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ENERGY IN EUROPE

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ENERGY POLICIES AND
TRENDS IN THE EUROPEAN COMMUNITY

FOCUS ON THE EAST

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NATURAL GAS IN EUROPE - THE UNAVOIDABLE FUTURE

Closing speech to the Conference on Natural Gas at Vilamoura, Portugal delivered by Commissioner Cardoso e Cunha, - April 1992

Ladies and Gentlemen,
I am sure you will all understand the Commission's satisfaction at taking part in the closing ceremony of this Conference.
In response to our invitation, the major European gas network operators, the representatives of European and non-European interests operating on our market and the national administrations of the Governments of the twelve Member States have met here for two days.
That is quite something. I doubt whether, in the short history of natural gas in Europe, a meeting has ever been held on such a scale.
I realize that our guests have come here largely out of curiosity at certain initiatives of the European Commission which now have a real chance of introducing a current of change in this important sector. I believe that it is important to explain why the Commission is taking such an initiative.

Indeed, the Commission is not an operator in gas, oil or any other form of energy, it does not stand for any particular kind of economic interest, but acts entirely impartially. Although it is an institution subject to public law, it also differs from national Governments which, with all due respect, are the natural product of parliamentary democracy, which exposes them to considerable influences.

All European Governments are influenced by the periods between two elections. This obviously makes the European market (the most sophisticated and most complex in the world) fragile, because the bodies most responsible for this great society and great market are naturally obliged to base their action on the limited period of two, three or at most four years between two parliamentary elections.

There is thus a risk in our society that vital decisions are essentially based on the short-term view; this is totally unacceptable in cases like this when dealing with important and far-reaching responsibilities affecting the whole continent.

It is here that the intelligence and wisdom of the founding fathers shows through, in interposing a body under public law - the European Community - between society and the Governments. The executive role of the Community was entrusted to the Commission, through a political process dependent on the results of national elections. It is thus without any fear of a 'democratic deficit' and with sufficient impartiality that the Commission is initiating certain discussions that would be quite out of the question if the initiative were limited to the national public authorities. The Commission does so in a spirit of responsibility and

fully conscious of its significance as a vehicle of change in a society such as ours in Europe.

The Commission cannot be accused of disruption. In fact, the Commission alone has the right to initiate proposals but it is not responsible for adopting them. Adoption of the Commission's proposals is the responsibility of the Member State Governments. If the Commission's proposals were incoherent or inappropriate, they would end up gathering dust in the Council's archives.

I should point out, however, that an overwhelming majority of the Commission's proposals are approved, sooner or later, by the Council of Ministers. This is a clear measure of the prestige that the Commission has succeeded in accumulating over nearly forty years, and naturally helps to assess the likelihood of Commission proposals becoming Community law.

That is why this debate is important today. It is of course why we have managed to interest the major operators whom I am honoured and pleased to see at this Conference.

It is not for me to tell a meeting of this kind, which collectively knows much more about natural gas than I do, about the peculiarities or features of the European natural gas network. I will endeavour to stick to the political aspect of network operation, not forgetting the special responsibilities of the operators and national regulatory authorities.

Natural gas is the 'in' energy and currently has a particularly high rate of penetration into European society as a result of three basic factors.

The first is the vitality resulting from a new direction or make-up of the market, which is likely very soon to evolve towards greater liberalization and greater competitiveness. I confidently predict that this will lead to a more dynamic market, to which all operators are sure to adapt without real difficulty.

The second factor affecting the penetration of natural gas in Europe is related to the worldwide concerns of environment policy.

And the third reason for stimulating the penetration of natural gas is greater diversity of supply. Europe's external supplies are about to be supplemented in two ways. First, by the appearance, or at least the prospect, of new fields to be exploited notably in Qatar, Nigeria and Iran; second, by the new economic regimes of two of the traditional main suppliers. I refer firstly to the states of the former Soviet Union and secondly to Algeria. These two markets, accounting for a significant proportion of European supplies, are currently evolving towards rules for commerce and finance that will place the whole strategy and tactics used up to now in gas negotiations on a completely different footing. You will have to review your entire experience in the light of this new development.

I shall try to explain these three chapters and the reasons for my belief that the two days of discussions at this conference will be a turning point in the evolution of European energy.

To begin with let us consider the internal market and the trend it has started. This is naturally an important opportunity for me to clarify the Commission's position and to justify some of the initiatives the Commission has taken over the past three years.

Let me explain that the Commission cannot and has no wish to be seen as the 'Big Brother' of European society. We aim to serve as part of a high quality administration, to analyse developments and trends affecting the sectors we work in, and we take great care on the political front (in view of the very delicate ties between the European institutions and the national governments) to use unambiguous institutional frameworks.

Let us not forget that any of the Commission's actions can be challenged by any operator before the Court of Justice in Luxembourg. This naturally places a special responsibility on the Commission. I should however point out that in most cases the Court upholds the Commission's decisions.

The implications of this are far-reaching as can be concluded from an analysis of Commission proposals on the basis of Community primary law.

The first basis of our work relates to the idea expressed here today by Dr Bergmann, what he calls the 'Magic Triangle'. In his view, and in that of the Commission, a balanced Community energy policy should be founded on *sufficient and secure energy supplies* (first angle of the triangle), under *economically satisfactory conditions* (second angle of the triangle) and a *reasonable compromise in relation to environmental constraints* (third angle of the triangle). I need not add anything to Dr Bergmann's analysis. The only thing I would say is that it is not so much a magic triangle as an intelligent triangle. The three conditions are subject to the action of public opinion through the political structures. Energy policy is not the result of balanced unanimity, but of an approach which should be guided by public opinion.

The second basis of our work is the internal market. The internal market is not in itself an objective of the Community. The Community's objectives are political and social, namely harmonious development of European society, balanced economic expansion, narrowing the gap between living standards in the Member States, and achieving closer relations between them. In order to achieve this we need to make the most of the complementary features of the national markets and make optimum use of available resources, both primary resources and those such as infrastructure and technology. We must also rationalize production, transport and distribution activities in all areas of the

economy. These are the objectives of the Community and of the Commission.

The internal market and Economic and Monetary Union are means of attaining those objectives. In this connection the internal energy market is clearly a subdivision of a more general discipline, the single European market. Its philosophy of freedom of establishment, competition and movement of persons, services, goods and capital, transcends the will, initiative, or even dogmatic or arbitrary attitudes of any national or Community politician.

We are working towards a goal which really cannot be reversed. It is unlikely that this framework will change in the near or distant future.

The Commission is well aware of the scale and complexity of the problems which it is raising. It wishes to ensure that the European natural gas network progresses in accordance with two principles:

First, stability and prosperity of the operating companies. There must be sound bases to enable the operators of the European energy sector to obtain a return on their investments.

But the second, equally important principle, is to find the right balance between producer and consumer interests within the philosophy of the internal market.

We have now made much progress as compared with the situation that prevailed in the Community three years ago, when it was often said that energy was simply not covered by the Treaty. We have taken great steps forward, but the Commission aims to maintain and step up the dialogue with industry, which has a more direct and possibly better understanding of the sector than we have.

I think the fact that this Conference is taking place and the form it has taken are a clear signal that industry has no reason to fear a dogmatic approach on the part of the Commission. The Commission has moved in step with the stimuli it has received from the sector, and dialogue ensures that these stimuli are taken on board. The actions of the Community institutions are clearly circumscribed by the rules of primary law to which we all subscribe.

Let us now look at some of the commercial customs and practices used in any market, especially a large one.

I do not wish my comments to be taken as a moral judgment. I am not here to point the finger at anyone. If I were in charge of one of the monopolistic European undertakings in the energy sector I would very likely do exactly as they do. I would exploit the circumstances of the market to obtain the best possible return on my investments. It is not therefore my intention to judge right from wrong.

I must point out, however, that protectionism is one of the growing pains in any sector of the economy; they all start off being protectionist. Protectionism is inherent in the establishment and development phase. Economic history shows this without a shadow of doubt.

Producers do not like the concept of competition. Even the most efficient, in all sectors of the economy, would prefer to work without competition. Only customers are interested in competition. So the level, the intensity and at times the aggressiveness of some opposition to attempts at liberalization should not surprise us.

The Commission maintains that protectionism is contrary to the general interest, because it involves risks to society. Here is a list of a few of these inevitable risks.

The first risk of protectionism is that the cost of inefficient management can be passed on to customers. All protected companies naturally tend to pass on the consequences of their own deficiencies to their consumers. When these inefficiencies are covered by State aid they are paid for out of public funds. This means that the public as a whole, even those who do not use the service concerned, pay these costs. This is unacceptable in Community terms.

The second risk is of technological and operational stagnation. The European gas networks cannot of course be accused of technological stagnation. Technically speaking, Europe has the best gas networks in the world, but in operational terms I have to say that there is stagnation, especially in commercial operations.

The third risk of protectionism is the incorrect assessment of commercial risks, since all protected companies tend to assess risks conservatively. This is perfectly natural; it would be surprising if they did otherwise.

The fourth risk of protectionism is that protected companies often tow the government line. This implies a number of disadvantages. Government intervention in management takes the form of political appointments of managers, sometimes incompetent, often chosen without any consideration of business sense and for the need to base the economic development of the enterprise on administrative, political or bureaucratic price fixing, without any relation to the real market. This unrealistic business policy leads to irrational adherence to all anti-competitive opportunities.

The fifth risk of protectionism is overdependence on or exaggerated development of certain commercial practices, which are legitimate but too rigid, such as 'take or pay' contracts or very long term contracts. A system of free competition would never have justified so high a percentage of operations being based on such inflexible contracts. This inflexibility runs counter to the harmonious development of the economy.

The sixth risk of protectionism is a general feeling among customers of distrust and insecurity, since they

have no way of judging the fairness of the commercial conditions imposed upon them.

The seventh risk is insufficient use of infrastructures as often happens in the case of gas pipelines, bearing in mind that these infrastructures are licensed by the company as a whole. There is no reason why they should not be used to obtain the highest rate of return, wherever possible.

Eighth, the natural, human and inevitable establishment of a climate of superiority and arrogance in relations between suppliers and customers, because these relations are unbalanced from the start.

The ninth disadvantage is suppliers' preoccupation with infrastructure matters. The European networks are above criticism as regards the technical quality of their infrastructure, but since they are often protected enterprises, other obligations to their customers, especially those related to their economic and commercial organization, take second place.

Finally, the establishment of a de facto dictatorship over customers, who are prevented from making a free choice of supplier. It is a basic right, and a democratic right demanded by society, even at some economic cost. Customers gradually become insensitive to any inadequacies in the supply since they have no experience of the merits or drawbacks of the alternatives.

The Commission is not making a moral choice, and does not set itself up as a judge of behaviour. The directives proposed by the Commission offer opportunities to those operators wishing to take advantage of them. Anyone wishing to maintain traditional systems for customer-supplier relations is free to do so. The Commission rejects any accusation of arrogance or interventionism. It is firmly convinced, however, that protectionism in European society is a risk that we should not and cannot afford to take. In line with the internal market, this principle is applied to all areas of social life in the Community. It is not peculiar to energy or to gas.

All sectors of European society in which there is still a strong protectionist component, including the common agricultural policy, must prepare for change, because change is inevitable. Anyone who thinks that a protectionist situation can be maintained indefinitely is deceiving himself. Given the impartiality of the Commission, and without any desire to interfere in the running of your business, it is our duty and our right to sound this warning.

Fortunately for them, the enterprises producing, transmitting and distributing energy are of a sufficient size, quality and intellectual level to wield considerable power. This power means that their opposition could delay the operational restructuring proposed by the Commission. I am nevertheless convinced that restructuring cannot be avoided.

It is a matter of timing. The whole thing might take six months or six years. I don't know. It has to do with the interplay of the powers involved and the ability to manage a change which is coming inexorably nearer.

I am also firmly convinced that action by an institution under public law such as the Commission must be governed by very strict principles. We cannot afford to become interventionists, nor have we the skills needed to run your business. Action by an institution under public law must be strictly limited.

In the first place it is for the institutions under public law to maintain balanced competition conditions and avoid discrimination in the concessions allowed by the national authorities.

Secondly it is for the institutions under public law to gradually harmonize the related sectors of the economy. Here I accede to an insistent request of the supply side. We must gradually harmonize taxation, standards and all the associated conditions of the market. It is a fair demand which we have an obligation to satisfy.

Thirdly, the public authorities must ensure that regulatory bodies exist and function, preferably controlled by market interests themselves.

It is also a duty of the public institutions to stop intervening in economics, to avoid interfering in the formation of prices or maintaining unbalanced conditions in the markets by the granting of exclusive rights or state aids.

The public authorities must remain vigilant regarding the security of installations.

Where the public authorities, or governments, are also shareholders in energy enterprises, they are duty-bound to act responsibly, using modern management rules and not becoming complacent. The main problem with public enterprises is that governments are usually complacent shareholders.

The seventh point is that public institutions must ensure transparency in their dealings with operators, whether they are customers or suppliers, respecting the need for reasonable periods to adapt, when adaptation is necessary for flexible and orderly reorganization.

Finally, they must be the final arbiters when the operators' direct methods are insufficient.

I can assure you that the Commission will not go beyond these rules. It naturally intends to accomplish its duties, taking account of its obligations under the Treaty, but without going too far. The Commission rejects accusations of bureaucracy or interventionism. On the contrary, the Commission considers that the fundamentally important thing is to abolish much existing legislation which offers too much protection to certain operators or makes the market unacceptably inflexible.

In summary, at this stage of the completion of the internal energy market, there is demand for gas.

Demand for gas is sure to grow. Potential supplies, or diversification of supplies, are very great. Europe has 70% of world reserves within its economic reach. When there is guaranteed demand and guaranteed supply, there is no reason, other than unacceptable meanness, to prevent the operation of the market. The market should operate as it does in other parts of the world. And operators which accept the rules of the game where there is a free market have no reason to refuse to do so in Europe.

I realize that this discussion raises difficulties which must be resolved. Three of the main objections raised to the innovative part of our proposal have been tackled: security of supply, the future for investments, and the position of small consumers. Neither party to the debate has yet been able to put forward arguments that convince the other.

The Commission honestly believes that within the context of a competitive and free market a satisfactory answer can be found to all the objections raised. We will continue talking, as is our duty. Nevertheless, through Community channels, we will do everything in our power to convince the legislators (the Council of Ministers and the European Parliament) as quickly as possible. We do not accept the idea that endless discussions can be an alternative to action, obstructing the necessary changes.

I do not wish to move on from the completion of the internal market without mentioning our efforts to promote harmonized development of the European networks, as a means of reducing the discrepancy in living standards between the regions of the Community.

The Commission, as part of its policies for the completion of the single market, is promoting the extension of the natural gas grid to outlying areas. It has been decided to grant substantial financial assistance from the Community's structural Funds to set up natural gas industries in Greece and Portugal, and to interconnect the British and Irish grids.

Other assistance for transmission and distribution infrastructure in less developed areas is under discussion. Similarly, loans could be granted by various Community institutions and other international financial institutions to underpin the efforts of the national and regional authorities and operators to promote the use of natural gas.

New forms of support for trans-European networks (funding of feasibility studies, low interest rates and loan guarantees) were adopted at the Maastricht summit in December 1991; natural gas transit projects will be able to take advantage of these favourable financial terms.

A word about the second factor influencing the penetration of natural gas - the environment. This is a challenge that none of us can shy away from: we all live on this planet and each of us, as we go about our daily business, has some influence on the environment.

In particular, we all consume energy and the production of that energy affects the environment.

On a world scale, some 80% of carbon dioxide emissions come from energy production, conversion or consumption.

The message is therefore a clear one: if we wish to have some influence on these matters, we have to resolve the energy issues.

We all know that the Community has agreed to the objective of stabilizing carbon dioxide emissions by 2000 at 1990 levels; this problem has to be solved at world level, although it may be too late to hope for the agreement of all those concerned; we have to rely on the influence of the European Community's good example.

Some months ago, the European Commission published its ideas on a strategy for attaining this ambitious target for CO2 emissions.

Obviously it was the CO2/energy tax that attracted most attention in the strategy, since it was new and controversial.

I should not want you to think that the tax is the only matter at issue. Certainly not! We have proposed a broad range of action, including stepping-up activities in the field of energy technology. Gas will derive most benefit from this, since it proves to be best suited to advanced combustion techniques, such as combined cycle, post combustion, catalytic combustion and the exchange of residual heat in small appliances. All these techniques add up to a substantial improvement in thermal efficiency. Consequently, the growing substitution of other fossil fuels by natural gas helps to conserve energy.

The third factor stimulating the growth of the gas market over the coming decades is the (admittedly still embryonic) new climate of cooperation and dialogue with the non-Community producing countries and with new transit countries.

Community relations with Norway have been strengthened with the recent signature of the economic agreement with the EFTA countries, which should be seen as a vehicle for greater integration and improved security for Community imports.

Looking east, I cannot forget the responsibility the Community has taken on regarding the transition to a coherent market economy in central and eastern Europe and the Commonwealth of Independent States.

The CIS and the central and eastern European countries rank among our political priorities and we are all aware of the need to step up efforts, not only on the European Energy Charter and its associated protocols, the Phare programme and the programmes for technical assistance to the CIS, but also in the context

of the OECD countries' activities, in which the Commission has a coordinating role.

Looking south, I am pleased to note that Algeria is interested in developing an additional opening into Europe, in the form of the western gas pipeline, crossing the Maghreb and the Iberian Peninsula. I am also pleased at Algeria's willingness to make hydrocarbon exploration and production accessible to foreign investment through intelligent partnership arrangements. Backup measures are being devised to develop cooperation with the Maghreb countries, as a contribution to much-needed stability in the region.

The potential new suppliers at the turn of the century will be Nigeria, Iran and the Gulf States. It is also particularly worthwhile monitoring the development of projects in those parts of the world. The Community will welcome any future progress that makes the Community market more accessible and facilitates trade in gas in any direction.

I do not wish to end without making a special reference to Portugal. Nobody in Brussels questions the importance of natural gas to Portugal. I am making every effort to ensure that Portugal is not the only Member State without a natural gas infrastructure.

The political support that Portugal can expect from the Commission is based on the fact that development of natural gas is in line with a significant number of Community policy objectives in Portugal, especially in the fields of energy, environment and support to small and medium-sized enterprises.

It is not always easy to promote or accelerate the necessary public funding. In the case of the Community financial contribution to the Portuguese gas project, the process has taken too long, and a number of obstacles have had to be removed. I am very pleased to hear that the last major obstacle was overcome just two days ago.

The use of natural gas in electricity generation will be another important advantage in relation to the present situation, not only because a more diversified range of fuels will be available and because it is the least polluting of all fossil fuels, but also for purely economic reasons. Natural gas allows lower investment costs and more flexible investment planning owing to the shorter leadtimes involved.

The economically viable size of gas-fired power stations is somewhat smaller than for other types, and so they can be built closer to consumer centres, thus limiting transmission losses. Natural gas is suitable for combined heat and power generation. In the case of Portugal, electricity generated from gas will make the seasonal variation in demand for natural gas more stable and will make the system more economical.

Everything is changing fast in the new Europe and the vitality generated by 1992 is already causing significant changes in the thinking of business and the public.

Producers, gas companies and consumers will all make a valuable contribution to this new structure we are building. The advantages in the future will certainly repay all our efforts.

The gas sector is not being asked to subscribe blindly to abstract changes nor do we intend our proposed change to become an end in itself. We maintain that a Community is exactly that, a common enterprise, in which no sector can be unaffected or exempt. Through competition we intend to ensure a measure of fairness and proper operation. As in political life, the only guarantee of stability is for everyone to take part. We defend democracy in our political institutions even when simplistic short-term arguments seem to support certain quasi-dictatorships in a particular sector. We would not be consistent if we abandoned the concept of competition or if we treated it as a product for export to the East only. The European economy and society have transcended this discussion of competition in the vast majority of sectors of the economy. We are also going to transcend it in the energy sector, especially in the gas sector. We want a gas industry that is prosperous and stable, but not at the price of anti-competitive practices, such as closed markets, exclusive rights clauses or administrative price fixing. That would run counter to the main European ideals and our principal objectives. We will remain respectful and considerate of one another and together will solve the problems of adaptation. The problems can and will be solved.

COMPLETION OF THE INTERNAL MARKET FOR ELECTRICITY AND GAS

BY Yvan Capouet, DG XVII
Task Force on Community Integration

On 22 January 1992 the Commission of the European Communities adopted proposals for Council directives aimed at completing the internal market for gas and electricity[1]. They are based on article 100A of the EEC Treaty which provides for a political dialogue with the European Parliament and the Council under the cooperation procedure.
The opening-up of the energy market is indispensable for the realisation of objective 1992. It will increase security of supply, will make European industries more competitive on the world market and will allow gas and electricity producers to optimise their performance.
The proposals forwarded to the Council are part of a progressive approach aimed at putting the internal energy market, defined by the Commission in 1989, into operation. They complete the directives adopted in 1990 and 1991 relating to the intra-European transit of electricity and gas and price transparency for industrial consumers.
The Commission's decision is the result of long and intensive consultation with national authorities and with all other interested parties.

BACKGROUND TO THE PROPOSALS

The Council has already adopted a number of directives which constitute a first step towards the completion of the internal market in gas and electricity.
The Directives on transit of electricity and gas[2] provide that each transmission utility shall facilitate electricity and gas flows required by other transmission utilities through its network, provided that reliability is not affected.
The Directive on price transparency[3] provides that electricity and gas utilities shall supply the rates they charge to all categories of customers to the Statistical Office.
This is a first step toward establishing an internal gas and electricity market. With a view to pursuing the work, the Commission, as early as September 1989, expressed its desire to review other possible measures, and in particular proposed consultations with all interested parties as part of its assessment of the desirability of third party access to European electricity and natural gas networks and the conditions under which such arrangements would have to be implemented.
As a result of these consultations, the current proposals pay particular attention to the characteristics of the electricity and gas markets and their development within the Community. They reconcile the technical management imperatives of the electricity and gas grids with greater scope for investment and enlargement of marketing opportunities.

1 *COM(91) 548 final.*

2 *OJ No L 313/30, 13.11.1990 and OJ No L 147/37, 12.6.1991*

3 *OJ No L 185/16, 17.7.1990*

PRINCIPLES OF THE PROPOSALS AND TIMING

The Commission's proposals are based on four general principles.

The first is the need for a phased approach. The internal market for electricity and natural gas should take shape over a period of time sufficiently long to enable the industry to adjust in a flexible and ordered manner to its new environment. This implies a step-by-step approach.

The first stage is of the implementation of the three directives already agreed. The second stage is the one now proposed, which the Commission would like to see enter into force on 1 January 1993, the date set in the Treaty for the completion of the internal market. As the energy sector is of vital importance to many other industrial sectors, lack of progress in this field would create problems in other areas.

A third stage will be defined in detail in the light of the experience acquired during the second. The Commission expects this stage to enter into force on 1 January 1996.

The second principle is that of subsidiarity. The Community must not impose rigid mechanisms, but rather should define a framework enabling Member States to opt for the system best suited to their natural resources, the state of their industry, their energy policies, and their regulatory practices.

The third principle is the avoidance of excessive regulation. The sectors in question are characterised by monopoly situations which call for a certain degree of regulation. Moves towards greater liberalization will undoubtedly make it necessary to introduce new regulations, although these will substitute for rather than supplement the existing ones, and will in many cases be more transparent.

On the institutional front, the Commission has opted for an approach based on Articles 57.2, 66 and 100a, since this provides for a political dialogue with the Council and the European Parliament, under the cooperation procedure. However, the Commission reserves the right to make use of all the powers conferred on it by the Treaty as and when appropriate.

CONTENT OF THE PROPOSALS

The proposals continue the liberalization process already initiated and introduce new agents of change while respecting existing structures.

They are based on the following elements:

- opening of electricity generation to competition;
- liberalization of the construction of transmission lines and gas pipelines;
- freedom of purchases and sales transactions, through a limited scheme of third party access to electricity and gas networks;
- a safety net to ensure that the safe operation of electricity and gas networks is not endangered;
- protection of small consumers against the risk of cross-subsidies;
- transparency of production, transmission and distribution activities of integrated electricity and gas utilities.

COMPETITION IN ELECTRICITY GENERATION AND SECURITY OF SUPPLY

Generation is the area in which competition in the electricity sector can develop the most quickly given the technical and economic constraints. It is therefore appropriate to allow access to the market for new entrants who wish to invest and compete with the existing producers.

It is proposed that Member States should create a regime for granting licences with a view to harmonizing conditions of access to the market for electricity producers. Proposals to ensure a competitive environment in exploration and production of natural gas and oil will be made shortly.

The opening-up of electricity generation should be achieved in a transparent and non-discriminatory fashion without hindrance to legitimate policy objectives of the Member States.

Accordingly, the proposals provide for intervention by the Member States at the following levels:

i) the definition of a number of criteria for generation installations regarding security, safety, environment and siting;
ii) the possibility of introducing a certain number of restrictive criteria as regards the nature of the primary source used, with a view to diversification;
iii) the possibility of making priority recourse to indigenous sources of electricity generation mandatory for up to 20% of needs;
iv) the priority use up to a certain degree of renewable energy sources or those using waste or cogeneration.

The proposals require the abolition of exclusive rights for the production of electricity.

In order to ensure that production capacity shall cover demand, the operator or the transmission system in any region is required regularly to review the balance between supply and demand and its future development. This review is to extend over a period sufficiently long to give early warning of prospective production capacity shortages and is to be made publicly available so that all parties, including consumers and distribution companies, as well as

existing and potential producers, shall be aware of the situation.

Against this background, the major buyers, distribution companies and large industrial consumers, will be able to decide on the best way to cover their needs. They can decide whether and to what extent to invest in generation capacity, or else to rely on short-term purchases, or again to contract for long-term supply with new investors.

In this way, the Member State and the transmission system operator are able to assess the overall adequacy of supply without overruling the buyers decisions which give shape to investments.

LIBERALIZATION OF ELECTRIC LINES AND PIPELINE CONSTRUCTION

Public or private operators should have the right to build lines so as to provide supplies to customers and obtain supplies in another region or another Member State, and to hook up their own lines to the interconnected system, provided that they meet non-discriminatory technical operational criteria.

To make this right of initiative effective, it is proposed that Member States set up a system for granting licences for the construction of electricity lines and gas pipelines, in order to harmonise the conditions for investors.

In the case of electricity, lines which directly connect a producer and a consumer while not being linked to the interconnected network are relatively unattractive, since the network offers the important advantages of flexibility and reliability. However, it is probable that new lines may prove attractive over short distances and, in the case of distribution networks, in areas which are new or being redeveloped.

The right of initiative to build lines does not alter the fact that the technical management of a network must be the task of a specific entity. On the contrary, it entails the laying down by that entity of non-discriminatory technical and operational criteria with which the owners of lines and of independent distribution networks must comply in order to be connected to the main network.

THIRD PARTY ACCESS

Development of competition in generation requires that independent producers must be able to transmit power to their own consuming installations, and sell it to their own subsidiaries or to third party customers. Such transactions will be carried out essentially via the interconnected network, on which it is indispensable that commercial freedom should be exercised in order to give real effect to competition in generation.

The proposals therefore stipulate that transmission and distribution companies shall offer access to their network at reasonable charges, within the limits of available transmission and distribution capacity.

The implementation of third party access will hence be the responsibility of the network operators.

Given the technical complexity and innovative nature of freedom of transactions in the electricity sector, it would be desirable for Member States to provide for a period of progressive adaptation and initially to restrict the use of the interconnected network to a limited number of undertakings which are the most suited to making use of it, that is to say, the large consumers and distribution undertakings.

For industrial undertakings, it is provided that the Member States may limit access by third parties to the electricity grid to large companies for the supply of sites with an (individual) annual consumption of over 100 GWh/year.

In this way, 400 to 500 industrial consumers would be concerned in the Community, in particular among the heavy energy-consuming industries: aluminium, cement, steel, chemicals, etc.

For gas, the threshold has been set at 25 million m3 per site. This threshold includes all sites using gas as a feedstock and is also adequate for the other large chemical industries. Other large users such as large steelworks are also concerned. For electricity generation, only power stations of 50 MW with an annual run time of 2000 hours or more are concerned. This means, in practice, that only base-load power stations will be involved.

Distributors shall be will be eligible who supply at least 3% of the electricity distributed in each Member State. For gas, the threshold has been fixed at 1% of national gas consumption. To avoid discriminating between distributors of different sizes, it is further provided that distributors may form purchasing consortia so as to reach the threshold. In total, a hundred or so distributors, individual or associated, would be eligible throughout the Community in each sector.

THE SAFETY NET

The three measures relating to limited access to the grid for third parties, the liberalization of production and the construction of lines, must be implemented in conditions of transparency and in a non-discriminatory manner, without endangering reliable technical network management. Efficient and secure operation of transmission and distribution systems could not be maintained without a single responsible management.

It is for Member States to designate the relevant transmission or distribution system operator in each

region or to delegate such designation to the undertakings having possession of the grids.

The term 'region' in this case means a geographical area appropriate to the management of the electricity network. In certain cases this may be the whole of a Member State, or smaller divisions, or even a region including parts of several Member States. It is not intended that the present structure should be affected by the directives.

Systems operators are to maintain, and to use every effort to further develop a secure, reliable and efficient system. They must cooperate with operators of other systems with which theirs is interconnected. They are to define the technical conditions for connection to their system of production installations (electricity generation plants or LNG facilities and gas storage facilities), consumers' systems, and lines or pipelines.

These are the essential requirements of the safety-net which must now be made explicit given the larger number of operators to be expected as a result of liberalization.

THE PROTECTION OF SMALLER CONSUMERS

The proposed directive does not provide for a procedure enabling final consumers below the eligibility thresholds to be granted access to the networks. Although the thresholds may be lowered in the third phase in the light of the experience required, there will in practice remain a *de facto* supply franchise at the distribution level in most cases.

It is therefore appropriate to allow Member States to regulate the relationship between captive consumers and their local supplier. Given the wide variety of distribution structures, Member States should be given as much leeway as possible for adapting the definition of the rights and public service obligations of the distribution company and the rights and obligations of the consumer to local circumstances and existing structures.

The captive consumer will benefit from the regulatory framework established by the Member State, in particular the rules governing the supply obligation. He will also benefit from the price control mechanisms applied by the Member State.

But above all, the main source of protection for the smaller consumer not eligible for TPA will lie in the possibility for his distributor to negotiate supply with different producers, thanks to TPA, and to pass on the benefit of this to the whole of his clientele.

In this way, there is no reason to expect distortion or discrimination between categories of consumers following the liberalisation of the electricity sector.

TRANSPARENCY

In order to harmonize the conditions within which electricity and gas undertakings operate, measures are proposed to separate the production, storage (in the case of natural gas), transmission and distribution activities of vertically integrated undertakings, whether public or private.

The Commission's approach is to require that these activities are performed in separate divisions. In addition, these divisions must publish separate accounts. In order to avoid, in this respect, different treatment of public and private undertakings, all undertakings are required to observe the standard accounting practice for commercial companies.

This will ensure that the accounts are established on a comparable basis, so that competition is fair, discrimination is avoided and regulatory or competition authorities can check that the tariffs charged for the provision of services which have some characteristics of natural monopoly are not abusive.

The proposed directives also improve transparency on a number of issues which are important for the overall economic efficiency of the electricity and gas systems. System operators are to report on the use made of the transmission capacity in the system and on its adequacy in relation to future needs. They are required to assess requests made by distribution companies and large users to use the networks. Above all, they develop and publish the basic elements used in setting the financial conditions for grid use. At the level of distribution companies, a form of indirect competition is introduced through the publication of reports on the quality of supply and the quality of service.

TAKE OR PAY ARRANGEMENTS IN THE GAS SECTOR

Existing Take or Pay (TOP) obligations need to be taken into account when liberalizing the natural gas market in order not to endanger the economic viability of existing gas companies. Existing TOP arrangements were agreed as a risk sharing mechanism between producers and gas companies, whereby gas companies guarantee to pay for a prefixed annual volume at the contract price, regardless of whether that volume is taken.

This was regarded as important, particularly in developing markets where no established market guaranteed the offtake.

The Commission has therefore proposed a special safeguard clause in the directive which allows a Member State, with the approval of the Commission, to take the appropriate measures in case one of its gas companies is faced with economic difficulties because of existing TOP obligations.

The completion of the internal market will change the economic circumstances of the gas industry. In a more competitive environment customers will be able to buy gas directly. Gas companies will have to take this new situation into account when entering into new TOP arrangements.

To the extent that gas merchandising companies will be able to market their gas anywhere in the Community, they will have many opportunities to capture new markets as demand is expected to grow significantly in the foreseeable future.

Under a TPA system, other ways of risk sharing can also emerge. Offtake guarantees can not only be given by gas companies but also by LDCs and large industrial users like power stations and feedstock customers, which have regular long-term offtake needs.

CONCLUSIONS

The Commission's purpose is to complete the internal market in energy. In order to do this it has to create a market in electricity and natural gas, i.e. an economic space within which buyers and sellers are able to deal with each other.

There is no reason to believe that the energy sector will not benefit from the kind of gains identified in the Cecchini reports. A situation where regional monopolies compete for the location of intensive energy consuming industries without due consideration for the practical opportunities of transporting energy is detrimental for the economy as a whole. Pricing the same electricity or the same gas differently on both sides of a border falls short of the economic optimum.

But, above all, the internal market is not a 'zero sum game' but a 'positive sum game'. By allocating risks in a different way, it will provide strong incentives for increased efficiency in the industry and more discipline in the choice and management of investments. It will enable a better balance to be achieved in the contractual relationship between suppliers and consumers. There will be more room for negotiation, more flexibility, more choice.

The internal market is not a threat to the existing structures and organisations, but a means to flexible problem solving, based on decentralised decision-taking by economic operators that will allow the Community to pursue a course of dynamic economic development in the energy sector.

COMMUNITY AID TO THE COAL MINING INDUSTRY

The Commission reports to the Council

Fossil fuels Directorate - Solid fuels Unit

On 11 November 1991, the Commission approved its 'mid-term' report on the implementation of Decision 2064/86/ECSC[1], establishing Community rules for Member States' aid to the coal-mining industry. Article 16 of this Decision stipulates that the Commission shall submit a report to the Council on the implementation of the Decision and any problems encountered, and propose any changes thought to be necessary.

Bearing in mind that, although such State intervention is defined as incompatible with the common market in coal in the ECSC Treaty (Article 4c), the overriding necessity to restructure the industry has justified the adoption since 1965 of a series of Community decisions whereby the Commission may authorize aid or subsidies on a transitional basis where the aim is to facilitate restructuring of the Community coal-mining industry while dealing with the social problems which would otherwise arise.

Decision 2064/86/ECSC, which expires on 31 December 1993, specifies that, for an aid to be authorized by the Commission, it has to contribute to at least one of the following objectives:

- improvement of coal industry competitivity in the interests of security of supply;
- creating new production capacity provided it is economically viable;
- attacking the social and regional problems related to developments in the coal industry.

It should therefore be noted that, under the present system of rules, simply maintaining the level of production is no longer considered a sufficient justification in itself for aid to the industry. This constitutes a significant tightening-up of Community policy.

The report at the outset distinguishes two types of State aid, according to, firstly, whether or not it is linked to current production and, secondly, whether the aid is direct or indirect.

On the basis of this distinction, the report then analyses both the quantitative and the qualitative development of all aid authorized since 1987 under Decision 2064/86/ECSC, and that authorized in 1986 still under the previous Decision.

The total amount of aid authorised at a Community level for current production rose from ECU 4 624 million in 1986 to ECU 4 954 million in 1990, i.e. an increase of 7% at constant prices. Over the same period, the average aid per tonne extracted rose from ECU 19.8 to ECU 24.8, a rise of around 25% at constant prices. This rise for the Community conceals substantial reductions in certain Member States.

Parallel to this purely quantitative country by country analysis, the report also sheds light on the increasing tendency of some Governments to resort to indirect rather than direct aid to current production. Indeed, while in 1986 indirect aid represented only 35% of the total, this had risen by 1990 to more than half.

More explicitly, the Commission notes that while aid, and other parallel measures, in certain Member States have been part of a modernization, rationalisation and restructuring process within the sector designed to lead either to a more competitive industry, or to its complete closure, in other States the measures taken did not always encourage the implementation of rationalization or restructuring programmes.

It is undeniable that the current aid framework has made possible the conditions for a thorough restructuring of the coal industry. But the level of current Community production costs underlines the need for restructuring to be extended to further coal-mining areas of Community, and to be carried out on an increasingly intensive basis. Compared with the world market price of about ECU 50/TCE[2], average production costs in 1989 were still ECU 145 in Spain,

1 *OJ No. L177 of 1.7.1986, p.1.*

2 *TCE = tonnes of coal equivalent.*

ECU 131 in Germany, ECU 98 in France, and ECU 87 in the United Kingdom.

The report then divides the difficulties encountered in implementing the current Decision primarily into three major areas: firstly, the difficulty of defining what payments are actually aid; secondly, to put an end value on such aid; and, thirdly, the delayed and often incomplete notification of aid by Member States which, in turn, makes it impossible for the Commission to adopt the necessary decisions promptly.

The report concludes with the Commission's stated opinion that Decision 2064/86/ECSC does not require amendment before it expires at the end of 1993. Great stress is put nevertheless on the need to intensify efforts to increase transparency, and to make further improvements regarding the presentation, budgetisation, and phased reduction of aid. In fact, the objectives of the Decision are still as valid today as when they were drawn up, and the Commission believes that the Decision continues to provide an appropriate framework for implementation of rationalization, restructuring and modernization measures for the sector.

For the future, improvement of coal sector competitiveness will still be the overriding priority, although the Commission recognizes that the world market price for coal certainly cannot be taken as a realistic cost target for Community production. The world price does not reflect such important criteria as security of supply or possible effects of long-term cost trends on the market. The Commission therefore believes that in any new aid framework which may follow on from the current Decision after it expires in 1993, it could be useful to define a reference price aimed at giving Community coal a more secure future sheltered from at least the most major uncertainties, while, at the same time, setting the upper limits of a reasonable security premium for indigenous production.

THE WORLD COAL PRICE OUTLOOK TO 2010

Publication of a report commissioned by DG XVII[1]

Fossil fuels Directorate - Solid fuels Unit

The subject of this study is to examine the likely price of coal imported into the European Community over the next two decades. This is in order to allow the Commission to be in a position to assess the competitiveness of Community coal production and thereby give some guidance in the planning of any new future Decision on State aid for the coal industry.

The author takes as his starting point the DG XVII report entitled 'Energy for a new century: The European perspective'[2] and, as this examined Community demand only, adds forecasts for other countries generated from the same macroeconomic and policy assumptions.

The main analytical tool used by the author is the widely-used international coal trade model 'World Coal Trade Expert System' (or WOCTES). This is a spatial equilibrium model in which buyers and sellers attempt to maximise their gains by buying as cheaply as possible and selling at as high a price as possible, subject to specific constraints such as transport costs, port capacity, supply diversity considerations etc. Demand for each country/region is equated to import demand (demand after taking into account domestic production and exports), and is simulated as a constant low-elasticity demand function, where a given percentage change in price results in a fixed percentage change in demand. This ensures that the exercise concentrates on the supply response of the market.

Coal supply from the major producers, on the other hand, is represented as a price-elastic linear function, the slope of which represents the rate of increase in the marginal cost as export supply is increased. For the minor producers, supply is taken to be inelastic and insensitive to international price levels: these producers always sell their entire exportable output.

The author examines both the thermal and coking coal markets in detail using this model and with the following assumptions;

- both markets are competitive,
- buyers will always choose lowest-cost supplies,
- buyers will not discriminate between suppliers.

For the thermal coal price range, the report examines three possible demand scenarios. Two of these correspond to those produced in the 'Energy for a new century' study: firstly, a very high demand scenario, and secondly, a conservation scenario, in which demand collapses after the year 2000.

In the first projection, coal demand is assumed to be unchecked by environmental concerns, whilst EC and Japanese domestic production rapidly contracts as protection is withdrawn. According to this scenario, sea-borne thermal coal imports are expected to exceed 400 mtce (million tonnes coal equivalent) in the year 2000 and 570 mtce by 2010. This compares with a level of 150 mtce in 1989.

The demand collapse scenario assumes a strongly growing economy, in which a rapid rate of capital stock turnover allows dramatic improvements in energy efficiency and, together with increasing concerns about the greenhouse effect, forces energy consumers away from coal. With a nuclear renaissance assumed in the latter half of the projection period, imports of steam coal would rise to 335 mtce in the year 2000, before falling back to just over 250 mtce by 2010.

A third scenario, produced independently of the 'Energy for a new century' study, was included as it reflects a widely held view in the coal trade. This is a more cautious and less dramatic projection which assumes that import demand will continue to grow throughout the next two decades, but at a slower pace. This would primarily be due to increasing resistance on environmental grounds, initially in Northern Europe, to new, coal-fired, power stations. While this scenario stops short of assuming a widely endorsed international agreement to make big cuts in CO2 emissions, it

1 The views expressed in this report do not necessarily reflect those of the Commission services.

2 'Energy in Europe' Special Issue, July 1990.

nevertheless results in much lower import projections: - around 275 mtce in the year 2000, and just over 330 mtce by 2010.

A surprisingly narrow range of thermal coal prices is forecast by the study, given the evidence of the 1980's. This reflects the assumption of a gentle sloping long-run supply curve, with, on average, every $US 1/tce increase in FOB (Free On Board) pier prices bringing forward an extra 17-24 mtce/year of supply. Additionally, the minor exporters are assumed to be price inelastic: that is, they will raise prices to the highest level consistent with selling all of their output. In the high demand scenario, they are therefore expected to sell more than in the lower demand scenario, thereby narrowing the price range.

The report concludes that, after a period of falling real prices for thermal coal, prices will rise considerably in real terms over the next two decades. CIF (Cost, Insurance and Freight) prices of thermal coal into ARA (Amsterdam, Rotterdam, Antwerp - the main EC ports) are projected to rise to $US60-68/tce (or 20-30% above 1990 levels) by the year 2000, and to $US57-76/tce by 2010, due to the increasing demand which will more than offset the anticipated increase in supplies.

There is a general consensus on the other hand that the market for coking coal will be comparatively stable as steel demand is expected to grow at a much slower rate than that for electricity. Additionally, technological changes are expected to reduce the amount of coking coal required per unit of steel.

Two scenarios are envisaged for this market: firstly, a strong growth scenario as steel demand and production increases in those non-OECD regions that will be dependent on increasing imports of coke, leading to demand being some 30% (45 mtce) above 1989 levels by the year 2010, and, secondly, a declining demand scenario as steel growth decelerates and new technologies (such as PCI and electric steel making) substantially reduce coking coal requirements per unit of crude steel produced. This latter scenario could imply a reduction of some 30% in demand over the next two decades.

A single, 'middle case' scenario is adopted by the author for the purposes of this report. This projects a small net increase in demand, with total sea-borne imports increasing from 150 mtce in 1989 to 159 mtce in 2000, settling at 157 mtce by the year 2010. With the smaller reserve base of coking coal vis-à-vis thermal coal, and in the absence of new, low cost marginal suppliers, there is a general expectation that costs will rise in real terms over the next two decades. The conclusion is that prices might increase to $US 68/tce (or up by 24%) by the year 2000 and to $US 69 (or up by 25%) in 2010.

The report also examines the likely future buyers' preferences in some detail, in terms of both diversification of suppliers, and the possibility of paying a premium for low sulphur coal. Ocean freight rates and costs are also examined and included in the equations, with a projection that rates will be higher over the next decade due to the higher average age of the fleets (leading to higher operating costs and insurance premiums), a reduction in world-wide shipbuilding capacity and increasing unwillingness of banks to lend to shipowners.

The author concludes the report with a brief analysis of the effects of the Gulf War and the implosion of the old Soviet Union, neither of which he feels will dramatically alter his basic projections.

ENERGY AND CITIES

BY J. Hamacher and M. Guillen *(national official on secondment)* **DG XVII**
Task Force on Community integration,
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The function of energy planning was originally to design and promote operations with a regional impact.
In order to target the Commission's activities more effectively, the Directorate-General for Energy launched an initiative in 1989 on energy in the urban environment. Almost 70% of the Community population already lives in cities, and the continuing trend is upward. The main objective is to promote local energy management, including optimization of energy distribution and production, recourse to local resources, improvement of energy efficiency and the internal market dimension.

Financial support for the preparation of local energy strategies is now the subject of annual invitations to submit proposals, with projects selected according to certain criteria, particularly their suitability for replication. This aspect is particularly important, since integration calls for dissemination and exchange of know-how throughout the Community is a major aim of energy and other Community policy.

A symposium on Energy and the Urban Environment was held in Mannheim, Germany in February 1991 to promote awareness among European cities that they would have to give higher priority in future to energy matters. At this symposium, a brochure setting out the experience of twelve European cities in urban energy management together with general conclusions was presented.

The symposium also saw the announcement of the creation of a network of European cities in the combined area of energy management and the environment. This initiative, promoted by DG XVII, was as it were both the fruit and the logical follow-up of cooperation between these cities. The network has 22 members, and aspires to being a platform for exchanging experience and know-how in those areas where cities can take energy and environment policy initiatives at local level. It is important to stress in this context that cities have a role in improving both the local and the Community situation. In this way, they are the instruments of a policy whose motto might be 'act locally, think globally'.

As a number of urban energy planning studies had by then either been completed or were at an advanced stage[1], a workshop was organized in December 1991, with the participation of all the cities concerned, to evaluate the projects accepted for support following the 1989 and 1990 calls for proposals. The representatives of 24 towns, including six capital cities, attended this workshop, which provided an opportunity to exchange experience and discuss the results of projects on various urban problems, and enabled the participants to make contact with their counterparts from practically all of the Community's Member States.

All the project presentations revealed a common realization that energy, environment and urban development are three closely linked key elements which determine the future evolution of a city. Consequently, the cities, confronted with growing energy demand in the domestic, commercial and industrial sectors, need a streamlined energy management system to integrate energy, ecology and the economy as sources of future progress.

For this very reason, virtually all the cities represented had considered the interaction between energy and the environment in the framework of their projects. Some have gone further and drawn up energy and environment plans (Turin, Newcastle-upon-Tyne, Bristol, Aix-en-Provence, Madrid, Copenhagen, Amsterdam, Berlin and Athens). Dublin and Lyons have set about elaborating dispersion models for air pollution in order to devise appropriate energy strategies. Brescia and Helsingør have established monitoring and energy management systems, and Saarbrücken, Kiel, Aarhus, Rostock and Rotterdam

[1] *Aix-en-Provence, Amsterdam, Athens, Berlin, Bremen/Rostock, Brescia, Bristol, Brussels, Copenhagen, Cork, Dublin, EETAA (Greece), Helsingør/Fredensborg, Helsingør, Kiel, Lyons, Madrid, Milan, Newcastle, Rotterdam, Rouen, Saarbrücken, Turin.*

have further developed methods designed to improve the energy efficiency of urban heating systems and of cogeneration. Cork and Rouen have looked at the potential for deriving energy from wastes.

In view of the importance of these issues to life in the cities, and in order to pursue Community objectives in the field of energy and the environment, the Directorate-General for Energy will continue to promote the necessary developments in this respect in the overall context of Community integration, of which economic and social cohesion is a key element. In this context, a meeting will be held in the autumn of this year, along analogous lines to the cities workshop, but this time addressing regional energy planning studies, with the aim, once again, of promoting such beneficial exchange of experience and generating spin-off.

TOWARDS A NEW EC-US AGREEMENT ON NUCLEAR COOPERATION

BY Esteban Diaz, DG XVII
Non-fossil energy Directorate - Nuclear conventions Unit

The European Atomic Energy Community (Euratom) has so far concluded three agreements (with Australia, Canada and the United States of America) which in practice deal in general terms with the political conditions for supplies relating to the fuel cycle and certain related services.
The nuclear cooperation agreement between the Community and the United States is currently one of the most important nuclear agreements in existence. The agreement actually consists of a Basic Agreement, of indefinite duration, which entered into force in August 1958, and an Additional Agreement for Cooperation between Euratom and the United States concerning Peaceful Uses of Atomic Energy. The latter, which entered into force in 1960 and has been amended on several occasions, expires on 31 December 1995.

DEVELOPMENT OF THE EXISTING AGREEMENT

The agreement was implemented in a completely satisfactory and continuous manner until 1978. In 1978, under the Carter administration, the Nuclear Non-Proliferation Act (NNPA) introduced new requirements to be incorporated into all US agreements with third countries.
The United States contacted Euratom and presented proposals in 1983, 1984 and 1986 for the negouation of a new agreement which would have reflected certain provisions in accordance with the new US legislation. The Commission however considered that the revision proposed by the United States was not acceptable because it would impose undue restrictions over and above the provisions contained in the existing agreement. The nuclear industry in the Community, and the Member States themselves, were of the same opinion. Moreover, it would have been unacceptable for the existing international agreement to be amended simply because one of the parties had amended its domestic legislation.
Realizing that the new negotiations called for by the NNPA would run into difficulties, the US Government inserted a clause - the 'Euratom clause' - into the NNPA, enabling peaceful nuclear cooperation with the Community to continue on the basis of the existing agreement pending its renegotiation.
However, the existing agreement remains in force on a fragile basis, as it requires an annual Presidential waiver, which is issued each March. In theory, the President of the United States could refuse to renew this waiver, which would prevent the transfer of US nuclear materials to the Community. This would be highly damaging, not only to the Community and to the USA, but also to third countries which possess US nuclear materials and wish to transfer them to the Community to undergo processing, which is essential for their use in the civil nuclear cycle.
Thus, each year since 1978, the Euratom-US agreement has depended on renewal of the Presidential waiver, which constitutes a limited and uncertain basis for cooperation.

NEW DIFFICULTIES

The accession of Spain and Portugal to the Community in 1986 further complicated the situation. Both of these countries had concluded bilateral agreements on nuclear cooperation with the United States. The consent rights included in these agreements imposed more restrictive conditions on Spain and Portugal than the consent rights included in the US-Euratom agreement.
This situation creates *de facto* discrimination: in spite of their membership of the Community, Spain and Portugal are subject to less favourable treatment in the

field of nuclear cooperation with the United States than the ten other Member States.

This *de facto* situation can be resolved by incorporating the two bilateral agreements into the Euratom-US agreement. On the basis of Article 106 of the Euratom Treaty, the Commission has endeavoured to bring this about. The discussions are blocked by the current provisions of US domestic legislation, which prevent the renunciation of the consent rights. This situation is a real Gordian knot which can be cut through only by the conclusion of a new Euratom-US agreement.

TOWARDS A NEW AGREEMENT

Since the existing agreement for cooperation was concluded more than 30 years ago (i.e. in the early days of the Community) the situation has changed radically. The Community has become a major world nuclear power. The Community leads the world in the field of controlled thermo-nuclear fusion (in November 1991 the European physicists at JET - the Joint European Torus - succeeded for the first time in generating power from nuclear fusion), while the Community's nuclear industry possesses know-how in all phases of the nuclear cycle.

In a joint declaration dated 23 November 1990 concerning relations in general between the Community and the United States, the United States, the Community and its Member States declared that they were convinced of the usefulness of strengthening and expanding their partnership on an equal footing. The new nuclear cooperation agreement should provide a stable and reliable framework for the continuation of mutually beneficial nuclear cooperation.

The new agreement should, therefore, suitably reflect the increased importance and diversification of the Community's nuclear industry and the enhancement of the European Community's role in international relations since 1960. It should also provide a solid and equitable basis for industrial, commercial and technical cooperation in the field of the peaceful, non-explosive use of nuclear power. There is evidence of increasing convergence between the European Community and the United States of America on nuclear non-proliferation and of a similar approach to the means to achieve it.

On the basis of these guiding principles, on 23 July 1991 the Commission adopted and proposed to the Council a draft Decision containing directives for the negotiation by the Commission of a cooperation agreement between Euratom and the United States of America. On 16 December 1991, following discussion of this proposal, the Council adopted negotiating directives on the basis of the second paragraph of Article 101 of the Euratom Treaty[1].

The negotiations should be completed by 1994, thus enabling the United States to complete their approval procedures in Washington in 1995. The new agreement will then take over from the existing agreement when it expires on 31 December 1995.

1 Such agreements or contracts shall be negotiated by the Commission in accordance with the directives of the Council: they shall be concluded by the Commission with the approval of the Council, which shall act by qualified majority.

NUCLEAR SAFEGUARDS FOR THE EUROPEAN COMMUNITY: THE FUTURE

Commission report on the operation of Euratom safeguards[1]

BY W. Kloeckner, P. Chare, W. Gmelin, R. Schenkel, B. Smith
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A review of the Euratom nuclear safeguards system appeared in Energy in Europe No 18. History since 1957, legal aspects, an outline of activities and likely future developments were presented.
As explained in that first article, the Commission of the European Communities is fully committed to the obligations contained in Chapter VII of the Euratom Treaty and to relevant international agreements concluded by the Community. There is close cooperation between the Commission and the International Atomic Energy Agency (IAEA).
This article examines recent developments and further safeguards concepts in greater depth.

The overall objective of European Community energy policy is to secure energy supply at reasonable cost and low environmental impact.

The public is highly sensitive to the peaceful use of nuclear energy in the Community. This extends to nuclear safety and the environment, physical protection and last, but not least, safeguards against misuse. This attention is welcome since it will contribute to removing at last the shroud of mystery and secrecy surrounding matters nuclear. More needs to be done to explain to a wider public the object of safeguards and the underlying concepts as well as the resources needed. This is necessary in order, *inter alia*, to promote the understanding that the control of complex technologies requires complex control concepts, and the cost and resource requirements of implementation will increase in line with the use of these complex technologies, and with the expectations put on the effectiveness, completeness and coverage of such controls. Safeguards is no exception.

[1] *SEC(92)80 final of 24 January 1992.*

SAFEGUARDS IN THE 1970S AND 1980S

The layout and structure of nuclear installations in operation over the past two decades generally involved clearly defined operational process steps, nuclear material being physically handled within the limits imposed by safety and human health requirements.

The quantities of material handled corresponded to the type of manufacturing operations and to the size of the plant. A feature of this type of operation is that material is normally accessible at certain specified process points, where activities are performed by the operators for quality control, internal accounting and safety purposes among others.

The Basic Technical Characteristics for such an installation describe the flow of nuclear material through the process, and identify the access points. Safeguards procedures could thus be established after completion of construction and during the commissioning of the plant without giving rise to any major interference with regard to safeguardability and inspection resources.

It is at these specific characteristic locations that inspectors collect the information required to implement safeguards. These safeguard objectives are related to detection probabilities and quantities of nuclear material within a given time period.

Inspectors' activities for this purpose involve all material passing these points, and include measurements with portable or at least transportable equipment. These operations are rather labour-intensive, but considered adequate for efficient and effective safeguards having regard both to the costs involved according to the size of the installation and the amounts of nuclear material concerned.

Over the operational life of a plant different parts are normally upgraded, for economic reasons but also to reduce the overall dose burden by appropriate state-of-the-art techniques whenever feasible. Until now, existing safeguards techniques could handle these

changes and meet the safeguards requirements thanks to the relatively small scale of plant operations.

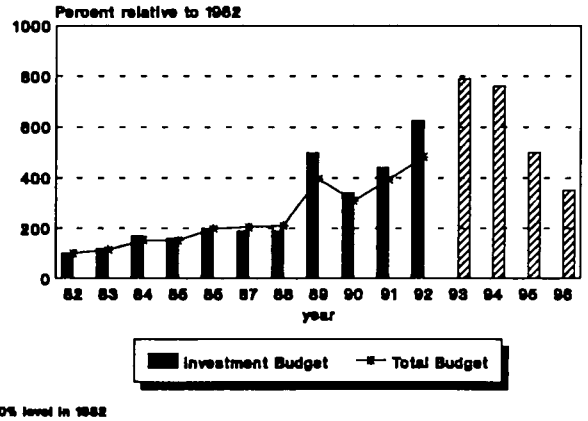
SAFEGUARDS IMPLEMENTATION IN THE 1990s

Safeguards in the European Community throughout the current decade will be characterized by both increased availability and greater use of plutonium in the commercial fuel cycle. This will require additional efforts if the efficiency and effectiveness of the relevant safeguards applications is to be maintained, or preferably upgraded. In pursuing this objective, new techniques have had to be developed, to force the safeguards challenge presented by the modern plants. Some of these have recently become operational, others are either under design or already in the commissioning phase and scheduled to come on stream during the next two to three years.

Thus, the European Communities counts three of four MOX[2] fuel manufacture plants (either in operation or close to that stage), with throughputs of up to 5t/year of plutonium, as well as three operational reprocessing facilities. All represent the latest state of the art in design, minimizing human contact with the process streams and relying on a maximum of automation and remote operation. This emphasis on automation alters the ratio of investment cost to labour cost, allowing large amounts of material to be handled with an optimum degree of rationalization.

In order to guarantee adequate safeguards in these automated plants, the inspectorate must follow this trend and increase its investment cost in equipment accordingly. Figure 1 shows the impact of this increase on the Euratom Safeguards Inspectorate's budget.

Figure 1
Euratom investment budget for 1982-1996



2 *C.S. Maniatopoulos, W. Gmelin, R. Schenkel: 'The Role of Nuclear Energy in the European Community' Proceedings of the ESARDA Symposium 1991, Avignon (France).*

NEW FEATURES OF SAFEGUARDS REQUIREMENTS

The safeguards approach for these large bulk-handling facilities needs therefore to reflect the triple demands of characteristic amounts, process times and probabilities. However, new factors arise, as these facilities require a significant shift from inspector-attended measurement/surveillance to an unattended mode:

a) demands on the availability of inspectors;
b) the need to minimize radiation exposure for both plant personnel and inspectors;
c) the need to minimize shut-downs for routine safeguards operations in an automated production line;
d) the requirement to use identical components in similar situations in such plants, so as to minimize development costs and maximize standardization of equipment.

In this context the issue of costs is a paramount one, as Safeguards Organizations like many other public bodies are under the twin pressures of limited resources and the obligation to maintain standards. In the nuclear field this is particularly so in view of the public's legitimately high level of expectations and concern.

IDENTIFICATION OF A NEW PROJECT

The Euratom Safeguards Inspectorate gets knowledge of the intention of an operator to construct a new plant in different ways. Firstly, Article 41 of the Euratom Treaty requires persons and undertakings to inform the Commission of investment projects related to new installations - and also to replacements and conversion of existing ones. In this way the Commission can conduct discussions with those concerned before forming a view on all aspects of such an investment related to the objectives of the Treaty. Notification is required at least three months before a first contract is concluded.

However, in the case of a reprocessing plant, the Commission must also approve the techniques to be used for chemical processing of the irradiated materials, as far as is necessary to conform to Treaty obligations. This means that the operator must submit the design plans immediately before they are finalized i.e. before construction can start.

For other types of installation Basic Technical Characteristics must be submitted to Euratom at the latest 45 days before any introduction of nuclear material. In the case of large bulk handling facilities this would be too late to incorporate safeguards instrumentation without extra costs for both operator and inspectorate, as well as delaying the project.

Experience has shown in fact that operators of new plants are well aware of the need for early discussion and to contact the Euratom Safeguards Directorate at the earliest possible opportunity. The time-scale is typically about 4 years, allowing sufficient time to design a safeguard scheme with the appropriate technical infrastructure and to incorporate it in the layout of the plant during construction, i.e. without delaying start-up.

Collection of information

Once the necessary contacts have been established, consultations are arranged, if necessary at different working levels, with the object of drawing up guidelines for the various types of information to be provided. These details are essential to basic understanding of the plant layout as well as the procedures that the operator intends to follow in order that the quantity and quality of the material from receipt, throughout the process up to the final product can be monitored, measured and thus verified. The Euratom safeguards regulation provides for a questionnaire for the specific type of installation, and this may serve as a reference point. Additional and more specific enquiries may be prompted by the discussions with regard to the detail of plant design plans.

Main areas of information relate to accounting and operational records, and at which process points and by what system these are established. In this context it is important to know the type and location of the operator's measuring equipment, as well as accuracy and precision, as well as details of other systems the operator intends to install, and which could have an impact on safeguards implementation.

It is obvious that commercial sensitivity of the plant and process design may incite operators to keep the provision of information to the legally inevitable minimum. This may create a conflict on those questions which the safeguard authority believes it imperative to answer in order to design and implement a credible safeguards scheme. In the Community these difficulties have usually been overcome, thanks to a Commission regulation regarding the handling of restricted or confidential information, which affords operators, government authorities and indeed Euratom itself, the necessary protection against unauthorised disclosure.

Safeguards approach

On receipt of the information, a safeguard concept is worked out. In the case of new generation facilities approach design obviously requires intensive consultation with the operators concerned. The size and complexity of operation, as well as the high degree of automation also necessitates a change of emphasis on the safeguards side from intensive inspector involvement to new integrated, highly sophisticated, and in some cases 'tailor-made' equipment, normally to run unattended because of plant operation and cost constraints.

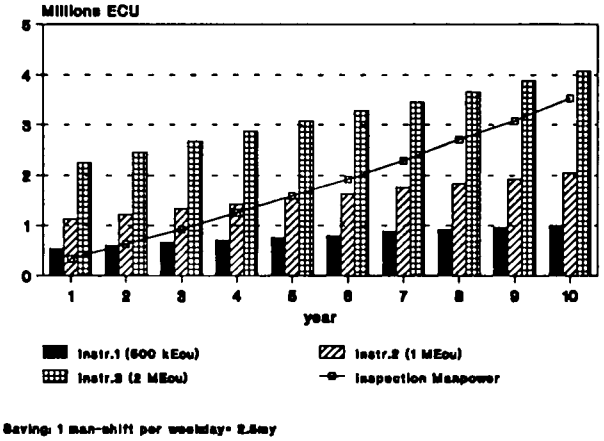
Resource considerations

The change of emphasis from labour intensive to automated inspection is clearly also the result of constraints on inspector recruitment. A study has shown that the break-even point of automation investments vis-à-vis the labour intensive alternative is likely to be at around 4 years, a fraction of the operational lifetime of such a plant, as may be seen from Figure 2.

A crucial question in discussions on safeguards is always the source of the necessary financing for such highly capital-intensive implementation concepts. An operator, of course, designs his plant in the first instance, within the limits imposed not only by licensing requirements, but also stringent commercial parameters seeking an optimum rate of return on investment, safeguards being for him strictly speaking a secondary consideration.

Euratom, however, continues to draw attention to the requirements of European law as laid down under the Treaty and its implication for the continuing acceptance of nuclear energy in the wider context. The fact that operators have become more and more aware of this indeed in itself reflects a recognition on their part of the need to gain greater acceptance of nuclear power among the broader public, despite differing views as regards the need for non-proliferation on the one hand, and the contribution of atomic energy to supply security on the other.

Figure 2
Cost comparison investment v. manpower for unattended measurement stations



SAFEGUARDS INSTRUMENTATION

The Safeguards Approach for a specific installation identifies the points, where safeguards instrumentation needs to be installed. For the reasons already explained this will be designed in such a way as to operate as far as possible unattended.
For each individual installation the inventory of necessary equipment will be drawn up and agreed upon with the operator. After obtaining the necessary basic information on space requirements, power supply needs, cable conduits etc. the operator can provide for incorporation or that at least sufficient account is taken of the requirements before the design is finalized as regards those specific parts of the plant.

TECHNICAL SPECIFICATIONS

Having identified all the necessary safeguards instrumentation, sufficient time must be allocated to draw up the technical specifications in detail.
These are then used to procure the equipment either by open tender or direct purchase. In the past we have seen that the experience acquired in one case will save considerable cost in other similar cases, as well as furthering equipment standardization, while maintaining state-of-the-art technical standards, which aim at economical use of safeguards resources, low irradiation and minimum burden for the operator.
The Euratom Safeguards Directorate has over the past few years purchased a large variety of relatively sophisticated instruments, representing the latest state-of-the-art technology. Procurement policy has also focussed on equipment for permanent installation, taking into account the demands of plant automation.
This equipment comprises different kinds of automatic nuclear material measurement stations based upon neutron and/or gamma techniques, surveillance systems based on the latest video technology, as well as data collection, logging, and transmission systems with the appropriate control software. Sensors, triggered by specific events for start up and shut-down of equipment are also installed.
The computer hardware and software used to run this instrumentation is also always up to the latest available performance standard.

DATA TRANSMISSION NETWORKS

The instrumentation signals produced throughout a large-sized facility would require a large number of inspectors working full-time to obtain all the relevant inspection data at local recording stations. The solution is to transmit the signals to a central office location, where they are processed and stored. This has the advantage that the number of inspectors then needed to interrogate the system for evaluation purposes is fewer than the number otherwise needed for local recording. This smaller complement can still organize their tasks in such a way that the inspection goals are achieved according to the procedures prescribed.

This optimization of inspection effort was the essential reason for installing a central transmission network exclusively for safeguards purposes throughout an installation and connected back to the inspectors' office. Initial experience is very encouraging and everything possible done to promote recourse to such systems wherever possible.

SAMPLING AND ANALYSIS

Quantity and quality of nuclear material requires a high number of samples to be taken for destructive testing. For older generation plants samples are transported to a safeguards laboratory for analysis. Apart from heavy logistics, results are reported just before the detection time elapses, when the relevant batch of material had often already been further processed.

For this reason the Euratom Inspectorate is installing a device called 'Hybrid K-Edge Densitometer' in reprocessing facilities. This device measures input solutions on-site and determines Uranium concentration and the 'Uranium/Plutonium'-ratio to a high degree of precision. These measurements are performed by the inspectors themselves with the assistance of the operator in handling the samples. Euratom considers this technique as a substantial technological advance, allowing inspectors to know the result of a measurement almost as soon as, if not possibly before, the operator declares his own result, still with a precision comparable to that of classical methods.

ON-SITE LABORATORY

The 'hybrid K-Edge' is part of a design developed by Euratom to cope with the large number of different samples originating from a reprocessing plant: a laboratory installed on-site and dedicated to safeguards known as the 'On-Site analytical Laboratory' (OSL). This laboratory will be equipped with the inspectors' own, independent analytical instrumentation, the analyses being performed by Commission staff. The system is thus independent from the operator, who will, however, continue to be responsible for all licensing and safety aspects. Work on the design of the OSL is at an advanced stage, and we are expecting to commission the first of these laboratories in about a year from now.

AUTHENTICATION

Safeguards authorities should thus aim to have primarily their own independent equipment installed.

However, situations will arise, where this is not feasible, due to particular circumstances. In such cases the operator's own process control instrumentation must be used, either by direct reading of his results or by taking a signal from his control devices at an appropriate point. This signal is then further processed by the inspectorate's own systems. In such cases it is essential to ensure the authenticity of such readings or signals, by independent checking of all relevant communication lines, starting at the point of signal production (e.g. detectors) up to the point where it enters the inspectorate's own network.

Various techniques have been devised for the purpose of this authentication, which is, obviously, to avoid the systems concerned being tampered with. A case by case study is needed to identify the steps required, together with an appropriate combination of actions with the timing for their implementation. Calibrations, functional tests, re-measurements etc. are carried out and systems sealed or put under surveillance after authentication to retain integrity. Encryption of data is another powerful authentication measure which has been investigated and put into practice already.

PROJECT MANAGEMENT

From the various points summarised above it will be apparent that implementation of safeguards in large fuel-cycle facilities will only be truly successful under a proper project management scheme to coordinate all the diverse activities in question. This scheme needs to be implemented from the moment that Basic Technical Characteristics are provided, through the commissioning phase, up to the stage of routine operations, to ensure that all safeguards interfaces work efficiently.

Such a scheme has to work under the following main constraints:

- coordination of all conceptual studies in line with the agreed time schedules;
- drawing up of all necessary technical specifications and to assure delivery of instruments for incorporation and installation in line with the plant construction schedule;
- efficient liaison with all appropriate parties;
- authentication of relevant instruments in line with progress on plant construction, lest they be sealed off or otherwise become inaccessible;
- scheduling of verification of the Basic Technical Characteristics in line with progress in the construction work, again before the part of the facility concerned become inaccessible;
- procurement of necessary resources, including recruitment of inspectors and capital investments;
- assurance of maintenance and service functions after commissioning.

It has been demonstrated that it is essential for the smooth running of the project that operator and inspectorate set up their internal management scheme and liaise together in a spirit of practical cooperation.

VERIFICATION OF BASIC TECHNICAL CHARACTERISTICS (BTC)

The verification of the Basic Technical Characteristics is a fundamental task for efficient safeguards inspection, and a prerequisite for validating routine inspection of nuclear material flows as well as inventory taking.

In the older generation 'classical' facilities, this activity was normally a one-off exercise after the BTCs had been received within the time laid down in the relevant Euratom regulation, (45 days before either first receipt of nuclear material or commissioning of the installation).

As far as reprocessing plants were concerned, this activity also served to confirm that the installation had been constructed in line with the approved plans, this being a condition for the Commission granting final approval.

Regular re-verification of the BTCs is carried out usually about once a year in order to confirm their continuing validity.

In large-scale new generation plants, BTCs verification generally pursues the same objectives. However, procedures have to be adapted in line with the complex automated design, the requirement for accessibility of key equipment for verification, calibration and validation through authentication.

These operations must start at an early stage in the construction schedule, and not merely after formal transmission of BTCs as referred to above. Among the project management constraints are the identification of equipment concerned by safeguards, and also optimum timing - i.e. when equipment can best be verified before it is sealed off and becomes permanently inaccessible.

Although operators are not in all cases legally bound to declare the relevant operations under pre-operation safeguards constraints, Euratom's experience so far is that discussions early on in construction stage are in fact welcome. It would seem that operators are increasingly conscious of the value of good safeguards credentials vis-à-vis the public as well as in regard to international commitments.

CONCLUSIONS

Successful implementation of all the steps of a particular safeguards concept, namely

- analysis of the technical aspects of the new plant;
- detailed definition of the safeguards approach;
- inventory of human and financial resources required;
- identification, procurement and installation of the instrumentation and other technical requirements;
- effective coordination of the whole project;

will guarantee a smooth start to routine inspection once the plant becomes operational.

The modern, integrated and/or unattended safeguards systems which Euratom has developed and is implementing wherever possible in the case of the large new plutonium plants, provide for a change of emphasis from operational costs to investment costs. Euratom expects that this trend will underpin the indispensable rationalization of safeguards implementation in this type of plant, while maintaining the equally indispensable high level of performance.

EXCHANGE AND TRANSFER OF ENERGY TECHNOLOGY UNDER THE INTERNATIONAL ENERGY COOPERATION PROGRAMME

BY Miriam Delehanty, DG XVII *(national official on secondment)*

International energy cooperation programme Unit

The overall aim of this programme is to encourage the transfer of reliable Community energy technology and to encourage and develop technological cooperation with non-member countries.
The ultimate practical objective is to establish partnerships between firms in non-member countries and in the Community, thereby complementing actions under the Thermie and EC International Investment Partners (ECIIP) programmes. THERMIE is mainly aimed at the stimulation of industrial cooperation with third countries by dissemination of innovative technologies and ECIIP at financing investments of joint-ventures.
The programme is targeted at non- member countries in the Mediterranean area, Latin America and Asia which demonstrate a certain level of industrial dynamism and which are the most important from an energy point of view.

BACKGROUND

Over the past few years the Directorate-General for Energy, through the medium of its International Programme, has been cooperating with developing countries in order to improve their energy policy planning resources and their capacity to implement rational energy policies. Such activity contributes to improving both the long term world energy situation and the Community's own security of energy supply. Ten years of cooperation under this Programme have shown both the important role of technology in this context and the need for the Community to focus on promoting and assisting in the development of exchanges of energy technology with a view to creating a dynamic basis for industrial cooperation. Moreover, the wide experience gained by the Community in the past ought to be used to advantage and provide an opportunity to set up 'joint ventures' between Community industries and non-member countries.
Against this background specific measures for the promotion of energy technology transfer were adopted in 1989.

FIELDS COVERED

In order to fulfil these objectives two public calls for tender were published in 1990 and 1991.
Project proposals could include a range of actions such as analysis of the equipment market, identification of the possibilities for local manufacturing and the setting up of joint ventures between firms in non-member developing countries and well-established firms in the Community.
Under this programme, Community finance is made available to cover 50% of the total cost, up to a maximum of ECU 100.000.

RESULTS

This programme has been well received and to date generated over 250 applications from which some 40 projects have now been selected for part-funding. By way of example, three projects for three different regions are briefly described below:

LATIN AMERICA

- The first project concerns the promotion of demonstration projects and the creation of joint-ventures with Mexican/British partners, with the object of improving both the security of electricity supplies and also certain features of engineering system design such as lighting flash location system, system automation, polymer concrete simulators and mechanical vapour recompression.

ASIA

• The second is a joint German-Irish project which aims to forge technological, industrial, commercial and educational links between two companies and a suitable partner in Thaïland in the field of small hydro power. In particular, it is planned to transfer the experience acquired through two recent EC energy demonstration projects. Particular emphasis is placed on the design, installation and maintenance of equipment for remote and isolated areas. Full training facilities are also provided for the Thaï partner.

MEDITERRANEAN

• The third project, in Tunisia involves cooperation between a French and a Tunisian company with the aim of setting up a wind pump department which would re-export this product to UMA and the African market. The Project itself concerns the realisation of a small wind turbine. This project is continuing at the present time.

DITECH PROJECT

In parallel with the programme described above, an operation on the Dissemination and Development of Technology for Energy Efficiency in Industry (DITECH) has been developed. This is a joint project between the Association of Southeast Asian Nations (ASEAN) and the Commission of the European Communities. It is carried out in cooperation with the Asian Institute of Technology, Bangkok and the ASEAN-EC Energy Management Training and Research Centre, Djakarta. The main objectives are to establish a framework between ASEAN and the EC to expand and strengthen ASEAN capabilities in the field of efficient energy use. This is to be achieved through transfer both of improved management methods and policies and of energy-efficient technology and experience from Europe.

The project also aims at intensifying the exchange of ideas and experiences in formulating policies which will encourage both public and private enterprises to implement energy efficient technologies, and hence to develop industrial cooperation between ASEAN and the EC in the field of energy technology.

1991 activities included presentations on energy audits appropriate to the ASEAN context and on energy management in buildings in ASEAN and in Europe.

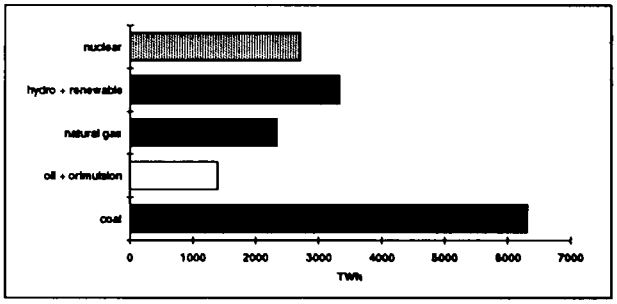
INTEGRATED GASIFICATION COMBINED CYCLE

The clean process from coal to electricity

BY Samuel Furfari, DG XVII
Energy technology Directorate

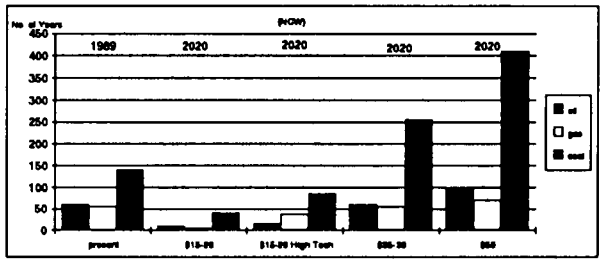
Coal-fired power stations currently supply 40% of the world's demand for electricity and consume more than half of the world's coal production. What is perhaps more significant is that the International Energy Agency, although taking full account of concerns about the damage to the environment from the gases emitted into the atmosphere from burning these large amounts of coal, competition from other fuels (particularly natural gas) and, in many cases, difficulties in finding the capital for new plant, still concludes that world coal consumption up to the end of the century will increase by 1.5% per year. Consumption in power stations will rise to about 3 billion tonnes per year by the beginning of the next century - which is equivalent to an increase in consumption of over 100 000 tonnes per day. This coal will continue to supply nearly 40% of the world's electricity (see Figure 1).

Figure 1
World electricity supply in 2000 (power station coal use: prospect to 2000



IEA Coal Research, October 1991

Figure 2
Evolution of remaining reserves according to oil price



Data from BP, R. Malpas, Institute of Energy, UK

If one looks at the world reserves of fossil fuels (see Figure 2) it becomes obvious that, as the world moves into the next century, energy supplied by coal must increase relative to oil and natural gas, as consumers realise that the reserves of these latter fuels are obviously finite. By the end of the first few decades of the next century, say within forty years from now, there will be no escaping the evidence that these gaseous and liquid fuels must be reserved for the premium uses for which they are most suitable - and this excludes power generation.

A large part of the growth in coal use, including that for power generation, will take place in developing countries such as China and India. The need to make sure that these countries have access to the latest technologies for burning coal cleanly and efficiently, and the necessary financial and political back-up to ensure that they are used successfully is obvious.

However, even in the developed countries - and in spite of the pressures exerted against the use of coal over the last few years on environmental and economic grounds - most predictions agree that the use of coal (including brown coal and lignite) will increase over the coming decades. Figure 3 shows the present (1991) use of coal, petroleum and natural gas together with the

other energy sources. It will be noted that the Community is currently using about 230 Mtoe (or about 310 Mt coal) in total.

Predictions for energy use up to the year 2000 have been developed by the Commission, starting from a scenario based on 'Conventional Wisdom' - that is, a consensus view on what will happen if the economy within the Community is allowed to grow steadily with market forces driving the system. The Commission is, as one might expect, continually updating its predictions and also considering alternative scenarios[1]

Four recent scenarios, taking into account both higher and more moderate economic growth, the economics of supply and relative fuel costs, and environmental concerns, gave coal requirements in the year 2000 in the Community varying from 230 to 300 Mtoe; i.e. an increase of from 0-30% of present consumption.

Turning to the use of coal in power stations, it can be seen from Figure 4 that in the conventional scenario, despite a 50% rise in the use of gas over the next eight years, coal will continue to supply the greater part of the increased demand for electricity which is expected to be required within the countries of the Community. Thus the amount of coal burned within the Community - as elsewhere in the world - will continue to be large and it is therefore of the upmost importance to see that this coal is burned as cleanly and as efficiently as possible. History has demonstrated that 'Conventional Wisdom' is rarely correct. Hence, the Commission developed three other scenarios based on various assumptions. However, all in fact suggest that coal will continue to be an important source for electricity generation. Phasing coal out is not an economic option. Certainly gas has become an attractive fuel and nuclear is a potential replacement. However, given the sheer volumes required and the problems inherent to these two energy sources, it will neither be politically, nor economically feasible to stop using coal for power generation. Figure 5 shows for all scenarios that coal will play a major role in the coming years; even if the least promising forecast were to turn out, it would still be necessary to replace huge amounts of capacity which will become obsolete in the years to come.

The Commission Directorate-General for Energy feels it is crucial to continue to develop and test new technologies towards using coal in an economic and environmentally acceptable manner. But they also have to be demonstrated on a scale sufficiently large to persuade industry that it is safe to invest large sums of money in them.

Figure 3: Community energy balance in 1991 (in % of 1132.5 Mtep)

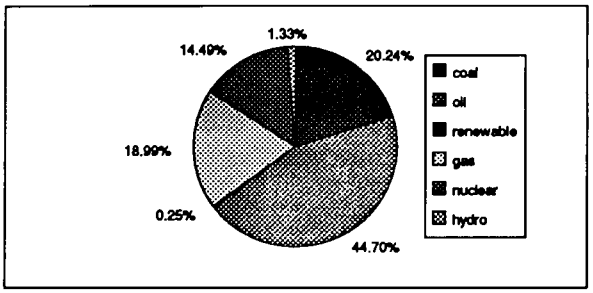
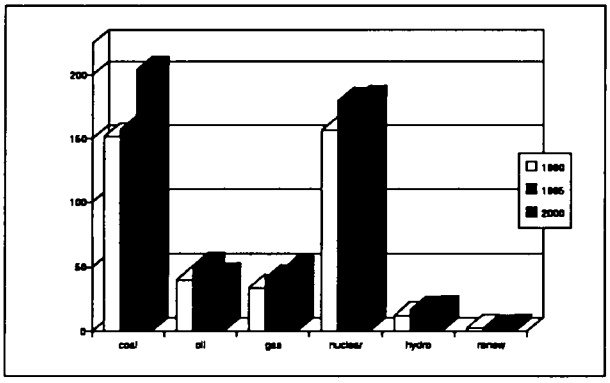
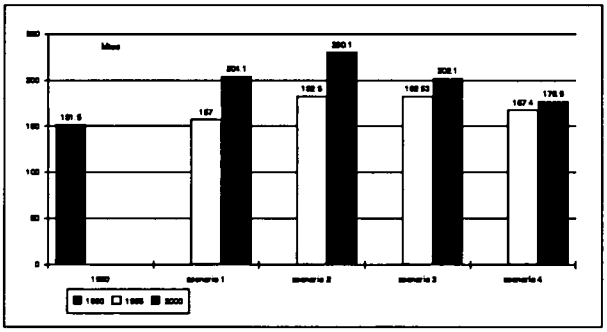


Figure 4: Electricity production by fuel ('Conventional Wisdom')



DG XVII data, August 1991

Figure 5: Coal consumption in power plant for four scenarios compared with 1990 data



DG XVII data, July 1990 and August 1991

1 *See Energy in Europe Special Issue, July 1990.*

As its contribution towards this end, it is continuing to support the development and demonstration of the new, major technologies within the countries of the Community.

Insofar as a large proportion of the coal used will go into power stations, and as the cost of new power stations, especially those of novel design, is high, it is understandable that much of this effort is targeted at power generation.

The European Community has supported research, development and demonstration of new processes for the production and utilization of coal and other solid fuels since the 1950's. The oil crises of the 1970's led to the setting-up of the EC Energy Demonstration Programme, implemented from 1978, which included support for the demonstration of coal liquefaction and gasification technologies. This was widened in 1983 to include combustion. Its current successor is, of course, the Commission's Thermie programme.

Certain projects from the earlier programme have proven to be valuable pre-cursors to the development of the IGCC system which is the main subject of this paper (and which is described later) will now be briefly described.

EC SUPPORT FOR COAL UP TO 1989

Over the period from 1978 to 1989, the EC made available grants totalling ECU 302 million. Of this, 41 million went to support liquefaction projects while 67 million was used to support combustion projects, especially the demonstration of fluidised bed combustion. A further ECU 122 million was spent on coal gasification, and it is the work on the development of pressurised gasifiers that is proving so important for the development of the latest 'clean coal' technology.

In the early 1970's, over 20 designs of pressurised oxygen-blown gasifiers were at different stages of development world wide: the interest at that time was mainly in the manufacture of synthetic natural gas and other industrial chemicals. Many of these never came to fruition, but the European Community can take special credit for supporting three of these designs, all different in concept, which are now ready for commercial use. The High Temperature Winkler Gasifier, developed by Rheinbraun primarily to gasify raw, brown coal, was developed and demonstrated for a number of years up to 1990 in a 1 500 tonnes/day brown coal plant the gasifier, operating at 1 000°C and 120 bar to produce 37 000Nm3/h of medium calorific value gas. The BGL Gasifier is a pressurised version of the well-known Lurgi fixed bed, counter-current gasifier developed by British Gas and Lurgi but with the difference that the ash is removed as a molten slag thanks to the temperature reached by the injection of a mixture of steam and oxygen into the bottom section of the bed. A rigourous test programme on a small commercial unit consuming about 600 tonnes coal/day has been completed. Support from the Commission is continuing for the development of a pressurised version of the entrained-flow, Koppers-Totzek process. Here, pulverised coal is fired into a reaction chamber with sufficient oxygen to partially oxidise the carbon in a flame reaction at temperatures over 2 000°C and at a pressure of 24 to 30 bar. A 48 tonnes coal/day demonstration plant has been built and developed by Krupp-Koppers. A range of fuels has been successfully gasified over more than 8 000 operating hours, demonstrating that this process, called the Prenflo process[2], is environmentally attractive and operates safely and economically. Mention should be made at this point for completeness' sake of two further designs for entrained flow gasifiers, broadly similar in concept to the Prenflo but with, as one would expect, some major design differences. These are the Shell Gasifier, largely developed in the Netherlands and in the USA, and the GSP process, developed in the ex-DDR and now by Deutsche Babcock in Germany.

THE THERMIE PROGRAMME

In 1990, support for the demonstration of new, and particularly 'clean' processes for the combustion and conversion of coal was made part of the Thermie programme, aimed at developing and exploiting new technologies across the energy sector as an essential part of establishing a strong energy base in Europe to meet the new economic and industrial demands of the unified internal market. The Thermie programme, to run initially from 1990 to 1994, was set up with a budget of MECU 350 for the period 1990-1992, to be divided between work in four main areas: the rational use of energy, new and renewable energies, hydrocarbon exploration and production and, last but not least, solid fuels. Proposals within the activities covered by 'solid fuels' have, therefore, to compete against proposals from the other three fields. Support is offered for those proposals which are thought to be technically and economically viable and it is a condition for support that the process can be shown to be operated safely and is able to meet environmental protection requirements.

Projects supported by the Thermie programme may be designed to advance or implement innovatory techniques, processes or projects which research and development already completed, has shown to be promising. The Commission will offer support up to 40% of the cost of the innovative content of the

[2] *See Energy in Europe No 16, December 1990.*

proposal in such cases. Alternatively, support may be given to enable a process or product, the value of which has already been proved within the Community, to be demonstrated elsewhere, either under different economic or geographical conditions in another country within the Community, or with technical modifications (dissemination project). Support in this case is limited to 35% of the eligible cost.

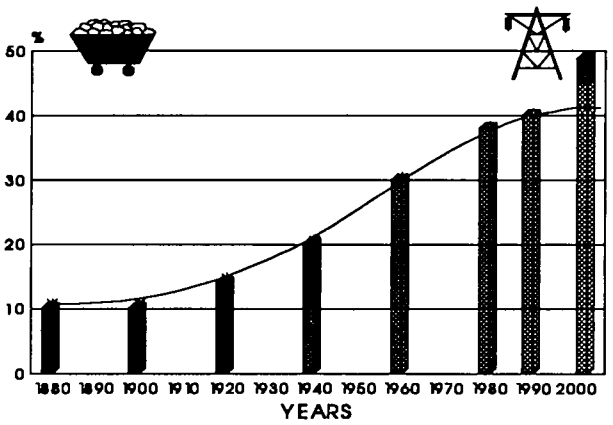
The range of topics which the Commission will finally be supporting in the areas of the combustion and conversion of coal is, of course, to a large extent determined by the proposals put to it. The Thermie programme also provides, however, the opportunity for the Commission to promote a programme of work, particularly by encouraging a number of interested parties from different countries within the Community to mount a joint attack on a subject which the Commission feels should be developed. The first, and a major example of such a targeted programme has been the project on the Integrated Combined Cycle (IGCC) plant and this will now be described.

THE INTEGRATED, GASIFICATION, COMBINED-CYCLE CONCEPT

Fuel technologists have for many years been seeking methods of producing electricity from coal which are not limited by the thermodynamic constraints on the conversion efficiency from the energy in the coal to that in the electricity, which are inherent in the steam cycle. At the same time, it is essential that any process provides means for most, if not all, of the major sources of environmental pollution present in coal, such as sulphur, nitrogen, heavy metals, grit and dust, to be removed without a reduction in efficiency.

Starting from around 10% at the beginning of the industrial revolution, the efficiency of power generation has constantly increased, (see Figure 6) though it can be seen from the graph that the rate has begun to fall off over recent years as it becomes increasingly difficult to make significant improvements to the steam cycle; this evolution is following an 'S'-shaped curve, like any learning process. Hence, new drastic improvements are not to be expected, for the asymptotic part of the curve has now been reached. Of course progress will continue but much more slowly. As an example, it is reported that a Preussen Elektra pulverised coal power plant with DESOX and DENOX in Staudinger (near Frankfurt) will have a net efficiency of 42% with steam conditions of 260 bar and 545/560°C with start-up expected at the end of 1992. IGCC is coming on stream now, and hence it should be expected that a new 'S'-curve will follow, leading to further improvement of the plant efficiency and thus also to lower CO_2 emissions.

Figure 6
Evolution of coal-fired power plant efficiency



The proportion of the heat in a hot fluid which can be converted into work (or electricity) is dependent on the temperature at which it begins to do work and that at which it finishes. The highest steam temperature that normally can be used at the inlet of a steam turbine is about 600°C, but inlet temperatures approaching 1 000°C are feasible and still higher temperatures will be possible as materials and turbine designs improve. A gas turbine fired directly from the gases from a pressurised combustor therefore has potentially higher conversion efficiency than a steam cycle. Moreover, the temperature of the gas leaving the gas turbine is still high enough to generate steam to operate an efficient steam cycle as well. It is also possible to use all the heat generated in cooling components throughout the plant in this steam cycle, using the temperature differential down to the condensation temperature of the steam. The temperature/entropy chart shows how the gas cycle sits on top (see Figure 7) of the steam cycle, the combination making use of a wider temperature range than would be possible with either type of steam cycle on its own.

Hence, the combination of a gas turbine, fired by hot, exhaust gases from burning a fossil fuel, together with a steam turbine using steam generated from the heat in the exhaust gases from the gas turbine and other heat recovered throughout the overall system has been demonstrated to give a higher conversion efficiency than from a traditional steam cycle in plants using a gas as a fuel. Such 'combined cycle plants' are now being proposed for many of the latest generation of gas-fired power generation units. As an example, the Ambarli power plant should be mentioned: this 1350 MW gas combined cycle plant near Istanbul has a net efficiency of 52.5% as compared with a typical maximum of 40% using a straightforward steam cycle.

Figure 7
Thermodynamic diagram for combined cycle

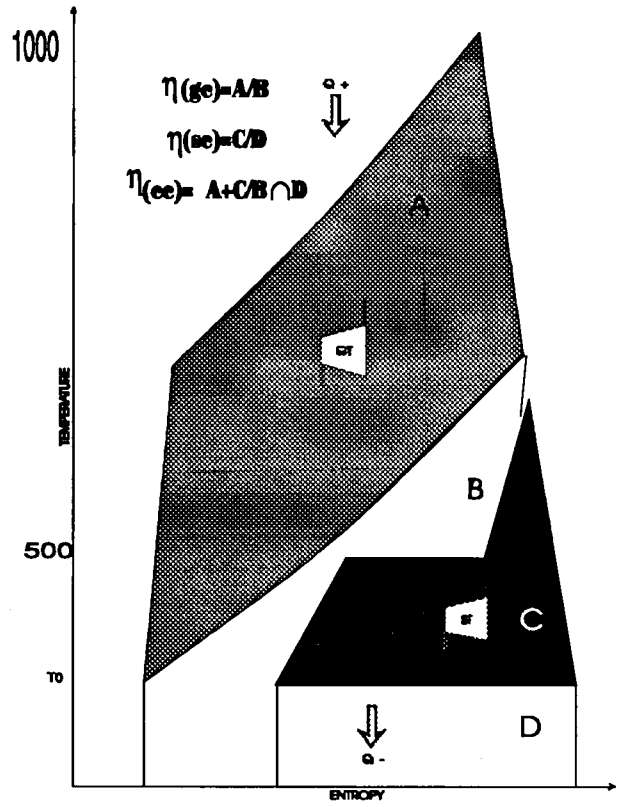
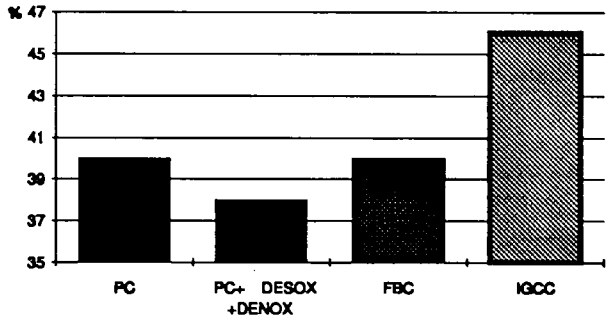


Figure 8
Comparison of various coal power plant efficiency



Where coal is the preferred fuel, it is possible to use this same 'combined cycle' approach by first gasifying the coal so as to produce a clean gas to fire into the gas turbine. Such a process, termed the IGCC (Integrated Gasification Combined Cycle) system, is now thought to be the most promising option for coal burning, power generating plant in the immediate future for the following reasons:

1. It offers, using technology already available and proven, an improvement in conversion efficiency, typically in the order of 45-47% (compared with typically 38% with pulverised fuel firing with flue gas desulphurisation and denitrification) (see Figure 8). This reduces not only the cost of electricity produced, but also the amount of carbon dioxide emitted per unit of electricity generated (carbon dioxide being one of the so-called 'greenhouse gases' which it is argued will contribute to man-induced thermal warming of the atmosphere world-wide).
2. An important feature of the IGCC system is that it offers the prospect of further rises in conversion efficiency as gas turbines capable of operating at higher temperatures under industrial conditions are developed. The limit on the inlet temperature for gas turbines presently available is below 1 000°C, but turbines to take gases up to 1 300°C are already under test, and this rise in inlet temperatures should make it possible to obtain conversion efficiencies of the order of 47-48 %.
3. The IGCC system offers the means to limit the pollutants in the exhaust gases to whatever level is thought to be environmentally and economically justified. There are thermodynamic advantages in cleaning the gas from the gasifier while hot, and ways of doing this are being studied. However, it is planned in most of the plants now under consideration to cool the gas (collecting the heat for feeding back into the cycle elsewhere) and then to clean it by washing and other techniques to remove the pollutants. This is discussed in more detail below.

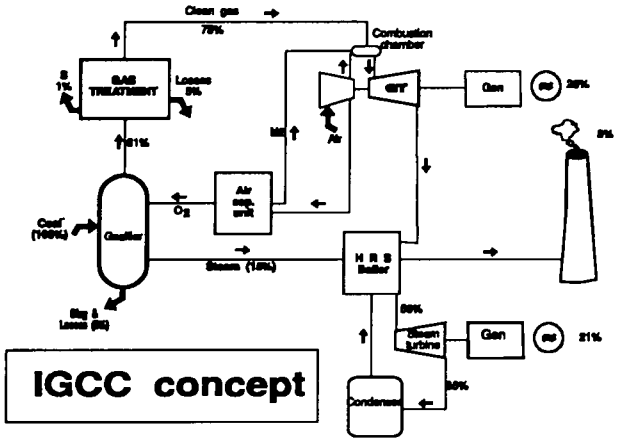
The IGCC system therefore gives the best option of producing 'clean' electric power using coal as the fuel. It will be necessary to demonstrate the viability of the complete system, however, before embarking on full commercial applications.

ENGINEERING THE IGCC PROCESS

What, then, are the main components of a typical IGCC plant? (see Figure 9).

The coal, after preparation, is fed into a pressurised gasifier, generally oxygen blown. The quality of fuel that can be used is dependent on the gasifier, but some now available are capable of operating with coals of all ranks, including high ash or moisture or variable quality. Some of the suitable gasifiers developed within the Community, have been mentioned earlier.

Figure 10
The IGCC concept



All these oxygen-blown gasifiers discharge the ash in the coal as a hot liquid slag. The gasifier is cooled with a steam jacket, the used steam produced being fed into the steam cycle.

Pending an effective way of cleaning the combustion gas while still hot, the gas is first cooled and then cleaned by washing (see next section). The clean gas is then burned with compressed air, possibly tempered by nitrogen or steam so as to limit the formation of nitrogen oxides and to produce the required temperature for the gas turbine inlet. The gases discharged from the gas turbine are passed to a steam generator, the steam being integrated into the steam circuit feeding into the steam turbine.

The design of the steam side has to maximise the use made of all the heat available from the gasifier, heat exchanger and gas turbine exhaust boiler at the appropriate energy loads. The final efficiency of the system depends greatly on optimal use of the heat produced at all stages both in the gas and steam turbines, taking into account the cost of plant used. In addition, all the heat demands in the various units of the combined cycle system need to be met with the correct quality of steam or hot water, again bearing in mind that cost criteria have to be taken into account. A number of ancillary functions must also be integrated into the system such as the production of oxygen for the gasifier, the nitrogen produced at the same time hopefully finding a use in tempering the temperature of the gases fed to the gas turbine, as described earlier.

It will be seen that the characteristics of the gasifier used, the performance of the gas turbine and the way in which the gas and steam cycles are integrated will effect the overall efficiency and performance of the plant. Component selection and the manner of their integration are crucial to produce a design which maximises the advantages of the combined cycle concept.

ENVIRONMENTAL CONSIDERATIONS

The advantages of the IGCC system in limiting atmospheric pollution to low levels have already been referred to. It will be of interest to look into the way individual pollutants are dealt with in a little more detail.

The limits on sulphur oxide emissions, especially in the case of larger plant, are already severe (400 mg/Nm^3). No doubt even tighter limits will be imposed in years to come but there is no doubt that the IGCC system will be well able to meet these. There are a number of well-established processes for washing sulphur compounds from gases. Desulphurisation efficiencies in excess of 90% can be achieved and it is expected that sulphur oxide emission levels less than 10mg/Nm^3 will be obtained. The sulphur is usually produced in the form of elemental sulphur, though solid sulphur compounds can be produced. It is to be hoped that, at least until a large number of commercial plant come on stream, it will be possible to find a market for the sulphur products, though in due course the question of safe disposal of this material along with slag will need to be addressed.

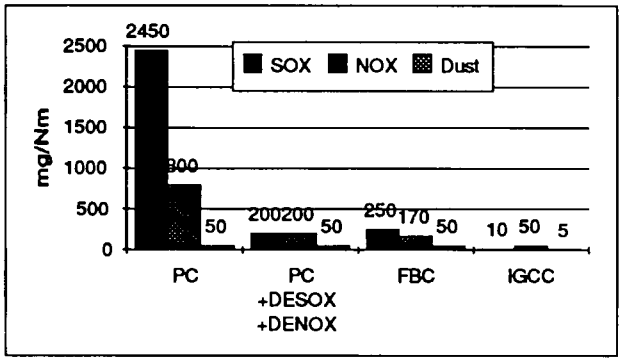
Nitrogen oxides in the flue gas can come from two sources: from nitrogen compounds in the coal and from the air as a result of flame reactions. Fuel-bound nitrogen can be removed almost entirely in the cold gas purification stage. The formation of NOx in the combustion process can be limited by diluting the combustion gas with water vapour and/or nitrogen. Further reduction in NOx formation may be possible by the use of a 'staged' combustion system.

Wet washing of the combustion gas will ensure very low emission of dust and solid particles. At the same time, sodium and other metallic salts will be removed. This will not only prevent any environmental nuisance from these compounds but will also reduce deposition and corrosion in the gas turbine blades, a matter which will become of increasing importance as turbine inlet temperatures increase.

There is no doubt therefore that the IGCC system will allow coal to be burned with very low emissions of SOx, NOx and dust, as can be seen from the comparison with other coal fired systems in Figure 11).

The importance of reducing the emission of carbon dioxide from power stations in limiting the build up of the 'greenhouse gases' is a matter of debate. The contribution of power station emissions to the total appears to be less, and the timescale over which global warming will occur longer than suggested a few years ago. Even so, it is clearly prudent to limit carbon dioxide emissions as much as possible.

Figure 11
Emissions of SOx, NOx and dust for coal-fired power plant



The Community has decided to aim at stabilizing CO_2 emissions in the year 2000 at the 1990 level. Removing carbon dioxide from the flue gas and storing it so that it does not escape into the atmosphere, while being studied, is a long way at present from being a practical proposition, so that the only option available now is to raise conversion efficiency to as high a level as possible. As has been explained, the IGCC system does this.

The role of the European Community

The view of the experts within the European Commission is that it is vital to develop IGCC to a commercial scale as soon as possible so as to have an established 'clean coal' technology suitable for the conversion of coal to electricity. available for exploitation. There are clear commercial and technical advantages for the countries of the Community in developing this system. The Commission has strongly felt for some years a need for a demonstration project by which expertise can be made widely available among the Member States of the Community.

Such a project would, however, be expensive, as a relatively large plant is needed, providing at least 200-300 MWe of electricity, costing about MECU 400-550. The Commission can only realistically be expected to support such a project at this time and, as has already been discussed, this means making invidious selection decisions between alternative technologies and configurations. The Commission has the duty - and the desire - to support projects in which as many countries and companies within the Community as possible can be involved and have access to the technology developed. At the same time, it realises that the financial support from the Community, limited as it must be to the innovative part of the project, will leave a large financial contribution to be found by the commercial and local governmental concerns putting forward the project.

Taking advantage of the provision for 'targeted' projects in the Thermie regulation, as discussed earlier, the Energy Directorate-General convened a hearing of interested parties to discuss a possible Community project on IGCC. The Hearing was held in Brussels on 15 November 1988 and was attended by about 180 delegates including plant constructors, consultants, engineering companies and electricity producers. The meeting concluded that the technology was far enough advanced to build a demonstration plant, and that the construction of such a demonstration plant should not be delayed while further refinements are considered. The position of IGCC as the best available technology for the clean use of coal was confirmed and consideration was given to a project incorporating sufficient flexibility to allow the inclusion of different applications.

Following the Hearing, Commission officials called meetings with electricity supply companies within the Community, as a result of which a number of proposals were formulated and evaluated. It was finally decided to support the proposal to build the demonstration plant in Spain. So, after more than four years of preparation, the decision was formally taken by the Commission on 4 December 1991 to support the construction of this plant at Puertollano in Spain, but as a real joint European venture, supported by various Member States' utilities.

The Puertollano project

The Puertollano project is backed by a number of electricity supply companies including, from the host country, Endessa, Iberdrola II, Sevillana de Electricidad and Hidoelectrica del Cantabrica, as well as by Electricité de France and Electricadade de Portugal. It is hoped that other sponsors will join the project, and at the time of writing a few companies have shown real interest in sponsorship or full membership. Table 1 gives the present share structure of Elcogas, the company which was created for this project on 8 April 1992.

Table 1: Investment participation in Elcogas

Endesa	36.67%
Electricité de France	35.0%
Iberdrola II	13.33%
Sevillana de electricidad	8.89%
Hidoelectrica del Cantabrico	4.44%
Electricadade de Portugal	1.67%

The proposal is to build a plant, capable of burning both local and imported bituminous coals, to produce 305 MWe net (gross power 337 MWe) at an efficiency (based on the use of local coal) of 44.5-45.5%. Sulphur dioxide emissions (at 15% O2) will be less than 10 mg/Nm3 while the level of nitrogen oxide will be less than 60mg/Nm3. Carbon dioxide emissions will, thanks to the higher efficiency, be only 80% of those of conventional plant.

Puertollano is a large industrial area in Central Spain, about 200 km South of Madrid. The local coal, as a mixture of washed and unwashed coals, has a 9-14% moisture, a 20-25% ash, and 13-25% volatility. Chlorine is only about 0.02%, but the sulphur content can range from 1.5 to as high as 4%. The plant will, however, be designed also to burn a wide range of other EC and imported coals including a mixture of petroleum coke and coal. Coals with volatile contents up to 35% and chlorine up to 0.5% will be included.

The choice of gasifier and gas and steam turbines are important decisions still to be taken. The total cost of the project is estimated at MECU 565. About 12% of this is accounted for by the oxygen plant, about 30% by the gasifier and about 37% by the equipment making up the gas and steam turbine cycles. It should be possible to have the plant commissioned to take natural gas in 1995, with coal use starting at the beginning of 1996.

It is hoped that, over a three year demonstration period, it will be possible to verify the efficiency, availability and performance of the plant under continuous operation and to test the gasifier behaviour when using a number of imported and local coals.

This will be a high profile European project, deserving of wide support throughout the Community, and the Commission looks forward to it demonstrating that coal can be converted into electricity in a clean and highly efficient process.

FOCUS ON THE EAST

1. EC-ENERGY COOPERATION WITH CENTRAL AND EASTERN EUROPE

BY Peter NAGY, DG XVII
Coordination Unit

The 1989 revolutions in Central and Eastern Europe have profoundly changed the continent's political and economic perspectives.
The European Community and the other members of the Western World rapidly took up this new challenge, setting up new arrangements for assistance and cooperation with Central and Eastern European countries ('PECOs') and getting restructuring going in these countries as soon as possible. The conditio sine qua non *for such assistance and cooperation was that a beneficiary country committed itself to the principles of democracy, including free elections, and to the restructuring of its economy on the basis of free-market principles.*
The following countries of Central and Eastern Europe (PECOs) are now eligible for this new assistance: Poland, Hungary, CSFR, Romania, Bulgaria, Albania, Latvia, Estonia and Lithuania. The situation as regards Yugoslavia should of course be reconsidered after the recognition in 1992 of the new States Croatia, Slovenia and Bosnia-Herzegovina.
Coordination of assistance from the group of 24 OECD countries (G-24) was entrusted by the G-7 at the Paris Summit of July 1989 to the Commission. The Commission's own assistance is mainly channelled through PHARE.
These activities in Central and Eastern Europe were followed by a Technical Assistance programme for the Commonwealth of Independent States (CIS), and by the negotiations for the European Energy Charter, now at the final stage leading up to the basic agreement and protocols. These subjects are dealt with elsewhere in this issue.

ENERGY COOPERATION EC-PECO

The energy sector crucial to the (economic) restructuring of Central and Eastern Europe. Energy is also a sector of vital concern to both East and West. Energy has a strategic importance. In this respect we should consider that even if some of these countries have indigenous energy resources (e.g. Hungary and Romania have oil, Estonia oil shale, Albania hydropower, and CSFR and Poland solid fuels), all remain dependent for their supplies mainly on the CIS and on Russia in particular.

On the other hand, energy from the 'East' may prove very welcome in the future for our own security and diversification of supply. Energy is, of course, essential to keep industry moving, and with it the wealth of nations. We share our concerns with Central and Eastern Europe as regards nuclear safety and the other environmental problems matters such as CO2, NOx, and SO2 emissions.

Furthermore business opportunities afforded by the energy sector (e.g. in the technology sector) are available for both the East and the West.

After the Gulf crisis, and following G-24 decisions of October 1990, energy has its own place in the G-24 and in the PHARE processes. Also other Community areas of energy cooperation with Central and Eastern

European countries have been set up, such as the access to ECSC loans which at this stage applies to Poland, Hungary, CSFR, Bulgaria and Romania.

Apart from this, energy is also one of the fields of cooperation provided for in the 'Europe Agreements' which were concluded with Poland, Hungary and Czechoslovakia in December 1991. Negotiations with Bulgaria and Romania should be concluded soon.

Relations between the Community and the PECO in the energy field can, therefore, conveniently be dealt with under the following headings:

- bilateral relations DG XVII-PECO (International Energy Cooperation Programme and Thermie)
- G-24
- PHARE
- Negotiations on Europe agreements
- ECSC loans

BILATERAL RELATIONS DG XVII-PECO

DG XVII has two 'bilateral' programmes which concern countries of Central and Eastern Europe, among others: the International Energy Cooperation Programme and Thermie.

INTERNATIONAL ENERGY COOPERATION PROGRAMME

A specific Central and Eastern Europe programme, covering Poland, Hungary, Yugoslavia and Czechoslovakia, has now been in place for two years within the framework of the overall cooperation programme. This assistance, which is of modest financial proportions (totalling about ECU 1 million for both 1990 and 1991), is currently directed at enhancing the institutional capacities of the countries concerned, particularly at city and regional levels, the development of energy policy and planning and of energy efficiency improvement in industrial enterprises.

Concerning Hungary, a study of the potential for third party financing has been completed. A survey on energy use in the Hungarian food industry, assistance for energy management in the city of Miskolc, and the setting-up of the EC/Hungary Energy Management and Technology Dissemination Centre (to be co-financed with PHARE aid and the Hungarian authorities) have also been started.

In Poland, studies are in progress concerning the restructuring of the oil sector, energy management in the city of Gliwice and the setting up of a District Heating Masterplan in Bydgoszcsz. In Czechoslovakia, assistance is being made available for increased energy efficiency in the building sector. Other projects under discussion include an energy conservation programme and a training programme. Contacts with former Yugoslavia have resulted in the organization of a seminar on energy management, an energy management conference and the preparation of an energy prices study.

THERMIE

The Community's 'Thermie' programme[1] for the promotion of energy technology in Europe is primarily aimed at the Community itself. However, under certain conditions, promotional activities outside the Community can also be supported. The total budget amounts to MECU 350 for the first three years 1990-92[2].

In particular, so-called 'associated measures' designed to encourage the application and market penetration of energy technologies may also be financed and carried out in third countries such as the PECO's and the Republics of the former USSR. Such associated measures include market studies, market evaluations and dissemination activities, such as organization of seminars and conferences, publications, and so on. Most of these activities are carried out by the recently established Community network of Organizations for the Promotion of Energy Technology (OPETs). Furthermore a limited number of specific projects on technology transfer have been initiated.

Moreover, the Commission recently took an explicit decision extending OPET activities to the East. Centres are being set up initially in the three Baltic States, Moscow, St. Petersburg, Kiev, Minsk, Warsaw and Prague. In Hungary activities will be channelled through the EC-Hungary Energy Centre.

GROUP OF 24

The G-24 framework of assistance to the Central and East European countries was established following the 'Arch' Summit which brought the world's seven most industrialized nations together in Paris on 14-15 July 1989 (G-7). Coordination of the assistance was entrusted to the Commission.

Initially, market access, agriculture, environment, investment and economic reform were identified as the key areas on which G-24 aid should focus, and working groups set up for these areas. Energy was dealt with in the framework of the environment.

In the face of severe structural problems in the energy field in the PECOs (exacerbated by the introduction of hard currency payments in the former CMEA (COMECON) trading block from January 1991, the uncertainty of supplies from the USSR both in terms of deliveries and price, and finally the Gulf crisis) the 24 OECD countries agreed at their High Level meeting of

[1] *Council regulation (EEC) No. 2008/90 of 29 June 1990; OJ No. L185, 17.7.1990, p.1.*

[2] *See Energy in Europe No. 17 and 18, and later in this 'Focus on the East'.*

30 October 1990 to declare energy a new priority sector for coordinated assistance. The Commission was mandated to draw up a list of priority requirements together with the IEA and other international organizations. In the newly established Energy Working Group, the G-24 and five international organizations (EIB, EBRD, the World Bank, IEA, and the UN-Economic Commission for Europe) participated.

The G-24 Energy Working Group, chaired by Mr Maniatopoulos, Director-General for Energy, prepared a strategy paper for energy assistance over the medium and long term, which was adopted by the G-24 High Level meeting of 30 January 1991 and was sent to the PECO countries. The paper, the text of which follows this article, aims to provide flexible 'guidelines' for assistance and identifies, after an analysis of the present difficulties in the energy sector, three broad priority areas for cooperation: a) policy formulation and planning comprising restructuring of the sector, pricing issues, forecasting, development of regulatory frameworks, etc.; b) 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; and c) energy, environment and safety - with special attention to nuclear safety; other issues such as the need for clean coal technologies are also addressed.

Among the other coordination activities of the Energy Working Group, mention should be made of the aim of avoiding duplication and wastage of resources as well as efficient cooperation among donor countries, including the creation of a special energy 'scoreboard'. This lists ongoing and planned actions of the G-24 members.

A special G-24 meeting on the electricity sector of 4 June 1991 led to the identification of key areas of assistance to the PECO in this sub-sector. These include interconnection of networks, environmental protection and energy efficiency, tarification and pricing, training, restructuring of the industry and nuclear safety.

PHARE

GENERAL

PHARE is the Community's programme for Central and Eastern Europe, set up in 1989 originally for Poland and Hungary and later extended to other Central and Eastern European countries[3].

PHARE aims at providing financial and technical support to the economic reform process in the PECO countries towards an economy based on market forces and covers more or less the same key areas of assistance as those of the G-24 process.

Aid is provided in the forms of grants, although fund-generating loans may also be envisaged. PHARE normally provides so-called 'software assistance' i.e. technical assistance, training, feasibility studies, activities aimed at reformulating regulatory frameworks, institution-building and small pilot projects. Limited purchase of equipment is also possible (eg. PC's and other office equipment). Investments are not financed under the PHARE scheme as this is the task of the private sector and the banking community, including the international banks (EIB, EBRD, World Bank, *et al*).

When deciding on the projects to be financed, the Commission takes all due account of the preferences and wishes expressed by the recipient countries. This means in practice that the initiative to propose projects lies with the PECO countries. In other words, PHARE helps the PECO's to help themselves!

Projects for submission by recipient countries to the Commission require a coherent strategy, and not be merely a shopping list of uncoordinated and possibly unsubstantiated requests.

The assistance is provided through the governments of the countries concerned, although projects should aim to establish a framework that will allow private industry to develop.

In addition to a country-by-country approach, PHARE also includes a regional one i.e. where three or more of the PECOs are involved. Projects eligible under the 'regional facility', representing about 10% of the annual PHARE budget, should be such as can only be implemented on a regional basis (because of the intrinsically indivisible nature of the action; for example nuclear safety problems or interconnection of networks), or also offer substantial economies if implemented on a regional basis.

The total PHARE budget for all sectors was MECU 500 in 1990, MECU 785 in 1991 and MECU 1 000 in 1992.

[3] *Council Regulations No.3906/89 of 18 December 1989, OJ No. L375, 21.12.1989 p.11 and No. 2698/90 of 17 September 1990, OJ No. L 257, 21.9.1990; p.1.*

In order to coordinate PHARE assistance within the beneficiary country, each country has nominated a national coordinator at Ministerial level.

Before a project can be launched Community procedures for external aid, including tendering procedures, have to be followed. This disciplined procedure should ensure competition and transparency. As a general rule, contracts may only be awarded by direct agreement when their value does not exceed ECU 50 000; over that amount, open or restricted tendering procedures are applied. For most energy projects, which usually take the form of technical assistance, a restricted tender is organized.

Within the Commission, the Directorate-General for External Relations' PHARE Operational Service (PHOS) is the budgetary authority, and works closely together with the specialist DGs concerned, including DG XVII. At project implementation level, the EC delegations in the recipient countries, where they exist, also play an important role.

A typical PHARE project cycle can be summarised as follows:

- an indicative programme for all sectors, agreed upon by the Commission and the beneficiary country, sets the priorities for each country for one or two years;
- identification of projects during fact-finding missions by the Commission;
- EC Member States meeting in the PHARE Committee give opinion on a draft Financing Proposal, describing the sectoral aid programme, including the projects;
- Commission decision on Financing Proposal;
- Signature of Financial Memorandum (which is in fact an adapted financing proposal) by the Commission and the beneficiary country;
- Establishment of PIU (Programme Implementation Unit) in the beneficiary country (in Energy Ministry in the case of energy projects) to manage the implementation of projects. The PIU consists of representatives of the beneficiary country flanked by EC consultants;
- PIU launches calls for tender after establishing with the Commission's approval the (final) terms of reference for projects and the short list;
- evaluation of tenders by PIU, in cooperation with the Commission, followed by preparation and signing of contracts;
- implementation and management of projects by the PIU. Where problems arise, EC delegations on the spot are the first contact point.

More detailed information on conditions for participation by consultants in the Phare programme is given at the end of this article.

PHARE AND ENERGY

In 1990, the first year of the operation of PHARE, energy was dealt with, following the G-24 model, in the framework of the environment programme, although in fact Council Regulation 3906/89 establishing PHARE mentions energy *expressis verbis* as one of the sectors in which cooperation should be undertaken. About a quarter of the MECU 100 set aside in 1990 for assistance in the environmental field in Hungary, Poland, the former GDR and Czechoslovakia, is aimed at projects related to the energy sector.

Following the G-24 High Level decision of 30 October 1990 to the effect that energy should become a new priority area of assistance to the PECO, the PHARE programme included a separate energy chapter from 1991 onwards. For most of the countries, assistance to the tune of some MECU 3-5 was earmarked in 1991 in the respective Indicative Programmes. Taking into account the limited funds available, resources need to be directed to those parts of the energy sector where the urgency is the greatest. In general, priority areas for cooperation, identified in the G-24 framework, apply equally in the PHARE context. Among these areas are policy formulation and planning including pricing issues, energy supply and demand questions (such as diversification and energy saving) and the environmental and safety implications of the energy sector (such as nuclear safety).

The following amounts have been set aside per country in the 1991 programme:

Bulgaria - MECU 10 for 1991 and 1992 together; regional, nuclear MECU 11.5 for 1991-1992; Czechoslovakia - MECU 5, regional, nuclear second phase MECU 3.5 for 1991, corresponding to the amount of phase 1 in 1990; Hungary - MECU 5; Poland - MECU 3; Romania - MECU 1. For the three Baltic States assistance in 1991 under the ex-USSR programme amounted to: Lithuania - MECU 1.75; Latvia - MECU 1.25; Estonia - MECU 0.25.

In most of the countries the PIU's should have been set up at the latest by summer 1992, following selection of the consultants. Implementation of projects started in spring 1992. In Romania and CSFR electricity studies are already underway, whereas in Bulgaria the nuclear programme is also well advanced.

Apart from the 'standard country programme' the Commission decided for humanitarian reasons in December 1991 to assist Bulgaria with electricity imports to overcome the severe shortages of the winter of 1991-92. This shortage of power, which led to repeated electricity cuts in Sofia, is largely due to the closure of several units of the Kozloduy nuclear power plant at the demand of the IAEA because of safety concerns: this plant accounts for 40% of Bulgaria's electricity supplies.

A complete list of planned PHARE projects can be found at the end of this article.

The planning phase for PHARE in 1992 was completed in spring 1992. In some of the countries a limited energy programme is already being set up.

Apart from the basic country-by-country approach, the Commission also envisages launching 'regional' energy studies in 1992. These may concern, for example, studies on electricity and gas interconnections, petroleum refining and transport, or management training.

EUROPE AGREEMENTS

The Community concluded negotiations on Association Agreements or 'Europe Agreements' with Poland, Czechoslovakia and Hungary in December 1991. These Agreements when they enter into force will replace the present first generation of trade and cooperation agreements with these countries.

The Europe Agreements provide for the creation of a free trade area, political dialogue, financial assistance and cooperation in the field of industry, technology and science. Energy, including nuclear safety, is one of the areas of cooperation currently under negotiation.

In the longer term, the Community will have to consider the relationship with the PECO's from a broader perspective including of course the question of their accession one day to the Community.

Negotiations for a Europe Agreement with Romania and Bulgaria started at the end of 1991. With the three Baltic countries and Albania a first generation trade and cooperation agreement is currently being negotiated and will also include energy.

ECSC LOANS

In the framework of the ECSC Treaty, loans of up to MECU 200 may be granted for investments in the steel and coal sectors in Poland, Hungary, Czechoslovakia, Bulgaria and Romania. In the coal sector, the projects envisaged in which at least one Community undertaking should be associated, deal with security and working conditions in mines, reconversion of the coal industry and the protection of the environment. Discussions are already taking place between the Commission and the Polish authorities on the ECSC loans. Other PECO countries have also expressed their interest.

CONCLUSION

The Commission rapidly assumed its challenging role of bringing together East and West after the events of 1989 in Central and Eastern Europe. The energy sector being one of the key areas of concern.

As we have seen energy has found its own place, from 1991 on, in the PHARE and G-24 process. Cooperation programmes have now been negotiated with almost every country of Central and Eastern Europe.

For 1992 priorities are to execute the 1991 programme, enhance cooperation with countries in which a programme already exists, and establish programmes in the rest, such as Albania, Croatia, Slovenia and possibly others still. The setting-up of a regional energy component of PHARE is also one of the important steps to be made this year.

G-24 HIGH LEVEL MEETING

30 January 1991

G-24 ASSISTANCE IN THE ENERGY SECTOR OVER THE MEDIUM AND LONG TERM

The G-24 High Level meeting of 30 January 1991 approved this paper with the amendments incorporated in this final version

1. INTRODUCTION

At the Paris Summit of the Arch on 14-15 July 1989, G-7 decided to support the economic reconstruction of Poland and Hungary. The Commission was mandated to co-ordinate the aid provided to these two countries. Twenty four western countries subsequently became associated with this operation (G-24). In 1990 the aid was extended, in principle, to other central and eastern European countries (except the USSR), provided that they carry out the requisite political and economic reforms.

Priority areas for the aid programme were: market access, agriculture, environment, investment and economic reform.

Taking into account these priority areas, separate Working Parties of G-24 were established: agriculture, investment, training and environment. Energy issues were addressed in the framework of the Working Party on environment.

The energy sector of central and eastern European countries faces severe problems. Recently, these problems have been exacerbated by the outbreak of the Gulf crisis, by problems with supply of oil and gas from the USSR and, by the accelerated break down of the COMECON trading system.

At the High Level meeting on 30 October 1990, the G-24 agreed, taking into account the severe problems in the energy sector of Central and Eastern Europe, that energy should become a priority sector for co-ordinated assistance. The Commission, in co-ordination with the IEA and other international organizations, was invited to draw up an inventory of priority requirements for assistance by the G-24.

Following this meeting, the G-24 Working Group on Environment was extended to cover energy matters. This Working Group on Energy and Environment held its first meeting on 21 December 1990.

This paper, which has been prepared in co-operation with the IEA, the World Bank and other international organizations, takes into account the comments of the G-24 Brussels Network meeting of 5 December 1990 and the Working Group meeting of 21 December 1990 and responds to the remit of 30 October 1990. Please see section 7 for concluding remarks.

2. CURRENT PROBLEMS IN THE ENERGY SECTOR OF CENTRAL/EASTERN EUROPE

The main problems in the energy sector of the Central and Eastern European countries may be characterised as follows, bearing in mind that these problems and the extent to which they are already being tackled may vary according to the country involved:

- in the previous centrally planned economies, the energy sector was determined notably by political and administrative rather than commercial factors; prices, at well below world market levels, played little part in allocating resources; the absence of market signals promoted great inefficiency in both production and consumption of energy;

- high dependency on a single energy source (notably Poland and Czechoslovakia as regards coal) and on a single foreign supplier (USSR) of oil and natural gas for most of the countries, and of electricity for some of them. With regard to the nuclear sector, the USSR has an important role as supplier of nuclear technology to Czechoslovakia, Hungary and Bulgaria. These countries need design and construction information on

this technology in order to take full responsibility for nuclear safety;

- the increasingly difficult supply situation in the USSR, leading to growing requirements for imports from other sources (mainly for oil);
- poor energy management and low energy efficiency in mostly outdated and centrally planned industries (including energy production and distribution), of which energy intensive industries represent a large share;
- severe environmental consequences of energy production and consumption including problems of nuclear safety;
- a requirement from 1991 to pay for energy imported from the USSR in hard currency;
- difficulty of access to new technology and in its assimilation; at the same time, problems during transition period in ensuring availability of spare parts and maintenance of supplies;
- poor data availability and rapidly changing industrial and energy consumption structures, making the design of longer term strategies difficult.

These problems have been exacerbated by the economic effects of the Gulf crisis and the breakdown of the COMECON trading system. The 'double oil crisis' (Gulf crisis and payment as from 1991 in hard currency), in combination with the current severe economic problems, in the countries concerned, could jeopardise the processes of economic adjustment.

3. Western response in the Energy sector

Western countries, institutions and the private sector are already quite active in the energy sector in Central and Eastern Europe.

The Commission's own co-operation programme for Eastern Europe so far covering Poland, Hungary, Yugoslavia and Czechoslovakia, has now been in place for more than a year. This assistance, which is of modest financial proportions (totalling about ECU 1.4 million in 1990), is currently directed at the enhancement of the institutional capacities of the countries concerned, particularly at city and regional levels, the development of energy policy and planning and the improvement of energy efficiency in industrial enterprises.

The 1990 PHARE programme also already contains an important energy component. About a quarter of the ECU 100 million set aside for assistance with environmental protection programmes in Hungary, Poland, the former GDR and Czechoslovakia this year will be used for projects with a specific energy component.

The IEA, which is not a financial donor organization , aims mainly at the sharing of expertise with the governments of the Central and Eastern European countries on energy policy and, in particular, the analysis of options for fostering market based energy sectors. Assistance is being provided through two main approaches: 1) the evaluation and development of energy strategies through the IEA's country review process; and 2) serving as a catalyst for the resolution of energy policy issues and problems through conferences, seminars and workshops.

The World Bank's objectives are to provide technical assistance to help Eastern and Central European governments, agencies, producers and consumers to: (i) develop energy strategies, policies and investment programmes for more effective and efficient energy production, consumption and trade; (ii) develop environmental management strategies, policies and programmes relating to the production, trade and consumption of energy; and (iii) promote intra- and inter-regional energy trade, especially with the European Free Trade Association (EFTA).

The European Investment Bank is already active in Poland and Hungary in the oil, gas and electricity sectors. Other organization s are also involved in energy co-operation or will become so soon (EBRD). G-24 countries are active on a bilateral or multilateral basis (e.g. the Pentagonal Group).

The United Nations Economic Commission for Europe (UN ECE), having long-standing experience in establishing contacts between the East and West, has concentrated its efforts on several studies, workshops and seminars in the various energy sectors. A data bank with statistics on the Central and Eastern European countries is also available.

Finally, it should be underlined that the development of a market economy is fundamental to the improvement of the energy situation of the Central and Eastern European countries. In this respect, it is important to facilitate the creation of a private energy sector, as far as appropriate. On the other hand, oil, gas and electricity companies are becoming increasingly involved in investments in Central and Eastern Europe. This will continue as general investment conditions improve.

4. Approach to G-24 assistance in the Energy sector

As a starting point for developing the new G-24 mandate to assist Central and Eastern Europe in the energy sector, the following points of departure should be taken into consideration:

(a) assistance given in the sector should aim at consistency with that provided in other sectors (industry, transport, environment, economic growth) and be supportive of the overall objectives of both the

'donors' (G-24 and international organization s) and the Central and Eastern European countries;
(b) the underlying aim of assistance in this sector, as in others, should be to help develop policies, institutions and practices which allow production and consumption to be determined by market forces in a competitive environment. An important part in achieving this aim should be played by private investment;
(c) assistance to the Central/Eastern European countries should be based, as far as is possible in a rapidly evolving situation, on a coherent strategy established by these countries. However, such a strategy should not preclude urgent ad hoc assistance;
(d) assistance should be tailored to the specific needs of each individual country;
(e) but regional co-operation between Central/Eastern European countries should nevertheless be encouraged (e.g. in gas, electricity linkages; nuclear safety; environmental effects of the energy sector);
(f) account should be taken of the key role of the USSR as the traditional energy supplier;
(g) assistance should be provided within the appropriate framework, taking into account the character of the assistance and the nature of the donor and the beneficiary;
(h) through the exchange of information, the G-24, the international organization s and the Central/Eastern European countries should aim to prevent duplication of work. A 'scoreboard' of ongoing and planned actions to be established by the Commission could prove useful as in other areas of G-24 assistance. Information from the beneficiary countries is also necessary.

5. Areas for cooperation

In response to the current serious problems in the energy sector in Eastern and Central Europe, the G-24 and the international organization s should offer assistance over both the medium and longer term (short-term emergency assistance for the coming winter and financial implications of the Gulf crisis are being dealt with in separate papers). It should be noted that this assistance should be supported by an overall improvement of the investment climate, thus attracting the necessary private investment.
The G-24 assistance and particularly the identification of a concrete G-24 project, should be checked against the following proposed framework of areas for co-operation. This framework may be seen as a 'guideline' for assistance in the energy sector in the medium and longer term both for donors and for beneficiary countries. It is clear that this guideline, particularly taking into consideration the rapidly evolving circumstances in Central and Eastern Europe, needs to provide scope for some flexibility.

A. Policy formulation and planning

Policy formulation and planning underpins the performance of the energy sector of a country. Assistance in this area could include the development of market oriented structures (e.g. in production and distribution), the re-organization of the energy sector (including privatisation, whenever appropriate), pricing issues, analysis of supply and demand (including diversification by product and origin), assessment of policy choices including options leading to a sustainable development in the long term, forecasting and scenario assessment, structures to cope with energy crises, the development of a regulatory framework, regional (intra- and inter state) energy planning.
The means to accomplish this would be: country review; studies and workshops; collection and management of information and data; training; institution building; and technical assistance.

B. Energy supply and demand

In the shorter term, priorities for action would include:
- energy efficiency and conservation in households, buildings and specific industrial sectors and at the city and regional level;
- development of policy and action options for the restructuring of energy supplies, including short term alternative oil, gas and electricity supplies.

In the longer term we should focus on:
- improvement and development of production and distribution in the different energy sectors (oil [e.g. refinery losses], gas, coal, electricity including nuclear [e.g. sharing experience via the twinning of nuclear power stations]; district heating and transmission);
- modernization and retrofitting of obsolete equipment in order to save energy;
- (geographical) diversification of energy supply (interconnection of networks; substitution of solid fuel and heavy fuel-oil by natural gas where appropriate; development of alternative/renewable sources).

The means to accomplish the above might include: information exchange (workshops, seminars); training; feasibility studies; audits; technical assistance; 'third party financing'; financing of investments and infrastructures; and the transfer of technology.

C. Energy, the Environment and Safety

The environmental and safety implications of energy production, transport and consumption demand specific actions, in particular in the field of nuclear safety. Other priority areas may include: combined heat and power systems; the improvement of the fleet for public/urban transport; emissions control and ash

disposal; mine water effluent discharges; soil and ground water loss associated with open cast mining.
Environmental considerations are an important element of energy policy in all the areas discussed under A and B above, and they are particularly relevant to policy planning and formulation, energy conservation and efficiency, inter-fuel substitution to 'cleaner fuels' and the use of clean coal technology.
The main means of implementation would be: training; technology transfer; monitoring institutions; financing of investments and infrastructures; dissemination of information; quality control for equipment and material for energy conservation and pollution control produced by domestic industries; implementation of standards, CO2 and NOx targets; to further the role of government as a model for energy efficiency programmes could be stressed.

6. Specific needs of the Central/Eastern European countries

On the basis of a report carried out by a group of consultants, as well as other information sources, the following specific fields of cooperation in each country have been identified. Since consultants' study was finalised before the outbreak of the Gulf crisis, and the reform process in Central and Eastern Europe is evolving rapidly, new priorities may already have emerged. Further studies may therefore be necessary.
It should also be noted that several problems in the individual countries concerned could be more easily solved through a regional (i.e. interstate) approach.
The areas and specific projects for cooperation which we have been able to identify up to now are:

All countries
- Energy planning and policy formulation, including notably pricing and re-organization of the energy sector;
- Energy conservation and efficiency;
- Environmental aspects of the energy sector;
- Nuclear safety;
- Energy statistics.

Bulgaria
- Review of the primary fuel supply options, with an emphasis on gas imports;
- Modernisation of fossil-fired power plants and district heating systems;
- Desulphurisation and reduction of NOx emissions from coal-fired power plants;
- Expansion of domestic power generation capacities;
- Technologies and installations for reducing the sulphur contents in crude oil processing;
- Modernisation of the distribution system, notably in the oil products sector;
- Legal support for the efficient use of energy;
- Transfer and introduction of energy saving and ecologically clean technologies in the production sphere.

Czechoslovakia
- A study of energy conservation in industry to identify industries to be given priority treatment;
- Natural gas (interfuel substitution);
- Security of oil supply (interconnection and modernisation of pipelines);
- Desulphurisation and reduction of NOx emissions from coal-fired power plants;
- Technology transfer to modernise the energy sector.

Hungary
- Cooperation on energy conservation with institutions, (e.g. with the Hungarian Energy Efficiency Office);
- East-West energy links (oil trade; electricity grid; and natural gas pipelines);
- Expansion of domestic power generation capacity;
- Environmental aspects of oil refineries.

Poland
- Establishment of a (regional) agency for energy conservation;
- Institution of a conservation programme for the transport system;
- Legal support for the efficient use of energy;
- Analysis of investment choices in the energy sector and review of the role of government in relation to investment in the energy sector;
- Development of a framework for formal relationships between government and state owned energy industries in the medium term;
- Development of programmes to limit social dislocation generated by restructuring of the coal industry, particularly in Lower Silesia;
- Cooperation on the repowering of power plants, particularly in relation to meeting environmental regulations. The main requirement is in identifying sources of investment capital;
- Maintenance and improvement of district heating systems. Major requirements are restructuring of pricing systems, installation of metering systems, maintenance and protection from corrosion of valves and piping;
- Environment - low cost options for the control of emissions from small combustion sources;
- Modernization of distribution system, notably in the oil products sector;
- Study of options for gas imports in conjunction with the needs of other countries, with particular attention to the evolution of absolute and relative costs of gas;
- Feasibility studies on renewable energy sources (eg. geothermal energy).

Romania

- Supply/demand studies with emphasis on electrical power systems;
- Re-organization of the energy transformation sector, including in particular the electric power system;
- Rehabilitation and repowering of power plants;
- Development of the electricity network and interconnection with networks in other countries;
- Introduction of combined heat and power plants using natural gas and low coal combustion technologies;
- Pilot projects for energy conservation in industrial sectors;
- Substitution of fossil fuels by renewable energy sources;
- Analysis of investment choices in the energy sector, particularly in nuclear and hydro power plants;
- Technology transfer to modernise the energy sector;
- Desulphurisation and reduction of NOx emissions from coal-fired power plants
- Legal support for the efficient use of energy.

Yugoslavia

- Energy technology dissemination and transfer;
- Development of the gas and electricity network and interconnection with networks in other countries;
- Pilot projects for energy conservation and efficiency in different sectors (households, industry, transport, etc);
- Rehabilitation and repowering of thermal and hydro power plants;
- Expansion of domestic power generation capacities;
- Increase use of natural gas;
- Studies for coal gasification;
- Modernization and management in the refinery sector;
- Improvement of distribution of electricity;
- Combined heat and power possibilities;
- Increased utilisation of renewable energy sources.

While we already have a substantial amount of information on the situation in these countries in the energy sector, it may be necessary to send further missions to the countries concerned in order to evaluate more precisely their medium and longer-term needs. The IEA sent a mission to Poland at the beginning of November 1990 to conduct a broad review of the sector which has already provided useful information. Furthermore, the United States has sent a mission to Central and Eastern Europe in December 1990 in order to examine the prospects for co-operation in the sector. The additional information which becomes available as a result of these two initiatives and others should be communicated through the G-24 framework in order to avoid unnecessary duplication.

7. Concluding remarks

The Commission would welcome, after the comments received from the meetings of 5 and 21 December 1990, that the present High Level meeting of the G-24 approves sections 1-5 of this paper and in particular its analysis of the situation and proposed approach for cooperation over the medium and longer term with the six Central and Eastern European countries as outlined in Sections 4 and 5.

The Commission proposes that the G-24 takes note of a preliminary list of areas for cooperation and specific projects identified in Section 6.

Furthermore, G-24 should recommend the Commission to send this paper to the six Central and Eastern European countries as a basis for discussing G-24 assistance to them.

PARTICIPATION OF WESTERN EXPERTS AND CONSULTANTS IN THE PHARE PROGRAMME

The Commission normally calls upon western experts and consultancies for the execution of the PHARE technical assistance programmes. Consultants are sent to Central and Eastern European countries inter alia *to make preliminary studies, establish terms of reference for projects, as members of a PIU (Programme Implementation Units in the beneficiary countries manage implementation of sectoral programmes including those for energy) as well as to carry out a project itself. The Official Publications Office of the European Communities in Luxembourg recently issued an 'operational guide' to the PHARE programme. For experts and consultants wishing to participate in the PHARE programme the following part of the brochure is of particular interest.*
It should be noted that the brochure does not yet cover specifics for those countries (such as the Baltics, Albania, etc.) which only recently became eligible for support under PHARE.

Experts and consultants who wish to participate in the PHARE-energy programme may send their official request, indicating the (energy) fields of interest, countries of interest and evidence of experience and capacity, to both of the following addresses:

Commission of the European Communities
Directorate-General for External Relations
Phare Operational Service
Mr M. Franco
200 rue de la Loi
B-1049 Brussels
and:
Commission of the European Communities
Directorate-General for Energy
Mr P. Lambert
200 rue de la Loi
B-1049 Brussels

EXTRACT FROM THE OPERATIONAL GUIDE TO PHARE

... PROGRAMME IMPLEMENTATION

Typically, PHARE programmes call for technical assistance by Western experts and consultants, the procurement of supplies or provision of start-up funds.

WHO IS RESPONSIBLE?

In line with PHARE's general approach, it is normally the recipient countries' role to purchase the necessary supplies and contract the services using Commission procedures. In many instances, a special programme implementation unit (PIU) is set up by the recipient government agencies to undertake these functions.

WHAT IS THE COMMISSION'S ROLE?

The implementation units act in close cooperation with the Commission's services: its PHARE Operational Service in Brussels and its Delegations in the respective capitals of Central and Eastern Europe. They not only help prepare tender specifications and contracts in accordance with Community financial regulations but also monitor and audit tendering proceedings, contract awards and payments. Whatever their participation in any given project may be, however, responsibility and decision lie ultimately with the recipient countries.

WHAT PROCEDURES ARE USED?

In providing these forms of assistance PHARE follows established Community procedures in the area of external aid, governed by the financial regulation applicable to the general EC budget.
As a general rule, contracts may only be awarded by direct agreement when their value does not exceed ECU 50 000; in excess of that amount, open or restricted tendering procedures are applied.
As far as procurement of supplies is concerned, an open tenders procedure is used in which all interested parties from the Community and any of the recipient countries can participate on equal terms. The calls for tender are published in the respective country according to its normal practices, an abbreviated 'Notice for tender' being published in Series 'C' or supplement 'S' of the EC Official Journal in all official Community languages.
For the contracting of consultants or other services the same rule essentially applies, but the very special nature of most of the technical expertise and

professional proficiency required in each particular case renders it more expedient to restrict contracts and tenders to firms or persons with already proven success and experience in the relevant field.

The awarding national authorities rely significantly on suggestions of suitable candidates made by the PHARE Operational Service. In general, such suggestions are drawn from the information the Operational Service disposes of through its many working contacts, existing data bases in related areas such as Dacron for development aid or inputs from other Directorates-General in their particular fields of activity.

The Operational Service actively tries to broaden this base, continuously receiving and accepting requests from consulting firms to be considered, accompanied by proper presentations which are duly put on file for eventual further reference. Where necessary and appropriate, either with a general purpose or especially for one particular programme prequalification notices are published in the EC Official Journal which invite all interested consultants to manifest their interest and document their qualifications in the respective field of activity. On that basis of proven experience and capacity, suitable consulting firms are then selected for long lists, which are transmitted to the contracting authorities of the various recipient States for reference whenever their services might be required.

Drawing upon these resources and adding the tendering authorities' own proposals, a short list of firms is established for any given restricted tender for technical assistance, which are then invited to tender. There is no national quota to be imposed; acceptance of tenders being on quality and price.

WHAT SPECIFIC COMMUNITY CONDITIONS HAVE TO BE MET?

The particular conditions and formalities to be met in each case are set out in the tendering documents themselves. However, the Community imposes general basic requirements for participating in PHARE implementation procedures:

- participation is open on equal terms only to all natural or legal persons and companies having the nationality or being incorporated with their main establishment or place of business in one of the Member States of the European Community as well as those from any one of the beneficiary countries Bulgaria, Czechoslovakia, Hungary, Poland, Romania or Yugoslavia.
- the supplies to be purchased must originate within the European Economic Community according to the general EC concept of origin. This clause is regularly inserted into all contracts and tenders.
- only the economically most advantageous offer will be retained, giving most value for money. Criteria like technical value and quality of technical assistance, operating costs, delivery periods and, of course, price are mentioned in the tendering conditions of each particular case.
- prices must be quoted in ecus and are paid either in ecus or the currency of one of the EC Member States or of the recipient country.

WHERE CAN INFORMATION ABOUT PHARE PROGRAMMES BE OBTAINED?

Notices of invitation to tender for supplies and prequalification bids are published in all Official Community languages in the 'S' supplement of the EC Official Journal which can be obtained from the Commission's Publications Office in Luxembourg and its normal distribution outlets.

The open tenders specifications can be obtained from the distributions centres listed in the notices of invitation. All tenders are published by the respective national awarding authorities according to national tradition and procedures...'.

PLANNED PHARE PROJECTS (ENERGY)

COUNTRY PROGRAMME

Hungary 1991, MECU 5

1. Restructuring of energy sector/studies (coal and district heating study)
2. Creation of an energy centre
3. Energy statistics
4. Investment data/appraisal
5. Energy savings:
   - National Saving Campaign
   - Pilot Project 1 - energy management in Baranya county
   - Pilot Project 2 - district heating, pilot project in Debrecen
6. Management assistance
7. Potential for renewable energy

CSFR 1991, MECU 5

1. Assistance in energy planning and policy preparation (e.g. least-cost power plan; regulatory institutions etc.)

2. Energy efficiency
   - Buildings
   - Industry
3. Regional energy planning

Bulgaria 1991-1992, MECU 10

1. Assistance in the restructuring of the energy sector (priority fields: structure of the sector, policy formulation, statistics, pricing/taxation, energy saving)
2. Assistance in the nuclear sector (study on national storage site for the final disposal of nuclear waste)
3. Assistance for the diversification and security of supply
   - National programme for the development of domestic lignite
   - Gas supply to households
   - Electricity strategy studies
   - Conversion units Kozloduy NPP to combined gas cycle
     1st phase
     2nd phase
4. Management assistance

Bulgaria - winter 1991-1992, MECU 10

Humanitarian aid, import electricity after shut-down of Kozloduy NPP-unit.

Poland 1991, MECU 3

1. Assistance in energy planning and policy preparation
2. Energy conservation and efficiency
3. Energy legislation and regulatory framework

Romania 1991, MECU 1

1. In the framework of a multi-disciplinary technical assistance in energy sector (energy efficiency, training etc.)
2. Electricity restructuring

Estonia 1991, ECU 250 000

General T A in energy sector (expert in Ministry)

Latvia 1991, MECU 1.25

1. General energy TA for Ministry
2. Energy saving strategy
3. Energy restructuring plan

Lithuania 1991, MECU 1.75

1. General energy TA for Ministry
2. Assistance to set up energy strategy
3. Safety assessment Ignalina NPP

REGIONAL PROGRAMME

Bulgaria 1991, MECU 11.5

Emergency programme nuclear safety Kozloduy

1. Industrial emergency programme (specific six-month programme, housekeeping and twinning)
2. Specific nuclear safety aspects (verification, safety evaluation etc.)
3. Electricity supply study

CSFR 1991, MECU 3.5

(continuation of Phare/Environment 1990 for CSFR)
Nuclear safety in CSFR, phase 2 (Bohunice)

1. Accident localization compartments
2. Emergency cooling
3. Nuclear Safety, inspection

PHARE/ENVIRONMENT 1990 AND 1991: PROJECTS RELATED TO ENERGY

Poland 1990, ECU 8 800 000

1. Setting up of production of flue gas desulphurisation equipment for coal-fired power plants
2. Setting up of production of circulating fluidised bed boilers
3. Desalination relating to Czeczott hard coal mines

Poland 1991, ECU 4 500 000

Low level air pollution emission abatement.

Hungary 1990, ECU 6 513 000

1. Study SO2 emission reduction at three power stations
2. Fluidised bed installations at Ajka power station and extension of municipal natural gas networks at Dorog
3. Geothermal pilot project
4. Taurus rubber plant, energy saving
5. Thermal water resources study

Czechoslovakia 1990, ECU 3 800 000

Nuclear safety, phase I

1. Evaluation of seismic risk at the Bohunice site
   Evaluation of operational safety of V230 reactors (two units in Bohunice) including a preliminary study on accident probability
2. Study for replacement of information and control systems for V213 nuclear reactors
3. Basic engineering services for control system of Temelin nuclear reactors (under construction)
4. Upgrading of operators' knowledge of modern nuclear technology
5. Engineering services for Prunerov II desulphurisation

Ex-GDR, ECU 3 100 000

Reduction emission of Meissen-Rechts heating station and Dresden-Mickten heating/power station.

2. EC-ENERGY COOPERATION WITH THE STATES OF THE FORMER USSR

BY Claudia Gintersdorfer, DG XVII *(expert)*
Energy Policy Division, Policymaking Unit

Since the European Council decided, at its Rome meeting in December 1990, to support reform and recovery of the economy in the former Soviet Union, momentous events have transformed the former USSR into a loose Commonwealth of Independent States. Following the Minsk agreement of 8 December to which the non-Slavic Republics (with the exception of Georgia) subsequently acceded, the Community recognized the sovereignty of the 11 CIS Republics. At this stage an Indicative Programme for Technical Assistance in 1991, laying down general guidelines, as well as Sectoral Programmes for energy, management training, food distribution, transport and financial services had already been signed with representatives of the central Soviet authorities.
Considerable difficulties confronted the Community as regards the implementation of the 1991 TA programme, which was conceived before the disintegration of the Soviet Union, following the new political and economic realities. Many former all-Union ministries have been dissolved or are being reorganized, and as a result fact-finding missions to identify reliable interlocutors in the CIS Republics have consumed valuable time. Following implementation of the 1991 programme, a new decentralized approach, has been adopted for the current year reflecting more fully the specific needs of each Republic.
The main subject of the present article is the EC Technical Assistance programme to the CIS (TACIS), but a brief overview of other forms of Community cooperation with the New Independent States is also included, notably Thermie, the European Energy Charter, bilateral agreements and the follow-up of the Washington Conference.

BACKGROUND

The area covered by the former Soviet Union is one of the richest in the world in natural resources, accounting for 21% of world energy production, most energy resources being concentrated in Russia, which accounted for 91% of oil, 77% of gas and over 50% of coal production in the former USSR. Other Republics with important energy reserves include Kazakhstan and Azerbaijan for oil, Turkmenistan and Uzbekistan for gas and Ukraine and Kazakhstan for coal.
Paradoxically, one of Russia's most lucrative industries and its biggest export earner, has been run down by decades of under-investment in equipment, lack of exploration, depletion of the more accessible reserves as well as the usual overall inefficiency arising from centralized management:

- crude **oil** production is continuing to fall steeply from the peak of 1988. The review of Russia's oil licensing system has further exacerbated the situation, causing a 40% drop in sea-borne exports in the first three weeks of 1992 compared to December of last year. Problems are particularly acute in the main oil-producing region of Tyumen in Western Siberia where social unrest among workers has contributed to the steep decline in production.
- the state of the **gas** industry is somewhat better - nevertheless, the growth rate has slowed down since 1986 and will not make up for the decline in oil production. Poor maintenance of pipelines and the danger of disruption due to political disputes between producer and transit Republics are potential threats to future development.
- the **coal** sector has been in stagnation for the past 20 years. Old mines are in a poor state of repair and uneconomic to run, while untapped deposits are situated in remote areas. Rail transport is hampered by a lack of capacity. Miners' strikes due to bad living conditions have contributed to a decline in production.

To date, capital investment by major foreign companies has faced political and legal obstacles, including the unstable political situation aggravated by ethnic tensions, the absence of complete adequate taxation and other legislation, and conflicts of competences between federal and regional authorities.

Thus small and, incidentally, highly profitable service contracts aimed at minimising the sheer waste of oil by replacing leaky pipes or reopening idle wells, have so far tended to take precedence over long-term investments.

The Russian government has embarked on an ambitious reform programme aimed at creating a favourable investment climate. A **law on mineral rights** was passed on 21 February 1992 introducing a licensing system for access to resources and rules on the sharing out of royalties among federal and local authorities. A draft **law on foreign concessions** is under discussion and gradual lifting of price controls for energy and raw materials came into effect from mid-April.

Successful reform is, however, hampered by a number of factors, including the decline in production, an upturn in inflation, balance of payments difficulties, the fall in exports and increasing demand for the import of foodstuffs, medicine and spare parts.

Assistance to get through this difficult transitional period, which has been described as a 'no market, no plan' situation, is therefore urgently needed. Recovery in the energy sector is a key element in the overall reform process as it affects export earnings and imports as well as other sectors and branches.

Finally, the Chernobyl catastrophe and the alarming safety deficiencies subsequently discovered in most nuclear reactors of Soviet design (RBMK and the older VVER) make it imperative to implement an emergency programme in order to avoid another nuclear accident.

In the area of energy saving, a notion unknown in the former USSR, there is an enormous potential for achieving quick results by reducing wasteful demand, rather than increasing production in order to meet energy needs, while at the same time reducing the harmful effects to the environment.

Energy production in the ex-USSR (1989)

	OIL	NATURAL GAS	COAL	ELECTRICITY
ex-USSR (%)	100.0	100.0	100.0	100.0
Russia	90.9	77.4	55.4	82.5
Ukraine	0.9	3.9	24.3	17.2
Belarus	0.3			2.2
Moldova				1.0
Estonia				1.0
Latvia				0.3
Lithuania				1.7
Georgia			0.2	0.9
Armenia				0.7
Azerbaijan	2.2	1.4		1.4
Kazakhstan	4.2	0.8	18.7	5.2
Turkmenistan	1.0	11.3		0.8
Uzbekistan	0.5	5.2	0.8	3.3
Tajikistan			0.1	0.9
Kyrgyzstan			0.5	0.9
ex-USSR	607 Mt	796 Mrd m3	740 Mt	1722 TWh

Sources: OECD, IMF, World Bank, 'A study of the Soviet economy' (Le Monde 27.8.91), Planecon.

Oil in the ex-USSR

	REFINING CAPACITY				PRODUCTION
	1970		1989		1989
	Mt	%	Mt	%	
Total ex-USSR	264	100	455	100	100
Russia	199.0	75.4	284.0	62.4	90.9
Ukraine	14.0	5.3	53.0	11.6	0.9
Belarus	12.0	4.5	41.0	9.0	0.3
Moldova					
Estonia					
Latvia					
Lithuania			14.0	3.1	
Georgia	4.0	1.5	4.0	0.9	
Armenia					
Azerbaijan	21.0	8.0	22.0	4.8	2.2
Kazakhstan	4.0	1.5	22.0	4.8	4.2
Turkmenistan	5.0	1.9	7.0	1.5	1.0
Uzbekistan	5.0	1.9	8.0	1.8	0.5
Tajikistan					
Kyrgyzstan					

Source: Planecon.

TECHNICAL ASSISTANCE PROGRAMME

INITIAL DECISIONS

In December 1990 the European Council in Rome allocated ECU 400 million to the 1991 technical assistance programme for the former Soviet Union with the objective of supporting its transition towards a market economy. The total amount was split up between five priority sectors as follows:

	MECU
Energy	115
Management training	103
Food distribution	74
Transport	45.8
Financial services	37.5

Of the overall budget, ECU 15 million was earmarked for the three Baltic Republics which will, however, be included in the PHARE programme from 1992 onwards.

Council regulation (EEC/EURATOM) No 2157/91 of 15 July 1991[4] placed the Technical Assistance Programme on a legal footing and after approval by EC Member States the 'Indicative Programme' was signed by Commission Vice-President Andriessen and USSR Ambassador Voronin on 2 August 1991.

INDICATIVE PROGRAMME

The so-called 'Indicative Programme' lays down annual general guidelines for the various sectors with a view to promoting transition to a market economy. Assistance measures comprise policy-making advice, the design of a legal and administrative framework, training, the reorganization of existing institutions and the setting-up of new ones. Reasonable costs of supplies required for carrying out these operations are also covered. Implementation is based on a decentralized approach, closely involving aid recipients themselves, and is aimed at maintaining a balance between Republics, giving priority to integrated programmes with a degree of geographical concentration.

IMPLEMENTING PROCEDURES

The Commission, assisted by the Member States' 'Management Committee for Assistance to the USSR', is responsible for the final selection of projects and implementing the programme. Participation is open to enterprises based either in the Community or the former Soviet Union.

On the CIS side a Coordinating Unit (CU) located in Moscow and staffed by CIS and EC experts, assists in the day-to-day running of the programme. Its tasks include: informing potential recipients, receiving and examining financing applications before passing them on to the Commission as well as participating in running the programme itself.

SECTOR PROGRAMME FOR ENERGY

Following approval by the Management Committee on 10 October, the financing decision was taken by the Commission and the Sector Programme for Energy was signed by Messrs Andriessen and Silaiev (Chairman of the Inter-State Economic Committee of the USSR) on 12 December 1991.

The main guidelines for assistance in the energy sector are:

- the overall objective of supporting reform and recovery of the Soviet economy;
- the general framework provided by the Energy Charter process which aims to develop East-West cooperation in the energy field by exploiting mutually complementary needs and resources. The object of Technical Assistance is to assist with the practical implementation of this process;
- the identification of five priority sectors of assistance, i.e. nuclear safety, energy saving, electricity, oil/gas and sector structures (legal and administrative frameworks)

Out of the total MECU 115, nuclear safety claims the lion's share (MECU 53) for obvious reasons, i.e. the risk of another major nuclear accident. Another MECU 21 is allocated to energy saving as there is an enormous potential for more efficient energy use in the former USSR which could bring significant improvements within a relatively short period of time. A more detailed breakdown of budgetary allocations by sub-sector follows this article.

PROGRESS TO DATE

As already indicated, implementation of the 1991 programme has been complicated by the dramatic political changes which occurred after the inception of the TACIS programme. One of the main obstacles hampering progress is the difficulty of identifying responsible interlocutors in the Russian Federation and the other Republics with whom to discuss projects on an on-going basis.

In February of this year a series of visits covering the nuclear, electricity and oil and gas sectors were undertaken in order to finalise projects with authorities in the Republics, as well as with the end recipients concerned. A number of projects for immediate launching have been selected, while others require

[4] *OJ No L201 of 24.7.1991, p. 2.*

further work to finalise the terms of reference before calling for tenders.

1992 PROGRAMME

It is planned to set up national Coordinating Units in each of the twelve Republics, answering to a high-ranking official who would be the Community's interlocutor. For a transitional period the existing Coordinating Unit in Moscow which will eventually become the national unit for Russia will continue to represent the other CIS Republics. This approach will facilitate decentralization, ensuring that each Republic receives a fair share of the TA budget, as well as improving direct communications with the Commission and interested economic operators in EC Member States.

The 1992 programme will be based on the priority sectors already identified in 1991 - with the option of adding some new priorities - in order to guarantee consistency. The choice and relative weight of each sector will, however, depend on the priorities of each individual Republic.

In addition, a budgetary allocation has been set aside for regional projects involving three or more Republics, to deal with horizontal or wider issues such as economic reform and telecommunications as well as energy.

THERMIE/TACIS ENERGY CENTRES

The four Thermie centres set up in the CIS, and dealt with elsewhere in this feature, are to be reinforced under the TA programme as regards their energy efficiency activities, and the establishment of new centres in other locations is envisaged. Thus an initial energy efficiency infrastructure is to be set up in the CIS with a view to reducing energy consumption through a programmed approach.

EUROPEAN ENERGY CHARTER

The idea for a pan-European Energy Charter, the brain-child of Dutch Prime Minister Ruud Lubbers and dealt with in greater depth elsewhere in this feature, is to develop existing complementarities between energy producers and consumers and holders of technology with the aim of promoting the establishment of a market economy in Europe and indeed beyond. It obviously took the needs and capacity of the former Soviet Union and the countries of Central and Eastern Europe as its starting point.

The uncertainty over who would sign the Charter on 16-17 December in The Hague on behalf of the Soviet Union in fact threatened to derail the Charter process at the last minute. A compromise formula was adopted, providing for signatures of each Republic as well as the Inter-State Economic Committee, but without official recognition of the Republics' sovereignty. It was agreed to leave the Charter open for signature by those Republics not present in The Hague - at the time of writing Turkmenistan's interest in participating in the Charter process continues to be doubtful.

The underlying problems for the CIS Republics, apart from organizational difficulties, are the fast pace of negotiations not allowing Republics to familiarize themselves with the complex issues involved and to coordinate their position, as well as their non-participation in many of the international agreements which bear a direct relationship with issues addressed in the Basic Agreement (notably the GATT and the OECD investment code).

The Russian delegation has therefore requested to reschedule some of the meetings in order to allow other CIS delegations to acquaint themselves with the documents and the 'rules of the game' between countries in the international economic community. A special seminar for this purpose took place in May and the possibility of setting up a Charter coordination centre in Moscow is also being examined. Moreover, a 'Transition Sub-Group' is to be set up in the framework of the Basic Agreement with a view to preparing draft provisions on transitional arrangements for the CIS and Central and East European countries.

BILATERAL COOPERATION AGREEMENTS

The Community wishes to conclude specific cooperation agreements with the CIS Republics which would be adapted to the specific situation of each partner, also taking into account its geographical location. While going further than purely commercial agreements they would be a 'half-way house' to the so-called 'Europe Agreements' negotiated with some Central and Eastern European countries. Priority will be accorded to agreements with the Russian Federation, Belarus, the Ukraine and Kazakhstan.

WASHINGTON CONFERENCE FOLLOW-UP

The US launched the initiative for an international conference on the coordination of short-term emergency assistance to the New Independent States, which met for the first time in Washington from 21-23 January 1992. Almost 60 countries and a number of international organizations attended. Five working groups for energy, medical aid, food, housing and technical assistance were set up, the latter being co-chaired by the Commission. The follow-up of the Washington Conference is in the hands of the

Community, which organized a Ministerial Conference in Lisbon in May to which the CIS Republics were also invited.

In the meantime the Energy Working Group met in Paris on 7 February to launch three parallel missions covering most of the CIS Republics in order to establish a more satisfactory inventory of their needs, and to receive their reports, in Brussels in April. Organization of the missions has been entrusted to the IEA and the Commission who will also invite industry representatives to take part. A further meeting took place in Paris in May in preparation for the Lisbon Ministerial conference.

Conclusion

In spite of the difficulties described earlier, the 1991 TACIS programme is now well under way. While still assigning pride of place to Russia, which is both the largest Republic and the main energy producer, this year's programme adopts a decentralized approach to take account of the new political realities.

The Technical Assistance programme acts as a pillar in the architecture established under the European Energy Charter by promoting the transfer of EC know-how to the East and serving as a catalyst in attracting the foreign investment necessary for the reconstruction of the energy sector in the CIS Republics.

Coordination of Community assistance with that of other countries and international organizations is taking place in the framework of the Washington process which aims at providing short-term assistance in several priority sectors to satisfy immediate energy needs and thus ease problems of transition. If political stability can be achieved and the commitment towards the radical reform process launched by Russia is maintained, the energy sector could become a crucial element in the integration of the CIS Republics into the world economy and their transition towards a market system.

TACIS SECTORAL PROGRAMME FOR ENERGY 1991: BUDGETARY ALLOCATIONS

	MECU	
Sectoral structures		**2**
Energy saving		
Energy saving strategy	1	
Energy Centres	10	
Specific projects and activities	10	
Total		*21*
Nuclear safety		
Operational safety (including safety analyses)		
VVER V-230	30	
RBMK	8.5	
All reactors	5	
Training and management centres	4	
Sub-total	47.5	
Reinforcement of safety authorities and public information	5.5	
Total		*53*
Electricity		
Restructuration and adaptation to market economy	10	
Electricity production and environmental aspects	5	
Export of electricity from the USSR	2	
Total		*17*
Oil and gas		
Regulatory framework	3	
Oil and gas transport	5	
Oil and gas production and refineries	9	
Total		*17*
Implementation		**4**
Monitoring and evaluation		**1**
TOTAL		**115**

3. EAST-WEST COOPERATION IN THE ENERGY FIELD SECTOR-BY-SECTOR

A. HYDROCARBONS

BY Antonio Garcia Fragio DG XVII
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The hydrocarbons sector in the CIS has run into increasing difficulties in spite of the efforts made by the central planners to redress the situation. Now, after the fall of Communism the system is gradually moving into a market economy and opening to foreign assistance. This outlines some of the problems of the hydrocarbons sector and describes in further detail the Community's efforts undertaken with resources from the 1991 budget to provide Technical Assistance.

SOME FACTS AND FIGURES ABOUT OIL AND GAS IN THE CIS

About 40% of world's proven gas reserves are in the territory of the CIS. The Russian Federation is the world's largest gas producer with an annual production of about 80% of the total 830 billion cubic meters produced by the CIS. Gas production increased by a factor of four throughout the period 1970-1990 and has remained practically constant for the last two years.

The gas transmission network developed in parallel with the increasing gas production and the CIS has nowadays over 230.000 km of gas transmission lines, out of which some 21.000 km are about 30 years old. The CIS integrated gas system includes more than 250 gas and gas/condensate fields, several hundred gas compressor stations and over 45 underground storage reservoirs totalling 140 billion cubic meters. This giant gas production and transmission network is commensurate with:

- the huge size of the territory;
- the strong concentration regarding production areas, as about 85% of the natural gas output comes from Western Siberia and Central Asia;
- the fact that gas consumption is at present also concentrated in the highly industrialized and densely populated areas of the European part of Russia, Ukraine and Belarus, which are distant from the producing areas.

The CIS is also a large world oil power, though its oil production and reserves represent a smaller share in world terms than in the case of gas. In fact, the territory of the CIS holds only about 6% of total world proven oil reserves, but currently produces about 15% of the world total. The Russian Federation is the major producer with about 90%, the other main producers being Kazakhstan, Azerbaijan, Ukraine, Belarus, Uzbekistan, Turkmenistan, Tajikistan and other Central Asian Republics.

Oil production declined from a peak of 624 mtoe in 1988 to 518 mtoe in 1991. This trend is expected to continue throughout 1992 and oil production may have dropped by the end of 1992 by about 25%, with respect to the peak levels of 1988.

MAIN FEATURES AND GENERAL PROBLEMS OF THE HYDROCARBONS SECTOR

The downturn in world energy prices occurred in the mid 1980's, coincided with the beginning of the slow-down in hydrocarbons production in the former Soviet Union. Oil output first fell in 1985, recovered in 1986-87, but began to plummet again after 1988, putting the spotlight on the contradictions and rigidities inherent in the Soviet hydrocarbons sector.

As in the rest of the energy field, central directives governed hydrocarbons activities and assigned production quotas, allocated investments and established prices, in the absence of any direct interfaces between producers and customers. As many as five different Ministries[5] had been allocated

[5] *The USSR Oil and Gas Ministry, The Ministry of the Gas Industry, The Ministry for the Chemical and Oil Refining Industry, The Ministry for the Construction of Oil and Gas Installations, The Ministry of Geology.*

responsibilities in the hydrocarbons sector (sometimes with overlapping, occasionally with conflicting interests) and controlled the drilling, producing and transportation bodies responsible for operations.

The lack of flexibility of a system established on the basis of centrally planned targets led to many distortions and anomalies. For example, in order to fulfil targets of meters drilled, on the basis of which drilling concerns were remunerated, these enterprises seem to have concentrated on drilling a large number of shallow wells, rather than a lesser number but generally more difficult deeper bores, sometimes leading to suboptimal reservoir drainage patterns. On the production side, intensified pressure to increase output, and thus to satisfy foreign exchange requirements, meant rapid recovery programmes rather than more rational approaches based on ultimate recovery values.

The familiar picture continued with unrealistic price levels, not reflecting real costs and scarcity value of the products, not allowing efficient matching of supply and demand. Enormous wastages are reported throughout the production-distribution chain. Significant amounts of associated gas seem to have been flared on production sites, not to mention the losses in the pipeline gathering systems which according to some former Soviet sources could represent as much as 2% of total oil produced.

Apart from the direct effects that the centralised command economy, with its rigid mechanisms of control and inadequate incentives, have had on the hydrocarbons sector, the isolation and autarchy embodied in the Communist system also played a role. The oil and oil equipment industries lag years behind Western industry: the price collapse during the eighties, obliged the latter to improve efficiency and reduce production costs, and to embark on new technological programmes. The Soviet oil industry did not have to face this challenge and remained anchored in its traditional way of operating. Lack of modern oil field equipment, such as that required for artificial lifting, poor steel pipe quality, the scarcity of blowout preventors and the absence of modern mud technology are only some of the examples of the pressing technological needs in the former USSR.

One should however not end this seemingly gloomy overview of the general situation in the hydrocarbons sector without acknowledging the enormous effort already made in developing the pipeline network, especially for gas. The tangible result is that today the CIS network plays a major role in the gas supply security of most of Continental Europe. Again, it should also be mentioned that the former USSR always honoured its contractual gas delivery commitments with the West.

Following the transformation of the USSR into the - admittedly shaky - Commonwealth of Independent States, structural and institutional reforms are gradually taking place. For example, in the Russian Federation a new and more decentralised administrative structure with sectoral and territorial lines of authority seems to be emerging, the issue of ownership of mineral resources is being addressed in new legislation currently bed drafted, and the role of the previous Central Entities and State Production Associations is being redefined. All this should contribute to a new structure for the hydrocarbons sector, more in line with the tendencies towards liberalization and decentralization which are now, despite the uncertainties and perhaps inevitable political fragility, gaining strength in the former USSR.

SPECIFIC PROBLEM AREAS

THE SLOW-DOWN IN HYDROCARBONS PRODUCTION: TECHNICAL AND ECONOMIC CAUSES

Apart from the organizational reasons mentioned earlier, the decline in oil production in the territory of the CIS can be attributed to a combination of factors both economic and technical. On the one hand, capital investment in oil exploration and production has progressively declined since 1989 as a result quite simply of cuts in direct allocation of funds by the Central Authorities, combined with the fact that low domestic selling prices barely covered average production costs, and did not allow producers to generate any surplus for additional investments.

Furthermore, serious equipment shortages have occurred, partly because of disruption and unrest in the major manufacturing republics for oil field equipment, and also following reduced availability of foreign exchange, needed to compensate for the shortfall of CIS production by paying for imports in hard currency. In addition two other factors should be mentioned:

- increasing costs associated with more difficult exploration and production, as the more easily recoverable reserves are depleted and remote and technically more challenging areas are developed;

- on purely technical grounds the operational and reservoir engineering practices used to date are not always those best suited to cope with progressively declining production reservoirs now being encountered. Massive water flooding techniques have been extensively used, which in the beginning allowed high rates of recovery, but now when high depletion stages are reached, may result in lower production rates.

THE UNCERTAIN STATE OF THE PIPELINE NETWORK

The former Soviet Union has been a world pipeline installation leader for years, not only in terms of the high average annual pipeline construction rate, but also due to the fact that a high proportion of their main gas transmission corridors consist of large diameter, thickwall pipes, which have no doubt required substantial economic and technological efforts. In fact most of the world's 56 inch gas pipelines in operation are in the territory of the CIS.

However, this enormous construction capacity, made possible only by the allocation of huge investment and labour resources, has not been always been backed up by construction, operation and maintenance procedures in line with those currently applied in the West.

The former Ministry of Oil and Gas Construction, responsible for designing and building oil and gas pipelines and associated transmission facilities, invariably put quantity before quality. Practices like third party inspection, quality assurance, independent quality control and certification, which are regarded as central to Western manufacturing and construction, failed to develop as such in the centrally-planned system. The result has been that while Soviet Research Institutes are internationally highly regarded, in materials and welding research, many questions are nevertheless outstanding today regarding the reliability of parts of the pipeline network. These concern maintenance and monitoring systems including leak detection and corrosion control procedures as well as operation itself.

AN OUTDATED REFINING SECTOR

More than half of the existing refineries in the CIS were built before 1970, and only about 55% of production is accounted for by medium and light products, while the output of modern Western refineries is over 75% of such products. Plans drawn up in the late seventies and early eighties to build new regional refineries with catalytic cracking units in order to replace part of the traditional refinery capacity, were abandoned due to other priorities in the oil and gas sector.

The impact of neglecting oil refinery investment has been increasingly felt since the mid 1980's, when demand for light products started to grow. The only way in which Soviet refineries could produce more light products was simply to run more crude, thus also of course producing more heavy fuel oil, demand for which was in turn progressively diminishing as a result of increased use of gas as a substitute for oil in the industrial and power sectors.

THE COMMUNITY TECHNICAL ASSISTANCE PROGRAMME

Supporting the reform and recovery of the Soviet economy, and ensuring that the actions undertaken are consistent with the principles and provisions of the European Energy Charter are two key guidelines of the Technical Assistance Programme in the energy sector. Priorities adopted at the outset were the identification of pilot or demonstration projects which can later be replicated, and the development a new structural and legal framework with long-lasting beneficial effects.

MAIN FEATURES OF THE 1991 PROGRAMME

The preceding paragraphs highlight some of the areas in which cooperation is needed and on which International Assistance should concentrate in order to benefit the hydrocarbons sector in the short to medium term, as well as catalytic effects thanks to which the sector could better adapt to the new market environment.

Recovery of the oil and gas sector from its present state will not be achieved without fundamental changes in the areas of pricing and institutional and structural reforms. This is why the Commission has initially given priority *inter alia* to actions aiming at developing a new economic legal and administrative framework under which the burden of centralised decision-making would be gradually removed and independent companies could operate. The Community programme thus provides for the development of new regulatory frameworks covering ownership and development of hydrocarbons resources, introduction of a market based system of tariffs and prices, and assistance in the restructuring of the sector, with a view to introducing competition between enterprises.

But company decision-makers, executives and middle-management personnel will also have to adapt to the new ways of business thinking, while the legislative and institutional reforms are still underway, hence the further priority area of management assistance and training covering business management, marketing and financing, and field management skills.

Looking at the present situation and from a perspective more directly related to current hydrocarbons operations and development, specific actions in the fields of oil and gas production, oil and gas transport, and oil refining have also been identified as priorities.

Regarding oil and gas production, and in view of the complex organizational structure of the oil sector, it was found preferable to select a specific regional objective, rather than a broader sectoral approach covering upstream activities in general. The Tyumen region with approximately 70% of all Russian crude oil production has been selected as a case study where assistance will range from technical advice on

exploration and production to organization and restructuring, and will also address regional development strategy.

In regard to oil and gas transport the progressively deteriorating pipeline network and associated facilities were identified as giving scope for a wide programme of technical assistance, in order to increase safety, improve control systems, reduce losses and cut maintenance costs.

As far as the refinery sector is concerned the present situation is largely caused by old and inefficient processing facilities, which will have to be upgraded to increase efficiency and meet future demand trends. Priority assistance will therefore be in the form of studies to define the future restructuring of the sector, combined with specific case studies on the possible upgrading of selected types of refinery.

MAJOR FEATURES OF THE OIL AND GAS PROGRAMME

In line with these priorities and following the guidelines set out for the sector, the Community decided to finance, over twenty projects from the 1991 budget for a total cost of 17 MECU.

The main projects concerning the institutional and regulatory framework are as follows:

- Assistance in the field of hydrocarbons law. This includes not only the laws and regulations *per se*, but also their implementation, and the type of regulatory bodies which will be needed.
- A workshop on hydrocarbons legislation which should allow open discussion with the Russian legislative experts and officials on the legal framework being developed and lead to recommendations on the institutional and organisational changes required to implement such legislation.
- A study on the reorganisation of the gas sector in the CIS which aims to:

(i) define the structural changes needed to enable the industry to operate efficiently in a market economy,
(ii) identify transitional stages,
(iii) look at how the changes already underway in other sectors of the economy would affect transition in the gas sector.

- A study to draw up a future structure for gas transport tariffs, both internally in the CIS and for gas exports, as well as establishing gas sales pricing principles within the CIS.

A second group of projects related to oil and gas transportation aims at evaluating the present state of the hydrocarbons pipeline network, and developing inspection and maintenance procedures in order to reduce losses and improve reliability. Assessment of the state of the CIS gas compressor installations with a view to their modernization also falls within this group of projects. In the area of gas distribution, two pilot projects have been selected which concern the installation of low pressure polyethelene pipes.

Finally under the oil and gas transportation heading, assistance will also be provided to improve the control system for gas transmission along the main corridors.

Regarding hydrocarbons production, the setting up of a Task Force in the Tyumen region is envisaged, which should assist the Authorities in establishing the economic, legal, social and technical conditions for the future development of the region.

These activities will cover the following areas:

a) Legal aspects linked to hydrocarbons law, taking into consideration the results achieved in other projects supported in the framework of the Technical Assistance programme.
b) Financing aspects, focusing on the ways and means to mobilize and concentrate any financing capacity generated.
c) Contractual matters, with a view to ensuring a legal/administrative framework for establishing sound and secure relationships with the oil and oil services industries.
d) Social aspects including wage structures, welfare facilities and, generally speaking, covering all factors relevant to optimal use of human resources in Western Siberia.
e) Technical conditions to restore production in the short term and to allow for increasing production in the future, in particular:

- advice on exploration tools for evaluation of reserves both in the search for new reservoirs and to improve knowledge of reservoirs already producing;
- recommendations on optimal use of modern enhanced oil recovery techniques;
- identification of needs for modernization of drilling equipment, production facilities and pipeline systems;
- assessment of maintenance and upgrading requirements at production facilities in order to improve environmental conditions;
- recommendations on improved logistics in order to match present production levels and to prepare future plans to cope with possible increases.

Regarding the refinery sector, refineries have been selected for assistance in a number of Republics, and two general studies are under way, one addressing the potential use of modular techniques for refinery upgrading, the other investigating the logistics and flow balances of the existing transport networks in order to identify present and likely future constraints.

A great deal of emphasis has been placed on training, both in individual projects and in sectoral training programmes throughout the whole hydrocarbons sector, as this element is considered crucial if long-term benefits are to be guaranteed.

CONCLUSIONS

To get to grips with the profound political, social and economic changes now occurring in the CIS is bound to require substantial effort and time. Added to the difficulty of shifting from a centrally planned to a market economy is the unprecedented scale of this change, affecting as it does about 300 million people, citizens of what was considered to be the leading power in its part of the world.

Due to the role of oil and gas in the CIS economy and its importance as a source of foreign exchange, technical assistance and foreign investment can both play particularly important roles throughout this transition period. Management expertise, modern technology and equipment are urgently needed and welcomed in order to re-fuel the hydrocarbons sector.

B. SOLID FUELS

BY V. Luque-Cabal, DG XVII
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Eastern and Central European countries as well as several Republics of the Commonwealth of Independent States (ex-URSS) are major producers of solid fuels. In 1987, the ex-Soviet block as a whole, i.e. the Soviet Union and its six European CMEA (COMECON) partners, produced 1.6 Gigatonnes - or 950 Mt of coal equivalent(Mtec) - of both hard coal and low-grade brown coal and accounted for 36% of world coal output (30% in coal equivalent). Actual solid fuels resources in the countries in question are very large, accounting for 28% of world reserves.
Coal mining used to occupy a strategic place in economic systems striving for self-sufficiency. All the economies of Central and Eastern Europe (except Albania) are heavily dependent on locally-produced solid fuels, which represent 75% of indigenously produced energy and 55% of overall energy consumption.

In Poland, solid fuels account for 80% of primary energy consumption, followed by Czechoslovakia, with around 60%. Most of this is domestically produced though there are imports of coking coal for steel-making. In Bulgaria and Yugoslavia solid fuels are marginally the most important primary fuel with around 40% of consumption in each case. In Hungary and Romania, however, coal is less important than either oil or gas and accounts for about 25% of primary energy consumption. Except in Poland, solid fuel production is mainly of lignite and it is commonly mined and used along lines which would be environmentally unacceptable in the West.

Poland is one of the world's largest producers of hard coal and in 1989 accounted for 83% of production in Eastern Europe. Production was steady at about 190 Mt/year between 1982 and 1988 but dropped to 178 Mt in 1989 and 147 Mt in 1990. Production in Czechoslovakia has also been fairly constant at around 25 Mt/year. Romania is the only other large scale producer, with about 9 Mt in 1989 but only 4 Mt in 1990. Hungary and Bulgaria each accounted for about 1.8 Mt in 1990.

The most significant feature of the energy economy of Eastern Europe is the scale and dominance of the brown coal (lignite) industry. This is the result of policy decisions to increase internal self-sufficiency in energy, in particular for electricity generation. Brown coal production in the PECO, excluding the ex-GDR, totals some 340 Mt per year (approximately 110 Mtec per year). This brown coal is not only low in heat valuc; much of it is high in sulphur content and control measures to limit SOx emissions are almost non-existent. There is little effort to reclaim land ravaged by brown coal extraction. The net result is that many parts of Eastern Europe near centres of production or consumption of coal have become environmental disaster areas.

The share of solid fuels in the total energy picture in the CIS Republics differs from that in Eastern Europe because since the 1960's, oil, and more lately gas, have replaced coal in many applications in industry, transport and the household/public utility sector. In 1987, solid fuels accounted for under 24% of USSR total primary energy requirements, not so far from the average of 21% for the OECD countries.

Most of the twelve CIS Republics have producing mines. However, eight major basins account for most of the output. Production is split roughly half and half between the European part and the Asian part of the former USSR. In the Ukraine, the Donetsk is the dominant coal basin producing about 200 Mt/year of bituminous coal and anthracite largely from underground mines. Most of the least-cost resources have been largely exhausted in this traditional coalfield.

The largest producing Republic is the Russian Federation. The Pechora basin, within the Arctic circle, the Moscow basin and the Urals region in the Eastern part of the Republic produce lower rank coals with outputs of approximately 30 Mt/year in each case.

Also in Eastern Russia, the Kuznetsk basin is the dominant region, producing around 150 Mt/year of bituminous coal. About two-thirds of this output comes from underground mines. Except for the new hard coal producing region of South Yakutia in the Russian Far East (15 Mt/year) the development strategy continues to stress the expansion of the eastern surface mines,

among which the Kansk-Atchinsk basin is one of the largest in the world (50 Mt/year).

The Republic of Kazakhstan is the third producer with two coalfields: Karagana which produces about 50 Mt/year of bituminous deep-mined coal and Ekibastuz, which produces 90 Mt/year of low-grade open cast coal.

Internal transport is a most important factor in the coal scene east of the Urals because of the great distances between these enormous resources and the market. Systems such as coal slurry pipelines and 'coal-by-wire' transport, that is transmission of coal-generated electricity at ultra-high voltage (UHV), are at an early stage of development.

Solid fuel comprising either hard or low-grade coal including brown coal and lignite, is expected to remain a key fuel choice in Central and Eastern Europe, including a number of CIS Republics, due to the energy security implications stemming from abundant indigenous supply. But to achieve this, apart from the political and economic reforms that have to follow the overall transition of these countries from centrally-planned systems to market-oriented ones, it will be crucial to find new ways of meeting emerging efficiency and environmental requirements.

Cooperation with Member States and institutions of the European Communities will be vital for the proper management of this transition period. The Community has long experience in solving problems such as the restructuring, rationalization and modernization of the coal industry, the implementation of flanking policies aimed at the associated social and regional problems, and the reconversion and reindustrialization of mining areas. Also on offer are practical solutions to reduce the environmental impact of coal extraction and consumption, especially in populated areas, methods of inter-regional cooperation, and other related experience of great relevance to these countries in their transition to the market economy.

C. NUCLEAR SAFETY

BY Marc Deffrennes, DG XVII
Industries and markets Directorate, Nuclear energy Unit

Nuclear energy is important for the electricity supply of a number of countries: Russia, Ukraine and Lithuania (together about 30% of electricity supply), Hungary (nearly 50%), Bulgaria (33%) and Czechoslovakia (nearly 25%). Nuclear reactors in the new Federal Länder of Germany (ex-DDR) have been stopped.

Most nuclear power plants in these countries are based on two Soviet designs: the VVER type (Pressurized Water Reactors; similar in conception to most Western reactors) on the one hand, and the RBMK type (pressure tubes, water-cooled, graphite moderated, 'Chernobyl' design) on the other hand.

There are roughly 50 VVER type reactors in operation or under construction. The older ones (VVER 440-230) are quite robust but do not have all the safety features required under internationally accepted safety standards: one example is the lack of a containment building. Extensive safety audits have been carried out by international teams of experts of the IAEA (International Atomic Energy Agency) and WANO (World Association of Nuclear Operators). A list of recommendations and proposed upgrading measures has been issued, implementation of which has now to start, focussing first, of course, on the highest priority aspects. The two next generations of VVER reactors (VVER 440-213 and VVER 1000 respectively) come closer to international safety standards, but nevertheless some improvements are needed.

The other type of reactor (RBMK), of which fifteen are in operation on five sites located in Russia, Ukraine and Lithuania, is well known to give rise to greater safety concerns. Substantial improvements have already been put in hand by the international community following the Chernobyl accident, mainly under bilateral agreements, and the IAEA will also start an overall safety assessment of this type of reactor in 1992.

In addition to technical improvement of power plants, the focus must be on upgrading 'safety culture', which is quite inadequate in the East European and CIS countries. Training activities need to be set up, as well as improvement of the capabilities of independent safety authorities.

Finally, upgrading programmes have also to be drawn up as regards the fuel cycle, mainly in relation to waste treatment.

Software up-grading has already been started by the European Community under PHARE (in all East European countries) and TACIS (Technical Assistance to the CIS) budgets, in order to improve the safety of operating plants, fuel cycle related activities and to strengthen national safety authorities.

As with all other activities under PHARE and TACIS, the Directorate-General for External Relations (DG I) is managing the programmes in each case with the support of the technically competent Directorates-General. Thus, DG XVII has the technical lead in its sector at industrial level (operators, design and engineering offices, architects and suppliers).

PHARE ACTIVITIES

For Czechoslovakia three projects have been drawn up so far under PHARE 1990: probabalistic safety assessment (PSA) for Bohunice VVER 230; instrumentation and control (I&C) study VVER 213; I&C study VVER 1000. The call for tenders has been sent out and bids are currently under evaluation.

A regional PHARE 1991 programme was defined in mid-1991 on an emergency basis in response to the concern the IAEA had shown as regards safety of the four VVER 230 plants at Kozloduy in Bulgaria.

Major operations under this programme engaged in this field relate to:

- housekeeping activities at Kozloduy;
- twinning arrangements between the Kozloduy and the Bugey nuclear power plants;
- strengthening of safety authorities;
- start of industrial activities described in the WANO programme (six months).

The first three activities were started in 1991. For the fourth industrial contractors have been chosen, and the contracts should be signed very soon. Part of the budget is still available to fund two projects in Czechoslovakia.

A draft financing proposal for the regional nuclear programme has been drawn up by the services of the Commission for 1992 and is presently under discussion with the competent authorities in the beneficiary countries.

TACIS ACTIVITIES

From the 1991 budget 53 million ECU will be spent in the field of nuclear safety improvement. A very successful meeting took place at the beginning of February in Moscow where a Commission delegation met with various counterparts from Russia, Ukraine, Lithuania and Armenia. As a result, a list of about 30 projects has been agreed upon with corresponding budgets. Most of the funds will be spent on improvement of the oldest VVER 230 reactors. Technology transfer projects in the field of training and reactor operating safety were also approved. Support to the regulatory safety authorities in Russia and the Ukraine will account for 25% of the total budget.

For 1992 a provisional total amount of ECU 450 million has been earmarked for Technical Assistance to the CIS but the breakdown between different sectors is still to be decided.

Part of the budget for the 1992 programme will be spent on retraining and reconversion of ex-Soviet nuclear experts hitherto engaged on military programmes.

FUTURE

It is clear that operations so far set in train with European Community funding are only a starting point and would remain ineffective if not integrated within a broader perspective. Means have to be found to finance hardware modifications and upgrades of both operational installations and plants under construction. The cost of such activities will be greater than present software evaluation exercises and will be beyond the scope of the PHARE and TACIS budgets. The European Community is presently investigating ways to fund these long-term activities, which constitute the only means of definitively increasing nuclear safety in the countries of Central and Eastern Europe and in the CIS.

D. ELECTRICITY

BY Pierre Mallet, DG XVII *(national official on secondment)*
Industries and markets Directorate, Electricity Unit

Lenin once defined Communism as giving power to the Soviets plus bringing electricity to the whole country; not surprisingly much effort has since been made in this sector by our Eastern neighbours. Now that Communism has been dropped, assistance in the transition to a market economy in this particular field has taken on an obvious symbolic significance.

ELECTRICITY IN THE EAST: PRESENT SITUATION

First of all, in the electricity sector as in the rest of the economy in formerly Communist countries, there is as yet no clear distinction between the State and industry: either the tasks of utilities are simply done by a department of the Ministry of Energy or, where electricity companies exist as separate entities, they are not really independent and most decisions are still taken by the administration. Besides, the management methods applied are not in line at all with market economy conditions: there are, for instance, no adequate accounting procedures, no knowledge of corporate finance, insufficient decentralization of responsibilities, etc.

Another characteristic of the sector, which is in fact a common problem for the majority of public services in Eastern countries, is the inadequate level of tariffs. Among other things this counters any real incentive for energy conservation, and access to financial resources much needed for investments.

Moreover, as in other sectors in the energy field, Central and Eastern European countries are marked by high per capita consumption compared to their level of development. Estimation of future demand is thus extremely difficult because, generally, when a country achieves a higher level of development, its energy intensity decreases as the share of electricity in the total energy consumption increases. This implies that, in Central and Eastern European countries, two competing trends will be observed: on the one hand, as energy intensity decreases and conservation policies start to show positive results, demand will fall; on the other hand, new electricity uses will certainly come on stream, pushing up consumption.

Another feature, linked to the very high capital-intensity of the electricity sector, is the fact that large investments will be needed in these countries: we are speaking in terms of several tens of billions of ecu or even more; moreover, this gigantic effort will have to be made against a background of scarce financial resources.

On the production side of the electricity industry, the situation is characterized by many old, inefficient and polluting plants. In some countries, insufficient maintenance, the lack of spare parts and the use of inadequate fuels have led to very low plant usage rates. Quite often, extensive use of indigenous solid fuels is still the rule. Some Central European countries are still very dependent on the ex-USSR. Also many nuclear power plants were built and are still operated under inadequate safety standards. Moreover, in Central and Eastern European countries electricity production is responsible for a large proportion of polluting emissions, and the disastrous situation as regards the environment in this area demands dramatic action.

On the transmission side, a very real 'electrical iron curtain' still exists in the sense that the Eastern and Western electricity networks, although using the same frequency, are not operated on a synchronous basis. Exchanges between these two systems are therefore only possible through back-to-back conversion stations (converting alternating current to direct current and back again to alternating current) or by isolating certain areas within one of the systems and connecting them to the other. The first solution is very costly and the second one cannot offer satisfactory supply quality: this situation of course limits exchanges greatly. Moreover, the introduction of synchronous operation will itself take time because of the current difference in performance level between the two systems, which means that the quality of supply now offered by the Western electricity companies might be adversely affected in case of premature connection and that prior improvements are therefore necessary.

GUIDELINES FOR COMMUNITY ACTION

It is clear from the foregoing analysis where the priorities for the Community action must be set. Assistance is urgently needed for restructuring the sector, to define a new legislative framework, to introduce modern management methods adapted to the market economy, to promote energy efficiency, to help in the modernization of power plants, including from the environmental point of view, notably by allowing technology transfers, and to contribute to the future development of exchanges through networks improvements.

EXAMPLES OF OPERATIONS IN CENTRAL AND EASTERN EUROPE

In most of the central and Eastern European countries, the Community will fund 'Energy Restructuring Groups', providing high-level local authorities with advice on overall energy policy and the electricity sector is of course a major element in this process.

In Romania, the Community is sponsoring a preparatory study for the restructuring of the electricity sector in two parts: the first deals with the regulatory and institutional framework, including a critical review of the existing organizational structures and procedures, an evaluation of alternative organizational structures, (e.g., vertical integration versus independent companies based on functional lines, national versus regional organization, divestment opportunities, etc.), and an assessment of current and possible future forms of ownership, including an evaluation of gains in efficiency to be expected from private sector involvement. The second part of the study will address management issues and include an assessment of present management techniques and procedures, a critical review of staffing and training, resources and requirements required by restructuring proposals, and an evaluation of present accounting systems and financial practices. Each of the above points will include recommendations for action with a detailed plan for phased implementation

In Romania and Czechoslovakia second studies are being funded, in the shape of least-cost development plans for the respective electricity sectors.

In Bulgaria, the Community is sponsoring a strategy study for the electricity sector in cooperation with the US Agency for International Development. This covers five aspects: restructuring of the sector, demand forecast and provision of recommendations on demand side management; a development plan for power generation and for the high voltage network, and environmental problems.

A regional study is envisaged with the aim of improving the situation as regards the transmission networks: its purpose would be to define technical solutions to increase power exchanges between East and West in the short, medium and long term and to evaluate their profitability. The study will have to examine the possible benefits of synchronous operation of the two systems, determine the prerequisites for this, and assess whether it is preferable to connect all the countries at once or to adopt a step-by-step approach. It will also have to define 'target networks' in various scenarios. This would provide a medium and long-term perspective which could be most useful for investors, particularly considering the high costs and long life-time of the investments required in this field. The study should be action-orientated and include and justify a list of investments required for the high-voltage networks in the short, medium and long-run.

Lastly, as successful transition to the market economy will require much change in attitudes and perceptions of key personnel in both Government departments and energy enterprises in Eastern countries, there is a very substantial job to be done in the way of management education and development in the energy sector. For that purpose, a regional training scheme is envisaged which would involve personnel from the East spending extended periods of time in counterpart organizations in the EC. By this means, a common management culture with shared values, attitudes and techniques should be spread eastwards.

EXAMPLES OF OPERATIONS IN THE CIS

In the framework of the Technical Assistance Programme to the CIS, the Community will support about 30 projects in the electricity sector, with a total budget of 17 MECU, which will include the following studies:

- acceptable arrangements for the structure, organization and the financial and operating arrangements of the electricity supply industry;
- definition of the legal framework in which the electricity supply industry will operate, including the following aspects: property, company, and personnel legislation, terms of service and obligations, electricity legislation (licensing, public duties, status of auto-producers, price transparency obligations, investment authorization procedures, tendering procedures, ...);
- a draft salary and employee incentive programme for a regional electricity company (Tver region);
- improved management in a regional electricity company (St-Petersburg region);
- advice on establishing and certifying tariff procedures for two regional electricity companies (Moscow and Tver regions);

- action aiming at the introduction of market-orientated management on the distribution side of the electricity supply industry, notably by the creation of a pilot distribution agency for the Moscow electricity company;
- help with the refurbishment of power plants;
- transfer of Western know-how in the field of environmental protection in the power generation sector including, for instance, assistance in the installation of monitoring and control systems, or for the development of Denox systems;
- introduction of Western usage techniques for the high voltage transmission networks;
- a number of training projects, including a programme for a large number of personnel from the electricity sector to spend some time in Western utilities.

Emergency assistance to Bulgaria

In addition to these operations, some of which should produce visible effects in a few months at the earliest, but mostly in the more medium-term only, the Community has been faced with more urgent requests. In Bulgaria, following a recommendation issued in June 1992 by IAEA experts stating that it would be unwise to go on operating certain units at the Kozloduy nuclear facility, the Commission was asked to coordinate Western assistance. A specific programme has been launched with three aspects: improvement of plant operating conditions, strengthening of local safety authorities' capacity, and electricity supply replacement during the winter. The results of a study made available late last year confirmed the high probability of severe shortages and proposed appropriate solutions. Indeed, with the arrival of winter, electricity supplies in Sofia had to be interrupted for one hour in every four, with potentially dire results for Bulgaria's efforts to rebuild its economy. The closure of Kozloduy Units 1 and 2, at the request of the Western nations, has obviously aggravated existing electricity supply problems further. It was decided to allocate 10 MECU to pay for electricity imports, and these deliveries have to some extent compensated for the drop in local output.

Conclusion

Two final points should be made concerning Community action on electricity in the East:

- the definition of projects in which emphasis is placed on concrete actions: projects should not just produce useful reports which are then shelved. For this reason, follow-up of the actual implementation of the recommendations put forward is included wherever possible. Moreover, almost all projects include a training component in order to guarantee a real lasting effect as far as possible. For greatest impact and cost-effectiveness, funded projects are designed for potential replication wherever possible and results always disseminated.

secondly, in order to avoid duplication of effort, selection of action to be sponsored also takes account of initiatives of other donors such as EIB, EBRD, World Bank, IEA and UN-ECE. Exchange of experience takes place on a regular basis, notably through the G-24, and it should be noted that a special meeting of the G-24 Energy Working Group was held last year specifically to discuss electricity matters. Moreover, in one case, in Bulgaria, since both the EC and the US, through its Agency for International Development, envisaged funding similar projects, the decision was taken to organize cooperation leading to joint support. In fact, Community action should complement those of development banks, which are intended to fund investments, and, more generally, contribute to the creation of a favourable climate and secure investment framework for local and foreign investors.

It is to be hoped that all these concrete initiatives, which are still modest compared to the needs, will help consolidate democracy in these countries, and create peaceful relations based on mutual respect. In return, donors may well have a lot to learn from the very rich cultures of our Eastern neighbours.

4. THE EUROPEAN ENERGY CHARTER

A new framework for pan-European energy cooperation

BY Richard Greenwood, DG XVII
seconded to the European Energy Charter Secretariat

On 17 December 1991 in The Hague, the European Energy Charter was signed by the European Community and 43 countries including most of the independent Republics of the former USSR. The signing of the Charter is the first vital step in establishing a new framework for energy trade, commerce and cooperation across the whole of Europe. Negotiations are now underway to translate the political declarations of the Charter into legally binding texts. The Charter process is considered to be an essential contribution to the massive task of reforming the energy sector in the former centrally-planned economies and of consolidating the integration of these countries into the free-trading economic system.

Following the dramatic events in Eastern Europe and in the former Soviet Union around the turn of the decade, the Prime Minister of the Netherlands, Mr Ruud Lubbers, proposed a bold initiative centring on the energy sector to consolidate and underpin the changes then taking place. At that time, with the acquiescence of the head of the then Soviet State Michael Gorbachev; popular movements were challenging the administrations in the former centrally-planned economies and governments based on pluralism and free-market economic principles were once again democratically elected. While such fundamental changes were deeply welcomed, it was also clear that they could bring severe economic disruption, exacerbating the fragility of a process that had been almost undreamed of for over forty years.

It was at the European Community Summit held in Dublin in June 1990 that Prime Minister Lubbers proposed the creation of an energy community across the whole of Europe, to use trade and cooperation in energy to help bring economic development and political stability. At the CSCE[6] Summit in Paris in November 1990 President Delors presented the Commission's views and in particular the idea of a European Energy Charter. This idea was adopted by the European Community Summit in Rome the following month, which asked the Commission to organize an international Conference to negotiate a European Energy Charter and to prepare a draft Charter text for the Conference. The draft prepared by the Commission[7] was discussed by the Member States of the Community and an agreed text adopted by the Council on 10 July 1991[8].

In parallel to the preparation of a draft Charter, the Community, through the Commission and the Council, had been preparing the international conference to negotiate the Charter and associated documents, which opened in Brussels on 15 July 1991. Virtually every country of Europe, including every country of Eastern and Central Europe and the Soviet Union, as it then was, attended the opening session. In addition to organizing and hosting the Conference, a delegation from the European Community was also present to participate in negotiations. The other members of the OECD - that is the US, Japan, Canada, Australia and New Zealand - also attended, and several organizations (EBRD, EIB, IAEA, IEA, OECD, World Bank and UN-ECE), and a number of the Maghreb and Gulf States, responded to invitations to them to send observers.

The opening session of the Conference only met for two of the three days foreseen, but it achieved all that was planned. Firstly, the Conference unanimously adopted the Community's proposal for the Conference Chairman, Ambassador Charles Rutten, former Permanent Representative of the Netherlands to the European Communities. Secondly, the round of statements by participating delegations wholeheartedly endorsed the aim of establishing a European Energy Charter and welcomed the Commission's draft text as a

6 *Conference on Security and Cooperation in Europe ('Helsinki' process).*

7 *Communication from the Commission on a European Energy Charter, COM(91) final, 14.02.1991.*

8 *'A Draft European Energy Charter', Council of the European Communities, 10.07.1991.*

very solid base for negotiation. The Conference also agreed on the establishment of a number of Working Groups and the choice of chairmen to negotiate the texts of the various documents. Mr Maniatopoulos, Director-General for Energy at the European Commission was nominated chairman of Working Group I, to negotiate the Charter itself, whilst the chairmanship of Working Group II, to elaborate the Basic Agreement, a legally binding translation of the Charter, was allocated to Mr Duncan Slater of the British administration. Mr Slater was subsequently appointed British High Commissioner to Malaysia and has been replaced by Mr Fremantle, also of the British administration. Senior energy officials from Hungary, Norway and Canada were nominated as the chairmen of Working Groups III, IV and V, to negotiate the sector protocols for energy efficiency, hydrocarbons (oil and gas), and nuclear energy respectively. A Conference Bureau was also established, to coordinate the organizational decisions relating to negotiations and comprising the Chairman of the Conference as a whole (Ambassador Rutten), two Vice-Presidents (from the Soviet Union and from Portugal), the chairmen of the Working Groups, and the Secretary-General to the Conference, Mr Clive Jones. As Secretary General, Mr Jones, Deputy Director-General for Energy at the European Commission, is responsible for the running of the Conference and for generally facilitating the negotiations. He heads the interim Conference Secretariat, whose members are drawn from a number of the participating countries and institutions, and who provide the Secretaries to the different Working Groups among other duties. A timetable for Working Group meetings and further Plenary sessions was also agreed by the Conference at its first meeting.

First priority was given by the Conference to the elaboration of the Charter text itself, a political declaration to establish a new model for energy trade and cooperation, within the framework of a market economy. This work began by analysing the initial statements made by delegations and by requesting further comments on the Community draft for the Charter in time for the first Working Group meeting held at the end of September. In August however, the dramatic events in Moscow lead to the subsequent dissolution of the Soviet Union and the independence of the former USSR Republics.

The three Baltic States also gained their independence during this turbulent period. Despite these upheavals, the Charter, the first multinational declaration including the newly formed states and governments of the eastern half of Europe, was signed at the Hague Ministerial Session on 17 December. This achievement bears eloquent witness to the will of the participating countries to conclude the document and to their readiness to find agreement despite their different histories and circumstances. It is also a tribute to the European Community, and in particular to the European Commission, which had initiated the Conference and played such a central role in its fulfilment. This not only included launching the initiative, preparing a first draft of the Charter and providing many of the key staff required for the different functions, but also of providing the main facilities for the Conference.

The European Energy Charter is a declaration by the signatory states which sets out the objectives, principles and actions which they undertake to follow to establish a new framework for cooperation, investment and trade in energy. Whilst this is only one sector of economic activity, it is a very important one for any economy and particularly so for Europe. Indeed it is a certain complementarity of energy resources and markets, technology and capital between Eastern and Western Europe, and the consequent opportunities for investment and trade, which is the main *raison d'être* of the Energy Charter. Moreover, energy activities inevitably have an impact on other areas such as the environment - for example via gaseous emissions from power stations, coal or hydrocarbon extraction, and specific issues arising out of nuclear energy. Very often these problems are not limited by national boundaries, but are typically of international concern, so that again there are clear benefits to be had from energy cooperation. The Charter indeed incorporates and balances the many different aspects of energy relations, such as access to resources and to markets, seeking the best use and management of energy resources and ensuring proper protection of the environment, or again promoting private sector activity on the one hand and cooperation between public authorities on the other.

A more complete distillation of the Charter text reveals, in summary, the following central undertakings:

- to assure stable and transparent legal frameworks for energy activities by the private sector. These are to be based on free market economic principles, including non-discrimination, competition and market-orientated prices which should nevertheless reflect environmental costs and benefits. The relevant legislation in a country should include measures for the promotion and protection of investments and the protection of intellectual property rights;
- to facilitate access to energy resources (subject to state sovereignty and sovereign rights over such resources) to local and international energy markets, to energy technology, and to sources of capital;

- to develop trade in free movement of energy products, materials, equipment and services, consistent with multilateral international agreements such as GATT (General Agreement on Tariffs and Trade) and other relevant agreements such as those on non-proliferation;
- to facilitate access to transport infrastructures for the transit of energy in economically and environmentally sound conditions, and the development of international energy transmission networks, in particular for electricity and gas;
- to promote the efficient management and use of energy resources at all stages of the supply chain, i.e. in the production, conversion, transport, distribution and end-use of energy, thereby contributing to both the protection of the environment and the ability to meet energy needs;
- to modernize, renew and restructure the energy supply industry, in particular in the countries of Central and Eastern Europe and of the Commonwealth of Independent States;
- to cooperate in the energy field, including:
  i) the exchange of views on energy policies and their coordination as necessary for promoting the objectives of the Charter;
  ii) exchange of technology information and know-how in the energy and environmental fields, and cooperation on research and technological development and demonstration projects;
  iii) cooperation on vocational education and training in the energy sector and on the dissemination of information to the public, in particular on energy efficiency;
  iv) to develop and implement safety principles and guidelines to achieve and maintain high levels of health and environmental protection.

Because of the importance of the link between energy and the environment, special attention is given to this area in the Charter. In particular, a major contribution must be made by improvements to energy efficiency. To achieve these objectives, the Charter declares that the signatories will cooperate on and promote a range of measures including:

- the use of regulatory and market-based instruments;
- in particular, energy prices which more fully reflect environmental costs and benefits;
- the use of energy mixes designed to minimise adverse effects on the environment in a cost-effective way;
- the use of renewable energies and clean technologies;
- the exchange of know-how regarding environmentally sound energy technologies and the efficient use of energy;
- achieving and maintaining a high level of nuclear safety.

From the description given above, it can be seen that the Charter is a wide ranging declaration of key importance for establishing a renewed energy industry and energy community across Europe and beyond. Nevertheless it was recognised from the beginning that these political declarations alone would not be sufficient to promote industrial investment and trade and would therefore need to be translated into legally binding texts, in other words into an international treaty. Negotiations are currently underway on this major task with the work divided into the Basic Agreement, grouping the horizontal issues, and a number of sector protocols covering the different energy sectors, namely energy efficiency, nuclear power including safety, and hydrocarbons. Work covering other major sectors such as electricity and coal is also envisaged. The Basic Agreement is intended to include general provisions on free market principles such as access to markets and resources, (subject to certain provisions on sovereignty), freedom of energy trade and movement - including energy transit - and of establishment, investment promotion and protection, and non-discrimination and fair competition. The institutional arrangements, which are likely to comprise a Governing Council made up of representatives of the signatory states served by a permanent Secretariat, and disputes procedures, are also included. The sector protocols will then apply the general principles of the Basic Agreement to the particular sector in question. Good progress has already been made on the three sector protocols where work has already begun (see above), although the more complicated issues in the Basic Agreement must first be resolved before the sector protocols can be finalised.

Clearly many of the provisions will need to be at least compatible with, and indeed often reflect, the provisions of existing agreements such as the GATT. One complication here is that the participating states from the eastern half of Europe are not yet members of GATT, which itself is an evolutionary process. These countries have nevertheless shown considerable flexibility in accepting the principles of GATT and similar agreements. Notwithstanding this, these former centrally planned economies are naturally passing through a very difficult period of change and enormous challenges lie ahead; immediate free convertibility of currencies, for example, when there are still severe shortages of basic needs, is clearly inappropriate. For this reason transitional arrangements are being examined for certain provisions under the Charter, although these must be fully justified and periodic reviews of progress towards full compliance are required.

To conclude, the Charter provides a new framework not only for private enterprise, but also for cooperation between governments and other public entities. Free

trade and the market can indeed generate a sustainable circle of wealth creation and investment, but given the immense challenges ahead, including in areas less appropriate to private investment, cooperation between public authorities is also essential. The agreement of the Charter and that of its protocols will have been a very major undertaking, already bringing together now a Europe which had been divided for so long. Yet in a way the task even then will have only begun, and the 'proof of the pudding will be in the eating'. In this respect the Community, which has played such a central role in the elaboration of the Charter, will continue to play an equally central role in ensuring its success, and thus its contribution to the prosperity and stability of Europe.

5. THE THERMIE PROGRAMME

BY Hans van Steen, DG XVII
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One of the important new features of the Thermie programme for promotion of energy technology for Europe[9], is the requirement for industrial cooperation with third countries in the four sectors covered by the programme[10]. and especially so for the so-called associated measures. These comprise a wide range of activities for assessment, evaluation and dissemination of energy technology, set out in Annex V of the Regulation.
Technology improvements have already been identified as a political priority in the effort to improve the energy situation in the countries of Central and Eastern Europe and the Commonwealth of Independent States (CIS). Transfer of energy technology has been recognised as a major means of improving the environmental situation, where much of the harmful impact is directly related to the use of out-dated and badly maintained energy technology. The Commission has therefore decided to focus attention on these countries, although action is also taking place in EFTA countries, such as Austria and Scandinavia. This new dimension of the Thermie programme is closely linked to energy technology promotion already under way in the Community, in which the OPET network, set up by the Commission[11], plays a vital role. The Commission's decision to carry out promotional activities in third countries is in effect an extension of the OPET network in particular into Central and Eastern Europe and the CIS.

GETTING COOPERATION OFF THE GROUND

Effective energy technology promotion requires a decentralised approach. This was the philosophy behind the creation of the OPET network within the Community, and this strategy is obviously equally valid as far as third countries are concerned. With a view to implementing such a decentralised approach, the Commission published an open call for tender[12] with the aim of identifying suitable cooperation partners for this task.
On the basis of bids received, the Commission decided to conclude contracts with eight Community-based organizations to establish cooperation with Poland, Czechoslovakia, Hungary, Estonia, Latvia, Lithuania, Russia, Ukraine, Belarus, Austria and the Scandinavian countries[13].
A decentralized approach to technology promotion requires operational infrastructure. No such infrastructure existed in most of the countries concerned, and the first task of the eight new OPET organizations was to establish such a base for cooperation. Following fact-finding missions to all countries covered, cooperation partners have now been identified and already Energy Centres have been set up in Warsaw (Poland), Prague (Czechoslovakia), Budapest (Hungary), Tallinn (Estonia), Riga (Latvia), Vilnius (Lithuania), St. Petersburg and Moscow (Russia), Kiev (Ukraine) and Minsk (Belarus). A list of the Centres will be found overleaf.
These Energy Centres are now operational and form the institutional basis for cooperation activities, with a basic staffing of two or three EC experts and three to five local experts in each Centre. They also offer office and meeting facilities and documentation for visiting experts, e.g. from the OPET network. In Austria and Scandinavia, the infrastructure was of course already in existence, and the presence of the Commission can be limited to Thermie Information Services located in Oslo (covering Scandinavia) and Vienna. Furthermore, the Commission is considering establishing Centres in

9 *See Council Regulation (EEC) No 2008/90, OJ L 185 of 17.7.90.*

10 *The programme covers rational use of energy, new and renewable sources of energy, solid fuels and hydrocarbons.*

11 *The OPET network was created by Commission decision C(90)2562 of 15.12.1990. A detailed description of the OPET network can be found in Energy in Europe No 17 (July 1991), p. 35.*

12 *See OJ No. C 124 of 14.05.1991.*

13 *Commission decision of 5 December on technology cooperation with third countries (COM(91)2729).*

Katowice (Poland), Bratislava (Czechoslovakia) and Sofia (Bulgaria).

ACTIVITIES INCLUDED IN THE PROGRAMME

In the case of Eastern Europe and the CIS the Commission, for obvious reasons, attached great importance to avoiding any unnecessary delay in implementing the programme. Therefore a so-called 'crash programme' has been launched, starting up activities on the spot immediately. Most involve assessments and audits concentrating on technological energy efficiency improvements mainly in the industrial sector. In this area energy savings in many cases can be achieved in the short term and at very low cost. This part of the assistance should have been completed by the end of May, by which time more than 100 operations should have been carried out.

Work programmes for the Centres are in preparation for long-term technology cooperation. Initial assessments of the type of energy technology promotion needed, and appropriate to each area in question, have been undertaken by the contractors and form the basis for drawing up these programmes. The latter will include not only follow-up to the technology assessment and audits carried out under the crash programme, but also production of documentation, organization of conferences, workshops, fairs, business meetings, etc, establishment of data-bases and last, but not least, training of personnel.

All these activities will be carried out in close collaboration with the 35 other organizations in the OPET network, who will be directly involved wherever appropriate. The network concept, involving all 43 organizations, allows for twinning arrangements, where activities developed and in some cases implemented for the EC can be adjusted as necessary and transferred to similar organizations in third countries.

COORDINATION WITH OTHER COMMUNITY PROGRAMMES

Thermie is not the only programme for cooperation with third countries in the energy field. As described elsewhere in this issue of *Energy in Europe*, energy has been identified as a key sector for support both to the CIS in the framework of the Technical Assistance programme and to Central and Eastern Europe in the framework of the PHARE programme. With a view to coordinating the various operations, and avoiding duplication or waste, close interaction with these programmes has been ensured.

Although operations financed under the Thermie programme naturally focus on technology cooperation, whereas the two other programmes deal with energy cooperation in a wider context, there is in fact good scope for such interaction. As an example, it has been decided that approximately half the funds earmarked for supporting energy saving in the CIS under the Technical Assistance Programme will be used for strengthening the Centres initially established under Thermie, or for establishing Centres in areas not yet covered by Thermie. Another example in Central and Eastern Europe is the Centre in Budapest which was initially decided on as a project to be supported by the PHARE programme.

CONCLUSIONS

The Commission's aim in this third country cooperation under Thermie is to ensure that European energy technologies play an important role in the development of the energy sector, in countries outside the Community as well. This is of great importance in the process of restructuring the energy sectors of the CIS and the countries of Central and Eastern Europe, where the aim is also to set up infrastructure for energy technology transfer, for instance along the lines of the European Energy Charter.

At the same time, a further aim of such cooperation is to demonstrate that efficient energy technology is a key component in the development of a sustainable energy policy by these countries. Environmental damage can also be significantly reduced and the quality of life improved in these regions which are of course of the utmost political and economical importance to the Community.

List of centres in Eastern and Central Europe and the CIS

EC-Energy Centre Moscow
Enin
19 Leninsky Prospekt
117927 Moscow
Russian Federation
Tel: 7-095-9525527 or 9521117
Fax: 7-095-9525527
Telex: 411 700 for Box N 13010 ENCONS

EC-Energy Centre St Petersbourg
Appec
Lenelectronnash
111 Grazdanski Prospekt
195265 St Petersbourg
Russian Federation
Tel: 7-812-9060225 (satellite)
Fax: 7-812-531 1405
Telex: 064000 121 345

EC-Energy Centre Kiev
Institute for Energy Saving
Academy of Sciences of Ukraine
11 Pokrovskaya Street
254070 Kiev
Tel: 7-0144-4170737
Fax: 7-0144-4170737

EC-Energy Centre Minsk
Belviec
PO Box 154
220002 Minsk
Belarus
Tel: 7-0172-236949
Fax: 7-0172-213618
Telex 252 101 Neman SU

EC-Energy Centre Tallin
Institute of Thermophysics
1 Paldiski Road
200001 Tallin
Estonia
Tel: 7-0142-452973
Fax: 7-0142-452435

EC-Energy Centre Riga
Lea
I Gamibu Dambis, 12, 1st floor
226810 Riga
Latvia
Tel: 45-302 49903 (international)
32 88 57 or 32 88 56 (local)
Fax: 45-302 49903 (international)

EC-Energy Centre Vilnius
Litovenergo
13 Juozapaviciaus Street
232748 Vilnius
Lithuania
Tel: 7-0128-290224
Fax: 7-0128 290224

EC-Energy Centre Sofia
1407 Sofia
51 James Boucher Blvd
Bulgaria
Tel: 359 681461
Fax: 359 2 668951
Telex: 22219 ENPRO BG

EC-Energy Centre Prague
Vupek
18 Stetkova
140 00 Prague 4
CSFR
Tel: 42-2-430948
Fax: 42-2-235 0415

Hungary: *The EC-Hungary Energy Centre, Budapest, is currently moving to new premises.*

EC-Energy Centre Warsaw
IPPT PAN - Institute for Fundamental Technological Research
21 Swietokrzyska
PL-00-049 Warsaw
Poland
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6. THE HUNGARY-EC ENERGY MANAGEMENT AND TECHNOLOGY DISSEMINATION CENTRE

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Under the Directorate-General for Energy's International Programme many projects set up in Central and Eastern Europe in 1990 (See Energy in Europe No 18) are now coming to fruition. Perhaps the most significant current development is the setting up of the Hungary-EC Energy Management and Technology Dissemination Centre. The Centre has recently opened in Budapest and an EC Special Adviser, Mr Ian Brown, will coordinate the EC's input. We are convinced that institution building can serve as a worthwhile contribution to the development of effective energy management practices and sound energy planning. This article provides an in-depth view of plans for the Centre in 1992. The Centre is also partly funded from the Commission's PHARE programme.

BACKGROUND

The pattern of energy use in Hungary as in the other of the former CMEA countries has hitherto been based on cheap and plentiful supplies from the former Soviet Union, and on a pricing structure unrelated to the costs of production. These factors have led to a pattern of energy use which is markedly less efficient than that of EC Member States.

The energy intensity of Hungarian industry is approximately two and a half times higher than the average for Western Europe, and nearly four times higher than that of its nearest Western neighbour, Austria. This very high level of energy intensity is largely explained by three factors: the low level of general industrial efficiency, inefficient energy use due to low energy prices, and an industrial structure characterized by heavy energy-intensive industry.

Improving the efficiency with which energy is used in Hungary is vital both for the development of an advanced market economy, and for the environment. It is to underpin this process that the EC and the Hungarian government have jointly set up the Hungary-EC Energy Management and Technology Dissemination Centre. It is important to note that this is a joint effort, both Hungary and the EC contributing to the Centre. Thus the work of the Centre should be seen very much as a cooperative effort.

HOW WILL THE CENTRE HELP TO IMPROVE ENERGY EFFICIENCY IN HUNGARY?

The Centre's first aim is to strengthen cooperation between the European Community and Hungary in the field of energy and energy management, and to encourage better energy management in Hungary.

The Centre will help by bringing together European Community expertise with Hungarian skills in order to improve energy efficiency. Both behaviour and technology need to be changed. Training and education programmes, information, technology transfer, and assistance in energy planning are among the activities planned for the Energy Centre.

TRAINING AND EDUCATION

Training is a priority area of activity for the Energy Centre. While much effort was put into the training of energy managers in Hungary in the past, this work has largely lapsed. The Energy Centre will, under funding from the PHARE programme, re-introduce training courses for energy managers in Hungary.

The Centre will draw up and organize a series of training courses, which will be practical in nature, utilising both Hungarian and EC experience, in order to develop a programme directed at Hungary's needs and incorporating EC experience in energy management and energy efficiency technology.

These training courses will be run as pilot actions in 1992, results then being evaluated in order to finalise the full programme of training courses. These training courses will be offered in Hungary to energy managers in industry, and to energy managers in public and institutional buildings, hospitals, colleges, and public buildings. However, training will focus not only on engineers in industry and in the building sector, but

also on boiler operators and maintenance personnel, who in Hungary have a very considerable influence on energy use.

INFORMATION

The Energy Centre will also act as a technical information Centre for energy management in Hungary. Both technology-specific and end-use specific publications are being prepared with the aim of improving energy management throughout the Hungarian economy. The first task which the Centre will assume is that of raising the level of awareness of the importance of energy management both among the general public and in industry. The same goes for awareness of the link between energy use and the environment, still at a low level as in the rest of the former Soviet block.

SEMINARS AND WORKSHOPS

The Energy Centre will be organizing a number of seminars and workshops which will support the aims of the Centre to increase awareness of the importance of energy efficiency, to change behaviour, and to serve as a focus for the dissemination of advanced technologies in Hungary.

ENERGY TECHNOLOGY PROMOTION

Changing behaviour is a pre-requisite to improving energy efficiency while improvement of the technology of energy use is also a pressing need. The curent Community programme Thermie, and its predecessor the EC Demonstration Programme, have developed innovative technologies which can provide unique resources for Hungary. Commercially developed technologies, and those developed through Member States' programmes, can also be disseminated in Hungary through the Thermie programme[14].
In Hungary the Energy Centre will host OPET activities to be coordinated by the Italian OPET, ENEA. Technology transfer to Hungary, under the Thermie programme, involves both the identification of the most appropriate technologies required, and their subsequent dissemination in Hungary, through the most appropriate available means of promotion.

ENERGY PLANNING

The Centre will encourage the development of expertise in energy planning in Hungary. This will be done by the organization of exchanges of both techniques and results between relevant institutes in the EC and in Hungary, and between Member State governments and the Hungarian government as regards energy planning. In addition the Centre will assist directly in energy planning in Hungary, in cooperation with Hungarian partner institutions.

INTERNATIONAL COOPERATION

The primary role of the Centre is to act as a coordinator of EC programmes in order to strengthen cooperation in the energy field between the EC and Hungary. However, numerous parallel and complementary initiatives - seminars, energy audits and so on - are also being taken both by Member States' governments, and by institutes and agencies. In this respect, exchange of information between the Centre and the PIU (Programme Implementation Unit), set up in the Ministry for Industry and Trade to manage implementation of the PHARE-EC Energy programme will be important. One of the projects to be funded under PHARE is the setting up of a data-base on all the various projects supported by different donors.
The Energy Centre will thus help to avoid duplication and waste by maintaining an adequate data-base containing details not only of its own programmes and events, but also of all other operations relating to energy efficiency in Hungary. This data-base will be freely available to all relevant institutions, in the interests of improving coordination, in line with the Commission's coordinating role in the context of the G-24 (Group of 24 OECD countries).

[14] *OPETs: Organisations for the Promotion of Energy Technologies are a network of institutes and companies with expertise in energy technologies, who act as the local agents for the implementation of the Thermie programme in the Member States.*

CONFERENCE ON 'ENERGY AND ECONOMIC AND SOCIAL COHESION IN THE COMMUNITY' - LISBON, 4-5 JUNE 1992

The Commission of the European Communities, in close cooperation with the Portuguese Ministry for Industry and Energy, organized a conference on 'Energy and economic and social cohesion in the Community' in Lisbon on 4 and 5 June 1992.

This conference was opened by the Portuguese Minister for Industry and Energy, **Mr L.F. De Mira Amaral**, together with the Commission's Director-General for Energy, **Mr C.S. Maniatopoulos**. Among other personalities present were **Professor Cl. Desama**, Chairman of the European Parliament's Committee on Energy and Technological Research, and the Directors-General for Regional Policy and Coordination of Structural Policies in the Commission, **Messrs E. Landàburu and T. O'Dwyer.**

The Commission is aware of the need to demonstrate in political terms at national and regional level that energy has an important role to play in Community integration and regional development.

One of the objectives of the Treaty on European Union approved at Maastricht is to strengthen economic and social cohesion and to further the integration of the less developed regions.

The Community's economic and social cohesion objective is to narrow the development gap between the regions. This objective must be made an integral part of all Community policies, including energy policy.

The conference brought together some 200 high-level participants, mostly representing political circles in the Community and the Member States concerned with energy, regional development and economic and social cohesion matters, including the European Parliament, the Economic and Social Committee, the Commission of the European Communities, trade and industrial organizations, representatives of the regions and municipalities, and the national energy and regional development authorities of certain Member States.

The main aims of the conference were to:

- highlight the contribution of the energy sector to the process of Community integration and economic and social cohesion;
- provide political guidelines for the action which will need to be taken in the coming years in the field of energy policy with a view to enhancing its contribution to the objective of economic and social cohesion;
- stimulate discussions on the use of Community financial instruments and the structural funds in the energy field.

Mr Luis Filipe Pereira, Portuguese Secretary of State for Energy; Mr C.S. Maniatopoulos, EC Director-General for Energy; Mr V. Romano, ENEL

The various papers presented to the conference highlighted the links between energy and economic and social cohesion in the context of the process of Community integration. While completion of the internal market in energy constitutes a step forward for the Community as a whole, accompanying measures are necessary to ensure that the least developed regions get at least an equal share of the expected benefits. Without listing all the possible causes of imbalance, it should be noted that the current isolation of certain regions or areas of the Community from major energy transport and distribution networks makes it difficult to satisfy their energy needs on account of the high cost of getting energy to them. Investing in the extension of these networks is expensive and often out of the question for the regions concerned, and alternative solutions involve higher costs for energy users. If energy is not made available from networks at a reasonable price, it will be more difficult to convince business to invest in these regions.

The least-favoured regions and areas, and the less developed regions in general, have significant endogenous potential (mainly renewable energies and potential energy savings), the exploitation of which can not only help improve the satisfaction of energy needs but more generally can also contribute to the harmonious development of these regions. Investment

in renewable energies and rational energy use generates economic activity (added value and local jobs) and helps improve the quality of the environment and the standard of living.

A degree of consensus was reached at the conference on the objectives, strategy and means needed to achieve better osmosis between energy and economic and social cohesion:

- **Access to several forms of high-quality energy at reasonable prices** is a precondition for economic and social progress in the less developed regions, and is therefore a **priority objective**. Energy must be an integral part of policies aimed at strengthening economic and social cohesion.
- The **strategy** for achieving this objective is to improve access to major energy networks, promote energy efficiency and exploit endogenous resources. Implementation of this strategy implies a coordinated approach to the 'energy/regional development' interface both at Community level and in the Member States and regions. The main actions and programmes proposed during the conference to implement this strategy should be aimed at:
  - improving the infrastructure of peripheral countries and less-developed regions;
  - with Community support, connecting these countries and regions to the gas and electricity networks of the more northerly countries of the European Community;
  - seeking solutions to the problems faced by southern Europe;
  - working towards the establishment of a long-term Mediterranean policy on energy cooperation;
  - promoting the setting-up of networks for exchanging experience between the regions of Europe. Examples cited include the European network of 'regional energy and environment agencies' and the 'urban energy and environment' network; the setting-up of a network linking the island regions was proposed;
  - paying greater attention to energy planning at regional and urban level;
  - proposing targeted programmes covering the energy/regional development interface in rural areas, island regions and towns;
  - finding solutions to the problem of financing these programmes both within the framework of the new structural funds, and at Member State and regional level.

For the development of the proposed strategy, the programmes and actions under way or recently adopted at Community level and by the Member States are no more than a good starting point. It is essential to find ways and means of stepping up and enlarging them, while at the same time seeking to tailor them more closely to the specific needs of the less developed regions. It must be made clear that even if the means required to step up and enlarge these programmes and actions can come in part from the structural funds, the Member States and the regions must assume their responsibilities and declare this to be a priority, particularly in their regional development programmes.

INAUGURATION OF EC ENERGY CENTRES IN RUSSIA AND POLAND

Energy **Commissioner Cardoso e Cunha** officially inaugurated the EC Energy Centres in Moscow (6 June 1992), St Petersburg (8 June 1992) and Warsaw (10 June 1992). Alongside the ceremonies, he met prominent Russian and Polish politicians and industrialists.

Commissioner Cardoso e Cunha at the inauguration

Mr Rolf Meijer, EC Director ff of the Energy Technology Directorate with the EC Energy Bus in Moscow

Up to now a total of nine Energy Centres have been established in Eastern Europe, within the framework of the Thermie programme. The Centres act as focal points for information and advice on all aspects of European Community energy technology. During their first year of operation the Centres will carry out nearly 200 energy technology assessment and promotional activities including energy technology

and market evaluations, seminars and publications. These activities are designed to assess the market potential for EC equipment and pave the way for industry-led energy technology transfer and cooperation.

The Commissioner also visited industrial sites where initiatives under the Thermie programme have been undertaken. It may be noted that more than half of the 100 projects launched in the first six months of 1992 have been completed and show significant results.

ENERGY COUNCIL, 21 MAY 1992
MAIN RESULTS

INTERNAL MARKET IN ELECTRICITY AND NATURAL GAS

The Council held a policy debate on two proposals for Directives concerning common rules for the liberalization of the market in electricity and natural gas in the Community, in the context of completing the internal market.

Following that debate, the Presidency drew the following conclusions:

'The Presidency:

1. considers is desirable that a gradual and progressive approach be adopted on this issue, with the smooth running of the internal market as a whole as a constant objective;
2. notes that, at the preliminary policy debate on the two proposals, a broad consensus was reached on:
   - the importance of security of energy supplies, which, at Member State level, must be guaranteed;
   - the important role of environmental protection in the implementation of the proposed Directives;
   - the advisability of giving a substantial role to the principle of subsidiarity and avoiding, as far as possible, further rules at Community level and in the Member States;
   - the need to take account of the different characteristics of natural gas and electricity when examining the two proposals;
3. also notes that some Member States are in favour of:
   - opening up the energy production sector to competition and the abolition of exclusive rights concerning construction of electricity lines and natural gas pipelines;
   - an increase in the transparency of this sector by means of a separation (unbundling) of vertical energy undertakings;
4. recalls that, in the context of the liberalization of the Energy Market, some delegations have misgivings as to the possible consequences of implementing the principle of Third Party Access (TPA);
5. also notes the fact that these misgivings concern, in particular: the challenge to the guarantees relating to the system of property ownership; protection of the interests of small consumers; non-discriminatory treatment in respect of tariffs; the introduction of a suitable infrastructure, and if necessary, of the related funding; definition of transparency of costs; application of the rules of competition in order to avoid price distortion; advisability of having an evaluation report from the Commission on the introduction and operation of the transit of electricity and natural gas as recommended by the Council directives of 1990 and 1991; an adequate transition period; an evaluation of progress at the end of the 2nd stage before beginning an examination of the 3rd stage;
6. hopes that the Council will give a significant stimulus to the effective resolution of these problems and that appropriate flanking measures, such as trans-European networks and suitable infrastructures, which are essential to the smooth running of the internal market, will be adopted at the same time.'

The Council instructed the Permanent Representatives Committee to continue examining the proposals in particular in the light of Opinions of the European Parliament and the ESC.

COMMUNITY STRATEGY TO LIMIT CO2 EMISSIONS

The Council heard a statement by **Mr Cardoso e Cunha**, Member of the Commission, followed by an exchange of views on the Commission proposals concerning a Community strategy to limit CO2 emissions and improve energy efficiency, including an energy chapter and an overall strategy.

In this context, **Mr Cardoso e Cunha** referred to:

- new proposals to improve energy efficiency in the building, transport and industrial sectors in the context of the SAVE programme;
- increased recourse to renewable sources of energy by means of the new Altener programme;
- the Commission's intentions in the context of preparation of a Community position of proposing a tax on CO2 and energy at the Rio de Janeiro Conference.

The Council instructed the Permanent Representatives Committee to study the formal proposals expected from the Commission.

The Council also adopted a statement reaffirming the importance it attached to the Thermie programme as an essential element of energy policy and as a means to take account of the most recent environmental concerns, hoping that the level of activity to be taken into consideration in its budget discussions would continue to enable that programme to make an

appreciable contribution to solving technological problems in the energy sector.

Oil supplies - possible Community accession to the IEA

The Council noted the Commission's presentation of two proposals for Directives providing for appropriate measures in the event of difficulties in the supply of crude oil and petroleum products to the Community and a draft Decision containing a negotiating brief with a view to possible Community accession to the International Energy Agency (IEA).
It will be remembered that, at its meeting on 29 October 1991, the Council has asked the Commission to submit new proposals on this subject and to adapt the draft negotiating brief concerning Community accession to the IEA, taking account of the distribution of powers between the Community and the Member States in the fields covered by the IEA.
Following the preliminary discussion, the Council instructed the Permanent Representatives Committee to continue examining the proposals, in particular in the light of the Opinions awaited.

Oil market and the refining industry in the Community

The Council was informed by **Mr Cardoso e Cunha** of the situation on the oil market and in the refining industry in the Community, on which the Commission submitted a communication to the Council.

Conditions for granting and exercising authorizations to prospect, exploit and extract hydrocarbons

The Council heard the Commission's presentation of a proposal for a Directive aiming at gradually establishing the internal market by calling upon Member States to ensure non-discriminatory access by entities to the prospecting and exploration for or extraction of hydrocarbons and non-discriminatory exercise of these activities.
Following a discussion, the Council instructed the Permanent Representatives Committee to continue examining the proposal, in particular in the light of the European Parliament's Opinion.

Energy policy objectives

The Council held a discussion on updating the Community energy policy objectives for 1995 and convergence of Member States' policies.

Energy planning at regional level

The Council adopted the following conclusions:
'The Council notes the communication submitted by the Commission on 22 May 1991 on energy planning in the European Community at regional level.

The Council:
- expresses its interest in the regional energy planning measure introduced by the Commission;
- endorses the orientation and priorities indicated by the Commission for the measures in progress;
- emphasizes the need to strengthen co-ordination with existing programmes such as SAVE and Thermie, with measures under the structural funds and, in line with the principle of subsidiarity, with the Member States' own measures;
- notes the Commission's intention of evaluating and following-up these measures and of informing it, together with the European Parliament and the Economic and Social Committee, of the outcome thereof by the end of 1993 at the latest. On this basis the Council will examine what arrangements could be made for continuing these measures, taking account also of links with others programmes.'

Efficiency requirements for new boilers

Following the cooperation procedure with the European Parliament, the Council adopted the Directive on the efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels.
That Directive, which is one of the measures sparked off by the SAVE programme, aims at creating the conditions for establishing the internal market by ensuring common energy efficiency standards for each type of apparatus that are accepted by all the Member States.
The Directive has a dual aim: energy savings as the domestic and tertiary sector absorbs a major and increasing proportion of the final consumption of energy in the Community, and the resultant protection of the environment.
The enacting terms, moreover, provide for the granting of the CE mark and the awarding of quality labels (stars) under specific conditions.

Labelling of household appliances

The Council adopted a common position on a Directive on the indication by labelling and standard product information of the consumption of energy and other resources of household appliances.
The Directive should enable consumers to choose more energy-efficient appliances.

Electricity and natural gas transmission infrastructures in the Community

The Council adopted the following conclusions:
'The Council:
1. notes with interest the analysis and the approach in the communication which the Commission has forwarded to the Council and the European

Parliament on electricity and natural gas transmission infrastructures in the Community;

2. reaffirms that the development and establishment throughout the territory of the Community of trans-European networks in the energy sector is aimed at increasing security of supplies in the Community, permitting balanced operation of the internal market within a system of open, competitive markets and strengthening economic and social cohesion in accordance with Articles 129b, 129c and 129d of the Treaty on European Union;
3. considers that the action to be taken to attain that objective must as of now be in accordance with the provisions of the Treaty on Union and calls upon the Commission to continue its work of drawing up guidelines for electricity and natural gas transmission infrastructures in close conjunction with the Member States, with a view to submitting proposals for such guidelines to the Council;
4. considers in this context that Community action to realize in full the objectives set out in the Treaty on Union should start in 1993;
5. welcomes the Commission's intention of:
   - involving the various parties concerned as fully as possible in the drafting of these guidelines;
   - establishing priorities in order to ensure that all Community regions can benefit from the internal market;
   - ensuring a coherent approach between the Community Structural Funds and support given in the context of the trans-European networks;
6. calls upon the Commission to convene meetings of experts from the Member States to hold the necessary talks.

OTHER BUSINESS

The Council also heard the Commission's outline of the energy aspects of its communication on the setting up of trans-European networks.

The Council noted the Commission's intention of submitting to it next autumn guidelines in the sphere of trans-European networks, as provided for in Title XII of the Treaty on European Union.

The Council also noted:

- the first Commission report to the Council on energy investment projects in the Community pursuant to Regulation No 1056/72 (situation as at 1 January 1990);
- the Commission mid-term report on the application of Decision No 2064/86/ECSC establishing Community rules for State aid to the coal industry during the period 1987-1990.

LUANDA CONFERENCE ACP/EC 4-6 MAY 1992

From 4 to 6 May the Commission of the European Communities, with the support of the Government of the People's Republic of Angola, organized an ACP/EC Oil and Gas Conference in Luanda.

The presence of the Angolan Prime Minister, **Mr F. Van Dunen**, **Mr A. Cardoso e Cunha**, Member of the European Commission with responsibility for Energy, **Mr R. Maraj**, Minister for Foreign Affairs of Trinidad and Tobago and current President of the Council of ACP Ministers, **Mr L.F. De Mira Amaral**, Portuguese Minister for Energy, **Mr Landoite**, the Angolan Oil Minister, and many other political figures from the ACP countries was a sign of the importance which both the Community and the ACP countries attach to the development of cooperation between the ACP and the EC in the field of hydrocarbons.

Mr M. Souidi, Secretary General of AAPP; Mr Almeida Sampaio, Vice-Minister of the Angola Plan; Mr C.S. Maniatopoulos, EC Director-General for Energy; Mr Q. Lumsden, Director, IEA, Paris; Mr Carvalho de Simões, Regional Coordinator of the SADCC

More than 200 participants from almost 50 ACP and EC countries, more than 30 oil and gas companies, international bodies such as the IEA and the World Bank, specialized institutions and the press took advantage of the excellent climate of discussion to exchange their views on oil and gas development in the ACP countries.

This exchange of views is part of the broadening of dialogue between producers and consumers of hydrocarbons, to which the whole of the international community is now fully committed and which it hopes will help make the international energy and oil situation more stable and predictable. The exchange of views also took place with the more specific framework of the special relations entertained between the Community and the ACP countries under the Lomé Convention.

The first part of the Conference, dealing with the place and role of the ACP countries on the international energy scene, confirmed the importance of hydrocarbons in meeting world energy needs. Everyone agreed that this importance could only grow in the future and would require active cooperation by all the parties concerned - the producing and consuming countries and the economic operators.
In the second part of the Conference the oil and gas companies and the ACP countries recounted their various experiences in hydrocarbons development in the ACP region. All the speakers stressed the importance of a climate favourable to risk investment in the hydrocarbons industry. The pivotal role of economic operators in mobilizing the human, financial and technical resources needed for the development of hydrocarbons was recognized and needs to be encouraged.
In the third part of the Conference international public finance organizations and private companies tackled the financial issues, giving an idea of the amount of investment required and the ability of the international financial system to mobilize the resources needed to carry out infrastructure or marketing projects, inter alia.
The last part of the Conference singled out several areas of technical cooperation between the Community, the ACP countries and industry. These included manager training, support for regional or technical cooperation as it appears, for instance, within the framework of the SADCC or the APPA, and technology transfer.
All the speakers welcomed the smooth organization and the quality of the contributions at this first ACP/EC Conference on hydrocarbons.
Each side took note of the suggestions for specific cooperation put forward at the Conference and undertook to examine the best ways of continuing the dialogue started in Luanda.

CONCLUSIONS OF THE CONFERENCE BY C.S. MANIATOPOULOS DIRECTOR-GENERAL

'Now that we have reached the end of our work here, I should like to say how pleased I have been by the intensity and quality of the impassioned discussions which have taken place over the last three days. Representatives from all over the world have met here in Angola. We have found a common language and have managed to create a climate of understanding and desire for progress, and this I welcome wholeheartedly.
This first ACP/EC Conference on hydrocarbons, organized by the Commission with the backing of the Angolan authorities, has brought together more than 200 participants from almost 50 ACP and EC countries, more than 30 oil and gas companies, international bodies such as the IEA and the World Bank and specialized institutions such as Europia, APPA, SADCC and university institutes.
We have been honoured by the presence of leading political figures from the ACP and Community countries.
Their presence here bears witness to the importance which our public authorities attach to the development of EC/ACP relations in the field of hydrocarbons.
I believe that we have reached the goal we set out to achieve and that this undertaking has been an unqualified success. The discussions have taken place in an excellent climate of tolerance and mutual understanding and have been open, clear and informed. But let us not blow our own trumpets too much.
Before sharing a few of my personal impressions with you, however, I should like to give my warm thanks to all those - the Commission officials, the Conference Service, the interpreters, my own colleagues, of course, but also all those working for the Angolan Government and for industry operating in Angola - for their active support in organizing this first oil and gas conference to be held in an ACP country, in conditions which were not always easy.
I am proud that, together, we proved ourselves equal to this organizational challenge.
And the main personal conclusions which I have drawn from the conference? There are six:

1. An impressive amount of information has been gathered on energy and hydrocarbons in the ACP countries. The diagnosis is clear. All those involved, the producers, the consumers and the oil companies, have reached the same conclusion: hydrocarbons will be called upon to play a major role in the future. They constitute a factor of interdependence for producer and consumer countries.

2. Concerns were expressed on all sides. For some it was security of supply, for others, of demand. Mutual awareness of markets and industrial interests must be developed in a spirit of openness. The experience which the Community gained in drawing up the European Energy Charter can and must be employed to the benefit of the ACP countries, too. The frequent contacts we have already enjoyed with other production zones or regional organizations such as OAPEC, the GCC, the Latin-American Energy Organization and now the former USSR must be extended to the ACP countries, especially those which are members of the APPA.
   Dialogue needs to be consolidated and stepped up.

3. In spite of a few divergences, it has become very apparent that businesses are the main guarantors of economic and industrial development, provided that they can operate in stable and profitable conditions. Competition between investment areas will be keen, and the contractual framework will no doubt have to be adapted here and there. The reference to the draft European directive on exploration and production was significant.
   The essential requirements are political and economic stability and a contractual framework adapted to today's needs.
4. The importance of cooperation between states and businesses has by now been established. Everyone is in favour of it. However, it requires an appropriate framework and a modernized, accelerated education and training process.
   The Community can help to get training off the ground or to step it up, but it is the ACP countries themselves which must take the decisions.
5. Economic development must include the manufacture of good quality finished products. Downstream sectors, refining and distribution will also require major investment. It is not right that countries which export crude should become net importers of finished products because of the inefficiency of their refining equipment.
   It is vital that refineries be modernized and transport and distribution infrastructure developed. These areas too will attract investment provided that the conditions for profitability are met.
   My fifth point is therefore that the development of national economies requires an efficient instrument for distributing energy products.
6. Lastly, the environment and its protection cannot be considered to be the exclusive concern of the industrialized nations. They must be integrated into the development process, failing which the long-term cost to society will be enormous.
   Here too, the Community must provide help and experience. However, the ACP countries too must give priority to the protection of the local and global environment.

In conclusion, Mr Chairman, Your Excellencies, ladies and gentlemen, all of these points, and the list is by no means exhaustive, call for action. Planning ahead is a step in the right direction, a direction shared by both the ACP and the EEC countries, by producers and consumers: stability, foreseeability and a propitious investment climate are all essential.

We have seen that there is room for improvement in the situation. That is why the Commission is planning an initiative to carry on the work begun in Luanda. A joint ACP/EC energy working party might be an interesting approach, a first step towards broadening the discussion on a number of problems tackled at this conference. Such a working party could be set up in the autumn following contacts between the Commission and the General Secretariat of the ACP countries.

In his opening address the Prime Minister reminded us that 'God helps those who help themselves'. I share that philosophy. Development and progress, both economic and social, are dynamic phenomena which, as Mr Cardoso e Cunha pointed out, only materialize when knowledge, money and human resources are available and when there is a will to combine them.

I truly believe that this Conference has helped to get that process under way to the benefit of all concerned.'

EC/AUSTRALIA HIGH LEVEL ENERGY CONSULTATIONS BRUSSELS, 29-30 APRIL 1992

The first session of the Energy Consultations between senior officials of the Commission of the European Communities and Australia took place on 29-30 April 1992 in Brussels.

The EC delegation was led by **Mr C. S. Maniatopoulos**, Director-General of the Directorate-General for Energy and the Australian delegation by **Mr Peter Core**, Executive Director of the Department of Primary Industries and Energy.

These consultations provided the opportunity for an extensive exchange of views and of information on energy policies and issues, and further strengthened the close bilateral relationship which has been forged in recent years between the EC and Australia.

The EC and Australian delegations reviewed world energy markets and the outlook, and noted that perspectives for increased trade in energy and in particular in coal looked promising.

The Community side gave a detailed account of ongoing developments in the internal energy market particularly as regards the gas and electricity sector. Information was also given on the perspectives for energy policy in the Community following the Maastricht Treaty, and on current thinking as regards introducing more competition and reducing subsidies in the coal sector. This was complemented by information on similar policy initiatives currently under discussion in Australia.

Both sides stressed the importance of open and competitive markets in the energy sector. The complex issue of energy and the environment was discussed. Both sides gave an account of current developments and initiatives undertaken by their authorities on this issue and also on wider

environmental/energy matters. Both sides were working towards achieving a global solution at the UNCED conference in Rio. However, it was recognised that, given the many conflicting interests, this would require decisions at the highest political level.

EC/International Atomic Energy Agency (IAEA) meeting Brussels, 28 April 1992

A meeting took place on 28 April between delegations from the European Commission, led by **Mr Cardoso e Cunha**, and the International Atomic Energy Agency, led by its Director-General, **Dr H. Blix.**

An exchange of views and information took place on a range of international nuclear relations issues. Subjects discussed included: the strengthening of IAEA safeguards and of the nuclear non-proliferation regime, issues related to the supply of nuclear fuel and fuel cycle services and the public acceptability of nuclear energy.

Dr Blix and **Mr Cardoso e Cunha** and endorsed a new partnership approach on the implementation of safeguards in the European Community by the IAEA and Euratom under the provisions of the trilateral safeguards agreement between the European Community, its non-nuclear weapon Member States and the IAEA. This new approach will lead to further improvement in the application of safeguards within the Community. It is intended to bring this new partnership approach into operation as soon as possible.

Informal Energy Council, Vilamoura 3-4 April 1992

On 3-4 April an informal meeting of the EC Council of Energy Ministers took place in Portugal.

The internal energy market, the European Energy Charter and the Community's wider energy objectives were discussed.

The discussion on the **internal energy market** was constructive and fruitful and more progress was made than had been expected.

Concensus was reached on a number of principles, in particular to leave maximum room for subsidiarity, to provide for minimum regulation, to take into account the different characteristics of electricity and gas, to emphasize the protection of the environment, and to give priority to security of supply.

As to the substance of the proposals, a large majority of delegations were in favour of putting an end to production monopolies as well as to exclusive rights for the construction of lines, as well as to more transparency by 'unbundling' of both management and accounting.

Different points of view were expressed as regards TPA, but without dogmatic positions being taken. Some delegations were in favour while others expressed specific concerns, in particular with reference to public service obligations, protection of small consumers, equal treatment with regard to tariffs, scope for national (energy) policy, appropriate infrastructure and its financing, enhanced transparency, effective application of competition law, in particular to avoid 'dumping', as well as the question of transitional periods.

The Commission remains of the opinion that these concerns can be met and satisfied within the framework of the proposed directives.

The Commissioner concluded that work had to continue on the basis of the proposed directive with a view to preparing a substantial debate in the May Council. Bilateral consultations at both political and technical levels were held before the latter.

The Energy Charter

The Energy Charter was discussed over lunch. An account of the progress made since the signing of the Charter in December was given. Signature of the basic agreement is envisaged at the end of June. The basic agreement should be limited to those few rules which are truly indispensable for the energy industry to operate and invest in the countries concerned. This would already give the European Energy Charter the operational content it needs.

Community Energy Objectives

The main concern of Member States with respect to the Energy Objectives were CO2 reduction and the energy/CO2 tax, nuclear safety in the East, environmental policy, supply and demand balance for natural gas, social and economic cohesion and interconnections, and the development of Thermie, SAVE and Altener.

MAJOR COMMISSION CONFERENCE ON NATURAL GAS, APRIL 1992

The Directorate-General for Energy (DG XVII) at the Commission of the European Communities organized a Conference in Vilamoura, Portugal on 2-3 April 1992 to discuss a number of issues related to natural gas. This Conference 'Natural Gas Policies and Technologies', the first (dealing with policy aspects) of a set of two Conferences dealing with natural gas this year. The second will take place in Athens, Greece on 14-16 October 1992 and will focus on technologies for natural gas.

The main Conference remit was to address the following subjects:

- Community policy on natural gas supplies and relations with producer countries;
- progress so far and remaining goals as regards the internal market in the natural gas sector;
- the role of natural gas as a vehicle to increase economic and social cohesion between Community regions;
- the protection of the environment as a steadily increasing factor in discussions on the future of energy, and in particular the implications of this for gas;
- the situation and needs of countries and regions now introducing natural gas, and the way in which new users could be better integrated in the European market.

The Conference gathered over 200 representatives of Member States' administrations, gas production, transmission and distribution companies, and gas consumers as well as from the major non-EC gas suppliers.

Mr C. S. Maniatopoulos in the opening session stressed the need for a Community energy policy and highlighted the major elements of the EC natural gas policy. **Mr L. F. Pereira** (Secretary of State for Energy in Portugal), **Mr F. Gutman** (President of Eurogas and Gaz de France) and **Mr B. Sälzer**, MEP (Member of the Committee for Energy, Research and Technology) respectively addressed the future for natural gas in Portugal, the development of the natural gas industry in Europe, and the role which natural gas can play as a tool for economic and social cohesion.

In the five sessions different views were expressed regarding the future of the European natural gas market. Producers, gas companies and consumers expressed their opinion on a wide number of issues ranging from supply and demand perspectives to internal market developments.

All speakers agreed natural gas will be a growing market in the coming decades, the main factors determining the future share of gas in the Community energy balance being: environmental concerns, pursuit of the right balance between supply and growing demand, and implementation of the Community's internal market policy.

Sessions four and five of the Conference concentrated on those countries which are now developing their gas grids. Reference was made to the need for financial support for natural gas infrastructures in these developing markets, which in its turn will contribute to strengthening economic and social cohesion at Community level.

The Portuguese Minister Mr Luís Mira Amaral, Commissioner Cardoso e Cunha and Director-General Mr C. S. Maniatopoulos during the closing session.

Mr Luís Mira Amaral (Minister of Industry and Energy of Portugal) and **Mr Cardoso e Cunha** (Member of the European Commission responsible for energy) closed the Conference.

In his concluding remarks[1] the Commissioner referred to the monopolistic features of the gas market and emphasized the need for further progress in market liberalization which by making gas-to-gas competition possible should increase further penetration. The creation of the internal market will also increase opportunities for both gas companies and consumers to widen their perspectives, and it should therefore be a determining factor in reducing costs and improving productivity and quality of services.

In the external policy context **Mr Cardoso e Cunha** highlighted the good relations which the Community enjoys with its major external suppliers of natural gas, and also to the ongoing efforts further to enhance the producer-consumer dialogue.

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[1] *The complete text of the closing speech is printed at the beginning of this issue.*

VISIT OF THE ALGERIAN ENERGY MINISTER TO THE COMMISSION 24 MARCH 1992

Mr Aït Laoussine, Minister for Energy of Algeria, paid a visit to **Commisioner Matutes**, responsible for North-South relations and **Commissioner Cardoso e Cunha**, responsible for Energy, on 24 March 1992.

During his meeting with **Commissioner Cardoso e Cunha**, the Algerian Minister expressed his country's willingness to become prime exporter of gas to the Community. He explained the new liberal approach adopted by Algeria with regard to foreign companies' investments in oil and gas exploration and production.

He asked for the Commissioner's political support in familiarizing European industry with the new legislation. He also insisted on the need for Algeria to have a correct assessment of its oil and gas resources notably in the Southern part of the Sahara. He therefore asked the Commission for financial assistance in launching a detailed study of the region's potential.

Commissioner Cardoso e Cunha welcomed the recent developments in Algerian investment legislation and indicated his support for the survey request pending further detailed work by the respective departments of the Commission and the Algerian Ministry.

EC ENERGY COMMISSIONER VISITS JAPAN, 26-27 FEBRUARY 1992

At the invitation of the Japanese authorities, **Commissioner Cardoso e Cunha** visited Japan on 26-27 February 1992.

He delivered a keynote speech in the opening session of the 6th Symposium on Pacific Energy Cooperation, in which he reviewed progress on the internal energy market in the EC, developments as regards a tax on energy and EC thinking on achieving stability of supplies and prices of oil.

Commissioner Cardoso e Cunha also met MITI **Minister Watanabe**, in order to discuss a number of issues in the energy sector and the scope for reinforcing mutual cooperation between the EC and Japan in the energy field.

EC ENERGY COMMISSIONER VISITS SWEDEN, 20 FEBRUARY 1992

Commissioner Cardoso e Cunha visited Sweden on the 20 February 1992, to give a speech on 'EC experience in liberalizing energy markets' at the Vattenfall symposium, 'Towards a Free Market for Electricity'.

He also took the opportunity to meet the Swedish Minister of the Environment and National Resources in order to discuss energy issues of mutual interest and also future perspectives in the context of Sweden's application for membership of the Community.

SYMPOSIUM ON PHOTOVOLTAÏC ENERGY ISTANBUL, TURKEY 9-12 FEBRUARY 1992

At the prompting of the Directorate-General for Energy and in cooperation with the Directorate-General for External Relations a symposium was held in Istanbul (Turkey) from 9 to 12 February 1992 in order to promote industrial cooperation between the European Community and non-member Mediterranean countries on photovoltaïc solar energy.

This symposium was attended by more than a 100 high-level representatives of EC industry, Ministries, national bodies and captains of industry from non-member Mediterranean countries.

The symposium was opened by:

- **Mr C. S. Maniatopoulos**, Director-General for Energy at the Commission of the European Communities;
- **Mr Süheyl Elbir**, Director-General of Electrical Power Survey and Development Administration
- and **Mr M. Lake**, EC Ambassador to Turkey.

The symposium was organized by **Mr J. Bonda**, Secretary-General for the European Photovoltaic Energy Association (EPEA).

Thanks to the quality of the speeches, the rewarding discussions which followed them and the ensuing round-up of views the aims of the symposium were easily achieved.

Informal contacts during the symposium made possible first moves towards industrial commercial agreements. It was, moreover, decided that a multi-disciplinary think-tank be set up under the aegis of the EPEA in order to analyse the problems linked with the expansion of photovoltaïc solar energy in the Mediterranean. This think-tank would be made up of representatives of European industry, the Mediterranean countries concerned and Member States' administrations.

THERMIE CONFERENCE FOR JOURNALISTS - BRUSSELS, 5-6 DECEMBER 1991

On 5 and 6 December 1991, 200 journalists from the European Community and beyond gathered in Brussels to discuss the role of energy technology in meeting the challenges facing Europe today. The keynote speech was given by **Commissioner Cardoso e Cunha** and described the way in which energy technology, and the Thermie programme in particular, can make important contributions to the challenges of the environment, Central and Eastern Europe and the CIS, the single market and economic and social cohesion.

Mr Andrej Konopljanik, Russian Minister, Commissioner Cardoso e Cunha, Mr C.S. Maniatopoulos

Mr Maniatopoulos opened the conference and spoke of the importance of energy policy and the role of energy technology in achieving policy goals. A round table was chaired by **Antonio La Pergola**, Chairman of the European Parliament's Committee for Energy, Research and Technology. Among the other important international speakers was **Andrej Konopljanik** from the Russian government, who explained how Thermie can make a vital contribution to the future prosperity of the CIS, particularly on the demand side.

The Conference received extensive media coverage, and its success has promoted the Energy Directorate-General of the European Commission to maintain close contact with the European media on Thermie and energy technology matters.

THERMIE - 1992 PROGRAMME

A number of events under the Thermie programme are taking place in the summer and autumn 1992, organised on behalf of the Community through the OPET network (Organisations for the Promotion of Energy Technology). These are important activities in that they stimulate interest and increase awareness of energy technology on a Community-wide basis:

Efficient Energy Recovery from Heat Emissions in Textile Industry -19 June 1992, Oporto, Portugal

This Business Workshop had a triple remit:

- to give detailed information on suitable cases for application of heat recovery from hot water effluents and gaseous emissions;
- to encourage market introduction of improved energy technologies for heat recovery;
- to give an opportunity for equipment suppliers and the audience to meet and exchange views.

The Potential for Small and Medium Sized Wind Energy Applications in Mediterranean Countries - 25-27 June 1992, Rhodes, Greece

The seminar aimed to:

- present state-of-the-art and the means for promotion of wind energy technologies;
- provide systems analysis on legislative, financial, technical and environmental aspects;
- present concrete experience with small and medium-size grid connections and autonomous wind turbine systems, as well as with combinations with other hybrid systems;
- encourage market penetration of the above technologies.

The intention in organizing this seminar was to help to develop better knowledge of the potential of today's wind energy technologies and to strengthen confidence in the technical and economical viability of small and medium-sized wind energy applications. Technical site visits were laid on to small and medium-sized enterprises using wind energy in the vicinity.

Improved Rational Use of Energy (RUE) Technologies for the Cement Industry 26-28 October 1992, Berlin, Germany

The overall objective of this seminar is the dissemination of information, and the transfer of technological know-how to promote improved technologies for a more rational use of energy in the cement sector. A major issue addressed by the seminar will be the modernisation of the cement industry in Eastern European Countries.

The seminar is intended to:

- give detailed information on the present situation and future trends for more rational use of energy;
- provide an analysis of the state-of-the-art in proven and ready-for-market energy technologies;
- encourage the market introduction of innovative energy technologies;
- identify financial barriers and incentives.

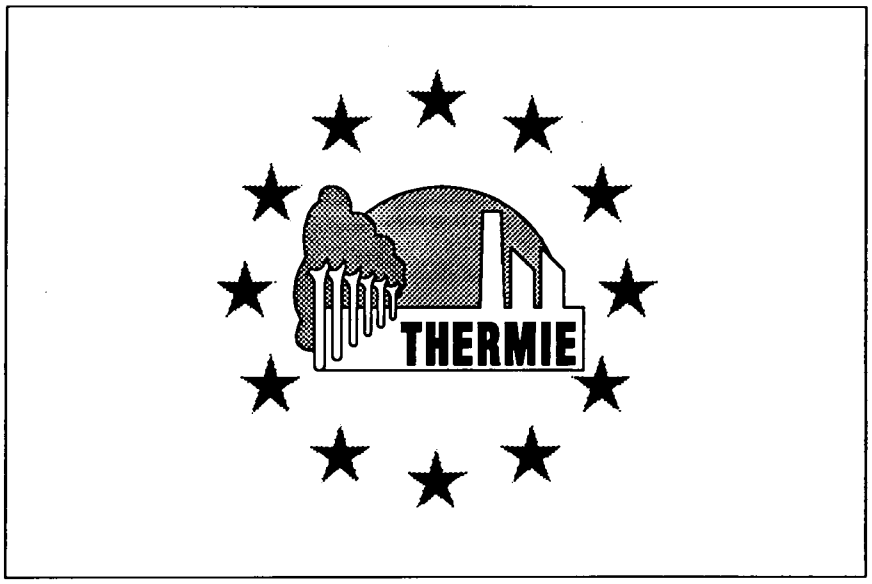
Site visits are to be made to cement producing plants in the Berlin area. The seminar will be conducted in English, French and German, with simultaneous interpretation during all sessions.

International Symposium on Technologies for the Efficient and Clean Combustion of Lignites 17-18 November 1992, Thessaloniki and Ptolemais, Greece

The symposium is intended to:

- promote the adoption of efficient combustion technologies for lignites aiming at energy saving and reducing harmful environmental impacts;
- promote improved techniques for reducing emissions and for ash evacuation of lignite-fired power stations;
- provide participants from Eastern European countries and the former Soviet States with an opportunity to become acquainted with the new technologies in the lignite sector and facilitate introduction in their own countries.

There will be a one-day technical visit to Ptolemais, a lignite mining area which also has lignite-fired power plants with a total capacity of about 3500 MW. The visit will include a presentation on lignite power plants in Greece, a visit to the plants themselves, and a visit to an open-cast mine. The symposium will be conducted in English, German and Greek, with simultaneous interpretation during all sessions.



Other forthcoming Thermie events:

Title	Date	Place	Contact
New technologies for the rational use of energy in refrigeration processes in the agrofood sector	2 June 1992	Saint-Quentin, France	Miss Laure Martin Tel: 33-22-45.18.90
Centralized Energy Management in Buildings	2-3 June 1992	Prague, Czechoslovakia	Mr Florian Sauter-Servaes Tel: 49-6172-3004-0
The impact of new energy technologies on the efficient management of public transport in medium sized towns (with ASTER)	3 June 1992	Bologna, Italy	Miss Milena Guizzardi Tel: 39-51-23.62.42
Seminar and exhibition at 'Euroforum' entitled 'Renewable Energy Sources'	3-5 June 1992	Seville, Spain	Mr Jose Donoso Alonso Tel: 34-1-556.84.15
New technologies for improving the energy efficiency of rotating machinery	4-5 June 1992	Dublin, Ireland	Ms Sonja Waugh Tel: 353-1-37.01.01
Rig automation drilling	10 June 1992	Aberdeen, United Kingdom	Dr Jim Mann Tel: 44-224-70.66.00
Impact of new energy technologies and future potential for small hydro energy	11-13 June 1992	Lisbon, Portugal	Mr Feliz Mil-Homens Tel: 351-1-471.14.54
Efficient energy recovery from heat emissions and radiant energy sources in the textiles industry	11 June 1992	Barcelona, Spain	Mr Conrad Meseguer Tel: 34-3-439.28.00
European seminar on district heating	11-12 June 1992	Watford, United Kingdom	Mr Paul Davidson Tel: 44-92-366.44.37
Cogeneration for non-residential buildings	16-17 June 1992	Barcelona, Spain	Mr Joan Josep Escobar Tel: 34-3-439.28.00
The impact of new energy technologies on the efficient management of public transport in medium sized towns	18 June 1992	Vejle, Denmark	Mr Hans Moller Andersen Tel: 45-33-11.83.00
Efficient energy recovery from heat emissions and radiant energy sources in the textiles industry	19 June 1992	Porto, Portugal	Mr Feliz Mil-Homens Tel: 351-1-471.14.54
Potential for technologies to improve the energy efficiency of coal-fired boilers and furnaces in Czechoslovakia	21-27 June 1992	Czechoslovakia	Mr Florian Sauter-Servaes Tel: 49-6172-3004-0
Potential for technologies to improve the energy efficiency of coal-fired boilers and furnaces in Hungary	21-27 June 1992	Hungary	Mrs Cathy Durston Tel: 44-235-43.30.62
Potential for technologies to improve the energy efficiency of coal-fired boilers and furnaces in Poland	21-27 June 1992	Poland	Mr Jorg Bostel Tel: 49-221-806-2870

Centralized energy management in buildings	23-24 June 1992	Budapest, Hungary	Mr Florian Sauter-Servaes Tel: 49-6172-3004-0
Building shell and energy efficiency	25-26 June 1992	Milan, Italy	Miss Paola Perini Tel: 39-2-76.01.56.72
The potential for small and medium sized wind energy applications in Mediterranean countries	25-27 June 1992	Rhodes, Greece	Mr Dimitris Papastefanakis Tel: 30-1-662.64.60/1
Exhibition stand at 'Offshore Northern Seas'	25-28 August 1992	Stavanger, Norway	Dr Peter Bigg Tel: 44-224-70.66.00
The impact of new energy technologies on the efficient management of public transport in medium sized towns	September 1992	Cologne, Germany	Miss Milena Guizzardi Tel: 39-51-23.62.42
Workshop on hydrocarbons technology	September 1992	Greece	Mr Spyros Pavlidis Tel: 30-1-862.96.60
Platforms decommissioning	September 1992	Spain	Mr Jesus Goiri Tel: 34-4-423-50.50
Modelling of oil reservoirs	September 1992	Lisbon, Portugal	Mr Feliz Mil-Homens Tel: 351-1-471.14.54
Pigs for risers	September 1992	Rotterdam, Netherlands	Mr Wout van Kampen Tel: 31-46.59.52.76
Efficient energy recovery from heat emissions and radiant energy sources in the textiles industry	September 1992	United Kingdom	Mrs Cathy Durston Tel: 44-235-43.30.62
The potential for grid connected wind parks in Europe	Poss. September 1992	Holland	Mr Lex Bouman Tel: 31-46.59.52.76
New technologies for the rational use of energy in the paper and board industry	16-18 September 1992	Strasbourg, France	Mr Michel Viaud Tel: 33-1-47.65.20.00
Potential for technologies to improve the energy efficiency of coal-fired power stations in Czechoslovakia	October 1992	Czechoslovakia	Mr Flemming Oster Tel: 45-33.11.83.00
Study & site visits: Potential for technology to improve energy efficiency of coal-fired boilers, furnaces and dryers in China	October 1992	China (Liaoning)	Mr N Dyeure Tel: 33-1-47.65.20.00
Potential for technologies to improve the energy efficiency of coal-fired power stations in China	October 1992	China (Tianjin)	Mr Wout van Kampen Tel: 31-46.59.52.76
New developments in energy efficient surface coating technology covering the manufacturing industry	13-16 October 1992	Antwerp, Belgium	Mr Peter Criel Tel: 32-3-231.16.60
Natural gas and the rational use of energy	14-16 October 1992	Athens, Greece	Mr Spyros Pavlidis Tel: 30-1-862.96.60
Collective biogas plants - European experience in combined manure & waste processing	22-23 October 1992	Herning, Denmark	Mr Kenneth Larsen Tel: 45-33.11.83.00

New technologies for the rational use of energy in the cement industry	26-28 October 1992	Berlin, Germany	Mr Klaus Schmidt Tel: 49-6172-3004-0
Workshop on Geotechnics	Autumn 1992	Ireland	Dr Jim Mann Tel: 44-224-70.66.00
Diagnostic methods for offshore structures	Autumn 1992	London, United Kingdom	Miss Paola Perini Tel: 39-2-76.01.56.72
Workshop on Hydrocarbons Technology	Poss. Autumn 1992	France	Miss Paola Perini Tel: 39-2-76.01.56.72
Safety and stability of sub-sea pipelines	Autumn 1992	Denmark	Mr Kenneth Larsen Tel: 45-33.11.83.00
Potential for new energy efficient technologies in the fish processing industry covering northern Europe	Autumn 1992	Bremen, Germany	Mr Bodo Wilkens Tel: 49-6172-3004-0
New technologies for the rational use of energy in the fish processing industry covering southern Europe	Autumn 1992	Bremen, Germany	Mr Bodo Wilkens Tel: 49-6172-3004-0
New developments in energy-efficient electro-technologies covering industry in northern Europe	Autumn 1992	United Kingdom	Mrs Cathy Durston Tel: 44-235-43.30.62
Oil and gas technology in a wider Europe	3-5 November 1992	Berlin, Germany	Mr Bernhard Voigt Tel: 49-30-25.49.6-0
New technologies for the rational use of energy in greenhouse horticulture in southern Europe	12-14 November 1992	Crete, Greece	Mr Dimitris Papastefakanis Tel: 30-1-662.64.60/1
Techniques for efficient and clean combustion of lignites	17-18 November 1992	Thessaloniki, Greece	Mr Spyros Pavlidis Tel: 30-1-862.96.60
New technologies for the rational use of energy in the non-ferrous metals industry	18-20 November 1992	Milan, Italy	Miss Paola Perini Tel: 39-2-76.01.56.72
Cogeneration technologies for Latin American countries	Not yet known	Brazil	Mr Feliz Mil-Homens Tel: 351-1-471.14.54
New technologies for the rational use of energy using landfill gas	Not yet known	Eastern Europe	Mrs Cathy Durston Tel: 44-235-43.30.62

Further details of these and all other Thermie events can be obtained from:

Mrs Graeme Cole
OPET-CS
18 av R Vandendriessche
B - 1150 Brussels

Fax: +32-2-771.56.11

DOCUMENT UPDATE

MAIN COMMISSION ENERGY DOCUMENTS, PROPOSALS, DIRECTIVES

COM/91/548 FINAL — Proposal for a Council Directive concerning common rules for the internal market in electricity. Proposal for a Council Directive concerning common rules for the internal market in natural gas. (Presented by the Commission).

SEC/92/553 FINAL — Communication from the Commission to the Council: Electricity and natural gas transmission infrastructures in the Community.

COM/92/152 FINAL — Communication from the Commission to the Council: The oil market and the refining industry in the Community: recent developments and prospects.

COM/92/145 FINAL — Proposal for a Council Directive providing for appropriate measures to be taken in the event of difficulties in the supply of crude oil and petroleum products to the Community. Presented by the Commission.

COM/92/110 FINAL — Proposal for a Council Directive on the conditions for granting and using authorizations for the prospection, exploration and extraction of hydrocarbons. Presented by the Commission.

COM/92/246 FINAL — Communication from the Commission to the Council on a Community strategy to limit carbon dioxide emissions and to improve energy efficiency.

COM/92/182 FINAL — Proposal for a framework directive on energy efficiency (SAVE).

COM/92/180 FINAL — Proposal for a decision concerning the specific actions for greater penetration of renewable energy resources (Altener).

COM/92/226 FINAL — Proposal for a directive on a combined carbon/energy tax.

COM/92/181 — Proposal for a draft Council decision concerning a mechanism for monitoring of Community CO2 and other greenhouse gas emissions.

COM/92/708 FINAL — Communication from the Commission to the Council on clean and efficient energy for development.

SEC/92/724 — Communication from the Commission on technical harmonization and standardization in the energy sector.

NEW ENERGY PUBLICATIONS

'L'Europe de l'Energie - Objectif 1992 et perspectives 2010' (in French), Guy de Carmoy, Georges Brondel
Official Publications Office of the European Communities, Luxembourg
ISBN 92-826-3275-X

'Energy - A Challenge for Europe and the World' (English, French, Portuguese, German)
Commission of the European Communities, Directorate-General for Energy - April 1992

'Energy Efficient Lighting in Buildings', Commission of the European Communities, Directorate-General for Energy

'Centralized Energy Management in Buildings', Commission of the European Communities, Directorate-General for Energy

'Assessment of Incineration of Industrial Wastes', Commission of the European Communities, Directorate-General for Energy

'Creating a Regional Energy Agency - why and how', Commission of the European Communities, Directorate-General for Energy and FEDARENE

'Regional Energy Planning - a way to integrated development', Commission of the European Communities, Directorate-General for Energy and FEDARENE

EUROSTAT

RAPID REPORTS - ENERGY AND INDUSTRY

1991-19 Gas prices
1991-20 Electricity prices
1991-21 Industrial trends - December 1991
1991-22 Price systems - Electricity
1991-23 Price systems - Gas
1992-1 Industrial trends - January 1992, EC industrial production stagnant
1992-2 Industrial development sluggish
1992-3 Electricity prices (Supplement to No 1991-20)
1992-4 Gas prices (Supplement to No 1991-19)
1992-5 Report on the Community Coal Industry in 1991
1992-6 Electricity statistics
1992-7 Downturn in Germany too
1992-8 Inland deliveries of petroleum products in 1991
1992-9 Evolution of inland deliveries of unleaded motor spirit
1992-10 Statistical aspects of the natural gas economy in 1991
1992-11 European industry without engine for growth
1992-12 Hard coal - extra-Community imports 1988-1991

Energy prices 1978-1990 - Eurostat
ISBN 92-826-2354-8 Office for Official Publications of the European Communities, Luxembourg

Gas prices 1985-1991 - Eurostat
ISBN 92-826-3069-2 Office for Official Publications of the European Communities, Luxembourg

Electricity prices 1985-1991 - Eurostat
ISBN 92-826-3068-4 Office for Official Publications of the European Communities, Luxembourg

Energy Balance Sheets - 1989-1990 - Eurostat
ISBN 92-826-3814-6 Office for Official Publications of the European Communities, Luxembourg

Energy - Yearly statistics 1990
Office for Official Publications of the European Communities, Luxembourg

Energy Monthly statistics
1992 - 1
1992 - 2
1992 - 3
1992 - 4
Office for Official Publications of the European Communities, Luxembourg

L'opinion européenne à l'égard de l'énergie en 1991

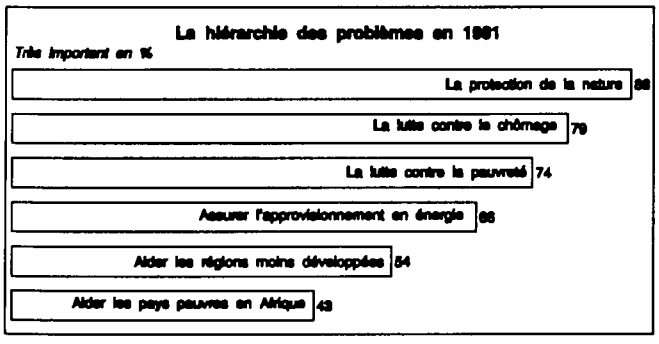
Cette enquête, menée pour le compte de la Direction Générale de l'énergie de la Commission des Communautés Européennes, a pour but de mesurer l'évolution de l'opinion publique européenne à l'égard des différentes questions liées à l'énergie. Pour ce, une enquête Eurobaromètre a été réalisée, en mars 1991, pour la sixième fois depuis 1982, dans les douze Etats Membres auprès de 13.121 citoyens.

L'Eurobaromètre est un important outil d'enquêtes bi-annuelles réalisées systématiquement par la Commision Européenne dans les douze Etats Membres. Cette sixième investigation illustre clairement l'évolution des mentalités, des opinions, des préocupations ou des priorités des Européens dans le domaine de l'énergie, et la vitesse à laquelle celles-ci changent.

Après une introduction consacrée à l'importance attribuée par les Européens à l'approvisionnement en énergie, quatre aspects fondamentaux ont été abordés dans ce rapport[1], à savoir: l'image des différentes sources d'énergie, l'énergie nucléaire ayant fait l'objet d'une étude plus approfondie; les problèmes d'environnement; les attentes des Européens vis-à-vis du Marché Unique de l'Energie; et les effets de la fréquentation des média sur les opinions en matière énergétique.

L'approvisionnement en énergie

L'approvisionnement en énergie est perçu comme un des problèmes les plus importants auxquels notre société est actuellement confrontée.



Eurobarometer 35.0 - INRA (Europe)

En effet, si la hiérarchie des problèmes reste la même qu'il y a deux ans, on constate toutefois de nouvelles tendances.

La plus importante tendance concerne la prise de conscience du problème de l'approvisionnement de l'énergie. Les opinions publiques les plus clairement sensibilisées à l'importance du problème, sont celles du Royaume-Uni, du Luxembourg et de l'Irlande.

Quant aux solutions à ce problème, une Directive au niveau communautaire a maintenant les faveurs de 80% des Européens (67% en 1989).

Les opinions sur les questions relatives aux qualités des différentes sources d'énergie évoluent également de façon sensible.

A titre d'exemple, l'image des combustibles solides continue à se détériorer, spécialement en ce qui concerne la sécurité d'approvisionnement et les dangers de pollution. Quoique le pétrole obtienne un score à peu près aussi médiocre que les combustibles solides en termes de stabilité des prix ou de sécurité d'approvisionnement, et que 2% seulement l'associent à une moindre pollution, on observe cependant une légère amélioration des opinions positives.

1 Ce rapport est disponible sur simple demande adressé au Redacteur en Chef, *Energy in Europe*, DG XVII, Commission des Communautés Européens, 200 rue de la Loi, B-1049, Bruxelles, Belgique.

Le gaz naturel, quant à lui, reste le choix le plus fréquent en ce qui concerne la stabilité des prix et la sécurité d'approvisionnement. Toutefois, il est nettement moins cité qu'auparavant en tant que source d'énergie peu polluante.

L'image de l'énergie nucléaire se détériore aussi selon ces trois critères, tout en restant meilleure, en termes de moindre pollution, que celles des combustibles solides ou du pétrole.

Enfin, et par contraste, la perception des énergies renouvelables s'améliore de façon impressionnante en matière de moindres dangers de pollution, en obtenant les deux tiers des votes européens.

Globalement, on observe des jugements un peu plus favorables à l'égard des combustibles solides (en Irlande), du pétrole (au Danemark et dans l'ex-RDA), du gaz naturel (aux Pays-Bas), de l'énergie nucléaire (en France, mais moins qu'en 1989), des énergies renouvelables (dans les pays méditerranéens mais aussi de plus en plus au Royaume-Uni ou aux Pays-Bas).

L'image de l'énergie nucléaire, analysée plus en détails, montre une évolution très positive en ce qui concerne son coût. En effet, six Européens sur dix sont convaincus des avantages de ce point et du fait que le nucléaire les rende moins dépendants des sources énergétiques situées hors de la Communauté.

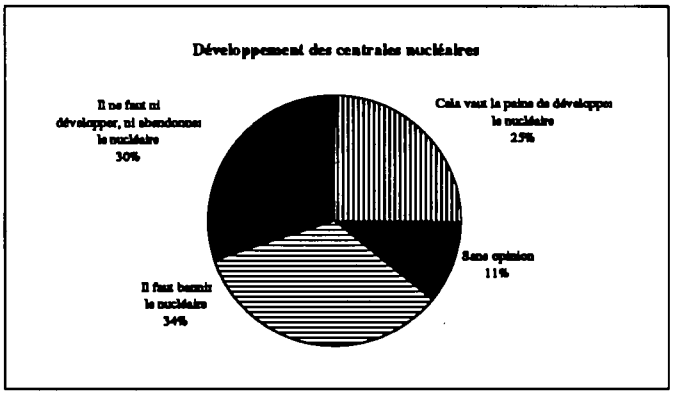
En revanche on observe encore une réduction de la proportion des Européens qui voient, dans le nucléaire, une forme d'énergie propre et non polluante: seulement 31% partagent cette opinion.

Toutes proportions gardées, ce sont les ex-Allemands de l'Est (58%), les Hollandais (44%) et les Danois (39%) qui restent les meilleurs défenseurs de la 'propreté' du nucléaire.

Il est intéressant de noter que ceux qui ont une attitude plus favorable à l'égard du nucléaire sont les hommes, les personnes âgées de 40 à 54 ans, les plus instruits ainsi que ceux qui ont des sensibilités politiques de droite.

Cela étant, quid du développement des centrales nucléaires?

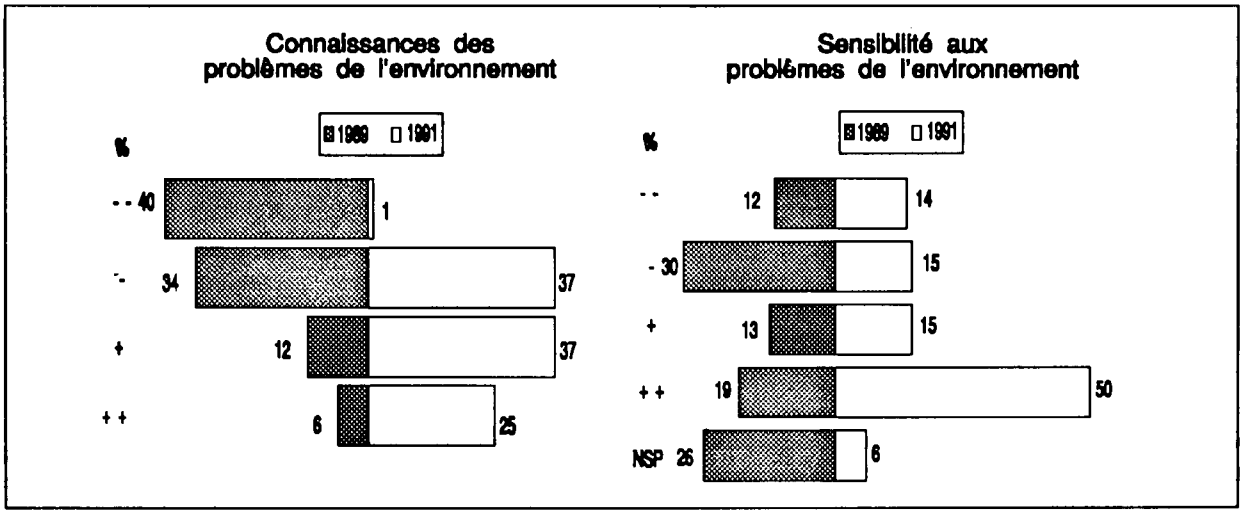
Sur ce point, les opinions varient beaucoup: 25% des Européens pensent qu'il faut aller de l'avant, 30% plaident en faveur du statu quo (c'est-à-dire ni développer de nouvelles centrales, ni abandonner celles qui existent) et 34% souhaitent l'arrêt de leur développement et bannissent le nucléaire, qui présente, selon eux, des dangers inacceptables.



Eurobarometer 35.0 - 1991 - INRA (Europe)

La figure ci-dessus montre une réduction du nombre des opposants inconditionnels (51% en 1989). Ceux-ci restent cependant nombreux en Grèce (53%), en Irlande (52%), au Danemark (46%), au Luxembourg (46%) et en Allemagne (47%).

En termes d'environnement, la quasi totalité des Européens se sentent fortement préoccupés par les problèmes d'environnement et ce, dans tous les Etats Membres et dans toutes les couches de la population.



Eurobarometer 35.0 - 1991 - INRA (Europe)

En ce qui concerne les causes présumées des principaux problèmes environnementaux, on observe quelques associations bien spécifiques.

L'effet de serre et la destruction des forêts sont surtout attribués à l'utilisation du charbon et du pétrole, au recours aux produits chimiques et/ou à des technologies énergétiques inefficaces et dépassées.

Les pluies acides sont dues, pour plus de 50% d'Européens, à l'utilisation des produits chimiques.

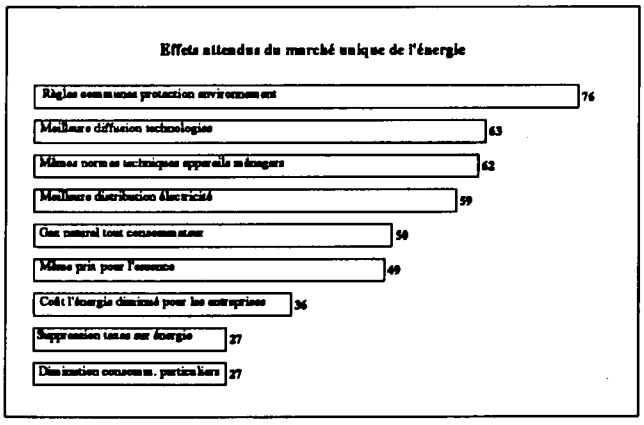
Quant à la destruction de la couche d'ozone, elle est incriminée aux produits chimiques, mais aussi, et de plus en plus, au charbon et au pétrole.

Cependant, on constate que le degré de sensibilisation de nos interlocuteurs aux problèmes d'environnement ne semble influencer en rien leur perception des avantages ou inconvénients des combustibles fossiles.

Les énergies renouvelables sont plus appréciées, à tous points de vue, par les Européens les plus sensibilisés aux problèmes d'environnement, qui sont aussi plus nombreux à s'opposer à toute énergie nucléaire.

De même, une meilleure connaissance des sources de ces mêmes problèmes conduit à apprécier davantage le gaz naturel, l'énergie nucléaire, et les énergies renouvelables et ce, exclusivement en termes de risques de pollution.

Effets attendus du marché unique de l'énergie



Eurobarometer 35.0 - 1991 - INRA (Europe)

Il faut constater la forte progression, au cours de ces deux dernières années, de la confiance dans les conséquences effectives du marché unique de l'énergie. En effet, 76% d'Européens s'attendent à des règles communes sur la protection de l'environnement, 63% à une meilleure diffusion des technologies, 62% à l'introduction de normes techniques harmonisées pour les appareils ménagers, 59% à une meilleure distribution de l'électricité, 50% à la mise à disposition du gaz naturel à tout consommateur.

Mais il reste vrai que les Européens croient globalement plus à la création d'un cadre technico-juridique pour le marché unique qu'à ses forces économiques.

Tous les objectifs proposés reçoivent par ailleurs l'adhésion de 65 à 80% des personnes interrogées. Toutefois les attentes sont particulièrement fortes à l'égard d'une diffusion accrue et d'une répartition plus uniforme des technologies énergétiques nouvelles et efficaces (jugée très importante dans tous les Etats Membres).

Une exigence en forte progression, spécialement aux Pays-Bas, au Royaume-Uni, en Espagne, en Italie, et au Portugal réside dans l'amélioration de la distribution d'électricité dans toute la Communauté. De même, la standardisation des normes techniques pour les appareils ménagers est spécialement attendue en France, en Belgique, en Irlande, aux Pays-Bas et au Royaume-Uni.

Enfin, l'étude montre que les Européens qui fréquentent le plus souvent les media sont les mieux informés sur les problèmes énergétiques. Par exemple, ceux-ci accordent plus d'importance à l'approvisionnement énergétique - ils sont aussi plus volontiers en faveur d'une action commune dans ce domaine - et ont plus généralement entendu parler des trois problèmes d'environnement. Ils ne les considèrent pas pour autant comme (encore) plus sérieux, et n'y sont donc pas plus sensibilisés. Ces personnes sont également celles qui leur attribuent les causes plus nombreuses (et les plus exactes) démontrant donc un meilleur degré de connaissances. Ce sont les Européens les plus nombreux à prôner le développement des centrales nucléaires en attribuant plus fréquemment à l'énergie nucléaire des avantages de coût, d'indépendance et même de propreté.

Conclusion

En guise de conclusion, on retiendra particulièrement l'intérêt croissant vis-à-vis des problèmes d'approvisionnement en énergie ainsi que la détérioration progressive de l'image de combustibles solides et du pétrole. Tous les Européens se sentent, par ailleurs, fortement concernés par les problèmes d'environnement tels l'effet de serre, les pluies acides et la destruction de la couche d'ozone. Cette préoccupation les conduit à être plus favorables aux énergies renouvelables, au gaz naturel et même à l'énergie nucléaire. Quant au marché unique de l'énergie, les attentes sont nombreuses, au niveau de l'élaboration de politiques communes pour la protection de l'environnement, de meilleures normes techniques et une meilleure distribution. Finalement, les Européens consultant fréquemment les media sont ceux qui expriment le plus d'intérêt ou d'avis sur ce domaine et qui sont le plus favorables à la recherche de solutions communes.

La cooperation énergétique avec l'Europe Centrale et Orientale et l'ex-Union Soviétique

Par Peter Nagy, DG XVII, unité 'Conception de la politique' (A1)

Les révolutions survenues en 1989 dans les pays d'Europe centrale et orientale (PECO) ont incité la Communauté européenne et d'autres pays du monde occidental à réagir de façon significative.

Les PECO ont été admis à bénéficier de nouvelles formes d'aide et de coopération pour autant qu'ils s'engagent à se démocratiser et à restructurer leur économie selon les principes de la libre entreprise. La Pologne, la Hongrie, la Tchécoslovaquie, la Yougoslavie, la Roumanie et la Bulgarie remplissent actuellement cette condition et seront bientôt rejointes par l'Albanie et les trois Etats baltes.

Le G7 a chargé la Commission des Communautés européennes de coordonner l'aide émanant de 24 pays de l'OCDE lors du sommet de Paris en juillet 1989. L'exécutif européen dispense sa propre assistance essentiellement à travers le programme PHARE.

Les activités en Europe centrale et orientale se sont prolongées par un programme d'assistance technique à l'URSS et par la négociation d'une Charte européenne de l'énergie.

L'électricité constitue un des domaines de la coopération avec l'Est.

Généralités sur les PECO

Le secteur de l'énergie est une des pierres angulaires de la restructuration économique des PECO. L'énergie joue un rôle à part entière dans les mécanismes du G24 et de PHARE, surtout depuis la crise du Golfe et les décisions d'octobre 1990 du groupe susmentionné. D'autres sources communautaires de collaboration énergétique avec les PECO ont été créées : les possibilités de prêts CECA, le programme de coopération énergétique internationale des Communautés européennes et le volet du programme THERMIE qui vise à introduire et à promouvoir les technologies novatrices et certaines infrastructures d'accompagnement dans les pays précités et en ex-URSS. Par ailleurs, l'énergie constitue également une des activités de coopération prévues dans les accords européens qui ont été conclus avec la Pologne, la Hongrie et la RFTS (République fédérale tchéco-slovaque).

Les PECO et PHARE

Le programme PHARE a prévu une aide d'environ 3 à 5 mécus dans le domaine de l'énergie pour la plupart des PECO en 1991. La Commission a déjà entrepris des missions en vue de définir des projets concrets. Indépendamment des programmes destinés aux différents pays, une action régionale particulière portant sur la sûreté nucléaire a été entamée en Bulgarie et dans la RFTS.

Les montants indicatifs suivants ont été arrêtés dans le programme 1991 : Bulgarie : 10 MECU en tout pour 1991 et 1992; RFTS : 5 MECU; Hongrie :5 MECU; Pologne : 3 MECU; Roumaine : 0,5 MECU; Bulgarie (action régionale nucléaire) : 11,5 MECU pour 1991-1992; RFTS (action régionale nucléaire, 2e phase) : 3,5 MECU.

Les PECO et l'aide du G24

Les premiers résultats obtenus par le groupe de travail 'Energie' du G24 sont notamment l'élaboration d'une stratégie d'assistance énergétique à moyen et long terme et ce qu'il est convenu d'appeler un tableau indicateur, c'est-à-dire un relevé des initiatives actuelles et prévues des donateurs du G24. Ces deux éléments joueront un rôle important pour la mission de coordination de la Commission. L'étude stratégique définit trois grands domaines prioritaires en ce qui concerne la coopération avec les PECO : la formulation et l'agencement de la politique, l'offre et la demande d'énergie, y compris l'efficacité énergétique et la diversification (géographique), et la problématique énergie-environnement-sûreté (nucléaire).

En outre, la Commission a organisé plusieurs réunions de coordination avec d'autres donateurs tels que l'Agence Internationale de l'Energie (AIE), la Banque mondiale, la Banque Européenne d'Investissement (BEI) et les Etats-Unis. Ces rencontres ont en fait confirmé certaines des conclusions de l'étude susmentionnée.

Le programme d'assistance technique à l'URSS

En ce qui concerne l'es-Union soviétique, l'énergie représente une des priorités du programme communautaire d'assistance technique, dont l'enveloppe s'élève à 400 MECU. Un programme d'un montant de 155 MECU a été lancé en juillet 1991 au lendemain de la visite à Moscou des services de la Commission. Il englobe la sûreté nucléaire (la moitié du budget), la refonte des institutions et de la réglementation, les économies d'énergie, l'électricité et le pétrole et le gaz. Les programmes énergétiques des trois Etats baltes pour 1991 seront financés grâce aux fonds du programme d'assistance technique.

La Charte européenne de l'énergie

Les négociations actuelles sur la Charte de l'énergie et les protocoles sectoriels mettent en évidence les activités de coopération en Europe centrale et orientale et en ex-URSS.

Cette Charte se fonde essentiellement sur la complémentarité qui lie les acteurs évoluant sur la scène énergétique européenne. Ses objectifs sont l'expansion des échanges d'énergie, la coordination, la coopération et l'optimisation de l'utilisation de l'énergie, ainsi que la protection de l'environnement.

Ils devraient être atteints grâce à des initiatives communes en matière d'accessibilité et d'exploitation des ressources, de protection des investissements, de promotion des échanges, de spécifications techniques et normes de sécurité, de recherche, de développement technologique et d'innovation, de rationalisation de l'utilisation de l'énergie et enfin, de la protection du milieu naturel.

Trente-cinq pays ont été invités à la conférence préparatoire qui s'est tenue à Bruxelles du 15 au 17 juillet 1991. Elle regroupait tous les pays d'Europe et les pays non-européens de l'OCDE, ainsi que les observateurs de plusieurs Etats du Maghreb et du Golfe et de certaines organisations internationales (BERD, BEI, AIE, AIEA, OCDE, Banque mondiale et CEE-NU).

Les déclarations liminaires des différentes délégations ont indiqué une attitude résolument positive à l'égard des principes présentés par la Commission, relatifs à une charte de l'énergie .

Cinq groupes de travail ont été créés en vue d'examiner respectivement le corps de la charte (sous la présidence de la Commission), et une convention d'application générale réglant les aspects horizontaux, organiques et institutionnels (secrétariat, financement, contentieux, etc.), sous présidence britannique. Les autres groupes de travail concernent respectivement l'efficacité énergétique et les problèmes d'environnement (présidence hongroise), le domaine des hydrocarbures (présidence norvégienne) et la question du nucléaire et de sa sûreté (présidence canadienne). Les protocoles sectoriels correspondants auront un caractère juridiquement contraignant.

Le commissaire européen Antonio Cardoso e Cunha (à droite) et le secrétaire d'Etat néerlandais aux affaires économiques, Mme Van Rooy, accueillant la délégation soviétique à la réunion préparatoire de la Charte européenne de l'énergie.

Le premier groupe de travail a entamé ses travaux en septembre 1991 sous la présidence de M. Maniatopoulos,

Directeur Général de l'Energie à la Commission européenne. Ils ont abouti au parachèvement du texte de la Charte, qui a été signée lors d'une conférence internationale tenue à La Haye les 16 et 17 décembre. La négociation des protocoles au sein des autres groupes de travail se prolongera en 1992.

L'évolution récente en ex-URSS

Il est évident que l'évolution récente de l'ex-Union soviétique influera sur toutes les activités de coopération susmentionnées. La Commission devra, en particulier, reconsidérer le nouveau rôle des diverses républiques. En outre, il faudra que les relations avec les PECO s'intensifient et s'étendent aux Etats baltes et à l'Albanie dans le cadre du programme PHARE.

La coopération dans le domaine de l'électricité

Le secteur électrique peut être pris comme exemple de la coopération dans un domaine important.

Un premier débat dans le cadre du G24 s'est concentré sur les problèmes d'approvisionnement dont ont souffert certains PECO l'hiver dernier. L'alimentation électrique de la Bulgarie fait l'objet d'une surveillance étroite en cet hiver 1991-1992, surtout depuis la fermeture de certaines tranches de la centrale nucléaire de Kozloduy. La Commission a déjà lancé une étude de ces problèmes d'approvisionnement.

De plus, le 4 juin 1991, l'exécutif européen a organisé une réunion spéciale du groupe de travail 'Energie' du G24 consacrée à l'électricité. Les aspects suivants y ont été définis comme les domaines clés d'une aide potentielle : interconnexion Est-Ouest des réseaux, protection de l'environnement et efficacité énergétique, tarification et calcul des prix, formation, restructuration du secteur et sûreté nucléaire.

La Commission envisage une aide au secteur électrique dans certains volets de PHARE, notamment la mise en oeuvre de projets régionaux (c'est-à-dire concernant au moins trois PECO). L'étude de l'interconnexion des réseaux occidentaux et orientaux en constituera l'élément essentiel.

Il ne faut cependant pas perdre de vue que la Commission dispose de ressources limitées et que son aide vise essentiellement l'assistance technique. La modernisation des réseaux nécessite des investissement substantiels qui ne sont rentables qu'à long terme et des technologies spéciales que seules les industries concernées sont capables de mettre en oeuvre.

Le volet 'Electricité' du programme d'assistance technique à l'Union soviétique abordera les domaines suivants : décentralisation et restructuration (y compris la privatisation), modernisation de l'équipement, production électrique et environnement et exportations d'électricité soviétique.

Programme international de coopération énergétique - projets récents en Pologne, en Hongrie et en Tchécoslovaquie

Par Miriam Delehanty, DG XVII, unité 'Programme international de coopération énergétique' (A3)

Depuis la révolution pacifique de 1989 en Europe centrale et orientale, la Communauté européenne a relevé le défi qui consiste à aider les pays d'europe centrale et orientale (PECO) à évoluer vers l'économie de marché. Le programme PHARE a été créé pour répondre directement aux besoins de la Hongrie et de la Pologne, les premières à avoir engagé une réforme politique, et s'est ensuite étendu aux autres PECO. Ce programme exécute actuellement des projets concernant tous les grands secteurs, dont l'énergie, dans l'ensemble de ces pays. Parallèlement (et en coordination avec PHARE), le programme international de la direction générale de l'énergie oeuvre également dans ce domaine et a établi, en 1989, des premiers contacts avec les autorités compétentes des PECO en vue d'une coopération en matière de gestion et de programmation énergétique. Ce programme est bien placé pour apporter une aide compte tenu de l'expérience que des activités semblables en Amérique latine, en Asie et en Méditerranée lui ont apportée. Le présent article détaille quelques-uns des projets en cours en Pologne, en Hongrie et en Tchécoslovaquie.

Pologne - programmation énergétique à Gliwice

Historique

Un projet de programmation énergétique se déroule actuellement dans la ville polonaise de Gliwice avec le concours financier de la Commission des Communautés européennes et de l'"IMO Project Fund' danois.

La maire de cette agglomération a accordé un priorité élevée à cette programmation et participe lui-même activement au projet. D'autres institutions polonaises contribuent aussi largement à cette initiative.

M. A. Galazewski, maire de Gliwice, Pologne

Le projet comprend une partie préliminaire et une partie principale. La première est achevée et les experts polonais et communautaires sont en train de se concerter pour définir la seconde.

Objectif

Le projet vise à procurer à la municipalité et aux distributeurs de courant de Gliwice des bases de décision rationnelles pour les mesures visant à assurer un approvisionnement en énergie à la fois économique et respectueux de l'environnement.

Dans ce cadre, l'administration locale utilisera plusieurs méthodes d'évaluation mises au point en Europe. En outre, le projet doit encourager davantage le transfert de technologies de l'Europe vers Gliwice.

Résultats de la partie préliminaire

La partie préliminaire du projet a cerné les problèmes clés de l'approvisionnement en énergie, étudié quelques cas sélectionnés de structures de l'offre et de la demande dans ce domaine et examiné le système d'organisation à Gliwice.

Par ailleurs, outre, un modèle mathématique utilisable dans cette ville a été élaboré. Il repose sur les données disponibles à l'échelle locale et permet d'effectuer des calculs simples en situation d'économie de marché.

Trois options ont été étudiées à ce stade pour le système de chauffage. Il ressort de cette analyse que l'option PC (production combinée de chaleur et de courant) réduit les coûts directs au minimum tout en représentant la solution la plus écologique pour l'agrandissement de la centrale thermique. En revanche, elle suppose des frais d'investissement maximaux. Du point de vue de l'environnement, l'option des économies d'énergie prend la seconde place dans la hiérarchie. Le troisième scénario prévoit une alimentation en chaleur d'origine industrielle.

Les experts européens qui participent au projet soulignent que, selon la stratégie adoptée dorénavant, le système d'approvisionnement énergétique de Gliwice nécessitera des investissements plus ou moints importants à brève échéance. Cependant, la structure des prix, les conditions de financement, etc. en Pologne limitent étroitement les possibilités à cet égard.

Il sera donc extrêmement important de pouvoir choisir des solutions grâce auxquelles les réalisations pratiques parviendront, le plus possible, à compenser les investissement consentis.

Avenir de la partie principale

Le plan fournira un apport essentiel aux autres activités régionales dans le domaine énergétique car il permettra à la municipalité de Gliwice d'évaluer les différentes possibilités et donc d'arrêter des objectifs appropriés.

Le projet se concentrera sur l'extension des méthodes de programmation à l'échelle municipale et régionale. Une première étape a été récemment franchie dans ce sens avec la réunion organisée en octobre à Gliwice à l'initiative de son maire.

Pologne - un plan directeur pour Bydgoszcz

Historique

Confrontée à une pénurie des capacités d'approvisionnement et désireuse de se doter d'un réseau de chauffage urbain (CU) économe en énergie, la ville de Bydgoszcz a demandé à la Communauté européenne d'élaborer une stratégie capable de résoudre son problème.

L'étude de la rénovation et de la modernisation d'un système de chauffage urbain suppose l'analyse détaillée de quatre aspects essentiels :

- financier
- commercial
- technique
- institutionnel

Comme ils sont étroitement liés et que les éléments de l'un peuvent influer sur le contenu et le résultat des autres, leur examen s'est effectué simultanément.

Aspects financiers

L'élément fondamental de l'analyse financière est que les prix de l'énergie en Pologne rejoindront ultérieurement les tarifs mondiaux, ce qui signifie une hausse considérable.

Aux prix actuels, l'avantage de la production combinée de chaleur et de courant profite entièrement aux consommateurs de courant. Autrement dit, la société utilisatrice achète ses thermies à l'exploitant de la centrale à un prix comparable au coût de production de celles que fournissent les chaudières au charbon produisant exclusivement de la chaleur. Si l'on veut que le chauffage urbain devienne compétitif par rapport à d'autres systèmes d'approvisionnement en énergie, il convient de partager l'avantage susmentionné entre les consommateurs de courant et de chaleur.

La structure tarifaire du chauffage urbain de Bydgoszcz doit être agencée de façon à ce que les utilisateurs ne paient que la chaleur consommée et non plus les prix fixes actuels, indépendants de la consommation réelle. L'application de toute nouvelle structure devra être précédée par des améliorations techniques du réseau qui permettront aux clients d'ajuster leur consommation de chaleur, ce qui est actuellement impossible.

Aspects commerciaux

L'analyse commerciale repose sur l'hypothèse selon laquelle la demande unitaire de chaleur à Bydgoszcz descendra au niveau prévalant actuellement en Europe septentrionale au cours de la période couverte par la programmation, soit 20 ans.

Comme personne dans cette ville ne paie ses calories en fonction de sa consommation, le système ne comporte aucune dispositif de mesure. Toutes les données concernant la capacité requise et la consommation annuelle reposent donc sur des calculs et des suppositions.

L'expérience résultant du calcul de la demande maximale de chaleur indique qu'il convient de perfectionner les outils de programmation dont dispose l'entreprise de chauffage urbain de la ville de façon à ce que ses grands investissements ne s'opèrent plus sur la base d'hypothèses.

A court terme, une des améliorations consisterait à installer des dispositifs mesurant la consommation réelle dans les unités de production; plus tard, l'installation de calorimètres chez les utilisateurs permettra de calculer le rendement du réseau.

Toute extension du réseau devra être conçue de manière à ce que la quantité de chaleur fournie par la production combinée soit aussi élevée que possible et la capacité requise pour cette production aussi faible que possible.

Aspects techniques

La conception du système de chauffage urbain de Bydgoszcz en complique singulièrement l'exploitation ou l'adaptation en cas de raccordement de nouveaux utilisateurs. Le réglage de la température pose également un problème.

L'amélioration du réseau par des installations modernes suppose une diminution de la température maximale à 130°C et une rectification de la qualité de l'eau afin d'obtenir un réglage correct des vannes.

L'analyse technique sera précédée par des calculs concernant la possibilité de renover les canalisations.

Aspects institutionnels

D'après les évaluations, le personnel de la société distributrice de chauffage WPEC est excédentaire comparativement à celui de ses homologues européennes. Il devra vraisemblablement être réduit de plus ou moins 20 % par rapport à son niveau actuel lorsque le système aura été modernisé.

Hongrie - gestion de l'énergie à Miskolc

Historique

Le présent projet procède en partie du souhait du ministère hongrois de l'Industrie de procéder à une étude de l'utilisation, de la préservation et de la gestion de l'énergie et en partie du voeu de la Communauté européenne (DG XVII) de créer un projet de programmation énergétique pouvant servir de modèle aux réalisations futures des moyennes et grandes villes d'Europe orientale dans ce domaine.

Miskolc a été choisie comme ville modèle et le champ de l'étude a été mis au point. Avec ses 210.000 habitants et son secteur industriel développé, cette agglomération est représentative de beaucoup de cités d'Europe orientale. Le projet englobe le rassemblement de données, l'élaboration d'un plan de référence, des mesures à l'aide d'un modèle mathématique spécifique, des actions de formation et l'exécution d'études de pré-faisabilité sur les initiatives sélectionnées.

Organisation

En vue de contrôler le projet, un comité directeur a été créé, présidé par le maire de Miskolc et regroupant des représentants de l'administration centrale et de certaines grandes sociétés du secteur énergétique ainsi que les experts européens affectés au projet.

Un groupe de travail a également été constitué sur place afin d'assurer le contact quotidien nécessaire.

Etat d'avancement

Le projet a commencé en janvier 1991 et doit normalement se terminer en automne 1992.

Le rassemblement des données est à présent terminé et la plupart des programmes de formation s'achèveront à la fin de cette année.

Dans l'état actuel des choses, différents problèmes et possibilités d'aménagement urbain ont été cernés et certaines des études de pré-faisabilité sont déjà prêtes. Ces travaux concernent notamment l'implantation d'un incinérateur dans l'agglomération, où il importe que les déchets municipaux soient considérés comme une ressource énergétique et pas simplement comme un problème d'environnement.

Résultats escomptés

La participation locale très enthousiaste devrait garantir la perpétuation du processus de programmation dans l'administration municipale et les sociétés concernées.

Des résultats particulièrement importants sont escomptés dans les domaines suivants :

- meilleure compréhension des liens entre les aspects écologiques et organisationnels de la programmation énergétique chez les décideurs locaux;
- découverte de solutions pour exploiter l'infrastructure existante en modernisant les installations techniques et en explorant de nouvelles sources d'énergie telles que la production combinée, la biomasse et les déchets industriels;
- démonstration de la nécessité d'adapter la programmation énergétique aux conditions locales et établissement de parallèles avec les systèmes d'approvisionnement occidentaux modernes dans le cadre de visites d'installations danoises et britanniques.

Un processus de programmation n'est jamais complet et l'utilisation de méthodes de travail efficaces et d'un matériel moderne devrait permettre d'éviter de se laisser

abuser par des mirages coûteux dans le domaine de l'énergie et de l'environnement.

Le risque d'erreurs d'investissements dans ce secteur est très élevé dans l'ex-Europe de l'Est si l'on n'analyse pas soigneusement les options offertes.

Tchécoslovaquie - énergie dans le batiment

Le présent projet s'est déroulé en deux volets parallèles. Le premier a porté sur l'étude technique et statistique du potentiel d'économies d'énergie dans le bâtiment et le second sur l'analyse des diverses contraintes économiques et structurelles qui s'opposeraient à la mise en oeuvre d'un vaste programme destiné à épargner l'énergie dans ce secteur.

Etude technique et statistique des immeubles

Cette étude s'est effectuée en étroite collaboration avec les experts tchécoslovaques et en trois temps :

- expertise technique fouillée de 20 bâtiments différents de Prague et de Bratislava;
- rassemblement de données plus sommaires sur une centaine d'immeubles de différentes catégories;
- évaluation globale du potentiel d'économies d'énergie dans les constructions tchécoslovaques à partir de renseignements statistiques sur le parc immobilier national et de l'expérience pratique européenne.

Une liste de priorités pour les mesures d'économie possibles a été établie sur la base de ces travaux.

En outre, des recommandations techniques concernant les normes énergétiques ont été élaborées en vue d'une refonte de la réglementation tchécoslovaque en matière de construction.

Potentiel d'économies

Le potentiel d'économies d'énergie est non seulement une donnée technique, mais aussi un chiffre clé pour l'examen comparatif des prix de l'énergie et du coût d'investissement des mesures d'économie.

Compte tenu des prix mondiaux des combustibles, des matériaux et du matériel, les immeubles tchécoslovaques présentent une marge d'économies de 8 à 10 % selon que l'on opte pour l'isolation des toitures et des façades ou pour le calfeutrage des chaudières, l'isolation des canalisations et la régulation, avec une période de retour de 0 à 15 ans.

Une diminution supplémentaire de 3 à 5 % de la consommation sera possible en appliquant le principe de la gestion énergétique aux systèmes de chauffage moyens et importants. Cette solution demandera très peu d'investissements directs en matériel, mais nécessitera la formation de conseillers en énergie et du personnel des chaufferies. Si l'on veut épargner encore plus, il convient de prendre également en considération le potentiel d'économies du système d'approvisionnement. Ceci concerne spécialement les systèmes de chauffage urbain, où il est possible de réduire les pertes du réseau, et le recours à des solutions d'approvisionnement rationnelles telles que la cogénération, l'exploitation de la chaleur dissipée dans l'industrie, l'incinération des déchets, etc.

Etude des obstacles structurels aux économies d'énergie

Trois groupes de travail ont été créés afin de définir les entraves économiques, juridiques et autres à la mise en oeuvre d'un vaste programme d'économies d'énergie dans le bâtiment. Leurs 65 membres proviennent de toutes les régions du pays et représentent des institutions tant gouvernementales que non-gouvernementales. Ces groupes de travail ont analysé les conditions qui déterminent actuellement les économies d'énergie en Tchécoslovaquie et ont formulé plusieurs recommandations quant aux modifications ou mesures à entreprendre.

Ces recommandations prévoient notamment d'introduire une tarification fidèle aux coûts pour toutes les formes d'énergie, de former du personnel technique à la gestion de l'énergie et d'aider le secteur de la production à approvisionner le marché avec les matériaux d'isolation et l'équipement technique nécessaires.

Une des recommandations essentielles de l'ensemble des groupes de travail consiste à réclamer une législation complète pour soutenir tout programme d'économie de l'énergie.

Le rapport rassemblant les résultats de cette analyse a été soumis aux autorités tchécoslovaques lors d'un colloque qui s'est tenu le 30 octobre 1991.

Centre énergie CEE-Hongrie

Compte tenu du succès du concept de centre de gestion de l'énergie ailleurs dans le monde (ANASE et Inde), la

Communauté européenne projette d'en créer un en Hongrie. Son but consistera à servir de point de ralliement à une gamme étendue d'initiatives de coopération énergétique entre la Communauté et la Hongrie et de centre de promotion des méthodes de gestion énergétiques modernes dans ce pays. Cet objectif sera poursuivi grâce à diverses activités, dont l'échange d'expérience et de résultats de recherches dans le domaine considéré, la formation et l'éducation, des programmes d'information et de publicité, la recherche économique et la programmation énergétique et l'encouragement du transfert technologique entre les Douze et la Hongrie.

Ce centre sera fondé conjointement par la Communauté et le gouvernement hongrois, mais on envisage que d'autres organismes donateurs et certains opérateurs du secteur de l'énergie puissent collaborer à ses travaux (et à son financement). Ainsi, certains Etats membres de la Communauté pourraient songer à y participer une fois qu'il aura été créé.

Contributions communautaire et hongroise

La création du centre fait l'objet d'une co-entreprise hungaro-communautaire. Les frais matériels d'établissement seront financés dans le cadre du programme énergétique 1991 de PHARE, tandis que le financement du projet proviendra du programme PHARE et d'autres sources. Dans le cadre de la participation communautaire, la DG XVII a nommé un conseiller supérieur à Budapest.

La participation hongroise comprend la fourniture de personnel local et de bureaux. Le projet étant bien avancé, le centre pourrait s'ouvrir avant la fin de l'année.

L'avenir du nucléaire
- Une perspective Européenne

Conférence sur 'L'avenir de l'énergie nucléaire' - Londres, le 17 octobre 1991

Par J.-C. Charrault, DG XVII, Division nucléaire

La plupart des sociétés démocratiques reconnaissent aujourd'hui que le nucléaire pose à la fois des problèmes d'acceptation au sein de la collectivité et des problèmes d'ordre technique. Les premiers sont apparemment plus importants que les seconds et en tout cas plus difficiles à résoudre.

Le public est indéniablement fondé à se demander si certains aspects du cycle nucléaire, comme le stockage définitif des déchets de haute activité ou le déclassement des installations, sont véritablement réglés, car nous ne l'avons pas encore démontré à l'échelle industrielle. D'un autre côté, nous réalisons que, même disposant de toute l'information nécessaire, le public ne perçoit pas correctement le nucléaire.

L'énergie nucléaire est une notion lointaine. Les gens sont habitués au gaz naturel chez eux, aux véhicules à moteur, aux avions, etc. et acceptent qu'ils engendrent des risques. Ce n'est pas le cas pour les centrales nucléaires. La perception de l'approvisionnement électrique commence et finit à l'interrupteur; le problème est à convaincre la population et les hommes politiques que le nucléaire doit être jugé sur sa valeur intrinsèque et comparé aux autres sources d'énergie en termes de respect de l'environnement, de la sûreté et des coûts directs et indirects.

Un regard sur la scène européenne indique que seule la moitié des douze Etats membres de la Communauté produit actuellement de l'énergie nucléaire. Cette production couvre pourtant plus d'un tiers des besoins d'électricité de l'ensemble de la Communauté. Toutes les nouvelles démocraties d'Europe centrale et orientale ont entrepris des programmes nucléaires civils, notamment la Pologne. Cette dernière, bien qu'ayant arrêté les travaux de ses deux centrales en construction, compte néanmoins avoir en service une capacité égale à celle qu'exploite la Belgique à l'horizon 2010. Enfin, l'ex-URSS dispose d'un potentiel de production d'électricité nucléaire de 35 GW (soit 12 % de ses besoins totaux) et construit actuellement un parc supplémentaire de 30 GW.

Ce contexte nous inspire deux observations : le nucléaire restera longtemps encore une source d'énergie importante en Europe et il incombe aux responsables politiques chargés de programmer l'approvisionnement énergétique futur de décider dans quelles conditions le nucléaire se développera dans leurs pays respectifs.

La Commission européenne n'entend pas influer sur le choix d'un Etat pour ou contre le nucléaire; cependant, une fois l'option nucléaire prise, elle estime de son devoir de promouvoir l'assimilation de ce type d'énergie dans la société grâce au respect des traités européens en la matière.

La situation actuelle dans les Etats Membres

Actuellement, le nucléaire contribue à raison d'environ 35 % à la production d'électricité dans la Communauté européenne. Il ne devance que légèrement le charbon dans le palmarès des sources d'énergie primaire utilisées pour cette application, ce que la plupart des gens ignorent. Il mérite probablement une image nettement plus positive que celle qu'on lui attribue généralement.

Sur les douze Etats membres que comprend la Communauté, cinq (le Danemark, la Grèce, l'Irlande, le Luxembourg et le Portugal) ont effectivement renoncé à la voie nucléaire. Ce groupe compte pratiquement tous les 'petits' pays, dont la taille n'est vraisemblablement pas étrangère à leur décision. La production électrique de ces cinq Etats représente moins de 6 % de la production communautaire totale et certains d'entre eux importent des quantités notables d'électricité d'origine nucléaire.

Brièvement, la situation dans les autres Etats membres se présente comme suit :

En **Belgique**, une décision en faveur de la construction d'une nouvelle centrale nucléaire n'est pas attendue de sitôt. Les anciens projets des électriciens du secteur public prévoyaient la construction d'une huitième centrale, mais le gouvernement a réclamé des évaluations économiques supplémentaires et adopté des scénarios de croissance ne prévoyant pas davantage d'énergie nucléaire. Le gaz naturel semble être la solution privilégiée, du moins pour le moment, pour la production d'électricité indigène. Les centrales nucléaires existantes ont néanmoins fourni 60 % de la production totale d'électricité en 1990.

Centrale nucléaire de Tihange, Belgique

Compte tenu du volant de travail actuel de la **France**, le gouvernement a ralenti ses commandes de centrales nucléaires. Elles reprendront vraisemblablement dans quelques années, lorsque cette marge de réserve aura disparu, ou si l'augmentation des contrats d'exportation d'électricité à long terme le justifie. Les 56 unités couplées au réseau possèdent une capacité globale de 56 GWe. En 1990, elles ont produit près des trois-quarts de l'électricité du pays. Six tranches supplémentaires (réacteurs à eau sous pression de 1300 et de 1450 MW) sont en construction.

Dans l'**ex-république fédérale d'Allemagne**, le nucléaire a fourni 34 % de l'électricité produite en 1990. Alors que 21 centrales sont en service, aucune n'est en construction. On s'accorde généralement pour dire qu'il n'y aura pas de suite immédiate au récent 'train' de trois tranches standard, dont la dernière a commencé à fonctionner commercialement il y a peu. Aucune capacité supplémentaire n'est prévue pour la prochaine décennie. Toutefois, ces derniers temps, le gouvernement a confirmé à plusieurs reprises sa position favorable au maintien de l'utilisation du nucléaire.

En **Italie**, l'énergie nucléaire a fait l'objet d'un débat politique acharné au lendemain de Tchernobyl. Le référendum de novembre 1987 a abouti à l'adoption d'une politique instaurant un moratoire de cinq ans dans la construction et l'exploitation des centrales nucléaires. Entretemps, les importations d'électricité, principalement d'origine nucléaire, ont augmenté chaque année et satisfont aujourd'hui environ 15 % des besoins nationaux. Le pays a entrepris un programme de recherche et de développement industriel visant des réacteurs alliant sécurité intrinsèque et passive; son objectif général consiste à choisir, d'ici à fin 1993, une configuration que l'on développera ensuite minutieusement en concentrant tout l'effort sur elle.

Aux **Pays-Bas**, le gouvernement et le parlement ont décidé, au lendemain de Tchernobyl, de reconsidérer l'utilisation du nucléaire et de procéder à certaines études. Aucune décision n'est attendue dans l'immédiat. Les deux centrales nucléaires qui fonctionnent dans le pays fournissent environ 5 % de la production d'électricité. Parallèlement, la programmation électrique insiste sur l'utilisation rationnelle de l'énergie. Les importations d'électricité (nucléaire) se poursuivront (5,5 TWh en 1989) et le recours au gaz naturel s'intensifiera probablement.

En **Espagne**, les installations nucléaires ont fourni quelque 52 TWh en 1990, soit 36 % de la production totale d'électricité. La construction de cinq centrales a cependant été arrêtée. Ce moratoire persistera au moins jusqu'en 2000, en accord avec le dernier plan énergétique national qui a été adopté en 1991.

Au **Royaume-Uni**, une seule centrale sort actuellement de terre (Sizewell B), tandis que la part du nucléaire dans la production d'électricité a atteint 20 % en 1990.

Globalement, nous vivons une situation où les autorités ne ressentent pas tellement le besoin de développer le potentiel nucléaire à brève échéance. Elle s'explique par la faiblesse de l'augmentation de la demande et l'absence de besoin immédiat de remplacer les installations nucléaires existantes, ce qui encourage le prolongement de la vie des centrales actuelles dans toute la mesure du possible.

Les scénarios de la demande d'électricité

Au cours des 20 prochaines années, la demande d'électricité dans la Communauté croîtra probablement plus, en pourcentage, que la demande d'énergie primaire. Nous avons effectué, il y a quelque temps, une étude visant à explorer les scénarios possibles pour l'avenir. Actuellement, notre production nette d'électricité se situe aux alentours de 1700 TWh/an. Nous prévoyons qu'elle passera à 2000-2400 TWh/an en 2000 et à 2000-2700 TWh/an en 2010. A cette date, nous pourrions être contraints de produire, au bas mot, 50 % d'électricité de plus qu'aujourd'hui, voire davantage si nos projections surestiment l'amélioration du rendement énergétique. Afin de décider des solutions à apporter à cette augmentation des besoins et du rôle à attribuer au nucléaire, nous avons utilisé plusieurs hypothèses allant d'une 'progression lente de la demande d'électricité doublée d'un moratoire nucléaire' à un 'accroissement sensible de la demande accompagné d'un réveil du nucléaire'.

Selon le scénario choisi, la quantité d'électricité produite par les centrales nucléaires pourrait légèrement augmenter ou pratiquement doubler ces vingt prochaines années. Du point de vue des capacités installées, la fourchette pour 2010 s'étend d'une valeur basse de 117 GWe à une valeur haute de 166 GWe (contre 105 GWe actuellement).

Une approche plus pragmatique et qualitative laisse entrevoir des conditions propices à la recrudescence du nucléaire. En effet, la montée de l'inquiétude que suscitent les problèmes écologiques et la multiplication des recommandations (nationales et internationales) visant à réduire les émissions qui polluent l'air sont de bon augure pour un accroissement substantiel de la production d'électricité nucléaire. De plus, les événements du Golfe, en soulignant la sécurité précaire de notre approvisionnement pétrolier, pourraient nous pousser à priviliégier les ressources indigènes que nous contrôlons, ce qui ne peut évidemment que servir la cause du nucléaire.

Les retombées écologiques planétaires

Les préoccupations écologiques s'intensifient et se répercutent déjà sur les décisions politiques dans une foule de domaines à l'échelle communautaire et mondiale. Les années 1980 ont vu surgir le plus actuel - et d'aucuns diront le plus épineux - des défis écologiques qui guettent notre monde, à savoir le réchauffement de la planète et l'effet de serre.

Notre étude sur l'électricité a évalué les émissions de SO_2, de NO_x et de CO_2. Les rejets de SO_2 et de NO_x sont combattus grâce à des techniques connues, mais il n'en va pas de même pour le CO_2. En réalité, aucune technique n'est capable de réduire les émanations de ce gaz, qui sont responsables de 50 à 55 % de l'effet de serre.

Les ministres de l'Energie et de l'Environnement de la Communauté européenne ont convenu, lors de leur conseil du 29 octobre 1990, de "prendre des mesures destinées à stabiliser les émissions globales de CO_2 à leur niveau de 1990 pour l'an 2000". Cet objectif est suffisamment souple pour que les Etats membres dont les besoins énergétiques relativement faibles sont appelés à augmenter avec le développement industriel puissent adopter des cibles et des stratégies adaptées à leur croissance tout en améliorant l'efficacité énergétique de leur activité économique.

Les propositions récemment publiées par la Commission prévoient notamment une taxe combinée énergie/CO_2 qui épargnerait les énergies renouvelables, à l'exception des grandes sources hydroélectriques. L'énergie nucléaire ne serait frappée que par la composante énergétique de ce prélèvement et gagnerait donc un atout de concurrence par rapport aux combustibles fossiles.

La taxe envisagée, soit l'équivalent de 3 $ par barril de pétrole, serait prélevée à partir du 1er janvier 1993 et augmenterait d'1 $ par an pour atteindre 10 $ en 2000. Elle s'élèvera à 5 $ pour le nucléaire et la houille blanche et à 14 $ pour le charbon. Cette fiscalité est évidemment loin de faire l'unanimité, car le nucléaire incorpore déjà ses coûts écologiques dans ses coûts de production (déclassement, gestion des déchets, etc.). Cependant, elle avantagera l'atome par rapport aux sources fossiles. Les ministres de l'Environnement des Douze réunis à Amsterdam à la mi-octobre 1991 ont entériné le principe du plan de la Commission.

La production d'énergie engendre environ 30 % du CO_2 dissipé dans la Communauté. Cette proportion est moins grande qu'auparavant. Ainsi, par exemple, la quantité de carbone émise par la production d'électricité des Douze en 1988 a été sensiblement la même qu'en 1973 malgré une expansion de près de 50 % de ladite activité. Si l'on avait brûlé du charbon au lieu de recourir au nucléaire, les émissions de gaz carbonique seraient aujourd'hui supérieures de plus de 70 % à ce qu'elles sont.

A cet égard, les futurs rejets de CO_2 des centrales électriques pourraient varier considérablement selon le scénario qui prévaudrait. Nous avons notamment calculé que, dans l'hypothèse d'une demande d'électricité peu dynamique et d'une reprise du nucléaire, ils seraient moins

élevés en 2010 que maintenant. Manifestement, le nucléaire constitue le seul moyen d'atteindre nos objectifs en matière de CO_2 sans gonfler les coûts. Par contre, si la demande s'emballe et le moratoire dure, les rejets de nos centrales électriques augmenteront démesurément.

Notre réflexion sur ces inquiétants problèmes d'avenir ne doit pas exagérer le cas de l'Europe occidentale, car la déterioration de l'environnement dans les pays d'Europe centrale et orientale (PECO) est nettement plus dramatique. Tous ces pays, y compris l'ex-URSS, éprouvent de graves difficultés énergétiques (de production, de transport ou de consommation) et écologiques (largement liées aux précédentes). Signalons en particulier la pénurie d'électricité, le niveau alarmant de la pollution atmosphérique due à l'utilisation des combustibles fossiles et la sécurité douteuse des centrales nucléaires.

La charte de l'énergie

Le principe d'une grande charte pan-européenne de l'énergie fut initialement avancé par M. Jacques Delors, président de la Commission des Communautés européennes, lors de la conférence sur la sécurité et la coopération en Europe qui s'est tenue à Paris en novembre 1990. La proposition de M. Delors s'inspirait d'une idée lancée à l'origine par le premier ministre néerlandais, M. Ruud Lubbers.

Le sommet des chefs d'Etat et de gouvernement des Douze, qui eut lieu à Rome en décembre 1990, convint d'organiser une conférence internationale en vue d'examiner et d'adopter une telle charte. La Commission élabora un projet et la séance d'ouverture de ce colloque se tint, au niveau ministériel, en juillet 1991.

Tous les pays d'Europe, y compris l'ex-URSS, ainsi que les pays non européens appartenant au groupe des vingt-quatre (Etats-Unis, Canada, Japon, Australie et Nouvelle-Zélande) furent invités à y participer. D'autres Etats et certaines banques et organisations internationales, spécialement l'AIEA, furent admis en tant qu'observateurs.

La charte poursuit les objectifs suivants :

- développer les échanges d'énergie;
- instaurer une coopération et une coordination dans le domaine concerné;
- optimiser l'utilisation de l'énergie et la protection de l'environnement.

Cette accord sera mis en oeuvre par le truchement de conventions particulières, appelées 'protocoles', et d'un 'protocole fondamental' établissant des règles communes à tous les secteurs.

Les protocoles thématiques dit 'sectoriels' régissent les secteurs suivants :

- énergie nucléaire (avec, le cas échéant, relèvement des normes de sécurité);
- hydrocarbures (gaz et pétrole);
- exploitation rationnelle de l'énergie et de l'environnement.

La charte de l'énergie a été signée lors d'une conférence ministérielle spéciale, qui s'est tenue à La Haye les 16 et 17 décembre 1991.

Le protocole nucléaire revêtira une importance capitale pour l'avenir de la source d'énergie correspondante, notamment sous l'angle industriel, commercial et technologique et du point de vue des licences. La Communauté a toujours éprouvé de l'intérêt pour la libre circulation des installations et services nucléaires et singulièrement pour un marché des réacteurs (ou îlots nucléaires) où les mêmes règles de sûreté et normes de construction seraient respectées partout.

Les objectifs de sûreté et de viabilité économique pourront ainsi être atteints et le nucléaire, qu'utilisent la plupart des futurs adhérents à la charte de l'énergie (six Etats membres de la Communauté plus les Etats-Unis, le Japon, le Canada, la Suisse, la Suède, la Finlande, la Bulgarie, la Tchécoslovaquie, la Roumanie, la Hongrie, la Yougoslavie, l'URSS et éventuellement la Pologne) pourrait gagner en acceptabilité et en crédibilité auprès du public.

Par conséquent, si le protocole nucléaire de cette charte est ratifié par la Communauté et ses partenaires, il procurera des bases idéales pour le développement ultérieur de ce secteur en Europe orientale, centrales opérationnelles et en construction confondues.

L'aide aux réacteurs de l'est

Si l'énergie nucléaire, sa sécurité et son économie constituent un thème prioritaire de la coopération pan-européenne, la réforme des installations de conception soviétique en représente le volet le plus urgent.

En plus des initiatives qui ont vu le jour à l'échelle intercontinentale - AIEA (Agence International de l'énergie atomique) et WANO (Association mondiale des exploitants nucléaires) et qui concernent essentiellement les centrales

soviétiques les plus vétustes, la Communauté a échafaudé un programme couvrant l'ensemble des problèmes et des installations. Son financement sera assuré dans le cadre du plan d'aide que les chefs d'Etat et de gouvernement des Douze ont arrêté à Rome en décembre dernier pour l'URSS et par le budget du programme Phare pour les autres PECO.

La Commission, qui est chargée d'exécuter ces programmes, a également été invitée à coordonner l'ensemble de l'aide internationale dans le domaine nucléaire.

Une première réunion de coordination des Etats membres du groupe dit G24 (la Communauté plus douze autres pays) s'est déroulée au début du mois d'octobre sous la présidence de M. Brinkhorst, directeur général de la DG XI, et la seconde s'est tenue fin novembre.

Abstraction faite d'une étude succinte sur la Pologne en 1990, les mesures communautaires ont commencé à se concrétiser en 1991; elles se décomposent comme suit :

Bulgarie (programme PHARE) :

- projet urgent d'un montant de 11,5 MECU approuvé en juillet 1990 pour la modernisation des centrales nucléaires de Kozloduy;
- projet d'un montant de 1,2 MECU pour le traitement des déchets radioactifs produits sur le site susmentionné.

Tchécoslovaquie (programme PHARE) :
6 projets à l'étude pour un montant global de 7 MECU.

URSS (assistance technique du programme URSS)
47,5 MECU ont été affectés à un programme sur la sûreté de fonctionnement et 5,5 mécus à des questions de réglementation (y compris l'information du public).

La Commission se propose d'élaborer progressivement une approche d'ensemble vis-à-vis des projets qui entrent en ligne de compte pour le programme PHARE et le programme d'aide à l'Union soviétique; il s'agira d'un élément important du protocole nucléaire de la charte de l'énergie.

Un comité directeur présidé par la Commission (DG XVII) a été créé en vue de soutenir l'aide à la sécurité nucléaire en Europe orientale et en URSS. Il se compose de représentants des Etats membres de la Communauté européenne et des délégués de l'AIEA et de la WANO y participent en tant qu'observateurs.

La crise du Golfe: quelques réflexions

M. Politis Europeos, expert en géopolitique de l'énergie

Un de nos lecteurs nous a fait parvenir l'article suivant, consacré aux aspects économiques et politiques de la crise du Golfe.

La crise du Golfe, déclenchée par l'invasion du Koweit par l'armée irakienne le 2 août 1990, a brutalement ramené la réflexion sur le concept, difficile à cerner, de stabilité pétrolière.

Pendant les deux premiers mois de la crise, alors que le prix du baril grimpait irrésistiblement jusqu'à 40 dollars, la crainte l'emportait, les accusations de manipulation des marchés se multipliaient, les modèles économétriques des grandes institutions internationales simulaient les conséquences d'un emballement du prix du brut sur les balances des paiements, l'inflation, le taux de croissance, le commerce mondial, le chômage.

Psychologiquement la plupart des commentateurs et prévisionnistes se replaçaient dans la situation vécue près de vingt ans plus tôt, au moment du premier choc pétrolier.

Dès la mi-Janvier 1991, soit 22 semaines après le début de cette crise, le prix du baril redescendait à 15 dollars pour se stabiliser ensuite en-dessous de 20 dollars. Les mesures d'urgence et, plus spécialement, les stocks de sécurité des pays occidentaux n'avaient, heureusement, pas dû servir.

La communauté internationale soulagée pouvait saluer (cf. communiqué de la réunion ministérielle de l'AIE le 8 juin 1991) le bon fonctionnement des marchés, y compris les 'futurs marchés' pourtant fortement soupçonnés d'effet déstabilisateur entre août et octobre.

Le communiqué de l'AIE contenait aussi une référence (plutôt discrète) au rôle, déterminant, joué par quelques pays producteurs (principalement l'Arabie Saoudite, l'Iran, le Vénézuela) qui avaient compensé très rapidement la réduction d'offre (4,3 mio de barils/jour) consécutive à la crise et à l'embargo imposé par les Nations Unies sur les exportations de pétrole à partir de l'Irak et du Koweit.

Les craintes de l'été n'étaient plus qu'un mauvais souvenir. La supériorité des forces coalisées était telle que jamais le régime de Bagdad n'aurait pu, à aucun moment, ni endommager sérieusement les installations pétrolières situées au Nord-Est de l'Arabie Saoudite, ni, à fortiori, placer sous son contrôle une part importante des réserves pétrolières mondiales.

Les affaires pouvaient reprendre leur cours normal ('business as usual'), le temps était venu aussi de la reconnaissance des intérêts mutuels et donc de la reprise du 'dialogue' entre pays producteurs et pays consommateurs: Ispahan (mai 1991), Paris (juillet 1991), workshop de l'AIE (janvier ou février 1992), Norvège (second semestre 1992).

Enfin, le vieux rêve d'un dialogue Nord-Sud limité au pétrole pouvait renaître, quelque quinze années après l'échec de la 'CCEI'. Cette fois toutes les chances seraient réunies: tous les protagonistes ayant appris entretemps qu'on ne pouvait porter atteinte aux lois du marché ... et surtout pas invoquer le concept de prix, le 'saint des saints'.

Il faut espérer que cette 'happy ending' ne soit pas qu'une belle histoire et surtout qu'elle ne fasse pas oublier certaines réalités profondément inscrites dans la géologie et la politique.

Si la crise du Golfe s'est bien terminée, elle a cependant révélé des perspectives fort préoccupantes à moyen terme (les 10 ou 20 prochaines années).

Dans cette perspective de temps, le pétrole n'aura toujours pas de substitut économiquement viable pour ses usages principaux, notamment la fabrication des carburants.

D'ici-là, le poids du Moyen-Orient, dans la détention des réserves et dans la capacité d'accroître la production rapidement en cas de besoin, aura considérablement augmenté.

De même, il est peu vraisemblable que d'ici-là les facteurs d'instabilité politique affectant cette région du monde, et sa périphérie, aient pu être maîtrisés (mais il faut être optimiste à propos de la conférence de paix au Moyen-Orient qui s'est ouverte récemment).

"... global reliance of Persian Gulf oil will increase. The vast majority of the world's most economic, known reserves are concentrated in this region ... *The geopolitical stability of the Persian Gulf will remain at risk indefinitely*" (National Energy Strategy, Washington DC, February 1991).

Par ailleurs, nul ne sait ce que seront devenues la production, les exportations et la consommation de pétrole de l'ex-URSS.

Ces données géologiques et politiques doivent nous faire réfléchir dans la mesure où le pétrole restera, pour longtemps encore, un produit stratégique, c'est-à-dire, un produit qui, en termes de sécurité d'approvisionnement et de niveau de prix, jouera un rôle important dans l'activité économique des grands pays industrialisés.

Il n'y a aucune garantie pour que nous voyons se reproduire la conjonction observée pendant la crise du Golfe à savoir capacité et décision de certains pays pétroliers d'accroître rapidement leur production combinée avec une supériorité militaire américaine écrasante.

Au lieu de céder à une 'euphorie excessive' après des 'craintes excessives', nous devrions ainsi analyser de façon dépassionnée les voies et moyens, multiples, par lesquels la communauté internationale, et en particulier la Communauté européenne, pourraient 'conjurer le sort' et se mettre davantage à l'abri - dans la mesure du possible et du rationnel - d'instabilités et de chocs futurs, qui, compte tenu de la concentration prévisible de la production et du trafic, auraient des conséquences considérables.

Il est tout-à-fait possible que ces chocs futurs prennent naissance aussi bien dans les principaux pays pétroliers, par suite d'un changement de comportement et/ou de stratégie, qu'à leur périphérie, c'est-à-dire, dans les pays et les mers par lesquels le pétrole transite jusqu'à nos ports de déchargement.

La seule solution est d'agir au plan international dans un sens multidimensionnel. Les buts de cette action seraient à la fois le long terme - c'est-à-dire contrôler le volume et la structure de la demande d'énergie et pétrolière - et le court terme, c'est-à-dire l'assurance de disposer de stocks de sécurité suffisants, la surveillance des voies maritimes et terrestres, ainsi que l'amélioration du fonctionnement des marchés (cotations spot et contrats à terme).

Nulle action ne saurait se limiter au seul domaine de l'énergie: la politique étrangère et de sécurité, la coopération économique et commerciale ont aussi un rôle essentiel à jouer.

En définitive, la question centrale que la crise du golfe pose à la Communauté européenne, engagée sur la voie de l'Union Economique et Politique, est surtout celle de sa capacité à intégrer dans une stratégie cohérente les aspects énergétiques, économiques et politiques de la stabilité pétrolière internationale ... dont elle a encore tellement besoin.

Un tel défi n'est pas hors de portée si la Communauté sait faire de la stabilité pétrolière un des axes de sa politique externe, vis-à-vis des pays de l'Est et de l'Union Soviétique (Charte Européenne de l'énergie, programme PHARE et programme d'assistance technique), vis-à-vis des pays du bassin méditerranéen (politique méditerranéenne rénovée), vis-à-vis des pays du Golfe (accord de coopération avec le CCG), et vis-à-vis du Moyen-Orient dans son ensemble (conférence de paix).

L' action de la Communauté Européenne pour promouvoir la maîtrise de l'énergie dans les villes et agglomerations urbaines

Presentation de Mr G Gerini, Chef d'Unité mesures d'accompagnement (DG XVII-TF 2)
à Montréal, Canada 10 Octobre 1991, au Colloque sur l'Evaluation Energétique globale des villes

Les perturbations successives des marchés énergétiques et leurs conséquences négatives sur le développement économique ont amené de nombreux Etats membres de la Communauté à prendre conscience de la nécessité de restructurer leur consommation d'énergie : consommer mieux et moins en produisant plus est alors devenu une priorité. Cet examen des problèmes énergétiques par la demande (diffuse par nature) et non plus seulement par l'offre (habituellement centralisée) a ouvert des perspectives nouvelles et prometteuses pour les échelons territoriaux permettant des analyses et recherches de solutions appropriées aux questions posées par les consommateurs citoyens ou entrepreneurs : les villes sont alors redevenues des acteurs privilégiés de la politique énergétique.

La ville est en effet le lieu de concentration humaine et industrielle où est consommée plus de 80% de notre énergie. C'est dans cet espace restreint que se trouvent exacerbées, parfois à l'extrême, la plupart des grandes questions de société de cette fin de millénaire. Et l'on constate alors que l'énergie se retrouve souvent au coeur des grandes problématiques, soit directement : qualité et confort des logements, valorisation énergétique des ordures, alimentations en réseaux, circulation et pollution des carburants automobiles ..., soit indirectement : diminution des charges (notamment pour les défavorisés), promotion des transports en commun, rétablissement des proximités travail - domicile-loisirs, création de valeur ajoutée et d'emplois locaux etc...

Toutefois, la volonté des villes de jouer à nouveau un rôle conséquent sur le plan énergétique s'est heurtée à des obstacles importants : insuffisance d'informations adéquatement détaillées et fiables sur la demande et les économies d'énergie; manque de méthode et d'instruments pour l'analyse et la prévision des évolutions; carence de savoir-faire et d'équipes locales; absence d'un climat de confiance entre toutes les parties intéressées.

Les premières actions des villes pour maîtriser l'énergie ne furent donc pas réalisées dans les meilleures conditions : conduites de façon isolé, rarement intégrées dans une programmation globale et sans relations extérieures. Les résultats quant à eux furent souvent difficiles à évaluer, et trop peu diffusés.

Dès lors, s'est imposée d'une part la nécessité d'une action communautaire portant sur la programmation énergétique et d'autre part l'oportunité d'échanger les expériences des villes entre elles au niveau européen. C'est ainsi que, depuis 1982, (et particulièrement depuis 1989) la Commission stimule et participe au co-financement d'études, de séminaires d'activités de diffusion des connaissances et des expériences sur le thème de la maîtrise de l'énergie en milieu urbain.

Cette action contribue aux objectifs plus généraux que la Communauté s'est assignée non seulement en matière de politique énergétique par l'amélioration de l'efficacité énergétique, mais également en matière d'intégration communautaire et d'environnement.

Présentation de la programmation énergétique urbaine

Ce concept de programmation est apparu judicieux pour inciter les Municipalités à une réflexion globale sur l'énergie qui a le double mérite de sensibiliser les élus et de les amener à plus d'efficacité dans leurs choix d'investissements.

Qu'est ce que la programmation énergétique?

On peut définir la programmation énergétique de la façon suivante: c'est le rassemblement, l'évaluation et l'analyse systématique de données socio-économiques et techniques en matière d'énergie ou en rapport avec l'énergie, effectués à l'échelon d'une agglomération, et l'utilisation de ces données pour aider au choix d'une politique énergétique intégrée à un développement global. La programmation doit en effet permettre de définir des actions visant l'efficacité énergétique en cohérence avec les autres axes de la politique de développement prévus pour l'agglomération concernée, mais aussi aux échelons nationaux et communautaire.

De par cette définition, la programmation énergétique urbaine contribue ainsi à donner à la politique de l'énergie sa dimension socio-économique, élément qui est implicitement inscrit dans les objectifs énergétiques communautaires. En particulier, elle permet d'évaluer dans quelle mesure l'énergie peut être un facteur déterminant pour le développement global d'une zone urbaine.

L'accent mis sur la dimension socio-économique répond aussi à l'un des objectifs clés de l'Acte unique européen, qui repose sur un renforcement de la cohésion économique et sociale de la Communauté.

Objectif

Le principal objectif de la programmation énergétique consiste à améliorer la gestion de la demande par la promotion de l'efficacité énergétique et l'utilisation plus intensive des ressources localement disponibles et, en particulier, les énergies endogènes nouvelles et renouvelables.

Consommer moins (en étant plus performant) ou différemment (en utilisant les énergies renouvelables) permet alors de limiter parfois considérablement les émissions rendues responsables de plus des trois-quarts des problèmes de pollution urbaine (CO_2, SO_2, NO_x, PbO, etc.). La contribution de la maîtrise de l'énergie à la préservation de l'environnement apparaît alors capitale en zone urbaine.

Bien entendu, cet objectif est poursuivi en parallèle et en cohérence avec d'autres programmes de la Communauté, tels que le programme Thermie qui co-finance les projets novateurs et de dissémination des technologies énergétiques les plus performantes ; le programme Valoren qui co-finance les investissements de maîtrise de l'énergie dans les zones défavorisées et périphériques de la Communauté ; ou encore le futur programme SAVE (Specific Actions for Vigorous Energy Efficiency).

Cadre de l'action

La programmation énergétique urbaine fait l'objet d'une procédure d'appel d'offre (associée à la programmation énergétique régionale) publiée au Journal Officiel des Communautés Européennes. Cette publication ayant généralement lieu en début d'année, précise les éléments nécessaires pour l'engagement d'une proposition, à savoir :

- Les objectifs généraux de la programmation et leurs évolutions éventuelles; aujourd'hui par exemple, en plus de la maîtrise de l'énergie, l'accent est mis sur les incidences environnementales de la consommation énergétique.
- Les domaines couverts et les priorités qui s'y rapportent sont clairement indiqués. C'est ainsi que jusqu'à présent deux types de projets d'études sont recevables pour les villes : les programmations énergétiques en milieu urbain de plus de 100.000 habitants; et les études de faisabilité faisant suite à une étude de programmation.
- Les renseignements d'ordre financier et juridique concernent principalement le soutien financier de la Commission (maximum 40% plafonné à 100.000 écus par projet), les conditions d'éligibilité (les propositions doivent être présentées par des organismes à caractère public) et les droits et obligations contractuelles des futurs bénéficiaires du soutien.

Les premiers résultats de l'action et leur impact en termes de publication, de dissémination et d'animation

Aujourd'hui, une trentaine de villes[1] ont bénéficié de cette action (tableau 1); représentant près de 10% de la population et des consommations communautaires.

Pour la fin de 1992, la Communauté disposera d'un nombre encore plus important d'études et elle se propose d'en effectuer l'évaluation globale. Les études réalisées à ce jour ont permis d'éclairer la Communauté sur les

1 Sont exclues les villes ayant bénéficié d'un soutien dans le cadre de l'appel d'offres 1991.

situations extrêmement diversifiées rencontrées dans les villes de son territoire, et si la maîtrise de l'énergie n'est certes pas la solution miracle pour régler tous les problèmes, elle apparaît bien souvent comme un préalable nécessaire à toute entreprise.

A titre d'exemples montrant la diversité et parfois la complexité des situations locales, on citera les quelques cas suivants d'application de la programmation énergétique (les tableaux 2 et 3 donnent une vue plus complète des questions abordées dans le cadre de la programmation énergétique).

- A Amsterdam, depuis 1989, on coordonne les actions de maîtrise de l'énergie dans un souci d'économies tout autant que de protection de l'environnement : la valorisation énergétique des déchets, le recours aux énergies renouvelables, les substitutions par des énergies moins polluantes (transports au gaz) constitueront les axes autour desquels s'articuleront la politique et les actions de la municipalité à moyen et long terme. Cet ambitieux programme est mené en coopération avec Madrid et Copenhague.
- A Aix en Provence, la programmation énergétique débouchera sur la mise en place de systèmes d'observation et d'information sur l'énergie et l'environnement permettant des choix de politiques urbaine dans le centre et les quartiers nouveaux (bioclimatisme, transports, gestion économe des réseaux, etc.).
- A Berlin, après avoir engagé une première analyse sur Berlin Ouest, depuis 1990, la ville s'attaque à la programmation de multiples opérations liées à la consommation et à son approvisionnement énergétique dans le cadre de la réunification avec Berlin Est : l'inter-connexion de tous les réseaux, les mises aux normes de consommation et de confort à l'Est, la réduction des pollutions industrielle et automobile, constituent les thèmes centraux de cette programmation.

Ces études ont aussi permis d'alimenter les réflexions et les débats de nombreux séminaires, groupes de pilotages, ateliers, publications. Ces actions de communication permettent une diffusion des connaissances sur les instruments et les modèles d'analyses ou de prévisions énergétiques; en outre, elles favorisent les échanges d'expériences ainsi que la coopération entre les institutions, les experts et les autres acteurs de la programmation énergétique. A titre d'exemple, nous pouvons citer :

- Le symposium de Rome en 1988 sur le thème de la programmation énergétique en milieu urbain et le management de l'environnement.
- Le colloque de Berlin en 1989 sur le thème de l'économie d'énergie et l'environnement urbain.
- Le séminaire de Storstrøm en 1990 sur les énergies renouvelables et les technologies énergétiques propres.
- Enfin, le symposium de Mannheim en février 1991 où une Charte de coopération énergétique entre cinq villes (Amsterdam, Berlin, Besançon, Mannheim, Newcastle) fut adoptée.

Cette charte dit notamment que ses signataires :

- ont 'l'obligation de contribuer activement à la réduction de la consommation et à une production plus efficace de l'énergie de façon à améliorer l'environnement'.
- pratiqueront 'l'échange large et régulier des connaissances et savoir-faire des villes réunies par la Charte'.
- constitueront un réseau 'visant à créer la plus complète transparence entre les villes européennes sur leurs compétences dans le domaine de l'énergie, les méthodes de planifications menées, les technologies performantes utilisées, ainsi que sur la façon d'utiliser au mieux et d'élargir l'espace d'action politique dans lequel cela s'éxerce'.

Cette dernière réunion de Mannheim a été l'amorce d'une collaboration entre un grand nombre de villes communautaires (et mêmes au-delà puisque des liaisons existent déjà avec des villes de l'Europe de l'Est). Cette collaboration avait commencé en 1989 sur un projet dénommé 'Cities' où douze villes Européennes (une par Etat membre) acceptèrent de présenter en commun une action exemplaire que chacune d'elles avait conduite pour mieux maîtriser l'énergie.

De ce premier travail collectif devait naître le besoin de poursuivre les échanges de pratiques et de savoir-faire consacré dans la Charte de Mannheim et concrétisé à Paris le 27 mars 1991 par la mise en place de 6 groupes de travail reflétant bien les thèmes centraux de la programmation énergétique, à savoir :

- les transports urbain;
- la gestion des déchets;
- l'utilisation économe de l'énergie;
- la politique urbaine de l'énergie;
- la communication, sensibilisation;
- la promotion des énergies renouvelables.

Aujourd'hui, une structure légère fonctionne à partir de la ville de Besançon et s'emploie à animer les groupes de travail de ce que l'on appelle désormais le 'réseau des villes européennes pour la maîtrise de l'énergie et l'environnement'. Ce réseau compte dès à présent une vingtaine de membres, et il constitue pour la Commission

un réservoir d'idées, ainsi qu'un excellent moyen de diffusion d'informations.

Conclusion

Voici une action qui a convaincu un nombre significatif de villes de la Communauté de la rentabilité de la maîtrise de l'énergie.

L'intérêt des villes se situe à différents niveaux :

- Intérêt financier d'abord
  - par les économies de charges qu'elles peuvent réaliser pour elles-mêmes sur leur propre patrimoine ou pour les citoyens en agissant pour un meilleur confort de l'habitat et un développement des transports publics;
  - par les économies sur les investissements : par exemple en programmant des regroupements de travaux lors de percement de voirie pour faire passer plusieurs réseaux en même temps, ou en associant des investissements complémentaires (du type : la piscine sera construite en même temps que l'usine d'incinération des ordures et près du réseau de chaleur, car elle est le seul moyen de valorisation de la chaleur en été).
- Intérêt budgétaire ensuite inhérant à tous les établissements contraints d'appliquer les règles de la comptabilité publique (tout gros investissement doit être inscrit à l'avance au budget).
- Intérêt technique afin d'adopter des procédés cohérents et compatibles les uns par rapport aux autres. Exemple : il n'est peut être pas nécessaire d'agrandir la décharge si l'on a par ailleurs choisi un procédé d'incinération avec récupération de chaleur.
- Intérêt environnemental, par la valorisation énergétique des déchets urbains (réseaux de chaleur) et par la diminution des pollutions atmosphériques, ce qui a des incidences très positives sur la santé publique;
- Intérêt en terme de développement local et de l'emploi par le volume considérable de travaux générés entre autre par l'isolation des bâtiments, l'entretien des générateurs de chaleur, la valorisation des énergies locales et renouvelables, etc;
- Intérêt social par l'amélioration des conditions et du cadre de vie ;
- Intérêt réglementaire : exemple des schémas d'urbanisme qui doivent être modifiés à l'avance pour permettre le moment venu les investissements souhaités.

Enfin, l'action d'impulsion menée au niveau de la Communauté, a été déterminante pour le développement de la programmation énergétique en milieu urbain; cela avec un budget limité, de l'ordre de 1 million d'écus par an au cours des dernières années. Aujourd'hui il est clair qu'un nombre croissant de villes européennes commence à se rendre compte que la gestion de l'énergie mérite une prise en considération particulière dans le cadre de la politique urbaine. Nous espérons que l'action communautaire décrite ci-dessus puisse inciter d'autres villes, aussi bien à l'intérieur qu'à l'extérieur de la Communauté, à s'engager dans cette voie.

Tableau 1

Liste des villes et agglomérations urbaines ayant bénéficié d'un soutien pour conduire des actions de programmation et de faisabilité énergétique[2]	
Aix-en-Provence	Fredensborg
Amsterdam	Helsingør
Athènes	Kiel
Berlin	Lyon
Bremen	**Madrid**
Brescia	Milan
Bristol	Newcastle
Bruxelles	Rochefort
Chambéry	Rostock
Cleveland	Rotterdam
Coimbra	Rouen
Copenhague	Saarbrücken
Cork	Turin
Dublin	

Sont exclues de cette liste les villes ayant bénéficié d'un soutien dans le cadre de l'appel d'offres 1991.

Tableau 2
Maîtrise de l'énergie en milieu urbain

Etudes financées en 1989

Pays	Ville	Type d'étude
D	Kiel	Développement de moyens supplémentaires pour réduire la consommation d'énergie primaire dans le réseau de chauffage urbain
	Saarbrucken	Transformation du chauffage de 75 maisons unifamiliales et 4 bâtiments tours vers un système de co-génération et pompes de chaleur
DK	Copenhague	Initiation à la cogénération et à la protection de l'environnement (avec Amsterdam)
	Helsingør	Mise au point d'un système d'information intégré dans le domaine de l'énergie et en vue d'une protection environnementale (chauffage urbain, distribution électrique, biogaz, bâtiments communaux)
E	Madrid	Réduction des consommations des produits pétroliers, suppression du charbon dans les usages domestiques, experimentation sur les énergies propres, gestion des déchets, éducation en matière de transports, implication des institutions locales, régionales et nationales
F	Aix-en-Provence	Développement d'une planification énergétique tenant compte de la politique de développement de la ville ayant pour but une maîtrise des systèmes de gestion de l'énergie et des informations sur l'impact environnemental
GR	Athènes	Développement d'un plan énergétique avec identification des choix possibles par une base de données reliant tous les secteurs énergétiques
IRL	Dublin	Quantification et correlation entre les usages énergétiques, et la pollution atmosphérique/contrôle des fumées/plan d'action pour améliorer le chauffage des locaux dans le but de réduire la pollution
I	Turin	Mise au point des outils d'analyse pour évaluer l'incidence des stratégies décisionnelles sur l'énergie et l'environnement
	Brescia	Conception d'un système télématique pour le monitorage et le contrôle automatisé des secteurs de l'énergie et transport - suivi de la pollution de l'air et des eaux
NL	Amsterdam	Plan stratégique pour la valorisation thermique des déchets, avec la cogénération et le chauffage urbain, en stimulant les économies d'énergies, et en favorisant l'usage du gaz dans les flottes de transport
	Rotterdam	Réhabilitation de 72 logements/optimalisation des conditions de confort énergétique/co-génération
UK	Newcastle	Etude pour identifier et correler les prévisions urbaines et les besoins énergétiques futurs dans tous les domaines, incluant les transports. Préparation d'un plan d'action coordonnant le développement régional et les implications environnementales.

Tableau 3
Maîtrise de l'énergie en milieu urbain

Etudes financées en 1990

Pays	Ville	Type d'étude
B	Bruxelles	Gestion écologique et sociale de l'énergie dans l'agglomération-impact de la maîtrise de l'énergie en termes d'insertion sociale/environnement
D	Berlin	L'avenir énergétique de la région de Berlin dans le cadre de la réunification Est/Ouest (demande - approvisionnement)
DE	Bremen Rostock	Etude pour transférer les structures d'approvisionnement et de gestion de l'énergie d'une ville comme Bremen vers des régions moins développées et plus polluées comme Rostock
DK	Helsingør Fredensborg	Conception d'un système d'information pour les départements techniques municipaux, en vue d'une meilleure gestion de l'énergie
F	Rouen	Planification des modes de traitement des déchets par valorisation énergétique pour la ville et sa région
	Lyon	Pollutions induites par la consommation d'énergie-élaboration d'un modèle d'analyse et de prévisions
GR	(Toutes villes)	Recherche en vue de la mise en place d'un système de contrôle des combustions externes (et de leurs pollutions) par les autorités locales
IRL	Cork	Etude sur les possibilités de valorisation des déchets urbains par digestion anaerobie
I	Milan	Conception d'une procédure de certification énergétique pour les bâtiments - programmation pour son application
UK	Cleveland	Etude des correlations entre les usages énergétiques et l'environnement dans les centres urbains de la région
	Bristol	Politiques pour améliorer l'environnement urbain - d'action sur l'énergie

Etude énergétique transfrontalière Aquitaine-Euskadi

l'Ente Vasco de la Energia et *Aquitainénergie*

Régions situées en bordure du Golfe de Gascogne, de part et d'autre de la frontière franco espagnole, Aquitaine et Euskadi regroupent respectivement 2 730 000 et 2 135 000 habitants.

L'intérêt d'une étude énergétique transfrontalière conjointe sont rapidement apparu aux deux organismes qui l'ont réalisée, à savoir EVE (l'Ente Vasco de la Energia) et son homologue Aquitainénergie (l'Agence Régionale de l'Energie d'Aquitaine). C'est en effet au niveau des frontières que se manifestent d'une manière plus évidente les différences entre les systèmes énergétiques, les types de réseaux ou les tarifs. C'est également à leur voisinage que s'enregistrent les écarts les plus sensibles au niveau du prix de la main-d'oeuvre ou de l'énergie, susceptibles d'entraîner des délocalisations d'entreprises.

Cette étude, engagée dès la fin de 1989, a pu bénéficier du soutien de la Direction Générale de l'Energie, et comporte deux phases successives.

La première phase, achevée en automne 1990, a eu pour objectif essentiel de dresser un constat parallèle de la situation énergétique des deux territoires et, porte sur l'analyse des balances des dernières années, l'inventaire des infrastructures et de leurs potentialités, et la comparaison des tarifications.

Les balances énergétiques traduisent la diversité des ressources d'Aquitaine, et la forte dépendance énergétique d'Euskadi (Ktep).

	Aquitaine	Euskadi	Aquitaine + Euskadi
Production d'énergie primaire	11.200	720	11.920
Consommation intérieure brute	10.650	4.630	15.280
Consommation d'énergie finale	6.400	3.740	10.140

La ventilation par secteur se répartit globalement par tiers en Aquitaine entre agriculture/industrie, résidentiel/ tertiaire et transports.

En Euskadi, la seule industrie représente les deux tiers de la consommation finale.

Les taux de pénétration des types d'énergie dans la consommation brute, laissent en Euskadi une large part au charbon et produits pétroliers, l'Aquitaine étant plus spécialisée dans le gaz et l'électricité.

Part des énergie en %	Charbon	Produits petrol.	Gaz	Electricité	Energie renouvel.
Euskadi	19.3%	48.2%	8.3%	20%	4.2%
Aquitaine	2.2%	34.9%	12.9%	44%	6.0%

Les infrastructures énergétiques de production d'Euskadi sont essentiellement axées sur le gisement de gaz de Bermeo, la production électrique, hydraulique et thermique, et le raffinage. Celles d'Aquitaine concernent les gisements gaziers, dont Lacq, la production pétrolière, l'électricité hydraulique et nucléaire, et deux gisements de lignite.

Les échanges interfrontaliers, ne portant que sur les carburants et l'électricité, ont été très limités ces dernières années. Si l'interconnexion électrique existe, les réseaux gaziers s'interrompent actuellement à la frontière.

L'analyse des tarifications montre que, si les structures tarifaires sont proches, des différences importantes de niveau de prix traduisent les options énergétiques des deux Etats, et sont d'ailleurs fortement modulées par la fiscalité.

Ainsi, globalement, les énergies de réseau coûtent moins cher en Aquitaine, alors que les produits pétroliers sont meilleur marché en Euskadi, comme en témoigne le bilan ci-dessous (Base 100 en Aquitaine).

	Prix Euskadi Base 100 Aquitaine	
	Petit consommateur	Gros consommateur
Charbon	65	140
Gaz	120/140	80
Electricité	111/120	115/130
Fuel lourd	-	40/55
Fuel domestique	65/75	
GPL	76	
Essence	77	
Gazole	90	

Ces écarts sont également le reflet de la nature et des dimensions des infrastructures nationales, bien qu'apparaissent des divergences notables pour les mêmes catégories d'usagers entre Euskadi et Aquitaine.

La deuxième phase de cette étude, actuellement en cours, s'est donné pour objectif d'améliorer la coopération ainsi que les échanges énergétiques entre les deux régions. Objectif ambitieux certes, puisque les prérogatives régionales demeurent limitées dans ce domaine qui relève, pour les deux territoires, d'un centralisme traditionnel de l'Etat, tant en matière de choix ou de localisation des investissements de production que de fixation des tarifs. Néanmoins des actions sont engagées dans d'autres domaines pour resserrer les liens interfrontaliers, notamment en matière d'infrastructures de transport ou de communication, et de formation, au sein de l'Arc Atlantique auquel adhèrent les deux régions.

Des contacts mutuels entre les producteurs ou acteurs énergétiques régionaux et nationaux ont été engagés et ont permis d'inventorier les obstacles à une coopération élargie, et à un accroissement des échanges. Ces deux orientations constituent en effet le préalable à un plus grand rapprochement tarifaire.

Cette seconde partie de l'étude vise également à déterminer, dans un contexte régional élargi, les localisations optimales des centres de production et de transformation, et à concevoir des actions concrètes, communes et concertées entre les deux Régions. Elle devrait être achevée début 1992.

Estabilizacion del CO_2 en la Comunidad para el año 2000

Peter Faross, DG XVII: Unidad de Energía y Medio Ambiente (A-2)

Como consecuencia de la Decisión adoptada en octubre de 1990 por los ministros de Energía y Medio Ambiente de la Comunidad para estabilizar en el año 2000 las emisiones globales de CO_2 en la CE al mismo nivel que en 1990, la Comisión de las Comunidades Europeas publicó un libro blanco titulado 'Estrategia comunitaria para limitar las emisiones de dióxido de carbono y aumentar el rendimiento energético'. La finalidad de la estrategia resumida en ese documento es lograr la estabilización del CO_2 para el año 2000.

Modo de alcanzar el objetivo

La estrategia de la Comisión consiste en adoptar medidas ideadas para conseguir el objetivo al mínimo coste y que están justificadas también en cuanto a objetivos no relacionados con el cambio climático. El planteamiento combina los aspectos reglamentarios tradicionales y la introducción de un instrumento fiscal nuevo para aumentar los precios actuales de la energía.

El programa estratégico está compuesto por:

- una serie de medidas no fiscales para aumentar el rendimiento energético;
- un impuesto sobre la energía y el CO_2 para fomentar el uso racional de la energía y la utilización de fuentes energéticas con contenido de carbono escaso o nulo;
- medidas complementarias que se deberán adoptar en cada país.

Medidas no fiscales

El objetivo fundamental de una serie de medidas reglamentarias y voluntarias en lo que se refiere a la producción de electricidad, la industria, el transporte y el hogar es aumentar el rendimiento energético en la Comunidad. Muchas de dichas medidas se hallan recogidas en cierto modo en el programa SAVE de la Comisión. Las propuestas principales se pueden resumir del siguiente modo:

Producción de electricidad

- nuevo programa de apoyo a las energías renovables (Altener);
- propuesta de planificación al mínimo coste;
- fomento de la producción combinada de calor y electricidad;
- mayor uso de las fuentes renovables de energía, sobre todo de los productos de biomasa.

Industria

- aplicación general de auditorías energéticas;
- acuerdos voluntarios para grandes consumidores industriales;
- explotación de calor y electricidad combinados;
- establecimiento de sistemas de financiación de terceros.

Transporte

- aplicación de la mejor tecnología disponible para reducir las emisiones de escape y aumentar el rendimiento del combustible;
- utilización del tren, las vías fluviales y el transporte combinado en lugar de la carretera;
- utilización del transporte colectivo en lugar del privado;
- campañas de información y formación;
- introducción de límites de velocidad más estrictos.

Hogares y comercios

- normas nuevas y de mínimo consumo para los electrodomésticos (congeladores, frigoríficos, calderas, etc.);
- mejora del sistema de alumbrado;
- mejoras en el aislamiento de edificios;
- mayor información (etiquetado).

Al margen de estos cuatro sectores, se deben adoptar algunas otras medidas como el reciclado de residuos, sistemas de mejora de la calidad de vida en las ciudades y campañas de repoblación forestal. Aun contando introducir con mayor rapidez las medidas reglamentarias y voluntarias y con darles un mayor alcance, no es probable que se logre el objetivo de estabilización del CO_2. Se espera que, junto con los resultados del progreso técnico que, de todos modos, se hubieran producido con la renovación del equipo fijo y otras evoluciones del mercado, dichas medidas contribuyan a conseguir la mitad del objetivo. Al ser probable que los posibles resultados del cambio de combustible no se noten hasta después del año 2000 (con sólo cierto margen de maniobra en el caso de la producción de electricidad con gas natural), es necesaria la adopción de medidas fiscales adicionales para crear incentivos que permitan una introducción más rápida de nuevos equipos energéticos de buen rendimiento y para impulsar la utilización de fuentes de energía con contenido de carbono escaso o nulo.

Impuesto sobre la energía y el CO_2

Se considera que un impuesto nuevo que produzca aumentos de precios a largo plazo de las fuentes de energía tradicionales es el medio más adecuado para conseguir un cambio del comportamiento de los 345 millones de consumidores de energía de la Comunidad. La Comisión está a favor de un impuesto combinado sobre la energía y el CO_2, cuyo componente de energía no debería sobrepasar el 50%.

No cabe duda de que un impuesto sólo sobre el carbono crearía los incentivos más eficaces para reducir las emisiones de CO_2. Sin embargo, dicha medida sería una carga de relativa importancia para los usuarios de combustibles sólidos, la fuente de energía más utilizada y segura en el mundo entero. Por otra parte ello favorecería considerablemente la energía nuclear, cuya utilización presenta ventajas en cuanto a la reducción del CO_2 pero que tiene sus propios problemas específicos. Además, según la estructura energética de los Estados miembros, un impuesto que recaiga al 100% sobre el carbono tendría repercusiones muy distintas sobre la competitividad industrial. Por consiguiente, el impuesto combinado sobre la energía y el CO_2 parece ser un término medio que refleja las realidades económicas y políticas y, al mismo tiempo, estimula el aumento del rendimiento energético y la utilización de fuentes de energía menos contaminantes.

Nivel impositivo e introducción gradual

El nivel impositivo necesario para conseguir el objetivo de estabilización del CO_2 en la Comunidad para el año 2000 dependerá de una serie de variables clave, como el crecimiento económico o los precios mundiales de la energía, y de la respuesta de los agentes económicos a las medidas políticas previstas. Todas esas variables están sometidas a un grado considerable de incertidumbre. No obstante, según varios estudios disponibles, es probable que un tipo impositivo equivalente a 10 dólares estadounidenses por barril de petróleo, junto con otras medidas políticas, consiga aproximar la estrategia general al objetivo de estabilización del CO_2. Dichos 10 dólares por barril de petróleo se introducirían paulatinamente para que la industria y otros agentes económicos pudieran ajustarse al impuesto. Desde 1993 se podría aplicar un impuesto de 3 dólares por barril, que iría aumentando en 1 dólar por barril en años sucesivos y hasta el 2000.

Neutralidad fiscal

Uno de los aspectos clave del nuevo impuesto propuesto es su neutralidad en cuanto a la renta pública, lo que significa que no debería provocar ningún aumento de las contribuciones reglamentarias ni de los impuestos. El impuesto ha de quedar compensado con incentivos y desgravaciones fiscales para empresas y particulares, lo que no debería suponer un aumento de los impuestos sino un cambio del sistema impositivo con el que se protegiera más el medio ambiente.

Grandes consumidores industriales

Es obvio que gravar unilateralmente con un impuesto de ese tipo repercutirá de modo negativo en la competitividad industrial. Los efectos en las industrias con gran consumo de energía podrían ser dramáticos. Sectores como el acero, productos químicos, metales no ferrosos, cemento, pasta de papel y papel podrían sufrir hasta el punto de cambiar de

emplazamiento su producción, llevándola fuera de la Comunidad. En cuanto al carácter global del efecto de invernadero, ese tipo de medida no conduciría a una reducción de las emisiones de CO_2 en todo el mundo, por lo que debería darse a dichos sectores de gran consumo energético un tratamiento especial hasta que los principales competidores de la Comunidad también introduzcan impuestos sobre la energía. No obstante, dichos competidores deberían contribuir a alcanzar el objetivo de estabilización mediante acuerdos voluntarios.

Repercusiones económicas

La introducción de las medidas anteriormente expuestas sólo acarrearía modestos costes macroeconómicos, debido, fundamentalmente, a la neutralidad del impuesto respecto a la renta pública y a su introducción gradual. En el conjunto de la Comunidad podrá haber, en comparación con lo que ocurriría durante el período considerado, unareducción del ritmo anual de crecimiento económico (entre el 0,05 y el 0,1%) y un aumento temporal del índice de inflación (0,3 a 0,5% anual).

Características del impuesto

Los caracteres concretos del impuesto se deberán acordar con los gobiernos de la CE. A fin de que los costes administrativos sean bajos, deberán utilizarse hasta donde sea posible los mecanismos tributarios existentes. La energía empleada en las reservas industriales de suministro y las energías renovables, salvo la energía hidráulica a gran escala, deberían quedar exentas del impuesto. La Comisión está considerando la introducción de un sistema armonizado de impuestos nacionales sobre la energía, cuya recaudación iría a parar al Ministerio de Hacienda de cada Estado miembro, en lugar de un impuesto 'comunitario' propiamente dicho. Se considera fundamental realizar un planteamiento armonizado, a fin de evitar distorsiones artificiales de la competencia en el mercado único de la Comunidad.

Control y cláusula de salvaguardia

Se deberá establecer un sistema de control capaz de demostrar si, junto con las medidas nacionales complementarias, la estrategia comunitaria propuesta da como resultado el logro del objetivo de estabilización de las emisiones de CO_2. Será preciso también evaluar de manera continua la aplicación del impuesto, de manera que se pueda suspender o ajustar según el desarrollo económico y los avances hacia el objetivo de la estabilización. Si en algunos Estados miembros la estrategia comunitaria acarrea costes superiores a la media comunitaria, deberán preverse compensaciones para dichos Estados.

Conclusión

La estrategia esbozada por la Comisión no sólo debería dar como resultado la estabilización de las emisiones de CO_2 sino también un aumento de la seguridad del suministro de energía en la Comunidad mediante un rendimiento energético más elevado y un mayor uso de fuentes de energía de escaso o nulo contenido de carbono. Sin embargo, sólo se podrá afrontar el problema del calentamiento global si las medidas comunitarias forman parte de una política unánimemente aceptada en todo el mundo. La Comunidad debe convencer a sus principales socios comerciales industrializados, como los Estados Unidos o Japón, de que sigan su ejemplo. Conviene recordar que la CE sólo produce el 13% de las emisiones mundiales de CO_2 (EE.UU.: 23%, países de Europa del Este y antigua Unión Soviética: 25%, Japón: 5%).

Perspectivas

Los ministros de Medio Ambiente, Energía y Economía y Hacienda se han referido al documento de estabilización del CO_2 al expresar sus respectivos pareceres. Los ministros de Medio Ambiente han manifestado una opinión favorable al documento de la Comisión.

Los ministros de Energía han subrayado la importancia de la Comunicación de la Comisión y la necesidad de contar con una estrategia que incluya múltiples aspectos, pero no llegaron a conclusiones definitivas en su reunión del 29 de octubre.

En un segundo Consejo conjunto de Energía y Medio Ambiente, celebrado el 10 de diciembre de 1991, se trató en detalle la estrategia propuesta y se alcanzaron conclusiones políticas que permitían a la Comisión seguir adelante con las propuestas jurídicas necesarias. Los textos legales de las propuestas de la Comisión podrían ser aprobados antes de la Conferencia de las Naciones Unidas de Medio Ambiente y Desarrollo que se celebrará en junio de 1992.

La Comisión anuncia una ayuda de 115 milliones de ECUs para el segundo año de los proyectos Thermie

Michael Gowen, DG XVII: tecnología energética; Unidad de estrategia, difusión y evaluación

La Comisión de la CE ha decidido los niveles de ayuda económica correspondientes a 1991 para proyectos de tecnología energética del programa Thermie para el fomento de las tecnologías energéticas europeas.

Es el primer año íntegro de ayuda económica a proyectos del programa Thermie, que se aprobó el 29 de junio de 1990 y durará hasta finales de 1994. En noviembre de 1990, se concedió una pequeña serie preliminar de ayudas, que ascendían a 45 millones de ecus.

Actualmente, se ha dado apoyo económico a un total de 151 proyectos de los 582 presentados, por un importe de 115 millones de ecus en total, con lo que las inversiones asignadas son de unos 300 millones de ecus. Los proyectos y la ayuda económica se dividen entre los distintos sectores del siguiente modo:

	Nº de proyectos	Ayuda económica (mecus)	% del total
Uso racional de la energía	64	34.3	29.8
Edificios	19	4.4	3.8
Industrias energéticas	5	3.3	2.9
Industria	30	18.6	16.2
Transportes	10	8.0	6.9
Fuentes renovables de energía	51	35.7	31.1
Energía solar	13	7.2	6.3
Biomasa y residuos	12	9.3	8.1
Energía geotérmica	7	6.1	5.3
Energía hidráulica	10	4.1	3.6
Energía eólica	9	9.0	7.8
Combustibles sólidos	6	22.1	19.2
Hidrocarburos	30	22.9	19.9
Total	151	115.0	100

El uso racional de la energía siempre es un campo que tiene prioridad a la hora de conceder ayudas comunitarias, ya que aumenta el rendimiento del uso de la energía, reduce la contaminación ambiental (mediante la disminución del dióxido de carbono y otras emisiones) e incrementa la competitividad de la industria europea. Pese a que la mayoría de los proyectos en este sector se refieren a la industria, se aprecia que una parte considerable de los fondos se ha concedido este año al sector de los transportes. En general no hay demasiadas propuestas para aumentar el rendimiento energético en los edificios, lo cual se refleja en las decisiones de la Comisión.

Por otra parte, la ayuda a las fuentes renovables de energía es relativamente elevada, dado que se presentó un número considerable de proyectos útiles y, en la decisión preliminar de Thermie del año pasado, se concedió a proyectos de ese tipo una parte relativamente pequeña de los fondos. Por consiguiente, en cierta medida, la decisión restablece el equilibrio, como puede verse en el cuadro que aparece más adelante.

En el sector de los combustibles sólidos, las decisiones de la Comisión incluyen la primera fase de la financiación de un importante proyecto multinacional con el objetivo de conseguir la gasificación integrada con ciclo combinado de gas y vapor (IGCC). Se trata de una tecnología muy prometedora para generar electricidad con carbón y con un rendimiento mucho mayor que el de los métodos tradicionales.

Las decisiones de la Comisión incluyen también una cantidad especial de 10 millones de ecus para 18 proyectos en los nuevos estados federados de la República Federal de Alemania, de conformidad con la Decisión de la comisión de asignar un presupuesto adicional en 1991 a los nuevos estados, tras la reunificación alemana.

Durante los dos primeros años de Thermie (1990-91), la Comisión ha concedido para 213 proyectos un total de 133,6 millones de ecus de ayuda económica, repartidos del siguiente modo:

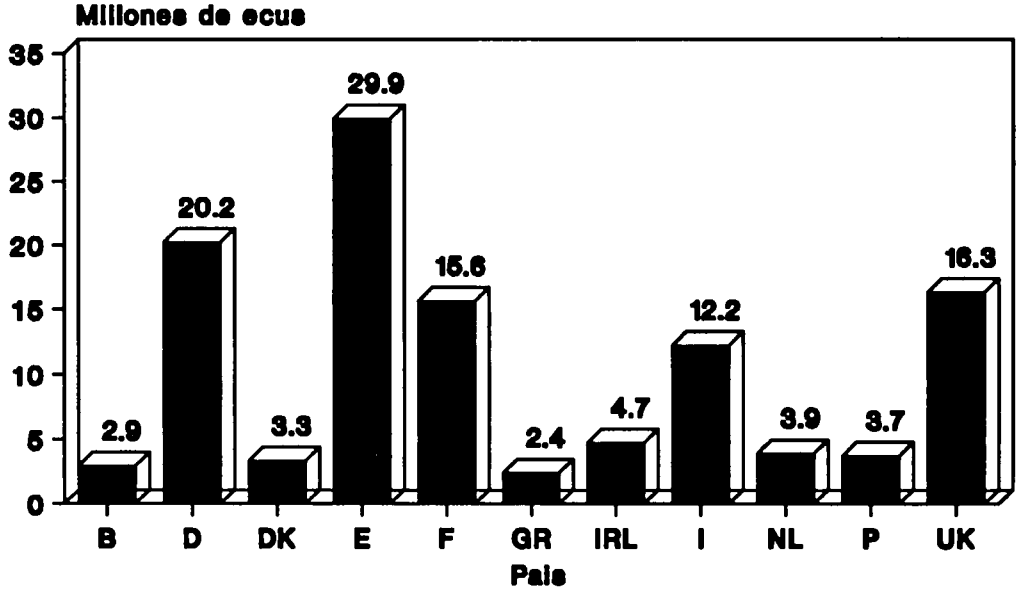
	N° de proyectos	Millones de ecus	% del total
Uso racional de la energía	103	53.0	33
Fuentes renovables de energía	78	42.4	27
Combustibles sólidos	9	30.7	19
Hidrocarburos	46	32.9	21

La finalidad de las ayudas es comercializar las tecnologías energéticas innovadoras que hayan superado la fase de investigación y desarrollo. Su aplicación comercial sigue siendo arriesgada, por lo que no es probable que puedan salir adelante sin el respaldo de la Comunidad. Es interesante destacar que más de la mitad de los proponentes que reciben ayudas son pequeñas y medianas empresas.

Estas tecnologías permitirán ahorrar energía, proporcionar suministros adicionales de energía para la Comunidad (reduciendo, al mismo tiempo, nuestras importaciones, sobre todo de petróleo), aumentar la calidad del medio ambiente reduciendo las emisiones contaminantes (especialmente, de dióxido de carbono, dióxido de azufre y óxidos de nitrógeno), generar inversiones y crear empleo.

Las tecnologías que resulten rentables podrán emplearse también en otros países exteriores a la Comunidad, aplicando las medidas relacionadas con el programa Thermie y relativas al fomento de tecnologías energéticas. Europa Central y Oriental y la Unión Soviética son zonas en las que dichas medidas podrían tener considerable valor.

Thermie 1991
Ayudas economicas (en millones de ecus)



Total aceptado: 151 proyectos
por una cantidad de 115 millones de ecus

Thermie: fomento de la innovacion en el transporte publico

Pat Bell, EOLAS, Dublín

Usted está sentado en la escalinata de la plaza de España, en el centro de Roma, con un *gelato* bien frío. Absorto por el color y el bullicio de gente, está a punto de perder el autobús número 119 que estaba esperando. Y se da cuenta del porqué: es un autobús silencioso.

¿Silencioso? Sí, silencioso. Con la ayuda económica del programa Thermie, la empresa pública de transportes de Roma, ATAC, ha mantenido en servicio ocho minibuses eléctricos desde 1984[1], seguramente los únicos de ese tipo en el mundo que recorren un itinerario regular de un servicio de transporte público.

Uno de los minibuses eléctricos de Roma

Aunque tal vez no estén justificados plenamente desde un punto de vista puramente energético, han demostrado ser atractivos en esa zona peatonal de la Roma histórica por motivos ambientales, como la eliminación de emisiones nocivas y la contaminación sonora. Además, con esta singular línea de autobuses, ATAC ha adquirido una experiencia inestimable en el mantenimiento de autobuses eléctricos en servicio.

Uno de los problemas con los que topó ATAC fue la necesidad de recargar las baterías durante el día al final del recorrido. Gracias a un nuevo proyecto[2] subvencionado por Thermie, se pondrán en servicio cuatro minibuses eléctricos Iveco, equipados con baterías de sodio y azufre (NaS) fabricadas con las técnicas más avanzadas. Con estas baterías de alta energía, que funcionan a una temperatura de 300°C, se debería resolver el problema de tener que recargarlas al final del recorrido.

Ese proyecto sólo es uno más de los muchos dedicados al uso racional de la energía en el transporte que la Comunidad Europea está ayudando a financiar a través de su programa Thermie para el fomento de las tecnologías energéticas europeas. En la última década, mediante Thermie y otros programas anteriores, la Comunidad ha venido concediendo alrededor de 50 millones de ecus en ayuda económica a 60 proyectos de transporte. Dada la creciente importancia de este sector y su proporción cada vez mayor en el consumo de energía, es probable que en el futuro aumente considerablemente la parte de los fondos correspondiente a dicho sector.

Pero cambiemos de escenario. Usted se halla ahora en Munich viajando en lo que parece un autobús urbano normal. Al entrar en una zona urbanizada de la ciudad, el conductor cambia a funcionamiento silencioso con un golpe de interruptor. Usted ya se había dado cuenta del funcionamiento suave y sin vibraciones de ese autobús. Pero...¿no es un autobús eléctrico?

No, pero utiliza un sistema de conducción diesel-eléctrico que elimina la necesidad de transmisión mecánica; de ahí su suave funcionamiento. Además, posee una unidad de almacenamiento de energía que genera energía durante los períodos de desaceleración y frenado para utilizarla cuando sea necesario, por ejemplo, al arrancar de una parada o al entrar en zonas urbanizadas o peatonales.

Con fondos procedentes del programa Thermie[3], este sistema ha sido desarrollado por la empresa Magnet Motor GmbH de Starnberg y utiliza los motores eléctricos de densidad de alta potencia de la propia empresa. En un nuevo proyecto[4], habrá 10 autobuses en cuyas ruedas se instalarán dichos motores, lo que permitirá la fabricación de un autobús con un piso realmente bajo y de fácil acceso para los pasajeros, con el que se ahorrará un 25% de energía y se reducirán en un 50% las emisiones contaminantes.

Entretanto, en Copenhague se está planificando la aplicación de una nueva tecnología a un concepto antiguo para abordar el problema de la contaminación urbana. El concepto antiguo es el trolebús impulsado por un cable eléctrico por encima del mismo, mientras que la nueva tecnología es un sistema de tracción de corriente alterna en autobuses articulados con doble sistema de propulsión.

Todos los días hasta 95.000 pasajeros pueden ser transportados en autobús entre las estaciones de Nørreport

y Nørrebro. Pese a que se ha reducido el tráfico, se han sobrepasado los límites de NO_2 de la OMS y se han registrado niveles sonoros que superan en 70 dB el nivel permitido. Con un nuevo proyecto[5] subvencionado por Thermie, este tramo de vial de 3 km estará dispuesto para la circulación de trolebuses. Los brazos del trolebús se conectarán y desconectarán al cable superior en menos de 15 segundos; fuera del tramo antes mencionado, este autobús dual funcionará como un autobús convencional de gasóleo. Esperamos con interés los resultados.

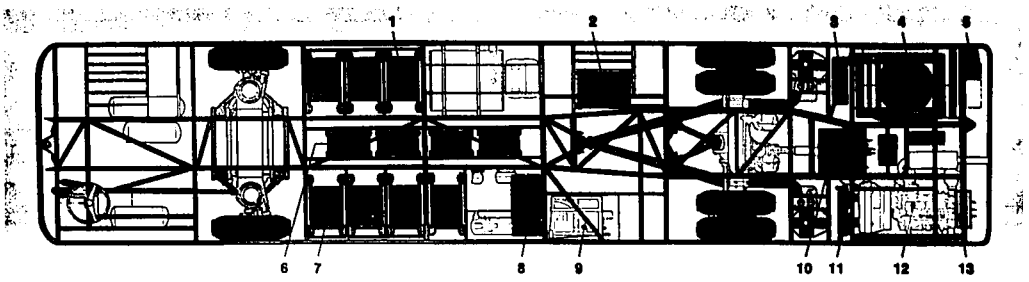
Para finalizar este circuito por Europa, volvamos a Italia, a Bolonia esta vez. En esta ciudad la empresa de transporte público, ATC, ha dirigido dos proyectos revolucionarios en un barrio periférico de la ciudad. Con el respaldo de Thermie, la tecnología correspondiente se utilizará a gran escala.

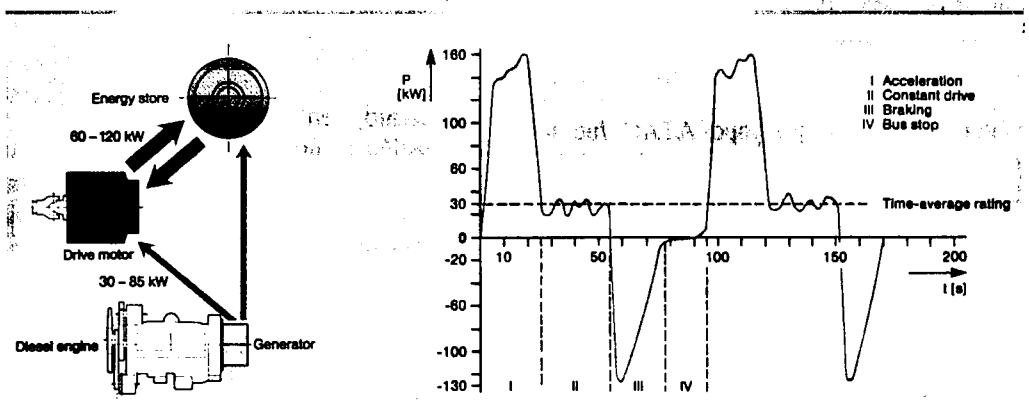
En cuanto al primer proyecto[6], se instalará un sistema de localización por radio de vehículos de transporte público y de dirección automática del servicio. El control automático de los vehículos se realizará nada menos que con cuatro satélites geoestacionarios. Respecto al segundo proyecto[7], se establecerá un itinerario flexible y un servicio de transporte público 'previa solicitud'. En una pantalla de color instalada en una parada de autobús se informará de la hora de llegada del autobús siguiente. Cuando se desee llamar a un autobús, un escáner óptico leerá una tarjeta especial; acto seguido, la 'reserva' se transmitirá al autobús apropiado y un mensaje de vídeo informará al usuario de su llegada inminente.

Cualquiera que haya pasado por la experiencia de esperar en una parada de autobús en una oscura noche de invierno preguntándose cuándo llegaría, si es que llegaba, el autobús siguiente apreciará este avance. Gracias a Thermie, esperar el autobús ya nunca volverá a ser lo mismo.

Referencias a los proyectos Thermie

1. Minibuses eléctricos de transporte público urbano (EE/684/84-IT).
2. Minibuses eléctricos de transporte público urbano con baterías de alta energía (TR/212/91-IT).
3. Ahorro de energía mediante la aplicación de sistemas de tracción diesel y eléctrico con almacenamiento magnético dinámico en autobuses de transporte público (EE/39/85-DE).
4. Transmisión eléctrica para 10 autobuses de piso bajo con un nuevo sistema de tracción que ahorra energía (TR/9/91-DE).
5. Línea de autobús dual en Copenhague con sistema dc tracción de corriente alterna (TR/213/91-DK).
6. Optimización del consumo de energía de la red dc transporte público mediante el control centralizado del servicio (TR/41/91-IT).
7. Optimización del consumo de energía mediante un servicio 'de guardia' de transporte público en un itinerario fijado y flexible (TR/43/91-IT).





Programa Thermie de fomento de tecnologías energéticas

G. Molina, DG XVII: tecnología energética; Unidad de estrategia, difusión y evaluación

En este artículo se destacan algunos resultados del programa de tecnologías energéticas de la Comunidad Europea para el ahorro en la industria y en el sector de la energía.

Posibilidades de difusión en la industria y en el sector de la energía

El artículo se refiere al período de duración de un proyecto comunitario de demostración (de 1978 a 1989) y abarca un total de 316 proyectos, de los cuales 263 corresponden al sector industrial y 53 directamente a las industrias dedicadas a la energía. Todos los proyectos contaron con el respaldo económico de la Comunidad Europea por reunir las siguientes condiciones:

- estar relacionados directamente con el funcionamiento y control de una planta o instalación de tamaño normal en la que se puedan explotar fuentes alternativas de energía, ahorrar energía o sustituir hidrocarburos en cantidades considerables;
- explotar técnicas, procesos o productos innovadores o una nueva aplicación de los procesos o productos existentes;
- poder fomentar la utilización de instalaciones del mismo tipo;
- ofrecer perspectivas de viabilidad industrial y comercial;
- tener dificultades para obtener fondos de inversión elevados a causa de los potenciales riesgos técnicos o económicos que entrañan.

Con los datos existentes se calcula que el ahorro anual de petróleo conseguido por 247 de los proyectos respaldados por la CE es de alrededor de 1,4 x 106 tep anuales. Suponiendo que de cada uno de esos proyectos se hagan 10 proyectos más, habrá en la Comunidad un potencial de ahorro de energía igual a 1,4 x 107 tep anuales. Conviene señalar que el consumo anual total de energía de los 12 Estados miembros es de 1,1 x 109 tep anuales (datos de 1989).

Se han seleccionado varias tecnologías surgidas de los proyectos anteriormente mencionados, debido a su atractivo carácter innovador y al elevado número de aplicaciones potenciales. Dichas tecnologías se presentan a continuación.

Cogeneración

La cogeneración es la producción simultánea de electricidad y de calor o vapor para procesos industriales. Ahorra combustible porque la energía residual resultante de un proceso de calentamiento se aprovecha para producir electricidad y la energía residual producida en una central eléctrica se aprovecha para generar calor.

En consecuencia, es uno de los mejores modos previstos para ahorrar combustible, dado que muchos procesos industriales habituales producen un considerable volumen de energía residual adecuada para dicha tecnología. Las turbinas de vapor o de gas se suelen emplear en aplicaciones de cogeneración.

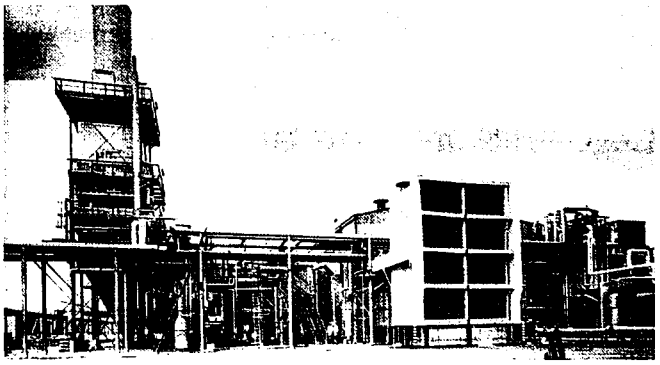
Turbinas de vapor

Las turbinas de vapor se utilizan para producir electricidad (producción convencional y cogeneración). Un ejemplo típico es la recuperación del calor producido por los gases de escape de un horno de vidrio flotante para conseguir vapor y, acto seguido, utilizarlo en una turbina de vapor para producir electricidad. En otra aplicación, parte de la energía producida en una caldera, en forma de chorro de vapor a alta presión, se utiliza para mover una turbina de alta presión de una fábrica de papel, mientras que la energía restante, en forma de gases de escape a presiones que van desde los 3 a los 15 bares, se emplea para hacer funcionar la maquinaria de la fábrica de papel, como digestores, mezcladores y secadores. Las turbinas de vapor combinadas con una red de calefacción urbana, como un condensador, son algo muy corriente en el Norte de Europa.

Turbinas de gas

Las turbinas de gas se suelen utilizar en sistemas a gran escala, sobre todo donde se puede disponer de gas natural u otros combustibles gaseosos, como el gas de refinería. Los sistemas de turbina de gas tienen bajos costes de capital,

especialmente en el caso de sistemas grandes. Es importante destacar que las turbinas de gas no sólo pueden quemar gas, sino también combustibles líquidos, como aceites ligeros y fuel. Existen dos tipos de turbinas de gas para aplicaciones industriales: el tipo industrial para centrales de alta potencia y el tipo, derivado de la técnica aeronáutica, para centrales de menor potencia. La turbina funciona como generador y los gases de escape posibilitan aplicaciones directas en procesos industriales (hornos, secadores, etc.) o producción de vapor en una caldera para recuperar calor (con o sin combustión posterior).



Montaje de la entrada de aire de una central con turbina de gas y caldera modificada de recuperación de calor

Turbinas orgánicas de Rankine

La turbina orgánica de Rankine utiliza una materia orgánica como fluido y puede recuperar energía de forma rentable de fuentes de calor residual a baja temperatura. Se puede construir en una amplia gama de tamaños y su producción por unidad de energía residual es de un 20 a un 30% mayor que la obtenida con turbinas de vapor. Un ejemplo típico es la recuperación del calor producido en una columna de destilación de aceites ligeros mediante una unidad de ciclo orgánico que utiliza isopentano como fluido.

Combustión posterior

En una central de cogeneración, el rendimiento térmico se puede aumentar más con un sistema de combustión adicional, que utiliza el oxígeno existente en los gases de escape como material oxidante. Además, el sistema de combustión posterior puede aumentar la capacidad térmica de la central de cogeneración respecto al componente eléctrico. Por último, utilizando la cámara de combustión posterior se reduce considerablemente la contaminación atmosférica, ya que las altas temperaturas alcanzadas en dicha cámara pueden quemar las partículas no quemadas.

Hornos de combustión en lecho fluido

En este caso, el término fluidificación se refiere a un modo especial de poner en contacto sólidos granulares con un gas o un sólido. La fluidificación tiene varias aplicaciones, como los procesos de combustión, reacciones químicas y técnicas de intercambio de calor con mayor rendimiento. Aplicaciones típicas son:

- combustión de combustibles sólidos de baja calidad (y coste) en centrales de cogeneración;
- producción de vapor para procesos industriales mediante combustión de los alquitranes ácidos residuales de las refinerías.

Tubos de calor

Un tubo de calor es un intercambiador innovador de calor que tiene mayor rendimiento y una serie de ventajas respecto a los sistemas covencionales. Por ejemplo, no es necesario ningún bombeo adicional para que circule el fluido de intercambio de calor y una gran parte de la capacidad de transferencia de calor se conserva incluso en el caso de que fallen uno o más tubos.

Un típico ejemplo es un proyecto de demostración del uso de un sistema de recuperación mediante un tubo de calor para recuperar el calor procedente del escape de un secador de leche. El calor recuperado se utiliza para precalentar el aire suministrado al secador, con el consiguiente ahorro de energía.

Pilas de combustible

Las pilas de combustible son dispositivos de transformación de energía que, mediante un proceso electromecánico, transforman la energía química contenida en un combustible en energía eléctrica. Estos dispositivos se caracterízan por un alto rendimiento, poco ruido y una contaminación mínima.

La ósmosis inversa consiste en una técnica de separación que emplea membranas de polímeros sintéticos. Es una técnica con un elevado potencial de ahorro de energía en la industria agraria de alimentación. Ejemplos típicos son la concentración de caseína clorhídrica utilizando la ultraósmosis (con un ahorro de energía del 90%), la concentración de zumo de tomate, la separación de las pequeñas partículas suspendidas del mosto y la concentración de almíbares.

Almacenamiento de energía

El objetivo general del almacenamiento de energía es el aumento, en condiciones normales de funcionamiento, de la potencia media a la máxima de sistemas diseñados de 'carga baja' o 'menor carga posible', con la consiguiente reducción de la capacidad disipada de energía máxima y un aumento del rendimiento del sistema respecto a la transformación de la energía primaria.

Las actuales aplicaciones industriales del almacenamiento de energía incluyen regeneradores de alta temperatura utilizados en las industrias metalúrgicas y del vidrio, acumuladores de vapor en las industrias papeleras, almacenamiento de agua caliente en industrias con procesos a baja temperatura y almacenamiento de hielo en las industrias agrarias de la alimentación mediante un banco de hielo, que se emplea como evaporador durante el día y almacenador de calor durante el período de electricidad de tarifas bajas.

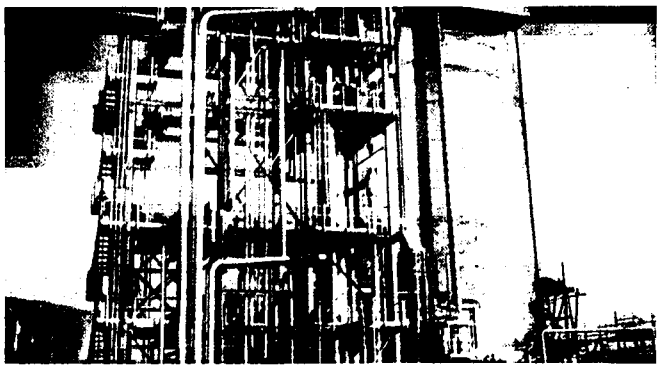
Automatización de procesos industriales

Mejorar los resultados generales en los procesos industriales es una preocupación constante. El problema se plantea en la fase de diseño de la central así como en la ampliación o modificación de un proceso ya existente. También se hallan dificultades al elegir las condiciones de funcionamiento y el control de la central en relación con la producción requerida. En los últimos años se han desarrollado sistemas más efectivos de control de procesos. Se empezó con los circuitos individuales digitales, cuyos puntos fijos se modificaban manualmente, y, actualmente, se han desarrollado sistemas digitales de control directo en los que el ordenador que controla el proceso puede separar las variables y ajustar los parámetros independientes a las condiciones de funcionamiento.

Un ejemplo típico es la aplicación de un sistema de regulación de motores que controla la velocidad de rotación de los motores eléctricos utilizando técnicas de control automático de retroalimentación negativa.

Procesos industriales innovadores

Además de las tecnologías descritas anteriormente, a continuación se exponen brevemente algunos otros procesos innovadores de gran interés.



Central de reciclado isobárico para producir urea

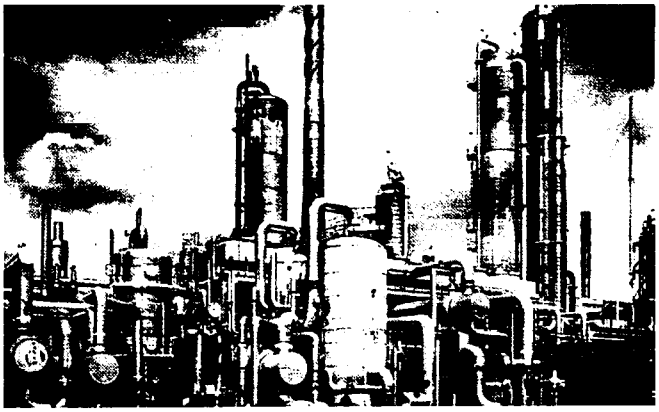
- un nuevo proceso de síntesis de urea se caracteriza porque necesita muy poca energía (el consumo de vapor es un 40% más bajo que el requerido con las tecnologías convencionales actuales más avanzadas). Este nuevo proceso produce una alta proporción de transformación en masa mediante el reactor de síntesis y consta de una fase sencilla de reciclado isobárico de los materiales que no han reaccionado en el fermentador, lo que conduce a un consumo de vapor relativamente bajo. Aunque sólo sea en cuanto al ahorro de energía, está clara la importancia de este nuevo proceso, ya que, en la actualidad, se producen anualmente en todo el mundo 47 millones de toneladas de urea mediante procesos convencionales, lo que representa un 34% de la producción total de nitrógeno;

- la recuperación de energía de los plásticos residuales no es una operación muy rentable, puesto que sólo se puede recuperar un máximo de un 10% de la energía utilizada mediante incineración, junto con la producción de agua caliente, vapor y electricidad. El nuevo proceso es limpio, no contamina y contribuye a reducir los costes del tratamiento de los residuos domésticos. Los residuos plásticos se echan en una criba vibrante y luego en un triturador lento, formado por dos discos cortadores paralelos que cortan los residuos en trozos de varios centímetros de longitud. Después de eliminar los materiales no combustibles, como metales, vidrio, etc., se concentran los plásticos y, luego, tras separarlos magnéticamente, se lavan, deshidratan y secan;

- un nuevo método para recuperar calor a temperatura media de hornos en forma de cúpula. La energía de los gases de escape del regenerador se recupera en forma de calor a temperatura media mediante un intercambiador térmico con convectores de fluido;

- un nuevo método para recuperar energía de una fábrica de tintes para tejidos. Consiste en recuperar casi toda el agua refrigerante y el condensado de la fábrica modificando los circuitos de calentamiento y enfriamiento de fluido;

- tros procesos de especial interés para el ahorro de energía incluyen un nuevo método de gasificación mediante el proceso de alta temperatura de Winkler y otro nuevo método de ahorro de energía en una fábrica de amoniaco modificando el actual proceso de fabricación. Otro ejemplo es el nuevo motor de expansión de gas natural que impulsa un compresor helicoidal.



Parte del nuevo equipo instalado para precalentar el agua de una caldera de alta presión

Financiación de terceros

Pese a que, hasta el momento, sólo se ha utilizado en un pequeño número de aplicaciones, en el futuro la financiación de terceros interesará a una amplia gama de inversiones en el sector del rendimiento energético, como la cogeneración, la calefacción urbana y la gestión de la productividad.

La financiación de terceros se define como un medio de movilizar capital privado con una empresa exterior, a fin de invertir en rendimiento energético empleando el propio ahorro de energía para pagar la inversión. De este modo, el ahorro de energía se convierte en una 'fuente de ingresos' que puede mantener un negocio, el negocio de invertir en el ahorro de energía y garantizar el resultado del mismo.

Según el sistema fiscal del país en que se aplique, este concepto permite la financiación, sin que conste en el balance de la empresa, de inversiones considerables sin la inyección de capital inicial. Además de presentar un gran atractivo para las empresas que disponen de capital interno o externo limitado, el concepto es popular por su versatilidad, ya que permite invertir donde el ahorro es el resultado deseado, por ejemplo, en rendimiento energético, ahorro en el mantenimiento de instalaciones, ahorro en el tratamiento y eliminación de contaminantes, ahorro en el tratamiento de residuos, etc.

Se trata, por consiguiente de una herramienta útil para fomentar inversiones dirigidas a aumentar la productividad y, por tanto, la competitividad.

En el pasado se ha utilizado la financiación de terceros en los proyectos respaldados por la Comunidad. Actualmente, se está fomentando dentro del programa SAVE (Medidas específicas para una mayor eficiencia energética) como parte de una estrategia para lograr un gran rendimiento energético a largo plazo.

CORDIS: Acceso fácil a los resultados y a los fondos de los proyectos Europeos de investigación y desarrollo

En los próximos cuatro años la Comisión de la CE dotará una ayuda de 5.700 millones de ecus para proyectos europeos de investigación, y desarrollo tecnológico. Dichos fondos forman parte del tercer Programa Marco 1990-1994, que abarca campos de investigación tan distintos como la tecnología de la información y las telecomunicaciones, la investigación sanitaria, la ciencia marina, la aeronáutica y el programa **Thermie**, que concede fondos y otras ayudas a proyectos industriales, agrarios, regionales y otros en el sector energético.

¿Cómo puede usted y su empresa, centro de investigación o universidad beneficiarse de esta ayuda? ¿Cómo mantenerse puntualmente informado sobre nuevos programas, convocatorias de propuestas y ofertas? ¿Dónde encontrar colaboradores y aumentar al máximo sus posibilidades en el mercado único europeo?

La respuesta rápida a esas preguntas se halla en CORDIS. Creado dentro del programa comunitario VALUE en diciembre de 1990 y respaldado por la **DG XVII** para aprovechar todos los aspectos de la investigación comunitaria, CORDIS puede facilitar a las organizaciones europeas información fundamental sobre los avances en el sector de la energía y ayudarles a divulgar sus propios logros y puntos fuertes.

CORDIS significa Servicio de Información sobre Investigación y Desarrollo Comunitarios. Este servicio informático facilita acceso a un número ingente de documentos comunitarios que, de hallarse en letra impresa, llenarían muchos estantes de una biblioteca a base de tomos del Diario Oficial de las CE, documentos COM, informes de investigación y largos listados de prototipos esperando ser explotados industrialmente. Ello plantearía problemas adicionales a la hora de saber dónde buscar.

CORDIS le facilita la tarea. El sistema es completamente electrónico y se comunica con el usuario a través de menús con los que se puede encontrar lo que se busca en cuestión de minutos. Ya no necesita romperse la cabeza para recordar detalles básicos de la investigación europea. La potente memoria del gran ordenador se los buscará.

El servicio CORDIS es gratuito a través del centro de servicios ECHO de la Comisión en Luxemburgo. La mayoría de los ordenadores pueden conectarse fácilmente al servicio mediante las redes públicas o de investigación. De los nueve servicios diseñados, ya se han puesto a punto y están funcionando seis.

- El servicio de **programas de IDT** tiene más de 200 discos con información detallada de todos los programas patrocinados por la Comunidad;
- El servicio de **proyectos de IDT** facilita unos 14.000 discos sobre proyectos individuales, muchos de los cuales se están comercializando actualmente;
- El servicio de **publicaciones de IDT** ayuda a encontrar fuentes impresas mediante resúmenes y otros detalles bibliográficos de publicaciones y documentos resultantes de las actividades comunitarias de IDT;
- El servicio de **resultados de IDT** facilita valiosas indicaciones y datos sobre los prototipos ya dispuestos para la explotación industrial o campos en que se necesita una colaboración mayor.

Otros archivos le ayudarán a entender los procedimientos de la Comunidad Europea:

- **Documentos COM de IDT** facilita el texto básico de las comunicaciones, propuestas y recomendaciones de la Comisión al Consejo de Ministros y al Parlamento Europeo en el ámbito del desarrollo tecnológico;
- **Siglas de IDT** explica abreviaturas y acrónimos, como ESPRIT, BRITE y CORDIS.

Antes de que finalice 1991 se ofrecerán dos nuevos servicios:

- **Noticias de IDT**, revista informática a base de artículos breves y noticias frescas sobre convocatorias de propuestas, publicaciones y conferencias.
- **Socios de IDT** puede ayudarle a encontrar colaboración en otros centros de investigación, universidades o empresas para trabajar conjuntamente en proyectos tecnológicos europeos. Muchos progamas fomentan la formación de equipos multinacionales y este servicio puede ayudar a dar a conocer sus puntos fuertes y necesidades a fin de hallar los socios adecuados en los países de la CE y la AELC.

¿Cómo acceder a toda esta información? Simplemente rellenando el impreso que aparece más adelante, y la

Comisión le enviará las instrucciones para conectar su ordenador. Cuando se inscriba en el servicio CORDIS, recibirá documentación completa sobre el modo de hacer preguntas y obtener información. No hace falta ser experto en sistemas informáticos.

Hay dos posibilidades. Por un lado, si nunca ha accedido a una base de datos informática, CORDIS facilita un servicio de instrucciones fáciles mediante menús que le ofrecen varias posibilidades de elección, como, por ejemplo, hacer un listado de los servicios ofrecidos, con lo que sólo tiene que pulsar el número que parezca más apropiado, luego escribir unas cuantas palabras clave y CORDIS le buscará el documento o disco. Por otro lado, ECHO también facilita acceso utilizando el Lenguaje Común de Ordenes (CCL), que se basa en unas diez órdenes especiales. Por ejemplo, si escribe FIND RACE:ACR aparecerá el significado de la sigla RACE. ECHO proporciona también una amplia gama de cursos y seminarios para quienes deseen utilizar este sistema más especializado. A través de un servicio europeo gratuito de teléfono se facilita ayuda por teléfono en varias lenguas.

ECHO/CORDIS
Apartado 2373
L-1023 Luxemburgo

Tel: 352 34 98 11
Fax: 252 98 12 34

Desearía recibir información sobre **CORDIS** []

Me gustaría añadir el nombre y los datos de mi organismo al servicio **socios de IDT** []

Desearía utilizar el servicio **resultados de IDT**
Les agradecería que me enviasen impresos para describir los resultados de investigación del organismo al que pertenezco []

Nombre .....

Organismo .....
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Dirección .....
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Tel: .....

Fax: .....

Italia

por M. Sáinz Andrés, DG XVII: 'Task-force': integración comunitaria: Unidad de medidas complementarias

Con Italia Energía en Europa *continúa su presentación de informes sobre energía en los países de la Comunidad Europea.*

La dependencia de Italia de las importaciones en casi el 85% de su abastecimiento energético es el factor principal que caracteriza la política energética de este país. Pese a una pequeña caída, desde 1973, en lo que se refiere al abastecimiento energético y a la economía, Italia sigue siendo muy vulnerable a las fluctuaciones del mercado del petróleo, que suministra casi el 60% de las necesidades energéticas del país. La decisión de no utilizar energía nuclear, tras el referéndum celebrado en noviembre de 1987, cambió el rumbo de la política energética de Italia y trajo consigo el aumento de la dependencia de las importaciones.

Características energéticas

Estructura de la demanda

Consumo interior bruto en 1990 (millones de tep)

	Italia	CE	Italia (%)	CE (%)
Carbón	14.5	197.6	9.6	17.9
Lignito	0.3	33.5	0.2	3
Petróleo	89.9	492.9	59.3	44.6
Gas natural	39.1	207.8	25.8	18.8
Energía nuclear	-	156.4	-	14.1
Electricidad primaria y otros	7.7	17.8	5.1	1.6
Total	151.4	1.106	100	100

El abandono de la energía nuclear y por el consumo de combustibles sólidos inferior a la media comunitaria se ven compensados por el uso a gran escala de petróleo y gas natural.

Evolución de la demanda

Las crisis energéticas de 1973 y 1979 provocaron grandes cambios en los hábitos de consumo de energía.

La demanda de energía cayó bruscamente entre 1979 y 1985, sobre todo en el caso del petróleo, mientras que aumentó el consumo de electricidad primaria y, aún más, el de gas natural.

Demanda de energía primaria (millones de tep)

	1973	1979	1985	1990	1995	2000
Combustibles sólidos	10.2	11.3	16.1	15.1	18.1	23.7
Gas natural	14.3	22.9	27.3	37.5	42.0	50.0
Electricidad primaria	10.0	12.7	17.0	17.4	20.1	21.0
Petróleo	105.3	102.1	85.6	94.7	97.2	92.0
Energías renovables	-	-	0.2	0.3	0.5	1.0
Total	139.8	149	146.2	165	177.9	187.7

La relativa estabilidad de los precios del petróleo, junto con la reactivación del crecimiento económico en los últimos años, aumentó el consumo de energía, especialmente a partir de 1985, lo que puede seguir sucediendo en el futuro, aunque mitigado por los programas de ahorro de energía ya puestos en marcha.

Consumo final de energía

Consumo total (millones de tep)

	1980	1988	2000
Italia	98.2	102.6	126.9
CE	702.0	717.3	900.0

Con 1,8 tep, el consumo per capita de energía en Italia se sitúa por debajo de la media comunitaria de 2,2 tep. Sin embargo, se prevé que en el año 2000 se llegue a las 2,2 tep.

Sectores (%)

	1980		1988		2000	
	Italia	CE	Italia	CE	Italia	CE
Industria	39.5	35.5	33	31	31	30
Transportes	25.5	24.5	31	30	32	30
Hogares, etc.	35	40	36	39	37	40
Total	100	100	100	100	100	100

Entre 1980 y 1988, el consumo en el sector de los transportes aumentó a expensas del industrial, conforme a la evolución experimentada en el conjunto de la CE.

Fuentes (%)

	1980		1988		2000	
	Italia	CE	Italia	CE	Italia	CE
Combust. sólidos	4	9	3.5	8	3	5.5
Gas	20	20	25	22.5	27	24
Derivados del petróleo	60.5	54.5	53	50	49	50
Electricidad	15.5	16.5	18.5	19.5	21	20.5
Total	100	100	100	100	100	100

El consumo de combustibles sólidos en Italia es inferior a la media comunitaria, lo que se compensa con un mayor uso de los productos derivados del petróleo y de los diversos tipos de gas. En el futuro, el consumo final de productos derivados del petróleo disminuirá, mientras que el de gas y electricidad aumentará.

Intensidad energética de la economía italiana (toneladas por millones de ecus de PIB -valores de 1985)

	1980		1988		2000	
	Italia	CE	Italia	CE	Italia	CE
Energía primaria	263	341	234	303	197	256
Energía final	186	223	164	194	135	160
Electricidad	30	37	31	38	31	36

La intensidad energética de la economía también se halla por debajo de la media comunitaria. Entre 1980 y 1988, disminuyó en un 11%. Se espera que para el año 2000 haya una reducción del 16% aproximadamente, evolución similar a la de otros países comunitarios.

No obstante, la intensidad de la electricidad permanecerá bastante estable.

Política energética

Dependencia de las importaciones: la cuestión principal

Importaciones netas (millones de tep)

	1980	1985	1988	1995	2000
Combustibles sólidos	11.4	14.8	13.2	21.2	27
Gas natural	11.8	16.0	19.5	25.8	28.7
Petróleo	95.8	81.2	84.7	91.3	85.7
Total	119.4	114.1	120.1	140.5	144.4

Dependencia de las importaciones (importaciones como porcentaje del consumo)

	1980	1985	1988	1995	2000
Combustibles sólidos	97	96	94	99	100
Gas natural	52	59	58	63	64
Petróleo	99	97	94	95	95
Total	87%	85%	83%	85%	85%

Pese a la ligera reducción de las importaciones de energía después de las crisis del petróleo de 1973 y 1979, Italia sigue manteniendo una acusada dependencia de los proveedores exteriores y, por tanto, es especialmente vulnerable a cualquier crisis de suministro y aumento del precio de la energía en general y del petróleo en particular.

Los requisitos de protección ambiental y la decisión de no utilizar energía nuclear hacen que sea muy difícil acabar con la dependencia del exterior.
Las siguientes cifras dan una idea de lo delicado de la situación:

- Italia sigue dependiendo de fuentes externas en más de un 80% de su abastecimiento de energía, frente a la media comunitaria, que es inferior al 50%;
- la energía hidroeléctrica, la geotérmica y la electricidad producida con otras fuentes propias del país cubren menos del 30% de la demanda total de electricidad, frente a un 90% en la mayoría de los países industrializados;
- el petróleo y el gas suponen más del 75% del consumo total de energía (frente al margen entre un 55% y un 65% de otros países industrializados);
- el petróleo supone el 60% del consumo total de energía (frente al 45% de los Doce).

La antigua Unión Soviética, Libia y Argelia son los principales proveedores de Italia en petróleo y gas, siendo Libia el principal proveedor de petróleo. Italia depende del Próximo Oriente en un 40% aproximadamente de su petróleo.

Esta situación explica el deseo de Italia de estrechar y fortalecer los lazos con la Comunidad, Europa Oriental y los países mediterráneos y su activo papel en la extensión de las redes interconectadas de electricidad.

Objetivos principales de política energética

El 10 de agosto de 1988 el gobierno italiano aprobó su Nuevo Plan Energético ('PEN 1988'). Sus objetivos fundamentales se centran en:

- el aumento de la producción con fuentes propias de energía;
- la diversificación de las fuentes de importación;
- el ahorro de energía;
- la protección ambiental.

Para ello se han establecido los objetivos específicos siguientes:

- ahorro de energía entre 17 y 20 millones de tep;
- aumento de la producción con fuentes propias de energía hasta alcanzar los 44 millones de tep en el año 2000 (un 48% más que en 1988);
- incremento a 3 millones de tep de la utilización de energía procedente de fuentes renovables;
- modernización de las refinerías, de acuerdo con los cambios estructurales de la demanda de petróleo;
- ampliación de la infraestructura de transmisión y distribución de gas natural que proporcione la capacidad necesaria para cubrir la demanda, que se calcula en 50 millones de tep en el año 2000;
- desreglamentación de la distribución de petróleo;
- aumento de la producción de electricidad para cubrir la demanda, que se calcula en 315 TWh en el año 2000;
- revisión del sistema de fijación de los precios de la energía.

El Parlamento italiano debatió el PEN 1988 en mayo de 1990. En aquellos momentos, ya se habían rebasado las previsiones realizadas en el plan, debido al rápido crecimiento del consumo de energía en 1988 y 1989.

El Gobierno propuso que se revisasen las cifras y, entretanto, decidió aumentar los impuestos de determinados productos energéticos.

El sistema de imposición y la política de fijación de precios se consideran los medios más importantes para conseguir los objetivos de ahorro de energía y protección ambiental.

Principales problemas de la política energética

Impulso de los recursos energéticos nacionales

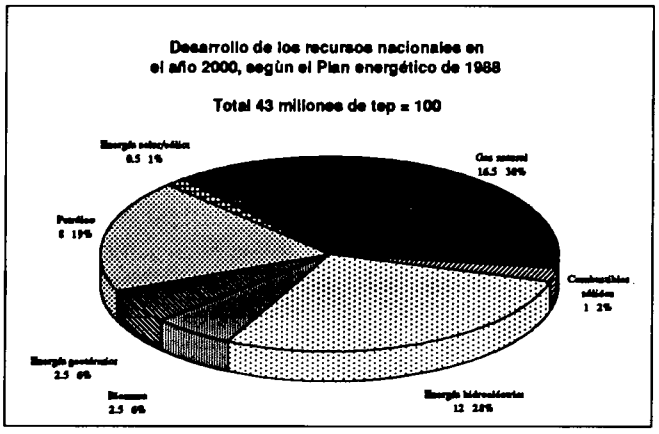
Las necesidades energéticas de Italia superan con mucho su capacidad de producción.

En 1990, Italia sólo produjo 23,9 millones de tep, mientras que su consumo durante ese año fue de 151,4 millones de tep.

Producción de energía primaria en 1990
(en miles de tep)

Carbón	59
Lignito	254
Petróleo crudo y condensados	4774
Gas natural	14052
Energía nuclear	-
Electricidad	2726
Otros	1980
Total	23865

El Plan energético de 1988 incluye medidas para fomentar el desarrollo de los recursos nacionales.



Proyectos de interconexión a gran escala

Electricidad

Se han elaborado planes para construir centrales eléctricas en el Sur del país, donde la producción de electricidad es insuficiente.

En la actualidad se está construyendo una conexión entre la Italia continental y la isla de Cerdeña a la vez que se está considerando la posibilidad de enlazar las redes eléctricas de Italia y Córcega. Desde hace tiempo viene estudiándose la interconexión entre las redes italianas y griegas, proyecto que permitirá la conexión e integración de la red griega con la red comunitaria interconectada y, al mismo tiempo, diversificará las fuentes de suministro eléctrico al Sur de Italia.

ENEL también está estudiando planes de interconexión con la antigua Unión Soviética y Túnez.

Gas

Se está llevando a cabo un estudio de viabilidad del abastecimiento de Córcega y Cerdeña con gas procedente de la red del continente.

Ahorro de energía

El ahorro de energía es uno de los principales componentes del PEN 1988. Se considera que incrementar el rendimiento energético es el modo más adecuado de reducir la dependencia del suministro exterior y de proteger el medio ambiente sin frenar el crecimiento económico.

Una política basada en precios altos y en incentivos para ahorrar energía es fundamental en este proceso.

El PEN 1988 fija un objetivo de ahorro situado entre 17 y 20 millones de tep.

Energía y medio ambiente

En los últimos cinco años la preocupación por la protección del medio ambiente ha venido aumentando rápidamente. Consecuencia de ello fue la creación en 1986 del Ministerio italiano de Medio Ambiente.

El Gobierno ha aprobado también uno de los procedimientos más avanzados de evaluación de las repercusiones ambientales provocadas por el establecimiento de nuevas centrales eléctricas.

En el PEN 1988 se estipulan medidas para reducir las emisiones de contaminantes y se fijan objetivos de reducción para el año 2000 del 75% en el caso del SO_2, el 40% en el del NO_X y el 30% en el del CO_2.

Situación energética

Petróleo

El consumo primario de petróleo experimentó una fuerte disminución entre 1979 y 1985. No obstante, desde 1985 se ha venido produciendo una fuerte recuperación, provocada por la demanda adicional de petróleo para producir electricidad y, sobre todo, por el crecimiento del sector de los transportes.

Es de prever que siga reduciéndose la demanda de petróleo respecto a la demanda total de energía, debido a las medidas de diversificación adoptadas.

Gas natural

En la década de los 80, el consumo de gas natural experimentó un rápido crecimiento, la mitad del cual fue consecuencia del uso de gas natural para producir electricidad, una vez que se prohibió el uso de la energía nuclear.

Se prevé que dicho crecimiento seguirá en la década de 1990, aunque a menor ritmo.

Combustibles sólidos

Con un 10% de la demanda total, el consumo de combustibles sólidos en Italia es muy bajo, en comparación con la media comunitaria que es un 21%. La mayor parte del carbón se quema en centrales eléctricas.

En el PEN 1988 se prevén grandes aumentos para los años 2000 y 2010, pero ese objetivo es difícil de alcanzar, dados los problemas ambientales que plantea la combustión de carbón.

Electricidad

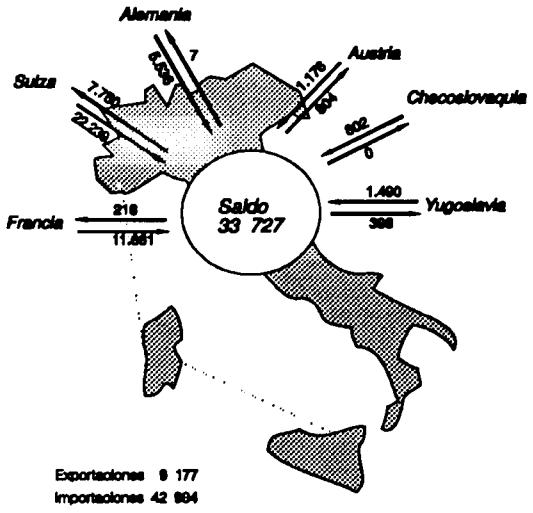
Durante los años 80, sobre todo a partir de 1985, el consumo de electricidad aumentó más rápidamente que el PIB, tendencia que se espera que continúe hasta mediados de los 90.

Desde 1985 el aumento de la producción de electricidad en Italia no ha conseguido mantenerse a la altura de la mayor demanda. Por tanto, ha sido necesario aumentar las importaciones, con lo que la dependencia de las mismas llegó hasta el 15% en 1990.

A causa de la oposición local a la construcción de nuevas centrales eléctricas, está siendo difícil conseguir el aumento de la producción de electricidad previsto en el PEN 88.

(millones de kWh)

Comercio exterior de electricidad en 1989



Combustibles utilizados para producir electricidad (1988)

	TWh		%	
	Italia	CE	Italia	CE
Energía nuclear	-	545.7	-	34
Energía hidroeléctrica y geotérmica	45.9	.205	24	13
Gas natural	33.4	128.4	17	8
Petróleo	84.6	150.9	44	9
Combustibles sólidos	29.2	581.2	15	36
Total			100	100

Del total de la electricidad producida, el 76% se genera a partir de combustibles fósiles, incluido un 44% producido con petróleo (frente al 9% de los Doce).

Se espera que aumente la producción de electricidad con gas natural y que disminuya la producción de electricidad con petróleo.

Energías renovables

El PEN 1988 prevé un considerable incremento de la producción de energía a partir de fuentes renovables, desde 0,2 millones de tep en 1987 hasta 3 millones de tep en el año 2000.

ENEL tiene planes ambiciosos para aumentar su capacidad geotérmica de 528 MW en 1988 a 1.500 MW al final del siglo. Además de ello, se han puesto en marcha proyectos de energía eólica y solar.

La industria energética en la víspera del mercado único Europeo

La culminación del mercado interior supondrá cambios de amplio alcance en la industria energética italiana, sobre todo en lo que respecta al control gubernamental de las empresas públicas de energía, a la política fiscal y a la fijación de precios.

En Italia las empresas estatales controlan la mayor parte de la producción y distribución de energía. El monopolio de ENEL se ha puesto en tela de juicio y se ha creado una comisión especial para estudiar el asunto. Se estudia la posibilidad de privatización de parte de la compañía, especialmente en cuanto a la producción de electricidad.

A pesar de los considerables avances realizados en la desreglamentación de los precios de la energía, el Gobierno sigue controlando una amplia gama de productos energéticos.

Por regla general, los impuestos sobre productos derivados del petróleo son más elevados que en otros países comunitarios. En consecuencia, la armonización tributaria supondrá grandes recortes. Se considera que la política impositiva es un medio importante de conseguir los objetivos políticos de ahorro de energía y de protección del medio ambiente.

Al mismo tiempo, Italia fomenta la ampliación de las redes de gas y electricidad, lo cual podría ser muy beneficioso para un país tan dependiente de la importación de energía.

Das nukleare Sicherheitssystem von Euratom

GD XVII: Direktion Sicherheitsüberwachung Euratom

Dieser Artikel berichtet über den neuesten Stand in dieser Frage, die in zwei früheren Nummern von Energie in Europa *(Nr. 3 vom Dezember 1985 und Nr. 4 vom April 1986) behandelt wurde.*

Er gibt einen Überblick über die Geschichte und die für die Tätigkeiten im Bereich der Sicherheitsüberwachung maßgeblichen rechtlichen Strukturen und betrachtet sodann im einzelnen die Entwicklungen im internationalen Umfeld, in dem Konzepte der Sicherheitsüberwachung ausgearbeitet werden.

Die Nutzung der Kernenergie ist seit langem durch einen gewissen Zwiespalt gekennzeichnet. Auf der einen Seite hat ihre militärische Anwendung bereits zahlreiche Menschenleben gekostet, und die furchtbare Zerstörungskraft der heute vorhandenen Kernwaffen bedroht nach wie vor die Existenz der Menschheit. Auf der anderen Seite hat ihre friedliche Nutzung zur Stromerzeugung einen außerordentlich wertvollen Beitrag zu einer sauberen und wirtschaftlichen Lösung des Weltenergieproblems geleistet. Seit die Nukleartechnologie allgemein verfügbar geworden ist, besteht eines der zu regelnden Probleme darin, die friedliche Verwendung von Kernenergie zum allgemeinen Wohl der Menschheit zu fördern, gleichzeitig aber dafür zu sorgen, daß Kernmaterial, kerntechnische Ausrüstung und Technologie, die für friedliche Zwecke bestimmt sind, nicht zur Entwicklung und Herstellung von Nuklearwaffen und Sprengkörpern mißbraucht werden. Die nukleare Sicherheitsüberwachung stellt das wichtigste Werkzeug zur Erreichung dieses Zieles dar.

Der Ausdruck „Sicherheitsüberwachung" im Sinne dieses Artikels bezeichnet die Maßnahmen, mit denen nachgeprüft wird, daß Kernmaterial und kerntechnische Ausrüstung nicht für die Entwicklung von Waffen eingesetzt werden. Die Sicherheitsüberwachung hat nichts mit Fragen des Objektschutzes, der Betriebssicherheit, des Strahlenschutzes oder der Freisetzung radioaktiver Stoffe in die Umwelt zu tun, für die andere nationale und internationale Einrichtungen zuständig sind.

Sicherheitsüberwachung — ein weltweites Anliegen

Nach dem Zweiten Weltkrieg wurde durch die erste Entschließung der Vollversammlung der neugeschaffenen Vereinten Nationen ein Ausschuß eingesetzt, der einen Vorschlag — den sogenannten Baruch-Plan — prüfen sollte mit dem Ziel, eine internationale Behörde zu errichten, die das gesamte Kernmaterial in allen Bereichen nuklearer Tätigkeit in der Welt überwachen sollte. Obwohl der Plan in der Folgezeit modifiziert wurde und sich auf das weniger ehrgeizige Ziel einer Erfassung der Wiederaufarbeitungs- und Anreicherungsanlagen beschränkte, hätte er einen allzugroßen Verzicht auf nationale Hoheitsrechte erfordert, um annehmbar zu sein.

Eine Zeitlang wurden in dieser Frage keine weiteren Fortschritte erzielt, bis Präsident Eisenhower in seiner Rede „Atome für den Frieden" die Errichtung einer Internationalen Atomenergie-Organisation (IAEO) forderte, die zur Verbreitung des Nutzens der Kernenergie beitragen und gleichzeitig gewährleisten sollte, daß ziviles Kernmaterial in friedlichen Nuklearprogrammen verbleibt, indem es internationalen Überwachungsmaßnahmen unterworfen wird. Die IAEO wurde daraufhin im Jahre 1957 in Wien gegründet. Ebenfalls 1957 wurde im Rahmen der Römischen Verträge das multinationale Sicherheitsüberwachungssystem von Euratom geschaffen, das die Mitgliedstaaten der Europäischen Gemeinschaft umfaßt.

Daneben hat sich eine andere wichtige Form der Kontrolle entwickelt, die die Ausbreitung von Kernwaffen verhindern soll. Länder, die Kernmaterial liefern oder nukleare Technologie und nukleares Know-how bereitstellen, machen entweder allein oder als Mitglieder verschiedener Gruppen Lieferauflagen für die Empfängerländer. Diese Auflagen bestehen in erster Linie in der Forderung, daß die Empfängerländer sich mit der Sicherheitsüberwachung einverstanden erklären müssen, bevor es zu einer Lieferung von Kernmaterial, kerntechnischer Ausrüstung, Know-how oder bestimmten anderen Stoffen, die im Zusammenhang mit dem Kernbrennstoffkreislauf stehen, wie z. B. schweres Wasser, kommt. Im Falle der Mitgliedstaaten von Euratom wurde diese Sicherheitsüberwachung stets von der Direktion Sicherheitsüberwachung Euratom der Kommission der Europäischen Gemeinschaften durchgeführt.

Das zunächst von der IAEO entwickelte und vorwiegend außerhalb Europas angewandte Überwachungssystem war in seinem Einsatzbereich begrenzt, da es in erster Linie für Reaktoren konzipiert war und nicht voraussetzte, daß ein Staat all seine nuklearen Tätigkeiten den internationalen Überwachungsmaßnahmen zu unterstellen hatte. Als ein Hindernis bei den Gesprächen zur Schaffung eines umfassenderen Kontrollsystems erwies sich der Plan, die Nichtkernwaffenstaaten einer vollständigen Kontrolle zu unterwerfen, den Kernwaffenstaaten hingegen keine Verpflichtungen aufzuerlegen. Zum entscheidenden Durchbruch bei den Diskussionen kam es, als die Kernwaffenstaaten ihrerseits Verpflichtungen in bezug auf die Abrüstung von Atomwaffen übernahmen.

Der ursprünglich angenommene Sicherheitsvertrag über die Nichtverbreitung von Kernwaffen (NV-Vertrag) wurde 1968 zur Unterzeichnung aufgelegt und ist inzwischen von mehr als 120 Ländern unterzeichnet worden, einschließlich — seitens der Europäischen Gemeinschaft — der zehn derzeitigen Nichtkernwaffenstaaten und dem Vereinigten Königreich. Frankreich hat seine Bereitschaft zur Unterzeichnung angekündigt. Dieser Vertrag verbindet die Zusicherung seitens der Nichtkernwaffenstaaten, ihr gesamtes Kernmaterial der IAEO-Überwachung zu unterstellen, mit Zusagen der Kernwaffenstaaten bezüglich der Abrüstung.

Sicherheitsüberwachung in Europa

Das nukleare Sicherheitsüberwachungssystem von Euratom wurde durch den Euratom-Vertrag (1) begründet. Dessen allgemeine Ziele umfassen u. a. die Verpflichtung, „... durch geeignete Überwachung zu gewährleisten, daß die Kernstoffe nicht anderen als den vorgesehenen Zwecken zugeführt werden ..." Der Vertrag ermächtigt die EG-Kommission, spezifische Anforderungen in bezug auf die Führung und Vorlage von Aufstellungen über Betriebsvorgänge festzulegen, um eine Buchführung über Kernmaterial und damit die Durchführung von Sicherheitsmaßnahmen zu ermöglichen. Zu diesem Kernmaterial gehören alle Formen und Qualitäten von Uran, Plutonium und Thorium, einschließlich der Erze. Zur Erfüllung dieser und zweier anderer Auflagen aus dem Vertrag wurden 1959 zwei Verordnungen in Kraft gesetzt; um diese Zeit wurden auch die Inspektionstätigkeiten aufgenommen. Die beiden Verordnungen bildeten über Jahre hinweg die Rechtsgrundlage für die Durchführung der Euratom-Sicherheitsüberwachung und wurden 1976 durch die Verordnung (Euratom) Nr. 3227/76 ersetzt. Die Aufgaben von IAEO und Euratom sind einander in hohem Maße ähnlich, obwohl das IAEO-System auf vertraglichen Grundlagen und nicht auf Verordnungen beruht. Außerdem wendet sich die IAEO an Staaten, während sich Euratom mit den einzelnen Betreibern von Nuklearanlagen befaßt. Zur Durchführung des NV-Vertrags war eine Vielzahl von Abkommen zwischen der IAEO und den einzelnen Ländern oder Ländergruppen notwendig. Eines hiervon, das sogenannte Verifikationsabkommen, wurde von der Gemeinschaft, den ihr (damals) angehörenden sieben Nichtkernwaffenstaaten und der IAEO ausgehandelt und ist 1977 in Kraft getreten. Es definiert die Anwendung von Überwachungsmaßnahmen des NV-Vertrags in Euratom-Nichtkernwaffenstaaten unter Aufrechterhaltung der führenden Rolle Euratoms. Wie alle anderen Abkommen im Rahmen des NV-Vertrags beruht es auf einem 1971 von der IAEO nach eingehenden Beratungen verfaßten Musterabkommen.

Um den Zielsetzungen beider Überwachungsorganisationen gerecht zu werden und den Betreibern keine überflüssigen Belastungen durch ein doppeltes Kontrollsystem aufzubürden, wurde eine Reihe von Absprachen und Arbeitsregeln für die Planung und Durchführung der Inspektionen getroffen, die regelmäßig überprüft werden. Zwecks Anpassung des Sicherheitsüberwachungssystems von Euratom im Hinblick auf die Durchführung des Verifikationsabkommens wurde 1976 eine überarbeitete Verordnung Nr. 3227/76 der Gemeinschaft erlassen, die die obengenannten früheren Verordnungen ablöste.

Tabelle 1

Materialbilanzzonen unter Sicherheitsüberwachung in Europa mit Beständen von > 1 Ekg (2) (Stand 31.12.1990)		
Art der MBZ	**EUR**	**IAEO**
Forschungslaboratorien	58	23
Gruben	25	0
Konzentration und Konversion	9	0
Anreicherung	8	6
Bearbeitung und Fabrikation	31	15
Wiederaufarbeitung	17	3
Forschungsreaktoren und kritische Anordnungen	69	47
Leistungsreaktoren	129	52
Lagereinrichtungen	73	35
Insgesamt	419	181
LOF (3) und andere Anlagen mit Beständen von < 1 Ekg (2) (Stand 31.12.1990)		
	EUR	**IAEO**
Anzahl der Anlagen	329	120

(1) Vertrag zur Gründung der Europäischen Atomgemeinschaft, unterzeichnet am 25. März 1957 in Rom.

(2) Ekg = effektives Kilogramm. Zur Definition des effektiven Kilogramms s. Verordnung 3227/76, Artikel 36 Buchstabe o.

(3) Bei den Anlagenexternen Standorten (LOF) und anderen Anlagen handelt es sich um MBZ, deren Bestand weniger als 1 Ekg Kernmaterial beträgt.

Seit 1978 sind in langwierigen und mühevollen Verhandlungen sogenannte „anlagenspezifische Anhänge" vereinbart worden, in denen die Erfordernisse und Inspektionstätigkeiten für jede einzelne Anlage im Rahmen der NV-Sicherheitsüberwachung festgelegt wurden. Solche Anlagen sind Reaktoren, kritische Anordnungen, Konversionsanlagen, Isotopentrennanlagen, Brennstoff-Fabrikationsanlagen, Wiederaufarbeitungsanlagen für bestrahlten Brennstoff, Lagereinrichtungen usw. Gegenwärtig sind über 210 anlagenspezifische Anhänge in Kraft. Das unter das Verifikationsabkommen mit der IAEO fallende Material war natürlich gleichzeitig der Euratom-Sicherheitsüberwachung unterstellt. Selbst in den Fällen, in denen noch keine anlagenspezifischen Anhänge abgeschlossen worden sind, unterliegen sie ebenfalls der Sicherheitsüberwachung durch die IAEO aufgrund von Ad-hoc-Vereinbarungen zwischen den beiden Organisationen. Griechenland, Spanien und Portugal als Nichtkernwaffenstaaten, die während der oben geschilderten Entwicklungen der Gemeinschaft beigetreten sind, wurden in die getroffenen Vereinbarungen einbezogen.

Parallel dazu machten zwei Euratom angehörende Kernwaffenstaaten, nämlich das Vereinigte Königreich und Frankreich, jeweils „freiwillige Angebote" zur Duldung der IAEO-Überwachung in ihrem Hoheitsgebiet. Das Angebot des Vereinigten Königreichs führte zu einem 1976 mit Euratom und der IAEO unterzeichneten Abkommen. Ein grundlegender Unterschied zu dem Verifikationsabkommen für Nichtkernwaffenstaaten besteht darin, daß Routineinspektionen der IAEO nur auf Anlagen Anwendung finden, die (auf der Basis einer Anlagenliste des Vereinigten Königreichs) von der IAEO von Zeit zu Zeit für diesen Zweck bestimmt werden. Aufgrund des französischen Angebots wurde 1978 mit Euratom und der IAEO ein Abkommen unterzeichnet. Sein Anwendungsbereich beschränkt sich auf von Frankreich ausdrücklich bezeichnetes Material. In diesem Zusammenhang sei darauf hingewiesen, daß nach dem Euratom-Vertrag alles „zivile" Kernmaterial sowohl in Frankreich als auch im Vereinigten Königreich den gleichen, für die Nichtkernwaffenstaaten geltenden Bestimmungen der Euratom-Sicherheitsüberwachtung unterliegt. Aus Tabelle 1 ist die Anzahl der Materialbilanzzonen (MBZ) ([4]) in der Gemeinschaft ersichtlich, die Ende 1990 der Sicherheitsüberwachung durch Euratom und die IAEO unterstellt waren.

Anwendungsbereich der Euratom-Sicherheitsüberwachung

In den der Euratom-Sicherheitsüberwachung unterstellten Anlagen befinden sich gegenwärtig etwa 203 t Plutonium, 13 t hochangereichertes Uran, über 200 000 t Uran anderer Anreicherungsstufen und 2 600 t Thorium; die Verteilung ist aus Tabelle 2 ersichtlich. Die Meldungen der Betreiber umfassen zur Zeit 600 000 Buchungszeilen pro Jahr. Diese Meldungen werden systematisch überprüft und bei Material, das der IAEO-Überwachung unterliegt, in der Euratom-Zentrale in Luxemburg in eine für die Weitermeldung nach Wien geeignete Form gebracht.

Wie bereits erwähnt, beruht die Euratom-Sicherheitsüberwachung auf europäischem Recht und sieht, als äußerste Maßnahme, die Verhängung schwerer Sanktionen bei Verstößen vor. Sie gilt für das gesamte zivile Kernmaterial von dem Augenblick an, da es entweder auf dem Hoheitsgebiet der Gemeinschaft abgebaut oder in irgendeiner Form aus Nichtgemeinschaftsländern eingeführt wird. Zwar ist der Hauptzweck des Systems die Aufdeckung einer Abzweigung von für friedliche Zwecke bestimmtem Kernmaterial für nichtfriedliche Zwecke, doch wird darüber hinaus auch überprüft, ob die Meldung eines bestimmten Verwendungszwecks korrekt ist und ob von Lieferländern gemachte Auflagen eingehalten werden.

Tabelle 2

Verteilung der Bestände (Ende) 1990 (auf den nächsten Prozentpunkt aufgerundet) nach Anlagenart und Art des Materials

Art der Anlage	Art des Materials ([5])					
	D	N	L	H	P	T
Forschungslaboratorien	1	~0	~0	2	~0	1
Forschungsreaktoren und kritische Anordnungen	~0	~0	~0	44	1	1
Anreicherung	31	9	57	~0	1	1
Brennstoffkonzentration, -konversion und -fabrikation	2	52	3	14	6	~0
Wiederaufarbeitung	~0	~0	1	1	1	~0
Leistungsreaktoren	2	16	20	19	22	~0
Lager	63	19	19	20	70	1
LOF, Gruben, sonstige	1	4	~0	~0	~0	97

([4]) MBZ = Materialbilanzzone: Basiseinheit der Sicherheitsüberwachung, d. h. eine Zone, für die sich a) jeder Zu- oder Abgang und b) der reale Bestand an Kernmaterial nachweisen läßt. In der Regel bildet eine Anlage eine Materialbilanzzone, eine große Anlage kann aber auch aus mehreren MBZ bestehen.

([5]) D = abgereichertes, N = natürliches, L = geringangereichertes, H = hochangereichertes Uran; P = Plutonium, T = Thorium.

Rechtsgrundlage des Euratom-Überwachungssystems

Grundlage für die Euratom-Sicherheitsüberwachung ist Kapitel VII (Artikel 77 bis 85) des Euratom-Vertrages aus dem Jahre 1957.

In Artikel 77 heißt es:

„Die Kommission hat sich nach Maßgabe dieses Kapitels in den Hoheitsgebieten der Mitgliedstaaten zu vergewissern, daß

(a) die Erze, die Ausgangsstoffe und besonderen spaltbaren Stoffe nicht zu anderen als den von ihren Benutzern angegebenen Zwecken verwendet werden;

(b) die Vorschriften über die Versorgung und alle besonderen Kontrollverpflichtungen geachtet werden, welche die Gemeinschaft in einem Abkommen mit einem dritten Staat oder einer zwischenstaatlichen Einrichtung übernommen hat".

Absatz a erfordert ein Berichterstattungs- und Überprüfungssystem hinsichtlich der Verwendung von Kernmaterial aller Art. Absatz b deckt eine Reihe wichtiger Abkommen über die Lieferung von Kernmaterial ab, etwa aus den Vereinigten Staaten, Kanada und Australien. Diese Abkommen enthalten Vorschriften für die Überwachung des Materials, solange es in der Gemeinschaft verbleibt. Dieser Absatz gilt auch für die zwischen Euratom, seinen Mitgliedstaaten und der IAEO geschlossenen Abkommen.

Die weiteren Artikel bestimmen folgendes:

— die Grundforderung, daß alle kerntechnischen Anlagen der Sicherheitsüberwachung unterliegen;

— die Forderung, daß die Verfahren für die Wiederaufarbeitung von bestrahltem Brennstoff der Genehmigung der Kommission bedürfen;

— das Recht der Kommission, Inspektoren einzustellen;

— das Recht der Inspektoren auf jederzeitigen Zugang zum Kernmaterial der betreffenden Anlagen sowie zu den jeweiligen Unterlagen und Personen;

— das Recht, im Falle einer Verletzung des Vertrags ggf. Zwangsmaßnahmen zu verhängen;
— den Ausschluß des Kernmaterials, das ausdrücklich für die Zwecke der Verteidigung bestimmt ist, von der Sicherheitsüberwachung.

Um die Vertragsvorschriften in ein anwendbares System von Maßnahmen zur Sicherheitsüberwachung umzusetzen, schreibt die Verordnung (Euratom) Nr. 3227/76 die den Betreibern von Kernanlagen obliegenden Verpflichtungen fest; hierzu gehören vor allem folgende:

— Der Betreiber muß Euratom die „grundlegenden technischen Merkmale" seiner Anlage unter Verwendung eines ausführlichen Fragebogens übermitteln. Zu den benötigten Informationen gehören eine Darlegung der Vorkehrungen für die Handhabung von Kernmaterial, eine Beschreibung des Kernmaterials selbst, eine Beschreibung des Kernmaterials, das in der Anlage gehandhabt wird und eine Beschreibung des Systems der Kernmaterialbuchführung und -kontrolle. Alle Änderungen der grundlegenden technischen Merkmale sind der Kommission mitzuteilen. Nach Eingang der grundlegenden technischen Merkmale kann Euratom Inspektoren entsenden, um diese Informationen nachzuprüfen.

— Der Betreiber muß ein System für die Kernmaterialbuchführung einrichten und anwenden, sobald er solches Material handhabt. Zu den Merkmalen dieses Materialbuchführungssystems gehört, daß alle Anlagenteile, in denen Kernmaterial vorhanden sein kann, sogenannten Materialbilanzzonen (MBZ) zuzuordnen sind. Für jede MBZ muß die Buchführung im einzelnen jeden Stoff aufführen, der in die Zone eingebracht wird bzw. diese verläßt, einschließlich der Menge, der Art, der Zusammensetzung der Stoffe, der Sicherheitsauflagen usw. Alle anderen Bestandsänderungen, z. B. Kernumwandlung durch Bestrahlung oder Änderung der Kategorie sind ebenfalls zu verbuchen. Plutonium, hochangereichertes Uran, geringangereichertes Uran, natürliches Uran, abgereichertes Uran und Thorium sind jeweils getrennt zu erfassen. Im Rahmen des Materialbuchführungssystems ist von Zeit zu Zeit (meist ein- bis viermal pro Jahr) eine reale Bestandsaufnahme vorzunehmen, deren Ergebnisse Euratom zu melden sind.

— Das Tätigkeitsrahmenprogramm ist regelmäßig mitzuteilen.

— Die Absicht zur Durchführung einer realen Bestandsaufnahme und das entsprechende Programm hierzu sind mitzuteilen.

— Eine geplante Reaktorabschaltung zur Nachladung ist mitzuteilen.

— Bestimmte Materialbewegungen, Ein- und Ausfuhren von Kernmaterial sind im voraus mitzuteilen.

— Die Genauigkeit sämtlicher Materialbestimmungen und -messungen ist zu gewährleisten und Euratom im Rahmen der obengenannten Meldung der grundlegenden technischen Merkmale mitzuteilen.

Für jede überwachungspflichtige Anlage sind Einzelheiten über die obengenannten Verpflichtungen in den „besonderen Kontrollbestimmungen" niedergelegt, ein rechtlich verbindliches Dokument, das von der Kommission nach Konsultation mit dem betreffenden Mitgliedstaat und Betreiber erlassen wird.

Überblick über die Überwachungsmaßnahmen

Die Euratom-Inspektoren führen in den nuklearen Anlagen Verifikationsmaßnahmen durch, um folgendes zu prüfen:

- ob die vom Betreiber gemeldeten grundlegenden technischen Merkmale zutreffen;
- ob das vom Betreiber angewandte System entsprechend den Angaben in den grundlegenden technischen Merkmalen und in zufriedenstellender Weise funktioniert;
- ob das System der Buchführung ausgeglichen ist, d. h., ob beispielsweise jeder Abgang von einem Materialkonto einem Zugang zu einem anderen Konto entspricht;
- ob Übereinstimmung besteht zwischen der Buchführung des Betreibers, seinen Betriebsprotokollen und seinen regelmäßigen Meldungen an Euratom;
- ob die Buchführung des Betreibers Übereinstimmung mit den Buchführungen anderer Anlagen aufweist. In der Euratom-Zentrale in Luxemburg ist ein umfassendes System zur Überprüfung innerhalb der gesamten Gemeinschaft eingerichtet worden, mit dessen Hilfe festgestellt wird, ob Kernmaterialsendungen eines Betreibers von einem anderen Betreiber ordnungsgemäß verbucht wurden und der Empfang gemeldet worden ist;
- die Übereinstimmung des realen Bestands mit den Aufzeichnungen des Betreibers über Bestandsveränderungen und den Zuweisungen zum jeweiligen realen Bestand. Es können verschiedene Arten von Materialbewegungen geprüft werden, insbesondere Bewegungen zwischen Materialbilanzzonen derselben Anlage, Bewegungen zwischen Anlagen desselben Mitgliedstaates, Bewegungen zwischen zwei Mitgliedstaaten und Bewegungen zwischen einem Mitgliedstaat und einem Staat außerhalb der Gemeinschaft. In den ersten drei Fällen können Nachprüfungen entweder beim Versender oder Empfänger erfolgen, falls die Sendung versiegelt war.

Ein umfassendes Verifikationssystem muß all diese Aktivitäten einschließen. Begreiflicherweise gilt jedoch das Hauptaugenmerk dem Vergleich zwischen realem Bestand und Buchungen, wofür auch die meisten Mittel eingesetzt werden; nur so kann gewährleistet werden, daß keine Abzweigung vom erklärten Gebrauch stattgefunden hat.

Die Häufigkeit und Art von Inspektionen sind von Anlage zu Anlage unterschiedlich und hängen von der Menge und der Art der gehandhabten Stoffe ab. Ein Überblick über die typische Inspektionshäufigkeit wird in Tabelle 3 gegeben.

Tabelle 3

Typische Inspektionshäufigkeit nach Art der Anlagen

Art der Anlagen	Typische Inspektionshäufigkeit	
	Von	Bis
Forschungslaboratorien	1/Jahr	12/Jahr
Forschungsreaktoren und kritische Anordnungen	2/Jahr	6/Jahr
Gruben und Konzentrationsanlagen	0/Jahr	2/Jahr
Anreicherungsanlagen	12/Jahr	1/Woche
Konversion und Fabrikation (Natururan, geringangereichertes Uran)	12/Jahr	1/Woche
Konversion und Fabrikation (hochangereichertes Uran und MOX)	12/Jahr	kontinuierlich
Wiederaufarbeitung	12/Jahr (wenn nicht in Betrieb)	kontinuierlich
Leistungsreaktoren	2/Jahr	24/Jahr
Lagereinrichtungen	1/Jahr	täglich

Die Euratom-Zentrale in Luxemburg besitzt eine komplexe Infrastruktur zur Unterstützung der Inspektionstätigkeiten. Eine Abteilung bearbeitet alle Buchungsberichte und Meldungen der Anlagenbetreiber und erstellt auf dieser Grundlage eine Datenbasis für die Inspektoren. Etwa offene Rückfragen werden ebenfalls an den Inspektor weitergegeben, bevor er seine Inspektionsreise antritt. Die Planung der Inspektionen, einschließlich des Einsatzes von Geräten, erfolgt vierteljährlich, wird monatlich auf den neuesten Stand gebracht, und für diejenigen Anlagen, die der gleichzeitigen Überwachung von IAEO und Euratom unterliegen, wird die Planung mit der IAEO abgestimmt. Eine andere Abteilung stellt der Inspektionsabteilung logistische Unterstützung in Form von Meßgeräten, Siegeln, Kameras und sonstigen Geräten zur Verfügung und sorgt für nicht zerstörungsfreie Prüfungen der von den Inspektoren genommenen Proben.

Die Auswertung der Inspektionstätigkeiten und -ergebnisse erfolgt auf zwei Ebenen. Zunächst wird bereits während der Inspektion mit den gegebenen Möglichkeiten eine erste Prüfung und Bewertung vorgenommen, wobei zumeist untersucht wird,

ob Übereinstimmung zwischen den Daten besteht und sich keine größeren Fehlbestände ergeben, jedoch wird noch keine eingehende Analyse durchgeführt. Zu diesem Stadium der Auswertung zählt auch die wichtige Aufgabe, ob die vom Betreiber angegebenen grundlegenden technischen Merkmale noch immer zutreffen.

Die Auswertung im zweiten Stadium erfolgt in der Zentrale, mit Unterstützung durch die Laboratorien der Gemeinsamen Forschungsstelle der EG (GFS) und umfaßt folgende Tätigkeiten:

- Prüfung von Siegeln, die entfernt wurden; die Ladung der Behältnisse, die mit dem Siegel verschlossen wurden, ist selbstverständlich bereits während der Inspektion überprüft worden;
- Entwicklung und Betrachtung von Überwachungsfilmen;
- Auswertung der Analyseergebnisse von Proben, die nicht zerstörungsfrei untersucht worden sind;
- Auswertung von Meßergebnissen der „zerstörungsfreien Prüfung", d. h. insbesondere der Messung von Neutronen- und Gammastrahlen-Emissionen von Kernmaterial; diese Daten werden ebenso wie die Daten aus der nicht zerstörungsfreien Prüfung systematisch mit den Aufzeichnungen des Betreibers und mit Berichten über das entsprechende Material verglichen;
- Auswertung von Unterschieden zwischen den von der absendenden und der empfangenden Anlage gemeldeten Daten über eine bestimmte Materialbewegung;
- Auswertung der gesamten Materialbilanzdaten für jede „Materialbilanzzone". Je nach Art der Anlage kann es sich hier um eine sehr aufwendige Arbeit handeln; die Genauigkeit und Zuverlässigkeit aller Komponenten der Materialbilanzen muß berücksichtigt werden, und für die Durchführung solcher Analysen wurden Computerprogramme entwickelt;
- Beurteilung gewisser Kenndaten der über eine bestimmte Zeitspanne ausgeführten Tätigkeiten, d. h. der Daten über Realbestandsdifferenzen, die sich bei der regelmäßigen Bestandsprüfung ergeben haben, der Daten über unterschiedliche Abfallkategorien usw.

Die Ergebnisse der Auswertung können Unstimmigkeiten aufweisen, die der Erklärung bedürfen. In diesen Fällen kann Euratom eine Reihe von Folgemaßnahmen veranlassen, wie:

— Aufforderung an den Betreiber, offensichtliche Unstimmigkeiten zu erklären;

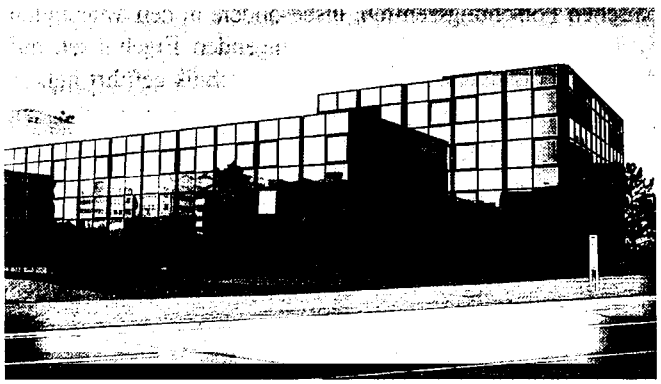
— Steigerung der Häufigkeit und Intensität von Inspektionen oder Änderung der Inspektionsstrategie, sowie schließlich

— Verhängung von Zwangsmaßnahmen gemäß Artikel 83 Euratom-Vertrag. Diese reichen von einer Verwarnung bis zum Entzug von Ausgangsstoffen oder besonderen spaltbaren Stoffen.

Die Kriterien für die Inspektionsplanung und die Inspektionsziele wurden so festgelegt, daß Euratom in der Lage ist, seine Verpflichtungen aus dem Vertrag und den oben angeführten sonstigen Abkommen zu erfüllen.

Mittel

Die Kommission beschäftigt in Luxemburg ein Team von Inspektoren mit der entsprechenden administrativen und logistischen Unterstützung. Der Personalbestand der Direktion Sicherheitsüberwachung beträgt gegenwärtig 241 Beamte, von denen 177 Inspektoren sind, die von der Kommission nach einer eingehenden Sicherheitsüberprüfung eingestellt werden. Der Personalbedarf wird entsprechend den wachsenden Anforderungen laufend angepaßt. Die Direktion mit Sitz in Luxemburg ist eine von sechs Direktionen der Generaldirektion Energie (GD XVII). Die Kosten des Betriebs der Sicherheitsüberwachung werden sich 1991 auf etwa 7,5 Mio ECU belaufen (ohne die Aufwendungen der Gemeinsamen Forschungsstelle für Untersuchungen im Rahmen der Sicherheitsüberwachung). Im Rahmen des Inspektionsaufwands von Euratom wurden 1990 etwa 7 500 Manntage für über 2 000 Inspektionen geleistet.



Zentrale der Direktion Euratom-Sicherheitsüberwachung, Luxemburg

Für die Verifikation und Kontrolle von Nuklearmaterial verfügt Euratom über eine Reihe von technischen Hilfsmitteln. So sind Meßgeräte für zerstörungsfreie Prüfungen vorhanden, mit denen direkte Messungen zur Bestimmung von Menge und Isotopenzusammensetzung von Plutonium und Uran in verschiedenen Formen durchgeführt werden können. Zur Kalibrierung werden eigene Meßstandards, darunter auch im Besitz von Euratom befindliche anlagenspezifische, ständig eingesetzt. Von bestimmten Mengenprodukten, wie Uranhexafluorid sowie Eingangs- und Ausgangslösungen in Wiederaufarbeitungsanla-

gen, werden routinemäßig Proben (etwa 800 pro Jahr) entnommen und für die nicht zerstörungsfreie Prüfung in die Laboratorien der Gemeinsamen Forschungsstelle der EG (GFS) gesandt. Schließlich wird durch Maßnahmen der Eingrenzung und Beobachtung sichergestellt, daß die Kenntnis bezüglich bestimmten Kernmaterials oder eines Arbeitsfeldes fortlaufend aufrechterhalten wird. Zu diesem Zweck werden optische Überwachungseinheiten installiert, die beispielsweise in vorgegebenen Zeitabständen Fotoaufnahmen machen. Diese Einheiten werden regelmäßig ausgetauscht und die Aufnahmen betrachtet. Umfangreicher Gebrauch wird auch von Siegeln gemacht (etwa 18 000 pro Jahr), insbesondere zur Sicherung von Material, das von einer Verifikation bis zur nächsten unverändert bleibt. Für die enorme Arbeit der Speicherung, Wiedergewinnung und Analyse der eingehenden Daten, die Erstellung von Berichten an die IAEO und zahlreiche andere Aufgaben betreibt die Direktion einen Spezialrechner, an den bis zu 32 Terminals angeschlossen werden können. Darüber hinaus steht eine Reihe kleinerer Rechner zur Verfügung (etwa 90 PCs), mit denen beispielsweise Meßergebnisse vor Ort ausgewertet oder Daten des Betreibers vor Ort oder in der Zentrale geprüft und beurteilt werden können.

Die Direktion Euratom-Sicherheitsüberwachung führt selbst keine Forschungstätigkeiten durch, sondern greift hierzu in großem Umfang auf die Einrichtungen der Gemeinsamen Forschungsstelle zurück. Es ist bereits eine Reihe von Instrumenten für allgemeine und spezielle Überwachungsaufgaben vor Ort konstruiert worden, und auch bei den Techniken zur Eingrenzung und Beobachtung wurden beachtliche Fortschritte gemacht. Daneben bestehen auch Verbindungen zu außereuropäischen Forschungszentren, insbesondere in den Vereinigten Staaten, was zu besonders nutzbringenden Ergebnissen auf dem Gebiet der zerstörungsfreien Meßtechnik geführt hat.

Um ständig Anschluß an die technologische Weiterentwicklung zu halten, beteiligt sich Euratom auch an der „European Safeguards Research and Development Association" (ESARDA), einer Vereinigung, deren Ziel die Forschungskoordination in Europa auf dem Gebiet der Sicherheitsüberwachung ist und die den Erfahrungs- und Informationsaustausch zwischen Anlagenbetreibern, Forschungsstätten und der Direktion Euratom-Sicherheitsüberwachung unterstützt. Schließlich ist Euratom noch in einige Programme von EG-Mitgliedstaaten zur Unterstützung der IAEO-Forschung einbezogen und betreibt durch die Forschungszentren der GFS ein eigenes derartiges Programm.

Zusammenarbeit mit der IAEO

Der größte Teil der Inspektionstätigkeiten von Euratom betrifft auch die IAEO. Im Rahmen regelmäßiger Treffen wird die Inspektionsplanung mit der IAEO erörtert, mit der Euratom außerdem in folgenden Bereichen zusammenarbeitet: Folgemaßnahmen bei Unstimmigkeiten, Überwachung des Transits von Kernmaterial, Festlegung von Inspektionszielen und -kriterien, Anwendung neu entwickelter Instrumente, Methoden und Techniken der Sicherheitsüberwachung. Damit die oben erwähnten Verifikationsabkommen in die Praxis umgesetzt werden konnten, mußten für die nachstehenden Gebiete besondere Arbeitsvereinbarungen und Absprachen ausgehandelt werden:

- Inspektionen in besonders sensitiven Anlagen; es wurde vereinbart, für die wenigen betroffenen Anlagen gemeinsame Inspektorenteams zu bilden, damit beide Organisationen unabhängig voneinander ihre Bewertung vornehmen können, jedoch Doppelarbeit und Beeinträchtigungen der Betreiber auf ein Minimum beschränkt bleiben;

- Beteiligung von IAEO-Inspektoren an Euratom-Inspektionen in sonstigen Anlagen; hierzu wurden Arbeitsvereinbarungen getroffen, wobei Leichtwasserreaktoren und Fabrikationsanlagen für geringangereicherte Uranbrennstoffe besondere Aufmerksamkeit gewidmet wurde;

- Festlegung der Tätigkeiten, die von den IAEO-Inspektoren durch Beobachtung der Euratom-Inspektoren ausgeführt werden sollen, und daher auch jener Tätigkeiten, die auf andere Art und Weise als durch Beobachtung abgewickelt werden können;

- Verfahren für die Zuordnung der Kosten, die durch die Sicherheitsüberwachung verursacht werden.

Eine Vielzahl von Anlagenspezifischen Anhängen wurde bereits erfolgreich mit der IAEO und den Betreibern ausgehandelt, doch einige harren immer noch ihres Abschlusses. Diese betreffen im wesentlichen die neu hinzugekommenen Anlagen der früheren Deutschen Demokratischen Republik, wo Euratom seine Inspektionen sofort nach der deutschen Vereinigung aufgenommen hat. Die Verhandlungen über diese Dokumente haben der Direktion Euratom-Sicherheitsüberwachung einen beträchtlichen Einsatz abverlangt und werden dies auch noch während einiger Jahre tun, da für jedes Dokument erfahrungsgemäß mehrere Verhandlungsrunden erforderlich sind. Die Anwendung der oben erwähnten Arbeitsvereinbarungen und Absprachen zwischen den beiden Organisationen wird von den durch die Verifikationsabkommen auf zwei Ebenen eingesetzten Verbindungsausschüssen überwacht.

Ausblick

Die technischen Mittel zur Durchführung der Überwachungsmaßnahmen haben sich während der letzten Jahre rasch fortentwickelt, und dieser Trend wird voraussichtlich anhalten. Auf

dem Gebiet der zerstörungsfreien Meßinstrumente konnten der Einsatzbereich und die Anwendbarkeit der verfügbaren Ausrüstung erheblich erweitert werden. Auf dem Gebiet der optischen Überwachung werden hochentwickelte Videoeinheiten routinemäßig zum Einsatz gebracht, um die seit längerem benutzten Einheiten mit je zwei Schmalfilmkameras zu ergänzen. Aufgrund erheblicher technischer Fortschritte in der Siegeltechnologie kommt heute eine Vielzahl perfektionierter Systeme zum Einsatz, wie beispielsweise Siegel, die eine elektronische Fernabfrage gestatten.

Auch die Konzeption und der Betrieb von Nuklearanlagen haben in den letzten Jahren deutliche Veränderungen erfahren, was erhebliche Rückwirkungen auf die Durchführung der Sicherheitsüberwachung hat. Aus Sicherheits- und Strahlenschutzgründen werden Anlagen geplant und betrieben, in denen das überwachungspflichtige Kernmaterial zunehmend unzugänglich ist (massive Transport-/Lagerbehälter, die nur für begrenztes routinemäßiges Öffnen ausgelegt sind; stark abgeschirmte, sichere Lagerung von sensitivem Kernmaterial). Zu den neuesten Entwicklungen gehören fortschrittliche Meßgeräte und hochentwickelte Eingrenzungs- und Beobachtungssysteme mit Überwachungs-/Registriersystemen, die die überwachungsrelevanten Vorgänge registrieren und darauf reagieren können. Diese Entwicklungen müssen fortgesetzt werden, um mit der Weiterentwicklung der Anlagenplanung Schritt halten zu können, und spezifischen Situationen angepaßt werden.

Die wichtigsten Anlagen des Brennstoffkreislaufes, d. h. die Anlagen zur Fabrikation von Brennstoffen und zu ihrer Wiederaufarbeitung, werden so konstruiert, daß sie vollautomatisch (und ferngesteuert) betrieben werden können. Aufgrund dieses Trends wird man auch künftig von bisherigen Verfahren der Sicherheitsüberwachung und Inspektion abgehen müssen, woraus sich für Euratom die Notwendigkeit ergibt:

- Überwachungssachverständige noch stärker als bisher an den Planungs- und Bauarbeiten zu beteiligen, und zwar lange vor der Inbetriebnahme;
- zunehmendes Gewicht auf die Zuverlässigkeit der Anlagenpläne, der Meßmethoden und der Buchführung der Betreiber für Überwachungszwecke zu legen;
- der Verifikation und der erneuten Verifikation der grundlegenden technischen Merkmale größere Bedeutung einzuräumen;
- die Überwachungstätigkeiten unter gleichzeitiger Begrenzung des zusätzlich erforderlichen Personals mit Hilfe der Entwicklung und Anwendung automatischer, weitgehend unbemannter Meßvorrichtungen fortzusetzen, wann immer dies möglich ist.

Schlußfolgerungen

Kennzeichnend für die Sicherheitsüberwachung bis zum Jahr 1995 wird einmal die Bewältigung des Problems der zunehmenden Verfügbarkeit und Nutzung von Plutonium im kommerziellen Brennstoffkreislauf der Gemeinschaft sein und zum anderen die erwünschte weitere Verbesserung der Wirksamkeit und der Leistungsfähigkeit der Sicherheitsmaßnahmen im allgemeinen.

Die Wirksamkeit der Euratom-Sicherheitsüberwachung hängt von der Organisation und Motivierung des Inspektionsdienstes, von seinem raschen Eingreifen, von dem Ausmaß, in dem Betreiber und staatliche Behörden ihren Verpflichtungen nachkommen, sowie schließlich von den für die Sicherheitsüberwachung zur Verfügung stehenden Mitteln ab.

Mit dem Inkrafttreten der Verifikationsabkommen hat sich die Arbeit der Direktion Sicherheitsüberwachung infolge der Anwesenheit von IAEO-Inspektoren entsprechend den getroffenen Arbeitsvereinbarungen und Absprachen beträchtlich verändert. Zusätzliche Schwierigkeiten ergaben sich daraus, daß auch in den nicht von der IAEO inspizierten Anlagen ein gewisses Maß an Überwachungsmaßnahmen gewährleistet sein muß. Infolgedessen wurden das Personal und die Mittel bedeutend aufgestockt; sie werden auch künftig erhöht werden müssen, um zusätzlichen Inspektionsverpflichtungen entsprechen zu können und mit der Erweiterung der Gemeinschaft und dem Wachstum der friedlichen Kernenergienutzung in Europa Schritt zu halten.

Die Kosten der beiden Organisationen, Euratom und IAEO, für die Sicherheitsüberwachung in der Europäischen Gemeinschaft sind im Vergleich zu den Betriebskosten für den nuklearen Brennstoffkreislauf verhältnismäßig gering und stellen eine lohnende Ausgabe dar, durch welche die objektive Gewißheit der friedlichen Nutzung gegeben werden kann, was eine Grundvoraussetzung für die laufende Versorgung der zivilen Kernenergieprogramme mit nuklearem Material ist.

Die finanziellen Beihilfen der Gemeinschaft für den Energiesektor 1989 (Zuschüsse und Darlehen)

GD XVII: Task Force Integration der Gemeinschaft (TF 2)

Die Generaldirektion Energie (GD XVII) hat vor kurzem den Jahresbericht über die finanziellen Beihilfen der Gemeinschaft für den Energiesektor im Jahre 1989 veröffentlicht. Die Unterstützungsmaßnahmen haben die Form von Zuschüssen aus dem Gesamthaushalt (Kapitel 70 und 73, Strukturfonds) und dem EGKS-Haushalt sowie von Darlehen, die von den Finanzierungsinstrumenten der Gemeinschaft (EIB, NGI, Euratom, EGKS) bereitgestellt werden.

1988 hatte sich die finanzielle Unterstützung der Gemeinschaft für den Energiesektor (Zuschüsse und Darlehen) auf insgesamt 2 757 Mio ECU belaufen, von denen 948 Mio ECU auf Zuschüsse und 1 809 Mio ECU auf Darlehen entfielen.

Zuschüsse für den Energiesektor

Die aus Haushaltsmitteln gewährten Beihilfen der Gemeinschaft zugunsten des Energiesektors erfolgen in Form der Unterstützung von energiepolitischen Maßnahmen (Kapitel 70), der Finanzierung spezifischer Maßnahmen in den Bereichen Forschung und technologische Entwicklung (Kapitel 73) und von Beihilfen aus den Strukturfonds.

Die Reform der Strukturfonds und die beschlossenen neuen Methoden der Unterstützung machen es unmöglich, den Gesamtbetrag der dem Energiesektor 1989 gewährten Zuschüsse zu beziffern. Aufgrund der Reform werden die Beihilfen für den Energiesektor in Verbindung mit regionalen operationellen Programmen gewährt, die im Rahmen der für jeden betroffenen Mitgliedstaat für den Zeitraum 1989—1993 aufgestellten Gemeinschaftlichen Förderkonzepte (GFK) zusammengefaßt werden. Daher läßt sich die dem Energiesektor aus Mitteln der Strukturfonds gewährte Unterstützung nur für den Zeitraum 1989—1993 in ihrer Gesamtheit ermitteln, nicht aber für die einzelnen Jahre.

Die Finanzierung der Energiepolitik (Kapitel 70) erfolgt vorwiegend über zwei Arten von Unterstützungsmaßnahmen, die vom Rat für den Zeitraum 1986—1989 beschlossen worden sind: technologisches Entwicklungsprogramm auf dem Kohlenwasserstoffsektor und Demonstrationsprogramm.

Die finanzielle Unterstützung der Energiepolitik betrug 1989 insgesamt 131,7 Mio ECU, wovon 35,97 Mio ECU für die technologische Entwicklung im Kohlenwasserstoffsektor und 84,87 Mio ECU für Demonstrationsvorhaben und industrielle Pilotprojekte bereitgestellt wurden.

Was die Forschung und Entwicklung im Energiesektor angeht, so werden spezifische Energievorhaben in den Bereichen Kernfusion, Kernspaltung und nichtnukleare Energien aus dem Rahmenprogramm für Forschung und technologische Entwicklung (1987—1991) finanziert oder kofinanziert. Insgesamt belief sich die Unterstützung von Forschung und Entwicklung im Energiesektor 1989 auf 353,3 Mio ECU.

Im Rahmen der Reform der Strukturfonds (1) wurden fünf vorrangige Ziele aufgestellt, auf welche sich die finanziellen Bemühungen der Gemeinschaft im Rahmen koordinierter Politiken konzentrieren werden. Beihilfen an den Energiesektor erfolgen überwiegend im Rahmen des Ziels Nr. 1 „Förderung der Entwicklung und strukturellen Anpassung der weniger entwickelten Regionen" und teilweise des Ziels Nr. 2 „Umstrukturierung derjenigen Regionen, die vom industriellen Niedergang ernstlich betroffen sind" sowie des Ziels Nr. 5b „Förderung der Entwicklung ländlicher Gebiete". Diese Ziele haben einen geographischen Bezug; aufgrund der Verordnung gelten als Regionen im Sinne des Ziels Nr. 1 drei Länder — Griechenland, Irland und Portugal — zusammen mit dem italienischen Mezzogiorno, etwa 70 % des spanischen Hoheitsgebiets, Korsika, den französischen überseeischen Departements und Nordirland.

(1) ABl. L 185 vom 15.7.1988, S. 9; ABl. L 374 vom 31.12.1988, S. 1.

Gemeinschaftliche Maßnahmen werden zu den für jedes Land bzw. jede Region aufgestellten Gemeinschaftlichen Förderkonzepten (GFK) zusammengefaßt und beziehen auch die mehrjährigen Verpflichtungen ein, welche die Kommission vor der Reform eingegangen ist, um den unter die Ziele Nr. 1, Nr. 2 und Nr. 5b fallenden Regionen zu helfen. Dabei handelt es sich um Vorhaben des Valoren-Programms der Gemeinschaft, die IMP (Integrierte Mittelmeerprogramme) (1986—1992) und spezifische Energiemaßnahmen.

Die Maßnahmen des Strukturfonds machen einen erheblichen Teil der gesamten Unterstützung des Energiesektors aus. Auf die 1988 vom EFRE geleisteten Beiträge zu Einzelvorhaben entfielen 25 % der gesamten Beihilfen zugunsten des Energiesektors.

Die folgende Tabelle weist den Geamtbetrag der Mittel aus, die dem Energiesektor im gesamten Zeitraum 1989—1993 aus Mitteln der Strukturfonds im Rahmen der Gemeinschaftlichen Förderkonzepte für Regionen des Ziels Nr. 1 zur Verfügung gestellt wurden.

(Mio ECU)

Land	Gesamtkosten geplanter Investitionen (1)	Bereitgestellte gemeinschaftliche Unterstützung				(2)/(1)
		Insgesamt (2)	EFRE	ESF	EAGFL	%
Spanien	264,7	117,3 (1)	117,3	—	—	44,3
Frankreich	52,6	12,5 (2)	12,5	—	—	23,7
Griechenland	1 466,6	513,0 (3)	513,0	—	—	35,0
Irland	24,3	13,0 (2)	13,0	—	—	53,5
Nordirland	9,0	5,0 (2)	5,0	—	—	55,5
Italien	2 165,0	890,2 (4)	879,9	1,0	9,3	41,1
Portugal	757,0	172,0 (5)	172,0	—	—	22,7
Insgesamt	4 739,2	1 723,0	1 712,7	1,0	9,3	36,3

Außerdem finanziert die EGKS drei Arten von Maßnahmen auf dem Kohlesektor, welche die Umschulung von Arbeitnehmern, Zinsverbilligungen auf EGKS-Darlehen für Investitionsprogramme der Industrie und die Kohleforschung betreffen.

1989 beliefen sich die EGKS-Beihilfen zugunsten des Kohlesektors auf 135,7 Mio ECU bei einem Gesamthaushalt von 456,7 Mio ECU.

In der folgenden Tabelle sind die Beihilfen zugunsten des Energiesektors in den Jahren 1988 und 1989 nach Herkunft der Mittel gegliedert:

Mittelbindungen (Mio ECU)	1988	1989
Energie (Kapitel 70)	141,6	131,7
FuE Energie (Kapitel 73)	360,9	353,3
Energievorhaben und -programme (Strukturfonds)	215,0	Neue Verordnungen
Valoren (EFRE)	6,8	40,2
IMP (Strukturfonds, Titel 551)	32,3	20,9
Spezifische Energievorhaben (EFRE)	14,1	18,6
EGKS-Haushalt	177,7	135,7

Darlehen zugunsten des Energiesektors

Die dem Energiesektor 1989 gewährten Darlehen beliefen sich auf insgesamt 1 951 Mio ECU, was gegenüber 1988 einer nominellen Steigerung um 7,8 % gleichkommt. Der Anteil der Energie an der von der Gemeinschaft 1989 insgesamt bereitgestellten Darlehenssumme betrug in diesem Jahr jedoch nur 16,3 %, nach 19 % im Jahre 1988 und 36 % im Jahre 1987.

Mit 97,5 % der Gesamtdarlehenssumme zugunsten des Energiesektors im Jahre 1989 ist die EIB nach wie vor der Hauptkreditgeber für Gemeinschaftsdarlehen an europäische Unternehmen, die in Vorhaben in den Bereichen Erzeugung, Transport und Verteilung von Energie investieren.

Die Tabellen 1, 2 und 3 enthalten eine Aufschlüsselung der dem Energiesektor gewährten Darlehen nach Herkunft der Mittel und Empfängerländern und weisen den Trend im Zeitraum 1985 bis 1989 aus.

Energiedarlehen aus Finanzierungsinstrumenten der Gemeinschaft

Tabelle 1 — Herkunft der Mittel (Mio ECU)

	1985	1986	1987	1988	1989
EIB	2 231,3	2 574,2	2 357,2	1 772,0	1 903,2
NGI	9,4	91,1	21,8	6,1	3,2
EGKS	90,8	121,9	449,1	30,8	45,0
Euratom	211,0	443,2	313,7	0,0	—
Insgesamt	2 542,5	3 230,4	3 141,8	1 808,9	1 951,4

Tabelle 2 — Herkunft der Mittel (%)

	1985	1986	1987	1988	1989
EIB	87,7	79,7	75,0	98,0	97,54
NGI	0,4	2,8	0,7	0,3	0,16
EGKS	3,6	3,8	14,3	1,7	2,30
Euratom	8,3	13,7	10,0	0,0	—
Insgesamt	100,0	100,0	100,0	100,0	100,0

Tabelle 3

Gesamtsumme der Energiedarlehen sämtlicher Gemeinschaftsinstrumente nach Ländern

	1985		1986		1987		1988		1989	
	Mio ECU	%	Mio ECU	%	Mio ECU	%	Mio ECU	%	Mio ECU	%
Belgien	77,8	3,1	—	—	—	—	—	—	—	—
Dänemark	250,5	9,9	227,9	7,0	279,1	8,9	247,5	13,7	113,3	5,8
Deutschland	198,1	7,8	447,6	13,8	420,1	13,4	158,3	8,7	51,5	2,6
Griechenland	71,7	2,8	125,1	3,9	90,5	2,9	10,4	0,6	155,2	8,0
Spanien	—	—	27,3	0,8	72,6	2,3	1,7	0,1	192,5	9,9
Frankreich	283,4	11,1	245,4	7,6	280,2	8,9	19,5	1,1	91,0	4,7
Irland	7,0	0,3	117,9	3,6	—	—	58,6	3,2*	43,7	2,2
Italien	991,2	38,9	1 045,7	32,6	1 082,2	34,6	793,6	43,9	806,9	41,3
Portugal	—	—	29,1	0,9	108,7	1,8	220,5	12,2	249,8	12,8
Vereinigtes Königreich	663,0	26,1	966,6	29,8	746,2	23,7	298,8	16,5	244,3	12,5
Andere	—	—	—	—	108,7	3,5	—	—	3,2*	0,2
EG	2 542,5	100	3 230,4	100,5	3 141,8	100	1 808.9	100	1 951,4	100

* Den Niederlanden gewährtes Darlehen

Internationales Programm für die Zusammenarbeit im Energiebereich Überblick über die Tätigkeiten im Zeitraum 1989—1990

von Miriam Delehanty, GD XVII: Internationales Kooperationsprogramm Energie (A3)

Das Internationale Programm für die Zusammenarbeit im Energiebereich der Generaldirektion Energie wurde in den siebziger Jahren als unmittelbare Reaktion auf die Entwicklung der Weltenergiemärkte ins Leben gerufen. Die Ölkrisen von 1973 und 1979 hatten schlagartig erkennen lassen, wie empfindlich plötzliche, starke Ölpreissteigerungen die Dritte Welt, aber auch Westeuropa treffen. Es zeigte sich, daß es der Energiepolitik an einem brauchbaren Instrumentarium und zuverlässigen Daten zur Beurteilung der künftigen Trends der Energienachfrage und der Nutzung lokaler Energieressourcen mangelte.

Vor allem den Entwicklungsländern fehlte das Sachwissen, um genaue Analysen von Energieversorgung und -bedarf in mittel- und langfristige Planungsstrategien umsetzen zu können. Vor diesem Hintergrund beschloß die Generaldirektion Energie 1980, mit diesen Ländern zusammenzuarbeiten, um die Voraussetzungen der Energieplanung zu verbessern. Dies wurde als wesentliche Bedingung erachtet, um die vielfach bestehende Abhängigkeit vom Öl als wichtigster Energiequelle im Interesse der Dritten Welt ebenso wie der Weltwirtschaft in ihrer Gesamtheit zu verringern. Während des zehnjährigen Zeitraums von 1980 bis 1990 hat die Generaldirektion Energie diesem Programm etwa 45 Mio ECU zugewiesen. Der vorliegende Artikel gibt einen Überblick über die Tätigkeiten in den Jahren 1989 und 1990.

Einleitung

Das 1980 eingeleitete Programm dient drei Zwecken: in erster Linie der Verbesserung der langfristigen Weltenergielage und damit der Versorgungssicherheit der Gemeinschaft durch Unterstützung anderer größerer Energieverbrauchsländer und -regionen bei einer sachgerechten politischen Entscheidungsfindung. Zweitens will man den Entwicklungsländern durch Förderung des Zugangs zu einer Energieversorgung zu mäßigen Preisen und mit den geringstmöglichen Kosten für die Umwelt bei ihrer sozialen und wirtschaftlichen Entwicklung helfen. Drittens schließlich soll die Präsenz der EG im technologischen und industriellen Bereich in diesen Ländern durch Anreize zur Zusammenarbeit mit Unternehmen und Fachorganisationen der Gemeinschaft bei gleichzeitigem vermehrten Austausch und Transfer von Technologie verstärkt werden.

Abgesehen von den neuen Herausforderungen im Energiebereich, denen sich das Programm zugewandt hat, wurde vor kurzem eine neue Gruppe von Teilnehmern einbezogen, und zwar die osteuropäischen Länder.

Sie stehen vor der ungeheuren Aufgabe, ihre Energiesektoren als Teil ihrer Integration in die Weltwirtschaft neu zu strukturieren. Für die Europäische Gemeinschaft ist es von großem politischem, wirtschaftlichem und ökologischem Interesse, zum Erfolg dieser Bestrebungen beizutragen.

Das Internationale Programm für die Zusammenarbeit im Energiebereich erstreckt sich gegenwärtig auf zwei voneinander getrennte Aktionsbereiche, die sich jedoch gegenseitig stützen:

1. Unterstützung von Forschung, Planung und Politik im Energiesektor, wofür Mittel in Höhe von etwa 4,4 Mio ECU für 1989 und 4,9 Mio ECU für 1990 vorgesehen wurden, und

2. Unterstützung von Pilotmaßnahmen zur Förderung des Technologietransfers und der industriellen Zusammenarbeit auf dem Energiesektor, für die 0,8 Mio ECU für 1989 und 1,3 Mio ECU für 1990 angesetzt wurden.

Die Tätigkeiten des Programms erstrecken sich u. a. auf:

- Studien zum Thema Energiepolitik und -management,
- technische Unterstützung bei der Umsetzung energiepolitischer Ziele der Regierungen,
- Seminare über wichtige Energiethemen,
- Ausbildungsprogramme für lokale Energieplanungsstellen, Manager und Studenten,
- das Kooperationsprogramm Energie und Entwicklung (COPED), ein internationales Nord-Süd-Netz von Energieforschungsinstituten und
- wechselseitige Besuche von Sachverständigen.

Von den angeschlossenen Ländern und regionalen Organisationen wird erwartet, daß sie sich nach Möglichkeit an der Finanzierung von Einzelvorhaben beteiligen. Mit Beginn des zweiten Jahrzehnts seines Bestehens in den Jahren 1989 und 1990 hat sich das Kooperationsprogramm in institutioneller Hinsicht konsolidiert. Mit Indien und dem ASEAN wurden Zentren für die Energiezusammenarbeit errichtet und mit Mexiko und Brasilien bilaterale Protokolle über Zusammenarbeit unterzeichnet. Darüber hinaus wurde das Netz der COPED-Institutionen durch die Aufnahme eines dreijährigen gemeinsamen Forschungsvorhabens über Elektrizitätssysteme in der Dritten Welt weiter gefestigt. Schließlich hat das Programm einen spezifischen Aktionsplan für die Zusammenarbeit mit Osteuropa eingeleitet. Beginnend mit Osteuropa sollen diese wichtigen Initiativen im folgenden Abschnitt kurz behandelt werden. Zum Abschluß wird eine Analyse der Ausgaben des Programms für 1989/90 nach Empfängern und Tätigkeiten gegeben.

Länder und internationale/regionale Organisationen, die 1989/90 am Internationalen Programm für die Zusammenarbeit im Energiebereich beteiligt waren

Regionen	
Lateinamerika	**Mittelmeerraum**
Argentinien	Jordanien
Brasilien	Algerien
Chile	Tunesien
Mexiko	Ägypten
Peru	Marokko
Asien	**Mittel- und Osteuropa**
China	Tschechoslowakei
Indien	Polen
Thailand	Ungarn
	Jugoslawien
Internationale/regionale Zusammenschlüsse	
OLADE (Energieorganisation Lateinamerikas)	ASEAN (Vereinigung der südostasiatischen Nationen)

Neuerungen im Zeitraum 1989—1990

Zusammenarbeit mit Osteuropa

Nach direkten Kontakten mit den Energiebehörden in Polen, Ungarn, der Tschechoslowakei und Jugoslawien (1) befaßt sich die Generaldirektion Energie seit kurzem mit einem bilateralen Kooperationsplan für Osteuropa. Für 1990 wurden 14 geeignete Kooperationsvorhaben mit Gesamtmitteln in Höhe von ca. 1,5 Mio ECU ermittelt, die es der EG ermöglichen, bei der Umstrukturierung der Wirtschaft dieser Länder eine aktive Rolle zu übernehmen.

Da die Kommission bei diesen Vorhaben mit osteuropäischen Energiebehörden zusammenarbeiten wird, hat sie die Gelegenheit, diejenigen Investitionen zur Verbesserung der Energieversorgung dieser Länder aufzuzeigen, die als Teil der Umstrukturierung ihrer Wirtschaft erforderlich sind. Es wurde festgestellt, daß folgende Bereiche besondere Beachtung erfordern:

- Förderung der Energieeinsparung,
- Studien und Beratung zwecks Umstrukturierung der wichtigsten Energiesektoren,
- Einführung einer Energieplanung nach marktwirtschaftlichen Grundsätzen (Preise, Versorgung, Nachfrage),
- Maßnahmen zur Förderung gemeinsamer Unternehmen und der Drittfinanzierung,
- Unterstützung institutioneller Entwicklungen, z. B. Errichtung eines EG—Ungarn-Energiemanagement-Zentrums.

(1) Koordiniert mit dem Wirtschaftsreformprogramm der Kommission für Polen und Ungarn (PHARE).

Energiemanagement-Zentren in Djakarta und Neu-Delhi

Durch die von der EG unterstützten Energiezentren in Djakarta und Neu-Delhi wurden die Vorkehrungen für Energieplanung und -management in den ASEAN-Ländern und Indien 1989/90 weiter ausgebaut. Diese Zentren dienen als Sammelpunkt für die Zusammenarbeit mit der Gemeinschaft und als Koordinierungsstellen und Initiatoren von Tätigkeiten im nationalen und regionalen Energiebereich.

Das ASEAN—EG-Zentrum für Energiemanagement, -ausbildung und -forschung (AEEMTRC) hat seine Ausbildungs- und Forschungstätigkeiten auf dem Gebiet des Energiemanagements weiter ausgebaut. Darüber hinaus hat es zwei größere gemeinsame Vorhaben mit Institutionen außerhalb des ASEAN eingeleitet. Das erste, das Ditech-Projekt, gilt der Verbreitung von Technologie zur Energieeinsparung und wird in Zusammenarbeit mit dem „Asian Institute of Technology" in Bangkok abgewickelt. Beim zweiten handelt es sich um eine geplante Durchführbarkeitsstudie für eine Erdgas-Pipeline, die durch alle ASEAN-Länder führen soll und an der ein Konsortium europäischer Gesellschaften beteiligt wäre; die Koordinierung und Aufsicht wird beim Zentrum liegen. Außerdem wurden in Malaysia bzw. auf den Philippinen zwei Ausbildungslehrgänge über Energie und Umwelt und städtische Energieplanung veranstaltet.

Das 1989 errichtete EG—Indien-Energiemanagement-Zentrum ist in seiner Organisation dem AEEMTRC ähnlich.

1989/90 wurden im Zentrum mehrere Ausbildungsmaßnahmen abgewickelt, Studien ausgearbeitet und Energiebilanzen aufgestellt. Das Zentrum führte das EG—Indien-Energiebus-Programm durch und leitete eine umfassende nationale Aufklärungskampagne zum Thema Energieeinsparung ein. Neben seinen laufenden Aufgaben wurde das EG—Indien-Energiemanagement-Zentrum vom indischen Energieministerium mit einer Reihe von Aufträgen betraut; nach Ansicht des Ministeriums kommt dem Zentrum eine Schlüsselposition als nationale Institution zur Koordinierung und Förderung von Energiesparmaßnahmen zu.

Vereinbarungen über Zusammenarbeit mit Mexiko und Brasilien

Mit Mexiko und Brasilien, zwei wichtigen Teilnehmern des Kooperationsprogramms, wurden im Wege bilateraler Protokolle über Zusammenarbeit gemeinsame Tätigkeiten im Energiebereich weiter ausgebaut.

1989 wurde ein zweites Dreijahresprogramm über die Zusammenarbeit zwischen der EG und dem mexikanischen Ministerium für Energie, Bergbau und bundesstaatliche Industrien aufgelegt. Das Programm, das mit dem staatlichen Energiesparprogramm Mexikos abgestimmt wurde, stellt Vorhaben in den für den mexikanischen Energiesektor wichtigen Bereichen auf (siehe *Energie in Europa,* Nr. 17).

1990 wurde anläßlich der Teilnahme von Kommissionsmitglied Cardoso e Cunha an der Ministertagung der OLADE zwischen der EG und Brasilien ein Protokoll über Energiezusammenarbeit unterzeichnet, das hierfür die Prioritäten im Zeitraum 1990—1994 aufstellt. Im Zeitraum 1989—1990 wurde die Ausarbeitung eines Energieplans für den Staat Bahia sowie eine Studie über Schlüsselsektoren des Energieverbrauchs unterstützt.

Neuorientierung des COPED auf ein gemeinsames Vorhaben

Das Kooperationsprogramm Energie und Entwicklung (COPED) wurde 1981 ins Leben gerufen und umfaßt heute zehn Energieforschungsinstitute in Europa und den Entwicklungsländern (2). COPED soll über jährliche Plenartagungen (1989 in Mexiko und 1990 in Grenoble), Arbeitsgruppen und informelle Kontakte gemeinsame Tätigkeiten der ihm angeschlossenen Institute fördern.

Anfang 1989 schlug COPED eine neue Richtung ein. Mit der ständigen Unterstützung durch die Generaldirektion Energie nahm es die Untersuchung eines Themas auf, das alle Institute und Zentren gleichermaßen angeht — wichtige Probleme und mögliche künftige Wege der Elektrizitätssysteme der Entwicklungsländer. In der Zeit von 1989—1990 wurde ein erster Abschnitt ausgearbeitet: „Die Schlüsselprobleme der Elektrizitätssysteme von Entwicklungsländern: Ausblick auf das 21. Jahrhundert". Jedes Institut hat gemäß seinem geographischen Standort einen regionalen Überblick und eine eingehende Analyse für einige größere Länder beigesteuert. Die Beiträge sind zusammengefaßt worden und stellen nunmehr eine einzigartige, umfassende Analyse dieses wichtigen Themas aus der Sicht einer in Entwicklung begriffenen Welt dar (3). 1990 wurde der zweite Teil des Basisprojekts in Angriff genommen: „Leistung der Elektrizitätssysteme in Entwicklungsländern".

Technologietransfer

In der Erkenntnis, daß den Entwicklungsländern aus der Anwendung europäischer Energietechnologie auf ihre eigenen Verhältnisse beträchtliche Vorteile erwachsen, hat die EG 1989

(2) Es gibt COPED-Institute in Kuwait, Thailand, Brasilien, Senegal, Argentinien, Mexiko, China, dem Vereinigten Königreich und Indien.

(3) Die Veröffentlichung „The key issues facing the electricity systems of developing countries", herausgegeben von Prof. A. de Oliveira, COPPE, Brasilien, erscheint binnen kurzem (EUR 13461).

ein Programm zur Unterstützung des Transfers von Energietechnologie in Drittländer aufgestellt.

Nach dem Konzept des Programms werden in einem ersten Schritt Seminare abgehalten, auf denen Unternehmen aus der Gemeinschaft mit entsprechenden Partnern der anderen Seite zusammentreffen und die in der Gemeinschaft, vor allem im Rahmen des Demonstrationsprogramms, entwickelten Technologien vorstellen können. Ein Seminar über Technologie für regenerative Energien wurde 1990 in Marokko abgehalten; weitere fanden in Brasilien (Biomasse, Kleinwasserkraft, Solarenergie), in Mexiko und auf Zypern statt. Parallel dazu wurden in einer umfassenden, derzeit laufenden Untersuchung die für einen Technologietransfer in Frage kommenden Bereiche ermittelt und Empfehlungen für ein Mehrjahresprogramm ausgesprochen.

Aufgrund einer Aufforderung zur Einreichung von Vorschlägen im Jahre 1990 wurden 20 europäische Unternehmen ausgewählt, deren Vorhaben für Technologietransfer in Drittländer finanziell unterstützt werden sollen. Die Projekte mit Standort in Lateinamerika, Asien, Mittel- und Osteuropa und im Mittelmeerraum betreffen erneuerbare Energien, Energieeinsparung, Elektrizitätserzeugung und -management sowie Drittfinanzierung. Auf diese Weise konnte die Kommission die Rolle eines „Katalysators" übernehmen, der die Herstellung engerer Bindungen zwischen Unternehmen des technischen und finanziellen Bereichs ermöglicht.

Analyse der Ausgaben des Programms für 1989—1990

Zusammenarbeit bei Energieplanung und -politik

Aufschlüsselung nach Haupttätigkeiten

Während der ersten Jahre des Programms, bis 1985, wurden die meisten Mittel für Studien aufgewandt, insbesondere Untersu-

Tabelle 1

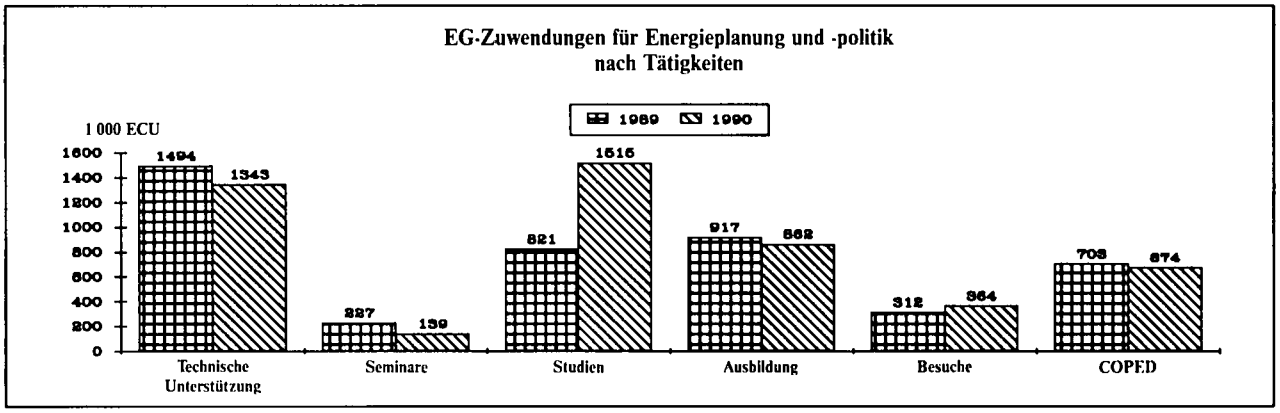
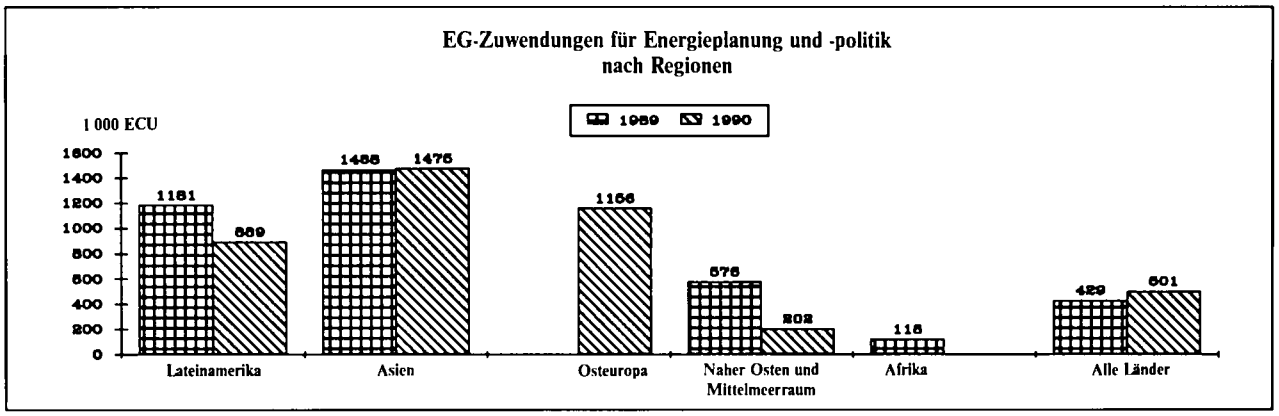


Tabelle 2



chungen über die Entwicklung einer Methode für die Energieplanung von Entwicklungsländern. Die Mittelzuweisungen späterer Jahre konzentrierten sich auf die Anwendung von Methoden in umfassenden Planungsprojekten und auf energiepolitisch relevante Fallstudien. Mit anderen Worten, bei der Mittelzuteilung ist ein Wechsel von grundlegender methodologischer Forschung zu mehr praxisorientierten Studien in Zusammenarbeit mit nationalen und regionalen Energiebehörden erfolgt.

1989 entfiel auf die technische Unterstützung von Regierungseinrichtungen der größte Einzelanteil (33 % bzw. 1,5 Mio ECU) der Zuwendungen für Energieplanung und -politik. Die Anteile für Studien und Ausbildung betrugen 821 000 bzw. 917 000 ECU. 1990 sind die Mittel für Studien, zum größten Teil in Osteuropa, nahezu verdoppelt worden, von 821 000 auf 1 515 000 ECU (31 % der Gesamtausgaben für 1990), und sind damit zum wichtigsten Tätigkeitsbereich dieses Jahres geworden. Die Anteile aller anderen Vorhaben, mit Ausnahme von Besuchen, sind von 1989 bis 1990 sämtlich etwas zurückgegangen. Das COPED-Netz hat in beiden Jahren etwa 700 000 ECU erhalten.

Tabelle 1 gibt eine Gliederung der Tätigkeiten.

Geographische Aufschlüsselung

1989 hat Asien mit einem Anteil von 33 % des Gesamtbudgets den größten Teil der Mittelzuweisungen aus dem Programm erhalten. Danach kamen als Hauptempfänger Lateinamerika (26 % des Budgets) und der Nahe Osten/Mittelmeerraum (13 %).

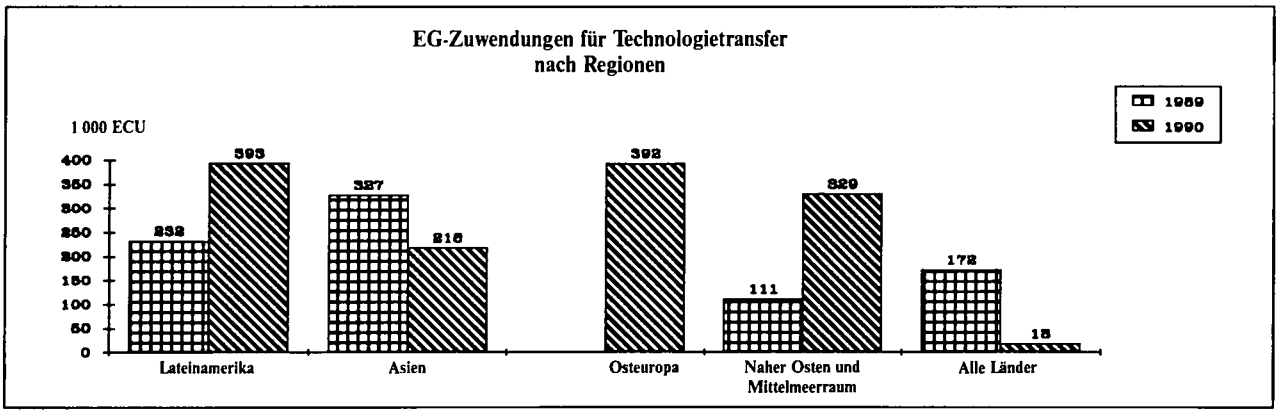
Tabelle 2 gibt eine Gliederung nach Regionen.

Technologietransfer

Das Programm für Technologietransfer wurde 1989 mit der Unterstützung von Vorhaben in Mexiko und Brasilien und eines laufenden Vorhabens über die Entwicklung und Verbreitung von Technologie im Bereich der Energieeffizienz in der Industrie (Ditech) aufgenommen. 1990 kam es zu einer beträchtlichen Ausweitung und Diversifizierung dieses Programms, in dessen Rahmen etwa 20 Vorhaben in 16 Ländern gefördert wurden.

In der nachstehenden Tabelle 3 werden die Mittelzuweisungen nach Regionen aufgeschlüsselt.

Tabelle 3



Schlußfolgerung

Die Energiekrisen der siebziger Jahre haben ursprünglich die Voraussetzungen für das Internationale Kooperationsprogramm geschaffen, das 1980 ins Leben gerufen wurde. Seither hat es sich entsprechend den auftretenden neuen Herausforderungen und den geänderten Verhältnissen in dem Maße weiterentwickelt, wie finanzielle und Umweltfaktoren die Notwendigkeit einer rationellen Energienutzung und von Energieinvestitionen erneut in den Vordergrund gerückt haben. Energieplanung, Energiepolitik und Technologietransfer sind nach wie vor von überragender Bedeutung für die wirtschaftlichen Aussichten der Entwicklungsländer ebenso wie der Länder in Osteuropa und damit für die Europäische Gemeinschaft und die Weltwirtschaft in ihrer Gesamtheit.

1989 und 1990 wurden verschiedene wichtige Neuerungen in das Programm eingeführt: Osteuropäische Länder wurden zu wichtigen Teilnehmern, ein spezifisches Programm für den Technologietransfer wurde aufgestellt, Energiemanagement-Zentren wurden in Neu-Delhi und Djakarta errichtet, spezifische Protokolle über Zusammenarbeit in Energiefragen mit

Brasilien und Mexiko abgeschlossen, und die Forschungstätigkeiten der COPED erfuhren eine Neuorientierung in Richtung eines gemeinsamen Basisprojekts. Nachdem das Programm im ersten Jahrzehnt seines Bestehens seine Nützlichkeit erwiesen hat, ist es nun in das fortgeschrittenere Stadium der institutionellen Konsolidierung eingetreten, in die Osteuropa einbezogen wurde, wo die Vorbereitungen zur Errichtung eines EG—Ungarn-Energiemanagement-Zentrums gute Fortschritte machen.

Das Internationale Programm für die Zusammenarbeit im Energiebereich hat bisher einen wertvollen Beitrag zum Prozeß der Entscheidungsfindung in energiepolitischen Fragen in einer Reihe von Entwicklungsländern geleistet, dem größere Bedeutung zukommt als es seinen relativ begrenzten Mitteln entspricht. Für die kommenden Jahre wird es gut vorbereitet sein, um weiterhin seine Unterstützung in Fragen des Energiemanagements zu leisten, die auch in Zukunft zu den wichtigsten Punkten auf der politischen Tagesordnung der Länder, der Regionen, ja der gesamten Welt zählen dürften.

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
I or —	discontinuity in series
of which	the words 'of which' indicate the presence of all the subdivisions of the total
among which	the words 'among which' indicate the presence of certain subdivisions only

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