investment in order to promote network building.
A major Conference on interconnexion of energy networks in the Balkans will take place in Thessaloniki on 16-17 October 1995.

Energy Efficiency :
Institution building is a major element for the success of energy efficiency policies. Assistance from EU should be directed to National Energy Agencies, which of course stand in close relationship with the institutional and economic structures in each country.
Co-ordination and complementarity between energy programmes should be improved , as in addition to the Community programmes (Phare, Synergy, Thermie, Save etc) there are bilateral lending opportunities (EIB, EBRD, World Bank, private Bank, private banks etc). The Black Sea Regional Energy Centre (BSREC) in Sofia could serve as a pilot co-ordination structure for regional energy projects to be undertaken in the Back Sea Region.

Twinning Networking :
Setting up networks among bodies and operators responsible in different energy fields is a very important issue. Conferences, workshops, exchanges are appropriate tools for this purpose.

Conferences to follow :

- with CEEC's next year, perhaps to be held in a CEEC according to proposals still to be received
- with republics of the Former Soviet Union, to be held in Finland during the first quarter of 1996.

General conclusions of the workshop on Energy Networks

- Trans-European Network policy is of interest for both Western, and Central and Eastern countries.
- It is not a programme for financial support.
- A Common approach is being developed for TEN's in Transport, Telecommunications and Energy.
- The guidelines will constitute a reference for future development of grids, to be used by all players : neighbouring countries, more distant countries and their energy companies.
- Subsidiarity is an important issue and Member States and third countries will be responsible for appraising the projects, giving the necessary authoritisations and co-finance, mainly in the transport sector.
- Industry will play a major role deciding which projects will be constructed and with which resources
- The Community will define priorities and by putting together all plans, will identify projects of common interest.
- The Community can mobilise financial resources from the TEN's budget line (co-financing of studies in the energy sector) or from other parts of the budget (Structural funds for projects in the Member States and PHARE funds for projects in the countries of Central and Eastern Eurpe).
- As far as PHARE funds are concerned, the *Copenhagen Facility* has been increased to 25% at the Essen Summit and the cross-border co-operation programme could also be used for network projects, on condition that there is a clear indication than the proposed projects correspond to real priorities for the countries concerned.
- The EIB and the EBRD will also be involved in financing TEN projects.
- The EIB will be appraising the economic, technical and financial viability of each project for which a loan is sought. Moreover, productive sector investment must offer an adequate financial return and international commitments (for environmental projects, for restructuring of national economies) must be respected.

Electricity grids

- Interconnection to the UCPTE grid of the Eastern part of Germany (new Bundesländer) and immediately after, that of the Centrel countries (Poland, Czech Republic, Slovakia, Hungary) is foreseen for the end of this year (first trials).
- There are no real obstacles to the interconnection of Romania, Bulgaria, Albania (and Greece) to the extended UCPTE grid, provided some limited investment can be carried out (regulation in Albania, some production capacity in Bulgaria, a link between Romania and Hungary). This will be achieved in the mid-term although dates have not been fixed.
- in the longer term, the problems of the interface with Russia, Ukraine and Bielorussia (UPS System) will have to be studied further, and the necessary decisions taken in co-operation of these of these countries. An initial study is being supported by PHARE.

Gas Networks

- There is a need for East-West gas links, as already indicated by the East-West gas interconnexion study supported by PHARE.
- Increases in demand and seasonability will create a need for increased storage capacities.
- Diversification, in the context of the European market through East-West links, the Iran/Central Asia - Europe project and a LNG terminal in the Atlantic Ocean.

Conclusions

- The TEN policy is being defined currently (in accordance with articles 129B, C, D of the European Union Treaty) and the necessary Community legislation will be adopted by the end of the year.
- There will be limited financial resources dedicated to the energy TENs (112 mECU for the 95-99 period).
- As for the Central and Eastern European countries, it will be useful to build on the foundation of the first series of interconnection studies already supported by PHARE.
- Further in-depth "regional" studies will be necessary in order to identify the priority projects will be needed for the short/medium term, in order to concentrate effort on these .
- Future conferences organised under the SYNERGY and PHARE programmes will provide an opportunity to confirm the consensus on specific priority projects for the energy networks.

Workshop on Restructuring and Energy prices

There will clearly be much future discussion on the different ways to build up the structures of the energy sector. Given this need for restructuring, future structures would have to :

- be open for cross-frontier exchanges to exploit the economic potential of a whole region.
- limit exclusive rights as far as possible.
- give consumers the choice to find the most efficient producers and suppliers.
- be involved in a competitive market environment.

- reflect economic reality (concerning the last point, broad discussion took place on the issue of the correct pricing to cover "real" costs).

The barriers to achieving such a structure, and the opportunities for success, as well as the implications and constraints of legal and institutional harmonisation, not to mention the "real" costs of accession will have to be addressed by each country individually.

In the context of the internal market the experience of the new member States, such as Austria, has shown that costs are higher than expected. But being aware of these difficulties enables planning of future activities in such a way as to reach the common objectives :

- security of supply
- lowering of costs
- reduction of the impact of the energy sector on the environment.

Workshop on Energy Efficiency Policies

Energy efficiency should be seen as an economic opportunity. Certainly it is an issue that is at the heart of all EU energy policy objectives. However, there are many barriers to address and problems that require clear solutions. One of the keys to overcoming these is to target activities carefully at particular needs. We have heard how this can be successfully achieved, in Slovakia for example where a training programme has helped to establish qualified energy advisors, and in Hungary where rational use of energy awareness was increased with a wide-ranging information campaign.

Throughout this workshop, there seems to have been a consensus that the two greatest barriers to energy efficiency are :

- a need for cultural change
- a need to find investment

The examples from Austria, Slovakia, Hungary and the Czech Republic all showed how such a change of attitude can be encouraged. A key message was that a whole range of measures is required to achieve results. Energy efficiency programmes must address policy, technology and financing issues. Information and awareness campaigns form an essential part of this process but must be aimed at audiences to deliver maximum benefits. For instance, in Austria, the promotional activities directed at children made use of interactive videos whereas for the general public, the mass media provides the most effective carrier of the message.

In addition, the benefit of adopting a bottom-up approach was repeated during the workshop. Energy users are in the best position to make changes for improved efficiency and so should be the main targets for energy efficiency campaigns.

Regarding investment and project financing, the EBRD representative provided an enlightening overview of how the bank can support energy projects. However, he emphasised that the Bank is only part of the solution to the problem of funding. The loans available (at market rates) can be more effective when combined with softening measures from other programmes. Co-operation with other International financing Institutions was also seen as an aim for the future. In general, it is not the availability of finance that represents a problem, but rather the lack of bankable projects and therefore the access to finance.

The idea of the international institutions and programmes working together - both with each other and with the countries of Central and Eastern Europe - was also a common theme. The benefits can already be seen, for example, in the Czech Republic where the EBRD and PHARE are in the process of arranging for an Energy Savings Fund. In Budapest, the Energy Centre provides a concrete example of how different programmes can, and do, work together for effective EU co-operation in Central and Eastern Europe.

Finally, a general message was that improved energy efficiency is a goal that is difficult but certainly possible to achieve. However, success depends on a variety of factors including :

- close co-operation between all of the parties concerned
- a long term commitment
- the identification of appropriate mechanisms to bridge the gap between the technical assistance offered by some EU programmes and the project financing available.

DOCUMENT UPDATE

The following documents are available from the DG XVII Library (226 avenue de Tervueren, 1150 Brussels)

MAIN COMMISSION ENERGY DOCUMENTS, PROPOSALS, DIRECTIVES

COM(94)59 Proposition de règlement (CE) du Conseil concernant un programme communautaire de support financier pour la promotion des technologies énergétiques européennes 1995-1999 ("Thermie II").

COM(94)62 Proposition de règlement (CE) du Conseil déterminant les règles générales pour l'octroi d'un concours financier communautaire dans le domaine des réseaux transeuropéens.

COM(94)132 Proposition modifiée de directive du Parlement européen et du Conseil sur les conditions d'octroi et d'exercice des autorisations de prospecter, d'explorer et d'extraire des hydrocarbures.

COM(94)282 Rapport sur le fonctionnement du contrôle de sécurité d'Euratom 1991-1992.

COM(94)383 Communication de la Commission au Conseil et au Parlement européen concernant le trafic illicite de substances radioactives et de matières nucléaires.

COM(94)405 Proposition de décision du Conseil relative à la signature du Traité sur la Charte européenne de l'énergie et à son application provisoire par la Communauté européenne.

COM(94)531 Recommandation de décision du Conseil pour la signature du protocole sur "l'efficacité énergétique et les aspects se rapportant à l'environnement", associé au Traité sur la Charte européenne de l'énergie.

COM(94)557 Proposition modifiée de décision du Conseil relative à la signature du Traité sur la Charte européenne de l'énergie et à son application provisoire par la Communauté européenne de l'énergie atomique présentée par la Commission conformément à l'article 119, aliinéa 2 du Traité CEEA.

SEC(94)477 Communication de la Commission - Demande d'avis conforme du Conseil et consultation du Comité CECA, au titre de l'article 55, par. 2 c) du Traité CECA, concernant un projet de décision de la Commission concernant l'octroi d'aides financières à 91 projets de recherche technique charbon 1994.

SEC(94)1126 Communication de la Commission au Conseil sur l'accord renouvelant l'accord de coopération entre le département de l'énergie des Etats-Unis d'Amérique et la Communauté européenne de l'énergie atomique représentée par la Commission des Communautés européennes, en matière de recherche et développement dans le domaine des garanties relatives aux matières nucléaires à conclure par la Commission conformément à l'article 101 paragraphe 3 du Traité instituant la Communauté européenne de l'énergie atomique.

SEC(94)1167 Proposition de décision du Conseil donnant mandat à la Commission de négocier des accords bilatéraux de coopération nucléaire entre la Communauté européenne de l'énergie atomique d'une part, et le Kazakhstan, le Kirghizistan, le Tadjikistan, l'Ukraine et l'Oubezkistan, d'autre part.

SEC(94)1277 Communication de la Commission au Conseil relative à une demande d'avis conforme du Conseil, au titre des dispositions du deuxième alinéa de l'article 54 du Traité CECA, pour l'octroi d'un prêt global à la "EFIBANCA-ENTE FINANZIARIO INTERBANCARIO S.P.A." de Rome, en vue du financement de programmes d'investissements qui contribuent à faciliter l'écoulement de l'acier communautaire.

SEC(94)1918 Rapport de la Commission au Conseil concernant la collecte des informations sur les investissements d'intérêt communautaire dans les secteurs du pétrole, du gaz naturel et de l'électricité.

C..(94)699 Note d'information sur les modalités du volet social d'accompagnement du programme de restructuration de l'industrie charbonnière (1994-1997).

THERMIE

- Energy Efficient Technologies for European Industries - A booklet on horizontal technologies in Europe
- Energy Investment Opportunities in European Industry - A booklet for financial institutions

BROCHURES

- Natural and low energy cooling in buildings
- Daylighting in buildings
- Subsea diverless intervention systems in the offshore oil industry
- Impact of new energy technologies and future potential for small hydro systems
- The oil production industry in western Siberia and the environment current practices and prospects for change
- A market survey on the equipment used within the actions of the THERMIE programme
- Energieeffizienz im öffentlichen, Stadtverkehr
- Definition of self-financing energy saving measures for the city of Moscow
- Economic evaluation of energy efficiency projects
- Renewable energy in agriculture

EUR-REPORTS

14748 Hydroelectric power station for low head in the river Maas near Linne

14814 Valtrede small hydro-plant

14837 Design construction and demonstration of the MS-3 windturbine

14920 Wind energy converter HSW 250

14963 Energy saving and climate control in greenhouses with concertina shaped screen made of metallized complex film

15025 Circulating fluidized bed steam generator for coal and low-grade fuels

15071 Cirmac BF-Carbiosystem upgrading of landfill-gaz into pseudo-natural gas

15072 Installation of one tubular (S) small hydro unit in Stratos HEP spillway on the Acheloos River (Phases II and V)

15073 Wind turbine/diesel system for irrigation in remote applications

15075 Minicentrale de Saint André d'Embrun

15145 RDH-system cold-blown discontinuous cooking

15146 Real-time energy management

15167 Photovoltaic rural electrification of 79 dwellings at Sierra de Segura (Jaén)

15168 Photovoltaic installation of the RF station Antikythira

15249 Solar generators for the energy supply of two switching exchanges in the Saintes archipelago (Guadeloupe)

15250 Solar energy and tourism in Cape Corsica

15281 Photovoltaic demonstrations projects

15486 Photovoltaïc powered education centre - Puerto Peñas

15490 Optimization of the combustion of pulverized coal through measurement and regulation of the coal mass flow

15491 Axial and helical micro-turbines and their application

15493 Setting-up of a new Francis closed chamber monobloc turbine at an irrigation channel

15752 Photovoltaic supply of the runway lights in an airport

15753 Autonomous photovoltaic and wind power supply for an unmanned lighthouse (Sapientza)

15754 Autonomous PV/battery power supply for an unmanned lighthouse (Lithari)

15755 Rambla del Banco - Photovoltaic power supply

PROCEEDINGS

Energy efficient technologies for the treatment of municipal solid waste in Greece and other Balkan countries

Business Workshop on energy efficient technologies in the food and beverage industry

Workshop on energy conservation potential in buildings

Financing cogeneration and district heating

Heavy oil technologies in a Wider Europe

FLAG BROCHURES

- Pipeline insulation system - New system reduces heating costs and delays hydrate formation
- Life-cycle design of semi-submersible platforms
- Hydra : Hydrogen diving technique
- "Cusp" - Connection of underwater systems and pipe-flowlines
- RISC - Reliability based inspection scheduling for fixed offshore platforms
- Wet welding for structural repairs

STUDIES

- Realising energy saving potential through the recycling of aluminium goods
- Energy savings through transformer losses optimisation (study and attachment)
- Energy saving measures and energy management systems in the field of compressed air
- A strategy for the promotion of renewable energy technologies to local authorities
- Wind energy market study Eastern Europe
- Energy valorisation of residual urban and industrial sludges
- Potential for medium and large sized industrial heat pumps in Europe
- Wind energy market study Eastern Europe - Poland
- Wind energy market study Eastern europe - Czech and Slovak Republics

THE SAVE II AND ALTENER PROGRAMMES

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The current SAVE ('Specific Action on Vigorous Energy Efficiency') programme covers the five years 1991-95. On 30 May the Commission adopted a proposal for a successor programme, 'SAVE II' (doc. COM(95) 225/4 fin.), based on the experience of the programme so far and the findings of a group of independent experts commissioned to evaluate the results of Save I and make recommendations for future action. This article is based on a paper given at the Conference entitled 'Energy for a Common Future', held at Baden (Austria), under the auspices of the Synergy programme, on 29 and 30 June 1995.

THE NEED FOR A COMMUNITY ENERGY EFFICIENCY INITIATIVE.

ENVIRONMENT

Since the efficient use of energy reduces the emission of pollutants to the atmosphere, it has been hailed as the single most important policy objective towards attaining the EU's stated goal of stabilising CO2 emissions to the 1990 level by the year 2000. In recognition of this fact, the SAVE programme has been recognised by the Commission as a cornerstone of the Community's CO_2 reduction strategy. This was reinforced by the Conclusions of the Environment Council of 15/16 December 1994 which stated 'The Council underlines once more that the target of stabilizing CO_2 emissions can only be achieved by a co-ordinated package of measures to improve energy efficiency and the rational use of energy based on supply and demand at all levels of energy production, conversion, transport and consumption, and to exploit renewable energies.'[1]

None of this means that the efficient management of energy use should be seen as a panacea for our environmental problems. It is however widely recognised that, under normal economic growth conditions, a substantial improvement in the rational use of energy will be necessary if the EU is to attain its CO2 objective. This will inevitably mean that Member States will have to supplement their efforts to manage the use of their energy resources and that the EU will have a role to play in co-ordinating and optimising these efforts.

THE COMMISSION'S GREEN PAPER ON EU ENERGY POLICY

The Green paper establishes three tenets to which energy policy should respond; industrial competitiveness, security of supply and protection of the environment. Energy efficiency satisfies these three imperatives. It safeguards security of supply by the wise use of energy resources, it reduces factor costs of industry thereby raising productivity, and it protects the environment by reducing the amount of harmful pollutants emitted into the air.

THE WHITE PAPER ON GROWTH, COMPETITIVENESS, AND EMPLOYMENT[2]

The Commission's 1993 White Paper mentioned the role of the new eco-industries such as energy

1 *Council Secretariat doc. no: pres. 94/ 273, 16.12.94*

2 *White Paper 'Growth, Competitiveness, Employment - the Challenges and Ways Forward into the 21st Century', Office for Official Publications of the European Community, Luxembourg, 1993* (Supplement N° 6/93 to the Bulletin of the European Communities)

efficiency as job generators. The Commission has estimated that such industries have an employment creation potential in the region of 100 000 permanent jobs and 200 000 man years by the year 2000. There is substantial empirical evidence to demonstrate that energy demand reduction investments create three or four times more jobs than equivalent energy supply projects[3]. A landmark study carried out in the EC in 1984[4] estimated that an enforced energy demand policy aimed at reducing energy consumption by 15% over 15 years might have an overall yearly net employment effect of about 520 000 man years.

THE 1995 ENERGY EFFICIENCY OBJECTIVE

It is now virtually certain that the Community will fall well short of the ambitious objective which the Council set in September 1986 for a minimum 20% improvement in the Community's energy intensity by 1995. The attainment of such an objective would have required a confluence of increased Member State initiatives in energy use management, allied to continuous price rises. In point of fact Member States' efforts in the field of energy efficiency declined during the ten year period in question and of course oil prices collapsed in 1986. The existence of such a stated objective was not a sufficient incentive of itself for Member States to maintain efforts to improve the rational use of energy: the benefits of an energy efficient society were foregone in favour of the short-term gains associated with cheaper energy.

A COMPLEMENT TO TECHNOLOGY

The European Community, mainly through the JOULE and Thermie programmes, has supported a great deal of development in the area of improved energy production and end-use technologies. Much of this development has taken place against a background of difficulty in introducing energy technologies to the marketplace. Since 1990, the Thermie programme has developed tools to assist market penetration of the technologies already developed. However, there is also much to be done on a policy level to remove barriers, both institutional and financial, to the introduction of efficient energy technology. The SAVE programme is the policy vehicle which complements the Community's energy technology programmes. SAVE in itself is technology-neutral. An example of this is the proposal for a Directive on energy auditing in industry presented to the Council under the (first) programme[5]. Some Member States did not have a well developed cadre of energy managers capable of carrying out such audits. SAVE therefore also supported the training of energy managers for energy auditing. Well qualified energy managers could be considered an asset in ensuring the penetration of energy technologies: thus the SAVE initiative complements the efforts of the technological programmes in bringing energy technologies to the marketplace.

SOCIAL AND ECONOMIC COHESION IN THE EU

Studies have shown that where energy efficiency programmes have been launched the savings made tend to be spent in the local economy and thereby increase the level of local economic activity with consequent improvements in the quality of life. Whereas investment in energy supply (generally located near major population centres) have a distinctly confined effect (only those in the general area of the construction benefit), investments in improving the efficiency of energy end-use produce jobs across a wide geographical area which may be important for the less developed regions and towns of the Community.

Energy management, by reducing factor costs, increases industrial competitivity, thereby increasing the chances of industrial growth and increase of employment. Again this is particularly important for peripheral areas of the Community.

The accession to the Union of Austria, Finland, and Sweden on 1 January 1995 has has had the effect of substantially improving the average level of EU energy intensity (energy used to produce a unit of GNP) and thereby placed greater pressures on the Union to achieve cohesion in this important area of economic activity.

Empirical evidence shows that policy programmes such as SAVE do much to accomplish the aim of social and economic cohesion by creating disposable income from energy savings. Other factors suggest that technology-based programmes can in fact have a negative effect on social and economic cohesion, since their greatest effort tends to be brought to bear on areas where a high level of technical competence already exists. These are generally not the geopgraphical areas with the greatest need in terms of the benefits of social and economic cohesion.

THE ENERGY EFFICIENCY PROTOCOL TO THE ENERGY CHARTER TREATY

As was reported in *Energy in Europe* N° 24, the Energy Charter Treaty was signed on 17 December in Lisbon. The Treaty, which establishes co-operation in the energy sector between the countries of the West and the transitional economies of Eastern Europe and

3 Power to Spare - A plan for increasing New England's Competitiveness through energy efficiency, New England Policy Council July 1987.

4 Employment Effects of Energy Conservation Investments in EC Countries, Fraunhofer Institute, study prepared for DG XVII.

5 COM(93) 279 final., O.J. C204/12, 28.07.93.

the former Soviet States includes a protocol covering the subject of energy efficiency. It has been estimated that some of the transitional economies have energy intensities which are literally a multiple of the average for the EU. The Union Member States have developed an impressive potential in the area of the efficient management of energy resources which can be transferred to the transitional economies. It is important, therefore, that experience gained on SAVE I be supplied to the transitional economies, and the mechanisms developed under the Energy Charter provsions offer themselves ideally for this purpose. The same argument is certainly true for all developing economies which, in the earlier stages of development, tend to be very energy intensive.

THE LESSONS LEARNED FROM THE SAVE I PROGRAMME.

LEGISLATION AND STANDARD SETTING.

The experience of SAVE in the area of administrative actions has turned out to be less positive than originally planned. The launching of the programme coincided with the introduction of the subsidiarity principle and, while it is acknowledged that the principle itself is particularly apposite in the case of energy efficiency actions (because they undoubtedly have their greatest effect in closest proximity to the consumer) the braking effect on the package of administrative measures announced in SAVE I has been considerable. It appears that the only reasonable way to proceed is to develop measures only in those areas where the Community has a well-established competence. Such an area would appear to be that of traded goods, where a substantial amount of work has already been done under SAVE I. The absence hitherto of an energy-related Article in the Mastricht Treaty means that there is as yet no specific legal basis for legislation in the energy area. Therefore, new legislative action under SAVE II must concentrate on areas where individual action by Member States could lead to a disruption of a major Community policy such as the Internal Market. While the current climate appears to be against further general energy efficiency legislation, the Commission is, of course, constantly monitoring the situation and will put forward proposals for such legislation forward as it may deem effective, necessary and timely.

PILOT PROJECTS

The purpose of the pilot projects was to strengthen energy efficiency infrastructures within the Member States, and to assist them in the introduction of the legislative actions proposed under SAVE I. In fact, a over 200 individual projects were undertaken. This placed a heavy administrative burden on the staff managing SAVE and led to a restricted effort in the setting up of co-operative projects and in the diffusion of results which represent an important element of 'added value'. An effort to redress this situation was undertaken in the fourth year of the programme and it is intended that SAVE II will place a greater emphasis on having Member States help each other through the transfer of experience regarding different policy options.

INFORMATION PROGRAMME

A comprehensive information programme was launched starting in 1993 through the use of the ***EnR*** network (a network of Member States' energy efficiency bodies). This action has proved very effective and has itself been a good example of subsidiarity at work. To date the information programme has been proposed on an annual basis by EnR and discussed with the Commission. It might be more suitable to develop an information strategy within the SAVE Committee and provide as necessary, for a number of different information networks which would be optimally equipped to respond to its different priorities and areas. Such an action would stress the 'added value' of Community support.

CO-OPERATIVE ACTIONS WITH OTHER ENERGY PROGRAMMES

It became apparent during the administration of SAVE that there were large areas of common interest between the actions being undertaken by the programme and those being undertaken by other programmes within the energy field. A co-operative effort was established between SAVE and Thermie in the area of third party financing (a novel financing mechanism which could be seen either as a technique to accelerate investments in the rational use of energy or as a technique for speeding up the introduction of new technology). This type of action will be expanded in SAVE II always taking into account that the essential distinction, namely that Thermie concentrates on gaining market penetration for new energy technologies while SAVE is concerned with the promotion of policy instruments. The Synergy programme and the regional and urban energy management programme will now also be called in to support a common third party financing initiative. Other areas of potential co-operation, such as education and training, demand side management, targeting and monitoring, obviously exist and should be developed during the life of the SAVE II programme.

It should perhaps be mentioned that while the JOULE and Thermie programmes aim to support research into, and to develop and demonstrate energy technology, as well as to advance mechanisms assisting penetration of these technologies in the marketplace, SAVE and Synergy are technology neutral, as already illustrated above in the case of the former. However, all three programme use the same tools to get part of their message across. Thus all three programmes use conferences, seminars, workshops, brochures and other information media. An effort must be made to build elements of one or more of the three programmes mentioned above into specific events. This effort is not as simple as it appears as the audience for Thermie events is generally drawn from a different one within the energy efficiency sector to that for SAVE events.

General observations

Energy efficiency can be accomplished in either of two ways - direct investment or behavioural change. Since the modest budget of the SAVE I programme has precluded it from being a vehicle for accelerating investment through direct subsidy, the main thrust of the programme has been aimed at creating a more positive environment for energy efficiency within the EU. This has been accomplished through administrative measures such as directives and through 'capacity building' in the Member States via pilot projects and information activities. The cost of large public promotional exercises is beyond the scope of the programme.

The PACE programme, which was aimed at the development of policy initiatives aimed at improving the rational use of electricity, was an attempt to influence consumer behaviour directly via information and the development of standards. Because of the synergy between its objectives and the more global objective of the SAVE programme, PACE was incorporated into SAVE. The two programme have successfully operated together and a range of electricity-based directives have been drafted in the course of the SAVE programme.

In the course of the five-year SAVE programme it has also became obvious that the efforts deployed by DG XVII in support of energy management in regions, cities and islands are a further response to the overall objective of the SAVE programme. Improvements in energy efficiency introduce a demand side approach to energy problems which requires development of regional and urban structures which can function act close to the final consumer. Such decentralised resouces enable effective action in advising consumers about the consequences of energy waste, and its avoidance, in exploiting local energy sources and in disseminating the most appropriate energy solutions. This action, like PACE, aims at radical behavioural changes and this in turn offers real synergy with SAVE. On account of this DG XVII's operations in the field of Regional and Urban Energy Management have been incorporated into the SAVE programme. This will have the effect of enriching both programmes and the initiatives developed for the SAVE II programme will benefit greatly from the resultant improvement in focussing.

THE STRUCTURE OF SAVE II

INTRODUCTION

The actions outlined below have drawn their inspiration from five sources:

- the experience of the Commission in operating the SAVE programme over the past five years.
- the conclusions and recommendations of a group of independent experts commissioned to evaluate the SAVE programme.
- the opinions expressed at the SAVE Conference held in Florence in 1994.
- the initiatives under the PACE and Regional and Urban Energy Management Programmes just referred to and now been incorporated into SAVE.
- the evaluation of the national CO2 abatement programmes implemented by Member States in response to the Council's CO2 stabilisation strategy.

STUDIES AND OTHER ACTIONS LEADING TO THE IMPLEMENTATION AND COMPLETION OF COMMUNITY ENERGY EFFICIENCY LEGISLATION AND PERFORMANCE STANDARDS.

Studies are required in order to prepare the technical dossiers which must accompany a proposal for a directive. A certain amount of ongoing work in the area of labelling and equipment standards will be completed under SAVE II. These efforts fall mainly into four areas:

Appliance labelling

This relates in particular to continuing initiatives in the area of appliance labelling under framework directive 92/75/EEC[6]. Several applications directives have already been adopted and there is a continuous effort in this area to bring forward additional applications directives for a range of energy-using equipment.

Voluntary Agreements[7]

Negotiations to establish voluntary agreements relating to improvements in the efficiency of energy end-use are underway with associations representing energy-

6 *O.J. N° L 297, 13.10.92, p.16*

7 *action hitherto under the PACE programme*

using equipment manufacturers. Such negotiations are inevitably very technical in nature: it is intended that under SAVE II investigations will continue on expected technological improvements and the long-term potential for improving end-use efficiency in the area of energy-using equipment. This work is a pre-requisite for the Commission's negotiating position vis-à-vis the manufacturers.

International energy end-use efficiency standards

The Commission is currently negotiating with the European Community's major trading partners on the establishment of international standards for several classes of energy-using equipment. At the moment the emphasis is on office equipment with large standby power requirements (PC's for instance). However, broader action is needed aiming finally at comprehensive international energy end-use efficiency standards. A series of mandates have already been given to CEN/Cenelec[8] regarding the establishment of measurement standards for certain energy-using appliances. This effort will be continued (and perhaps augmented) under SAVE II.

European Community energy end-use efficiency standards[7].

Only in cases where the approaches outlined above prove to be unproductive, will the Commission itself propose Directives for European Community standards indicating maximum energy consumption for specific classes of energy-using equipment.

Studies leading to other legislative action

While it appears that actual legislative activity under SAVE II will be concentrated on the items listed above, the Commission will from time to time carry out such studies as may appear opportune in preparation for future legislative action in the field on energy efficiency. Such studies might cover the entire spectrum of energy management improvement and will be decided on annually and on an ad hoc basis.

PILOT ACTIONS THROUGH NETWORKS

The experience gained with the information programme under SAVE I has demonstrated the effectiveness of particular networks in carrying out the strategic objectives set by the Commission. Networks have several advantages over individual action. Firstly, many of the programmes supported by SAVE I have a dimension going well beyond the boundaries of the Member State in which the work was carried out. In some specific cases, the use of Community-wide networks as contractors would therefore appear to be the ideal vehicle to maximise the Community dimension of many of these programmes and to optimise the multiplier effect of the different projects. Such networks involve large numbers of individuals and organisations, and thus already well-established information channels. SAVE II will assign part of its budget to large co-operative projects managed by appropriate existing pan-Community networks. To take two possible examples for action in this area, trans-national transportation networks could be targeted in exploring how best to organise energy-efficient transport systems, or again international architecture associations might be contracted to develop energy efficient solutions for new and existing buildings and to disseminate these throughout their membership. Networks of energy educators would be encouraged to develop energy management course material based on the latest multi-media technology and to disseminate this material as widely as possible. In the industry sector, industry associations would be motivated to develop and energy management programmes and educational materials specific to their industry and distribute such materials throughout their specific industrial sector. Similar pilot actions relating to regions, cities and islands will be promoted. Consumer associations would be used to develop and distribute materials promoting better energy behaviour. This list is obviously not exhaustive, and merely gives a few examples for this new activity which endeavours to optimise pilot action dissemination by utilising existing effective networks.

TARGETED PILOT ACTIONS

By the end of 1995, SAVE I will have supported approximately 250 sectoral pilot actions. The main areas of interest were education and training, integrated resource planning, transport, buildings, cogeneration and monitoring and targeting. While a large amount of information has been gathered there is still scope for pilot initiatives in all these areas. The Commission proposes to continue pilot actions in these sectors but to change the mechanism for supporting individual actions in order to have a more co-ordinated approach. A specific topic will be developed - for example ways to overcome barriers to cogeneration, or problems associated with urban transport systems - and a specific call for tenders launched. A significant degree of cross-border co-operation will be required of tenderers and the results of these targeted actions will be disseminated as widely as possible. Other areas which would be considered priorities for targeted pilot actions would be electricity end-use and the development and dissemination of innovative financing mechanisms such as third party financing. This is a new activity which has been developed from the experience of the SAVE programme and which has

8 see article in Energy in Europe N° 22 for these bodies' status and procedures.

been proposed by the team which evaluated that programme.

Dissemination of information through networks.

Direct information to the consumer is an important factor in raising awareness of improved energy consumption behaviour. As in the case of polot projects, the network concept seems tailor-made for dissemination work. The experience of this concept under SAVE I was positive and should be continued and built on. In SAVE I only one pan-Community network was used but it is proposed in SAVE II that, where appropriate, additional existing networks might be responsible for different aspects of the information programme and that the Commission, in consultation with the SAVE Committee, will carry out a strategic review with the networks involved to decide on the direction of the programme. This action would be closely co-ordinated with the results being obtained on all the initiatives developed under the SAVE II programme.

Monitoring of energy efficiency progress at national and EU level.

A number of important analytical tools have been developed under SAVE I. These include the extension of the MURE II[9] model to policy actions in the field of energy efficiency, a database containing both SAVE and Member State initiatives and the development of a user-friendly method of disaggregating energy intensity information in such a way as to highlight the advances attributable to energy efficiency alone. It is proposed under SAVE II to set up monitoring arrangements which will use a common methodology to analyse the energy efficiency level within the Community on a continuous basis and will chart progress towards the achievement of the EU's energy efficiency objective already mentioned. Member States already have a large amount of data concerning their own energy situation. An annual meeting will be held of Member State experts on trends in energy efficiency indicators and on the performance of energy efficiency initiatives. This will be a joint exercise between the Commission and the Member States. This is a new activity and is directly linked to the development of the appropriate tools under the SAVE programme.

Specific actions in favour of greater cohesion between Member States when drawing up policies aimed at more efficient energy management.

Despite their best efforts and those of the SAVE programme, a high level of disparity persists between the energy management infrastructures of the Member States of the Union and, indeed, between many regions ofthe EU. While some Member States began their energy efficiency efforts in the wake of the first oil crisis of 1973, others have scarcely begun their own national programmes. It is therefore important that SAVE II should be used as a vehicle aiming at greater cohesion between the Member States and regions in the area of prudent and rational use of energy resources. SAVE II would therefore launch a series of initiatives aimed at those Member States and regions where relatively little has thus far been done in the area of establishing energy use priorities which are more relevant to environmental and economic objectives. This initiative would be limited to Member States, and in some cases specific regions of individual Member States, whose energy efficiency infrastructures are as yet under-developed. The purpose of this action will be to harness Member States' experience to optimise alignment of regional or local capacity. Actions in this area might be:

- the setting up of linkages between different Member States or regions of different Member States with a view to the exchange of information,
- the creation of the necessary databases to allow those responsible for public policy to access information on effective local initiatives,
- assistance in setting up regional centres of excellence which will act as focal points for local energy management activities and which will have the expertise to develop regional energy resource solutions.

This regional energy resource management capacity building is an important consideration in developing effective management solutions to the very different energy supply/demand situations of Member States and regions.

This is a new activity which is linked to the movement within the Union to create greater economic and social cohesion. Energy efficiency creates wealth through the consequent increase in disposable income and has been shown to be an effective regional development tool. This need is not simply philosophical but is very real in the context of the Member States' efforts to achieve the CO2 objective set by the Council of Ministers.

Specific action aimed at improving energy management at regional and urban level

The pilot action programme aiming to improve energy management in the regions and the cities of the

9 The MURE model is a predictative model which simulates the effect of different energy efficiency policy actions on both a Member State and European Union level

Community, which has been in operation since 1990, has shown the importance of responding as a priority to local energy issues and actively researching local solutions. The programme provides assistance to local authorities in regions, islands and in cities to help them create energy management agencies whose main role will be to implement regional and local policies for optimum energy use. By this means, the programme contributes to the integration of energy into local plans for sustainable development and contributes to local and regional environmental efforts. A pre-requisite of this bottom-up approach is proximity to consumers through very decentralised channels of information, education and advice on energy management. This effort can sometimes be at the level of all classes of consumer, such as small companies (including SME's), public bodies, and in some cases may aim directly at the individual citizen, who in sheer numbers may offer the greatest potential for energy management actions. This point was highlighted in the SAVE I programme which considered actions close to the consumer aimed at changing his energy use pattern to be of paramount importance. SAVE II would not merely continue but also reinforce this action by co-ordinating the activities of SAVE with those of the programme for energy management in the regions and in the cities. Actions in this area would be focused on the setting up regional and local energy management agencies. They might include flanking support such as energy end-use education programmes, setting up of local energy management and information agencies, and carrying out of targeted projects with a high dissemination potential. The focus of this action is on regional and local authorities and is oriented towards altering the energy habits of all types of consumer. The specific actions which will take place in this sector will be discussed with the SAVE Committee.

ACTIONS AIMED AT ESTABLISHING ENERGY EFFICIENCY AS A CRITERION WITHIN EXISTING EU STRATEGIC PROGRAMMES.

The more rational use of energy is a strategic objective which impacts on many aspects of EU life. At the outset this article outlines the main effects of improving energy efficiency on employment, the environment, regional development and industrial competitiveness. However, the SAVE programme has been established to accomplish only one aim - an improvement in the way we use our energy resources. It is therefore important that SAVE should link with other Community programmes which have been set up to accomplish specific aims, to which improved energy use can contribute. This linkage has already been acknowledged by the Commission's Directorate General for Regional Policy which has made strenuous efforts in order to have energy efficiency and renewable energy projects included in the latest ERDF funding exercise. The SAVE programme must through co-operation with other Commission departments aim to ensure that improving the efficient use of energy resources is permitted to make its full contribution to the goals of the Community's programmes. The first element of this strategy will be a set of comprehensive studies which will examine the role the prudent and efficient management of energy end-use can play in job creation and in regional and local development.
This is a new activity which has evolved in parallel to the different programmes themselves. Programmes such as Valoren, funded by the European Regional Development Fund, have shown the enormous potential of energy efficiency as an engine for regional development. This very positive experience should be built upon.

CONCLUSION.

The SAVE programme has been assessed as having a positive effect as regards the efficient use of energy in the EU. There are many crucial reasons for continuing and expanding this effort including environmental protection, energy policy considerations, employment, regional and local policy, and social cohesion. Lessons learned from the first SAVE programme pleas in favour of re-orientating activities towards action with a more prominent Community dimension, and actions aimed at coherence in energy efficiency infrastructures within the EU. A complementary operation aimed at disseminating the results of Community energy efficiency efforts to third countries is also proposed. The proposal for SAVE II represents a comprehensive approach by the Community to the great environmental and economic potential for further rational use of energy. In order to create this comprehensiveness two existing initiatives, the programme for efficiency end-use in the electricity sector and the programme for the promotion of energy management in the regions, the islands and in local communities have been included in the SAVE proposal. The programme incorporates those elements which have proved successful in SAVE I, augmented by a series of new actions aimed at strengthening the programme and creating a more effective and synergetic approach to the Community's environmental and energy problems. ◻

THE COMMUNITY PILOT SCHEME ON ENERGY IN THE REGIONS, TOWNS AND CITIES OF THE UNION ITS DEVELOPMENT AND ITS IMPORTANCE

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ORIGINS OF THE SCHEME: FROM OBSERVATION TO REGIONAL ENERGY PLANNING

In the early 1980s - only three years after the second oil crisis, and against a background of disturbed markets - the Commission, with European Parliament support, started to concern itself with the regional aspects of energy. At a time when energy was expensive and there were risks of shortages, the main intention was to make use of the regional level in order to reach energy consumers, combat wastage, and tap local energy sources.

Consuming less and producing more then became an economic priority. This new approach focused on the demand side in order to encourage energy saving and the replacement of imported energy by local (and for the most part renewable) energy sources. It soon became clear that in order to reach the broad mass of consumers it was necessary to act at a level fairly close to and representative of energy users: the regions therefore became active players on the energy policy stage.

However, this objective ran into major problems such as the lack of reliable regional information about demand and potential in respect of energy saving and local energy sources, the lack of methods and instruments for analysing and forecasting developments, and the lack of dialogue and confidence between the parties concerned, etc. It therefore became apparent that there was a need for a Community regional energy planning scheme to help the regions to compile and analyse energy data in order to choose an energy policy consistent with their other development problems.

A first series of five studies was embarked upon in 1982 with a very small budget, and 45 studies of this kind had been funded by 1989.

FROM PLANNING TO REGIONAL AND URBAN ENERGY PROGRAMMING

Following the oil market events of 1986, although primary energy sources (especially oil) became cheaper, the bottom-up approach conceived earlier remained valid as a strong energy-management policy could be maintained in the industrialized countries because final energy prices (for electricity, motor fuel, etc.) were in many cases kept high, and there was a growing awareness of environmental problems (ozone layer, greenhouse effect, acid rain, etc.).

Following a first evaluation in 1989, the Community regional energy planning scheme was continued with the following changes:

- extension of the scheme downstream from the planning stage with interaction and negotiations between local energy players and short, medium and long-term programming of specific, hierarchically-ranked schemes (giving rise to the concept of energy programming adopted in 1990); this form of programming was to serve as a reference framework for future energy investments;
- extension of the scheme to towns and cities since over 75% of energy is consumed there and given their importance in terms of deciding on and managing many energy-related operations, in particular investments. This gave rise to the concept of regional and urban energy programming, also adopted in 1990;
- technical and economic feasibility studies for the most urgent and pressing investments;
- improvements in procedures and in the transparency of the scheme with an annual call for proposals published in the Official Journal of the European Communities.

FROM PROGRAMMING TO REGIONAL AND URBAN ENERGY MANAGEMENT

The programming concept had the undoubted merit of translating the conclusions of the exercises undertaken in this context into clearly identified, budgeted, priority schemes. However, certain limits quickly became apparent, especially in the towns and cities and regions without energy know-how or related resources.
In 1992 it became apparent that it was necessary to support the implementation of the regional and urban energy programming exercises since it had often been observed that the actual implementation of ideas and action emerging from the programming exercises remains limited if there are no resources on the spot with appropriate know-how. Consequently, the gradual development of the Community scheme towards the local level in the energy sector highlighted the need to set up local energy agencies.
The setting-up of local or regional teams or agencies then became one of the categories of schemes eligible for aid from the Commission subject to compliance with certain criteria such as the absence of such teams in the municipality or region in question, an undertaking to recruit competent staff, and the pursuit of energy-management objectives.
This support to local and regional teams or agencies directed the activities even further downstream, and the overriding concept was no longer programming but local and regional energy management.
The intention is to focus and develop the continuation of this scheme on the basis of this concept of management, which in fact to a very large extent supplements programming, and an ad hoc programme is envisaged. Proposals in this connection are being prepared by DG XVII, so as to perpetuate this instrument of support to the various levels of decentralized authorities, which should be operational from the beginning of 1996.

THE IMPORTANCE OF ENERGY MANAGEMENT FOR REGIONS, ISLANDS, TOWNS AND CITIES

CONCERNS OF LOCAL DECISION-MAKERS AND ENERGY MANAGEMENT:

There are many spheres of influence of the locally elected representatives where energy plays an important role:

- networks (electricity, gas, heat, refrigeration cold) the establishment of which should be programmed and rationalized;
- management of public services (cost-cutting);
- transport (which should be facilitated while safeguarding the environment);
- spatial planning (which has many implications for daily home/work travel which is very energy intensive);
- town planning (which may have implications for the energy performance of buildings);
- social measures (one of the increasingly important aspects of which concerns the right of the least favoured citizens to energy);
- the management of waste which can be used to produce energy;
- public health (partially dependent on environmental conditions which themselves to a large extent depend on energy consumption: in particular air quality);
- informing citizens, making them more aware, and encouraging them to work towards a general improvement in the quality of life in urban areas by altering their behaviour (in particular wasting less energy).

LOCAL ENERGY MANAGEMENT'S DIRECT ENERGY IMPLICATIONS

Local energy management first of all has an immediate effect in the area of energy saving as a result of its contribution to the spread of the most efficient technologies, and in the area of renewable energy sources since local authorities play an essential role in the process of promoting and implementing energy technologies.
It also makes a contribution to the definition of investment in energy distribution infrastructure by avoiding duplication of effort and fruitless competition between networks.

INDIRECT EFFECTS OF ENERGY MANAGEMENT IN TERMS OF LOCAL AND SUSTAINABLE DEVELOPMENT

Local energy management makes it possible to address a number of issues related to sustainable development, e.g.:

- the creation of jobs and local added value, in particular as a result of energy-saving schemes consisting of substituting investment and maintenance expenditure for operating expenditure, the former generating (much) more added value and local jobs (mainly in SMEs) than the latter;
- the emergence of an often considerable turnover related to the use of renewable energy sources. This route, involving a multiplicity of production/consumption systems, also represents a market which is very propitious to the creation and development of SMEs;
- environmental protection and an improvement in the quality of life, as a result of the effect of energy

management on improvements in urban transport, housing quality, waste utilization, etc.;

- awareness and mobilization of local energy consumers (including householders) in order to combat effectively energy-related pollution and wastage. Awareness can be raised by campaigns focusing on the financial (cost-cutting) aspects of energy management and meetings between local energy players who had hitherto been unfamiliar with one another. This generally also results in an exchange of ideas and consensus propitious to local development.

THERMIE GETS A GREEN LIGHT

Environmental Initiatives in the 1994/95 Programme

BY I Samouilidis, DG XVII
Energy Technology Directorate

The Thermie programme for the demonstration and promotion of clean and innovative energy technologies has recently taken a number of decisions to proceed with a wide range of projects and initiatives with a distinctly 'green' environmental accent. The programme run by the Commission of the European Community's Directorate-General for Energy (DG VII), has always had a major focus on the environment, and in particular, the key role that new, clean and innovative energy technologies in the fields of rational use of energy, renewable energy sources, solid fuels and hydrocarbons, can play in reducing the emissions of carbon dioxide and other pollutants.
The final year of the existing Thermie programme, 1994, saw the initiation of three key areas of activity within the field of energy and the environment:

ACCOUNTING FOR THE ENVIRONMENTAL BENEFITS OF ENERGY TECHNOLOGIES

A set of over-lapping and co-ordinated studies that begin to identify and quantify the environmental and economic benefits of the use of new, clean and innovative energy technologies supported under the THERMIE Programme. These activities build on the authoritative Cost-Benefit Analysis of the programme which was completed in 1994.
Examples Activities:

- "The Introduction of Ecological Balances sheets"
- "Guide to Including Environmental Impact in Cost-Benefit Assessments of Modern Energy Technologies"
- "Environmental Improvement of Successful Thermie activities in Moscow"

DISSEMINATION OF THE ENVIRONMENTAL BENEFITS OF CLEAN AND INNOVATIVE ENERGY TECHNOLOGIES

Thermie also focuses on disseminating the experience and benefits of its investment in technologies and associated activities, such as studies, by organising, attending and exhibiting at a wide number of influential exhibitions and trade fairs throughout the Member States. Within the environmental sector in the Thermie programme, a number of Organisations for the Promotion of Energy Technologies (OPET) will be spreading the message of the environmental benefits to key target groups such as industry, local and regional municipalities, universities etc., at such events.
Examples :

- Exhibition Stand at Heleco, Greece, 1995
- Exhibition Stand at Envitec, Germany, 1995
- Exhibition Stand at "Energy and Environment", Turin, Italy, 1994

EDUCATION, TRAINING AND DISSEMINATION TO KEY TARGET GROUPS

The environmental activities currently underway are often aimed at the education, training or dissemination of information to key target groups in society, in order to inform these groups about the environmental benefits of energy technologies, or how they may change the way they work to benefit from the energy savings or reduced emissions of pollution. Types of activities in this area include the organisation of seminars, workshops, round-tables and conferences.
Examples :

- "Double-Dividend of Energy Saving whilst Responding to New Environmental Legislation" : a series of targeted seminars in the UK

• "The Planning of Projects under Energy and Ecological Considerations"; a workshop in Germany, 1995

Although the Thermie Programme itself has ended in 1994, it is clear that the new JOULE-Thermie programme will continue to focus on environmental benefits of the new, clean and innovative energy technologies.

THERMIE ANNUAL REPORT 1994

BY J. Dessens, DG XVII
Energy Technology Directorate

There cannot have been a single issue of Energy in Europe which has appeared over the past five years without articles and reports on activities under the THERMIE programme (1990-94), and indeed if one were to add the financial support given under its predecessor, the DG XVII Demonstration Programmes, which began in the mid-seventies, it would be seen that over the two decades in question almost exactly 2 billion ECU were employed in support of European energy Technology. As our readers will know, the THERMIE programme is succeeded by a partnership programme under the EU Fourth Framework Programme on RTD, the non-nuclear energy programme or 'Joule-Thermie'.[1] Therefore, by way of an interim résumé of results, we thought nevertheless that readers despite the abundant material served up to them by our magazine in the past, might be interested to have the brief summary of the last annual report (for 1994) which follows.[2]

Since 1990, the Thermie Programme has been supporting the demonstration and promotion of European energy technologies. Crucial funding has been provided to projects which are helping to reduce energy imports and cut pollutant emissions, while at the same time secure future competitiveness and encourage economic and social cohesion within the European Union (EU).

During the five years of the Thermie Programme (1990-1994), 700 million ECU (MECU) of financial support was provided for projects and Associated Measures aimed at improving the Rational Use of Energy (RUE), promoting the wider use of Renewable Energy Sources (RES), encouraging the cleaner use of Solid Fuels (SF) and at optimising the exploitation of the EU's Oil and Gas (OG) reserves.

Thermie, as set up by Council Regulation (EEC) No 2008/90, operates along three distinct but inter-related axes: Technology Project Support, Associated Measures and Co-ordination with other Community and Member State programmes.

The bulk of Thermie's funds are allocated to carefully selected projects designed to demonstrate new energy technologies or new ways of using existing technologies which have not yet reached their full potential. This support for projects is complemented by major efforts undertaken through the Associated Measures, to stimulate the dissemination of these technologies. Many of these are implemented through a European-wide Network of Organisations for the Promotion of Energy Technology (OPET).

From 1995, most of the activities of Thermie will be carried out as the demonstration component of the Non-Nuclear Energy Programme (JOULE-Thermie) within the European Community's Fourth Framework Programme for Research and Technological Development including Demonstration.

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1 *(see article on the exhibition in Berlin on the occasion of the Spring Meeting there of the contracting parties to the Climate Convention, elsewhere in this issue.)*

2 *The full text is available (in english) from the Energy in Europe office (or from the energy technology directorate of DG XVII, fax +32-2-771.5611, e-mail: dessens.j@mhsg.cec.be, as are many other THERMIE publications referred to in earlier issues and which concern on-going projects already supported under the five-year programme - 'flag' brochures, newsletters, sector project catalogues...*

DEMONSTRATION OF NEW TECHNOLOGIES IN 1994

The final Call for Proposals under Thermie provided specifications and priorities for projects in the four technical areas and for targeted projects aimed at the gasification of biomass for the production of electricity and heat.
A total of 196 projects were selected, receiving support from Thermie amounting to 148 MECU, the highest number of projects and greatest value of funding in any of the five years. At the same time, most of the horizontal objectives set by the Commission were met in the selection of projects in 1994. One third of all funding went to projects in Objective 1 regions, those areas of the EU where development is lagging behind. Some 65% of all support went to projects involving enterprises from different Member States and 116 projects concerned SMEs.

TECHNOLOGY PROJECT SUPPORT IN 1994

RATIONAL USE OF ENERGY

The 1994 Call resulted in the selection of 61 RUE projects and the allocation of 43.42 MECU in three sectors.

Table 1

Sector	N° of Projects	Support (MECU)
Buildings	18	9.85
Industry	34	18.73
Transport	91	14.84

Several of the larger financial contributions were the second phase of funding for the targeted projects in buildings and transport, first selected in 1993.

RENEWABLE ENERGY SOURCES

Thermie groups RES projects into 5 sectors. Seventy five projects were selected to receive support totalling 46.75 MECU.

Table 2

Sector	N° of Projects	Support (MECU)
Solar:		
Thermal applications	8	1.62
Photovoltaïc applications	19	6.4
Biomass	5	22.55
Geothermal	14	6.8
Small-scale hydro	18	5.24
Wind	11	4.14

By far the largest sector of financial support for RES concerned the targeted projects for biomass gasification to produce electricity and heat. Proposals were required to include short rotation forestry, technologies based on fluidised bed systems, use of already tested tar elimination methods, use of a combined cycle and total energy/environmental/economic balances.

SOLID FUELS

Five large projects were selected to receive funding totalling 23.06 MECU. The 335MW$_e$ Integrated Gasification Combined Cycle (IGCC) project at Puertollano in Spain is the largest Thermie project with total funding since 1991 of more than 50 MECU. The 1994 support of 8.7 MECU is for the start of the operational phase.

OIL AND GAS

For the OG sector, 55 projects were selected to receive financial support of 34.91 MECU. This was more than in any other year and ensured a balance of the overall expenditure between sectors, set out in the guidelines established by the Council in the Thermie Regulation.

ASSOCIATED MEASURES FOR ANALYSIS, PROMOTION AND EVALUATION IN 1994

Over the last decade, large investments have been made by the European Community and Member States to develop innovative energy technologies. However, it is widely recognised that demonstrating a new technology is only half the battle - realising the potential of those technologies is the other half. Through its provisions for Associated Measures, Thermie was designed specifically to ensure a rapid and efficient promotion of new technologies across Europe and beyond. The ThermieRegulation envisaged three broad types of Associated Measures: evaluation and analysis of the market, promotion and publicity of technologies and project results, and monitoring and evaluation of projects.
The OPET Network implements most of the Associated Measures, which cover a spectrum of activities from production of a wide range of publications and videos to the organisation of specialised seminars and conferences, and from the operation of training courses and business missions to studies and market evaluations.

PUBLICATIONS AND VIDEOS

Regular newsletters described the OPET activities and the progress of targeted projects such as the Integrated Gasification Combined Cycle project at Puertollano in Spain, city transport and building design. Moreover,

30 technical brochures ("maxibrochures") giving information on particular technologies or processes, as well as more than 10 videos were produced.

SEMINARS, WORKSHOPS, BUSINESS MISSIONS AND TRAINING COURSES

Thermie funded several major conferences including "Energy Efficiency in Latin America" (March 1994), "Energy and Local Authorities in Europe" (June 1994) and the OPET meeting in Berlin (September 1994). A large number of seminars and workshops were also organised, as were several business missions and training courses for energy managers, many of them from Central and Eastern Europe.

EVENTS

The promotion of the EU's energy technologies at more than 15 trade fairs formed a key element of the dissemination activities undertaken by Thermie. The Thermie Exhibition, at the Martin-Gropius-Bau, Berlin, in September, attracted over 90 organisations from all Member States. More than 150 technologies were put on display, drawn from EC-supported and national and regional programmes, as well as those developed by private investors.

AUDITS, STUDIES AND MARKET EVALUATIONS

Studies and market evaluations are often a necessary first step to identify what technologies can be used, and where and how they can be implemented. Studies covered energy efficient technologies in sports facilities and hospitals, as well as energy savings in the transport sector in several EU Member States. In Central and Eastern European countries, including the Newly Independent States, Thermie Associated Measures supported about 12 audits mainly on the safe and efficient operation of boilers.

THE MARKETING GROUPS

Marketing groups were set up by the Commission in 1992 to intensify and systematise its co-operation with industrial and professional associations, independent experts and OPET. In 1994, the Groups continued to support the development of marketing and dissemination strategies for many of the areas covered by Thermie.

REVIEW OF THERMIE 1990-1994

Over the five years of the programme, Thermie has supported a wide range of technological innovation and new uses of already proven technologies. A total of 574 MECU has been made available to 726 projects. Reflecting the political priorities of the early 1990s, the majority of Thermie's funds, was utilised in support of RUE and RES projects. Of the four sectors within RUE a strong bias was given to industry projects, which accounted for half of the projects and funding. The production of energy from biomass and waste is considered to have enormous potential and its importance within EU policy-making was reflected by the fact that it was the most strongly supported RES sector. Both the sectors of SF and OG took 21% of total project funding each, although there were relatively fewer projects.

Table 3 : THERMIE Support for Projects 1990-1994

Sector	N° of Projects Selected	THERMIE Contribution (+/-MECU)
RUE :	**259**	**172**
- Buildings	71	31
- Industry	144	85
- Energy Industry	11	10
- Transport	33	46
RES :	**272**	**159**
- Solar:		
- Thermal Applications	34	9
- Photovoltaic Applications	73	26
- Biomass	50	62
- Geothermal	26	15
- Small-Scale Hydro	37	13
- Wind	52	34
SF	**28**	**121**
OG	**167**	**122**
TOTAL	**726**	**574**

Since the OPET Network began its activities in 1991, approximately 25 MECU each year has been allocated to Associated Measures. Over the four years, about 4 000 actions have been launched to promote new and efficient energy technologies. The majority of these were related to RUE and RES. Relatively few actions have focused on solid fuels and oil & gas technologies since the actions are aimed at smaller target numbers and the industries are already active in promoting technologies to more mature market sectors.

CONCLUSION

Energy remains as important and vital a commodity and service as ever. Society is continuing to demand cleaner, more reliable, more economic supplies and a wider range of choice. However, meeting such demands for the future requires far-sighted policy formulation and strong decision-making. Thermie is a prime example of the EU's institutions and the Member States working together to construct one of the most important and far-reaching energy programmes ever undertaken at a supranational level. Thermie has already made a major contribution to the EU - in terms of the environment, security of supply and competitiveness - but the full force of its benefits will only take effect in years to come. The Council and the European Parliament have demonstrated their commitment to energy technology support and it remains as vital as ever to ensure the Union maintains a strong impetus so that the best and most efficient technologies are used as widely as possible. ◻

ENERGY COOPERATION BETWEEN THE EU AND CENTRAL AND EASTERN EUROPE IN THE NON-NUCLEAR FIELD

BY P Nagy, DG XVII
Unit for Cooperation with third countries

This overview describes the situation at mid-1995 : the subject was last dealt with in this way in an article by the same author in Energy in Europe *N° 19, as part of our feature* 'Focus on the East'

INTRODUCTION

The European Union and the other members of the Western World acted swiftly and concertedly in response to the new challenge posed by the great changes of 1989 in Central and Eastern Europe. Countries of Central and Eastern Europe (CEEC's) became eligible for new assistance and cooperation forms on condition that they committed themselves to democracy and to the restructuring of their economy on the basis of free market principles.

Coordination of assistance to CEEC's from the 24 OECD countries was entrusted by the G-7 at the Paris 'Arche' Summit of 14 July 1989 to the European Commission. The EU's own assistance, which includes the energy sector, is mainly channelled through PHARE, but also through specific energy cooperation programmes such as Synergy and Thermie. Other EU instruments of (energy) co-operation with Central and Eastern European countries include loans under the relevant provisions of the European Coal and Steel Community and Euratom Treaties, and those from the European Investment Bank.

EU relations with CEEC's in the energy sector are governed by the European Energy Charter and various bilateral agreements. So-called *Europe* (Association) *Agreements* have been signed at the time of writing with nine countries (the Baltic countries, Poland, Czech Republic, Slovakia, Hungary, Romania and Bulgaria), Trade and Cooperation Agreements with Slovenia and Albania are in force, and negotiations for a Cooperation Agreement with Croatia are underway.

Since the Copenhagen European Council (June 1993), EU relations and cooperation with Associated countries have been geared towards preparation for future membership, without a formal timetable however having been agreed thus far. In this respect it should be noted that Poland, Hungary and Romania have already submitted their respective applications for accession. Clarifications on this matter are expected following the 1996 Intergovernmental Conference of the Fifteen existing Member States which will consider the whole matter of institutional reform and the future of the EU, including the existing Treaties and decison-making mechanisms.

Currently it is the *Pre-Accession Strategy* decided at the Essen European Council in December 1994 which provides the 'route plan' for Associated CEEC's as they prepare for EU membership.

PRE-ACCESSION STRATEGY

The Pre-accession Strategy, which includes only the Associated CEEC's as so far listed above, has as main instruments the "structural relations" between EU and CEEC institutions and the *Europe Agreements* which both have energy components, as will be summarised below.

Structural relations include joint (multilateral) EU-CEEC ministerial level meetings such as joint Energy Councils. At this stage energy matters are also discussed, depending on context, in other joint Councils (e.g. in the joint Council of Economics and Finanace Ministers, ECOFIN, in the case of Trans-European Networks), or in the framework of the bodies set up under the Europe Agreements.

The structured relationship covers also the second and third pillars of the EU as provided for in the Treaty on European Union (TEU or Maastricht Treaty) and which do have a bearing on the energy sector: cases in point are the development of the concept of security of energy supply as a factor in the CFSP (Common Foreign and Security Policy) and discussions on illegal trade in nuclear materials in the framework of JHA (Cooperation in the fields of Justice and Home Affairs).

The essential feature of the Pre-Accession Strategy is the progressive preparation of CEEC's for the internal (energy) market, supported by a series of flanking measures such as the development of Trans-European Networks).

Preparation for future accession of CEEC's to the Union could therefore develop along the following lines:

- harmonisation of and dialogue on energy policies (the EU's own evelving Energy Policies, in terms of the Green Paper of January 1995 and the White Paper expected at the end of 1995, will obvously be of paramount significance);
- alignment of CEEC energy legislation to the "acquis communautaire" in the energy field (as set out in the White Paper on preparation of the Associaterd CEEC's for integration into the Internal Market of the Union adopted at the Cannes European Council of June 1995 which includes an energy section[1]); all horizontal and other provisions included in the acquis which concern energy - such as competition (especially important will be implementation of the Treaty and secondary provisions concerning competition and state aids), including public procurement, fiscal, environment, and health and safety rules, among other areas; the provisions of the Energy Charter Treaty -
- general assistance for restructuring the energy sector;
- the development of intra-regional cooperation (for instance in the case of the Black Sea basin as a strategically important energy transit area);
- accelerated progress towards economic and social cohesion (particularly through the joint development of Trans-European Energy Networks: the priority status confirmed at the Essen European Council for the gas pipeline Russia-Belarus-Poland-EU and that (albeit second-line) of the Baltic electricity ring are significant in this connection)
- familiarisation with specific EU energy programmes (e.g. SAVE, Thermie and Alterner); following the European Council decision of June 1993 to open up EU programmes to Associated CEEC's, the Commission as a first step as regards the energy sector made a proposal to the Council for CEEC participation in the SAVE programme. Implementing decisions are not expected before 1996.

EUROPE AND OTHER BILATERAL AGREEMENTS

Since 1991, the EU and its Member States have signed Association Agreements, which are also called "Europe Agreements", with the Baltic countries, Poland (in force), the Czech Republic, Slovakia, Hungary (in force), Bulgaria and Romania, whereas Slovenia will follow suit before the end of 1995. These Agreements will replace the "first generation" of trade and cooperation agreements or the free trade agreements signed with the Baltic States. On account of the long ratification times involved, the EU has concluded "Interim agreements" aiming at implementing the provisions of the Europe Agreements concerning trade and trade-relating matters directly.

The Europe Agreements essentially providefor of a (limited) free trade area, political dialogue, approximation of laws, financial assistance and economic cooperation. Energy, including nuclear safety is one of the areas of cooperation. PHARE-funding is also covered by the Agreements. A special ECSC protocol on trade in coal and steel products is also a feature both the Europe and Interim Agreements. The bodies set up in pursuance of the Europe Agreements (Association Council at ministerial level, Association Committee at senior official level, ECSC sub-committee, Parliamentary Association Committee) are also competent, in principle, for energy matters.

The Trade and Cooperation Agreement with Albania also includes cooperation in the energy sector, as is the case with the Cooperation Agreement currently being negotiated with Croatia.

G-24 COORDINATION

As already recalled, the G-24 framework of assistance to the Central and Eastern European countries was established following the July 1989 Paris summit meeting of the G-7, and coordination of this assistance entrusted to the Commission.

Energy was initially dealt within the heading of the environment but, in the face of severe structural problems in the energy field in the CEEC's (exacerbated by the introduction of hard currency payments as from January 1991 between the countries which had been members of the CMEA (Comecon) trading block, as also by the uncertainty of supplies from the USSR both in terms of deliveries and price, and by the 1990-1991 Gulf crisis), the 24 agreed at a High Level meeting in October 1990 to declare energy a new priority sector for coordinated assistance.

The newly established G-24 Energy Working Group, (chaired by DG XVII) drew up an initial strategy paper for energy assistance over the medium and long term. The paper, approved in January 1991, aims to provide a flexible "guideline" for assistance and identifies three broad priority areas for cooperation, which are still on the international agenda:

- policy formulation and planning comprising restructuring of the sector, pricing issues, forecasting, development of regulatory frameworks, etc;

1 *doc. (COM)95 163 fin. 1 & 2, annex pp. 359ff.*

• energy supply and demand - this would include energy efficiency and conservation in the short term and improvement of production and distribution as well as (geographical) diversification of energy supply in the longer term;
• energy, environment and safety - here nuclear safety has a particular priority, but other aspects such as the need for clean coal technologies are also at stake.

A special G-24 meeting on the electricity sector was held in June 1991, whereas the meeting of 16 March 1992 focused on winter energy shortages in CEEC's.
On 4-5 March 1993 and on 3-4 May 1994, special meetings of the Energy Working Group were held in Tallinn (Estonia) and Vilnius (Lithuania) on the development of a regional approach to the energy sector in the three Baltic Republics. These Baltic meetings could be considered as pointers to the way the Energy Working Group would have gone on to tackle its responsibilities in the future: on-the-spot meetings, at the request by beneficiary countries, on selected subjects. However, in the light of the changing circumstances, the G-24 decided in March 1995 to discontinue the permanent status of the Energy Working Group.

Assistance Programmes in the Energy Sector

The EU's assistance programmes for CEEC in the energy sector are particularly the grant provisions in Synergy, Thermie, Phare and the loans available, as already referred to, under the relevant ECSC and Euratom legislation, and of course from the EIB.

Synergy

DG XVII's International Energy Cooperation Programme, now known as Synergy, covering both CEEC countries and the CIS (countries of the FSU), has been in place since 1990. This assistance, which is of modest proportions (totalling about MEcu 1 in 1990 and 1991, MEcu 1.9 in 1992 and MEcu 3-4 in 1993, 1994 and 1995), is directed at implementation of the principles of the European Energy Charter, enhancement of the institutional capacities of the countries concerned, the development of energy policy and planning for energy efficiency improvement.
Under this scheme, the Hungary-EU Energy Centre in Budapest (co-financed with PHARE, Thermie and the Hungarian authorities) and the Black Sea Regional Energy Centre in Sofia have also been set up.
A number of important energy policy conferences have been organised under Synergy.

THERMIE

The EU's industry programmes for the transfer of innovative European energy technologies have concentrated on the establishment of Energy Centres across the CEEC region: these have provided the structure for specific, small scale, actions which have contributed significantly to energy savings.

PHARE

PHARE (MEcu 1 100 per annum; MEcu 6 700 for the period 1995-1999) is the largest EU grant programme for support of restructuring of CEEC economies and has a mature and increasing energy component (both nuclear and non-nuclear).
Phare is in fact the major EU instrument in the Pre-Accession Strategy, and has developed from an annual Technical Assistance Programme into a multi-annual programme which can now also co-finance investments under specific conditions. In this context, it was decided at the Essen European Council that the 15% of the PHARE budget already earmarked for Trans-European Networks should be increased to 25% as from 1995.
PHARE supports country-oriented as well as 'multi-country' programmes, covering energy and other sectors, in which any or all PHARE countries may take part. Projects have been thus far concentrated on Technical Assistance for the development of (sectoral) energy policies and energy legislation; restructuring of energy utilities, training, and so on. As from 1993 the development of energy saving funds has been on the agenda. Furthermore, each CEEC has its own energy programme. The multi-country programme (MEcu 34 for the period 1992-1995) has focused as far as the energy sector is concerned on studies on interconnection of electricity and gas networks, the development of an energy policy dialogue, training and twinning schemes, among other priorities.
The PHARE Cross-Border Programme (MEcu 150 annually as from 1994) concentrates on the development of networks and cooperation in border regions between CEEC's and the Union. In the energy sector, (gas and electricity) network projects between Bulgaria and Greece and between the Czech Republic and Germany have been initiated.

ECSC, EURATOM and EIB LOANS

In the framework of the ECSC Treaty, loans of up to MEcu 200 may be granted for investments in the steel

and coal sector of CEEC's. In the coal sector, the planned projects, which have to involve at least one Community undertaking, address security and working conditions in mines, reconversion of the coal industry, and environmental protection problems among other needs.

Starting in March 1994, Euratom loans have been made available for Central and Eastern European Countries, for safety improvements at nuclear installations.

The EIB has been authorised since 1990 to provide loans to the CEECs. In the energy sector the Bank's project aims are energy saving and improvement of the environment.

Other assistance schemes

It should be noted that the European Union and its Member States continue to provide the lion's share of world assistance to the CEEC's. It should also be noted that the EU and its Member States have a majority share in the EBRD which also finances energy projects.

LA POTÍTICA ENERGÉTICA DE LA UNIÓN EUROPEA

Por el Dr. Günter Rexrodt
Ministro Federal de Economía de Alemania

Dr. Günter Rexrodt

La política económica europea se basa fundamentalmente en dos principios: el refuerzo de la competitividad y la creación de unas condiciones más favorables para la industria europea. Esta es la única forma de que la economía europea pueda realizar el ajuste estructural necesario frente a los cambios económicos mundiales, y el único medio de garantizar que Europa siga siendo atractiva para las actividades de producción.

Un suministro de energía seguro, con un precio atractivo y que no suponga un peligro para el medio ambiente es una condición básica para una economía competitiva, sin la que no es posible un crecimiento y un empleo sostenidos. Por ello, la política energética goza de una gran prioridad en el ámbito nacional, y en la lista de prioridades europeas numerosos temas de política energética figuran en los primeros puestos.

Si bien los obstáculos jurídicos al comercio de petróleo y carbón han desaparecido de la Comunidad, está todavía por crear un mercado interno para las energías de red. En este ámbito, es urgente la supresión de los monopolios de importación, exportación y suministro. Únicamente cuando se haya logrado esto podrá utilizarse plenamente el gran potencial de inversión e innovación del mercado europeo.

El abastecimiento de energía a través de redes no tiene que considerarse un área económica que debe dividirse y aislarse por países, sino que ha de formar parte del mercado interior. La Comunidad debe reforzar el papel de las empresas mediante la ampliación de su campo de acción. La competencia entre sectores redunda en una energía más barata para el consumidor, gracias a la consiguiente presión sobre los márgenes de beneficio y los precios y la necesidad de racionalizar al máximo las reservas. Y la experiencia pone de manifiesto que las diversas exigencias de los consumidores respecto a la seguridad en el abastecimiento se cumplen mejor con una gama de soluciones diversas. Las propuestas de la Comisión de la CE sobre liberalización con vistas a la creación de un mercado interior del gas y la electricidad también pretenden alcanzar este objetivo y cuentan con el apoyo decidido del Gobierno Federal. Estas propuestas son muy similares a las conclusiones de los grupos de expertos alemanes. En los últimos años, se han introducido algunos elementos básicos de esta iniciativa de la Comisión en diversos países, de diversas formas. Aparte del Reino Unido y los Países Bajos, puede observarse esta evolución en Noruega, Suecia, Finlandia y los Estados Unidos. Ello evidencia un esfuerzo por limitar al mínimo los monopolios y, en la medida de lo posible, eliminarlos completamente.

La reorganización del mercado comunitario del gas y la electricidad ha sido objeto de un acalorado debate en el Consejo y en el Parlamento Europeo, cosa que no es sorprendente, puesto que los sectores de la electricidad de los distintos Estados miembros difieren demasiado entre sí para tratarlos de repente de la misma forma. Es necesario un enfoque gradual. Al redactar los proyectos de directivas del mercado interior de la

electricidad y el gas, no deben abandonarse las decisiones de carácter empresarial a la administración central de la Comunidad, puesto que de ello derivarían nuevas distorsiones de la competencia y más ineficacia. En nuestra opinión, es muy importante evitar eso. Las empresas del sector de la energía no necesitan ni un conjunto de normas ni unos objetivos cuantitativos, ni promulgados por los gobiernos ni establecidos por la Comunidad. Lo que necesitan es un entorno de condiciones y medidas que conduzcan a çla competencia y a la innovación.

En Alemania también está teniendo lugar un intenso debate sobre una mayor liberalización de las normas nacionales de suministro de electricidad y gas, especialmente dado que el sistema de suministro de gas y electricidad de Alemania presenta, comparativamente, muchos elementos competitivos. Aún así, es necesaria una mayor liberalización, incluso en Alemania, que facilite la competencia efectiva en beneficio de los clientes. Debería eliminarse la reglamentación existente hasta ahora. Esto se aplica en particular a la supervisión de inversiones en las centrales eléctricas y en la construcción de redes. Más aún, en mi opinión, la protección del medio ambiente deberá incluirse en la legislación sobre energía como un objetivo de igual importancia. Siguiendo estas orientaciones, el Ministerio Federal de Economía ha presentado un proyecto para modificar la ley sobre el sector de la energía.

Las redes transeuropeas, bien para el transporte, el suministro de energía o, cada vez más, para el intercambio de información son factores decisivos para determinar el atractivo de un lugar determinado como centro de actividad económica. En particular, en el campo de la energía y las telecomunicaciones, el desarrollo y ampliación de las redes transeuropeas deberá llevarse a cabo fundamentalmente mediante la inversión privada. Las empresas deberán tomar la iniciativa en este ámbito. Es erróneo buscar soluciones mediante medidas nacionales, o en programas de subvenciones comunitarias, como se desprende del Libro Blanco de la Comisión sobre el crecimiento, la competitividad y el empleo, a pesar de la afirmación, totalmente acertada, de que la principal dificultad para ampliar las redes transeuropeas de energía no es financiera. Antes bien, los Estados miembros y la Comunidad deberán crear sistemáticamente el clima necesario para el surgimiento de iniciativas empresariales. Está claro que esta responsabilidad está estrechamente vinculada al objetivo de un mercado interior común en el que se incluya el sector de la energía. Sólo podrán utilizarse de forma óptima las redes transeuropeas de la energía dentro de un sistema económico basado en la competencia.

Con el título sobre redes transeuropeas de la energía que se incluyó en el Tratado de la UE en la Conferencia de Maastricht, la Comunidad ha obtenido el marco jurídico para contribuir al desarrollo de las redes europeas. Esto reviste especial interés para los Estados miembros situados en la periferia de la Comunidad, que hasta ahora no se han integrado adecuadamente en el sistema de redes europeas de electricidad y gas. En este ámbito, la Comisión puede desempeñar una función de coordinadora y facilitar la armonización de la planificación empresarial sobre redes transeuropeas. También pueden armonizarse y acelerarse en mayor medida los procedimientos de concesión de autorizaciones para determinados proyectos de inversión que afectan a varios Estados miembros. En este sentido, las consultas periódicas, a instancia de la Comisión, si es necesario, pueden suponer una contribución positiva. Desde un punto de vista técnico, el trabajo de normalización en el sector de la energía ha de recibir un mayor apoyo con el fin de garantizar la interoperabilidad de las redes.

En cambio, la ayuda financiera directa para las redes transeuropeas de la energía debería considerarse únicamente en casos aislados. Como norma, la ayuda comunitaria debe limitarse a fomentar estudios de viabilidad. A diferencia de lo que ocurre con las redes de transporte, la construcción de redes de energía se organiza sobre una base comercial en un gran número de Estados miembros. Con la construcción de redes de electricidad y gas se gana dinero como retribución por el riesgo que asumen las empresas. Las medidas de ayuda de la Comunidad deberán reservarse para proyectos que sin ellas no pudieran llevarse a cabo, y no debe permitirse que dichas ayudas conduzcan a una distorsión de la competencia. Esto se aplica a la competencia entre las compañías de gas y electricidad, pero también a las fuentes de energía que compiten entre sí y a la conservación de la energía, que la construcción subvencionada de redes no debe desincentivar. La protección del medio ambiente es una exigencia importante que la política energética ha de tener en cuenta. Existe una relación directa entre energía y medio ambiente.

En Alemania siempre se ha dado mucha importancia a *la protección del medio ambiente en el sector de la energía.* A menudo hemos estado en vanguardia de la evolución internacional en este campo, por ejemplo, mediante nuestras normas sobre grandes instalaciones de combustión y nuestras actividades en el ámbito de la protección del clima. Con la reducción de las emisiones de CO2 entre un 25 y un 30% para el año 2005, con respecto al nivel de 1987, el Gobierno Federal ha planteado un objetivo muy ambicioso. La parte de las emisiones de CO2 que corresponde a la República Federal de Alemania es del 4%. Por eso, es evidente que el reto de proteger la atmósfera de nuestro planeta corresponde a una política de medio ambiente de ámbito mundial. Los problemas mundiales del

medio ambiente no pueden resolverse sin una cooperación internacional o mundial eficaz.

La Unión Europea tiene una responsabilidad primordial en la formulación de planes de carácter ambiental. En este ámbito, la UE ya ha adoptado un gran número de iniciativas. A título de ejemplo, quiero citar el programa comunitario Thermie para el fomento de tecnologías energéticas innovadoras, que continuará como parte del IV Programa Marco de Investigación y Desarrollo Tecnológico. Con los programas SAVE y Altener y con la directiva SAVE, se han adoptado medidas concretas a escala comunitaria para fomentar la conservación de la energía y promover las energías renovables. El uso racional de las energías fósiles y su sustitución por fuentes de energía que estén tan libres de emisiones como sea posible no sólo contribuirá a proteger el clima de nuestro planeta, sino que también ahorrará recursos energéticos limitados. Estas dos estrategias son también, por lo tanto, un elemento importante para garantizar el abastecimiento de energía a largo plazo.

Pero los programas de asistencia y las medidas reguladoras sólo pueden contribuir parcialmente a la protección del medio ambiente. Sigue pendiente la cuestión de si no pueden alcanzarse los mismos objetivos con un coste menor y con mayor eficacia mediante soluciones distintas a las anteriormente expuestas.

En este contexto, creo que tiene una importancia fundamental la cuestión de cómo pueden movilizarse las fuerzas del mercado para garantizar una política energética segura y más adecuada para el medio ambiente. Cada vez encuentra mayor aceptación la idea de que una protección eficaz del medio ambiente exige una mayor utilización de los instrumentos del mercado. Los precios de la energía descendieron drásticamente en la década de los ochenta, lo que supuso un gran alivio para la industria europea, que importa la mayor parte de la energía que necesita. Pero los precios de la energía no reflejan en la actualidad todos los costes. La fijación de precios auténticos, que reflejen costes hasta ahora no incluidos, es condición esencial para un desarrollo económico sostenido y un consumo de energía que no perjudique al clima.

El impuesto CO2/energía propuesto hace algún tiempo por la Comisión de la CE sería un paso importante hacia la internalización de las repercusiones externas, y el Gobierno Federal lo apoya firmemente. Ello proporcionaría incentivos de mercado para la reducción de las emisiones de CO2 tanto mediante el empleo racional de la energía como mediante la sustitución de las fuentes de energía con una alto nivel de CO2 por otras con bajo contenido de CO2 o sin CO2. Al mismo tiempo, se están mejorando las condiciones para que se utilicen en mayor medida las energías renovables, que en el futuro tendrán que contribuir en mayor medida al suministro de energía.

Según la idea de la Comisión, los Estados miembros adoptarían la propuesta de forma que no aumentase la recaudación tributaria global. Este es un punto de gran importancia. No podrá haber un incremento de la parte del producto nacional bruto dedicada a tasas e impuestos estatales. En su lugar, deberá realizarse una reestructuración del sistema fiscal según criterios ecológicos. En la práctica, habrá que cuidar de que no haya desventajas competitivas sólo para la industria europea. La protección del clima no se verá favorecida con el desplazamiento de instalaciones de producción y fuentes de emisión de un país a otro.

En el último número de *La Energía en Europa*, mi colega norteamericana Hazel O'Leary hizo una presentación del plan de acción inmediato del Gobierno de los EEUU para la protección del clima. Pero las medidas ya adoptadas en Europa, en los Estados Unidos y en otros países no son suficientes. El convenio marco sobre el clima de Río de 1992 fue un primer paso a escala internacional para hacer frente al problema mundial del efecto invernadero. Este convenio, que entró en vigor en marzo de 1994, debe desarrollarse mediante un protocolo sobre el clima, con objetivos y medidas concretas. En la primera conferencia de signatarios en la primavera de 1995, deberá realizarse alguna contribución a este respecto. Por razones ecológicas y económicas, es necesaria una acción coordinada entre los principales países industriales.

La UE está llevando a cabo un intenso diálogo sobre la energía con los países de *Europa Central y Oriental* y los estados sucesores de la antigua *Unión Soviética*. La UE está apoyando a dichos países en el desarrollo y modernización de sus fuentes de energía. Pero la Unión Europea, con toda la importancia que tiene para nosotros, no debe aislarse del mundo exterior. Tanto en el este como en el oeste existe un interés por las redes y por una mayor internacionalización. Las razones para ello son las siguientes:

- La creciente dependencia de las importaciones en Occidente: el refuerzo de las relaciones comerciales este-oeste contribuirá a diversificar y, por tanto, a garantizar la seguridad de nuestro abastecimiento energético.
- Un mayor acceso a los mercados occidentales: con el fin de ganar divisas convertibles, los países del este productores de materias primas deberán poder vender sus recursos, es decir, el petróleo y el gas, en los mercado occidentales para adquirir divisas convertibles y con ello impulsar la modernización de su sector de la energía; esto también constituye una importante contribución a la protección del medio ambiente.
- El interés de Occidente en la estabilidad política y económica a largo plazo en los países en vías de

reforma: en este sentido es primordial el desarrollo y la expansión del sector de la energía.

Un ejemplo concreto de las redes este-oeste es el conjunto de acuerdos relacionados con la *Carta Europea de la Energía,* firmada en diciembre de 1994 en la Conferencia Internacional de Lisboa. Esta Carta establece las bases para gran una comunidad europea de la energía. El objetivo principal del acuerdo, que es vinculante con arreglo al Derecho Internacional, es la movilización del capital y la tecnología occidentales para invertir en los países en vías de reforma, mediante una mayor protección a los inversores. Además, la Carta establece una mayor liberalización del comercio en el sector de la energía, el tránsito sin obstáculos, es decir, la libre circulación de la energía desde los lugares de producción hasta los consumidores finales pasando por terceros países, una mayor eficacia en el uso de la energía y, no menos importante, la protección del medio ambiente. El acuerdo nos da la oportunidad, mediante la inversión en el sector de la energía, de contribuir significativamente a la protección del medio ambiente, dado que los sistemas de energía obsoletos y los procedimientos ineficaces deberán sustituirse por otros más modernos, eficientes y beneficiosos para el medio ambiente. Esto reviste una especial importancia en el caso de redes de energía deterioradas, métodos de transporte ineficaces y centrales eléctricas que deben renovarse o sustituirse. El Gobierno de Bonn considera el acuerdo como una importante contribución al desarrollo económico de los países en vías de reforma y, por lo tanto, a largo plazo, a su estabilidad política. Dada la complejidad de la materia y su importancia para los sectores de la energía, la inversión, el comercio y las relaciones internacionales, es muy meritorio que se lograra el acuerdo tras sólo tres años de negociaciones. Con él se alcanza un nuevo hito en la cooperación internacional en el ámbito de la energía.

Con el programa PHARE para los países de Europa Central y Oriental y el programa TACIS para los estados sucesores de la antigua Unión Soviética, la UE ha creado dos amplios programas de ayuda (PHARE con 850 millones de ecus en 1994 y TACIS con 510 millones de ecus en 1994), gracias a ellos se proporciona ayuda de forma prioritaria a estos países mediante medidas de asistencia técnica al sector de la energía. El objetivo es facilitar la reestructuración para obtener un suministro de energía seguro, competitivo, beneficioso para el medio ambiente y a un precio razonable, mediante el asesoramiento, la formación, los estudios y otras medidas de transferencia de tecnología. Los fondos puestos a disposición por la UE para el sector de la energía, con estos fines, son considerables: cerca del 5% de los fondos de PHARE y cerca del 10% de los fondos de TACIS en 1994.

Esta impresionante lista de temas de la política energética europea subraya la importancia de este ámbito para la UE. Me parece sorprendente que, al mismo tiempo, antes de la conferencia intergubernamental de 1996, se produzca un vivo debate sobre la introducción de un capítulo sobre energía en el Tratado de la UE. ¿Significa esto que la Comunidad ha adoptado las anteriores iniciativas sin estar legitimada por los Tratados?

¡Evidentemente que no! No obstante, el debate revela una diametral diferencia entre las políticas energéticas de los distintos países. No vemos la necesidad de regulaciones específicas por sectores y opinamos que el Tratado constituye, para el sector de la energía, un marco jurídico adecuado, que se caracteriza por la competencia y la libre circulación de bienes y servicios. La política energética de la Comunidad debe continuar basándose en el marco global que se creó para la Unión Europea. La política energética es política económica en la medida en que se trata de suministrar energía a precios aceptables. La política energética también es política de protección del medio ambiente en cuando se trata de reducir el impacto del suministro de energía en el medio ambiente. Por ello, la política energética debe estar al servicio de los demás objetivos del Tratado, y no viceversa.

Pero esta no es la actitud general. Un gran número de Estados miembros solicitan que el Tratado incluya normas específicas sobre la energía. Detrás de ello se esconde la preocupación de que el Derecho Comunitario, que se basa en el principio de la competencia, pudiera poner en peligro el abastecimiento de energía en la Unión Europea. Pero, en realidad, es lo contrario. La competencia efectiva mejora el rendimiento en general y lo mismo sucederá, en particular, con el sector europeo de la energía. La Comisión de la CE ha adoptado correctamente las medidas necesarias para la introducción de la competencia en el sector europeo de la electricidad y el gas.

Unas normas específicas para el sector de la energía, incluso si su formulación fuera "inofensiva", serían una señal errónea, pues se verían como una renuncia a la apertura de fronteras y a una mayor competencia en este ámbito. Tal renuncia en un sector clave de la industria europea constituiría un revés para Europa e iría en contra de los objetivos del plan de acción adoptado por el Consejo Europeo con arreglo al Libro Blanco de la Comisión.

La renuncia a normas sectoriales específicas para el sector de la energía dentro del Tratado de la Unión Europea permite que las políticas específicas tengan en cuenta las características propias de cada país. Por ejemplo, los Estados miembros con grandes reservas de energía fósil podrían utilizarlas en el marco de las normas generales del Tratado. Algunos Estados

miembros dependen en gran medida de la energía nuclear, mientras que otros, a su vez, prestan más atención a las energías renovables. La UE resulta doblemente beneficiada. Por un lado, se está produciendo una satisfactoria combinación de energías sin necesidad de adoptar medidas especiales, lo que contribuye a garantizar la seguridad del abastecimiento de energía y es especialmente beneficioso en los momentos de crisis del abastecimiento. Por otro lado, existe una competencia entre políticas. La UE evita así avanzar en una única dirección irreversible. En vez de esto, la política energética que obtenga mejores resultados será la que triunfe en la economía europea.

Este repaso de la política energética europea pone de manifiesto que en este ámbito se están debatiendo temas de gran importancia política y económica, y que se están adoptando decisiones tras un cuidadoso debate. Este proceso es indispensable para el desarrollo de la Unión Europea.

LA ÓPTION ELECTRONUCLEAR EN LA UNIÓN EUROPEA

Conferencia del O.I.E.A. - La opción electronuclear Viena, 5-8 de septiembre de 1994

Discurso del Director General preparado por J.C. Charrault y B.Brands, DG XVII
Unidad de Energía Nuclear

Señor Presidente, señoras y caballeros:

Empezaré por lo más evidente. La energía nuclear puede producir grandes cantidades de electricidad, sin utilizar hidrocarburos, conservando así algunos de los más valiosos recursos del planeta. Esta electricidad se produce de forma competitiva, no contribuye al efecto invernadero, proporciona seguridad de los suministros y estabilidad de los precios, fomenta el desarrollo de tecnologías avanzadas y crea mano de obra altamente cualificada. Por estas razones, la Comisión Europea opina que la Unión Europea como tal ha de reconocer que la energía nuclear se ha convertido en uno de los elementos esenciales de su política energética global, si bien comprende que, por razones políticas debidas fundamentalmente a la sensibilización de la opinión pública respecto a los riesgos nucleares, algunos Estados miembros hayan decidido no recurrir a la opción nuclear. El Tratado Euratom, uno de los Tratados constitutivos de la Unión Europea, constituye un instrumento adecuado para maximizar las ventajas de la energía nuclear y limitar sus riesgos.

Señor Presidente, antes de hablar sobre la utilización de la opción nuclear en la UE, es necesario referirse a ella brevemente en el contexto más amplio de la generación de electricidad. ¿Cómo se produce actualmente la electricidad en la Unión y qué puede esperarse para el futuro en este ámbito?

Actualmente existen tres fuentes principales de producción de electricidad en la Unión: la térmica convencional (57%), la nuclear (34%) y la hidroeléctrica (9%). Este 57% de energía térmica se subvidide de la siguiente manera: carbón 28,4%, lignito 9,9%, gas 8,4% y petróleo 10,3%. El crecimiento de la demanda de electricidad fue considerable en la década de los 70, cerca del 2,7% anual, y en los 80, con un 2,2% a principios de la década y un 2,8% a finales de la década. No obstante, la reciente recesión ha disminuido el crecimiento al 1,3% en 1992 y lo ha reducido en cerca del 1% en 1993.

El reparto entre los combustibles que utilizan las centrales térmicas tradicionales ha cambiado radicalmente en los últimos 20 años. La utilización de petróleo se ha reducido en más del 40%, debido, evidentemente, a la crisis del petróleo. El esfuerzo por reducir la dependencia de Europa respecto al petróleo se ha centrado específicamente en el sector de la electricidad. La utilización de la energía nuclear aumentó principalmente a finales de los 70.

También ha tenido su importancia en la elección de combustibles la normativa cada vez más exigente sobre el medio ambiente. El carbón se ha visto muy afectado; y la utilización del gas ha aumentado y continúa haciéndolo.

¿Qué puede esperarse para el futuro? Todo dependerá ciertamente de cómo reaccione la demanda. El consumo de electricidad continuará creciendo probablemente en la UE en los próximos 15 años. En contraste con las previsiones para los países en vías de desarrollo, este crecimiento no será enorme. Ello se debe a que en Europa, la electricidad se utiliza principalmente en sectores como la iluminación comercial, el equipo de oficina, los electrodomésticos y, en la industria, para los motores eléctricos. Todos estos sectores tienen la posibilidad de realizar un ahorro considerable. La Comisión Europea está prestando una gran atención al desarrollo de esta posibilidad.

Por todo esto, podría decirse que la hipótesis más probable para la producción de electricidad en la UE en el resto de esta década y la primera mitad de la próxima es que aumente la capacidad de manera limitada. Evidentemente, se necesitará más capacidad para sustituir a las instalaciones viejas y obsoletas.

Si a esta perspectiva de crecimiento moderado del consumo de electricidad se añade la evolución general prevista para el mercado europeo de la energía,

estaríamos tentados de preguntarnos dónde está el problema. No debemos, sin embargo, sacar conclusiones apresuradas. La necesidad de energía en Europa está estancada, al igual que en el antiguo bloque del este de Europa. Pero en cambio, fijémonos en lo que está sucediendo en la población mundial y en la economía de Asia. Las previsiones de crecimiento de la demanda para el año 2020 oscilan entre el 50% y el 100%, que tendrá que satisfacerse fundamentalmente con hidrocarburos y carbón. Por lo tanto, y esto se aplica especialmente a la UE con sus limitadas fuentes de suministro, no podemos quedarnos satisfechos con la situación actual. Debemos continuar trabajando en el ahorro de energía, en la diversificación de las fuentes de abastecimiento y en la conservación de la autonomía. Por lo tanto, y a pesar de las distintas opciones realizadas por los Estados miembros, la Comisión Europea opina que la energía nuclear puede y debe representar una función estabilizadora para la consecución de estos objetivos.

Miremos más de cerca la opción de la energía nuclear en la Unión Europea. ¿Qué uso se le da actualmente? La voluntad política de varios Gobiernos europeos ha hecho posible construir una Europa nuclear: la decisión soberana de los Gobiernos se plasmó en el Tratado Euratom. Se ha desarrollado una sólida industria nuclear europea que utiliza su propia tecnología, cubre el ciclo completo del combustible y satisface cerca de un tercio de las necesidades de electricidad de los 12 Estados miembros. Más de 130 reactores nucleares están en funcionamiento en 6 de los 12 Estados miembros. La Unión Europea, seguida de cerca por los EEUU, es el primer productor de electricidad nuclear del mundo. Esta industria emplea a más de 400.000 personas en la UE, y junto con las industrias relacionadas directa e indirectamente con ella, mantiene a varios millones de personas.

No obstante, esta industria está atravesando una etapa difícil. La posición adquirida a lo largo de los años será difícil de mantener. Será necesario adoptar medidas activas y creativas para que Europa, con su peso económico, industrial y financiero, siga siendo un líder mundial en energía nuclear.

Esto puede decirse de todos los sectores de la industria nuclear. Los constructores de centrales nucleares europeos han de sobrevivir en feroz competencia con los de Estados Unidos, que, en el mercado de las exportaciones, se aprovechan del creciente peso político de su país. En un futuro próximo, probablemente tendrán que competir también con los potentes constructores del sureste asiático, que gozarán de una presencia prácticamente global en el mercado. Frente a estas amenazas, los dos principales constructores europeos, Framatome y Siemens, han decidido unir sus recursos para diseñar un reactor para el futuro. Este proyecto presenta ventajas económicas, industriales, comerciales y de seguridad.

La industria nuclear europea tiene una gran participación en el mercado mundial del ciclo de combustible nuclear. Como todos sabemos, estos mercados están actualmente en dificultades. Este es el caso del mercado del uranio. La minería del uranio en todos los países con una economía de mercado se ve amenazada no sólo por el exceso de materias primas procedentes de las existencias acumuladas a lo largo de los años, sino también, y esto es más grave, por la aparición en el mercado de vendedores de los diferentes países de la CEI.

Además, la cantidad de material nuclear disponible debido al desarme podría influir decisivamente en el mercado y perturbarlo gravemente haciendo caer drásticamente los precios, tanto a corto como a medio plazo. El consiguiente problema de abastecimiento sólo podría abordarse de modo global. Deberán establecerse precios realistas basados en el coste, a fin de que el comercio pueda realizarse en condiciones equitativas.

La capacidad de la industria europea de conversión, que actualmente satisface las necesidades internas, también podría verse afectada por la intervención de las centrales de la CEI en el mercado mundial. Estos servicios ofrecidos por las empresas rusas tendrán que tener en cuenta asimismo criterios económicos.

Como todos sabemos,el mercado del enriquecimiento es un mercado muy competitivo en el que no resulta fácil a la industria de la UE desarrollarse. Los Estados Unidos están aparentemente a la ofensiva en este ámbito y parecen empeñados en recuperar la posición dominante que perdieron hace algunos años. América ha expresado su deseo de superar a las industrias europeas del enriquecimiento en cuanto a tecnologías punta tales como el enriquecimiento con láser.

Por ello, en la Unión Europea, la investigación referente al enriquecimiento con láser debe adaptarse a la situación europea con el fin de que los industriales europeos estén preparados, en caso necesario,para aplicar esta técnica del futuro antes de que sus competidores estén en situación de hacerlo. Pero, incluso entonces, el riesgo de que el material procedente del desmantelamiento del armamento nuclear perturbe la posición de la industria europea sigue siendo elevado.

Por último, el sector de fabricación de combustible convencional está actualmente abierto a la competencia y probablemente siga así en los años venideros.

Europa tiene una oportunidad, sujeta a condiciones adecuadas de no proliferación, en la creciente utilización del combustible MOX, que contiene plutonio. Actualmente se está utilizando en Francia,

Alemania y Suiza, y pronto se utilizará en Japón y Bélgica.

No obstante, es importante que las existencias intermedias de este material sean las mínimas.

La utilización de la energía nuclear no puede considerarse aisladamente. Ha de verse en el contexto más amplio de una política energética global. En opinión de la Comisión Europea, dicha política energética debería establecerse pronto en torno a los ejes siguientes:1) seguridad en el abastecimiento y estabilidad geopolítica, 2) competitividad y 3)respeto a las necesidades del medio ambiente.

Como ya hemos hablado de la competitividad al describir la situación de la industria europea, nos centraremos ahora en los otros dos ejes. Respecto a la seguridad en el abastecimiento, hay que señalar que la dependencia de la energía importada ha constituido siempre un problema para algunos Estados miembros de la Unión Europea. Los recursos de petróleo y gas se agotarán en un futuro no muy lejano. Según el O.I.E.A., a partir del año 2005 las importaciones de petróleo podrían suponer de nuevo el 70% de la energía consumida en los países de la OCDE, es decir, estaríamos en la misma situación que a principios de los años 70.

En vista de esto, es importante contar con una gran disponibilidad de uranio durante varias décadas. No es probable que la tensión internacional afecte negativamente a estos suministros. Lo único que podría suceder es una perturbación a corto y medio plazo, derivada de una caída de los precios de mercado.

Para Europa es muy importante hacer un uso facultativo de los recursos disponibles. Para lograr dicho objetivo sería importante hacer un uso óptimo de la energía nuclear, y dicha opción debería aprovecharse de forma que se extrajera de ella la mayor cantidad de energía posible. La opción de la reelaboración debería dejarse abierta, pues puede hacer que la UE sea menos dependiente de la energía importada.

También es importante para la estabilidad geopolítica la existencia de un régimen sólido y adecuado de no proliferación que garantice que no se hace mal uso del material nuclear. Dicho régimen es esencial para la industria nuclear.

La UE tiene su propio sistema de salvaguardia nuclear, coopera estrechamente con el O.I.E.A. y, como dijo recientemente el Secretario de Estado americano Warren Christopher, "no es inferior a nadie en su compromiso con la no proliferación nuclear". Huelga decir que la UE favorece la ilimitada e incondicional ampliación del TNP por parte de la Conferencia de Revisión y Ampliación de 1995.

El eje del medio ambiente, donde incluyo la seguridad de las instalaciones nucleares, es también muy importante. Ante este auditorio no es necesario extenderse sobre los peligros que pueden derivarse de la utilización de la energía nuclear, y lo necesario que es limitar la exposición a las radiaciones ionizantes, evitar accidentes o, en caso necesario, hacer todo lo posible para mitigar sus efectos. En la UE se han adoptado medidas a todos los niveles.

Los productores europeos han coordinado sus esfuerzos en lo que respecta a la seguridad(Siemens - Framatome: Reactor europeo de agua a presión). También lo han hecho las autoridades de los Estados miembros, y la Comisión ha elaborado recomendaciones. Pero deberán adoptarse iniciativas de armonización a escala mundial. La opinión pública no entendería que puedan variar los criterios según los países. Por ello, considero muy positivo el acuerdo sobre el Convenio Internacional para la Seguridad Nuclear, que estará abierto a la firma a partir del 20 de septiembre. La Comisión ha solicitado al Consejo un mandato negociador para poder suscribir como tal este Convenio. Pero es necesario ir más lejos. Son urgentes los problemas que plantea mejorar o continuar mejorando la seguridad en determinados países de Europa Central y Oriental y la CEI. La UE está contribuyendo en gran medida. La mayoría de ustedes conoce los programas PHARE y TACIS. También es importante en este contexto la Carta Europea de la Energía. El Tratado de la Carta de la Energía, cuya firma está prevista para finales de octubre, formalizará en un texto jurídicamente vinculante los compromisos políticos de 1991. El Protocolo Nuclear también tratará, entre otros asuntos, sobre la seguridad nuclear.

Más específicamente en el campo del medio ambiente, la UE como tal tiene suficientes atribuciones para someter a la industria nuclear europea a una estrecha vigilancia. Las instalaciones nucleares de la UE están muy controladas en cuanto a su impacto en el medio ambiente. También es relevante en este contexto la política del CO2. Aparte de la energía hidroeléctrica, de todas las fuentes de energía que pueden utilizarse para producir grandes cantidades de electricidad, la energía nuclear es la única que no produce CO2.

Señor Presidente:

Antes de acabar, permítame aclarar que la Comisión Europea reconoce que existen opiniones encontradas sobre la naturaleza de la energía nuclear y que los Estados miembros de la UE tienen distintos puntos de vista sobre su necesidad. La Comisión no puede adoptar postura sobre esta cuestión, ni lo hará. Las decisiones sobre el desarrollo de la energía nuclear son íntegramente responsabilidad de los Estados miembros. Pero la UE como tal, en virtud del Tratado Euratom, tiene competencias específicas respecto de la energía nuclear. Corresponde ahora a la Comisión garantizar la continuidad de las condiciones que

permiten a la industria nuclear seguir funcionando. Es necesario adoptar medidas a nivel europeo a fin de que las industrias nucleares establecidas en los Estados miembros de la UE puedan conservar la posición dominante que han alcanzado en el ámbito del desarrollo tecnológico y económico de la industria nuclear, posición con la que sirven a intereses más generales que los puramente europeos.

Gracias por su atención.

EL SECTOR DEL PROGRAMA THEMIE SOBRE LA "UTILIZACIÓN RACIONAL DE LA ENERGÍA EN LA INDUSTRIA"

Resultados de la convocatoria de propuestas de 1994

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ANTECEDENTES

La industria de la Unión Europea, al formar parte de la economía mundial, se ve continuamente afectada por factores externos tales como el coste de la mano de obra, el precio de la energía, la seguridad en el abastecimiento de energía y materias primas, las normativas sobre medio ambiente y muchos otros factores. La única manera de seguir siendo competitivo es combinar todos estos factores con el objetivo final de optimizar los beneficios económicos.

Esta exigencia insoslayable tiene una gran repercusión en la utilización de la energía. La racionalización de la utilización de la energía exige un enfoque muy diversificado que tenga en cuenta factores geográficos, el tipo de industrias en cuestión, la competencia del exterior de la Unión (aún más importante con los nuevos Acuerdos GATT) y la lenta recuperación tras una larga recesión.

Esto explica y justifica por qué el sector industrial es probablemente el menos definido en el programa Thermie, lo cual no quiere decir que sea el menos importante. De hecho, el sector industrial utiliza hasta un 40% de la energía primaria. Las industrias de producción con mayor intensidad de energía (industrias en que el coste de la energía supera el 10% del coste del producto final) se ven muy afectadas por la feroz competencia del exterior de la Unión y en muchos casos por la sobreproducción mundial. Entre estas industrias se encuentran las químicas, las del hierro y acero, pasta y papel, ladrillos y cerámica, vidrio, cemento y metales no férreos. Para aumentar su competitividad deberían tenerse en cuenta dos requisitos fundamentales: reducir el coste de producción (teniendo en cuenta que el coste de la energía no es despreciable) y utilizar tecnología punta (elaborar productos de más calidad con un consumo específico de energía igual o inferior y crear mercados para la exportación de tecnología avanzada). Para las que utilizan menos energía, aunque se aplican las mismas normas, la motivación y la repercusión del uso racional de la energía son menores.

En este contexto, el programa Thermie en el sector industrial sigue constituyendo una gran oportunidad para apoyar nuevas ideas de ahorro y uso racional de la energía, a pesar de los estrictos condicionamientos a los que se ve sometida la industria.

RESULTADOS DE LA CONVOCATORIA DE PROPUESTAS

La convocatoria de propuestas de 1994 del programa Thermie para proyectos innovadores y de difusión se lanzó en julio de 1993 con el límite del 1 de diciembre de 1993. Con el fin de evitar la dispersión, se estableció un esquema general sobre el tipo de propuestas del sector de la industria que podrían beneficiarse de la ayuda (Cuadro 1).

La respuesta fue considerable, presentándose un total de 120 proyectos que solicitaban una ayuda total de más de 150 millones de ecus (un proyecto determinado solicitó una cantidad de 26 millones de ecus). Esta solicitud excedía con mucho el presupuesto disponible, pero también debía realizarse una selección utilizando criterios tales como el carácter innovador, las posibilidades de reproducción, los beneficios para el medio ambiente, la colaboración internacional y, de forma especial, el ahorro de energía. En la evaluación de este año, se analizaron detalladamente las peticiones de ayuda económica y se verificaron con arreglo a criterios comunes coherentes con los objetivos del programa. Aunque esto ya se había aplicado antes, este año se ha hecho de forma más sistemática y estricta, incrementándose el nivel de equidad entre las propuestas de proyectos. En muchos casos, ello ha redundado en una considerable reducción de los costes reembolsables y, por lo tanto, de las cantidades que

podían concederse como ayuda económica. Tras esta evaluación, la solicitud total de ayuda económica se redujo a unos 60 millones de ecus. Al final, se aprobaron un total de 32 proyectos en el ámbito de la industria, incluida la industria energética, lo que significa que se seleccionaron un 25% con una ayuda total de 17'9 millones de ecus. Ello supone una subvención media de 550.000 ecus por proyecto.

Aparte, se estableció una lista de reserva de 17 proyectos para hacer frente a posibles anulaciones de las propuestas aprobadas antes de la firma de los contratos.

Cuadro 1

Extracto del anexo técnico THERMIE 94: "Utilización racional de la energía en la industria y en el sector de la energía"

Industria :

- Proyectos de tecnologías de recuperación de calor para procesos de producción u otros usos.
- Proyectos de tecnologías de recuperación de residuos, para la sustitución de materias primas o para cubrir las necesidades de energía en los procesos industriales.
- Proyectos para instalaciones o equipos auxiliares que exijan un elevado nivel de energía y/o asistidos por sistemas de control avanzados de bajo coste adecuados para una aplicación generalizada.
- Proyectos para la producción de frío utilizando calor residual.
- Proyectos sobre nuevas tecnologías que afecten a los procesos de producción, la calidad de los productos o su valor añadido, y en los que el ahorro de energía deba establecerse con exactitud..
- *Exclusiones: desarrollo de software, aplicaciones de sistemas de cogeneración, y utilización de aire puro o enriquecido en procesos de combustión.*

Sector de la energía :

- Proyectos de redes integradas de calefacción urbana asistidas por sistemas de control avanzados de bajo coste y basadas en tecnologías de combustión utilizables con diversos carburantes o en sistemas innovadores para el almacenamiento y distribución del calor.
- Proyectos destinados a aumentar la eficacia de la producción y transporte de electricidad, incluida la cogeneración.

La lista de proyectos aprobados y la lista de reserva (proyectos interesantes desde el punto de vista técnico pero que no han podido recibir ayuda por limitaciones presupuestarias) figuran en el cuadro 2, donde se da información sobre el número de proyectos y la ayuda total para los proyectos seleccionados. Los proyectos figuran por sectores industriales, con comentarios sobre las tecnologías empleadas y sobre si afectan al propio proceso industrial o al equipo auxiliar de un proceso determinado.

El cuadro 2 muestra una distribución equitativa entre los proyectos relativos al propio proceso industrial y los referentes al equipo auxiliar, confirmando que en ambas áreas sigue habiendo muchas oportunidades para el uso racional de la energía, dependiendo de las características del proceso. La principal diferencia es que las mejoras en el equipo auxiliar están directamente relacionadas con el ahorro de energía, mientras que las mejoras en los procesos conducen generalmente a la reducción del consumo específico de energía por unidad de producción. En algunos casos, el ahorro de energía es indirecto mediante el aumento de la calidad o la disminución de pérdidas. No obstante, ambos tipos de proyectos tiene que ver también con los demás objetivos principales de la industria, aparte del ahorro de energía, a saber, la reducción del impacto en el medio ambiente, el aumento de la competitividad y la mejora tecnológica.

A continuación se comentan los resultados expuestos en el cuadro para cada uno de los sectores industriales.

El sector agroalimentario es también un sector relativamente dinámico, expuesto a una feroz competencia en la UE y con pocos fabricantes no comunitarios, que, en cualquier caso, están representados normalmente dentro de la UE.

El número de proyectos de las fábricas de cerveza ha sido muy grande en el pasado, con propuestas de *Heineken* y *Guinness* por ejemplo, para la gestión de la refrigeración, la automatización de los procesos y la extracción del CO2. Estos ámbitos ya no presentan muchas oportunidades para la innovación y este año no se han recibido propuestas al respecto.

No obstante, sigue habiendo oportunidades para la difusión de tecnologías, entre las que se encuentran tecnologías transectoriales tales como los secadores de vapor (utilizados para la producción de pulpa de azúcar), pero ha de evaluarse cuidadosamente el riesgo que se corre realmente, y en vista de la competencia mencionada, deberán tenerse especialmente en cuenta los casos en que el usuario es el principal contratista.

De todos modos, los equipos de producción combinada de calor y electricidad a partir de residuos y las tecnologías de refrigeración siguen presentando buenas oportunidades.

Ladrillos: Este sector ha vuelto a ver su cuota reducida, en comparación con las anteriores convocatorias de propuestas. En los años 80, el proceso industrial mejoró en gran medida con la introducción de la automatización, los hornos herméticos y compactos, los carros ligeros y la recuperación del calor. La penetración de determinados mercados de la UE sigue siendo un reto para estas tecnologías, pero los riesgos técnicos son razonables.

En este caso sería más apropiado investigar instrumentos financieros para hacer frente a la debilidad financiera de las empresas afectadas. Nuevos tipos de hornos, o algunos de los que ya existen (como los hornos de rodillo, que ya reciben ayudas), originalmente diseñados para otros productos, podrían ser bien recibidos en el futuro, incluso para proyectos de difusión.

Dado el elevado contenido en polvo de los gases producidos por la fabricación de ladrillos, uno de los principales retos es recuperar el calor mediante un nuevo intercambiador térmico.

La PCCE (producción combinada de calor y electricidad) ofrece oportunidades para la producción económica de agua caliente, para la mejora del manejo y la plasticidad de la arcilla en la fase de moldeado del proceso.

El cemento es un sector intensivo en el uso de energía, en el que tradicionalmente se aprueban algunos proyectos todos los años. Este año sólo se han aprobado algunos conceptos nuevos de molinos de materias primas o prensas de rodillos, considerando que muchas de estas tecnologías están ya en fase comercial. Este año, las tecnologías están más concentradas en la recuperación del calor residual para la producción de electricidad y en algunas intervenciones innovadoras en el proceso.

La cerámica también es una rama que consume una gran cantidad de energía, siendo los principales productos los azulejos, vajillas y sanitarios. En el pasado se ha proporcionado ayuda a proyectos dirigidos a la integración de procesos mediante la utilización de la cocción única y la automatización total, pero el riesgo real en la práctica ha resultado ser bastante bajo. En el pasado, otra ámbito de actividad fue la trasferencia de tecnología de un producto a otro (por ejemplo, de los azulejos a la loza), con mayores ventajas en cuanto a la reducción del tiempo de fabricación y un mejor control de calidad, aparte del ahorro de energía. Otras opciones, tales como el granulado y el esmerilado seco deben presentar aún resultados positivos a fin de superar la reticencia de los usuarios, como alternativa a la actual tecnología de trituración por vía húmeda y secado por dispersión.

Química: se trata de un sector amplio y complejo, que a efectos del programa Thermie cubre tres áreas: los productos químicos orgánicos e inorgánicos a granel, distintos tipos de productos para los consumidores finales, y las refinerías. La preocupación por el medio ambiente es un incentivo importante para las inversiones en esta rama, como en la mayoría de las industrias que utilizan la energía de forma intensiva.

Las principales áreas de interés este año han sido la recuperación del calor, la integración de los procedimientos industriales y la utilización de los gases de escape, y la producción de frío. La cogeneración sigue ofreciendo buenas oportunidades en este sector, en algunos casos utilizando la combustión de los residuos industriales del proceso, pero los riesgos técnicos son bastante reducidos.

Sorprendentemente, este año se han presentado muy pocos proyectos para la mejora de procesos de producción, tales como la utilización de membranas celulares o nuevos tipos de catalizadores. En el futuro, la recuperación del calor residual para la producción de frío, así como la producción de derivados de las materias primas mediante la combustión en lecho fluído de residuos industriales podrían ser algunas de las oportunidades innovadoras más importantes.

Vidrio: esta rama cubre los siguientes tipos de vidrio: contenedor, plano, fibra, doméstico y técnico. Anteriormente, los proyectos de este sector tenían como objetivo recuperar la energía en regeneradores mejorados o en hornos con recuperación. El interés en la recuperación de energía para la producción de electricidad, que fue un ámbito de interés en el pasado, ha disminuido este año y sólo se ha seleccionado un proyecto para la mejora de la recuperación de energía en los regeneradores.

Metales no férreos: se incluyen aquí procesos industriales relacionados con los siguientes productos: aluminio, cobre, zinc, plomo y níquel, y metales preciosos. En esta rama se incluye un gran número de procesos y tecnologías, desde la extracción hasta la producción de productos acabados.

A juzgar por las propuestas presentadas, el reciclaje, la fusión secundaria y la fundición presentan un gran interés especialmente en los países del sur de Europa, pero únicamente han obtenido ayudas dos proyectos relacionados con los procesos de producción.

Este sector está muy expuesto a la competencia del exterior, principalmente por parte de la antigua Unión Soviética, y por lo tanto, podrán esperarse en el futuro proyectos dirigidos a reducir costes, aumentando así la competitividad de las empresas más prometedoras de la UE.

Pasta y papel: apenas se han considerado unos pocos proyectos en este área, donde la cogeneración constituía una importante área de interés en el pasado (las turbinas de gas con inyección de vapor eran muy interesantes para mantener la uniformidad de la producción de energía). No obstante, ahora se da más importancia a los procesos innovadores tales como el reciclaje de mezclas de polietileno y papel (este proyecto ha sido seleccionado para obtener ayuda financiera).

Hierro y acero: sigue siendo un sector de gran importancia para Thermie, a pesar de la actual crisis económica.

Este ámbito cubre una gran diversidad de productos y procesos que van desde los hornos de coque hasta la inyección de oxígeno en altos hornos y el refinado

secundario, y desde el recocido o la galvanización hasta el laminado en caliente.
La recuperación del calor y el reciclado de la arena de moldeado es un reto importante en este ámbito, en el que se ha aprobado un proyecto. Otro proyecto está vinculado al recalentado de alto rendimiento de tubos de acero. También existe un proyecto totalmente distinto referente a la limpieza de grandes superficies verticales de acero, para la que se aplicará un innovador chorreo con granalla sin polvo.
Textil: el ahorro de energía en este sector tiene lugar fundamentalmente en el proceso: cambios en la técnica de tejido, utilización de distintos aditivos o métodos de impregnación, etc.
En este sector siguen existiendo problemas relacionados con el medio ambiente, cuyas soluciones pueden combinarse con buenas oportunidades de recuperación del calor e integración del proceso de automatización. En la lista de reserva figura un proyecto.

Derivados de la madera: la principal área de actividad en esta rama es la combustión de residuos de madera para generar electricidad y calor, utilizándose éste último para el secado de la materia prima y el tratamiento del vapor. El riesgo técnico es muy reducido y afecta al control de la combustión y de las emisiones contaminantes.
Las nuevas prensas para la producción de paneles de fibras de madera pueden ser una idea interesante para reducir el consumo de energía en fases posteriores, pero hay que examinar cuidadosamente el potencial de mercado y los riesgos técnicos reales.
Servicios públicos: en este sector, las aplicaciones para la recuperación de energía, a pesar de ser pequeñas en porcentaje, son muy significativas. Se requiere fundamentalmente el uso de materiales innovadores, resistentes a la corrosión intensa y la erosión o con mayor resistencia.

Cuadro 2: Resultados de la convocatoria de propuestas de Thermie para la industria (1994)

Rama industrial	Tecnologías	Tipo	Nº	Total 1	Ayuda en ecus
Sector agroalimentario	- Reconversión de motores diesel a gas natural - Recuperación de la energía fría del hielo utilizado para conservar el pescado en los barcos. - Secador directo de productos agrícolas con combustible GPL. - Nueva tecnología modular para sistemas de refrigeración de baja y media energía. - Cogeneración de baja energía utilizando residuos de aceituna y girasol como combustible. - Secado de pulpa con vapor supercalentado. - Obtención de calor a partir de residuos en fábricas de patatas fritas (RL). - Producción de vapor a partir de la combustión de los residuos del procesamiento de productos lácteos.	*Auxiliar *Auxiliar *Proceso *Auxiliar *Auxiliar *Proceso *Proceso *Auxiliar	6	26 (23%)	3.878.000
Ladrillos	- Cocción rápida de tejas	*Proceso	1	4 (25%)	493.000
Cemento	- Nuevo procedimiento para el uso de las cenizas de los altos hornos. - Plantas de desalinización movidas por calor residual. - Producción de electricidad a partir de calor residual. - Recuperación del calor y PCCE en la producción de yeso - Producción de electricidad con ciclo Rankine a partir de calor residual a baja temperatura. - Precalentador de piedra para la producción de cal.	*Proceso *Proceso *Auxiliar *Proceso *Auxiliar *Proceso	6	8 (75%)	5.651.000

1 *Entre paréntesis figura el porcentaje de proyectos aprobados de cada rama.*

Cerámica[2]	- Recuperación del calor en la fundición de frita. - Nuevos hornos de túnel para ladrillos y cerámica. - Recuperación del calor en la calcinación del yeso (RL).	*Auxiliar *Proceso *Proceso	2	5 (40%)	652.000
Productos químicos[3]	- Gran ahorro de combustible en hornos de reformado con vapor - Almacenamiento térmico mediante la utilización de hidratos y sales eutécticas - Ahorro de energía en el calentamiento de fosfatos para la protección del acero. - Planta de oxidación mixta. - Innovación en turbinas de gas de PCCE - Eliminación del zinc mediante electrólisis. - Recuperación del calor y de las materias primas a partir de gases de salida que contengan NOx (RL). - Enfriamiento por absorción (RL). - Postcombustión para compensar los enfriadores por absorción (RL).	*Proceso *Auxiliar *Proceso *Proceso *Proceso *Auxiliar *Proceso *Auxiliar *Auxiliar	6	22 (27)	2.231.000
Vidrio	- Recuperación del calor de los hornos de vidrio. - Enfriamiento previo del aire de entrada en los compresores (RL).	*Proceso *Auxiliar	1	4 (25%)	502.000
Metales no férreos	- Nueva técnica de secado para láminas de metal impresas. - Fundición de láminas finas de aleaciones de zinc.	*Proceso *Proceso	2	5 (40%)	1.249.000
Pasta y papel	- Utilización de la energía del polietileno en el proceso de reciclaje. - Ahorro de energía en el cartón ondulado (RL). - Recuperación del calor a partir de gases de combustión (RL) - Optimización del rendimiento de las turbina de gas (RL)	*Proceso *Proceso *Auxiliar *Auxiliar	1	9 (9%)	1.150.000
Hierro y acero	- Chorreo con granalla sin polvo de superficies verticales - Recalentamiento de tubos de acero mediante inducción de alto flujo - Ahorro de energía y recuperación de materias primas en las fundiciones - Compresor de oxígeno controlado a media presión (RL)	*Proceso *Proceso *Auxiliar *Auxiliar	3	8 (37%)	1.218.000
Textil	- Sistema integrado para el ahorro de energía	*Proceso	0	2 (0%)	
Madera	- Uso energético de los residuos industriales - Combustión de residuos para la producción de energía en fábricas de madera - Recuperación de calor en instalaciones de combustión de astillas de madera (RL)	*Auxiliar *Auxiliar	2	4 (50%)	327.000
Varios	- Ventilación controlada de edificios industriales - Intercambiadores de calor con placa recubierta de esmalte	*Auxiliar *Auxiliar	1	12 (8)	205.000

2 *Incluida la fabricación de planchas de yeso.*
3 *Incluido el refinado*

Servicios públicos	- Producción de electricidad en relación con el transporte de piedra caliza - Producción de energía a partir de borra de coches (RL) - Recuperación del calor en terminales de GNL (RL) - Precalentador de lignito con calor residual (RL) - Ventiladores y bombas de velocidad variable (RL)	*Proceso *Proceso *Proceso *Proceso *Auxiliar	1	11 (9%)	200.000

En este grupo se incluyen también aplicaciones de las pilas de combustible a la cogeneración, concentradas en dos tecnologías a efectos de demostración: ácido fosfórico y carbonato fundido[4]. Hasta ahora, la experiencia pone de manifiesto que hay que seguir desarrollando la tecnología y los distintos servicios competentes de la Comisión están debatiendo una estrategia común de investigación y demostración.

Tecnologías horizontales: existen otras tecnologías, aparte de la PCCE, que pueden aplicarse a muchos sectores (de ahí el nombre de tecnologías horizontales). A continuación comentaremos algunas:

- Las bombas de calor tienen dificultades para la penetración en el mercado dada la diferencia de precio entre la electricidad y los combustibles. Lo mismo se aplica a la recompresión mecánica del vapor.
- Están surgiendo oportunidades para las bombas de calor que funcionan con motores de gas natural, con recuperación del calor de los gases de escape. Las bombas de absorción del calor representan una oportunidad si se resuelven los problemas de corrosión derivados de la utilización de LiBr.
- Los ciclos Rankine con fluído orgánico han reducido sus posibilidades debido a la necesidad de sustituir los fluidos de trabajo por otros que no afecten a la capa de ozono.
- Existe un gran potencial de ahorro de energía en el caso de los instrumentos de control de velocidad para motores eléctricos, si mejoran la eficacia, la duración y los costes. Algunos sistemas de recortadores ("choppers") ya reciben ayuda.
- La automatización de los procesos industriales y la introducción de sistemas de control inteligentes han captado el interés de algunos industriales, pero, teniendo en cuenta el escaso riesgo y las necesidades específicas de cada situación, este campo no tiene mucho interés para el programa Thermie.

Como se ha mencionado anteriormente, dentro de las diferentes ramas que se agrupan bajo la denominación de industria, los proyectos presentan una gran variedad de características y tienen prioridades muy distintas. No obstante, pueden señalarse algunos elementos comunes que apuntan a posibles estrategias para el futuro:

- La industria, que representa el 30% del total de la demanda de energía, con exclusión de la producción de electricidad, está perdiendo peso dentro del PNB de la UE.
- Existe una penetración gradual de la electricidad debido fundamentalmente a la facilidad de la automatización de los procesos y al control del medio ambiente.
- Los precios de la energía son ahora un factor secundario para la toma de decisiones industriales.
- Inversamente, la preocupación por el medio ambiente es un factor importante en las decisiones sobre nuevas inversiones.
- Existe un gran desequilibrio entre los países, siendo unos principalmente suministradores de una tecnología concreta y otros, usuarios. Además, en muchos casos, los usuarios tienen problemas financieros para instalar las nuevas tecnologías.
- En períodos de crisis es más importante para los responsables de la toma de decisiones conservar la cuota de mercado que reducir los costes.
- Existe un incremento de la competencia por parte de las empresas de la CEI, fundamentalmente en sectores que utilizan la energía de forma intensiva.
- Otro aspecto importante es la gran diferencia entre los países de la UE en cuanto al nivel de tecnología, las condiciones de mercado para la financiación externa de proyectos, el nivel de información acerca de los programas de la UE y los precios de la energía. Para superar estos problemas, se recomienda la utilización de estrategias específicas de difusión por países y tecnologías.

CONCLUSIONES

La convocatoria de propuestas de 1994 para el programa Thermie en el sector de la industria fue recibido con gran interés por parte de este sector. Tras un riguroso proceso de selección, se aceptaron el 25% de los proyectos presentados (32), que recibirán una ayuda total de 17'9 millones de ecus. En el futuro, seguirán realizándose esfuerzos para concentrar los recursos en las tecnologías más prometedoras de este sector industrial tan diversificado. □

[4] *Véase el artículo sobre las tecnologías de pilas de combustible que figura en esta revista.*

PROYECTOS DE INTERCONEXIÓN DE ELECTRICIDAD EN LA EUROPA CENTRAL Y LA REGIÓN MEDITERRÁNEA

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INTRODUCCIÓN

Hace tiempo que se han reconocido los beneficios (políticos, estratégicos, comerciales y técnicos) de la interconexión síncrona de los sistemas eléctricos de los países vecinos. Entre estos beneficios se encuentran una mayor seguridad y calidad del suministro, el reparto de la capacidad de producción de reserva, la reducción de pérdidas en los sistemas y las oportunidades, cada vez mayores, que ofrecen los intercambios internacionales de electricidad entre los países interconectados.

No obstante, tanto por razones políticas como geográficas, se han formado diversas organizaciones de cooperación que cubren distintas regiones: UCPTE (países continentales europeos), el sistema británico (en la isla principal del R.U.), NORDEL (Escandinavia), Comelec (Norte de África) y IPS/UPS (Europa Central y la antigua URSS). Si bien ya existen interconexiones entre estos sistemas[1], éstas se hacen generalmente a través de enlaces de corriente continua (denominados "espalda contra espalda" ("back-to-back")) o, a veces, enlaces síncronos que funcionan "en isla".

En los últimos años, se ha prestado especial atención al desarrollo futuro de las interconexiones entre estos sistemas. Un ejemplo concreto es el deseo de determinadas compañías de servicios públicos de la Europa continental de aprovechar la complementariedad entre su producción, fundamentalmente térmica, y la producción hidroeléctrica, barata y relativamente abundante, de los países escandinavos. Ello ha generado diversos planes que ya se están ejecutando o bien están en fase de proyecto para la construcción de nuevos enlaces submarinos entre los sistemas UCPTE y NORDEL. La Comisión está prestando mayor atención a estos proyectos, en el contexto de las Redes Transeuropeas, especialmente con vistas a la próxima ampliación de la UE.

No obstante, hasta ahora la participación concreta de la Comisión en los proyectos de interconexión con países no pertenecientes a la UE se ha limitado a la prestación de asistencia técnica, y las principales zonas que se han cubierto han sido Europa Central y la región mediterránea. Esta orientación recibió un fuerte impulso político en las conclusiones del Consejo Europeo de Corfú de junio de 1994, cuando se invitó al Grupo Christophersen[2] a profundizar en su examen sobre la extensión de las redes transeuropeas a los países vecinos, prestando especial atención a las regiones mencionadas.

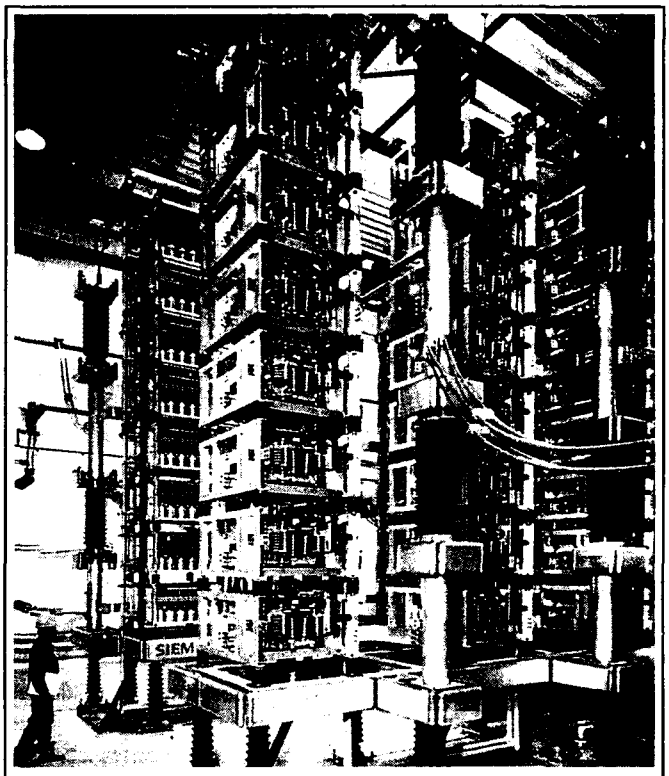
EUROPA CENTRAL

El programa PHARE de la Comisión lleva tiempo dando prioridad a la interconexión de los sistemas de electricidad de Europa Central con el sistema de Europa Occidental (UCPTE). Se están financiando una serie de proyectos a cargo de una línea presupuestaria de varios países dentro de este programa. Es importante señalar que las directrices de dichos proyectos se establecen en estrecha cooperación con las autoridades y empresas de los países interesados, así como con las organizaciones representativas de la industria eléctrica de la UE (Eurelectric y Unipede). Además, en su definición y ejecución, están estrechamente controlados por comités directivos compuestos por representantes de los países asociados, los consultores que intervienen, la Comisión, Eurelectric y, aspecto que es fundamental en relación

[1] Una notable excepción es que los sistemas UCPTE y Comelec aún no están interconectados. No obstante, se está trabajando en la construcción de un cable submarino que unirá los sistemas de Marruecos y España a principios de 1996.

[2] Uno de los grupos de trabajo de los representantes personales de los Jefes de Estado y Gobierno, presidido por el Comisario Henning Christophersen (1988-1994).

con posibles oportunidades de inversión, por representantes de las instituciones financieras internacionales (BERD, BEI y Banco Mundial). Desde el principio quedó claro que muchas empresas de la UE tienen interés en participar en estos proyectos, tan importantes estratégicamente, que resultan clave para sus planes de mayor internacionalización de sus actividades.Recientemente han finalizado dos de estos proyectos. El primero lo realizó un consorcio dirigido por EdF (Francia) y en el que participaron PPC (Grecia), ENEL (Italia) y SEP (Países Bajos). Su objetivo era estudiar los sistemas eléctricos de Rumanía, Bulgaria y Albania con vistas a su adecuación a los requisitos de la UCPTE. Además, se precisaron las medidas e inversiones necesarias para el funcionamiento síncrono paralelo de los sistemas eléctricos de estos países con la UCPTE, así como el calendario urgente más viable. Hay que señalar que este tipo de estudio considera el sistema interconectado en su conjunto y saca conclusiones y recomendaciones para el refuerzo global del sistema, y no necesariamente en la frontera entre los dos sistemas.



Esta estación transformadora "back-to-back" de 600 MW ATCC de Etzenricht enlaza las redes asíncronas de 420 kV de la ECPTE y la IPS. La fote muestra algunos de los bloques en los que se colocan las casi 900 válvulas de tiristor enfriadas con agua

El segundo proyecto fue realizado por un consorcio dirigido por Eurobayernwerk (Alemania), en el que participaron PREAG y VEAG (ambos también de Alemania), así como Verbund Plan (Austria), que financió su propia contribución al proyecto. El objetivo era facilitar, lo antes posible, la interconexión síncrona con la UCPTE de los países miembros de la organización Centrel (Polonia, la República Checa, Eslovaquia y Hungría). En estos países se están realizando ya mejoras a fin de que sus sistemas eléctricos cumplan los requisitos de la UCPTE en 1997 aproximadamente. El Proyecto PHARE realizó una contribución técnica (evaluación de los requisitos adicionales para el control del voltaje y la potencia reactiva), pero centrándose en la formación de personal especializado, para familiarizarlo con las normas y métodos del sistema UCPTE de reparto de la carga. Por último, el proyecto realizaba una evaluación comparativa de los estudios efectuados por cada uno de los países de Centrel, que son condición previa para la futura integración en la UCPTE.

Un tercer proyecto, que se iniciará próximamente, abordará la situación a más largo plazo (lo que significa, de forma realista, después del año 2000) y establecerá los planes más adecuados para el desarrollo de las redes de electricidad en las interfaces entre el sistema UCPTE, por entonces ampliado, y el sistema UPS. Hay que señalar que los países Bálticos también participarán en este trabajo.

Si bien puede considerarse que dichas iniciativas han contribuido a facilitar la futura ampliación del sistema UCPTE, será necesario estudiar más profundamente propuestas específicas de inversión, para demostrar en especial su viabilidad económica. Se dio un gran impulso a este proceso en la conferencia de alto nivel sobre interconexiones de gas y electricidad, celebrada a finales de octubre de 1994 en Budapest, y financiada por la Dirección General XVII de la Comisión (en estrecha cooperación con Eurelectric y Eurogas) con cargo al programa Synergy. Su objetivo era crear un foro para que las principales partes interesadas - Gobierno y organismos industriales y financieros- establecieran conjuntamente cúal era la mejor manera de avanzar en la cuestión estratégica de los intercambios de energía (tanto de gas como de electricidad) entre la UE y sus vecinos de Europa Central.

REGIÓN MEDITERRÁNEA

Varios países de las regiones mediterráneas del sur y del este seguirán experimentando un crecimiento y un desarrollo económico rápidos en las próximas décadas. Ello deberá corresponderse con un rápido crecimiento del suministro de electricidad. Mientras que este aumento de la demanda exigirá inevitablemente una considerable expansión de la capacidad de producción,

mediante nuevas instalaciones, así como de los sistemas de distribución y transmisión de estos países, resultarán también vitales las interconexiones entre sus sistemas eléctricos para aprovechar al máximo los valiosos recursos energéticos primarios.

La Comisión ha fomentado activamente el desarrollo de dichas interconexiones regionales de electricidad. Por razones políticas y logísticas se han iniciado una serie de estudios cuyos resultados se integrarán en un plan de desarrollo global para la interconexión de todos los países ribereños del Mediterráneo.

El primero de estos estudios se terminó en 1994. Se otorgó un contrato a un consorcio, dirigido por REE (España) y en el que participaron EdF (Francia) y ENEL (Italia), que proporcionaba asistencia técnica y formación a las empresas miembros de Comelec de Argelia, Marruecos y Túnez, durante una evaluación técnica y económica del potencial para futuros intercambios de electricidad entre los países del Magreb. Una característica notable de este trabajo fue el alto nivel de transferencia de tecnología entre los consultores occidentales y sus socios de Comelec. Se ha aceptado un informe sobre este proyecto para su presentación en el XVI Congreso del Consejo Mundial de la Energía que se celebrará en Tokio en octubre de 1995. Un segundo proyecto, en vías de finalización y financiado conjuntamente por la Comisión y el Gobierno austriaco con cargo a los presupuestos destinados al fomento del proceso de paz en Oriente Medio, está evaluando las perspectivas para el desarrollo de las interconexiones de electricidad entre Egipto, Israel, Jordania y la nueva Autoridad Palestina.

Por último, se ha proyectado evaluar las perspectivas para la interconexión de los sistemas de electricidad de Turquía, Siria y Líbano. Existen varios estudios recientes sobre estos países y es probable que la Comisión los revise de forma comparativa.

Además, cualquier trabajo que se realice en este ámbito deberá tener en cuenta el Acuerdo General de Comercio celebrado en junio de 1993 entre Egipto, Irak, Jordania, Siria y Turquía. Este acuerdo establece los planes concretos de estos cinco países para el desarrollo de la interconexión síncrona a alta tensión de sus redes eléctricas.

Estos acontecimientos tendrán todavía mayor importancia estratégica para la UE una vez se lleven a cabo las futuras interconexiones internacionales entre el sistema UCPTE y los países del sur y el este de la región mediterránea. En este ámbito son proyectos clave la interconexión entre España y Marruecos (en vías de realización y que deberá finalizar en la primera mitad de 1996) y la posible interconexión entre Grecia y Turquía (sic - en la fase de planificación más inicial). Estos proyectos están recibiendo cada vez más atención por parte de la Comisión en el contexto de los actuales trabajos del Grupo Christophersen y las conclusiones del Consejo de Corfú.

El cable submarino entre España y Marruecos constituye la prioridad más importante para el desarrollo económico de Marruecos, que necesita de manera apremiante el suministro de electricidad que puede proporcionar España. Ésta se beneficiará no sólo de un importante mercado para sus exportaciones, sino también en otros ámbitos tales como la ayuda de urgencia y el ahorro de combustible. El refuerzo de la cooperación regional entre Marruecos y la UE constituyó un criterio clave para el BEI en su reciente decisión de otorgar un préstamo de 80 millones de ecus a Marruecos para la realización de este proyecto.

La realización de las interconexiones Grecia/Turquía e Italia/Grecia, junto con los avances anteriormente mencionados y el proyectado enlace de la red libia con las de Egipto y Túnez, podría significar que el "Cinturón Mediterráneo" estaría finalizado en un futuro no muy lejano.

CONCLUSIÓN

Si bien la Comisión puede contribuir y ha contribuido a ampliar la interconexión de los sistemas eléctricos de Europa Occidental a los países vecinos de Europa Central y la región del Mediterráneo, la cuantía de la asistencia técnica que ha prestado hasta ahora en el marco de los proyectos anteriormente descritos es menor de 5 millones de ecus en total. Se está alcanzando rápidamente una fase en la que se necesitarán fondos mucho mayores para llevar a cabo la construcción de equipamiento específico y de los elementos de refuerzo que se consideren necesarios. Aunque ya está claro que los programas de la Comisión, tales como Phare, podrán proporcionar en el futuro una mayor financiación para proyectos de equipamiento físico (por ejemplo, mediante proyectos de inversión conjunta), también deberá buscarse una financiación adicional a partir de otras fuentes diversas, tanto públicas como privadas, dada la situación financiera a menudo difícil de las empresas de estas zonas. No obstante, cada vez hay un mayor apoyo político e industrial para estos proyectos y, por lo tanto, existen grandes posibilidades de aprovechar los prometedores resultados alcanzados hasta ahora.

LA POLITIQUE ENERGETIQUE DANS L'UNION EUROPEENNE

Dr Günter Rexrodt
Ministre fédéral de l'Economie

La politique économique européenne repose essentiellement sur deux principes : le renforcement de la concurrence et la création de conditions plus favorables pour l'industrie européenne. Seule l'application de ces deux principes permettra à l'économie européenne d'opérer les adaptations structurelles rendues nécessaires par l'évolution économique mondiale, et d'inciter les producteurs à rester en Europe.
Un approvisionnement en énergie sûr, à des conditions de prix intéressantes et respectueux de l'environnement est l'une des conditions de base pour que se développe une économie compétitive, sans laquelle une croissance et un niveau d'emploi soutenus sont impossibles. La politique énergétique jouit donc d'une priorité élevée aussi bien au niveau national qu'au niveau européen.

Dr. Günter Rexrodt

Alors que les entraves juridiques au commerce du pétrole et du charbon ont été supprimées dans la Communauté, il reste à créer un marché intérieur pour les énergies transportées par réseaux. Il est urgent de supprimer les monopoles d'importation, d'exportation et d'approvisionnement existant dans ce domaine. Ce n'est qu'à cette condition que le vaste potentiel d'investissement et d'innovation du marché européen pourra être pleinement exploité.
L'approvisionnement en énergie par des réseaux ne doit pas être considéré comme un secteur économique qu'il faut diviser et isoler par pays, mais comme partie intégrante du marché intérieur. La Communauté doit renforcer la responsabilité des entreprises actives dans ce secteur en étendant leur champ d'action. La concurrence entre exploitants, avec ses deux conséquences, à savoir la pression sur les marges bénéficiaires et sur les prix, et l'obligation de rationaliser au maximum, se traduisent par une baisse du prix de l'énergie pour les consommateurs.
L'expérience montre d'ailleurs que les besoins des consommateurs en matière de sécurité d'approvisionnement sont également mieux couverts lorsqu'il existe une gamme de solutions différentes. Les propositions de la Commission européenne en matière de libéralisation en vue de créer un marché intérieur de l'électricité et du gaz naturel vont dans le même sens, et le gouvernement fédéral leur est tout à fait favorable. Ces propositions rejoignent largement les conclusions auxquelles sont parvenus des groupes d'experts allemands. Au cours des dernières années, les éléments de base de cette initiative de la Commission ont été appliqués dans plusieurs pays sous différentes formes. On assiste à une évolution comparable non seulement au Royaume-Uni et aux Pays-Bas, mais aussi en Norvège, en Suède, en Finlande et aux États-Unis. Ces initiatives reflètent les efforts faits pour réduire les monopoles au strict minimum et, lorsque c'est possible, pour les éliminer complètement. La réorganisation du marché communautaire de l'électricité et du gaz a fait l'objet de débats très vifs au sein du Conseil et du Parlement européen. Cela n'est pas surprenant. Les structures économiques du secteur

de l'électricité dans les États membres sont en effet trop différentes pour que l'on puisse tout à coup les traiter uniformément. Une approche graduelle s'impose. Dans les directives concernant le marché intérieur du gaz et de l'électricité, il faudra se garder de transférer des décisions relevant actuellement des entreprises au niveau administratif central de la Communauté, car cela engendrerait de nouvelles distorsions de la concurrence et serait source d'inefficacité. Nous attachons une importance extrême à cet aspect. Les entreprises du secteur énergétique n'ont besoin ni de règles nationales ou communautaires, ni d'objectifs quantitatifs. Ce qu'elles attendent, ce sont des conditions générales et des mesures favorisant la concurrence et l'innovation.

A l'heure actuelle, on discute très activement en Allemagne de l'opportunité de poursuivre la libéralisation de la fourniture de gaz et d'électricité, car le système allemand comporte déjà de nombreux éléments de concurrence, comparativement aux autres pays. Néanmoins, une libéralisation accrue est nécessaire, même en Allemagne, pour favoriser une concurrence réelle au profit des consommateurs. La réglementation étouffante qui a toujours caractérisé ce secteur doit être supprimée, notamment en ce qui concerne la surveillance des investissements consacrés aux centrales électriques et à la construction de réseaux. Par ailleurs, j'estime qu'il faut inclure le respect de l'environnement dans la législation sur l'énergie comme objectif d'égale importance. Conformément à ces principes, le ministère fédéral de l'Economie a présenté un projet de loi en vue de modifier la loi sur le secteur énergétique.

Les *réseaux transeuropéens* dans les secteurs des transports, de l'énergie et, dans une mesure croissante, dans le domaine des télécommunications, sont un facteur décisif aux yeux des acteurs économiques. Cependant, le développement et l'extension de réseaux transeuropéens doivent reposer prioritairement sur le secteur privé, en particulier dans le domaine de l'énergie et des télécommunications. Il s'agit d'un domaine où c'est aux entreprises de prendre l'initiative. C'est faire fausse route que de rechercher des solutions dans des approches nationales ou dans des programmes de subventions communautaires, comme le laisse entendre le Livre blanc de la Commission "Croissance, compétitivité, emploi", même s'il est vrai que le principal obstacle à l'expansion des réseaux d'énergie transeuropéens n'est pas l'obstacle financier. Les États membres et la Communauté doivent plutôt créer systématiquement les conditions nécessaires aux initiatives des entreprises. Il est évident que cette responsabilité est étroitement liée à l'objectif de la réalisation d'un marché intérieur, englobant notamment le secteur énergétique. Les réseaux transeuropéens ne pourront être utilisés de façon optimale que dans un système économique fondé sur la concurrence.

Le chapitre sur les réseaux transeuropéens dans le secteur de l'énergie qui a été ajouté au traité sur l'Union européenne lors de la conférence de Maastricht dote la Communauté du cadre juridique qui lui permettra de contribuer au développement des réseaux énergétiques européens qui intéresse particulièrement les États membres situés à la périphérie de la Communauté et qui ont toujours été mal desservis par les réseaux de gaz et d'électricité européens. Dans ce domaine, la Commission peut assumer un rôle de coordination et faciliter l'harmonisation des projets des opérateurs en matière de réseaux transeuropéens. La programmation des procédures d'autorisations publiques pour certains projets d'investissement concernant plusieurs États membres peut également être mieux harmonisée et accélérée. C'est un domaine où des consultations régulières, au besoin à l'initiative de la Commission, peuvent être utiles. Du point de vue technique, il conviendrait d'encourager davantage les efforts de normalisation du secteur énergétique, afin d'assurer l'interopérabilité des réseaux.

En revanche, une assistance financière directe aux réseaux transeuropéens dans le secteur de l'énergie ne doit être envisagée que dans des cas isolés. D'une façon générale, l'aide communautaire doit se limiter à la promotion d'études de faisabilité. Au contraire de ce qui se passe pour les réseaux de transport, la construction des réseaux énergétiques est organisée sur une base commerciale dans un grand nombre d'États membres. Lorsqu'une société construit un réseau d'électricité ou de gaz, l'argent qu'elle gagne est la rémunération du risque qu'elle prend. Il faut réserver les mesures d'aides communautaires aux projets irréalisables sans elles, et veiller à ce qu'elles ne faussent pas la concurrence. Cela s'applique non seulement à la concurrence entre fournisseurs de gaz et d'électricité, mais aussi à la concurrence entre sources d'énergie et à la conservation de l'énergie, qu'il ne s'agirait pas de décourager en subventionnant la construction de réseaux. La protection de l'environnement est une exigence importante, dont la politique énergétique doit tenir compte. Énergie et environnement sont directement liés.

En Allemagne, nous avons toujours accordé une grande importance à la *protection de l'environnement dans le secteur de l'énergie*. Nous avons souvent fait oeuvre de pionniers, par exemple par notre réglementation sur les grandes installations de combustion, ou par nos activités dans le domaine de la protection du climat. Le gouvernement fédéral s'est fixé un objectif extrêmement ambitieux, en projetant de réduire d'ici à 2005 les émissions de CO_2 de 25 à 30 % par rapport aux niveaux de 1987. Les émissions de CO_2 de la république fédérale d'Allemagne représentent 4 % du

total mondial. Cela montre clairement que la protection de l'atmosphère de notre planète est un défi qui doit être relevé par une politique environnementale à l'échelle mondiale. Les problèmes écologiques mondiaux ne peuvent être résolus sans coopération internationale efficace ni sans partenariat mondial.

Un rôle central revient à l'Union européenne en matière environnementale. L'UE a déjà pris plusieurs initiatives dans ce domaine. Je citerai, par exemple, le programme communautaire Thermie pour la promotion de technologies énergétiques novatrices, qui doit être poursuivi à travers le quatrième programme-cadre pour la recherche et le développement technologique. La Communauté a pris, avec les programmes SAVE et Altener, et avec la directive SAVE, des mesures concrètes pour encourager la conservation de l'énergie et promouvoir les énergies renouvelables. L'utilisation rationnelle des énergies fossiles et leur remplacement par des formes d'énergie aussi peu polluantes que possible contribue non seulement à protéger le climat de notre planète, mais permet aussi d'économiser les ressources énergétiques non renouvelables. Ces deux approches constituent donc également un élément de garantie important pour l'approvisionnement énergétique à long terme.

Cependant, des programmes d'assistance et des mesures réglementaires ne répondent que partiellement aux exigences de protection de l'environnement. La question de savoir si les objectifs ne pourraient être atteints à moindre coût et avec plus d'efficacité par d'autres solutions que celles décrites plus haut est donc d'une actualité permanente;

A cet égard, j'accorde une importance capitale à la façon dont les forces du marché peuvent être mobilisées pour mener une politique énergétique garantissant la sécurité des approvisionnements en énergie et plus respectueuse de l'environnement. Le principe selon lequel une protection efficace de l'environnement passe par un recours accru aux instruments du marché est de mieux en mieux accepté. Les prix de l'énergie ont chuté spectaculairement au cours des années 1980. L'industrie européenne, qui importe la plus grande partie de son énergie, en a été grandement soulagée. Mais les prix actuels ne reflètent pas tous les coûts associés. Or, des prix vrais reflétant des coûts qui, jusqu'à présent, n'étaient pas pris en compte, sont la condition préalable d'un développement économique durable et d'une utilisation de l'énergie sans incidence négative sur le climat.

La taxe CO_2/énergie proposée par la Commission européenne constituerait un pas important vers l'internalisation des effets externes, et le gouvernement fédéral lui est très favorable. Cette taxe inciterait à réduire les émissions de CO_2, à la fois par l'utilisation rationnelle de l'énergie et par le recours accru à des sources d'énergie ne dégageant pas de CO_2 ou n'en dégageant que de faibles quantités, au détriment de celles qui en produisent beaucoup. Parallèlement, on s'efforce d'améliorer les conditions d'une utilisation accrue des énergies renouvelables, qui, à l'avenir, devront jouer un rôle beaucoup plus important dans la satisfaction de nos besoins énergétiques.

Aux yeux de la Commission, les États membres appliqueraient cette taxe d'une manière fiscalement neutre. Cet aspect est crucial. La part du produit intérieur brut constituée par les prélèvements et impositions ne doit pas augmenter, mais la fiscalité doit être réorganisée à la lumière de principes écologiques, sans, évidemment, que l'industrie européenne se voit infliger un désavantage concurrentiel unilatéral. Le déplacement des sites de production et de l'origine des émissions d'un pays à l'autre ne favoriserait en rien la protection du climat.

Dans le dernier numéro d'Énergie en Europe, ma collègue américaine Hazel O'Leary présentait le plan d'action immédiate du gouvernement américain pour la protection du climat. Mais les mesures déjà en vigueur en Europe, aux États-Unis et dans d'autres pays ne suffisent pas. La convention-cadre sur le climat adoptée à Rio en 1992 a été, sur le plan international, la première initiative pour affronter le problème mondial de l'effet de serre. Cette convention, entrée en vigueur en mars 1994, doit à présent être étoffée par un protocole sur le climat prévoyant des objectifs et des mesures concrets. La première conférence des signataires, au printemps 1995, doit y contribuer. Une action coordonnée des principaux pays industrialisés est donc indispensable pour des raisons écologiques et économiques.

L'UE poursuit un dialogue intensif sur l'énergie avec les pays d'*Europe centrale et orientale*, et avec les États nés de la dissolution de l'*Union soviétique*. Elle aide ces pays à développer et à moderniser leur approvisionnement en énergie. Mais l'Union européenne - aussi importante soit-elle pour nous - ne doit pas s'isoler du monde extérieur. L'intérêt de l'Est comme de l'Ouest réside dans la création de réseaux et l'internationalisation croissante pour les raisons suivantes:

- À l'Ouest, dépendance croissante vis-à-vis des importations : un renforcement des relations entre les marchés de l'Est et de l'Ouest contribue à la diversification et donc au renforcement de la sécurité de notre approvisionnement énergétique.
- Accès plus large aux marchés occidentaux : les pays de l'Est producteurs de matières premières doivent pouvoir vendre leurs ressources, c'est-à-dire le pétrole et le gaz, sur les marchés occidentaux pour obtenir les devises convertibles qui leur permettent de poursuivre la modernisation de leur secteur énergétique, et, partant, de contribuer sensiblement à la protection de l'environnement.

• Intérêt occidental dans la stabilité politique et économique à long terme des pays en transformation : le développement et l'expansion du secteur énergétique jouent à cet égard un rôle absolument essentiel.

Un exemple concret de coopération Est-Ouest est l'ensemble d'accords liés au traité sur la *Charte européenne de l'énergie*, signée en décembre 1994 lors de la conférence internationale de Lisbonne.

Ce traité est la base d'une communauté paneuropéenne de l'énergie. L'objectif principal de la Charte, qui a force obligatoire en droit international, est de mobiliser les capitaux et le savoir-faire occidentaux pour les investir dans les pays de l'Est en transformation, grâce à une meilleure protection des investissements. En outre, la Charte prévoit la poursuite de la libéralisation des échanges dans le secteur énergétique, le transit de l'énergie sans entraves, autrement dit sa libre circulation des sites de production aux consommateurs à travers les pays tiers, une utilisation de l'énergie plus efficace et enfin, et peut-être surtout, la protection de l'environnement. Cet accord nous permet, par des investissements dans le secteur énergétique, de contribuer largement à la protection de l'environnement, étant donné qu'il s'agit de remplacer des systèmes énergétiques obsolètes et des procédures inefficaces par des méthodes modernes, plus efficaces et plus écologiques, notamment dans le cas des lignes de transport d'énergie en mauvais état, des méthodes de transport inefficaces et des centrales électriques qui doivent être modernisées ou remplacées. Le gouvernement fédéral voit dans cet accord une contribution importante au développement économique des pays de l'Est en transformation, et donc, à long terme, à leur stabilité politique. Compte tenu de la complexité du sujet et de son importance pour les secteurs de l'énergie, des investissements, du commerce, et de la politique étrangère, il faut saluer le fait que l'accord ait été conclu après seulement trois ans de négociations. C'est une nouvelle référence pour la coopération internationale dans le domaine de l'énergie.

L'UE a mis sur pied deux ambitieux programmes d'assistance aux pays d'Europe centrale et orientale (programme PHARE : 850 millions d'écus en 1994) et aux États issus de l'Union soviétique (programme TACIS : 510 millions d'écus en 1994). Une des priorités de ces programmes est l'aide aux pays concernés par des mesures d'assistance technique dans le secteur énergétique. L'objectif est de faciliter la restructuration pour en arriver à un approvisionnement énergétique sûr, à un prix raisonnable, respectueux de l'environnement et compétitif, par différentes mesures de transfert de savoir-faire : conseil, formation, études etc. Les crédits que l'UE a mis à la disposition du secteur énergétique à cet effet sont considérables : en 1994, ils représentaient environ 5 % des crédits PHARE et 10 % des crédits TACIS.

Cette imposante liste d'aspects relevant de la politique énergétique européenne souligne l'importance de ce secteur pour l'UE. Je m'étonne que, dans le même temps, avant même la conférence intergouvernementale de 1996, on discute activement de l'introduction dans le traité sur l'Union européenne d'un chapitre sur l'énergie. Cela signifie-t-il que la Communauté a pris toutes ces initiatives sans que les Traités l'y autorisent ?

Il est bien évident que tel n'est pas le cas ! Toutefois, ce débat fait apparaître des conceptions diamétralement opposées de la politique énergétique selon les États membres. Pour notre part, nous ne voyons pas la nécessité d'une réglementation sectorielle spécifique, et nous pensons que le Traité offre un cadre juridique approprié au secteur énergétique, caractérisé par la concurrence et le libre-échange des marchandises et des services. La politique énergétique communautaire devrait, comme par le passé, être fondée sur le cadre global créé pour l'Union européenne. La politique énergétique relève de la politique économique dès lors qu'il s'agit d'assurer un approvisionnement en énergie à des prix acceptables. La politique énergétique rejoint la politique de protection de l'environnement lorsqu'il s'agit de réduire la pollution engendrée par la consommation d'énergie. La politique énergétique doit donc servir les autres objectifs du Traité, et non l'inverse.

Cette conception ne fait cependant pas l'unanimité. Un grand nombre d'États membres réclament l'introduction dans le Traité de règles spécifiques en matière d'approvisionnement en énergie. La préoccupation sous-jacente est que le droit communautaire, qui repose sur le principe de concurrence, puisse menacer l'approvisionnement énergétique au sein de l'Union européenne. Or, c'est tout le contraire : une concurrence effective améliore les performances en général et donnera les mêmes résultats dans le cas particulier du secteur énergétique européen. C'est donc à bon droit que la Commission européenne a pris des mesures pour introduire la concurrence dans le secteur de l'approvisionnement en électricité et en gaz en Europe.

L'adoption de règles spécifiques au secteur énergétique - même rédigées de manière "inoffensive" - serait un signal négatif, car cela reviendrait à abandonner l'idée de frontières ouvertes et d'une concurrence accrue dans ce secteur. Une telle renonciation dans un secteur clé de l'économie européenne serait un échec pour l'Europe et irait à l'encontre des objectifs du plan d'action adopté par le Conseil européen sur la base du Livre blanc de la Commission.

En renonçant à introduire dans le traité sur l'Union européenne une réglementation propre au secteur de

l'énergie, on permet la mise en oeuvre de politiques spécifiques tenant compte des particularités nationales. Par exemple, les États membres dotés de réserves considérables d'énergie fossile pourraient les utiliser dans le cadre des règles générales du Traité. Certains Etats membres accordent une grande place à l'énergie nucléaire, tandis que d'autres prêtent une attention particulière aux énergies renouvelables. L'UE en tire deux avantages : d'une part, on obtient un éventail énergétique satisfaisant sans devoir prendre des mesures particulières. Cela contribue à garantir la sécurité de l'approvisionnement énergétique et est particulièrement avantageux en cas de crise d'approvisionnement. D'autre part, comme il y a concurrence entre plusieurs politiques, l'UE évite de devoir s'engager de manière irréversible dans une seule direction. La politique énergétique qui donnera à long terme les meilleures résultats finira par s'imposer, pour le plus grand bénéfice de l'économie européenne.

Cette analyse de la politique énergétique européenne montre que, dans ce domaine, des questions d'une énorme importance politique et économique sont discutées, puis font l'objet de décisions, après une étude approfondie. Ce processus est indispensable à la poursuite du développement de l'Union européenne. □

ACCORD EEE ET ELARGISSEMENT DE L'UNION ASPECTS ENERGETIQUES ET CONSEQUENCES

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INTRODUCTION

L'Union européenne doit s'agrandir le 1er janvier 1995, date à laquelle l'Autriche, la Finlande et la Suède en deviendront officiellement membres. Les négociations d'adhésion menées avec ces trois pays et avec la Norvège, qui a cependant choisi par référendum de ne pas entrer dans l'Union, ont été conclues avec succès en mars 1994, un an à peine après leur ouverture officielle. L'achèvement rapide de ces négociations a été grandement facilité par l'existence d'accords de libre-échange entre l'Union et les pays candidats, et par l'Accord sur l'Espace économique européen (EEE). À la suite du rejet de l'adhésion par la Norvège, cet Accord restera une instance importante pour la coopération entre l'Union et les deux pays nordiques qui n'en sont pas membres, à savoir la Norvège et l'Islande.

L'Accord EEE

L'Accord EEE a été négocié entre les quatre pays candidats à l'adhésion, l'Islande, la Suisse, le Liechtenstein et les États membres de l'UE. L'objectif de base de cet Accord était d'étendre le marché unique aux pays de l'AELE (Association européenne de libre-échange). Les négociations ont été conclues en novembre 1991, mais ont dû être reprises à la suite du résultat négatif du référendum de 1992 en Suisse, qui empêchait ce pays de faire partie de l'EEE. À cause de l'union douanière existant entre la Suisse et le Liechtenstein, ce dernier pays n'a pu ratifier l'Accord non plus. Étant donné qu'il a fallu procéder à une nouvelle ratification, l'Accord n'a pu entrer en vigueur que le 1er janvier 1994.

L'Accord EEE est un accord international global et de grande portée qui étend aux pays de l'AELE participant à l'EEE une bonne partie des droits et obligations des États membres de l'UE. En ce qui concerne notamment la libre circulation des marchandises, des personnes et des capitaux, et la libre prestation des services, c'est-à-dire les quatre libertés de base du marché unique, l'EEE incorpore spécifiquement l'acquis communautaire, moyennant, dans certains cas, des adaptations, des périodes de transition ou des dérogations limitées. L'Accord couvre en outre un certain nombre de politiques d'accompagnement, parmi lesquelles la coopération en matière de politique de recherche, de développement technologique et de protection de l'environnement.

L'Accord lui-même comporte des règles sur la concurrence et des dispositions anti-trust, ainsi que des dispositions régissant les aides d'État et les monopoles d'État, qui reflètent étroitement celles du traité de Rome. Il comprend également un ensemble de dispositions institutionnelles, notamment une procédure de prise de décision qui permettra d'intégrer à l'accord l'acquis communautaire futur. L'Accord sera donc mis à jour en permanence. Il établit par ailleurs un mécanisme juridictionnel, composé d'une Cour de l'AELE fonctionnant parallèlement à la Cour de justice des Communautés européennes pour les questions relatives aux actions en infraction intentées à l'encontre de pays de l'AELE, et il prévoit l'institution de l'Autorité de surveillance AELE, qui veille à la mise en oeuvre de l'Accord pour ce qui concerne les pays de l'AELE, tout comme le fait la Commission européenne pour les États membres.

L'essentiel de la législation existante relative à l'énergie figure à l'annexe IV de l'Accord. Elle est donc applicable dans tout l'EEE. Il s'agit essentiellement des directives du marché intérieur sur le transit du gaz naturel et de l'électricité et sur la transparence des prix, de la législation sur l'information et la notification ence qui concerne les importations et le prix du pétrole brut et des produits pétroliers, de la législation relative à la notification des projets d'investissements dans les secteurs du pétrole, du gaz naturel et de l'électricité, et de la législation sur les carburants de substitution. On y trouve également

les directives concernant l'indication de la consommation des appareils domestiques et les exigences de rendement pour les chauffe-eau. En outre, des mesures ont été prises pour inclure dans l'Accord la directive concernant les autorisations en matière d'hydrocarbures récemment adoptée par le Conseil.

Le seul instrument législatif important en matière d'énergie qui n'a pas été inclus dans l'Accord EEE est celui concernant le niveau minimum des stocks de pétrole, qu'il a été décidé d'exclure pour un certain nombre de raisons, liées notamment au processus de prise de décision interne de l'UE. Il faut noter que la Communauté européenne de l'énergie atomique n'est pas signataire de l'EEE, et qu'en conséquence l'Accord ne couvre pas la législation sur l'énergie nucléaire.

En conclusion, force est cependant de reconnaître cependant qu'au regard de l'acquis communautaire en matière d'énergie non-nucléaire, l'Accord EEE représente 95 % du chemin qui conduit à l'adhésion pure et simple à l'Union. En ce qui concerne l'achèvement du marché intérieur de l'énergie et la promotion et la recherche en matière d'environnement et de technologie, l'Accord EEE constituera un cadre essentiel pour la coopération future entre l'Union, la Norvège et l'Islande.

Elargissement

A la suite des négociations sur l'Accord EEE, l'Autriche, la Finlande, la Norvège et la Suède étaient donc familiarisées avec l'acquis communutaire dans le secteur de l'énergie, ainsi que dans les autres secteurs couverts par l'Accord. Ce facteur a indéniablement accéléré les négociations d'adhésion, et a permis de les conclure dans les délais très courts qui leur avaient été impartis.

Les négociations d'adhésion ont donc naturellement tendu à se concentrer davantage sur les domaines non couverts par l'Accord EEE que sur les autres, par exemple l'énergie. Il n'est donc pas étonnant que les problèmes liés à l'agriculture et à la pêche, totalement exclues de l'Accord EEE, les questions de protection de l'environnement, domaine dans lequel les candidats à l'adhésion avaient généralement des normes plus strictes que celles de l'UE, la politique régionale et les questions budgétaires et institutionnelles aient absorbé beaucoup plus de temps et d'efforts lors de la conférence sur l'adhésion que les questions énergétiques.

Pour chaque pays candidat, les négociations étaient divisées en 29 chapitres traitant chacun d'un secteur particulier. Les questions d'énergie constituaient le chapitre 14. Par ailleurs, d'autres aspects en rapport avec l'énergie ont été traités dans d'autres chapitres, notamment le chapitre 13 (environnement) et le chapitre 18 (affaires extérieures). L'idée sous-jacente était de proposer une structure logique pour les négociations et de permettre un suivi aisé des progrès réalisés.

Avant les négociations proprement dites, la Commission avait donné son avis sur la demande d'adhésion de chaque candidat[1]. Pour aucun d'entre eux, la Commission n'a estimé que le secteur énergétique serait susceptible de poser des problèmes particuliers, que ce soit pendant les négociations ou comme conséquence de l'adhésion. Au contraire, la Commission a déclaré que, d'une manière générale, l'élargissement serait favorable à la situation énergétique de l'Union, et que la politique énergétique menée dans les pays candidats était, dans l'ensemble, compatible avec celle de l'Union.

Autriche

Dans le cas de l'Autriche, la Commission déclare dans son avis sur la demande d'adhésion que la structure de l'approvisionnement et de la demande en énergie de ce pays s'insère bien dans la structure communautaire. L'hydroélectricité, qui couvre environ 20 % des besoins totaux d'énergie primaire, est la principale source d'énergie indigène de l'Autriche. Le pétrole, avec environ 44 % du total, s'octroie la part du lion des approvisionnements en énergie, dont près de 90 % sont importés. Le gaz naturel est une source d'énergie importante. Les prévisions montrent que sa part du marché autrichien de l'énergie va continuer à augmenter. La Russie est de loin le principal fournisseur de gaz de l'Autriche. Plusieurs mines de charbon sont encore exploitées, mais le gros du charbon est importé. L'énergie nucléaire ne joue aucun rôle dans la structure énergétique autrichienne, l'utilisation de matières nucléaires ayant été interdite en 1978. Un accent particulier est mis sur le rendement énergétique et sur le rôle des énergies renouvelables, et on considère souvent que l'Autriche est en avance sur la plupart des États membres à cet égard.

Les négociations d'adhésion se sont déroulées sans heurts en ce qui concerne le chapitre de l'énergie. Elles se sont d'ailleurs terminées dès septembre 1993. Les principales discussions ont porté sur l'acquis communautaire en matière nucléaire, terrain que l'Accord EEE avait laissé vierge, comme nous l'avons dit. Depuis le référendum de 1978 sur l'énergie nucléaire, l'opinion publique est très sourcilleuse sur les questions nucléaires. Il était donc important pour l'Autriche d'obtenir la garantie explicite que le choix d'utiliser ou non la fission nucléaire à des fins énergétiques resterait du seul ressort national. Comme cette préoccupation était partagée par les autres pays candidats, une déclaration commune à ce sujet a été négociée et annexée au Traité[2].

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1 Les quatre avis de la Commission ont été publiés dans les suppléments au Bulletin des Communautés européennes 4/92 (Autriche), 5/92 (Suède), 6/92 (Finlande) et 2/93 (Norvège).

2 Déclaration commune n°4 sur l'application du traité Euratom.

Des problèmes plus complexes sont apparus dans d'autres domaines, notamment en matière de protection de l'environnement. Le trafic de transit est ainsi devenu l'un des sujets clés des négociations, mais cela a aussi été le cas pour des questions directement liées à l'énergie, comme la teneur en soufre du gazole routier et l'essence sans plomb. L'Autriche voulait conserver des normes environnementales élevées, tandis que l'Union mettait l'accent sur la libre circulation des marchandises. Finalement, une période transitoire de quatre ans a été prévue, pendant laquelle la législation en question devra être revue conformément aux procédures communautaires.

Il a également été question de l'énergie dans le chapitre consacré aux affaires extérieures. Certaines restrictions sur le commerce du lignite avec les pays d'Europe centrale et orientale, incompatibles avec l'Accord européen entre l'Union et ces pays, ont nécessité l'instauration d'une période transitoire d'un an pour régler ce problème.

Finlande

La Finlande a présenté sa demande d'adhésion en mars 1992. Ce pays participant à l'Accord EEE, la coopération entre la Finlande et l'Union était déjà développée à l'ouverture des négociations. C'était également le cas dans le secteur énergétique.

La situation géographique, le climat, la structure industrielle et les besoins de transports considérables de la Finlande, combinés à son manque relatif de ressources énergétiques nationales, se traduisent par une consommation énergétique et une dépendance vis-à-vis des importations plus élevées que dans la plupart des États membres de l'Union. L'économie finlandaise, après avoir connu l'un des plus forts taux de croissance d'Europe pendant la période de croissance soutenue des années 1980, a été frappée par une récession en 1990, à la suite de l'effondrement de l'URSS. Comme il semble à présent que la récession touche à sa fin, on peut s'attendre que la consommation d'énergie augmente de nouveau. Les seules ressources énergétiques indigènes sont la tourbe, l'hydroélectricité, les biocombustibles, notamment les copeaux de bois et autres déchets forestiers. Elles couvrent environ 20 % des besoins énergétiques totaux. Le pays dépend largement des importations pour la couverture de ses besoins énergétiques, mais celles-ci sont relativement bien diversifiées. La Finlande a notamment réussi à ramener la part du pétrole de 65 % de la consommation totale d'énergie avant la crise énergétique des années 1970 à environ 35 % actuellement, ce qui est nettement inférieur à la moyenne de l'Union.

Jusqu'à 1988, plus de 95 % des importations pétrolières finlandaises provenaient de l'ancienne Union soviétique. L'expiration de l'Accord commercial bilatéral fondé sur le troc, qui remontait à la fin des années 1940, et le démantèlement de l'URSS, ont entraîné un effondrement des importations de pétrole en provenance de la Russie et de la CEI, qui couvrent actuellement moins de 40 % des besoins finlandais. La dépendance énergétique reste cependant élevée vis-vis de la Russie, qui est notamment le seul fournisseur de gaz naturel de la Finlande. Le gaz naturel représentant 8 % de la consommation énergétique totale, il y a un intérêt considérable à étendre le réseau gazier finlandais aux autres pays scandinaves et à l'Europe continentale. Quant à l'électricité, le gouvernement finlandais a exprimé son intention de libéraliser le marché et de l'ouvrir à la concurrence. À cet égard, la position de la Finlande va dans le sens des vues de la Commission.

L'importance considérable accordée à la sécurité de l'approvisionnement, compréhensible étant donné la situation géopolitique de la Finlande, a amené ce pays à mettre sur pied un secteur nucléaire, qui assure à l'heure actuelle quelque 35 % de la production d'électricité. Deux des quatre réacteurs existants sont du type VVER 440, fournis par l'Union soviétique via Atomenergoexport dans les années 1970. Ils ont été reconditionnés avec l'aide de la technologie occidentale, et dotés de systèmes de sécurité de secours ; ils sont considérés comme sûrs dans l'ensemble selon les normes occidentales. En septembre 1993, le parlement finlandais a rejeté un projet de construction d'un cinquième réacteur. Cette décision était motivée par des préoccupations écologiques. La création d'une industrie nationale de la tourbe est un autre résultat du souci de la sécurité d'approvisionnement. La tourbe couvre actuellement 5 % des besoins énergétiques finlandais.

La plupart de ces aspects ont fait l'objet de discussions lors des négociations d'adhésion, pendant lesquelles plusieurs réunions préparatoires ont eu lieu, par exemple sur des questions relatives à l'exploitation de la tourbe. Les questions nucléaires ont également été examinées de façon approfondie. Il s'agissait notamment d'estimer l'opportunité de poursuivre les contrats avec la Russie pour la totalité du cycle du combustible destiné à alimenter les réacteurs VVER. Finalement, la Finlande a néanmoins accepté la totalité de l'acquis communautaire en matière énergétique, à l'exception de la législation sur les stocks pétroliers, pour laquelle une période de transition d'un an lui a été accordée. Le chapitre énergétique des négociations avec la Finlande a donc été clôturé bien avant la date limite du 1er mars 1993.

Suède

La politique énergétique de la Suède a récemment subi des modifications importantes. Le bilan énergétique s'est amélioré considérablement depuis la fin des années 1980, la dépendance des importations ayant été réduite de 80 % à 50 %. Cette amélioration est due à

un programme ambitieux de conservation de l'énergie, à la mise en valeur de sources d'énergie indigènes, de l'hydroélectricité et des biocombustibles, mais surtout à un programme nucléaire important, qui a été mis en oeuvre en dépit d'un référendum et d'une décision parlementaire de 1980 prévoyant l'arrêt progressif des douze réacteurs nucléaires d'ici à 2010. Ce calendrier a été rendu possible par une autre décision parlementaire subordonnant l'abandon de la production d'énergie nucléaire à la mise en service de nouvelles méthodes de production de l'électricité ménageant l'environnement.

Le débat actuel sur la politique énergétique en Suède est donc pour une grande part axé sur les possibilités de remplacer l'énergie nucléaire. Par ailleurs, et bien que la récession ait pesé sur la politique suédoise traditionnelle de normes strictes en matière de protection de l'environnement, le rendement énergétique demeure un aspect prioritaire. Des plans de libéralisation du marché de l'électricité ont été élaborés, mais aucune décision définitive n'a encore été prise. Le charbon et le gaz naturel ne jouent qu'un rôle modeste dans le bilan énergétique, mais cela pourrait changer en cas d'abandon du nucléaire.

Les négociations d'adhésion globales avec la Suède ont été dominées par des questions de politique structurelle et agricole, mais la protection de l'environnement et la santé publique y ont également occupé une place importante. Les aspects énergétiques, c'est-à-dire la législation actuelle dans le secteur de l'énergie, avaient , en revanche, été presque entièrement traités lors des négociations sur l'EEE. Seules les questions nucléaires, non couvertes par l'Accord EEE, ont été examinées dans le cadre du chapitre Énergie des négociations. Les questions de sécurité, le contrôle des installations nucléaires et le rôle de l'Agence d'approvisionnement de l'Euratom ont notamment soulevé certaines inquiétudes. Finalement, l'acquis communautaire en matière nucléaire a été accepté moyennant une période transitoire de deux ans pour l'application des normes sur la radioprotection et des déclarations communes sur l'importance du traité de non-prolifération nucléaire [3]. En ce qui concerne les contrats d'approvisionnement en matières nucléaires, les règles contenues au chapitre VI du traité Euratom s'appliqueront.

Norvège

Suite au rejet de l'adhésion à l'Union par le référendum norvégien de novembre 1994, l'Accord EEE restera le principal cadre officiel pour la coopération énergétique entre la Norvège et l'Union. Comme nous l'avons dit plus haut, cet Accord prévoit cependant une coopération sur la plus grande partie de l'acquis comunautaire en matière d'énergie, et l'incorporation à l'Accord de l'acquis futur dans les domaines concernés. Il y a donc tout lieu de compter sur la poursuite et même sur un renforcement de la collaboration entre la Norvège et l'Union sur les questions énergétiques essentielles qui se poseront probablement à l'avenir.

Étant donné l'importance du secteur énergétique norvégien, ces questions ont été discutées en détail tout au long des négociations d'adhésion. La plupart des problèmes soulevés ont reçu des solutions acceptables, notamment la question de la souveraineté sur les ressources, et, plus spécifiquement, la directive concernant les autorisations en matière d'hydrocarbures. On ne saurait nier que tous les problèmes énergétiques rencontrés lors des négociations d'adhésion ont reçu des solutions équilibrées et raisonnables.

Les priorités de la politique énergétique en Norvège sont bien sûr déterminées par le fait que ce pays est un gros producteur de pétrole et de gaz naturel. La Norvège est actuellement le quatrième exportateur de pétrole mondial, et avec ses gisements estimés à 5 milliards de tep, le plateau continental norvégien fournira gaz naturel et pétrole jusque bien avant dans le siècle prochain. Le rôle du pétrole et du gaz sur l'économie nationale est considérable, et la mise en valeur rapide de ces ressources a assuré une forte croissance pendant toutes les années 1980. L'aventure pétrolière n'est cependant pas sans problèmes. En effet, la dépendance exagérée vis-à-vis d'un seul produit peut avoir une incidence négative sur d'autres secteurs de la production. Pour accroître la compétitivité globale de l'économie, des mesures ont été introduite par la loi sur l'énergie de 1991 pour libéraliser le secteur énergétique et y renforcer la concurrence. Depuis lors, le secteur norvégien de l'électricité est l'un des moins réglementés d'Europe. La plus grande partie de l'électricité est produite par des centrales hydroélectriques, et ces dernières années, le pays a été exportateur net d'électricité. Une autre question importante ayant trait à la politique énergétique en Norvège est la protection de l'environnement ; la politique actuelle se fonde sur un modèle de développement durable, comme dans les autres pays scandinaves.

Étant donné le résultat du référendum sur l'adhésion, la coopération énergétique restera fondée sur l'Accord EEE, comme nous l'avons dit plus haut. Des mesures ont, par exemple, déjà été prises pour intégrer à l'Accord la directive concernant les autorisations en matière d'hydrocarbures. D'autres propositions en rapport avec le marché intérieur sur lesquelles un terrain d'entente peut être trouvé, seront également incluses dans l'Accord. De cette façon, le potentiel de l'Accord EEE pourra être pleinement exploité à l'avantage de toutes les parties concernées.

Islande

3 *Déclaration commune n° 25 sur le traité de non-prolifération.*

Les relations entre l'Union et l'Islande, membre fondateur de l'AELE, ont toujours été bonnes. Elles se poursuivront, ainsi que la coopération, dans le cadre institutionnalisé de l'Accord EEE, dont l'Islande est évidemment signataire.

La situation énergétique de l'Islande est très particulière : l'hydroélectricité et l'énergie géothermique couvrent la plus grande partie des besoins nationaux, et le fait qu'il n'existe encore aucune interconnexion des réseaux de gaz et d'électricité montre que les priorités énergétiques islandaises diffèrent considérablement de celles de l'Union. Il ne faudrait pas en conclure qu'aucune coopération n'est envisageable dans le domaine de l'énergie. L'Islande partage avec l'Union certains problèmes écologiques, notamment ceux liés aux émissions de CO_2, et se préoccupe particulièrement de la sécurité d'approvisionnement et de la dépendance vis-à-vis des importations. Il existe en outre de bonnes raisons de coopérer dans les domaines du rendement énergétique et de la technologie appliquée à l'énergie, notamment, dans le cas de l'Islande, en ce qui concerne les sources d'énergie nouvelles et renouvelables. L'Accord EEE semble donc constituer une bonne base pour la poursuite de la coopération énergétique, notamment avec l'Islande.

Conclusions

A la suite de l'issue heureuse des négociations d'adhésion à l'Union et du résultat positif des référendums organisés en Autriche, en Finlande et en Suède durant le second semestre de 1994, ces pays deviendront membres de l'Union à part entière le 1er janvier 1995. Par l'Accord EEE, la Norvège et l'Islande ont établi avec l'Union européenne des relations étroites dans de nombreux domaines, dont l'énergie. Ces événements se sont traduits par un renforcement général de la base énergétique de l'Union. Il n'existe pas d'incompatibilités fondamentales entre les objectifs de politique énergétique des nouveaux États membres, des pays de l'EEE et de l'Union. Tous inclinent à libéraliser davantage les marchés, à renforcer la protection de l'environnement et à intégrer les réseaux de transport. Certes, le simple fait qu'un plus grand nombre de pays participent aux débats compliquera inévitablement la recherche de compromis, mais on peut aussi espérer que l'élargissement et l'Accord EEE apporteront un nouveau dynamisme et de nouvelles idées à la politique énergétique de l'UE, qui semble être actuellement dans une phase décisive. ◻

STRATEGIE DE RECHERCHE-DEVELOPPEMENT ET DE DEMONSTRATION COMMUNE DE LA COMMISSSION EUROPEENNE POUR LA PROMOTION DE LA TECHNOLOGIE DES PILES A COMBUSTIBLE

A. Cena, D. Gillaert (DG XVII) et L.X. Huynh
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Les piles à combustible sont des dispositifs électrochimiques qui convertissent un combustible primaire en électricité avec un rendement pouvant atteindre 65 %, et qui permettent de récupérer la chaleur produite par la conversion pour la consommation thermique locale. Leur fonctionnement nécessite de l'hydrogène et de l'oxygène. L'hydrogène peut être obtenu à partir de sources primaires telles que le gaz naturel, le charbon, le pétrole ou la biomasse, tandis que l'oxygène est fourni par l'air ambiant ou utilisé pur.

Outre le haut rendement de la transformation en électricité, les piles à combustible présentent d'autres avantages : peu d'émissions polluantes (un meilleur rendement réduit aussi les émissions de CO_2), bon comportement en charge partielle, construction modulaire, délais de fabrication courts et remplacement rapide. Les piles à combustible sont utilisées dans une multitude d'applications exigeant de l'énergie mécanique, les utilisations finales principales étant la production combinée de chaleur et d'électricité dans les usines et les bâtiments, les transports et la production d'électricité.

Des efforts importants ont été déployés au niveau mondial pour exploiter cette technologie, mais la commercialisation des piles à combustible a été plus lente qu'on ne l'escomptait. C'est au Japon et aux États-Unis que le soutien apporté a été le plus actif, par le truchement de programmes gouvernementaux et de sociétés privées, alors qu'en Europe, les efforts ont été beaucoup moins systématiques, les Européens n'ayant commencé à s'y intéresser timidement qu'à partir de 1985.

Les efforts et les initiatives soutenus par des programmes nationaux ou communautaires ont donc été dispersés. Pour améliorer la situation, la Commission a décidé d'agir pour rendre les produits européens plus concurrentiels que ceux fabriqués à l'étranger.

Compte tenu de tous ces éléments et dans la perspective du quatrième programme-cadre, les directions générales "Science, recherche et développement" et "Énergie" de la Commission ont élaboré une stratégie commune de R-D et de démonstration afin de coordonner les différentes activités dans ce domaine. Cette stratégie poursuit deux objectifs principaux :

Réduction du coût des piles à combustible (éléments actifs et éléments périphériques) ainsi que des coûts de fonctionnement et d'entretien.

-Allongement de la durabilité des éléments critiques, en fonction des applications : transport, production combinée de chaleur et d'électricité pour les bâtiments ou les entreprises, production d'électricité.

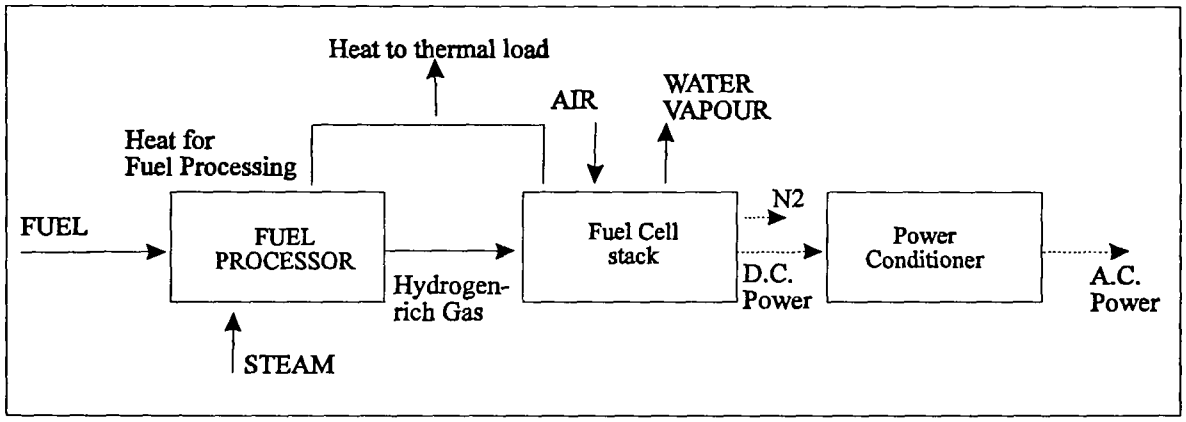
Ces deux objectifs constituent manifestement des défis considérables, notamment par la complexité de la technologie en cause. Des progrès doivent être réalisés prioritairement, dans les domaines suivants :

- réduction de la surface et du volume par unité de puissance ;
- amélioration des systèmes de commande (par ex. systèmes intelligents ou prédictifs) ;
- simplification de la fabrication ;
- réduction des coûts des systèmes de connexion aux réseaux ;
- réduction des coûts et allongement de la durabilité des éléments auxiliaires : turbocompresseurs, filtres, catalyseurs, etc.
- souplesse d'utilisation et facilité d'entretien, particulièrement dans les applications de transport ;
- normalisation et modularité des éléments, afin de faciliter les échanges entre technologies différentes ;
- intégration des piles à combustible dans d'autres équipements, notamment, derechef, en ce qui concerne les éléments moteurs dans les transports.

Eu égard à l'état d'avancement actuel de la technologie et ses enjeux, il faut combiner les efforts et optimiser

l'utilisation des crédits disponibles (publics et privés), et dans certains cas, recourir à des accords de coopération avec des entreprises extérieures à l'UE.
La stratégie commune vise à intégrer les initiatives de R&D et de démonstration. Elle sera mise en oeuvre en trois grandes étapes : contrôle des projets en cours, renforcement des activités de R&D, consolidation des initiatives industrielles par un soutien aux propositions de démonstration.

Figure 1 : Éléments de base d'un système générateur d'électricité utilisant des piles à combustible



PRINCIPALES TECHNOLOGIES DES PILES À COMBUSTIBLE

Le tableau 1 montre les principales technologies existantes, ainsi que les projets soutenus par des programmes CE, tels que BRITE-EURAM, JOULE et Thermie.
La technologie PEM est prometteuse, surtout pour les applications de transport, mais elle est coûteuse, car elle emploie du platine comme catalyseur. Les recherches dans l'UE en sont à leur début, mais les Américains sont parvenus à mettre au point les membranes nécessaires.
Les piles à combustible de première génération, du type AFC, sont utilisées dans les engins spatiaux. Outre un coût élevé, elles présentent deux inconvénients majeurs : la nécessité d'utiliser de l'hydrogène pur et un agent oxydant totalement exempt de CO_2. Pour ces raisons, le développement de cette technique n'est pas prioritaire.
PAFC est la principale technologie commercialisée sur laquelle se sont concentrées les activités de démonstration jusqu'ici. Son principal inconvénient est le coût élevé par kW installé, et même si les unités expérimentales ont permis d'acquérir de l'expérience, on voit mal comment les coûts pourraient être abaissés pour atteindre le prix de seuil commercial. Cette technologie jouera cependant un rôle dans la stratégie commune, surtout dans les recherches sur l'accroissement de la fiabilité des systèmes et par l'expérience qu'elle aura permis d'accumuler, et dont d'autres modèles de piles à combustible pourront bénéficier. Le faible rendement de la transformation en électricité et la température de fonctionnement élevée compromettent son potentiel commercial, surtout si l'on considère le haut rendement des turbines inspirées des turbines d'aviation ou de certains autres types de moteurs.
Le groupe de piles suivant est constitué de systèmes à haute température tels que les MCFC et les SOFC, encore en phase de développement (les MCFC sont les plus avancées), mais qui possèdent un marché potentiel prometteur étant donné leur rendement et leur température de fonctionnement élevée/moyenne. L'expérience acquise avec les projets THERMIE montre toutefois que les progrès demeurent plus lents que prévu ; il est donc peu probable que ces systèmes seront commercialisés à moyen terme, c'est-à-dire dans les cinq ans.
Les systèmes SPFC et DMFC sont en fait assez différents techniquement, mais constituent un groupe caractérisé à la fois par un rendement certes faible, mais aussi par une température de fonctionnement peu élevée, ce qui rend ces systèmes très intéressants pour les véhicules et la production combinée de chaleur et d'électricité dans les bâtiments. Ces technologies possèdent un bon potentiel commercial, étant donné leur coût relativement faible et leur application potentielle dans le secteur automobile, compte tenu de l'importance actuelle des questions écologiques dans les grandes villes.

Tableau 1 : Principales technologies des piles à combustible

Type	Rendement électrique Puissance max.	Électrolyte	Combustible	Température de fonctionnement °C	Projets Ce(1)
Piles à électrolyte basique (AFC)	65 %	KOH	H_2 pur	15-120	Néant
Membranes échangeuses de protons (PEM)	45 %	Électrolyte à polymère solide	H_2 pur		Néant
Piles à acide phosphorique (PAFC)	47 % 1 MW (UE) 11 MW (Japon)	H_3PO_4	Gaz de synthèse (2) reformage externe	170-210	THERMIE : 3
Piles à carbonate liquide (MCFC)	65 % 100 kW	$Li_2CO_3+K_2CO_3$	Gaz de synthèse (2) reformage interne	600-700	THERMIE : 4 JOULE : 5
Piles à oxyde solide (SOFC)	60 % 20 kW	ZrO2 (dopé à l'yttrium)	Gaz de synthèse (2) reformage interne	1000	BRITE-EURAM : 5 JOULE : 5
Piles directes au méthanol (DMFC)	45 % 10 kW		CH_3OH	60	JOULE : 4 (3)
Piles à polymères solides (SPFC)	45 % 10 kW		Gaz de synthèse (2)	80	

Remarque : dans les descriptions qui suivent, nous avons utilisé les abréviations.

(1) Il existe également cinq projets JOULE en rapport avec les sytèmes de piles à combustible et six concernant les reformeurs.

(2) Combinaison de CO/H_2 nécessitant habituellement un catalyseur modifiant la teneur en CO. Ce gaz peut provenir du charbon, de la biomasse ou du gaz naturel.

(3) Projets DMFC et SPFC combinés.

Qui travaille sur les piles à combustible dans l'UE ?

Pas moins de quarante organismes de recherche et sociétés travaillent dans ce domaine dans l'UE. Cela se justifie en partie, car les piles à combustible recouvrent plusieurs technologies, mais ce nombre élevé donne néanmoins une idée de la dispersion des efforts évoquée plus haut. Même s'il est possible de trouver des synergies avec d'autres activités d'un même groupe, et d'utiliser les résultats des activités de R&D pour d'autres produits de la même société, la concentration des activités à la source semble être encore nécessaire.

Les différents organismes peuvent être répartis en catégories. La liste qui suit n'est pas exhaustive, mais peut être considérée comme représentative :

- **Exploitants de réseaux d'électricité :** Elkraft, ELSAM (DK) ; Sydrakft, Vattenfall (S) ; Iberdrola (ES) ; ENEL, AEM, Acoser (IT, les deux derniers sont des services municipaux) ; SEP (NL),...
- **Exploitants de réseaux de gaz :** Ruhrgas (DE) ; SNAM (IT) ; Naturgas Syd (DK) ; Imatran Voima (FN) ; Austria Ferngas (AU) ; Enagas (ES) ; British Gas (UK) ; ENI (IT),...
- **Fournisseurs d'équipements :** De Nora, Fiat, Ansaldo (IT) ; Renault (FR) ; MTU, Dornier, Siemens (DE) ; TGI (ES) ; Elenco, Hydrogen Systems (BE) ; GEC, ICI, Rolls Royce (UK) ; Haldor Topose (DK) ; BCN-ECN, Schelde, Stork (NL) ; ABB (S/CH),...
- **Centres de recherche :** ECN (NL) ; ENEA (IT) ; Université de Poitiers (FR) ; Université de Bonn (DE) ; Université d'Athènes (GR) ; IFP (FR).

Le projet commercialement le plus avancé concerne les PAFC ; Ansaldo (IT) a créé conjointement avec IFC une société dénommée CLC, afin de commercialiser un module de 200 kW fabriqué par ONSI (filiale de FC). Le prix annoncé de ce module se situe aux environs de 2000 écus/kW, mais pour les installations les plus récentes, ce chiffre doit être doublé.

D'autres accords ont été signés pour la mise au point de systèmes MCFC entre Ansaldo et IFC et entre MTU et ERC (USA), ce qui élargit le cadre des activités de l'UE. En fait, dans certains cas, la contribution réelle du fabricant européen consistera à augmenter sa contribution à la valeur ajoutée du produit et à partager le marché potentiel de ces technologies.

Principes de la stratégie commune de la Commission pour les activités de R & D, et de démonstration dans le domaine des piles à combustible

La stratégie commune s'appuiera sur les trois principes de base suivants :

- concentration sur les piles à combustible à faible coût ;
- simplification des systèmes-réseaux de piles à combustible ;
- poursuite des efforts dans le domaine des piles à combustible à haute température.

Il faudra en outre prêter attention à l'évaluation des coûts et de la fiabilité des piles à moyenne température, essentiellement les **PAFC**.

Le tableau 2 précise les objectifs de cette stratégie pour les différentes technologies. Il est clair que leur réalisation nécessitera une action coordonnée et concentrée, qui ne portera pas uniquement sur la pile elle-même (matériaux, conditions de fonctionnement, etc.) mais aussi sur les autres éléments : échangeurs de chaleur, catalyseurs, turbocompresseurs, systèmes de commande, convertisseurs, etc. Le budget total à affecter aux activités répondant aux critères de la stratégie commune, après l'approbation du quatrième programme-cadre, sera d'environ 160 millions d'écus, également répartis entre les activités de R&D et les activités de démonstration.

Les tâches prévisibles seront réparties entre ces deux grands domaines, et les démonstrations seront fondées sur les résultats obtenus par la R & D. Il en ira ainsi notamment dans le cas du **réseau d'hydrogène**, domaine où des démonstrations n'auront lieu que si les études de faisabilité démontrent clairement les avantages potentiels de cette initiative.

Un autre domaine recevra une attention particulière : la mise au point de procédés de fabrication aptes à faciliter la commercialisation des produits lorsque les premiers résultats positifs des projets de démonstration seront disponibles.

Tableau 2 : Objectifs de la stratégie commune de la Communauté dans le domaine des piles à combustible

	PAFC	MCFC	SOFC	SPFC	Éléments auxiliaires
Situation actuelle	4 000 écus/kW (système)	20 000 écus/kW (pile)	30 000écus/kW (pile)	500 écus/kW (pile)	
Objectif 2005	2 000 écus/kW (système)	500 écus/kW (pile) et 2 000 écus/kW (système)	500 écus/kW (pile) et 3 000 écus/kW (système)	200 écus/kW (pile) et 1 500 écus/kW (système de station)	Reformeurs compacts et bon marché pour applications stationnaires et de transport.
	50 000 heures	50 000 heures	50 000 heures	20 000 heures (applications stationnaires)	Amélioration de l'équipement auxiliaire.

La mise en oeuvre de la stratégie suivra le parcours traditionnel pour ce type de programme : des appels d'offre seront lancés périodiquement pour les projets pour lesquels une aide financière au titre des programmes communautaires est souhaitée.

Ces appels d'offre seront fondés sur le document définissant la stratégie, et tiendront compte de l'expérience acquise au fil des années. L'état d'avancement des projets sera contrôlé étroitement.

La coordination avec d'autres programmes institutionnels sera assurée par l'intermédiaire des comités concernés dans les États membres et, sur le plan interne, avec d'autres programmes tels que MITI (anciennement BRITE-EURAM), EUREKA et Euro-Québec.

LE PROTOCOLE NUCLEAIRE DE LA CHARTE EUROPEENNE DE L'ÉNERGIE

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CONTENU DU PROTOCOLE NUCLÉAIRE

Dans le cadre des négociations sur la Charte européenne de l'énergie, il a été convenu de traiter les questions relatives aux utilisations pacifiques de l'énergie nucléaire et à la sûreté des installations dans un protocole spécifique, connu sous le nom de "Protocole nucléaire". L'objectif de ce Protocole est d'établir un cadre permettant une coopération accrue entre les parties signataires de la Charte afin d'accroître les avantages et de réduire les risques liés aux utilisations pacifiques de l'énergie nucléaire, notamment en établissant et en conservant un niveau élevé de sûreté nucléaire (article 1er).

A cet effet, le Protocole énumère une série de principes de bonne conduite en matière nucléaire. Ces principes sont :

- les principes en matière de non-prolifération (article 2), tels que coopération avec l'Agence internationale de l'énergie atomique (IAEA), à Vienne, application des lignes directrices du Nuclear Suppliers Group (groupe des pays fournisseurs de technologie nucléaire) en ce qui concerne les transferts nucléaires et les transferts de technologie nucléaire à double usage, au sens de la circulaire d'information INFCIRC 254, révision 1, de l'IAEA, adhésion au traité de non-prolifération nucléaire (TNP);
- la coopération et la coordination des activités entre les parties signataires et les organisations internationales, entre les parties elles-mêmes et entre les entités concernées sous leur juridiction en matière de sûreté nucléaire et de protection radiologique (article 3);
- des principes de conduite au niveau national (article 5) :
  (i) disponibilité de ressources financières et humaines ;
  (ii) cadre législatif et organismes indépendants responsables en matière d'utilisation de l'énergie nucléaire ;
  (iii) accès aux travaux de recherche et développement susceptibles d'assister les exploitants d'installations nucléaires ;
  (iv) promotion d'une culture de la sûreté, contrôles réguliers des installations nucléaires ;
  (v) respect des principes de sûreté nucléaire internationalement reconnus ;
  (vi) formation et recyclage du personnel ;
  (vii) plans d'urgence ;
  (viii) protection physique des matières nucléaires conformément aux circulaires AIEA INFCIRC 225 et 254 ;
  (ix) politique globale de gestion des déchets ;
  (x) normes nationales pour la protection radiologique de la population et des travailleurs, fondées sur les recommandations de la Commission internationale de protection contre les radiations ;
  (xi) système de responsabilité juridique et de réparation des dommages nucléaires ;
  (xii) information de la population sur les urgences radiologiques ;
  (xiii) analyse de l'incidence environnementale des projets d'installations nucléaires,
- des principes de conduite au niveau international (article 6) :
  (i) établissement de principes de sûreté internationalement admis ;
  (ii) examen de la sûreté nucléaire des installations par des organisations internationales ;
  (iii) adhésion à la Convention sur la protection physique des matières nucléaires ;
  (iv) respect des règles internationales relatives à la sûreté du transport des matières radioactives et aux transports transfrontaliers de déchets radioactifs ;

(v) adhésion à la Convention sur la notification rapide d'un accident nucléaire et à la Convention sur l'assistance en cas d'accident nucléaire ou de situation d'urgence radiologique ;

(vi) adhésion aux conventions de Paris et de Vienne sur la responsabilité civile dans le domaine de l'énergie nucléaire ;

(vii) consultation des États voisins sur la localisation de nouvelles installations ;

(viii) participation à des études internationales sur tous les aspects du cycle du combustible nucléaire.

Le Protocole couvre donc un très large éventail de questions relatives à quasiment tous les aspects de l'utilisation pacifique de l'énergie nucléaire et fait référence sinon à tous les accords internationaux dans ce domaine, du moins aux principaux d'entre eux. Le seul aspect non couvert est le commerce des matières nucléaires, considéré généralement comme relevant plutôt de la déclaration de base de la Charte sur l'énergie, et notamment de ses dispositions sur le commerce. Toutefois, l'Union européenne a exprimé une nette préférence pour des accords bilatéraux spécifiques en ce qui concerne le commerce des matières nucléaires.

COMPARAISON ENTRE LA CONVENTION SUR LA SÛRETÉ NUCLÉAIRE ET LE PROTOCOLE NUCLÉAIRE

Au cours des négociations sur le Protocole, qui se sont déroulées au sein d'un groupe de travail de la Conférence de la Charte de l'énergie constitué à cet effet, certains pays ont exprimé une certaine préoccupation sur la nature juridique du Protocole nucléaire. Dès le début, c'est-à-dire dès 1991, le Protocole devait avoir force obligatoire, car le traité sur la Charte européenne de l'énergie, tel qu'il a été finalement négocié et signé, prévoit que les protocoles qui le complètent sont, par définition, obligatoires en droit. Toutefois, de nouveaux facteurs ont amené certains pays à modifier leur position.

L'un de ces facteurs est la conclusion de la Convention sur la sûreté nucléaire, élaborée sous les auspices de l'AIEA. Cette Convention n'avait pas encore été proposée à l'époque où les travaux sur le Protocole furent entamés. Lorsque la première réunion d'un groupe d'experts a été convoquée par l'AIEA en 1992 pour préparer la Convention, l'opinion générale était que le Protocole serait terminé et entrerait en vigueur bien avant la Convention. Donc, même si un conflit apparaissait entre les deux textes dans un domaine de chevauchement, il était clair qu'étant entrée en vigueur après le Protocole, la Convention aurait priorité sur celui-ci, conformément à l'article 30, paragraphe 3, de la Convention de Vienne sur le droit des traités.

Cependant, comme la Convention, qui a été adoptée le 17 juin 1994 et est ouverte à la signature depuis le 20 septembre 1994, pourrait entrer en vigueur avant le Protocole ou en même temps que lui, plusieurs pays craignaient une certaine ambiguïté quant aux dispositions applicables au cas où les deux textes imposeraient des obligations différentes dans les domaines de chevauchement. Les gouvernements pourraient aussi éprouver des difficultés à obtenir de leur parlement le droit de ratifier simultanément deux textes qui se chevaucheraient de la sorte.

L'autre facteur nouveau est le fait que certains pays pensaient que le consensus serait plus facile à obtenir si le Protocole *n'avait pas* force obligatoire. Cela aurait résolu du même coup le problème de priorité entre les deux textes.

Dans ces circonstances, l'Union européenne a décidé d'attendre les résultats de la conférence de la Convention sur la sûreté nucléaire de juin 1994 pour voir dans quelle mesure les deux textes se chevaucheraient. On déciderait alors d'opter pour un Protocole nucléaire juridiquement obligatoire ou qui aurait simplement valeur incitative. En ce qui concerne la question de la priorité, l'Union européenne a décidé de proposer d'introduire une disposition affirmant la primauté de la Convention sur le Protocole. Dès lors, juridiquement parlant, il est difficile de défendre l'idée de transformer le Protocole en une simple déclaration incitative afin d'éviter tout conflit avec la Convention dans les domaines de chevauchement.

Cependant, il reste utile de comparer le texte final de la Convention sur la sûreté nucléaire avec l'actuel projet de Protocole nucléaire.

On retiendra les différences importantes suivantes :

La Charte européenne de l'énergie et, partant, le Protocole nucléaire (PN) concerneront sans nul doute des pays différents de ceux auxquels s'adresse la Convention sur la sûreté nucléaire (CSN). Par exemple, des pays comme l'Ouzbékistan, le Kazakhstan et le Kirghistan ne seront pas couverts par la CSN, mais adhéreront probablement au traité de la Charte. La Commission européenne a proposé au Conseil de ministres de négocier des accords de coopération en matière nucléaire, notamment sur les échanges de matières nucléaires, où des questions telles que la non-prolifération et la protection physique jouent évidemment un grand rôle. Comme le PN couvre également ces domaines (voir paragraphe 3 ci-dessous), il importerait que ces pays soient également liés par le PN.

La CSN s'appliquera uniquement aux centrales électronucléaires civiles terrestres et aux installations de stockage, de manutention et de traitement qui se trouvent sur le même site et qui sont directement liées à l'exploitation de ces centrales. Le PN, en revanche, couvre les grandes installations nucléaires, notion

beaucoup plus large qui s'applique à toute installation faisant partie du cycle du combustible. Outre ces deux aspects, le PN est appelé à avoir une portée plus vaste que la CSN par sa nature même : il concernera davantage d'aspects de l'utilisation pacifique de l'énergie[1] nucléaire. Il traite en effet de la non-prolifération des armes nucléaires et des contrôles de sécurité des matières nucléaires employées dans ces armes (article 2), de la protection physique des matières nucléaires (articles 5, paragraphe 12, et article 6, paragraphe 5), de la responsabilité civile des dommages nucléaires à l'échelle internationale (article 6, paragraphe 8) et de la sécurité du transport de matières et déchets radioactifs (article 6, paragraphe 6), aspects non couverts par la CSN. Mais même dans les domaines de chevauchement, le PN aborde les questions plus explicitement que la CSN. Cela s'explique notamment par le fait que le PN fait référence à des normes de sûreté en vigueur et internationalement reconnues. Par exemple, en ce qui concerne l'organisation pour les cas d'urgence, la CSN prévoit seulement que les autorités compétentes des États voisins (risquant de subir les effets d'un accident radiologique) reçoivent des informations appropriées aux fins des plans et des interventions d'urgence (article 16, paragraphe 2). Le PN, quant à lui, fait référence à la Convention sur la notification rapide d'un accident nucléaire, à la Convention sur l'assistance en cas d'accident nucléaire et à l'échelle internationale des événements nucléaires, instruments qui vont plus loin que l'obligation générale énoncée à l'article 16, paragraphe 2, de la CSN. Ces instruments définissent les installations auxquelles ils s'appliquent (à savoir non pas les seules centrales électriques nucléaires, mais la totalité des installations du cycle du combustible) et décrivent les événements qu'ils couvrent, le déclenchement du mécanisme d'information, les informations à transmettre, les autorités responsables de la transmission et de la réception des informations, etc. Un système d'alerte rapide, presque identique à celui prévu par la Convention, a été établi pour la Communauté par la décision du Conseil 87/600/Euratom du 14 décembre 1987[2].

A cet égard, on peut également évoquer l'article 5, paragraphe 15, du PN, selon lequel les recommandations sur la radioprotection formulées par la Commission internationale de protection contre les radiations (CIPR) sont les normes à utiliser pour l'établissement d'une législation nationale dans ce domaine. Depuis 1928, ces recommandations, qui sont universellement considérées comme une base scientifique adéquate pour l'établissement de normes de radioprotection nationales, ont joué un rôle important dans l'harmonisation des régimes nationaux dans le monde entier[3]. Ces recommandations définissent un système élaboré de protection des travailleurs et de la population contre les rayonnements ionisants qui va bien au-delà des trois principes fondamentaux en matière de radioprotection énoncés à l'article 15 de la CSN. À cet égard également, les normes de la CIPR ont été appliquées au niveau communautaire dans la directive 80/836/Euratom, du 15 juillet 1980[4], fixant les normes de base relatives à la protection sanitaire de la population et des travailleurs contre les dangers résultant des rayonnements ionisants. Le PN fait également référence aux règlements et codes de l'AIEA sur le transport de matières radioactives et les mouvements transfrontières de déchets, qui sont déjà admis et appliqués au niveau mondial.

L'article 16, paragraphe 2, de la CSN oblige les parties contractantes à communiquer aux populations exposées en cas d'urgence radiologique les informations appropriées aux fins des plans et des interventions d'urgence. Le PN va plus loin, car il incite en outre les organismes compétents en matière de réglementation et les exploitants d'installations nucléaires à communiquer une large gamme d'informations sur tous les aspects des activités qu'ils exercent dans le domaine nucléaire et qui intéressent la population (article 5, paragraphe 17). Le PN ne prévoit donc pas seulement l'information à transmettre en cas d'urgence, mais aussi une information sur le fonctionnement normal des installations, destinée à informer la population sur l'utilisation pacifique de l'énergie nucléaire. Cela répond aux obligations qui incombent aux États membres de l'UE en vertu de la directive 89/618/Euratom, du 27 novembre 1989, concernant l'information de la population sur les mesures de protection sanitaire applicables et sur le comportement à adopter en cas d'urgence radiologique[5]. Cette directive prévoit non seulement la diffusion d'informations sur les urgences potentielles ou réelles, mais aussi la diffusion de notions de base sur la radioactivité, ses effets sur l'être humain et l'environnement, et les différents cas d'urgence (ainsi qu'une explication simple du travail effectué dans les installations)[6].

A cet égard, le PN incite explicitement les exploitants d'installations, en plus des organismes nationaux compétents en matière de réglementation, à informer le public parallèlement aux organismes réglementaires.

1 *"hortor" - latin - "j'encourage"*

2 *JO n° L371 du 30.12.87, p. 76.*

3 *Voir R. Lennartz, " Health Protection against ionizing radiation and the Court of Justice of the EC", Nuclear Law Bulletin of the OECD, n° 53, juin 1994.*

4 *JO n° L246 du 17.09.80, p. 1.*

5 *JO n° L 357 du 07.12.89, p. 31*

6 *Voir la Communication de la Commission au sujet de la mise en oeuvre de la directive 89/618/Euratom, JO n° C 103 du 19.04.91, p. 12.*

La CSN oblige les parties contractantes à prendre les "mesures appropriées" à cet effet. Ces mesures peuvent bien sûr consister en une obligation pour les exploitants de communiquer les informations nécessaires, mais cela n'est pas dit expressément. Le PN est donc plus précis que la CSN à ce sujet.

Évaluation

Le fait que le PN couvrira d'autres pays et davantage d'installations, et qu'il traite de tous les aspects de l'utilisation pacifique de l'énergie nucléaire, constitue déjà un argument suffisant pour en faire un document ayant force obligatoire plutôt qu'une déclaration simplement incitative, et donc non contraignante. Cela donnerait d'autant plus de poids aux recommandations, réglements, codes et autres textes internationaux non contraignants auxquels il fait si souvent référence. De plus, comme nous l'avons expliqué dans ces lignes, même dans les domaines où la CSN et le PN se recoupent, le PN est plus précis et complet, mais ne contredit pas la CSN. L'argument selon lequel c'est précisément à cause de ce chevauchement que le PN doit être non contraignant est donc difficilement défendable. Comme nous l'avons dit précédemment, il suffirait, pour régler ce problème, d'ajouter une disposition affirmant la primauté de la CSN sur le PN. Enfin, la mise en oeuvre des obligations résultant d'un Protocole nucléaire juridiquement contraignant ne poserait pas de problèmes aux États membres de l'UE, car la plupart des domaines concernés sont déjà couverts par la législation communautaire (c'est le cas de la protection contre les radiations) ou par les politiques des États membres, coordonnées au niveau de l'Union européenne : c'est le cas de la non-prolifération. Des mesures d'application au niveau national ont déjà été prises. Il en va de même en ce qui concerne la protection physique des matières nucléaires, car tous les États membres de l'UE ont adhéré à la Convention régissant ce domaine.

Conclusion

En dépit de tous ces arguments, la majorité des délégations des parties signataires de la Charte de l'énergie, représentées au sein du groupe de travail V, semblent être d'avis que le Protocole nucléaire doit être une déclaration incitative, afin d'éviter tout risque d'interférence avec la mise en oeuvre de la Convention sur la sûreté nucléaire et avec la négociation d'une Convention sur la sûreté des déchets nucléaires. ◻

ASIE : LE DEFI ENERGETIQUE DU 21E SIECLE

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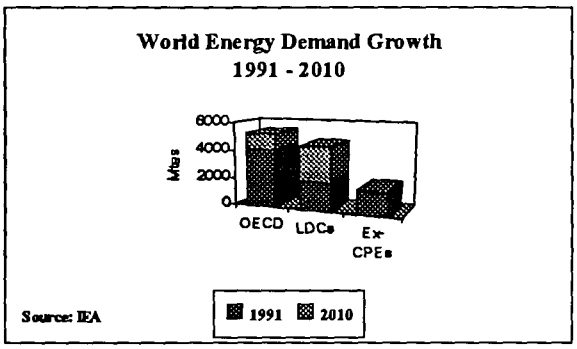
L'Europe en a fait l'expérience depuis les chocs pétroliers des années 1970 : nos marchés énergétiques sont plus sensibles aux pressions de l'offre qu'à celles de la demande. Étant donné les problèmes qu'a connus la chaîne d'approvisionnement à cette époque, les gouvernements européens ont cherché à remplacer le pétrole par d'autres formes d'énergie et ont accordé davantage d'importance à la conservation de l'énergie, par exemple en créant des agences publiques pour le rendement énergétique. Toutefois, un réalignement est en cours et ce sont les pays à forte croissance d'Amérique latine et d'Asie qui vont déterminer, pour l'essentiel, la forme et l'importance de la demande d'énergie mondiale. Si nous examinons les scénarios de consommation énergétique pour ces régions au cours du prochain siècle, il apparaît clairement que c'est la vigueur de leur croissance économique qui sera le facteur prépondérant, car cette croissance exigera une consommation énergétique accrue. Certains chiffres indiquent que la croissance de la consommation énergétique dans les pays en développement entre 2000 et 2010 dépassera la consommation actuelle en Europe occidentale. Ce phénomène, ajouté aux conséquences environnementales de cette énorme mutation, explique largement pourquoi la Commission européenne joue un rôle de plus en plus important dans la coopération énergétique avec les pays tiers, dont évidemment, ceux d'Asie. Cette préoccupation coïncide avec une grande initiative de l'Union visant à accorder à l'Asie une priorité beaucoup plus importante dans tous les secteurs d'activité, étant donné que son développement rapide a bouleversé l'équilibre économique mondial et conféré à cette région un plus grand rôle sur la scène mondiale.

CROISSANCE DURABLE

La croissance économique rapide de l'Asie a commencé au Japon dans les années soixante, mais elle s'est aujourd'hui répandue dans bon nombre de pays d'Asie orientale et d'Asie du Sud-Est. Elle est due pour une grande part au transfert d'industries d'exportation à fort coefficient de travail des pays où le coût de la main-d'oeuvre est élevé vers les pays d'Asie, où la main d'oeuvre est bon marché. La transformation économique radicale de pays tels que la Chine et la Corée est irréversible ; ces pays dynamiques connaissent toujours un taux de croissance à deux chiffres du PNB et de la production industrielle. En Asie méridionale, la croissance moyenne est beaucoup plus faible, mais elle s'est élevée à près de 5 %, et ces dernières années, des pays comme l'Inde ont commencé à modifier leur politique économique et à promouvoir une stratégie de croissance fondée sur le marché et induite par les exportations. L'UE est le principal partenaire commercial de l'Inde : elle absorbe 25 % de ses exportations et lui fournit 32 % de ses importations, même s'il s'agit d'un volume limité (14 milliards de dollars en 1992).

Néanmoins, la croissance économique durable à long terme dans l'ensemble de l'Asie risque toujours de se faire attendre à cause d'incertitudes politiques, mais elle est également menacée par des problèmes structurels : goulets d'étranglement au niveau des infrastructures, dégradation de l'environnement, télécommunications rudimentaires, systèmes de transport inefficaces et pénuries d'énergie, qui risquent de l'étouffer.

L'énergie continue donc à jouer un rôle clé dans l'économie asiatique. En 1993, c'est en Asie qu'on a enregistré les plus fortes croissances de la consommation d'énergie dans le monde, avec une augmentation globale de 3,8%, alors que la consommation des pays européens de l'OCDE baissait de 0,3% et que l'augmentation au niveau mondial n'était que de 0,2%. En Chine, troisième marché mondial de l'énergie, la consommation s'est accrue de 4,6% et a été multipliée par 22 depuis 1952. Celle de l'Inde a plus que triplé depuis 1970.



Le taux de croissance annuel de la consommation d'énergie en Indonésie a atteint 9,7 % pour la période 1986-1991, contre 2,6 % de 1981 à 1986.

Des répercussions sur l'environnement sont inévitables, car la croissance économique va continuer à être alimentée par une plus forte utilisation d'énergie. Dans ces conditions, l'AIE prévoit que, malgré la faible intensité énergétique qui caractérise l'Inde et la Chine, l'augmentation des émissions de CO_2 imputable à ces pays entre 1990 et 2020 sera supérieure à celle imputable à l'ensemble des pays de l'OCDE. Les émissions de ces deux pays atteindront le quart du total mondial en 2010. Les pays en développement sont actuellement responsables d'un tiers des émissions mondiales, contre un sixième en 1974. La liaison entre l'énergie et l'environnement est donc très importante, et elle se réflète dans de nombreuses activités de coopération de l'UE avec l'Asie, notamment dans le domaine des technologies du charbon propres.

En ce qui concerne la démographie, certaines estimations prévoient que la population mondiale va augmenter de trois milliards d'individus, et dépasser les huit milliards d'ici à 2020. Cette augmentation serait imputable à l'Asie et l'Amérique latine pour 60 %. A mesure que l'industrialisation progresse, la main-d'oeuvre rurale migre vers les villes, notamment dans des pays comme la Chine. Ces villes en expansion ont grandement besoin d'énergie et d'électricité pour construire des routes, créer des systèmes de transport et alimenter les nouvelles industries et les immeubles de bureaux dans les quartiers financiers. L'Inde et la Chine, qui consomment actuellement moins de 10 % de la production mondiale d'électricité, prévoient de construire des capacités de production qui représenteront, pour ces seuls pays, un quart des nouvelles capacités mondiales.

INITIATIVES DE LA COMMISSION

La Commission a réagi à ces bouleversements par une Communication au Conseil intitulée "Vers une nouvelle stratégie asiatique". Ce document a été présenté au secteur privé européen et a fait l'objet d'un rapport du Conseil de ministres de novembre 1994.

Cette nouvelle politique en vue de renforcer la présence européenne en Asie couvre tous les secteurs d'activité - politique, social, économique et commercial. Les réformes dans des pays dont l'économie était centralisée, comme la Chine, l'Inde ou le Vietnam, permettent une participation européenne tant au niveau du secteur public qu'au niveau du secteur privé. Il apparaît clairement que le secteur énergétique occupera une position essentielle dans cette réorientation, et qu'il faut lui accorder la place qu'il lui revient dans ce mouvement vers un renforcement de la présence économique européenne en Asie.

L'Union s'emploie également à conclure ou à renouveler des accords de coopération avec certains pays asiatiques tels que l'Inde, le Vietnam et la Corée. Cela est très important pour le secteur énergétique car chaque pays a ses besoins propres, et ces accords permettent de répondre aux priorités de politique énergétique de chaque partenaire et de prospecter de nouveaux marchés de l'énergie.

L'UE dispose, certes, de nombreux instruments politiques et programmes axés sur l'Asie. Toutefois, l'objectif actuel est de constituer une gamme cohérente d'activités et de mettre en place une politique-cadre que la Commission pourra utiliser comme un tout et appliquer aux différents pays d'Asie afin de répondre aux intérêts de l'UE et des États membres, et à ceux de nos partenaires asiatiques. Dans le cas de la Chine, il s'agira de mettre en place un cadre approprié pour améliorer les liens commerciaux et la coopération sur les questions environnementales.

Les pays asiatiques vont devoir investir des sommes énormes dans la construction de centrales électriques et de raffineries de pétrole, et dans l'extension de leurs secteurs pétrolier, gazier, charbonnier et hydroélectrique. La Commission doit donc adopter une approche cohérente et constante en ce qui concerne les scénarios énergétiques en Asie et veiller à ce que le secteur énergétique européen réagisse d'une manière adéquate. Cette stratégie doit couvrir les questions clés de l'offre et de la demande et créer les conditions propices à l'ouverture de marchés asiatiques aux technologies énergétiques européennes.

COOPÉRATION ÉNERGÉTIQUE AVEC L'ASIE

L'Union européenne peut donc jouer un rôle en Asie, premièrement en exploitant les possibilités commerciales et en obtenant que soient levées les barrières commerciales qui freinent les technologies énergétiques européennes éprouvées et à haut rendement, et deuxièmement en coopérant avec les pays asiatiques pour définir des politiques et des stratégies qui assureront la sécurité et la stabilité de l'approvisionnement énergétique mondial et des marchés.

La direction générale de l'énergie (DG XVII) a coopéré pendant de nombreuses années avec les pays asiatiques dans le secteur de l'énergie, conjointement avec la direction générale des relations économiques extérieures (DG I) et dans le cadre des accords de coopération bilatéraux et régionaux de l'Union et des programmes Synergy et Thermie de la DG XVII.
Les objectifs généraux suivants ont guidé l'approche de la DG XVII :

- assurer un approvisionnement énergétique sûr et à des prix raisonnables ;
- faciliter la collaboration entre les entreprises européennes et les principales industries productrices et consommatrices d'énergie en Asie ;
- promouvoir les transferts de technologies et la création d'institutions durables ;
- protéger l'environnement contre la pollution industrielle.

LE MARCHÉ ASIATIQUE

L'une des priorités parmi ces objectifs a été de découvrir les marchés potentiels dans la région et d'exploiter d'abord le secteur énergétique. Cette action vise à mettre en valeur l'image particulière de l'Union européenne et ses avantages comparatifs.
Comme c'est le cas pour d'autres secteurs industriels, ces activités axées sur le marché doivent être soutenues par des efforts en vue de surmonter les obstacles commerciaux en ce qui concerne les technologies énergétiques européennes efficaces, éprouvées et écologiques. Cet objectif est à son tour favorisé par la définition conjointe de politiques et de stratégies énergétiques destinées à assurer la sécurité et la stabilité de l'approvisionnement et des marchés énergétiques dans le monde.
Même si le taux de croissance varie d'une région d'Asie à l'autre, le fait qu'une grande partie de l'Asie en développement connaisse une croissance élevée et continue désigne ces pays comme les gros consommateurs d'énergie de demain. Alors que les exportations globales de l'UE vers l'Asie en développement ont considérablement augmenté, au point de dépasser proportionnellement celles des États-Unis, les exportations de technologies énergétiques des États membres ont chuté au niveau mondial. Pour corriger cette tendance, il faut se concentrer sur les marchés où la demande potentielle est forte. Le marché asiatique est donc un candidat de choix pour des activités de coopération énergétique susceptibles d'améliorer notre position commerciale.
Dans les années qui viennent, la coopération industrielle sera un défi important pour l'Asie comme pour l'Europe, notamment dans le secteur de l'énergie. La DG XVII s'efforce de promouvoir le secteur énergétique et d'en faire un modèle à imiter pour le transfert technologique dans tous les secteurs, étant donné la position clé de ce secteur comme point de pénétration dans les pays asiatiques. Cela demeurera un des buts principaux de nos programmes dans ce domaine.
La croissance de la consommation d'énergie en Asie, et de la consommation de pétrole en particulier, aura probablement des conséquences importantes pour les marchés énergétiques régionaux et mondiaux dans les décennies à venir. L'analyse des tendances actuelles montre que la Chine pourrait dépasser la Russie et devenir le deuxième marché énergétique du monde. En outre, le bilan pétrolier de la Chine s'est inversé en peu de temps, ce pays étant devenu importateur de pétrole pour la première fois depuis les années 1970. Bien que l'économie y reste fondée sur le charbon, qui représente 75% de la consommation d'énergie primaire, il a été fait appel au pétrole pour satisfaire la demande supplémentaire d'énergie dans les secteurs des transports et de l'électricité. Cet accroissement de la demande de pétrole n'a pas été accompagné d'une augmentation correspondante de la production nationale. La mise en valeur des ressources énergétiques asiatiques (par exemple le pétrole et le gaz naturel) ouvre donc non seulement d'immenses perspectives, mais elle est aussi indispensable. La coopération avec l'UE peut faciliter cette tâche, et sa réussite contribuera à réduire la pression des économies montantes sur les ressources pétrolières mondiales.
Certains des pays asiatiques qui connaissent de longues périodes de croissance économique prennent désormais conscience de manière plus aiguë de la nécessité d'utiliser efficacement l'énergie et des avantages qui en découlent. Un marché s'est fait jour pour les technologies à haut rendement énergétique, et les programmes européens concernés peuvent jouer un rôle en attirant l'attention des fournisseurs européens sur ces possibilités. Par ailleurs, les pays asiatiques très développés ont connu une expansion économique rapide. L'accroissement parallèle de leur consommation énergétique a fait naître un besoin urgent de politique énergétique et environnementale et a suscité une forte demande de technologies énergétiques à haut rendement. Sur le plan pratique, le manque de ressources financières ne devrait pas empêcher ces pays d'acquérir des technologies énergétiques à haut rendement, qui se révéleront payantes à l'avenir.

Tableau 1 : Emission de CO_2 : ventilation par région

%	1974	1980	1986	1990	1991
Europe occidentale	21,9	19,5	17,2	16,2	16,5
Union européenne	*20,2*	*18,0*	*15,8*	*14,9*	*15,2*
AELE	*1,6*	*1,5*	*1,4*	*1,3*	*1,3*
Europe centrale et orientale	5,2	5,6	5,4	4,3	3,9
Ex-URSS	16,9	18,0	18,1	17,1	16,6
ALENA	33,0	30,4	28,1	27,9	27,7
OCDE, région pacifique	7,2	6,3	6,0	6,6	6,7
Région méditerranéenne	0,5	0,5	0,6	0,7	0,8
Afrique	1,8	2,2	2,6	2,9	2,9
Moyen-Orien	1,1	1,8	2,8	3,1	3,0
Asie	9,8	12,6	16,0	18,3	18,9
Amérique latine	2,6	2,9	3,0	2,9	3,0

Source: DG XVII (*Annual Energy Review 1993*)

PROGRAMME D'ACTION SYNERGY DE LA DG XVII

Synergy est un programme de coopération énergétique avec des pays et des régions extérieurs à l'UE, dont l'Asie, qui peut contribuer de manière souple à l'élaboration de politiques et de stratégies énergétiques. Ses activités sont donc axées sur l'application des principes de politique énergétique de l'UE, la mise en place d'outils de programmation énergétique, la création de réseaux d'institutions de décision et la gestion des ressources énergétiques. La relation énergie/environnement est également un aspect très important. Tout l'intérêt de ce programme est qu'il peut compléter utilement d'autres programmes européens en se concentrant sur le secteur énergétique des pays tiers, et permet donc d'éliminer les barrières potentielles par une action rapide.

L'une des priorités du programme Thermie pour la promotion des technologies énergétiques européennes demeurera la coopération industrielle avec les pays tiers. Il est évident qu'il faut développer les relations avec l'Asie, eu égard, notamment, au niveau de la production et de la consommation d'énergie, à la croissance économique, aux préoccupations environnementales croissantes et à l'intérêt commercial direct des États membres. Dans une situation où les exportations de technologies énergétiques européennes ont chuté, il est important de déterminer où et quand des actions promotionnelles ciblées peuvent donner des résultats. Les fournisseurs européens de technologies seront alors en mesure de répondre aux besoins asiatiques locaux, tout en ouvrant de nouveaux marchés importants, au titre de l'extension des programmes de démonstration et des activités de dissémination déjà mis en oeuvre en Europe.

On peut dresser la liste exhaustive suivante des domaines spécifiques où des actions de coopération sont envisageables, compte tenu des contraintes budgétaires qui pèsent sur les programmes concernés :

- rendement énergétique;
- utilisation rationnelle de l'électricité;
- gestion de la demande;
- planification intégrée des ressources;
- cogénération;
- combustion propre du charbon;
- gestion de l'énergie dans l'industrie;
- sources d'énergie de remplacement (biomasse, énergie éolienne, hydraulique, solaire);
- prospection pétrolière et gazière;
- diversification de l'approvisionnement et promotion du gaz naturel;
- sûreté nucléaire et sécurité du cycle du combustible.

Généralement parlant, la coopération énergétique devrait se faire en étroite collaboration avec les gouvernements nationaux et les organisations régionales telles que l'ANASE. Les projets de programmation énergétique au niveau national et régional sont donc encouragés. Une assistance au niveau de l'organisation est fournie pour la mise en oeuvre de politiques énergétiques, notamment pour la création d'institutions (Centres de l'Énergie) qui seront chargées de l'application de la politique énergétique à moyen et long terme. Les projets découlant de ces lignes directrices comprennent des programmes de formation, des séminaires, une assistance technique, des études de planification, des audits énergétiques et des projets transfrontières (interconnexions). Ces activités devraient également s'étendre à toutes les priorités en matière de transfert technologique (prospection des marchés, dissémination, formation d'opérateurs locaux) et aux possibilités de financement (par exemple ateliers de financement).

En un mot, toutes ces actions ont pour but d'éviter des distorsions de l'offre dues au fait que, dans bien des cas, les investissements et la coopération industrielle risquent plus d'accroître l'offre d'énergie que de réduire la demande grâce à une technologie plus efficace et spécifique. Elles constituent aussi un cadre et un "pas de tir" pour la contribution du secteur énergétique européen à la nouvelle stratégie asiatique de l'UE. Étant donné les ressources limitées dont la DG XVII dispose pour ses programmes, il faut établir des priorités, en termes de pays et de secteurs, pour

obtenir l'efficacité maximale. La direction générale de l'énergie continuera d'analyser les problèmes énergétiques de la région asiatique et de veiller à ce que les projets de coopération donnent les meilleurs résultats dans un contexte nouveau, passionnant et en évolution constante.

Tableau 2 : Consommation énergétique intérieure brute totale : totaux par régions

MTep	1974	1980	1986	1990	1991	1992	80/74	86/80	90/86	91/90	92/91	92/74
							Evolution annuelle en %					
Monde (1)	**5 860**	**6 896**	**7 587**	**8 316**	**8 380**	**8 393**	**2,8**	**1,6**	**2,3**	**0,8**	**0,1**	**2,0**
Soutes	122	109	97	124	125	128	-1,9	-2,0	6,3	1,5	1,7	0,2
Europe occidentale	1 168	1 253	1 286	1 347	1 366	1 355	1,2	0,4	1,2	1,4	-0,8	0,8
Union européenne	*1 055*	*1 123*	*1 139*	*1 197*	*1 213*	*1 207*	*1,1*	*0,2*	*1,3*	*1,3*	*-0,5*	*0,8*
AELE	*114*	*130*	*147*	*149*	*153*	*149*	*2,3*	*2,1*	*0,3*	*2,7*	*-3,2*	*1,5*
Europe centrale et orientale	275	358	383	332	298	277	4,5	1,1	-3,5	-10,2	-7,1	0,0
Ex-URSS	908	1 132	1 294	1 357	1 333	1 219	3,7	2,3	1,2	-1,8	-8,5	1,6
ALENA	1 890	2 087	2 074	2 256	2 301	2 333	1,7	-0,1	2,1	2,0	1,4	1,2
OCDE, région pacifique	394	426	453	535	548	554	1,3	1,0	4,3	2,4	1,3	1,9
Région méditerranéenne	26	33	44	55	56	58	4,0	4,8	5,8	1,5	3,1	4,5
Afrique	162	222	289	326	328	337	5,4	4,5	3,1	0,8	2,6	4,2
Moyen-Orient	69	129	210	246	234	249	11,0	8,5	4,0	-4,9	6,3	7,4
Asie	613	868	1 150	1 408	1 457	1 547	6,0	4,8	5,2	3,5	6,2	5,3
Amérique latine	233	279	308	332	334	336	3,1	1,7	1,9	0,8	0,6	2,1
For memo:												
OCDE	*3 426*	*3 707*	*3 750*	*4 066*	*4 138*	*4 165*	*1,3*	*0,2*	*2,0*	*1,8*	*0,7*	*1,1*
Part du total (%)	*60*	*55*	*50*	*50*	*50*	*50*						
Pays hors OCDE	*2 312*	*3 080*	*3 741*	*4 127*	*4 117*	*4 100*	*4,9*	*3,3*	*2,5*	*-0,2*	*-0,4*	*3,2*
Part du total (%)	*40*	*45*	*50*	*50*	*50*	*50*						

(1) Consommation énergétique brute

Source: DG XVII (*Annual Energy Review*, 1993)

ENERGIE IN ÖSTERREICH

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GEOGRAPHIE, WIRTSCHAFT UND IHR EINFLUSS AUF DIE ENERGIEPOLITIK

Österreich ist ein Binnenstaat, nur 84.000 km² groß und geographisch dominiert von der Bergkette der Ostalpen. Über 40 % seiner Fläche sind bewaldet. Die Einwohnerzahl beträgt fast acht Millionen. Es gibt nur ein großes Ballungsgebiet, den Großraum Wien, wo über ein Viertel der Gesamtbevölkerung angesiedelt ist. Das Bruttoinlandsprodukt betrug 1993 2.100 Milliarden OS[1], das BIP pro Kopf ungefähr 258.000 OS. Der Anteil der Landwirtschaft an dieser wirtschaftlichen Leistung betrug ungefähr 2,5 %, der der Industrie 32 % und der des Dienstleistungsbereichs - insbesondere des Tourismus - 62,3 %.

Die Natur hat Österreich nicht gerade großzügig mit Energiequellen gesegnet: es gibt fast keine Steinkohlevorkommen (das letzte kleine Bergwerk wurde vor dreißig Jahren geschlossen), geringe Braunkohlevorkommen minderer Qualität und erhebliche, aber ständig abnehmende Kohlenwasserstoffreserven. Die wichtigste Energiequelle, jahrelang voller Stolz als "weißes Gold" bezeichnet und ein Symbol des österreichischen Wiederaufbaus in der Nachkriegszeit, ist die Wasserkraft. Schon nach 1918 und dann wieder nach 1945 wurde die Leistungsfähigkeit der österreichischen Wirtschaft durch wiederholte Verknappungen der Steinkohleimporte erheblich beeinträchtigt. Deshalb konzentrierte sich unsere Energiepolitik daraufhin stark auf die zur Genüge vorhandene Wasserkraft.

Abgesehen von der Wasserkraft wäre aber jeder Versuch, im Bereich der Energieversorgung Autarkie zu erreichen, ganz einfach unrealistisch gewesen. Österreich mußte damit leben, daß es jahrzehntelang stark auf Energieimporte angewiesen war. Deshalb hat die österreichische Energiepolitik auf Fragen der Versorgungssicherheit stets sehr sorgfältig geachtet und sich sowohl auf bilateraler als auch auf multilateraler Ebene um gute internationale Kontakte bemüht. Österreich gehörte zum Beispiel zu den Gründungsmitgliedern der Internationalen Energie-Agentur. Die lange gemeinsame Grenze mit (ehemaligen) Comecon-Staaten - Tschechoslowakei und Ungarn - und dem ehemaligen Jugoslawien galt sowohl als Chance als auch als Herausforderung, um im schwierigen politischen Umfeld der fünfziger und sechziger Jahre im Energiebereich mit Osteuropa Kontakte zu knüpfen; die Belieferung mit Energie aus den Ländern des Comecon erwies sich im Endeffekt als sehr zuverlässig. Ein weiterer Aspekt dieser "Internationalität" zeigte sich in der gezielten Entwicklung von Transitleitungen für Gas und Elektrizität durch österreichisches Gebiet; Gaslieferungen aus Rußland nach Italien, Frankreich und auch nach Slowenien, über die "Trans Austria"- und die "West Austria" Pipelines, gibt es seit zwanzig

1 *1 ECU = 13,490 OS (November 1994)*

Jahren, und zwei der wenigen HVDCC-Anlagen[2] in Europa, die einen umfangreichen Elektrizitätsaustausch mit dem österreichischen Verbundnetz ermöglichen, sind in Österreich in Betrieb.

ANGEBOT UND VERBRAUCH: LANGFRISTIGE TENDENZEN

Tabelle 1 enthält Schlüsseldaten zur gegenwärtigen Energiesituation Österreichs. Aber vielleicht wäre es interessanter, die Entwicklungen zu betrachten, die zu der gegenwärtigen Situation geführt haben.
Der Primärenergieverbrauch hat in den letzten beiden Jahrzehnten insgesamt zugenommen; diese Tendenz wurde lediglich durch Preisschocks, eine wirtschaftliche Rezession oder besonders günstige Witterungsbedingungen vorübergehend unterbrochen. Nichts-destoweniger ergibt eine gleichzeitige Betrachtung der Wirtschaftswachstumsraten, daß sich der Energienutzungsgrad ganz erheblich verbessert hat : Während der Primärenergiebedarf von 1973 bis 1993 insgesamt um ungefähr 20 % anstieg, wuchs das reale BIP um 57 %. Der Energieverbrauch pro BIP-Einheit sank um 24 %, in der Industrie sogar um 40 %.

Tabelle 1 : Energieangebot und -verbrauch

(in Petajoules)*

	1993
Einheimische Produktion	438,9
Importe	783,0
Angebot insgesamt	1221,9
Vorräte	-11,3
Exporte	68,1
Primärer Energieverbrauch insgesamt	1142,6
Primärer Energieverbrauch insgesamt	815,1
Sekundärenergieerzeugung	696,6
Nichtenergiescher Verbrauch	75,9
Verbrauch druch den Energiesektor	52,9
Verluste	17,0
Endverbrauch insgesamt	878,3
Industrie	228,0
Verkehr	237,5
Kleinverbraucher	412,8

Quelle : Vorläufige Energiebilanzen des Österreichischen Instituts für Wirtschaftsforschung (WIFO)

** Offizielle österreichische Energiedaten und -bilanzen werden normalerweise in Joule angegeben. Umrechnungsfaktoren : 1.000 t Steinkohle = 27,9 TJ;*
1.000 t Braunkohle = 11,1 TJ;
1 Million Nm³ Erdgas = 36,0 TJ.

Auch die Verbrauchsstruktur hat sich erheblich gewandelt (siehe Tabelle 2). Eine Aufschlüsselung nach Sektoren zeigt, daß die Kleinverbraucher mit 46 % den größten Anteil am Verbrauch haben; dieser Anteil hat sich in den letzten Jahren nicht nennenswert verändert. Der Anteil der Industrie am GEV (Gesamt-Endverbrauch) ist von 33 % im Jahre 1973 auf 26 % im Jahre 1993 zurückgegangen; dagegen beträgt der Anteil des Verkehrs jetzt 28 % im Vergleich zu 23 % vor zwanzig Jahren. In Anbetracht der zunehmenden Bedeutung des Verkehrssektors ist die deutliche Abnahme des Ölanteils umso bemerkenswerter.
In der heimischen österreichischen Energieproduktion dominieren mit Anteilen von 40 % bzw. 32 % im Jahre 1993 Wasserkraft und Biomasse; zwanzig Jahre zuvor betrug ihr Anteil nur 20 % bzw. 17 %.

Tabelle 2 : Die Entwicklung der Verbrauchsstruktur

(Anteil in Prozent)

	1973	1993
Kohle	18%	11%
Öl	52%	41%
Gas	15%	21%
Wasserkraft	8%	15%
Sonstige	7%	13%

Auf der Importseite dominieren dagegen fossile Brennstoffe. Bei längerfristiger Betrachtung der Gesamtimporte (wiederum für die Jahre 1973-1993), die insgesamt zugenommen haben, ist das Importvolumen für Öl und Kohle relativ konstant geblieben, während sich die Erdgasimporte verdreifacht haben. Diese Zahlen veranschaulichen deutlich den außergewöhnlichsten Aspekt des österreichischen Energiesystems: Während sich die allgemeinen Verbrauchsmuster und andere Schlüsselzahlen, wie etwa die über den Ölanteil und die Importabhängigkeit, weitgehend mit denen für viele EU-Mitgliedstaaten decken, ist der Anteil erneuerbarer Energien an der heimischen Produktion wie auch am Gesamtverbrauch außergewöhnlich groß. Allein die Wasserkraft hat einen Anteil von 10 % am GEV, bei den anderen erneuerbaren Energien sind es ungefähr 13 %; die Vergleichszahlen für die EU sind 1,5 % und 0,3 %.
Eine weitere Besonderheit ist die vollständige Ablehnung der Kernenergie. Im Jahre 1978 wurde die Frage der Inbetriebnahme des neu erbauten Kernkraftwerks Zwentendorf nach lebhafter öffentlicher Diskussion einem Volksentscheid unterworfen. Das negative Votum - 51 % Neinstimmen gegenüber 49 % Jastimmen - führte zu einem gesetzlichen Verbot der Nutzung von Kernkraft zum Zwecke der Energieerzeugung in Österreich. Versuche, diese Entscheidung zu revidieren, wurden 1986 infolge

2 *vgl. den Beitrag über Elektrizitäts-Verbundpläne in Ausgabe 24.*

der Katastrophe von Tschernobyl endgültig aufgegeben. Österreich gehörte zu den ersten Ländern, die mit Proteststürmen gegen kerntechnische Anlagen konfrontiert wurden, und auch zu den ersten, in denen die politisch Verantwortlichen ihre Entscheidungen entsprechend revidieren mußten. In den nächsten Jahren, ja sogar Jahrzehnten, sind sowohl in bezug auf die Akzeptanz der Kernenergie in der Bevölkerung als auch in bezug auf die entsprechende gesetzliche Lage keinerlei Veränderungen zu erwarten.

Tabelle 3 : Aufschüsselung der Energieimporte nach Regionen (Anteil in Prozent)

1993						
	Khole	**Öl**	**Gas**	**Elektrizität**	**Sonstige**	**Importe insgesamt**
OPEC	-	60,3	-	-	-	34,4
OECD	6,9	14,6	6,0	59,5	2,1	13,0
Ost-Europa	91,0	17,7	94,0	40,5	97,9	48,0
Sonstige	2,1	7,4	-	-	-	4,5
Summe	100,0	100,0	100,0	100,0	100,0	100,0

GRUNDZÜGE DER ÖSTERREICHISCHEN ENERGIEPOLITIK

Im Frühjahr 1993 legte die österreichische Regierung dem Nationalrat ihren offiziellen "Energiebericht" vor. Dieser Bericht besteht aus einer ausführlichen Beschreibung der Energiesituation und einem zukunftsorientierten "Energiekonzept". Das Konzept selbst enthält einen "Aktionsplan" für die Durchführung konkreter Maßnahmen.

Nationale Energiepolitik beruht auf den Prinzipien und den gemeinsamen Zielen der Internationalen Energie-Agentur. Sie muß den Herausforderungen der europäischen Integration, den Erfordernissen einer verstärkten globalen Zusammenarbeit in Anbetracht der Debatte über die Klimaveränderungen und der notwendigen Neuordnung der Beziehungen zu den Ländern Mittel- und Osteuropas gerecht werden.

Die wichtigsten Ziele der österreichischen Energiepolitik sind: Sicherung der Energieversorgung, Vereinbarkeit mit den Erfordernissen einer gesunden Umwelt, soziale Akzeptanz (siehe die Kernkraftdebatte!), oberste Priorität für eine effiziente Energienutzung, Einschränkung des Ölverbrauchs und der Importabhängigkeit sowie verstärkter Einsatz erneuerbarer Energien. Alle Maßnahmen, die zur Erreichung dieser Ziele ergriffen werden, müssen zukunftsfähig sein und der marktorientierten Struktur der österreichischen Wirtschaft entsprechen. Interventionen von seiten der Regierung sind folglich auf jene Bereiche beschränkt, in denen die Kräfte des Marktes ganz offensichtlich nicht in der Lage sind, die gewünschten Ergebnisse herbeizuführen.

Mit diesen politischen Zielsetzungen sind wohl in den meisten EU-Mitgliedstaaten vertraut. Die Herausforderungen, die sich hinter einer Handvoll Worten verbergen, sind jedoch beträchtlich.

ENERGIEPOLITIK UND DIE WELT

Die Folgen der Energieerzeugung sowie des Transports und Verbrauchs von Energie haben in allen Phasen zweifelsohne erhebliche Auswirkungen auf die Umwelt. Wirkungsvolle Lösungen für Umweltprobleme sind zwangsläufig globaler Natur - was aber nicht als Rechtfertigung für Unbeweglichkeit und Untätigkeit auf nationaler Ebene angesehen werden darf. Österreich hat in den letzten zehn Jahren den Anteil an energiebedingten Luftschadstoffen wie z.B. SO_2 erfolgreich reduziert. Der CO_2-Ausstoß ist jedoch ein viel größeres Problem. In Österreich wurden 1988 ungefähr 53 Mio. t CO_2 ausgestoßen; 1993 waren es - nach einem Spitzenwert von 63 Mt im Jahre 1991 - 57 Millionen. Wir haben uns verpflichtet, bis 2005 den CO_2-Ausstoß im Vergleich zum Ausgangsjahr 1988 um 20 % zu verringern (sogenanntes Ziel von Toronto). Das ist natürlich sehr ehrgeizig, und Österreich ist sich durchaus darüber im klaren, welche Schwierigkeiten die Union überwinden muß, um ihr derzeitiges Stabilitätsziel zu erreichen.

Zur Erstellung des oben erwähnten Energiekonzeptes hat das Österreichische Institut für Wirtschaftsforschung einen "Toronto-Plan" sowie einen "Stabilisierungsplan" erarbeitet, um die Auswirkungen der Zielvorgaben im Bereich des CO_2-Ausstoßes auf den Energieverbrauch abzuschätzen. Um das Ziel zu erreichen, wäre eine Reduzierung des Energieverbrauchs um durchschnittlich etwa 4 % pro Jahr pro Einheit des BIP erforderlich. Das heißt, daß der Gesamtenergieverbrauch im Jahre 2005 12 % unter dem von 1988 liegen müßte - oder sogar 30 % über dem - bei ansonsten unveränderten

wirtschaftlichen Bedingungen - für 2005 geschätzten Verbrauch. Nur durch eine radikale Umstellung von fossilen Brennstoffen auf erneuerbare Energien, verbunden mit einer grundlegenden Verbesserung der Energieausbeute, kann dieses Ziel in greifbare Nähe rücken. Ein wichtiges Element wäre die Einführung einer Energie- oder CO_2-Steuer als wirkungsvollstes Mittel, die äußeren Kosten des Energieverbrauchs zu "internalisieren". Österreich wird eine solche Steuer jedoch nicht im Alleingang einführen. Eine gemeinsame Lösung auf Unionsebene, wie sie von der Kommission vorgeschlagen worden ist und gegenwärtig im Rat diskutiert wird, wäre eindeutig vorzuziehen.

Im Osten alles neu

Österreich ist vom Zusammenbruch des Eisernen Vorhangs unmittelbar betroffen. Der grenzüberschreitende Verkehr - und vor allem der Straßenverkehr - hat sich (natürlich von einem relativ niedrigen Niveau aus betrachtet, wenn man als Vergleichsgrundlage das letzte "normale" Jahr der alten Weltordnung, 1988, nimmt) verdoppelt oder sogar verdreifacht. Außerdem haben erhebliche Wanderungsbewegungen - insbesondere im Großraum Wien, der jahrzehntelang einen geringfügigen, aber konstanten Bevölkerungsrückgang zu verzeichnen hatte - die langfristigen demographischen Trends umgekehrt. Folglich mußten neue, ehrgeizige Wohnungsbauprojekte in Angriff genommen werden. Diese Entwicklungen werden den Energieverbrauch sicher nicht unerheblich in die Höhe treiben.

Von diesen direkten, aber insgesamt eher marginalen Auswirkungen einmal abgesehen, profitiert Österreich deutlich von den neuen Marktwirtschaften und der Intensivierung des Handelsverkehrs, selbst wenn einige Teilbereiche - z.B. Textilien und Zement - aufgrund von Billigimporten aus unseren östlichen Nachbarländern erheblich unter Druck geraten sind. Im Energiebereich ist das System der Im- und Exporte aus den bzw. in die ehemaligen Comecon-Staaten jedoch erstaunlich gut intakt geblieben; eine nennenswerte Ausnahme bilden lediglich die Importe von Ausgangsstoffen für die Raffinerie Schwechat: Solange sie für russisches Rohöl künstlich niedrig gehaltene Comecon-interne Preise zahlen mußten, konnten ungarische und rumänische Raffinerien beim Verkauf von Ausgangsstoffen an den Westen ansehnliche Gewinne erzielen. Dieser Handel brach natürlich völlig zusammen, als Rußland rapide dazu überging, für seine Rohöllieferungen Weltmarktpreise zu berechnen.

Bei den Importen aus dieser Region überwiegen - was ihren Beitrag zur Versorgung Österreichs betrifft - Erdgas aus Rußland (ca. 5 Milliarden m^3 pro Jahr) und Steinkohle (Kesselkohle) aus Polen (1,5 Mio. t im Jahre 1993). Diese Importe basieren auf langfristigen Verträgen. Stromimporte werden normalerweise durch Exporte ausgeglichen, da sie auf Tauschverträgen ohne Ausgleichszahlungen basieren: Österreich exportiert in den Sommermonaten durch Wasserkraft erzeugten Strom und importiert dafür im Winter Strom aus Wärmekraftwerken.

Die vormals von bilateralen Kooperationsabkommen und regelmäßigen förmlichen Begegnungen im Rahmen der Arbeit gemischter Ausschüsse geprägten offiziellen Kontakte mit den im wirtschaftlichen Wandel begriffenen Staaten, wie den Staaten des ehemaligen Comecon oder "Ostblocks", sind jetzt, nach Anbruch der Ära der Demokratie, durch die Unterzeichnung neuer bilateraler Wirtschaftsabkommen auf eine angemessene Grundlage gestellt worden. Diese Abkommen sind so angelegt, daß sie mit Österreichs Mitgliedschaft in der Europäischen Union vereinbar sind oder, sofern sich aufgrund der Zuständigkeit der Union für die Handelspolitik Konflikte ergeben könnten, einfach zum entsprechenden Zeitpunkt auslaufen. Es gibt weder ständige Ausschüsse noch Arbeitsgruppen oder sonstige institutionalisierte Einrichtungen, die auf Energiefragen spezialisiert wären.

Förmliche bilaterale Kontakte auf Regierungsebene, früher eine Vorbedingung für geschäftliche Beziehungen, verlieren gegenüber den unmittelbar zwischen den Unternehmen abgeschlossenen Handelsverträgen an Bedeutung. Unternehmen der österreichischen Energiewirtschaft sind jetzt in den Nachbarländern Slowenien, Ungarn, der Slowakei und der Tschechischen Republik sehr stark engagiert. Die Kontakte mit anderen ehemaligen Comecon-Staaten entwickeln sich auf Unternehmensebene entsprechend langsamer.

An dieser Stelle muß nicht viel über den relativ schlechten Zustand des Energiesektors in jenen Ländern gesagt werden. Oft ist dieser von geringer Effizienz, hohen Verlusten und erheblicher Luft- und Wasserverschmutzung gekennzeichnet. All dies ist hinreichend bekannt. Österreich, dem die Schadstoffe, die es "importieren" muß, besondere Sorgen bereiten, hat für die Nachbarländer einen Sonderfonds zur Finanzierung umweltfreundlicher Projekte eingerichtet, der unter der Bezeichnung "Öko-Fonds" bekannt ist. 1992 wurden aus diesem Topf 260 Millionen ÖS für Vorarbeiten im Rahmen energiebezogener Projekte, insbesondere für die Modernisierung von Kraftwerken, in der Tschechischen Republik, der Slowakei und in Slowenien zur Verfügung gestellt.

Es gibt jedoch kein spezielles Hilfsprogramm für den Energiebereich. Als kleines Land mit begrenzten finanziellen Möglichkeiten zieht Österreich es vor, sich vor allem an großen multilateralen Hilfsprogrammen und Institutionen zu beteiligen, etwa der Weltbank, der

Arbeit der G-24 und der EBRD - und jetzt natürlich auch an den TACIS- und PHARE-Programmen. Wir hoffen, daß über diese staatlich finanzierten Hilfsmechanismen hinaus die Europäische Energiecharta mit der Unterzeichnung des Charta-Vertrags wirklich wie vorgesehen dazu beitragen wird, in Osteuropa ein günstigeres Investitionsklima zu schaffen, und dies zu einer wirksamen Mobilisierung privaten Kapitals führt.
Es läßt sich auch feststellen, daß - unabhängig vom offiziellen Beitritt Österreichs zur Europäischen Union - der Oberösterreichische Energiesparverband seit Januar 1993 im Rahmen des Thermie-Programms das Energiezentrum in Bratislava betreibt.

Eine Gemeinsame Zukunft in der Europäischen Union

Es ist vielleicht verwunderlich, aber der Beitritt zur Europäischen Union, die wichtigste politische (und wirtschaftliche) Entscheidung für Österreich seit Jahrzehnten, wird auf unsere Energiepolitik nur begrenzte Auswirkungen haben. Es ist eine einfache Tatsache, daß durch die oben erwähnte notwendige "Internationalität" marktorientierte Strukturen und Verhaltensmuster geschaffen wurden, die schon mit denen in anderen Mitgliedstaaten vergleichbar sind. Außerdem sind alle Mitgliedstaaten auch Mitglieder der Internationalen Energie-Agentur und folglich denselben politischen Grundsätzen und "gemeinsamen Zielen" verpflichtet wie Österreich.
Als das Abkommen über den Europäischen Wirtschaftsraum am 1. Januar 1994 in Kraft trat, galten plötzlich zahlreiche Richtlinien und Verordnungen im Energiebereich auch für Österreich. Die erforderlichen - sehr geringfügigen - Anpassungen unserer nationalen Gesetze waren im Laufe des Jahres 1993 durchgeführt worden. Weitere Änderungen könnten aufgrund der nächsten Schritte zur Verwirklichung des Binnenmarktes auf dem Gebiet der netzgebundenen Energien erforderlich werden; nach unserer Auffassung ist der Binnenmarkt unter allen energiebezogenen Themen, die derzeit in der Europäischen Union diskutiert werden, das wichtigste - gefolgt von der Frage einer CO_2-Energiesteuer. Die EU-Programme für eine effizientere Energienutzung, zur Förderung der erneuerbaren Energieträger und der Entwicklung neuer Technologien - SAVE, Altener und Thermie - decken sich vollkommen mit unseren nationalen politischen Zielen, und das Konzept der transeuropäischen Netze im Energiebereich ist im Hinblick auf die Verbesserung der Infrastrukturverbindungen mit den Ländern Mittel- und Osteuropas von besonderem Interesse. Diese Verbindungen können auch dazu beitragen, den politischen und rechtlichen Rahmen der Europäischen Energiecharta mit wirtschaftlichen Leben zu erfüllen. □

DIE REVISION DES BERICHTS ÜBER DEN MARKT FÜR FESTE BRENNSTOFFE IN DER EU 1993 UND ÜBER DIE AUSSICHTEN FÜR 1994

Von Jeff Piper, GD XVII
Industrien und Märkte, Referat Feste Brennstoffe

Anfang Oktober 1994 veröffentlichte die Europäische Kommission die Revision ihres Berichts über den Markt für feste Brennstoffe (Steinkohle, Koks, Braunkohle und Torf) in der Gemeinschaft. Er enthält die von den Mitgliedstaaten übermittelten endgültigen Zahlen für 1993 und die Prognosen für 1994. Dieser Bericht ist gemäß Artikel 46 des EGKS-Vertrags erforderlich: Um allen Beteiligten Hinweise für ihre Tätigkeit zu geben und um ihr eigenes Handeln zu bestimmen, hat die Kommission Marktentwicklung und Preistendenzen zu untersuchen.

Aus dem Bericht geht hervor, daß die Nachfrage nach Energie 1993 insgesamt weniger stark zurückgegangen ist als erwartet, und zwar um 0,7 % statt um 1,0 %, was auf die Rezession innerhalb der Gemeinschaft zurückzuführen ist. Der allgemeine Rückgang der Industrieproduktion hatte erhebliche Auswirkungen auf die Nachfrage nach Energie, was sich vor allen Dingen bei den festen Brennstoffen sowie in geringerem Maße beim Öl bemerkbar machte. Die Nachfrage nach Steinkohle war 1993 ungefähr 10 % geringer als 1992, während die Nachfrage nach Braunkohle um mehr als 7 % zurückgegangen ist.

Gemäß den Prognosen für 1994 wird die Gesamtnachfrage nach Energie 1994 um etwa 1,1 % steigen; Stein- und Braunkohle sind die einzigen Energiequellen, bei denen mit einem Nachfragerückgang gerechnet wird. Der Marktanteil der festen Brennstoffe an der Gesamtnachfrage nach Energie wird für 1994 auf 19 % geschätzt - verglichen mit 24 % im Jahre 1990.

Bei der Nachfrage nach Gas wird mit einem erheblichen Anstieg gerechnet. Durch die Maßnahmen zur Umstrukturierung, Rationalisierung, Modernisierung und zur Verbesserung der Wettbewerbsfähigkeit der Steinkohleindustrie in der Gemeinschaft wird die heimische Steinkohleförderung auch weiterhin reduziert. Die Gesamtproduktion war 1993 mit 158,6 Mio. t geringer als erwartet; ein zusätzlicher Produktionsrückgang war im Vereinigten Königreich, in Spanien und in Frankreich zu verzeichnen. Für 1994 wird nunmehr mit einer ähnlichen Entwicklung gerechnet, mit einem stärkeren Rückgang als ursprünglich erwartet, auf etwas weniger als 133 Mio. t statt 139 Mio. t. Die weitaus größte Diskrepanz ergibt sich im Vereinigten Königreich, wo die ursprünglichen Schätzungen von 55 Mio. t nunmehr auf 49 Mio. t berichtigt worden sind, während die neuesten Zahlen für Spanien von 17,7 Mio. t. (statt bisher 18,5 Mio. t) sprechen. Die Zahlen für Deutschland sind geringfügig nach oben angeglichen worden.

Die Produktionszahlen für Braunkohle und Torf sind sowohl für 1993 als auch für 1994 von Deutschland, Frankreich und Spanien ebenfalls nach unten angeglichen worden. 1993 war die Produktion mit 298,5 Mio. t um ca. 3,5 Mio. t geringer als erwartet; die Prognosen für 1994 sind um mehr als 9 Mio. t auf 290 Mio. t herabgesetzt worden.

Für die Koksproduktion in der Gemeinschaft entsprachen die endgültigen Zahlen mit etwa 39,5 Mio. t den Voraussagen. Die neueste Schätzung für 1994, 38,7 Mio. t, weist im Vergleich zu den vorangegangenen Schätzungen einen geringen Zuwachs auf; trotzdem bestätigt sie den Abwärtstrend bei der Nachfrage nach Koks, der auf die Veränderungen in der Hochofentechnik (Verwendung von Einblaskohle) und auf die zunehmende Verwendung von Elektroöfen zurückzuführen ist.

Der Rückgang bei der Anzahl der im Jahre 1993 in der Gemeinschaft im Durchschnitt unter Tage Beschäftigten war größer als zuvor angenommen, es sind über 27.000 Arbeitsplätze verlorengegangen. Für 1994 wird damit gerechnet, daß erneut mehr

Arbeitsplätze verlorengehen als erwartet, nämlich über 15.000. Dadurch wird ein neuer Tiefststand von etwas mehr als 110.000 erreicht.
Die Produktivität wächst weiter. Dies ist eine logische Konsequenz aus den in allen kohleproduzierenden Mitglied-staaten angewandten Umstrukturierungs-maßnahmen, die auch eine Schließung der unwirtschaftlichsten Zeche vorsehen. In der Gemeinschaft insgesamt ist die Produktivität stärker gestiegen als erwartet: 1992 förderte ein Untertagearbeiter 703 kg pro Stunde, 1993 waren es 777 kg, und für 1994 ist eine Steigerung auf etwa 800 kg möglich.

Aufschlüsselung auf der Grundlage der Schätzungen der Stromwirtschaft

	1993		2000	
	GW	%	GW	%
KERNKRAFT	105	23,1	113	21,3
HERKÖMMLICHE WÄRMEKRAFT:	261	57,4	322	60,5
Einfachbrennstoffkessel				
Kohle	63	13,8	69	13,0
Braunkohle	32	7,0	29	5,4
Öl	49	10,7	40	7,5
Erdgas	29	6,3	88	16,5
Vielfachbrennstoffkessel				
Kohle	73	16,0	78	14,7
Andere	16	3,6	18	3,4
WASSERKRAFT	83	18,3	88	16,5
ANDERE	5	1,2	9	1,7

Bei den Steinkohlelieferungen in der Gemeinschaft war 1993 ein stärkerer Rückgang zu verzeichnen als ursprünglich erwartet. 1992 betrugen die Lieferungen noch 314,4 Mio. t, 1993 sanken sie auf 272,8 Mio. t; das sind fast 3,5 Mio.t weniger als erwartet. Die Zahlen für 1994 mußten ebenfalls nach unten korrigiert werden, auf 255,8 Mio. t statt 259,6 Mio. t. Dies wäre der bisherige Tiefststand in der Geschichte der Gemeinschaft.
Während für den allgemeinen Rückgang beim Steinkohleverbrauch die Elektrizitätsindustrie und in geringerem Maße die Kokereien verantwortlich sind, mußten die Zahlen vor allem aufgrund gesunkener Lieferungen an andere Industrien nach unten angepaßt werden; diese Entwicklung ist nicht nur auf die Schwäche der Wirtschaft und folglich der Industrie zurückzuführen, sondern auch auf die niedrigen Preise für alternative Brennstoffe wie Erdölprodukte oder Petrolkoks.
In dem Bericht steht ferner, daß beim Verbrauch die stärksten Rückgänge voraussichtlich in den wichtigsten steinkohleproduzierenden Ländern der Gemeinschaft zu verzeichnen sein werden. Ohne das Vereinigte Königreich würde der Trend für 1994 allerdings wahrscheinlich einen geringfügigen Zuwachs der Nachfrage aufweisen.
Da der Bericht betont, daß der Elektrizitätssektor nach wie vor der Motor für die Nachfrage nach festen Brennstoffen ist, wird auch die geplante Nettoerzeugungskapazität in der Europäischen Union für die Jahre 1993 und 2000 kurz untersucht. Aus der Untersuchung geht hervor, daß die größten Kapazitätsschwankungen bei den konventionellen Wärmekraftwerken und insbesondere bei den gasbefeuerten Kombikraftwerken zu erwarten sind.
Der Bericht betont, daß die Verwendung von Erdgas zwar deutliche Vorteile mit sich bringt - es ist weniger kapitalintensiv, die Schadstoffemissionen sind geringer und der Energie-Wirkungsgrad ist höher -, aber auch Nachteile, da der Erdgasmarkt eher ein Regionalmarkt als ein Weltmarkt, mit einer geringeren Diversifizieriung bei den Zulieferern, ist. Die Erdgaspreise sind auch weitgehend an die Ölpreise auf dem internationalen Markt gekoppelt, d.h. an einen Markt, der wesentlich instabiler ist als der internationale Markt für Kesselkohle.
Bei den Einfuhren aus Drittländern verweisen die endgültigen Zahlen für 1993 mit 115,9 Mio. t statt der erwarteten 117 Mio. t auf einen stärkeren Rückgang als ursprünglich vorausgesagt. Dieser Rückgang von über 20 Mio. t im Vergleich zum Vorjahr war die logische Folge der geringeren Nachfrage nach Steinkohle und der umfangreichen Vorratshalden. Die Schätzungen für 1994 sind ebenfalls um fast 2 Mio. t nach unten, auf etwas unter 117 Mio. t, angeglichen worden, was noch immer eine geringfügige Zunahme im Vergleich zum Vorjahr bedeuten würde.
Bei den Lieferländern lag ein großer Teil des Gesamtrückgangs sowohl 1993 als auch 1994 in den Vereinigten Staaten. Die cif-Preise *(Kosten, Versicherung, Fracht)* für eingeführte Kesselkohle waren - ausgedrückt in USD - 1993 mit USD 44,80

pro t SKE im Vergleich zu USD 51,80 um mehr als 15 % niedriger als 1992. Durch die Aufwertung des Dollars gegenüber dem Ecu wurde diese Entwicklung jedoch zu zwei Dritteln wieder aufgehoben, so daß die Preise in Ecu 1993 um nur 4,4 % niedriger lagen.
Ausgedrückt in USD sank der Richtpreis für Kokskohleeinfuhren aus Drittländern 1993 um durchschnittlich 3 % im Vergleich zum Vorjahr. Ausdedrückt in Ecu ist er allerdings - wegen der Aufwertung des Dollars - um über 7 % gestiegen.

SCHLUSSFOLGERUNGEN

Der Bericht kommt zu dem Schluß, daß zwar der Anstieg des BIP der Gemeinschaft zu einem höheren Energiebedarf insgesamt führen dürfte, daß aber die festen Brennstoffe voraussichtlich der einzige primäre Energieträger sein werden, der von diesem Anstieg nicht profitiert, und der sich sogar stark rückläufig entwickeln könnte.
Der Steinkohleverbrauch wird wie bereits 1993 wahrscheinlich auch 1994 zurückgehen. Die gemeinschaftliche Förderung dürfte auch weiterhin rückläufig sein. Die Einfuhren könnten 1994 im Vergleich zu 1993 leicht ansteigen, aber sie werden deutlich unter dem Höchststand von 1992 bleiben. Die Haldenbestände bei Steinkohle könnten geringfügig abnehmen, werden aber bei über 110 Mio. t bleiben.
Der internationale Kohlemarkt hat sich nach dem Rückgang 1993 wieder etwas erholt, was vor allem auf die steigende Nachfrage auf den asiatischen Märkten zurückzuführen ist. ◻

VERGLEICH DER WICHTIGSTEN DATEN DES MARKTES FÜR FESTE BRENNSTOFFE (in Mio. t)

	1993 Voraus-schätzung	1993 Tats Ergebnis	1994 Voraus-schätzung	1994 jetzt	1994 jetzt/ Voraus.%	1994/93 (%)
STEINKOHLE						
Herkunft						
eigene Förderung	160,1	158,6	138,9	132,8	- 4,4	- 16,3
Wiedergewinnung	2,6	2,5	2,2	1,5	- 31,2	- 40,4
Einfuhren aus Drittländern						
Insgesamt	117,0	115,8	114,9	116,9	1,7	0,8
Lieferungen:	279,8	277,1	256,0	251,2	- 1,9	- 9,3
Kokereien						
Verstromung*	53,1	52,5	50,8	51,1	0,6	- 2,5
Sonstige	181,0	182,5	168,0	167,3	- 0,4	- 8,3
Ausfuhren nach Drittländern	41,5	37,9	40,8	37,4	- 8,5	- 1,4
Insgesamt	0,3	0,4	0,3	0,3	14,6	19,9
	275,9	273,2	259,9	256,1	- 1,5	- 6,3
KOKS						
Herkunft						
eigene Produktion	39,7	39,4	38,1	38,7	1,5	- 2,2
Einfuhren aus Drittländern						
Insgesamt	2,0	3,1	2,0	3,4	73,1	9,8
Lieferungen	41,8	42,5	40,1	42,1	5,0	- 1,1
Stahlindustrie						
Sonst. Lieferungen innerh. der Gemeinschaft	36,3	37,1	35,2	36,9	4,6	- 0,8
Ausfuhren nach Drittländern	5,1	4,8	4,9	4,2	- 12,7	- 10,8
Insgesamt	0,6	0,7	0,6	0,9	52,1	20,5
	42,1	42,6	40,7	42,0	3,2	- 1,5
BRAUNKOHLE UND TORF						
Herkunft						
eigene Produktion und Einfuhren	305,2	301,5	303,0	293,2	- 3,2	- 2,8
Lieferungen						
Brikettfabrikanten	46,2	47,7	45,5	40,7	- 10,6	- 14,8
Verstromung	235,4	233,8	237,3	233,5	- 1,6	- 0,1
Sonst. (einschl. Ausfuhren nach Drittländern)						
Insgesamt	23,5	20,0	20,2	19,0	- 5,7	- 5,0
	305,1	301,5	303,0	293,2	- 3,2	- 2,8

(*) Zahlen z. T. gerundet
* einschließlich industrieller und Zechenkraftwerke

EIN BESSERES IMAGE FÜR DEN ÖFFENTLICHEN PERSONENAHVERKEHR : UNSERE ANTWORTEN AUF DIE ÖKOLOGISCHEN HERAUSFORDERUNGEN - FÜR MEHR LEBENSQUALITÄT IM STADTBEREICH

Die Verbindung von Verkehrs-, Umwelt- und Energiefragen, Die Rolle des öffentlichen Nahverkehrs - Budapest, 31. Mai - 1. June 1994

Dieser Beitrag basiert auf einer Rede von G. Molina, GD XVII
Direktion Energietechnologie

DER AUTOR DANKT SYLVAIN DE ROYER FÜR SEINE UNTERSTÜTZUNG

Der Verkehrssektor spielt in modernen Wirtschaftssystemen eine zentrale Rolle, denn er bestimmt die Mobilität von Personen und Gütern. In der Europäischen Gemeinschaft leistet das Verkehrswesen einen wesentlichen Beitrag zur Vollendung des Binnenmarkts. Allerdings hat dieser Bereich auch einen zunehmenden Anteil am Energie-Endverbrauch und an den Schadstoffemissionen (32 % der Energie-Endnachfrage in der EG, 22 % der CO_2- und 57 % der NOx-Emissionen). Auch ist er fast völlig von importierten Mineralölprodukten abhängig. Dies stellt die Energieplaner aus Sicherheitsgründen, die Stadtplaner aus Umweltgründen vor eine große Herausforderung. Die derzeit im Straßen- und Luftverkehr zu beobachtenden Trends deuten auf sich noch verstärkende Engpässe und Verspätungen hin, auf Umweltverschmutzung und gesundheitliche Gefährdungen, auf unwirtschaftlichen Energieverbrauch und allgemeine wirtschaftliche Verluste.

Wenn wir uns den Zusammenhang zwischen Verkehr und Energieverbrauch näher ansehen, fallen zwei Dinge besonders auf. Erstens ist in diesem Bereich der Straßenverkehr für über 78 % des Energieverbrauchs verantwortlich, und zweitens ist der Pkw, der 70 % und mehr des Gesamt-Straßenverkehrsaufkommens ausmacht, der wichtigste Einzelverbraucher. Zwar wird der Kraftstoff-Wirkungsgrad der Pkw laufend verbessert, aber die dadurch erzielten Einsparungen werden durch das gestiegene Verkehrsaufkommen mehr als ausgeglichen. Hinzu kommt der derzeitige Trend zu größeren Pkw mit entsprechend höherem Kraftstoff-verbrauch, zu einer geringeren durchschnittlichen Fahrzeugbesetzung und einer geringeren Inanspruchnahme öffentlicher Verkehrsmittel. Es wird allgemein anerkannt, daß Maßnahmen, die darauf abzielen, die Nutzer privater Pkw zum Umsteigen auf öffentliche Verkehrsmittel zu bewegen, die einen höheren Energiewirkungsgrad haben, im Hinblick auf Energieeinsparungen und Umweltvorteile die wichtigste Chance überhaupt darstellen.

Die ständig zunehmenden Verkehrsstaus sind möglicherweise die größte Bedrohung für die innerstädtische Lebensqualität überhaupt. Schadstoff-emissionen sind gesundheitsschädlich und bewegen die Bewohner der Innenstädte zur Abwanderung in die Vororte. Dies führt zum verstärkten Einsatz von Kraftfahrzeugen in jenen Außenbezirken und folglich zu Verkehrsstockungen auf den Hauptarterien und Ausfallstraßen. Der konventionelle, straßenorientierte öffentliche Nahverkehr gerät in einen ähnlichen Teufelskreis: Längere Fahrzeiten veranlassen mehr Leute zur Benutzung von Pkw, was weitere Verkehrsstockungen zur Folge hat.

Aber es gibt Lösungen. Öffentliche Verkehrsmittel müssen in bezug auf Leistung und Qualität attraktiver und wettbewerbsfähiger werden. Auf nationaler, regionaler und lokaler Ebene muß dafür gesorgt werden, daß sich die Bürger ökologisch verantwortungsbewußt verhalten, indem sie öffentliche Verkehrsmittel benutzen.

Aus all diesen Erwägungen heraus muß etwas unternommen werden, um den Verkehrsfluß im öffentlichen Personennahverkehr zu verbessern. Einige technische Lösungen, die darauf abzielen, den städtischen Raum optimal zu nutzen, wie etwa Verkehrsbeschränkungen, Sonderspuren für Busse, Parkregelungen usw., sind bereits mit Erfolg angewandt worden. Vorschläge bezüglich der Dienstleistungsqualität und der Diversifizierung des Angebots sollten ebenfalls unterstützt werden, um verstärkt Investitionen zu fördern.

Wenn es uns gelingt, unser Ziel zu erreichen und den Anteil des öffentlichen Personennahverkehrs am Verkehrsmarkt zu vergrößern, wird sich auch die Gesamtsituation in den Städten in den Bereichen Mobilität, Energie und Umwelt verbessern.

UNSERE DERZEITIGE SITUATION

Eine der beunruhigendsten Fragen im Verkehrsbereich ist der zunehmende Anteil des Stadtverkehrs, und vor allem privater Pkw, an Energieverbrauch und Umweltproblemen wie etwa Luftverschmutzung, Lärm und Umwandlung öffentlicher Flächen zum Nutzen der Fahrzeuge.

Wir sollten beachten, daß der Energieverbrauch im Stadtverkehr in den vergangenen 15 Jahren viermal so schnell gestiegen ist wie im Außerortsverkehr und nunmehr fast 40 % des Gesamtverbrauchs in diesem Bereich beträgt.

Zwei Faktoren haben zum ständigen Wachsen des Verkehrsaufkommens beigetragen: die Ausdehnung der Stadtgebiete, in denen immer mehr Menschen wohnen, und der Anstieg des Lebensstandards. Die unmittelbaren Konsequenzen bestehen darin, daß immer mehr Haushalte mindestens einen Pkw besitzen, und daß die Pkw für immer kürzere Fahrten eingesetzt werden (20 % aller Fahrten sind kürzer als 1 km!).

Allzu lange ist in der Stadtentwicklung versäumt worden, zu berücksichtigen, daß innerstädtischer Raum sowohl begrenzt als auch teuer ist. Trotz zahlreicher Bemühungen und erheblicher Investitionen in den Straßenbau ist es nicht gelungen, die Verkehrsengpässe im Stadtbereich zu beseitigen: Das Verkehrsvolumen wächst schneller als die Kapazität des Straßennetzes, was schon jetzt eine Überlastung des zur Verfügung stehenden Raumes zur Folge hat. Dies führt zu Staus. Verkehrsstockungen sind die Ursache zweier zentraler Probleme für Busse (und für Straßenbahnen, wo sie nicht über eigene Spuren verfügen):

- Fahrten werden langsamer und sind häufig für die Fahrgäste weniger attraktiv, so daß weniger Leute öffentliche Verkehrsmittel benutzen und sich die Einnahmen verringern.
- Die Fahrzeiten verlängern sich, so daß mehr Fahrzeuge benötigt werden, um eine Verbindung in bestimmten Intervallen anzubieten, wodurch die Kosten steigen.

Wenn diese Kombination aus gestiegenen Kosten und einer gesunkenen Kundenzahl auf die übrigen Fahrgäste abgewälzt wird, ergibt sich daraus jener berühmte Teufelskreis, bei dem mehr und mehr Fahrgäste an andere Verkehrsmittel verlorengehen - zumeist, wie wir gesehen haben, an den privaten Pkw.

In einer Stadt mittlerer Größe ist der Pkw-Verkehr für 100 % der Blei- und Kohlenmonoxid-Konzentrationen, 60 % der Stickoxid-Konzentrationen und 80 % der Partikel-Konzentrationen verantwortlich.

Dieser Konflikt zwischen Stadtverkehr und städtischer Lebensqualität ist charakteristisch für eine Gesellschaft, die ständig in Bewegung ist. Zu diesem Thema sind jahrelang Forschungsarbeiten durchgeführt worden, und man hat verschiedene Problemlösungen entwickelt. Einige Städte haben sich durch Erzielen positiver Ergebnisse besonders profiliert.

Allgemein betrachtet verschlimmert sich die Situation jedoch weiterhin.

Die Sensibilität der Öffentlichkeit für Umweltfragen und die beunruhigenden Auswirkungen des Treibhauseffekts haben sich zu einem Katalysator für den dringenden Handlungsbedarf auf globaler Ebene entwickelt.

Es besteht ein allgemeiner Konsens darüber, daß sehr schnell gehandelt werden muß. Folgende Probleme müssen gelöst werden:

. Wie kann der Einsatz von Pkw in den Städten reduziert werden, wenn man gleichzeitig der Tatsache Rechnung trägt, daß die Pkw-Benutzung insgesamt ansteigen wird?

. Wie können wir jene bessere Umwelt schaffen, die von den meisten Bürgern erwartet wird - immer unter der Voraussetzung, daß dies nicht mit einer Beeinträchtigung der persönlichen Freiheit jener Bürger einhergeht[1]?

- Wie können die infolge von Verkehrsstockungen - insbesondere der Geschäftswelt und der Industrie - entstehenden Kosten reduziert werden?
- Wie können freie Räume geschaffen werden, die für den Einwohner und den Verkehr attraktiver sind?

Eine angemessene Antwort auf diese Fragen setzt mehrere Zugangsebenen voraus, die auf dem jeweils geeignetsten Verkehrsmittel beruhen. Man muß die mit der Mobilität einhergehenden wirtschaftlichen Vorteile im Auge behalten, gleichzeitig aber auch die Benutzung privater Pkw einschränken. Dem öffentlichen Personennahverkehr kommt hierbei eine wichtige Rolle zu. Er muß immer passendere Lösungen anbieten, um die Mobilität der Bürger zu gewährleisten.

WIE UND WO SOLLEN WIR HANDELN ?

Technische Lösungen zur Mobilitäts-sicherung in den Städten gibt es bereits; um sie zu verwirklichen, genügt es aber nicht, die breite Öffentlichkeit zu überzeugen; es ist unbedingt erforderlich, fest etablierten Pressure-groups entgegenzuwirken, deren Interessen nicht unbedingt mit denen der Gesellschaft insgesamt übereinstimmen. Es gilt schwierige politische Entscheidungen zu treffen, die sowohl großen Mut als auch die richtigen Überzeugungen voraussetzen.

Dieser Beitrag soll auf der Grundlage europäischer Erfahrungswerte einige der Strategien aufzeigen, die in

1 Der Kern des Problems ist tatsächlich die Frage der Anmerkung des Herausgebers: Eine völlige Quadratur dieses Kreises, der - wie so viele andere - persönliche Freiheitsrechte tangiert, wird niemals möglich sein!

Städten mittlerer Größe angewandt worden sind, um die Effizienz des innerstädtischen Verkehrs zu verbessern. Ferner soll er die wichtigsten Ergebnisse der durchgeführten Aktionen aufzeigen.

Hierzu gehören die **Fußgängerzonen**, die ein hervorragendes Beispiel dafür sind, wie die Innenstadt den Bürgern zurückgegeben werden kann. Derartige Maßnahmen haben sich bewährt, und sie haben viele positive Auswirkungen gehabt:

- Reduzierung des Energieverbrauchs: Wie wir gesehen haben, entfällt ein großer Teil der von Fahrzeugen verbrauchten Energie auf Kurzfahrten, 30-35 % der Stadtfahrten sind weniger als 2 km lang. Dies sind Entfernungen, die sehr gut zu Fuß oder mit Zweiradfahrzeugen zurückgelegt werden können. Nun ist erwiesen, daß ein Pkw beim Start und für die ersten paar Kilometer sogar doppelt oder dreimal soviel Kraftstoff verbraucht wie auf längeren Fahrten.
- Geringerer Straßenbelegungsgrad.
- Verringerung der Lärmbelästigung: Die Lärmbelästigung wurde in den Fußgängerzonen vieler Städte um ca. 15 % reduziert.
- Verbesserung der Luftqualität: Auf kurzen Fahrten mit kaltem Motor können sich die Schadstoffemissionen eines Fahrzeugs während der ersten paar Kilometer verdoppeln.
- Belebung des Einzelhandels: Solche Entwicklungen führen im allge-meinen zu einer Belebung des Einzelhandels mit einem Umsatzanstieg von durchschnittlich 30 %.
- Stadterneuerung: Längerfristig sind günstige Auswirkungen auf die Stadtplanung zu beobachten. Für einige Städte ist dies der Hauptgrund für die Schaffung von Fußgängerzonen. Die öffentlichen Anschubinvestitionen bieten einen wirkungsvollen Anreiz, privates Kapital für den Ausbau von Stadtteilen zu mobilisieren, eine weitere Verschlechterung der Wohnverhältnisse zu verhindern und jene Flächen neu zu beleben. Derartige Maßnahmen sind für Städte mittlerer Größe besonders gut geeignet.

Was die **Methoden zur Verbesserung des innerstädtischen Verkehrsflusses** betrifft, so ist bei der Betrachtung der Ergebnisse einiger dieser Techniken Vorsicht geboten, denn eine Verbesserung des Verkehrsflusses an einer Stelle kann anderenorts einen Anstieg des Verkehrsaufkommens zur Folge haben.

Tabelle 1 : Verkehrsmanagement im Bereich des öffentlichen Personennahverkehrs

Öffetlicher Personen-Nahverkehr	Trennung und Priorität	System der Operationellen Unterstützung	Benutzer-Information
- Carpool, Buspool, Vanpool, Fahrgemein-schaft	- Sonderfahrstreifen	- Automatische Regulierung nach :	- Informationen vor Fahrtantritt oder an ausgewählten Stellen in der Innenstadt (Fahrpläne, Quell- und Ziehaltestelle, Ankunft des nächsten Fahrzeugs
- Telefonisch	- Verkhersberuhigte straßen - Für öffentliche Verkehrsmittel und Fußgänger reservierte Straßen - Busspuren mit automatischen Leitsystemen - Vorrang für ferngelenkte Verkehrssteuerungssysteme	* Abfahrtszeit * auf der Anzeigetafel signalisierten Verfrühungen/ Verspätungen - Auf Zentraler oder lokaler Ebene eingeräumte selektive Priorität für öffentliche Verkehrsmittel - Zentrale Steuerung - Angaben über tatsächliche Fahrzeiten, Benutzer und Fahrpläne	- Anzeigetafeln an Bushaltestellen (Ankunft des nächsten Fahrzeugs) - Informationen währen der Fahrt (Wegstrecken, nächste Haltestellen) - Verbindung zum OAS zwecks Informationen über tatsächliche Fahrzeiten
* Car sharing in den USA * Hannover * Terni/Perugia (30% mehr Mobilität	Busspuren : Paris : 100 km Barcelona : 44 km Genf : 22 km Hamburg : 21 km	30-40 Unternehmen welweit	Zahlreiche Beispiele, vor allem in Frankreich
	Steigerung der Betriebsgeschwindigkeit	Reduzierung der Fahrzeiten Größere Zuverlässigkeit	Dienstleistungsqualität Gewinnung neuer Kunden

Eine **feste oder bedarfsorientierte (Echtzeit) Koordinierung von Licht-zeichenanlagen** führt zur Erhöhung und Homogenisierung der Geschwindigkeit und wirkt sich positiv auf die Fahrzeit und folglich auch auf den Energieverbrauch und den Luftverschmutzungsgrad aus.

- In der französischen Stadt Caen (150.000 Einwohner) ist es dank eines solchen Systems gelungen, fast 20 % der bis dahin in der Innenstadt verbrauchten Energie einzusparen. Diese Zahl verdeutlicht, daß die Durch-schnitts-ge-schwindigkeit der Fahrzeuge gestiegen und die Anzahl der Haltevorgänge gesunken ist, wodurch die durchschnittliche Fahrzeit um 28 % verringert werden konnte.
- In Orléans (110.000 Einwohner) verkürzten sich die Fahrzeiten dank einer bedarfsorientierten Koordinierungsmaßnahme, von der 58 Kreuzungen erfaßt werden, um 7 %, obwohl sich das Verkehrsaufkommen verdoppelt hat.

Ortsumgehungen dienen dem Schutz der Innenstädte: sie ermöglichen die Umleitung des Durchgangsverkehrs und eröffnen trotz größerer Entfernungen schnellere Verbindungen zwischen den einzelnen Stadtteilen. Diese Straßen bieten die Möglichkeit, die Innenstädte zu umfahren; die Umfahrung darf aber nicht zu weiträumig sein, da sie sonst an Attraktivität verliert. Der auf diese Weise gewonnene Raum ermöglicht Zeitersparnisse und folglich Kraftstoffeinsparungen für alle Straßenbenutzer.

Als Ergänzung zur Ortsumgehung ermöglicht eine **Aufteilung des Stadtzentrums** die Zugangsbegrenzung zur Innenstadt für Pkw. Gleichzeitig können die Zugangsmöglichkeiten für den öffentlichen Personennahverkehr verbessert werden. Die Lösung besteht darin, die Innenstadt in Einheiten aufzuteilen, die nicht direkt, sondern über eine Ringstraße miteinander verbunden sind. So können bestehende Direktverbindungen durch die Innenstadt für Pkw gesperrt werden, während nur Fahrzeuge des öffentlichen Nahverkehrs die Grenzen zwischen den Einheiten überschreiten dürfen.

So ist es zum Beispiel in Besançon gelungen, durch Schaffung solcher Verkehrs-einheiten den Pkw-Verkehr auf die Hälfte zu reduzieren. In Norwich hat sich dank der Entscheidung für diese Option ferner der Zugang zur Innenstadt für Fahrzeuge des öffentlichen Personennahverkehrs verbessert. Außerdem konnten Luftverschmutzung und Lärmbelästigung reduziert werden. Auch ist die Aufteilung, die lediglich eine Umstellung des Verkehrsleitsystems voraussetzt, eine der kostengünstigsten Methoden zur Einschränkung der Verkehrsströme.

Die Erhebung von **Straßenbe-nutzungs-gebühren** *im Stadtbereich* ermöglicht eine unmittelbare Beteiligung des Autofahrers an den externen Kosten (Unfälle, Luftverschmutzung,Lärmbelästigung, Straßen-benutzung). Diese sind zwar schwer zu quantifizieren, müssen aber an den Straßenbenutzer weitergegeben werden. Diese Methode ist allerdings vorerst wegen der für ihre Einführung erforderlichen Investitionen zur Lösung der Probleme europäischer Städte mittlerer Größe nicht geeignet.

Die **Begrenzung der Parkflächen** ist eine zusätzliche Methode zur Steuerung des Fahrzeugverkehrs. Sie kann folgende Formen annehmen:

- **Reduzierung der Anzahl der Parkplätze in der Innenstadt.** Hierdurch muß es möglich werden, den Gebrauch von Kraftfahrzeugen während der Stoßzeiten einzuschränken. Das Parken längs der Fahrbahn darf nicht zeitlich unbegrenzt und auch nicht unentgeltlich sein: Eine regelmäßige Überwachung ist erforderlich. Auf vorhandenen Plätzen müssen die Fahrzeuge auch für längere Zeit parken dürfen, aber die vorhandenen Kapazitäten sollten nach und nach eingeschränkt werden. Durch die Errichtung - auch unterirdischer - Parkbauten entstehen oft nicht nur Vor-, sondern auch Nachteile: Parkbauten sind teuer und sie ziehen weitere Autofahrer an. Den Pkw von Anwohnern muß bei der Vergabe von Parkplätzen (mit Hilfe von Aufklebern auf der Windschutzscheibe) Vorrang eingeräumt werden, um wieder mehr Anwohner in die Innenstädte zu locken bzw. eine Abwanderung von Anwohnern zu verhindern. Eine Begrenzung der Parkflächen in den Innenstädten vermag nur dann einen nachhaltigen Beitrag zur Einschränkung der Nutzung von Pkw in den Stoßzeiten zu leisten, wenn zugleich Maßnahmen ergriffen werden, um erstens den Zugang im Bereich des Stadtschnellverkehrs zu verbessern, was mit einer Verlagerung von Parkflächen aus der Innenstadt in die Vororte einhergeht, und zweitens die Verfolgung von Falschparkern zu intensivieren.
- **Umsteigen aus privaten Pkw in Fahrzeuge des öffentlichen Nahverkehrs dank der Schaffung preisgünstiger oder unentgeltlicher Pendlerparkplätze an den wichtigsten Terminals des öffentlichen Nahverkehrs in den Vororten.** Dies führt zu Energieeinsparungen, der "Verbrauch" von Raum im Straßenbereich wird reduziert, und Investitionen für teure Straßenbauprojekte können gesenkt werden. Die Parkgebühren sollten in höherem Maße mit dem Fahrpreis für die Weiterfahrt mit öffentlichen Verkehrsmitteln verbunden werden. Geschäfte und andere Einrichtungen müssen entwickelt und integriert werden, damit diese Parkflächen an Attraktivität gewinnen und Wartezeiten auch kommerziell genutzt werden können.

Tabelle 2 : Management der städtischen Ressourcen
(Neuorientierung der Funktionen der Innenstädte - gezielter Einsatz von Fahrzeugen)

Fuss-Gängerzonen	Aufteilun der Stadt in Zonen	Gebiete mit Zugangs-begrenzung	Verkehrsberuhigung	Parken : Infrastruktur und Verwaltung	Verkehrskontrolle
- Kleine Geschäftszentren - Für den Pkw-Verkher nich zugänglich - Zugänglich - nur für öffentliche Verkhersmittel	- Sektorale Abschottung zur Vermeidung von Stadtdurch-querungen	- Fläschen in Innenstadtnähe - zu bestimmten Tageszeiten für den Verkehr gesperrt	- Personen haben Vorrang vor Fahrzeugen - Fahrbahnmerkmale werden verändert, um den Verkehrsfluß zu verlangsamen	- Zugang zur Innenstadt nur für Fußgänger - Kontrollierte Parkflächen in Innenstadnähe - Park-and-ride-Systeme mit Anbindung an Stationen des öffentlichen Personennah-verkehrs - Neue Techniken der Parkflächen-verwaltung	- Erweiterte Verkehrszeichen-netze - Computer-gesteuerte lokale und zentrale Kontrolle - Ermittlung der tatsächlichen Fahrzeiten und Datenauswertung - Dynamische Strategien - Vorrang für öffentliche Verkehrsmittel
Deutsche Städte	Göteborg	40 italienische Städte	Delft, 10 deutsche Städte		Vereinigtes Königreich, niederländische Städte, Turin
	Weniger Lärm, weniger Unfälle, weniger Verkehr	Entfernung des Verkehrs, Reduzierung der Umwelt-verschmutzung	Lärm, Umwelt-verschmutzung und Verkehrs-geschwingidgkeit werden reduziert = 50% weniger Unfälle	Ile de France, Hamburg, Hannover	Steigerung der Verkehrs-geschwindigkeit, Vorrang für öffentliche Verkehrsmittel

Jede Strategie zur Regulierung und Begrenzung des Pkw-Verkehrs in den Innenstädten muß mit **Maßnahmen zur Steigerung der Effizienz** des öffentlichen Personennahverkehrs einhergehen.

Die Netto-Betriebsergebnisse vieler Betreibergesellschaften im Bereich des öffentlichen Personennahverkehrs sind unbefriedigend. Durch rigorose Kostensenkungsmaßnahmen ist es möglich, das derzeitige Niveau zu halten. Erfahrungen haben gezeigt, daß durch Einsparungsmaßnahmen im Energiebereich eine Hebelwirkung ausgelöst wird, durch die auch alle anderen Kosten gesenkt werden können. Folgende Maßnahmen können zur Erreichung dieses Ziels beitragen:

Durch *Maßnahmen zur Verbesserung des Netzbetriebs* wird einerseits der Energiewirkungsgrad des jeweiligen öffentlichen Verkehrsmittels verbessert, andererseits werden höhere Geschwindigkeiten erreicht, durch die sich die Attraktivität dieses Verkehrsmittels im Vergleich zum Pkw steigern läßt:

- *Die operationelle Unterstützung* ist ein System zur Fernortung von Bussen während des Betriebs. Es bietet die Möglichkeit, Verkehrsampeln an Straßenkreuzungen entweder automatisch oder von einer zentralen Leitstelle aus zu kontrollieren. Dieses System ermöglicht nicht nur regelmäßigere Verbindungen, sondern auch eine höhere Betriebsgeschwindigkeit und folglich Energieeinsparungen. In Lissabon sind mit Hilfe des *Gertrud*-Systems im Omnibusbereich Zeiteinsparungen von 20 % erzielt worden. Auch für den Pkw-Verkehr ist eine Koordinierung der Lichtzeichenanlagen von Vorteil: Durch automatische Aktivierung der Verkehrsampeln verringert sich die Anzahl der Haltevorgänge, was ebenfalls zu erheblichen Energieeinsparungen führt. In Städten, die ein solches System betreiben, konnten schätzungsweise 3-5 % des bisherigen Dieselkraftstoffverbrauchs eingespart werden.
- Im Interesse eines zügigeren Busverkehrs lassen sich auch durch Einrichtung von Busspuren Geschwindigkeitssteigerungen und Energieeinsparungen erzielen. Das größte Problem liegt darin, daß Autofahrer dazu neigen, Demarkationslinien bewußt zu ignorieren. Hier kommen zwei Lösungen in Betracht: Zwar lassen sich durch Schaffung von dem Gegenverkehr vorbehaltenenen Parallelkorridoren sofortige Geschwindigkeitssteigerungen erzielen (die

Benutzung einer derartigen Sonderspur durch einen regelwidrig handelnden Autofahrer, wie sie bei parallel verlaufenden Spuren eintreten könnte, ist hier ausgeschlossen). Aber diese Alternative bedeutet manchmal ein Sicherheitsrisiko für die Fußgänger. Außerdem können Busse, die sich in der dem übrigen Verkehr entgegengesetzten Richtung bewegen, nicht wie die Autofahrer von den aufeinander abgestimmten Verkehrsampeln profitieren. Die zweite Möglichkeit besteht in der Einführung von Busspuren, mit deren Hilfe sich die Betriebsgeschwindigkeit - verglichen mit den Verkehrskorridoren in Gegenrichtung - sogar verdoppeln läßt. Experimente haben gezeigt, daß eine Erhöhung der durchschnittlichen Geschwindigkeit (productivity speed) um einen Stundenkilometer Einsparungen von 2,5 bis 3 l Kraftstoff pro 100 km entspricht. Dank der Geschwindigkeitssteigerung können außerdem dieselben Fahrzeuge häufiger verkehren, was sich auf die Investitionskosten für rollendes Material positiv auswirkt.

Maßnahmen technischer Art ermöglichen ferner eine in bezug auf den Energieverbrauch wirtschaftlichere Nutzung der Fahrzeuge und leisten dadurch einen Beitrag zur Steigerung der Rentabilität des öffentlichen Personennahverkehrs. Die in diesem Bereich bestehenden Möglichkeiten lassen sich in drei Gruppen einteilen:

- Entwicklung besserer rechnergesteuerter Instrumente zur Kalkulation der Investitionen im Fahrzeugbereich auf der Grundlage optimaler technischer und wirtschaftlicher Kriterien;
- optimale Anpassung der mechanischen Merkmale von Fahrzeugen an die geplante Funktion;
- Erstellung wirtschaftlicher und vor allem präventiver Wartungspläne.

Schließlich muß betont werden, daß es oft schon genügt, einen Autofahrer in wirtschaftlichem Fahrverhalten zu *schulen,* um Kraftstoffeinsparungen von über 15 % zu erzielen. Hinzu kommen Einsparungen im Wartungsbereich und bei dem Verschleiß ausgesetzten Fahrzeugteilen wie etwa Bremsen und Kupplungen.

All diese auf eine größere Effizienz des öffentlichen Personennahverkehrs ausgerichteten Maßnahmen müssen unterstützt werden **von der Einsicht, daß es dringend erforderlich ist, das richtige "Image" zu entwickeln.**

All jenen Konzepten, die von Managern im Rahmen ihrer Marketingstrategien realisiert werden, und die man gemeinhin in die Rubrik "öffentliches Image" einstuft, ist Priorität einzuräumen.

Das "institutionelle Image" betrifft die Firma selbst. Zu diesem Bereich gehören unter Umständen auch das Bild, das die Öffentlichkeit von der betreffenden Firma hat, und der Glaube an

- die Zielsetzungen der Firma (Produkte, die sie auf dem Markt anbietet oder gerade zu entwickeln versucht);
- die Mittel, die zu ihrer Verfügung stehen, um dieses Ziel zu erreichen (Human- und Finanzkapital usw.);
- die von ihr zur Nutzung dieser Mittel angewandten Methoden (Personalmanagement usw.);
- andere besondere Merkmale, die sie aufweist.

Auf einer anderen Ebene geht es um das Image, das die Öffentlichkeit aller Wahrscheinlichkeit nach von den einzelnen Produkten haben wird, die diese Firma vertreibt, und für das jeweils Merkmale wie Preis, Nützlichkeit, Solidität, zuverlässiger Betrieb oder die Ästhetik des Designs ausschlaggebend sein können. Im Bewußtsein der Öffentlichkeit können mehrere oder alle Produkte einer Firma bestimmte Merkmale gemeinsam haben; in solchen Fällen sprechen wir vom Image einer Marke oder vom Image einer Produktpalette.

Die Imagegestaltung liegt hauptsächlich bei der Firma selbst. Wenn es dem öffentlichen Personennahverkehr gelingt, sein Image zu verbessern und seine Strategie auf ein erweitertes Dienstleistungsangebot auszurichten, wird es dem öffentlichen Personennahverkehr zweifellos gelingen, ein wichtiges Marktsegment zu erobern: das der *ungebundenen* Kunden.

Die Tabellen 3, 4 und 5 veranschaulichen die wichtigsten Merkmale des Aktionsplans zum öffentlichen Nahverkehr im Rahmen des THERMIE-Programms.

Drei Phänomene gehen aus den Ergebnissen dieser Studie hervor:

- Mehr und mehr europäische Städte mittlerer Größe sind immer stärker von Verkehrsproblemen betroffen. Und zwar aus einem ganz einfachen Grunde: In den eigentlichen Innenstädten ist einfach kein Platz mehr. Die Überlastung der Verkehrs- und Parkkapazitäten führt zu einer (nicht nur metaphorischen) Asphyxie und zum Stillstand. Daß eine physische Kapazitätserweiterung nicht möglich ist, führt oft zu katastrophalen Ergebnissen. Sowohl der Anspruch auf Mobilität von Personen und Gütern als auch der Schutz der Umwelt geraten in Gefahr. Aber es ist auch sicher, daß Lösungen gefunden werden können, wie einige konkrete Beispiele belegen.
- Die in Europa gesammelten Erfahrungen zeigen, daß heutzutage wirkungsvolle Strategien im Bereich des öffentlichen Personennahverkehrs auf dem Prinzip der Freiwilligkeit beruhen müssen. Ferner müssen sie parallel durchgeführte, koordinierte Strategien beinhalten, die sowohl den öffentlichen als auch den privaten Personennahverkehr umfassen. Den Städten stehen eine Reihe institutioneller und technischer Maßnahmen zur Verfügung, und zwar sowohl auf Straßenebene - durch Anwendung geeigneter

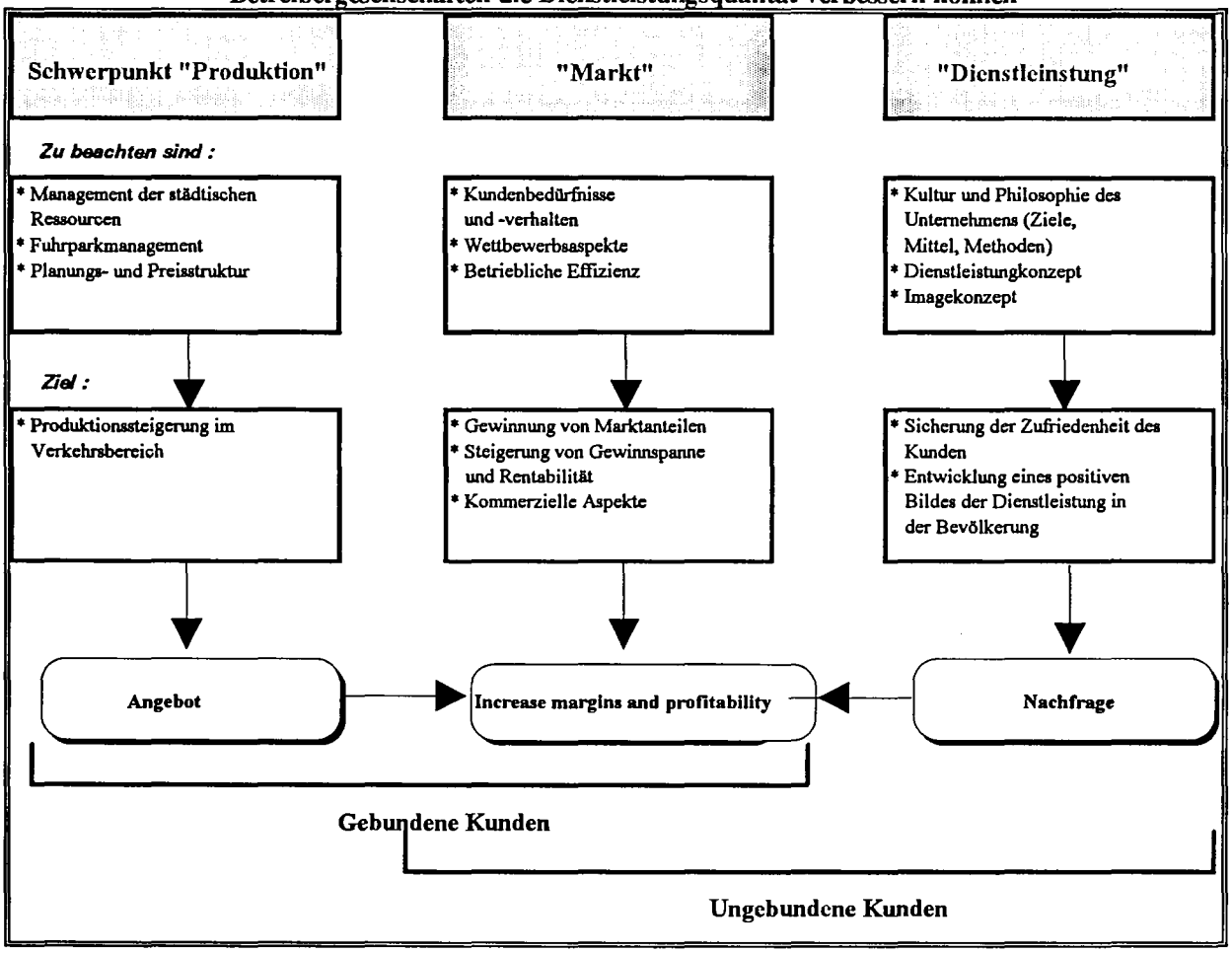
technischer Hilfsmittel - als auch im Bereich des öffentlichen Personennahverkehrs insgesamt.
Die Erfahrungen haben gezeigt, daß der Wirkungsgrad von Einzelinitiativen ungewiß und im allgemeinen eher gering ist, und daß Maßnahmen, die wirklich effizient sein sollen, parallel und koordiniert durchzuführen sind. Sie müssen sowohl den öffentlichen als auch den privaten Bereich umfassen. Das bedeutet, daß die notwendige Umstellung auf wirtschaftliche Verkehrsmittel nur gelingen kann, wenn weitere Schritte zur Beschränkung der Benutzung von Pkw unternommen werden.
Die Durchsetzung zusätzlicher Maßnahmen im Rahmen eines neuen Verkehrsplans hat zur Folge, daß die Benutzer ihre Gewohnheiten ändern müssen, und ist zumindest in der Anfangsphase für die Bevölkerung zweifellos nicht nur mit Annehmlichkeiten verbunden. Deshalb ist eine feste politische Basis eine Voraussetzung für das Gelingen dieser neuen Verkehrspolitik auf lokaler Ebene. Es ist wichtig, daß eine einzige Behörde die Befugnis erhält, technische Studien und Investitionsprogramme für den gesamten öffentlichen Personennahverkehr und den Verkehr im Einzugsbereich einer Stadt zu koordinieren. Die Einsetzung dieser Instanz muß jedoch von bestehenden lokalen Behörden gebilligt werden; die Zentralregierung und die Stadtverwaltung sollten zusammenarbeiten.

- Da erhebliche finanzielle Mittel auf dem Spiel stehen und die Bevölkerung gegenüber jeder auf dem Prinzip der Freiwilligkeit beruhenden Politik sehr sensibel reagiert, sollten die in Europa gesammelten Erfahrungen in stärkerem Maße propagiert und publiziert werden.
Es ist wichtig, daß die Städte in der Lage sein müssen, die konkrete Durchführung geplanter Maßnahmen selbst zu überwachen. In Anbetracht des Ausmaßes der Investitionen, die in vielen Fällen erforderlich sind, und der Empfindlichkeiten der Bevölkerung vor Ort müssen die lokalen Behörden die Auswirkungen der einzelnen Maßnahmen sehr gründlich auswerten.
Die meisten kleinen und mittleren Städte verfügen nicht über die Mittel, um präzise Informationen über die Verschmutzung der Umwelt einzuholen. Selbst die größten Städte sind nicht in der Lage, den Energieverbrauch im Verkehrssektor genau zu bestimmen.
Das internationale Ausmaß der stadtspezifischen Probleme ist mittlerweile so ernst und so deutlich sichtbar, daß es nicht länger angemessen ist, daß eine Stadt individuelle Lösungsvorschläge ausarbeitet, ohne sich darauf zu beziehen, was anderenorts getan wird.
Bandbreite, Komplexität und Kosten der zur Verfügung stehenden Lösungsmöglichkeiten sind so beträchtlich, daß es ein großer Fehler wäre, die in anderen, mit denselben Problemen konfrontierten Städten gesammelten Erfahrungen nicht zu nutzen.

THERMIE, EIN HILFMITTEL, UM DEN HERAUSFORDERUNGEN ZU BEGEGNEN

Das multisektorale Thermie-Programm, das von der Generaldirektion Energie verwaltet wird, dient der Förderung der verstärkten Nutzung neuer und innovativer europäischer Energie-technologien und der Unterstützung des Technologietransfers im Energiebereich innerhalb der Gemeinschaft. Im Zeitraum 1990-1994 erhielt das Programm von der Europäischen Union Fördermittel in Höhe von ungefähr 700 Mio. ECU. Durch finanzielle Unterstützung lassen sich die wirtschaftlichen und technischen Risiken überwinden, denen Projekte im Vorfeld des technischen Fortschritts ausgesetzt sind.
Innerhalb des Thermie-Programms liegt nunmehr ein besonderer Schwerpunkt auf "gezielten Projekten" in Bereichen, die derzeit noch nicht gefördert werden, oder in denen erhebliche technische Fortschritte zu erwarten sind. Diese gezielten Projekte setzen die Zusammenarbeit von Firmen bzw. Organisationen in mindestens drei Mitgliedstaaten voraus. Sie sind so konzipiert, daß sie erhebliche Auswirkungen auf den Energie- und Umweltbereich in der Europäischen Union haben werden.
Was den Verkehrssektor betrifft, so hat die Kommission erkannt, daß nennenswerte Energieeinsparungen im Stadtbereich nur mit Hilfe einer Verkehrsteilung zwischen privaten und öffentlichen Verkehrsmitteln erreicht werden können - und nur, wenn es gelingt, den Kraftstoffverbrauch zu verringern.
Deshalb wurden zur Lösung dieses Problems ausgewählte Projekte (*Jupiter, Entrance* und *Antares*) entwickelt, für die einige Schlüsselkriterien festgelegt wurden. Die einzureichenden Vorschläge werden sich auf städtische Gebiete und insbesondere auf Städte mittlerer Größe konzentrieren und sich mit der Verbesserung und Förderung des öffentlichen Personennahverkehrs befassen. Man wird Lösungen finden, um unter Einsatz der besten verfügbaren Technologie eine Reihe von Maßnahmen zu verknüpfen, um ein leistungsstarkes, voll funktionsfähiges System zu errichten. Zu den besonderen Schwerpunkten gehören auch eine Effizienzsteigerung im Energiebereich und eine Verringerung der Umweltverschmutzung. Die Abnahme der Verkehrsstockungen wird zur

Tabelle 3 : Förderung eines attraktiven Images für den öffentlichen Pesonennahverkehr : Wie die Betreibergesellschaften die Dienstleistungsqualität verbessern können



Verwirklichung dieses Ziels in erheblichem Maße beitragen.Dank der Entwicklung allgemein anwendbarer Modelle für Verkehrsmanagementsysteme im Stadtbereich und der Programme zu deren aktiver Verbreitung werden andere Städte erkennen können, welche Technologien ihren jeweiligen Bedürfnissen am besten gerecht werden (in den Mitgliedstaaten gibt es ungefähr 300 Städte ähnlicher Größe). Wegen des Umfangs der Projekte läßt sich ein breites Materialspektrum evaluieren; vielleicht wird es auch möglich sein, mit der Entwicklung gemeinsamer Spezifikationen für bestimmte Technologien zu beginnen, die dann überall in der EU zur Anwendung gelangen könnten.

Die äußerst wichtige zweite Ebene des Thermie-Programms betrifft Begleitmaßnahmen zur Förderung von Energietechnologien. In Anerkennung der Bedeutung dieser Maßnahmen schreibt die Thermie-Verordnung vor, daß bis zu 15 % der Gesamtmittel den Begleitmaßnahmen zugewiesen werden, hierzu gehören: Beurteilung des Marktpotentials für Energietechnologien; Überwachung und Evaluierung von Projekten; Verbreitung von Informationen über Energietechnologien und Ergebnisse von Projekten; unterstützung von und Zusammenarbeit mit geeigneten Institutionen auf nationaler, regionaler oder lokaler Ebene sowie industrielle Zusammenarbeit mit Drittländern.

Die Ziele der Vorhaben der Verbreitung entsprechen denen der "gezielten Vorhaben". Sie sind genau festgelegt:

- Verstärktes Umsteigen von privaten auf öffentliche Verkehrsmittel: Die Bürger sollen ermutigt werden, ihr Auto in der Garage zu lassen und öffentliche Verkehrsmittel zu benutzen. Dies betrifft natürlich die Verkehrspläne und die Parkmöglichkeiten, aber für die Betreiber selbst bedeutet es auch eine neue Dienstleistungs-qualität durch Einsatz neuer, wirtschaftlicher Verkehrssyssteme.
- Förderung einer klaren, gut angepaßten Politik des öffentlichen Nahverkehrs in Verbindung mit ausgewogener Stadtplanung zwecks Optimierung der zurückzulegenden Entfernungen und Reduzierung der Fahrzeiten.

Wenn es gelingt, dieses Ziel zu erreichen und einen weiteren Teil des Marktes im Bereich des öffentlichen

Personennahverkehrs zu erobern, läßt sich damit auch die Gesamtsituation in den Städten in bezug auf die Mobilität, den Energieverbrauch und die Umwelt verbessern. Außerdem werden die Verkehrsbetriebe vom Anstieg des Fahrgastaufkommens auch in finanzieller Hinsicht profitieren.
Die Zielsetzung des Thermie-Programms im Verkehrssektor klingt natürlich sehr ehrgeizig; es ist jedoch völlig realistisch, durch Verbreitung der im ersten Teil dieses Beitrags beschriebenen Maßnahmen zur Förderung des öffentlichen Personennahverkehrs beizutragen: All dies dient der Zukunft unserer Städte. Die Kommission ist entschlossen, im Rahmen des Thermie-Programms erhebliche Mittel zu investieren, um die sozioökonomischen Verhältnisse in den Städten zu verbessern. Diese Verhältnisse stehen natürlich in einem direkten Zusammenhang mit der Problematik der Energieeinsparung im städtischen Bereich.

Tabelle 4 : Verfügbare Mittel zur Effiziensteigerung im öffentlichen Personennahverkehr

Bessere Nutzung der städischen Ressourcens	Bessere Nutzung der städtischen Fuhrparks	Bessere Anpassung von Plannung und Tarifstruktur	Effiziente gesetzgeberische Massnahmen und Vorschriften
* Fussgängerzonen Aufteilung der Stadt in Zonen Zonen mit Zugangsbegrenzung Verkehrsberuhigung Park-fläschenmanagement * Verkehrskontrolle	Benutzerinformation System der operationellen Unterstützung Trennung und Priorität Diversifizierung im Verkehrsbereich	Raumnutzung Steuerliche Massnahmen Genehmigungserteilung nach Zonen Strassenbenutzungsgebühren in Stadtbereich	Organisation Finanzierung
* Neuorientierung in bezung auf die Funktion * Verbesserung der privaten Fahrzeugkontrolle	* Verbesserung des Fuhrpark-managements im öffentlichen Personennahverkehr	* Kontrolle der Stadtentwicklung * Einschränkung der Benutzung von Pkw * Finanzierung von Investitionsprojekten	* Förderung wirtschaftlich arbeitender Betreiber-gesellschaften * Aufbringung der für den Betrieb erforderlichen Mittel

der von THERMIE geplante integrierte Ansatz

DIE ZUKUNFTSAUSSICHTEN DES THERMIE-PROGRAMMS

Von Christine Jenkins, DG XVII
Direktion Energietechnologie

In unserer letzten Ausgabe wurde in dem Artikel Thermie am Scheideweg erläutert, in welchem Dilemma sich das Ende dieses Jahres auslaufende Thermie-Programm befindet. Der vorliegende Artikel umreißt, wie Thermie in Zukunft aussehen wird.

Sowohl das Programm als auch der Name Thermie werden auch nach Ende dieses Jahres fortbestehen. Das Programm wird jedoch - wie in unserer letzten Ausgabe vorausgesagt - nicht auf den ersten Blick wiederzuerkennen sein. Das neue Thermie-Programm wird nicht nur die im Vertrag über die Europäische Union, dem Vertrag von Maastricht, festgelegten Veränderungen auf dem Gebiet der gemeinschaftlichen Forschung, technologischen Entwicklung und Demonstration widerspiegeln; es wird auch geprägt sein von einem kohärenteren Umgang mit den Aktivitäten auf den Gebieten der Energiestrategieforschung, der Entwicklung, Demonstration und Verbreitung der Ergebnisse sowie von größerer Offenheit und aktiverer Zusammenarbeit mit den Mitgliedstaaten.

Wie erwartet werden die meisten Thermie-Aktionen nunmehr innerhalb des Vierten Rahmenprogramms im Bereich der Forschung, technologischen Entwicklung und Demonstration (FTE) stattfinden. JOULE-Thermie ist der übliche Name für das Programm Nichtnukleare Energien, das Forschung, Entwicklung, Demonstration und Verbreitung der Ergebnisse im Bereich der Energietechnologie miteinander verbindet. Das Programm wurde vom Rat "Forschung" am 29. September 1994 verabschiedet; die erste Aufforderung zur Einreichung von Vorschlägen wurde am 15. Dezember veröffentlicht. In den kommenden vier Jahren werden im Rahmen dieses Programms ungefähr 530 Mio. ECU für Thermie und 435 Mio. ECU für JOULE, das Programm der Europäischen Gemeinschaft für Forschung und technologische Entwicklung im Bereich der Energie, zur Verfügung gestellt.

Wie bisher geht der überwiegende Teil dieser Mittel an Projekte in den Sektoren rationelle Energienutzung (Industrie, Verkehrswesen und Gebäude), erneuerbare Energien und fossile Brennstoffe (Kohle, Öl und Gas). Die Kommission hat als Leitlinie für die Durchführung der neuen Aktionen mit Hilfe der Mitgliedstaaten ein Vierjahresprogramm ausgearbeitet.

Dieses Arbeitsprogramm umreißt eine globale Strategie zur Förderung der Energietechnologie auf europäischer Ebene: von der Forschung über Entwicklung und Demonstration bis hin zur Markteinführung. Zu den wichtigsten Zielen gehören:

- Verbesserung der Energie-effizienz im Nachfragebereich;
- Schaffung von Anreizen für die Durchsetzung neuer, sauberer und wirtschaftlicher Formen der Energieanwendung und -erzeugung am Markt;
- Schaffung von Anreizen für die Entwicklung erneuerbarer Energiequellen und für ihre Einführung auf europäischen Märkten;
- Verminderung der aus dem Verbrauch fossiler Brennstoffe resultierenden Schadstoffemissionen (insbesondere CO_2).

Das Arbeitsprogramm bildet auch die Grundlage der ersten Aufforderung zur Einreichung von Vorschlägen. Unternehmen, die sich im Rahmen des Thermie-Programms um Fördermittel für Demonstrationsprojekte bewerben möchten, werden hierzu in den nächsten vier Jahren vier Gelegenheiten haben. Zu diesen zählt auch die am 24. März 1995 auslaufende Aufforderung zur Einreichung von Vorschlägen. Für FuE-Programme wird es allerdings nur noch 1996/97 eine Aufforderung zur Einreichung von Vorschlägen geben.

Die Projekte werden durch begleitende Maßnahmen ergänzt. Hierbei handelt es sich einerseits um eine Fortsetzung gewisser Aspekte des Thermie-Programms, andererseits sind es neue Initiativen, um den wirtschaftlichen und ökologischen Herausforderungen der Gegenwart gerecht zu werden. So wird man mit den Maßnahmen zur Verbreitung von

Ergebnissen fortfahren, sich aber auf die Resultate der JOULE-Thermie-Projekte beschränken. Gleichzeitig werden neue Schritte unternommen, um den Zugang kleiner und mittlerer Unternehmen zu den neuen Technologien zu verbessern.

Organisationen, die an diesen begleitenden Maßnahmen teilnehmen möchten, können von offenen Ausschreibungen profitieren, die zumeist bis 1997 laufen.

Somit ist das neue Programm sowohl eine Fortführung der bisherigen als auch eine Einleitung neuer Maßnahmen. Es wird ferner von einer ausgeprägteren europäischen Dimension und von größerer Offenheit profitieren.

Dies bedeutet nicht nur, daß die Mitgliedstaaten an der Durchführung des Programms stärker als bisher beteiligt sein werden, sondern auch, daß Vorschläge nur von Konsortien entgegengenommen werden, an denen unabhängige Organisationen aus mindestens zwei Mitgliedstaaten beteiligt sind.

Unter diesen Umständen werden die ersten Verträge im Rahmen des neuen Programms voraussichtlich im Sommer 1995 abgeschlossen werden.

Aber die Geschichte des Thermie-Programms endet natürlich nicht mit der Demonstration und der sofortigen Verbreitung von Ergebnissen. Die Zukunft der internationalen Zusammenarbeit und die weitere Verbreitung von Energietechnologien sind allerdings noch ungeklärt.

Was diese Aspekte des Thermie-Programms betrifft, so müssen wir uns anderen Teilen des Vierten Rahmenprogramms zuwenden, nämlich den einzelnen Programmen für die Zusammenarbeit mit Drittländern und für die Verbreitung und Verwertung der Ergebnisse von Gemeinschafts-programmen. Bei diesen Programmen konkurrieren die Anträge auf Fördermittel für die Energietechnologien mit denen aus anderen FTE-Bereichen. Dies ist eine bedeutsame, anregende Veränderung gegenüber dem bisherigen Thermie-Programm.

Schließlich bleibt noch die Frage nach der weiteren Finanzierung von Verbreitungsvorhaben bzw. nach der Verbreitung der Ergebnisse nationaler, regionaler und privater Aktionen im Bereich der Energietechnologien (vormals Thermie-Aktionen, die nun jedoch außerhalb des Aufgabenbereichs des Vierten FTE-Rahmenprogramms liegen).

Der Vorschlag der Kommission, diese Aspekte des ersten Thermie-Programms durch ein zusätzliches Programm, Thermie II, mit einem Etat von 200 Mio. ECU weiterzuentwickeln und somit das JOULE-Thermie-Programm zu ergänzen, liegt noch auf dem Tisch des Ministerrates "Energie". Der weitere Weg dieses Vorschlags hängt davon ab, ob er vom Rat einstimmig angenommen wird. Das Europäische Parlament hat sich bereits einstimmig für den Vorschlag ausgesprochen und sogar angedroht, im Falle einer Ablehnung andere Vorgänge im FuE-Bereich zu blockieren. Der Rat "Energie" beschloß jedoch auf seiner Sitzung am 29. November 1994, daß sich der Ausschuß der Ständigen Vertreter erneut mit dem Vorschlag befassen solle. Deshalb ist bis zum 1. Juni 1995, wenn die nächste Sitzung des Rates "Energie" stattfindet, nicht mit einer endgültigen Entscheidung zu rechnen. Die Zukunft von Thermie II liegt also fest in der Hand der Mitgliedstaaten.

In der Zwischenzeit bereitet sich die Generaldirektion auf die mit dem neuen Thermie-Programm verbundenen Herausforderungen vor. Die Erwartungen sind hoch, aber es lohnt sich, ihnen gerecht zu werden. Die europäische Industrie hat es verdient. ◻

KONFERENZ ÜBER DEN OST-WEST-VERBUND IN DEN BEREICHEN GAS UND ELEKTRIZITÄT

Rede von C.S. Maniatopoulos
Generaldirektor für Energie, Europäische Kommission

EINE KONFERENZ UNTER DER SCHIRMHERRSCHAFT DES SYNERGY-PROGRAMMS DER GD XVII

Exzellenzen,
meine Damen und Herren,
im Namen der Europäischen Kommission freue ich mich sehr, Sie, verehrte Gäste, bei dieser Konferenz über den Ost-West-Verbund in den Bereichen Gas und Elektrizität willkommen zu heißen.
Diese Veranstaltung ist ein gutes Beispiel dafür, auf welche Weise die Generaldirektion Energie der Kommission darum bemüht ist, über ihr Synergy-Programm die Zusammenarbeit mit den Staaten Mittel- und Osteuropas und der GUS zu intensivieren.
Es ist uns eine Ehre, unseren Gastgeber, den auch für Energiefragen zuständigen ungarischen Industrie- und Handelsminister László Pál, hier zu begrüßen. Ich danke ihm für seine freundlichen Worte und für seine Unterstützung dieser Konferenz.
Die Teilnahme von Energieministern aus anderen Partnerländern Mittel- und Osteuropas und der GUS-Region zeigt, welch hohe Erwartungen an unsere Arbeit in den nächsten Tagen gestellt werden, und wir freuen uns, daß Sie gekommen sind.
Wir begrüßen auch die Vertreter der europäischen Energieerzeuger, insbesondere Eurogas und Eurelectric, die bei der Vorbereitung dieser Konferenz mitgewirkt haben.
Den internationalen Finanzeinrichtungen gebührt aufgrund ihrer langjährigen Verdienste um die Finanzierung von Energienetzen ein besonderer Platz in unserer Mitte.
Diese Konferenz findet zu einem Zeitpunkt statt, zu dem sich Europa und die Europäische Union selbst in Bewegung befinden.
Vor nur zweieinhalb Jahren haben unsere zwölf Mitgliedstaaten den Vertrag von Maastricht unterzeichnet, das Fundament für eine gefestigte Europäische Union auf der Grundlage einer verstärkten Integration im politischen, im Wirtschafts- und im Währungsbereich. Und in etwas über einem Jahr werden unsere Mitgliedstaaten bei der Regierungskonferenz 1996 weitere Schritte zur europäischen Integration unternehmen.
Die Regierungskonferenz von 1996 wird auch die Institutionen der Union auf ihre neue Rolle in einem größer gewordenen Europa vorbereiten. Nachdem die derzeitige Erweiterung 1995 Österreich, Finnland und hoffentlich auch Norwegen und Schweden in die Europäische Union führen wird, müssen wir uns darauf vorbereiten, neue Mitgliedstaaten aus Mittel- und Osteuropa willkommen zu heißen.
Wir wissen, daß Ungarn und Polen bereits offiziell an die Tür der Europäischen Union geklopft haben. Andere Länder werden ihnen mit Sicherheit folgen.
Gleichzeitig wissen wir auch, daß der Weg zur EU-Mitgliedschaft trotz erheblicher Fortschritte noch immer lang und manchmal hart ist. Die Industrie Mittel- und Osteuropas muß sich im europäischen Binnenmarkt behaupten. Die Regierungen aus Mittel- und Osteuropa müssen den notwendigen gesetzgeberischen Rahmen für die Zukunft schaffen. Und so weiter.
Die Europäische Union hat den Prozeß der Umstrukturierung Mittel- und Osteuropas und der GUS unterstützt und wird dies auch weiterhin tun. Die Union hat ihre Bindungen an diese Länder durch Europa-Abkommen, Handels- und Kooperationsabkommen bzw. Partnerschafts- und Kooperationsabkommen intensiviert.
Beim Dezembergipfel des Europäischen Rates in Essen wird die Union beschließen, ihre Beziehungen zu Mittel- und Osteuropa weiter auszubauen, insbesondere im Hinblick auf die Vorbereitung assoziierter Mitglieder auf eine Vollmitgliedschaft.
Aber kehren wir aus der Zukunft in die Gegenwart, zu unserer Konferenz, zurück.
Budapest ist als Konferenzort hervorragend ausgewählt, und das aus mehreren Gründen. Die Stadt liegt am Schnittpunkt zwischen Ost- und Westeuropa und auch zwischen Nord- und Südeuropa; das paßt wiederum sehr gut zum Thema unserer Beratungen: der Schaffung von Verbundnetzen. Budapest ist auch die

erste Stadt in Mittel- bzw. Osteuropa, in der die Europäische Union in einer positiven konzertierten Aktion mit der ungarischen Regierung eines Institution eingerichtet hat, die sich mit Energiefragen beschäftigt: das Energiezentrum Ungarn-EU.

Ich bin davon überzeugt, daß all dies die Teilnehmer dieser Konferenz heute und morgen bei ihrer Arbeit beflügeln wird.

Und nun wollen wir uns dem eigentlichen Thema der Konferenz widmen, dem Verbund von Energienetzen. Dies ist in der Tat einer der Eckpfeiler der Energiepolitik der Europäischen Union. Innerhalb der Union, wo wir noch immer viele "Lücken" haben, ist ein Verbund der Gas- und Stromnetze der einzelnen Mitgliedstaaten eine Conditio sine qua non für ein reibungsloses Funktionieren des gemeinsamen Energiemarktes. Verbundnetze fördern auch den wirtschaftlichen und sozialen Zusammenhalt der einzelnen Regionen der Union. Gleichzeitig haben sie positive Auswirkungen auf Arbeitsmarkt und Wettbewerbsfähigkeit. Ferner spielt die aus ihnen resultierende größere Effizienz eine wichtige Rolle für den Schutz unserer gemeinsamen Umwelt.

Im Rahmen unserer Beziehungen zu Mittel- und Osteuropa, den GUS-Staaten und natürlich auch anderen Ländern dient die Einrichtung von Verbundnetzen vor allem der Sicherung der Energieversorgung. Diese Interdependenz ist in der Tat eine raison d'être für die auf Betreiben der Europäischen Union von fünfzig Partnern - einschließlich der Union und aller Staaten Ost- und Westeuropas - unterzeichnete Europäische Energiecharta.

Die Charta steht am Anfang einer neuen Ära des Ost-West-Handels und der Zusammenarbeit im Energiebereich. Auf längere Sicht leistet sie einen Beitrag zum wirtschaftlichen Wohlstand unter Wahrung der Belange des Umweltschutzes.

Wir freuen uns, daß die Verhandlungen über den sogenannten Energiechartavertrag, in dem die gesetzlichen Verpflichtungen der einzelnen Partner über Fragen des Investitionsschutzes im Energiebereich sowie über Handels- und Transitfragen genau festgelegt sind, vor kurzem erfolgreich abgeschlossen wurden. Der Vertrag wird aus Anlaß des dreijährigen Bestehens der Charta im Dezember in Lissabon unterzeichnet.

Welch wichtige Rolle den transeuropäischen Netzen im Bereich der Energie (aber auch der Verkehrs- und Telekommunikationsinfrastruktur) innerhalb der Politik der Europäischen Union zukommt, zeigt sich darin, daß ihnen im Vertrag von Maastricht ein eigener Titel gewidmet ist.

Auch im Weißbuch der Europäischen Union von 1992 über Wachstum, Wettbewerbsfähigkeit und Beschäftigung spielen die transeuropäischen Netze im Rahmen der Strategie zur wirtschaftlichen Erholung in Europa eine entscheidende Rolle.

Diese Strategie ist bereits in Leitlinien über konkrete, förderungswürdige Projekte umgesetzt worden. Ich möchte hier auf die Mitteilungen der Kommission über Energienetze, sowie auf die Arbeit der sogenannten Christophersen-Gruppe verweisen.

Natürlich beziehen sich die meisten dieser Projekte auf Verbundnetze innerhalb der Europäischen Union. Nichtsdestoweniger wird von der Europäischen Union in ihrer internen Energiepolitik anerkannt, daß gewisse Verbindungen mit unseren mittel- und osteuropäischen Partnern wichtig und im beiderseitigen Interesse sind.

Dies ist der Grund dafür, daß die Union die Vorbereitung solcher Projekte von gemeinsamem Interesse - insbesondere anhand von Durchführbarkeitsstudien - fördern kann.

Maßnahmen zur Einrichtung von Ost-West-Verbundprogrammen im Energiebereich können auch von den speziellen Technische-Hilfe-Programmen der EU für Mittel- und Osteuropa profitieren, z.B. von SYNERGY, TACIS und PHARE.

Uns ist bewußt, daß für die Verwirklichung von Netzverbundprojekten beträchtliche Investitionsmittel benötigt werden, und die sind, wie wir wissen, in Mittel- und Osteuropa knapp.

Für die Finanzierung von Investitionen in diese Netze ist deshalb eine konzertierte Aktion mehrerer Partner erforderlich.

Die Europäische Union wird bei der Mitfinanzierung von Investitionen in Verbundprojekte zwangsläufig nur eine begrenzte Rolle spielen.

Ohne die Mitwirkung der internationalen Finanzeinrichtungen sowie der öffentlichen und privaten Hand würde sich die Finanzierung von Ost-West-Verbundnetzen im Energiebereich als schwierig erweisen.

Wir sind davon überzeugt, daß der Energiecharta bei der Intensivierung des Flusses von Investitionskapital über den europäischen Kontinent eine wichtige Rolle zukommt.

Wenn wir uns ein paar konkrete Ost-West-Projekte ansehen, die derzeit von der Europäischen Union gefördert werden, dann ergibt sich folgendes Bild:

Der Europäische Rat von Korfu (Juni 1994) hat das Projekt, die russischen Gasleitungen über Weißrußland und Polen mit denen der Europäischen Union zu verbinden, auf die Liste derjenigen Vorhaben gesetzt, denen besondere Priorität einzuräumen ist.

Im Rahmen von PHARE und TACIS sind Studien zur Untersuchung potentieller Ost-West-Verbindungen im Gas- und Elektrizitätsbereich erstellt worden.

Für den Gassektor werden darin Verbindungen der Europäischen Union mit Osteuropa einschließlich Rußland und auch - über den Balkan - mit Mittelasien angesprochen. Die potentielle Rolle der Erdgasfelder

unter der Nordsee und die Gasvorkommen im Norden Afrikas werden in diesen Studien ebenfalls berücksichtigt.

Im Elektrizitätsbereich konzentrieren sich die Studien auf die Vorbereitung östlicher Länder auf eine zukünftige Mitgliedschaft in der UCPTE. Auf dieser Konferenz werden die Ergebnisse der Studien genauer vorgestellt. Wir gehen davon aus, daß potentielle Investoren sich bei der Entscheidungsfindung an ihnen orientieren werden.

Wir wissen, daß die östlichen Länder auch schon selbst Schritte unternommen haben, um mit den Staaten, die wir in vergangenen Jahrzehnten einfach "den Westen" genannt haben, Verbindungen herzustellen. Wir wissen, daß vor kurzem der erste Spatenstich für den Bau der Gasleitung zwischen Ungarn und einem zukünftigen EU-Mitgliedstaat, nämlich Österreich, getan wurde. Dieses Projekt stärkt auch die Verbindungen zwischen dem wichtigsten Gaslieferanten, Rußland, und der Europäischen Union.

Zwischen der Ukraine, die - zusammen mit Weißrußland und der Slowakei - bei der Durchleitung von Gas in die Union eine besonders wichtige Rolle spielt, und Rumänien ist ein Verbund der Gasnetze in Vorbereitung; ebenso zwischen Griechenland und Bulgarien.

Im Elektrizitätsbereich haben die mitteleuropäischen Länder (Polen, Ungarn, Tschechische Republik und Slowakei) ihre Zusammenarbeit im Rahmen der Vorbereitung auf eine Mitgliedschaft in der UCPTE verstärkt. Die baltischen Staaten verhandeln derzeit mit ihren nordischen Partnern über einen Elektrizitätsverbund im Ostseeraum.

Exzellenzen,
meine Damen und Herren,

die Europäische Union und die Staaten Mittel- und Osteuropas sowie der GUS haben begonnen, ihre Beziehungen im Energiebereich zu intensivieren. Wir sind davon überzeugt, daß nur eine gemeinsame Einrichtung von Verbundnetzen allen beteiligten Partnern ein Höchstmaß an Vorteilen bieten kann. In der Tat liegt es in unser aller Interesse, unsere Energieversorgung zu sichern, unsere gemeinsame Umwelt zu schützen und für die Bürger Europas neue Arbeitsplätze zu schaffen.

Durch den Ausbau der Ost-West-Verbundnetze für Gas und Elektrizität werden unsere Beziehungen intensiviert - nicht nur im Energiebereich, sondern auch in politischer Hinsicht.

In diesem Zusammenhang möchte ich daran erinnern, daß auch bei der Europäischen Union mit dem Integrationsprozeß - vor über 40 Jahren - im Energiesektor begonnen wurde: durch die Europäische Gemeinschaft für Kohle und Stahl.

Jean Monnet, einer der Gründerväter der Europäischen Integration, hatte die richtige Vision: Um die Stabilität und den Frieden auf dem europäischen Kontinent zu sichern, müssen wir in ausgewählten Bereichen konkrete, gemeinsame Schritte unternehmen.

Ich hoffe, daß sich die Ergebnisse dieser Konferenz und auch unsere weiteren Arbeiten im Bereich der Gas- und Elektrizitätsverbundnetze zu einem solchen Schritt entwickeln werden, der uns hinführt zu einem besseren Europa.

NOTICE TO READERS

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Abbreviations and symbols

:	no data available
—	nil
0	figure less than half the unit used
kg oe	kilogram of oil equivalent (41 860 joules NCV/kg)
M	million (10^6)
t	tonne (metric ton)
t – t	tonne for tonne
toe	tonne of oil equivalent (41 860 kjoules NCV/kg)
fob	free on board
cif	cost-insurance-freight
MW	megawatt = 10^3 kWh
kWh	kilowatt hour
GWh	gigawatt hour = 10^6 kWh
J	joule
kJ	kilojoule
TJ	terajoule = 10^9 kJ
NCV	net calorific value
GCV	gross calorific value
ECU	European currency unit
USD	US dollar

EUR 10 Total of member countries of the EC before accession of Spain and Portugal in 1986

EUR 12 Total of member countries of the EC

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