



COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMUNICATION FROM THE COMMISSION

**Energy Efficiency in the European  
Community –Towards a Strategy for the  
Rational use of Energy**

## 1. The need for renewed efforts to promote Energy Efficiency

There is an urgent need to reinvigorate commitment both at Community and Member State level to promote energy efficiency more actively, especially, but not only, in the light of the Kyoto agreement to reduce CO<sub>2</sub> emissions. Improved energy efficiency will lead to a more sustainable energy policy and enhanced security of supply, as well as to many other benefits. It is important to underline, however, that it will play a key role in helping the Community to meet its challenging Kyoto target economically.

The underlying assumption behind this Communication is that, whilst energy intensity has decreased slowly but surely over recent years, it is essential to take the necessary steps to ensure that energy efficiency is substantially improved, and reflected in a significantly reduced level of energy intensity. The role of Member States and of regional and local authorities will be crucial in this context as much of the action on energy efficiency takes place at national level.

The Commission's objectives in presenting this Communication at this point in time, can be summarised as follows:

- To underline the economic potential for energy efficiency which exists.
- To present both the successes and failures of the policies followed so far, and draw the necessary conclusions.
- To highlight the need for more action at Member State and regional level in parallel with action at Community level.
- To refocus attention on promoting energy efficiency and stimulate discussion towards a more detailed Action Plan.
- To prepare the ground in this specific field for common and coordinated policies and actions which will need to be undertaken in the light of the Kyoto Agreement.

Saving energy has been a stated policy objective of the Community and its Member States since the first oil crisis in 1973, when energy security became of paramount concern and saving energy was an important element of the strategy to reduce oil imports, particularly in a context of high energy prices. However, as these pressures disappeared, so has much of the effort to improve energy efficiency.

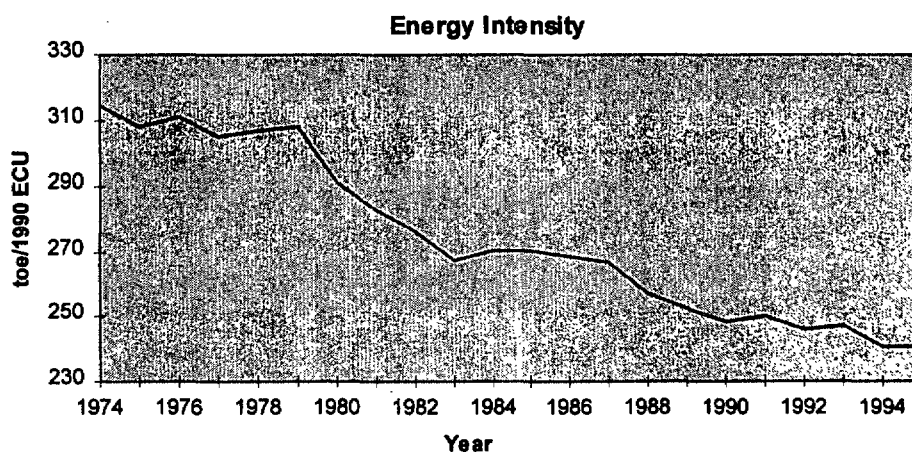
A more long-term view of energy demand reduction led in time to the realisation that it was possible to "delink" economic growth and energy consumption, allowing GDP to increase without commensurate increases in energy consumption. Market barriers and falling prices, however, have limited the scope and extent to which delinking has occurred, especially regarding the final or end-use of energy. It is worth noting the development of energy intensity in the Union between 1974 and 1995<sup>1</sup>, shown in Diagram A.

In spite of the existence of Community and Member State energy end-use efficiency programmes designed to remove them, many of the barriers to the rational use of

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<sup>1</sup> Energy in Europe "1997 -Annual Energy Review", European Commission , September 1997, p. 66. And Eurostat(Gross Inland Consumption/GDP.)

energy from the 1970s persist today. Analysis of the current situation indicates that strengthened efforts, including better common and co-ordinated policies and measures at Community and Member State level, are needed to increase energy efficiency, notably in the use of electricity, the generation of which accounts for some 30% of the Community's CO<sub>2</sub> emissions.



**Diagram A. Development of Primary Energy Intensity 1974 - 1995 (toe/1990 MECU)**

In this document the Commission:

- (i) outlines the potential for energy efficiency improvements from now until the year 2010;
- (ii) analyses the nature and types of barriers to the exploitation of this potential;
- (iii) reviews programmes and measures and their relevance to barriers and potentials;
- (iv) examines the economic rationale for programmes to remove barriers to energy efficiency, and
- (v) proposes elements for a strategy and priorities to exploit available potential which reflects Community and Member State roles and capabilities .

This Communication is only the first step towards a strategy for the rational use of energy. It indicates a policy commitment towards energy efficiency and focuses on what is realistically and economically feasible in the short and medium term. Following input from the other institutions, Member States and other interested parties, a more specific Action Plan for Energy Efficiency will be developed and more concrete actions and ways to implement them will be proposed.

The manner in which energy efficiency, together with other sectoral measures will contribute to the Kyoto commitments will be further developed in a forthcoming Commission Communication on a comprehensive post-Kyoto strategy for CO<sub>2</sub> emission reduction.

## **2. Realising the Available Energy Efficiency Potential**

Community and Member State activity improving energy efficiency and energy intensity can be justified economically if significant potential individual and societal

benefits remain unrealised by the operation of market forces. This is today the case, since due to market failure resulting from market barriers, many cost-effective investments in energy efficient technology and methods are not undertaken.

If no action is taken to promote energy efficiency only the *market potential* for energy saving can be expected to be achieved in practice, which is what can be realised by individuals and firms in the face of imperfect knowledge and other market barriers and without market intervention. However, what is very important to achieve, especially in the light of the Kyoto commitment is the full *economic potential*. Further action, beyond what is suggested in this Communication, can lead to the realisation of the *societal potential* and the *technical potential*. This Communication specifically focuses on action necessary to promote the economic potential for improving energy efficiency, as a first and necessary no-regrets step for reaping economic benefits, ensuring continued security of energy supply and meeting Community targets for the reduction of CO2 emissions.

Estimates are that the available economic potential between 1998 and the year 2010, for all sectors combined, is approximately 18 % of final annual energy consumption 1995, as shown in Table 1<sup>2</sup>.

**Table 1. Available Economic Potential in the European Union 1998 -2010**

<i>Sector</i>	<i>Final Energy Consumption, 1995 (Mtoe)</i>	<i>Available Potential to 2010, Per cent of 1995 Consumption</i>
Industry	268	17%
Transport	270	14%
Domestic and Tertiary	358	22%
<b>Total</b>	<b>896</b>	<b>18%</b>

### **3. Why the Potential Is Not Being Realised: Imperfections, Barriers and Shortcomings**

Despite the environmental, economic and energy policy advantages that energy efficiency offers, we are not realising sufficiently the cost-effective potential. Neither the Community nor the Member States efforts undertaken have so far managed to overcome the existing barriers to investments in energy efficiency. An effective strategy for the future must successfully tackle the main obstacles outlined below.

Energy efficiency will only fully penetrate the market if energy prices accurately reflect energy costs. Internalisation of externalities through taxation and fees is an effective way to increase investments in energy efficiency as outlined in the Community's Fifth Environmental Action Plan, "Towards Sustainability". It is important to realise that at the same time as efforts are being made to increase energy

<sup>2</sup> MURE model estimation, based on current energy prices. European Commission March 1998. The calculation for the transport sector is based entirely on fuel efficiency improvements. If other effects, including modal shifts, are included, the potential for the transport sector is estimated to be around 25% by the year 2010.

efficiency, the energy sector is undergoing significant changes, due in part to EU initiatives. These changes will affect the perception and role of energy efficiency. The completion of the internal market for energy, for example, with liberalisation and restructuring of both the electricity and gas sectors, will most certainly have an impact on energy efficiency. On the one hand, competitive pressure will improve the efficiency in energy production. Market forces will be released, economies of scale will be discovered and developed, tariff structures will change and new stakeholders will emerge to assume new roles. On the other hand, the liberalisation of the energy markets will inevitably mean lower energy prices. However, at the same time, increased competition as a result of the internal energy market is likely to lead to a tariff structure for the electricity industry which will better reflect true production costs without hidden cross-subsidies. It is clear that in a period of generally falling energy prices, specific measures to promote energy efficiency are more critical than ever.

After price signals, **lack of or incomplete information** is usually the first barrier to energy efficiency which one encounters. It is also the most ubiquitous. Imperfect knowledge of the product and lack of foresight on price development on the part of consumers, manufacturers and other stakeholders hampers the introduction of efficiency measures. Consumers receive inadequate or incomplete information from the service sector on running costs. Purchases are then often based on lowest initial cost or other criteria.

Information on system applications of energy technology is also often unavailable or inaccessible. As a result, equipment is often over-sized or incorrectly installed. There is also often a lack of technical skills and training in the energy maintenance and service sector. Because of expectations of relatively low and stable end-use energy prices, information on efficiency has also become less important in the planning and purchase of automobiles, appliances and other equipment.

Poor feedback of information to energy consumers also acts as a disincentive. This is particularly true for consumers who see no immediate or appreciable change in energy costs after having chosen energy-efficient alternatives. At a different level, lack of harmonised and comparable evaluation methods for analysing the results of energy efficiency initiatives can also be a barrier.

There are numerous **institutional and legal barriers** to greater energy efficiency. One example is found in the energy supply industry, where the institutionalised energy planning mind set has proven difficult to change. This tends to associate greater credibility with highly centralised power production than with more decentralised demand-side measures to meet increases in demand. Yet, least-cost analyses have shown that investments in demand-side energy efficiency are often more cost-effective than production-side investments.

One of the most difficult institutional barriers to overcome today is the continued practice of selling energy in the form of kWh instead of as energy services such as heating and cooling, lighting and power. Services are invariably what the energy consumer actually wants, not energy for its own sake. This is one of the arguments in

favour of the development of energy service companies and the use of integrated resource planning.

Other institutional barriers include things such as the practice among builders and landlords in some Member States to choose and install appliances with low initial costs but high running costs for energy, costs which are usually incurred by the home-buyer or tenant. The landlord-tenant problem of "split-incentives" is a classic example of this type of institutional barriers.

Lack of political commitment can also be said to constitute an institutional barrier. As energy efficiency occurs in small increments, there is never a grandiose ceremony associated with it as is the case when a new power station or highway is opened. Politically motivated incentive structures in the form of taxes and subsidies are also often based on short-term or fiscal goals.

There are also many different types of **technical barriers** to energy efficiency. Countless energy-efficient technologies have been held back from the market due to inadequate support in the form of technicians, consultants, trained repairmen etc., leading to lack of confidence on the part of the consumer, either regarding product reliability or maintenance of the equipment.

Barriers also arise because many manufacturers of equipment and appliances and builders are not specifically in the "efficiency" business and thus have different priorities in designing and selling their refrigerators, pumps, buildings etc. Low energy prices have contributed to this.

Reaching sufficient production volume for economies of scale to make the cost of a new product competitive is another common technical barrier.

The lack of standardised components, spare parts and fixtures for energy-efficient solutions is a barrier which the lighting, building and other industries have experienced. Community standardisation measures and programmes are helping to alleviate this problem, with the single market in mind.

**Financial barriers** such as lack of up-front capital are major barriers to cost-effective investment in energy efficiency. Self-financing capacities and loan facilities have traditionally been far better for energy producers than for energy consumers. Banks e.g., do not include reduced energy costs resulting from extra investment in energy efficiency in the calculations upon which they base the size of their loans.

The above list of barriers is not exhaustive. Its purpose is rather to illustrate the main categories of barriers to energy efficiency in order to address the question of how to remove them.

#### **4. Existing Measures for Energy Efficiency**

Future measures have to build on existing initiatives, overcoming weakness and pursuing successful experiences. It is important to underline that initiatives, with

varying degrees of effectiveness, have been undertaken at Community level since the late 1970's. However, by the late 1980s, the Commission concluded that the different energy efficiency instruments passed by Council in the 1970s and early 1980s had not fulfilled expectations. More effort was then required from the Member States. In 1986, the Council adopted a Resolution concerning new Community energy objectives, which inter alia, called for a 20% improvement in energy intensity of final demand by the year 1995<sup>3</sup>. A 1987 Communication entitled "Towards a continuing policy for energy efficiency in the European Community" (COM(87)233 final) proposed 14 energy efficiency measures to Member States to help achieve the 1995 target. In the 1990 SAVE proposal which followed, it was recognised that this Communication had had no appreciable effect, and it was necessary for the Commission to act at Community level.

The Commission's proposal of 13 November 1990 (COM(90)365final) for a Council Decision concerning the promotion of energy efficiency in the Community stated that "Community action in this field is revived in the light of changes in economic trends for energy and the need for greater environmental protection. In the energy policies pursued by most Member States, energy efficiency generally has become a lesser priority." The 1990 proposal stated further that the "majority of Member States have reduced or even completely abolished their programmes which directly support energy efficiency-linked investments." This conclusion led, among other things, to the approval in 1991 of the multi-annual SAVE Programme for energy efficiency.

In spite of SAVE, for the Community as a whole, the overall rate of decrease in energy intensity was not significant. By 1995, the improvement was only 12 %, far short of the target of 20 %. Even more alarming was the fact that the pace of improvement had slowed down to only -0.6 % per year between 1990 and 1995, compared to -2.0 % per year between 1985 and 1990<sup>4</sup>.

An important factor underlying the slow penetration of energy efficiency measures continues to be the relatively low priority attributed to energy saving by Member States, despite the Community efforts in this direction as described below.

There has been recognition at Community level, that **technological programmes** can play an important role in providing the basis for energy efficient technologies. In the JOULE-THERMIE programme launched in 1995 as a specific programme of the Fourth Framework Programme for RTD, 280 MECU were devoted to energy efficiency, representing 27% of the total budget and contributing to substantial achievements, especially in the reduction of energy intensity in buildings, transport and the process industries. A recent evaluation of THERMIE indicates that this Community programme is very well known amongst stakeholders on Community

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<sup>3</sup> Council Resolution of 16 September 1986 concerning New Community Energy Policy Objectives for 1995 and Convergence of the Policies of the Member States. OJC 241 of 25 September 1986.

<sup>4</sup> Eurostat 1997. Energy intensity for final energy consumption is only an indicator for energy efficiency, because it also includes economic restructuring, changes in fuel mix, etc.

energy markets and that it has impacted on market shares for energy-efficiency technology.<sup>5</sup>

However, the principal focus of the Community's action has been the **SAVE Programme**. After evaluation of the results of SAVE I, the SAVE II programme was adopted in December 1996 with an indicative budget of 45 MECU for five years. Its aim is "improving energy intensity of final consumption by a further one percentage point per annum over that which would have been otherwise attained. Compared with the original SAVE Programme, SAVE II was enlarged by the addition of the regional and urban energy efficiency programme and an electricity end-use programme.<sup>6</sup> and in March 1998, the Commission adopted its decision opening up the SAVE programme to Bulgaria, Lithuania, Poland, Romania, Slovakia and the Czech Republic.

One of the major elements of the Commission's non-technological efforts relates to the development and adoption of **legislation** having a Community-wide scope. The legislative programme largely relates to traded goods and, as such, is essential in completing the internal market. Evaluations of the effects in Member States of the Community labelling programme indicate that the programme has had a positive impact both on the share of energy-efficient models in EU manufactures' assortment of products and the market share of sales of efficient models. An extrapolation of the present trend of improvement in the energy intensity of cold appliances as a result of labelling, for example, indicates a reduced average intensity of 15% for the entire EU cold appliance market by the year 2010. That this improvement is in large measure a result of labelling is supported by the fact that there was no significant rate of change before labelling was introduced.

An important element of SAVE has been its focus on helping to build the necessary capacity and infrastructure for energy efficiency and to improve policy analysis. SAVE provides support for pilot actions and information dissemination activities in the areas of appliances, buildings, CHP, DSM, education & training, industry and transport. Over 350 pilot actions and studies have been carried out for this purpose, and the assessment of their effectiveness has indicated the areas of priority action where there is Community added-value. Programme evaluations show clearly that the SAVE programme has played a significant role in capacity-building in the energy sector but we have still not reached the stage where this has produced sufficient results in practice. A separate component of the SAVE Programme which supports the creation of energy agencies at regional, local and island level has proved to be significant. To date 140 such SAVE agencies have been set up throughout the Community, and their impact is starting to be felt at a local level. One of their roles which needs to be strengthened is the exchange of experience and best practices.

A further important element of Community action has been **support for investments** in less developed regions. The European Regional Development Fund (ERDF) and the Cohesion Fund have the possibility to contribute to increased energy efficiency. This

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<sup>5</sup> Horizontal Evaluation of DGXVII Energy Programmes, Report to the Commission, December 1996.

<sup>6</sup> Council Decision 96/737/EC of 16.12.97 concerning a multiannual programme for the promotion of energy efficiency in the Community - SAVE II.



is possible in both Objective 1 and Objective 2 areas, where national as well as regional energy programmes usually include specific measures to improve energy efficiency. However, a greater interest needs to be shown by Member States in these possibilities.

Evaluations of the programmes indicate that the programmes dealing with energy efficiency have had an impact on reducing energy intensity but have not been in themselves sufficient to bring about changes on a scale necessary. THERMIE is judged to have contributed significantly to meeting the Community goal of increased industrial competitiveness, especially among SMEs. The SAVE Programme has had measurable effect on capacity-building for energy efficiency and in CHP through replication of focused pilot projects. Through its legislative programme, SAVE has been judged to have made an important contribution to the improvement of energy efficiency. Estimates of the CO<sub>2</sub> abatement effects of different actions in SAVE and THERMIE support the claim that the programmes are producing tangible results.<sup>7</sup>

The main conclusions drawn point to the need to better focus and coordinate Community and Member State measures, to improve and strengthen existing measures, to facilitate exchanges of experience and best practice, and to select priority areas of action, in order to bring about the increased rate of improvement in energy intensity which individual and societal benefits and costs fully justify.

It should also be noted that efforts to improve energy efficiency outside the Union are important in the context of **international cooperation**, especially in the light of the global reduction of CO<sub>2</sub> emissions. The PHARE and TACIS programmes, intended to support reform and restructuring in the CEEC and CIS countries, respectively have promoted energy efficiency. INCO-Copernicus, an element of the Fourth Framework Programme intended for non-member countries, promotes both the efficient use of energy in buildings, industry and transport, as well as the clean and efficient production of energy from fossil fuels, through joint research and demonstration projects. INCO-DC has provided support to JOULE-THERMIE's accompanying measures in developing countries, aiming at promoting the use of clean and efficient energy in these countries. SYNERGY also supports energy efficiency projects in non-member countries. However, the economic energy efficiency potential in countries outside the Union is also far from being realised, and needs to be further encouraged.

## **5. Towards a Strategy for the Rational Use of Energy**

The fact the Union is not realising the full cost-effective potential for energy efficiency improvements, raises the question of why this is not happening. There are two important points to consider. First, it is clear that the market is still not functioning properly because there are market failures and barriers which hinder expected investments and actions. Secondly, the policies and programmes that the Community and its Member States have put in place have fallen short either because they were not sufficient, not fully effective or not adequately co-ordinated, or a combination of these. If we are to achieve, as a minimum, the economic potential for

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<sup>7</sup> Horizontal Evaluation of DGXVII Energy Programmes, Report to the Commission, December 1996.

energy efficiency, a renewed Community-wide commitment at Community, national, regional and local level is essential in order to implement the appropriate policies and measures as part of a wider strategy.

We need to build on the foundations for a comprehensive Community energy efficiency strategy which are already in place. A number of Community initiatives are already running, one of which is the SAVE Programme and the activities arising from it. Member States have programmes in place, as shown in Annex 2 which have had a greater or lesser degree of success. Numerous evaluations of energy efficiency programmes have been carried out in Member States, which show clear cost-effective increases in the market shares for energy-efficient lighting, appliances, heat-pumps and other energy-consuming equipment, often after only a few years of programme activity. Extrapolated over the life of the investments undertaken as a result of the programme, these activities impact on the energy intensity of individual end-use sectors by factors of up to 65%. The proposals made in this Communication build on documented successful experiences, and aim to ensure that they are more widely taken up.

A number of coordinated measures need to be taken. Progress will need to be closely monitored. One of the shortcomings of the current energy efficiency programmes is the insufficient monitoring and evaluation of results. Monitoring will become even more important in the future as it will be necessary to track the progress in meeting the Kyoto commitments. The Commission will continue to strengthen its activities in this area.

An energy efficiency strategy cannot be successfully implemented without the co-operation and support of a wide variety of actors throughout the Community. Increased co-operation with Member States must be sought as well as with the energy service industry, manufacturers, distributors, installers, industry associations, branch organisations, utilities, consumer organisations and NGOs.

Member States must be encouraged to promote awareness on energy efficiency. Particular importance should be given to increasing consumer awareness of the many cost-effective energy efficiency opportunities and new emerging technologies. OPETs, SAVE Agencies, consumer networks and other Community-supported dissemination networks can be more effectively used to increase co-operation in pursuit of such common objectives.

Better coordination of actions is very important, facilitated by the existence of a special forum where energy efficiency policies are discussed. If a group on convergence of national energy policies is established by Council as already proposed by the Commission, then a sub-group on energy efficiency with a special emphasis on improved co-ordination of national and Community measures will be foreseen. Alternatively an appropriate forum may need to be established to promote a re-newed impetus and commitment to energy efficiency, permit experience to be shared and follow and review progress at EU and Member State level.

There is clearly a need to identify and raise the profile of improving energy efficiency, giving it a more positive thrust both at Community and Member States level. It must be placed on an equal basis with energy supply options. While energy and environmental policy objectives cannot be achieved by demand-side options alone, neither can they be achieved solely by supply-side options. Energy efficiency programmes must be put in place and implemented effectively, but at Community and Member State level. Below is a first outline of what can be cost-effectively undertaken:

### **5.1 Promoting Energy Efficiency in Other Policies**

Greater focus needs to be placed on promoting energy efficiency via other policies. The **regional** and urban dimensions of energy efficiency must be developed more fully. Integrated regional and urban partnerships involving a wide variety of actors from different sectors need to be promoted as part of the activities undertaken under SAVE. The European Regional Development Fund and the Cohesion Fund must continue to contribute to increased energy efficiency by including specific policies and measures, but Member States must also ensure that they submit appropriate proposals.

**Transport** is another priority area for energy efficiency. Without appropriate policy action, emissions from transport will increase by about 40% between 1990 and 2010. The European Union has adopted a strategy on CO<sub>2</sub> and cars, which aims to reduce by 30% the average CO<sub>2</sub> emissions of new cars to 120g/km in 2005/2010 against the 1990 baseline. In the recent Communication on Transport and CO<sub>2</sub><sup>8</sup>, the Commission made an assessment of how to reduce energy use and hence CO<sub>2</sub> emissions from transport. The measures proposed concern four principal elements: further action on vehicle fuel economy; progress with fair and efficient pricing in transport; completion of the internal market in rail transport; as well as measures for better integrating the various modes of transport. It can be expected that those measures represent a cost-effective policy approach capable of halving the growth in CO<sub>2</sub> emissions by 2010. Beyond 2010, the large-scale introduction of new technologies (e.g. hybrid cars, fuel cells and alternative fuels) will reduce the use of fossil fuels and cut emissions significantly. Energy efficiency needs to become an integral part of transport policy.

Internalisation of externalities through **taxation** and fees, where appropriate, continues to be considered as a means to allow energy prices to reflect true costs. Market liberalisation benefits in the form of lower prices should partially accrue to environmental improvement when appropriate. The Commission tabled a tax proposal to the Council in 1997 concerning taxation of energy products, which would establish a broader minimum tax base. The Council is currently examining this proposal, which includes provisions for possible tax-exemptions for energy efficiency investments. It is important for progress to be made on this proposal. In parallel, Member States should be encouraged to examine what special tax incentives they can provide for energy-saving.

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<sup>8</sup> COM(98)204 final of 31.3.98

**Science Research and Technology Policy** also has a role to play in the energy efficiency strategy. The Fifth RTD Framework Programme foresees two specific key actions for "cleaner energy systems, including renewable energies" and "economic and efficient energy for a competitive Europe". Actions to be carried out by the JRC are also foreseen, for example, on new materials for high efficiency power generation system on prospective studies on upcoming technologies. The Community and Member States must pursue intensified research and development efforts on energy efficiency.

**International Commitment and Cooperation** for energy efficiency is also critical. The European Union is fully committed to participate in the implementation of the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects. Increased co-operation with other international organisations such as the International Energy Agency must be sought. Strengthened co-operation with international banks will allow more leverage for Community programmes and projects. Ensuring that the accession countries of Central and Eastern Europe and Cyprus are adequately prepared in the field of energy efficiency prior to membership, as identified in the Accession Partnerships with each of the countries concerned, is also a high priority.

## **5.2 Specific Priorities For Action**

On the basis of an assessment of the economic potential for greater energy efficiency and an evaluation of the effectiveness of actions already undertaken, the following areas for action are proposed as priorities for the short to medium-term. This is not intended to be an exhaustive list of actions, but rather indicate the main directions to follow, coordinating action at Community and Member State level.

### **(i) Energy-Efficient Buildings**

Buildings account for 40% of the EU's energy requirements. The building sector offers one of the largest single potentials for energy efficiency and should thus be a major focus for action. In addition to installed components and equipment, energy conscious design and use of buildings and new concepts in building renovation, refurbishment and life cycle analysis and costs are important.

Initiatives which can be undertaken under the SAVE Programme include e.g., the development of simple tools to help installers to design appropriate systems, training and certification in their use of these tools. This must be combined with information schemes providing the final customer with clear and reliable information about the performance of the energy systems they may be considering. Further measures in this field will include the review of Council Directive 93/76/EEC (below) which needs to be strengthened to improve energy efficiency in buildings.<sup>9</sup> It is important for Member States also to review their national standards for energy efficiency in buildings, to identify where improvements might be made.

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<sup>9</sup> The development of harmonised European standards under the Construction Products Directive (89/106/EEC) for products such as thermal insulation, windows, heat emitters, etc. can lead to the adoption of standards and indications in the form of information on inter alia product energy economy and heat retention properties.

### **(ii) Review of Council Directive 93/76/EEC to Limit Carbon Dioxide Emissions**

Council Directive 93/76/EEC has the potential to improve substantially energy efficiency and reduce carbon dioxide emissions by helping overcome a number of barriers. Results to date indicate, however, that many Member States have not given the Directive sufficient priority. This is attributed in part to the subsidiarity in the Directive. The Directive requires Member States to develop actions in six programme areas, (such as individual metering and billing of energy use, and energy audits in industry) but allows considerable flexibility regarding which instruments to choose and how. Member States are also required to monitor and report on the impact of the measures.

Strengthening specific articles in the Directive will enhance its impact. Making it more focused and precise is also necessary. Therefore, a directive amending Council Directive 93/76/EEC will be proposed by the Commission. The main areas of the present Directive which need to be strengthened include energy certification of buildings to include existing buildings and not only new buildings, further standards for the installation of insulation and proposals for inspections and energy audits.

### **(iii) Energy-efficient Household Appliances and Other End-use Equipment**

The technical barriers to energy efficiency need to be overcome. For domestic appliances, labelling has been established for a number of years and should be extended to cover all the major appliances. For minimum efficiency requirements, progress has been slower due to the long decision process and lack of cooperation from manufacturers. The "refrigerator directive" (96/57/EC), was a first example, followed by negotiated agreements for washing machines and televisions, as mentioned below. In the near future energy-efficiency standards for electric water heaters and room air conditioners will be negotiated.

In the commercial and industrial sectors there is no labelling scheme, and therefore negotiated minimum efficiency requirements are necessary. Proposals to introduce minimum efficiency requirements should be developed, for example, for ballasts for fluorescent lighting, electric motors, pumps, compressors, fans and commercial refrigeration equipment. For office equipment a voluntary quality mark to indicate the most efficient equipment for large purchasers (public authorities and large commercial enterprises such as banks, insurance companies, etc) is under discussion, based on world-wide harmonised technical specifications and the logo, *Energy Star*.

Incentive schemes in favour of the most efficient appliances, together with disincentives for inefficient appliances, should be promoted as a means of ensuring rapid market penetration of energy-efficient equipment.

### **(iv) Wider Use of Negotiated and Long-Term Agreements**

There is a large savings potential which can be realised by the removal of technical barriers in industry through minimum efficiency requirements or equivalent negotiated agreements establishing minimum efficiency requirement for manufactured goods. Therefore these instruments should be strengthened and expanded to other appliances and equipment, especially in the commercial and industrial sectors. Adequate funding under the SAVE Programme to allow detailed

technical/economic analysis and mandates to the standardisation bodies (CEN/CENELEC) is necessary to implement this strategy.

Several Member States have insisted on the use of more flexible instruments such as negotiated agreements between manufacturers to reach the same objective as mandatory minimum efficiency requirements. Negotiated agreements are considered a valid alternative to the introduction of legislation if they include commitments by a large segment of the manufacturers in a branch (at least 80%), stipulate quantified commitments to improvements in the appliances and equipment they produce and if they include an effective monitoring and self-regulating scheme and non-compliance procedures. Currently two agreements have been negotiated by the Commission with appliance manufacturers, for the reduction of energy consumption of stand-by losses of TVs and VCRs and for washing machines. A wider use of negotiated agreements should be sought, with targets corresponding to or exceeding any objectives set for energy intensity. These agreements concern tradeable goods such as appliances and equipment, but the inclusion of energy services should also be considered. Should negotiated agreements fail to deliver the expected results, mandatory standards must be implemented.

The Commission has adopted a Communication on Environmental Agreements (COM (96) 561), which aims "to promote and facilitate the use of effective and acceptable Environmental Agreements" as part of the effort to broaden the range of co-operation with industry. Long-Term Agreements (LTAs) with industry branches, are a specific type of Environmental Agreement, characterised by the fact that the industrial trade association in question and its members commit themselves to a quantified target for energy efficiency in their manufacturing processes. Wider use of this instrument should be made.

#### **(v) Increased Dissemination of Information**

Information dissemination must remain a high priority under the SAVE Programme and in Member States programmes, in order to remove the information barriers mentioned above. A renewed Community information campaign is planned, focusing the attention of consumers and other stakeholders on the fact that energy efficiency is more essential than ever and on how it achieves benefits. This campaign would require the active participation of all the energy stakeholders including consumer organisations.

The current successful programme of energy efficiency labelling of household appliances needs to be expanded to include other energy-using equipment, including building components. Information on this must be made more readily available. Consumer organisation participation in the dissemination of consumer information should be increased.

There is a need to increase the use of information technology and other innovative methods to reach new audiences with labelling and other information on energy efficiency and energy-efficient technology. For Commission projects, a greater emphasis will be placed on dissemination of results through e.g., new and existing

Community-wide networks. It is also recommended that training and certification on the use and maintenance of energy-efficient technology be expanded.

A new system of awards for energy efficiency, to be developed in cooperation with relevant organisations under the SAVE Programme, is being considered. This could be offered yearly for the institutions, organisations, authorities or persons in Member States making the most important contribution to energy efficiency. The system should be under the auspices of the Commission, with strong Member State participation.

It is also important to strengthen information dissemination on best practices in Energy Efficiency. Under the SAVE Programme, a European Energy Efficiency Best Practice Programme, in cooperation with Member States will be proposed.

#### **(vi) Third-party Financing, Guarantee of Results and Other Creative Financing Schemes**

Financial barriers require special attention. Third-party financing has been promoted for several years by the Commission in both the SAVE and THERMIE programmes as a means of removing such barriers. Model contracts have been prepared for all Member States and several projects have been carried out. Council SAVE Directive 93/76 requires Member States to develop actions related to third-party financing in the public sector. While this has been reasonably successful, the full potential of this instrument has not yet been achieved. The instrument needs to be strengthened by use in larger public sector undertakings and expanded to cover private sector needs. Therefore, new ways must be sought to promote the instrument and to increase the interest of commercial banks in assuming the role of guarantor for energy service companies (ESCOs) considering third-party contracting. In addition to increased commercial bank participation, new contract forms may need to be developed, such as the guarantee of results procedure which has been successfully used by the ALTENER programme. Energy efficiency investment project clearing houses will also need to be tested as a means of providing commercial banks with independent evaluations of the viability of proposed investments. Studies and pilot actions in these specified areas need to be carried out.

#### **(vii) Energy Efficiency in the Electricity and Gas sectors and CHP .**

It is important to overcome the institutional and legal barriers identified. Integrated resource planning or rational planning techniques are an important tool, especially in the context of liberalisation of the electricity and gas markets. The institutional barriers in these sectors may or may not be removed by increased competition. The Commission remains of the view, especially in the light of Kyoto, that IRP is an important component of the EU's energy efficiency strategy to increase the focus on the electricity and gas industry's role in providing energy services. There is a modified Draft Directive on Rational Planning Techniques which, while strongly supported by the European Parliament has yet to obtain sufficient support in the Council for adoption. The Commission continues to consider this Directive important, especially in view of the development of energy services arising from market liberalisation, and will consider the best way to proceed.

The use of combined heat and power in industry, the domestic and tertiary and the power sectors is critical for energy efficiency and must continue to be promoted by the Community and the Member States. The recent Communication on Cogeneration (COM(97)514 final) outlines the barriers and strategy for the European Union, and was endorsed by Member States in December 1997 in the form of a Council Resolution. It should be noted that the forthcoming proposal for a revision of Council Directive 88/609/EEC on polluting emissions from large combustion plants will require that new plants apply CHP where feasible, make provisions for the use of biomass and promote efficient production with fossil fuels.

More generally, there is a need to expand the promotion of energy efficiency undertaken by both electricity and gas utilities. A voluntary partnership will be developed whereby utilities support EU initiatives such as the labelling and appliance efficiency programmes through negotiated agreements. The Commission will continue to promote DSM through pilot projects and dissemination activities under the SAVE Programme. Commitments will be sought from utilities to market energy services and energy efficiency as part of their corporate goal.

**(viii) Energy Management and Technology Procurement.**

In order to promote energy efficiency in the public sector, the Commission intends to present a Proposal for a Directive on Energy Management, in which Member States and EU Institutions agree to follow established guidelines for purchasing cost-effective energy-efficient technology whenever constructing, repairing or furnishing buildings owned or leased by them. This should include all EU and Member State nationally-owned energy-using equipment, including automobiles. The intention is for public bodies to take the lead by setting examples regarding energy efficiency. Corporate commitment based on best practices programmes will be a logical extension of this. This work will be co-ordinated with the Community environmental management and audit scheme (EMAS). It will also include life-cycle cost analysis (LCC). Compatibility with the Commission's public procurement rules in implementing the programme will be assured. The potential in the building sector is judged to be large and the institutional barriers to realizing this potential are well known. An energy management programme for public buildings and property of this type is deemed to be an effective way to remove these barriers. The Commission will also continue to examine and improve its own energy management practices.

Cooperative technology procurement is an instrument to specify and aggregate the demand for energy efficiency in technology. It has been shown to work well in removing several different types of technical barriers. Technology procurement aims at encouraging new products to meet a demand (in this case for energy efficiency) that existing products on the market are unable to fulfil. Technology procurement is used to match producers' and consumers' perspectives in order to make the market function more efficiently with regard to energy efficiency. A group of knowledgeable and influential purchasers, defined as a "buyers' group", formulate product specifications with the help of technical experts, and initiate competition among producers to meet these demands. Technology procurement has been used successfully by several Member States. The feasibility of an EU-level procurement has been studied by the SAVE programme and the concept applied in a THERMIE



project. A new pilot project is now being considered and ways will be sought to broaden and increase this instrument's areas of application.

## **6. Next steps**

A strong commitment and clear signals from all decision-makers and stakeholders regarding the importance and priority of energy efficiency is needed if any significant energy saving is to be made, particularly in the light of the Union's commitment, undertaken in Kyoto, to reduce CO<sub>2</sub> emissions.

Apart from a Community Strategy, Member States will need to develop their own national strategies. In this context, consideration will need to be given to setting an objective to reduce energy intensity at Community and national levels, as well as in different sectoral activities.

It has been estimated that if a basic package of measures such as those proposed above, is implemented in an effective and co-ordinated fashion, it would have a measurable impact on reducing energy intensity in the Community over and above the trend of recent years (-0.6% /p.a.). If an additional annual reduction of energy intensity of 1% were to be achieved with the win-win measures proposed (which is realistic), this must be regarded as an achievement against the background of expected continuing low energy prices.

The focus of our strategy over the next years has to be the full realisation of the significant economic potential for the improvement in energy efficiency which exists in the EU, estimated to be, by 2010, as much as 18% of 1995 energy consumption.

This Communication is a first step in such a strategy. In the light of further discussion and input on the basis of the ideas presented in this Communication, the Commission intends to produce an Action Plan for Energy Efficiency.

**Annex 1.**

**Changes in Energy Intensity (Total Final Consumption/GDP)(toe/MECU 1990)**

	1985	1990	1995	Annual % Change 90/85	Annual % Change 95/90
<b>Austria</b>	181.2	161.5	159.6	-2.3	-0.2
<b>Belgium</b>	223.5	202.1	210.1	-2.0	0.8
<b>Denmark</b>	152.8	143.0	133.8	-1.3	-1.3
<b>Finland</b>	205.8	196.8	216.9	-0.9	2.0
<b>France</b>	160.0	143.5	142.7	-2.2	-0.1
<b>Germany</b>	204.3	177.4	154.8	-2.8	-2.7
<b>Greece</b>	253.4	230.6	231.4	-1.9	0.1
<b>Ireland</b>	216.7	201.1	161.9	-1.5	-4.2
<b>Italy</b>	129.7	128.4	128.4	-0.2	0.0
<b>Luxembourg</b>	443.3	409.9	318.2	-1.6	-4.9
<b>Netherlands</b>	222.1	192.8	196.5	-2.8	0.4
<b>Portugal</b>	229.3	217.1	234.3	-1.1	1.5
<b>Spain</b>	152.7	145.8	154.5	-0.9	1.2
<b>Sweden</b>	192.9	166.9	181.4	-2.9	1.7
<b>United Kingdom</b>	194.7	177.2	173.1	-1.9	-0.5
<b>European Union</b>	180.0	163.0	158.2	-2.0	-0.6

Source: 1997 -- Annual Energy Review, European Commission, September 1997.

## **Annex 2. Outline of Member State Programmes and Measures for Energy Efficiency**

### *Austria*

There is an Agreement between the Federal Government and the Federal Provinces (Article 15a of the Federal Constitution on Energy Conservation) which came into force on 15 June 1995. The article provides for the possibility of a common approach to energy policy throughout the country. The agreement covers: heat conservation in buildings, energy-saving hot water preparation, subsidies, individual heat cost billing, labelling of household appliances, certification of boilers and energy conservation in the industrial sector. An agreement with the Association of Austrian Energy Consumers provides for energy consultancy to companies with energy use of at least 20 TJ per year. Austria has adopted targets for 2000, in relation to 1991 in order to decrease energy for heating and water by 20%, decrease specific industry use of energy by 20% and decrease energy consumption of transport by 10%.

### *Belgium*

Energy efficiency is the responsibility of the regional governments. In 1993, the region of Wallonia adopted a decree to promote energy efficiency in all sectors by creating a coherent legal framework. The region adopted the thermal efficiency standard used in the Flemish region in 1997. Since 1992, the Flemish region has adopted a series of actions related to energy efficiency including thermal efficiency standards, energy agreements and consultancy services. The regions have a variety of subsidy and information programmes.

### *Denmark*

*Energy 21*, the most recent action plan for energy, was published in 1996. The main purpose is to contribute to sustainable development. A high priority of *Energy 21* is to promote more efficient use of energy. The objective of *Energy 21* is to achieve a 20 per cent improvement in energy intensity between 1994 and 2005. There is also a longer-term objective to improve energy intensity by 55% between 1994 and 2030. There is a heavy reliance on carbon taxes in combination with a full range of policy measures. Denmark is a pioneer in the use of energy labelling for buildings and recently revised the programme to improve effectiveness. It gives a high priority to encouraging cogeneration and in 1996 it established the Electricity Saving Trust to support electricity conservation initiatives.

### *Finland*

The most recent energy policy was sent to Parliament in June 1997. It calls for further improvement of energy efficiency. The goal is to bring the growth of total energy consumption to a halt in the next 10 to 15 years which means more specifically to increase energy efficiency by 10-20% by 2010. A Government Decision on the Implementation of Energy Conservation from December 1995 states that energy conservation has been a key of Finnish energy policy for the past two decades and will continue to be in the future. Finland is giving high priority to voluntary agreements with industry and municipalities. Finland also relies on the use of carbon taxes to help

encourage energy efficiency and has an extensive information programme and major technology development programmes.

#### *France*

Energy efficiency has been a major element of French energy policy since the 1970s and France has traditionally had one of the most comprehensive approaches in the European Union. In recent years, there have been government cutbacks which have affected the overall thrust of the programme. However, there are indications that there will be a significant budget increase starting in 1999. Since 1993, ADEME, the executive agency for energy efficiency, and the national utility, EDF, have had joint demand-side management programmes. ADEME also has one of the most effective regional networks in the EU and has had an effective consumer information programme for all end-use sectors.

#### *Germany*

Energy efficiency policies are largely designed to support the climate change and related environmental strategies as well as meet EU obligations. Germany has traditionally had a strong energy efficiency effort, both at the federal and state levels. The policies include regulations and voluntary agreements, combined with a strong emphasis on relying on the market mechanism. Germany was one of the first EU countries to require consumption-based billing of costs of central heating and hot water. There is also an important energy advisory service undertaken by the consumer association AgV which provides service in 330 cities. The government has voluntary agreements with 19 industry associations. Many Länder promote demand-side management.

#### *Greece*

In recent years, Greece has improved its energy efficiency programme, linking it closely to environmental objectives. Energy efficiency is being promoted through the Global Action Plan and the energy conservation sub-programme of the National Environmental and Energy Programme. The Global Action Plan, entitled Energy 2001, is the national action plan for energy conservation in the built environment. There are a number of subsidy programmes and energy audits which are undertaken by CRES. There are also voluntary agreements with energy-intensive industries. Support is being provided to encourage the development of energy service companies (ESCOs).

#### *Ireland*

Energy efficiency is one of the three pillars of Irish energy policy. It is an important element in the government's climate change strategy and strategy towards sustainable development. Ireland has developed an energy rating system for buildings and created the National Irish Centre for Energy Rating to deliver the programme. There are two major audit programmes for industry and a programme to fund measures recommended by the audit. The Irish utility, ESB, has an important demand-side management programme.

### *Italy*

The 1988 National Energy Programme (PEN) gives high priority to energy efficiency. Most of the policy instruments being used result from Law No. 10/91, entitled "Regulations for the implementation of the National Energy Plan with regard to the rational use of energy, energy savings and the development of renewable energy sources." It is a framework law to introduce regulations aimed at improving energy efficiency in all end-use sectors. Many of the regulations are still not completely in place. One, however, requires energy managers in companies and organisations consuming more than 10,000 toe (industry) or 1,000 toe (other). A number of subsidy programmes ended in 1995 due to lack of funding.

### *Luxembourg*

Parliament adopted the general Energy Efficiency Law of August 5, 1993. The law gives authority to several energy efficiency measures to be implemented, including new thermal efficiency standards that came into effect in 1996. A Grand Ducal decree requires the promotion of energy efficiency in municipalities. There are various subsidies for industry as well as mandatory energy audits in industrial enterprises consuming more than 3 GWh per year.

### *The Netherlands*

Energy policy gives high priority to both energy efficiency improvements and developing a sustainable energy economy. The *Third White Paper on Energy Policy*, published in 1996, set a target of an energy efficiency improvement equivalent to one-third of energy consumption within the next 25 years (33% improvement between 1995-2020, equivalent to 1.7% per year). Energy efficiency policies focus on three end-use groups: manufacturing industry, homes and buildings, and traffic and transport. The Netherlands has been one of the pioneers in the use of voluntary agreements in all sectors and provides a variety of subsidies to support the agreements. There are also several environmental taxes to encourage energy efficiency. The 1995 Action Plan for Sustainable Construction calls for revisions in the thermal efficiency standards in 1998 and 2000. The government has actively supported cogeneration. The utilities implement the Environmental Action Plan (MAP) which covers a range of subsidies and information programmes related to energy efficiency.

### *Portugal*

The Energy Programme, created in 1994 and partly funded by the EU, is primarily designed to provide financial incentives for energy efficiency. The objectives are to increase the use of indigenous energy sources and to improve energy efficiency. The Energy Programme for Buildings came into effect in 1995. Enterprises consuming more than 1,000 toe per year are required to establish energy management systems and their energy use patterns must be examined every five years. The five-year plans must be approved by the government. The Strategic Programme for the Expansion and Modernisation of Portuguese Industry provides incentives and voluntary actions to help industry both modernise and meet environmental goals. SIURE, the Regional Incentive System for the Rational Use of Energy, encourages investments in energy efficiency through audits, investment support, demonstration and information.

### *Spain*

The most recent energy policy is laid out in the National Energy Plan 1991-2000 (PEN), approved by Parliament in April 1992. The PEN gives high priority to energy efficiency. The goal of the energy efficiency plan is to reduce projected final energy demand by 7.6 per cent in the year 2000 compared to 1991 by decreasing 7% in industry, 9.6% in transport and 5% in the residential sector. There are a variety of subsidy programmes. IDAE, the Institute for Energy Diversification and Savings, provides third-party financing for hospitals and industry. The government launched a DSM programme in 1995. IDAE negotiated the first voluntary agreements with industry in 1996.

### *Sweden*

Sweden has traditionally had an ambitious energy efficiency strategy. The 1997 Bill on Sustainable Energy Supply gives a strong emphasis to energy efficiency using technology procurement. The goals for Sweden's 1997 energy policy are to secure the long-term and short-term supplies of electricity and other energy in internationally competitive terms. Until the 1997 Bill on Sustainable Energy Supply, the most recent official Swedish energy policy dated from 1991. Sweden also relies on a variety of environmental taxes, including a tax on carbon dioxide emissions. Sweden provides support for municipal energy management and requires municipalities to prepare energy plans.

### *United Kingdom*

The energy policy in the United Kingdom is based on ensuring secure, diverse and sustainable supplies of energy in the forms that people and businesses want, and at competitive prices. It is the government's view that this can be achieved through competitive energy markets working within a stable legal framework. Energy efficiency has been a major element of energy policy since the 1970s. The Energy Saving Trust was established to encourage investments in energy efficiency. The 1995 Home Energy Conservation Act requires all local housing authorities to identify measures that will improve energy efficiency in public and private housing. The United Kingdom is one of the leaders in developing a Best Practice Programme, which provides technical information for professionals in all sectors. The government also has an ambitious programme to improve the energy use of its own operations.

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