COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL

Comparison of Energy Saving Programmes of EC Member States

BACKGROUND STATEMENT

1. On 9 June 1980, the Council of the European Communities adopted a Resolution concerning new lines of action by the Community in the field of energy saving (1). The Resolution provided, inter alia, that Member States should, where this proved necessary, adapt their energy saving programme covering all main sectors of energy use and an appropriate energy pricing policy. The Council invited the Commission, on the basis of the information provided by the Member States, to keep it abreast of progress made with national energy saving programmes.

2. In 1980, the Commission communicated to the Council a comparison of Member States energy saving programmes with the framework programme annexed to the above mentioned Resolution (2), and, in 1982, it communicated a listing of energy saving measures introduced in the meantime (3)..

3. The present communication compares three types of measures used in Member States' energy saving policies :

   a) Regulations
   b) Financial Aids
   c) Information and Consultation Programmes.

   Demonstration and R & D Programmes as well as energy pricing policies (taxes, tariffs), being the subject of separate communications to the Council, are not dealt with in the present document.

4. A detailed comparison of these programmes is attached at Annexes I and II. The general conclusion which the Commission draws is that there are a number of points where improvements could be made, often with little or no extra expenditure even in Member States with relatively comprehensive programmes. The purpose of the covering communication is to draw attention to these.

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(1) O.J. n° C 149 of 18.6.80
(2) COM(80) 899
(3) COM(82) 326, Annex 2

Comparison of Energy Saving Programmes of EC Member States

(Communication of the Commission to the Council)

Comparison of Energy Saving programmes of EC Member States

Table of Contents

1. INTRODUCTION

1.1. On 9 June 1980, the Council of the European Communities adopted a resolution concerning new lines of action by the Community in the field of energy saving[1]. The resolution provided, inter alia, that Member States should, where this proved necessary, adapt their energy saving programmes so that, by the end of 1980, each of them would have an energy-saving programme covering all main sectors of energy use and an appropriate energy pricing policy. The Council invited the Commission, on the basis of the information provided by the Member States, to keep it abreast of progress made with national energy-saving programmes.

1.2. In 1980, the Commission communicated to the Council a comparison of Member states'energy saving programmes with the framework programme annexed to the above mentioned resolution [2]; and, in 1982, it communicated a listing of energy saving measures introduced in the meantime [3].

1.3. The present communication compares three types of measures used in Member States'energy saving policies :

a) Regulations
b) Financial Aids
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Demonstration and R + D Programmes as well as energy pricing policies (taxes, tariffs), being the subject of separate communications to the Council, are not dealt with in the present document.

1.4. Overall, the Gross Inland energy consumption per unit of GDP has declined, between 1973 and 1982, by a remarkable 20 %. The success of Member States in increasing overall energy efficiency, and in substituting other energy sources for oil can probably be attributed mainly [4] to

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1 O.J. No C 149 of 18.6.80
2 COM (80)899
3 COM (82)326, annex 2
4 There are many factors which influence overall energy efficiency (structural changes, energy prices, energy saving measures, substitution, changing imports of final energy, etc.) and which may influence each other. The Commission has prepared, in 1982, a working document about factors affecting energy consumption (XVII/73/82) and will continue its work in this field (see also European Economy N° 16, July 1983)

- the large price increases for fossil fuels in 1973/74 and still more in 1979/81, which induced both energy saving investments and organizational measures for more efficient use of energy, especially in the space heating and process heat sectors;
- structural changes within industry (e.g. decreased steel production), and as between industry and other economic sectors (especially an increased service sector).

Only in a few sectors and member countries does it seem that energy savings achieved in 1980 and 1981 were significantly influenced by energy conservation programmes. In general, however, it is too early to see the results of programmes which were often not introduced until the end of the 1970s and will take several years to work through the economy (construction, reinvestment). So the full impact of Member States' conservation measures will not be apparent before the mid-1980s.

1.5. There is a risk that energy consumption patterns, which changed drastically in 1979-81 because of large energy price increases, will revert to careless consumption in periods of stagnating or even short-term falling energy prices, coupled with increasing income, unless energy-consciousness is maintained, whether through active encouragement, through regulations through incitements in investment, or through some combination thereof.

If a shift back to old habits were indeed to occur, the risk to the economy could be serious. So the Commission believes that the efforts of the European Community should be maintained and that the energy saving programmes of the Member States should be improved.

2. CONCLUSIONS

A detailed comparison of these programmes is attached at Annexes I and II. The general conclusion which the Commission draws is that there are a number of points where improvements could be made, often with little or no extra expenditure even in Member States with relatively comprehensive programmes. The purpose of this covering communication is to draw attention to these.

2.1. Regulations

- Energy-saving related laws and administrative regulations mainly focus on space and process heat, and on energy labelling for domestic products. This makes sense because
  . owners and users of a building may be different people (e.g. rented apartment houses),
  . market transparency is far from complete (e.g. domestic appliances, basic rent which excludes heating costs etc.), or
  . knowledge of technical and economic factors is often limited, in particular in the residential sector and in small and medium-sized firms.

  As regards industry, moreover, the huge variety of technologies and organisations in factories, workshops etc. makes it difficult to design regulations which will not require costly measures of verification. In general, in these sectors, the provision of information, and individual consultation, seem to be much more cost-effective than regulations.

- Although many national factors must be given due weight in any international comparison of regulations, a comparison between energy-saving potential and presently enforced regulations nevertheless reveals certain short comings :

  . Firstly improvement of building codes seems possible, especially with regard to particular types of buildings (eg. office buildings), or particular circumstances, such as modernization, replacement or addition of parts of buildings.
  . Performance and operating standards for boilers could be improved. In particular, the importance of control equipment for central-heating and hot-water systems is underestimated in several EC countries. For example, particularly in regions or countries with degree day values[5] above 2,500 (on the basis of 18°C inside temperature), and with marked changes in daily temperatures, outdoor temperature control is very cost-effective. This argument applies particularly in the case of existing buildings where energy consumption can only be reduced to a limited extent through insulation because of economic, aesthetic, or technical reasons.

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[5] Degree day values represent for a given location the weather conditions in terms of heating requirements. They are the yearly total of daily positive differences between a reference inside temperature (for instance 18°C) and the mean outside temperature. The higher the number of degree days, the colder is the climate.

. Regulations promoting effective use of energy by mechanical ventilation and air-conditioning are in their infancy, although energy-saving potential is estimated as being of the order of almost 1 % of total final energy consumption.

. Individual heat metering in apartment and rented office buildings has scarcely begun to be enforced, although there is sufficient evidence that consumers will respond when they recognize that their charges can be reduced.

. The labelling of energy consumption of domestic appliances should be improved, so as to help consumers to make their purchases rationally.

- In most cases, the technical standards of existing regulations represent actual average practice. They very seldom require the best feasible performance. And target standards are not usually, as would be sensible, set three or five years in advance of the time they are to be enforced, in order to allow for research and development. This target setting policy, already common practice in other fields such as environmental policy (e.g. in the United States), has been scarcely followed in the Member States. This is surprising because

  . further increases in energy price levels are more likely than not, and technological innovation ought to take this into consideration,

  . in many cases, technological possibilities or best performance potentials are not contained in actual standards nor even contemplated (e.g. boiler performance standards).

2.2. Financial support

- Restricted availability of capital is one of the obstacles to greater energy saving. In particular small and medium-sized firms, whose credit lines are limited, may have difficulty in getting further credit for energy-saving investments. Technologies with expected long-term profitability, but with inherent risks, may be another case, e.g. district-heating, combined heat and power generation. In these cases, a warranty programme could perhaps be introduced. The problem of restricted financial resources may also be alleviated by subsidized loans for investments which have just passed the threshold of profitability (e.g. repayment and interest holidays for the first years after investment, or interest subsidy in high interest periods). This type of loan strengthens the financial situation of the investor while putting less of a burden on public budgets than many grant schemes.

- The cost-effectiveness of subsidies may be improved by a thoroughly designed programme which is restricted
  - . to selected technologies with profitabilities close to the break-even point;
  - . to combinations of investments to be made at the same time for technical reasons (insulation and control equipment);
  - . to a minimum amount of investment per dwelling or yearly energy consumption of a company;
  - . to persons or companies with relatively small income or financial resources;
  - . to subsidies covering at least 15-20% of costs;
  - . to a minimum running period of 4-5 years.

  These limitations, aimed at reducing free-rider effects[6], have already been implemented or are planned by some countries following practical experience of administering subsidy programmes.

- A policy of premature replacements may have some advantages in terms of reducing unemployment, or in periods when energy prices stagnate but are expected to increase again.

- The mis-channelling of investment, possible especially in the residential sector, and among small and medium-sized firms, because of a lack of technical know-how, could be reduced especially through mandatory consulting by external consultants before any grant application is submitted by investors.

- Particular attention should be paid to energy saving in rented housing, so as to alleviate any conflict of interest between tenants and landlords (landlords pay for energy saving investments, tenants pay for heating costs).

- Planning of financial aid programmes tends to neglect the larger context : The importance of non-financial factors in decisions to purchase residential heating equipment is, it seems, underestimated by the administration. Factors such as system reliability, warranty protection, environmental

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[6] Free riders lower the cost-effectiveness of subsidies, as they absorb available aids although they would have made the planned investment even without such aid (see Annex I chapter 2.4.)

aspects, adequate information about system costs and performance, and confidence in system suppliers and installers, are at least as important as initial system costs to purchasers.

2.3. Information programmes

- Although there is a lack of empirical evidence as to the effectiveness of broad public information campaigns as an instrument of energy saving policy, as compared with other measures such as energy pricing, all the EC governments have implemented information campaigns and considered them important for the development of a general energy awareness in the public, thus influencing consumers'decisions.

  The time seems now to have come when publicity campaigns should concentrate on mores specific topics, rather than simply promoting a general energy awareness.

- Detailed information about technological and organizational measures is of particular importance for consumer groups, and for companies lacking energy-related technical know-how and market knowledge. Here, information provided by governmental bodies does not necessarily need to be given directly to the individual investor, as in the case of energy labelling. There are many situations where detailed information transfer through existing channels or multipliers (e.g. consumer associations, house and landowner associations, chambers of commerce, installers and architects) is more cost-effective and contributes to faster implementation.

- Experience with information programmes has usually indicated that these were especially successful when :
  . information is based on personal communication, either in cases where managers of companies or consumers seek advice on their own initiative and are already interested and well-informed, or in cases where energy agencies, ministries or other bodies concerned with energy saving, address themselves to firms and consumers directly;
  . technical advice takes place "on the spot" and concrete and practicable suggestions are made for energy-saving measures.

  Governments should support or establish institutions which can effectively carry out energy saving consulting on the one hand and inspire the trust of those they advise on the other.

- A problem which is very difficult for a government to tackle is the multi-step flow of informal communication between the various actors in a society. As far as households are concerned, general information usually exerts influence through the intermediary of opinion leaders and through the so-called gate-keepers of social groups. These people have a strong influence on the information levels, attitudes, values and behaviour of individuals.

  In the industrial and commercial sectors a similar pattern of informal communication and dissemination of messages exists, e.g., information exchange between managers of firms, influence of market leaders, etc.

  There is no general strategy for governmental bodies on how to address opinion leaders. The Commission recommends, however, that governments use the existing communication structure as far as possible (e.g. organizing visits to firms, workshops, local and regional advisory services and information centres based on existing associations etc.).

- It is important for managers of all types of information programmes to take into account that firms or consumers with limited knowledge are often those which most need to adopt energy-saving measures. At the same time, however, the financial constraints they have to surmount are often more severe than those of any other social group. Governmental measures should, therefore, pay special attention to disadvantaged groups such as low-income households, small and medium-sized firms etc..

- Better information could also help to assure a more rational use of electricity. Analysis of the energy saving policy of the EC countries reveals a concentration on space and process heat and the related types of energy. At first sight the relatively small share of electricity in total final consumption might suggest that this policy is sound and sufficient. But it neglects the fact that, because of conversion costs, a saving of electricity leads on average to three times higher savings of primary energy. There is certainly room to more efficient use of electricity, especially through better information, e.g. about power-dependent control of electrically-driven engines such as pumps, ventilators, air-conditioning, compressors, agitators, conveyers or hauling plants in all sectors of electricity consumption (also in residential central heating or hot-water systems).

2.4. In general, Member States should not regard each specific measure as independent, but should try to develop an integrated energy saving policy which considers (taking into account the effects of energy prices and taxes) the interdependence of regulations, financial aids, and information programmes.

Current pressures on public authority budgets has produced a tendency to reduce subsidies and public investments for energy saving. When such reductions are necessary, it is suggested that RUE programmes should

- allocate more funds to warranty programmes and loans at lower interest rates, rather than to grants, in order to encourage investment among consumers as well as in small and medium-sized companies,
- concentrate on the removal of information barriers by running specific information and consulting programmes,
- implement strict controls of the application or regulations and study possibilities of a target-setting regulation policy.

Attention should also be paid to the quality of evaluation studies, which are often poor, especially as far as achieved energy savings and free rider effects are concerned.

2.5. The potential for energy savings is still remarkable : by 2000 A.D., about 25% of the final energy consumption of the Community, namely about 200 m toe a year, could be saved. Energy saving policy should play an important role in the 1980's, not only for this reason, but also because energy-saving investments or services have a positive and substantial net employment impact. Moreover, energy saving is almost always beneficial to the environment.

Most of the push for energy saving must be supplied at national level, and the above paragraphs have suggested some possibilities in improvement of Member States programmes. But there is also a need for action at Community level. This is especially true for standards for energy saving equipment and appliances, which need to be adopted at Community level if the advantages of the Community scale are to be exploited. In some cases, moreover, there are arguments for investment instruments at Community level. The Commission will shortly be submitting separate communications indicating possibilities in Community actions in the buildings, industrial and transport sectors.

Comparison of Energy Saving Programmes of EC Member States

Annex I

Comparative description of existing Energy Saving Programmes

Comparative description of existing energy saving programmes

Before presenting a comparison of existing energy saving measures in the EC countries the difficulties of this kind of analysis must be mentioned. Reasons why particular measures by governments were taken and others were not, depend on a great variety of factors which cannot be dealt with in depth in this communication (e.g. climatic, technical, economic, legislative and administrative conditions, policy goals, private activities, etc.). Some of these factors will, however, be illustrated more clearly in later Chapters.

The combination of all these factors, together with the countries' general philosophy and predominant problems, are needed to explain the relative importance attributed to regulations, financial aid and information programmes on one hand, and on the other hand, such measures as pricing, taxation, support to research, development and demonstration, promotion of nuclear energy use or the belief in the effectiveness of market forces.

Keeping the various factors in mind which influence the EC countries' energy saving policies, the three measures have been selected for analysis in this communication. For grants and for information, annual public expenditure per capita are compared. More sophisticated comparisons, however, such as of funds spent per toe saved or per ECU investment are not presented because suitable data is not available in most cases.

This report deals only with government measures. Efforts to promote energy saving, however, are also made through regional and local, public and private initiatives; the intensity of these activities depends upon the extent of decentralization of government policy.

1. Regulations

The regulations actually enforced in the EC countries can be classified into four different types:

- mandatory requirements for new buildings, heating equipment or specified goods,
- mandatory maintenance requirements, such as periodic inspections of boilers, control systems, or air-conditioning plants,
- behavioural requirements to be observed in everyday life, such as temperature limits, speed limits, or individual heat metering, and finally

- energy labelling to improve market transparency for the consumer or investor (electricity consumption of household appliances, fuel consumption of cars).

1.1. Building codes

In several countries thermal requirements for buildings were adopted long before 1973 for reasons unconnected with the energy crisis. The main purpose was to ensure sufficient overall thermal comfort, to avoid the risk of condensation on the inside of walls and consequent structural damage. In addition, prevailing climate, energy prices, local insulation costs, traditional modes of construction and costs, as well as heating habits certainly influenced building codes.

Such factors explain traditional differences in countries' regulations with regard to both calculation methods and standards. Since 1974, building codes have been drawn up to attain a more rational use of energy. A preliminary comparative study of the thermal requirements for buildings in the EC countries was made in 1975 and updated in 1981.

The values of the mean transmission coefficient Um required by the national building codes for newly-built houses and shown in Table 1 are taken from this study[1].

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[1] XVII/102/81 (Carpentier/Uyttenbroeck). The U-coefficient expressed in W/m2K, represents for a given material its resistance to heat losses. The smaller is U, the better is the material in terms of heat insulation. As several countries developed different approaches to define minimum thermal requirements, the national thermal regulations are translated into the maximum permitted mean U-values of several types of buildings as a function of the ratio between the volume of the building (V) and the heat loss area of the building (A). In a few cases where building codes changes in 1981 or 1982, the new mean U-values have been calculated or estimated respectively.

Table 1 : Building codes in EC countries

	B	D	DK	F	GR	I	IRL	LUX	NL	UK
Residential buildings										
- present standard in force since:	-	1981	1979	1977[5]	1979	1977	1982	-	1982	1982
- newly constructed		+	+	+	+	+	+		+	+
- modernized		+	+	-	-	-			-	-
- U_m-value[1]		>19 °C	>18 °C	>14 °C	>19 °C	>19 °C	>19 °C		>19 °C	>19 °C
o detached house		0.69	0.49	1.24[2]	0.71[2]	0.98[2]	0.85		0.94	0.85
o blocks of flats		1.01	0.79	2.07[2]	0.92[2]	1.44[2]	2.0[3]		1.48	1.41
Non-residential buildings										
- present standard in force since:	1982	1981	1979	1977[5]	-	1977	1982	1979	1982	1979
o public buildings[6]	1.6	1.01	0.75	3.53[4]		1.44	2.0[3]	~1.0	1.38	1.27
o office buildings[6]	-	1.01	0.75	3.53[4]		1.44	-	-	1.38	1.27
- buildings <19 °C	-	>12 °C	>10 °C	>14 °C		-	-	-	-	-[7]

1) detached house 864 m^3, detached block 12.000 m^3

2) coldest climatic zone

3) estimated

4) depends on glazed area of the building

5) revised in 1982, new figures are estimated, see text

6) 12 000 m^3; V/Atot: 3.53

7) estimated heating requirement less than 50 W/m^2

In Belgium, a standard (NBN B 62-301) has been discussed since 1979 which at present is enforced for public buildings and, although not compulsory, for social dwellings (K 80). The standard is said to be generally met in new buildings.

The Danish requirements of 1979 are the strictest of all EC countries. A further version revised in a few minor points, but not in the U-values, came into force in April 1983.

New regulations were set up by the West German Government in 1982 to replace the standards of 1977 in January 1984. Mean heat transmission losses will be reduced by 20 to 25 %. An additional change introduced by the new building code is that existing buildings are included where significant modernization is involved as well as for the replacement or addition of building parts.

In France heat losses in buildings are defined in maximum heat losses of the total building. Recent improvements would suggest that the equivalent Um-values in Table 1 would drop to around 1.0 W/m2K and 1.6 W/m2K for the coldest climatic zone. These are still rather high when compared to other EC countries with similar climates (see Figure 1). However, the French Government announced already in 1980, that the energy consumption of new buildings should be reduced by 50 % in 1985 and is therefore considering, inter alia, the introduction of stricter building codes.

Greece introduced relatively strict building codes for new residential and public buildings in 1979. For three climatic zones depending on minimum outside temperature during two successive days, the regulation stipulates maximum U-values for building elements and for facades as well as maximum mean heat transmission.

Ireland adopted 32 % stricter standards in 1982. The mean U-value, which did not depend on the shape of the building in the 1979 regulation, is still kept invariant from the volume/area relation.

The Italian building codes in force since 1977 are defined in maximum permitted volumetric heat losses of the building, similar to the French regulations. Six climatic zones specified on a degree days basis take into account the large differences in climate between Northern Italy and Sicily. The building codes also include existing buildings where significant modernization is involved.

Luxembourg only has building standards for public buildings. However, foreign standards are applied (German DIN, French AFNOR, and Belgian NBN). Building standards, similar to those of West Germany, are in preparation.

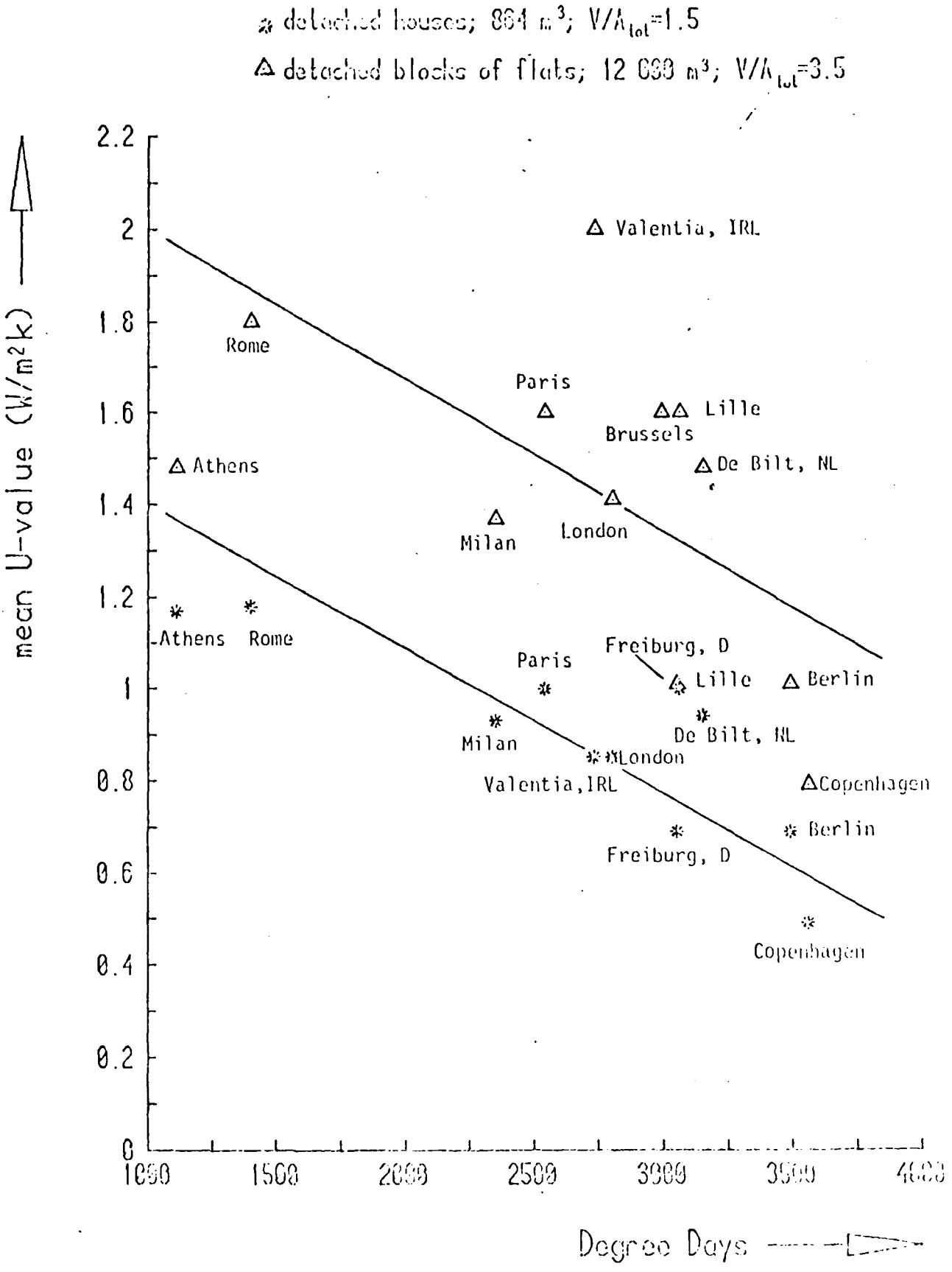
In the Netherlands, building codes from 1978 were again revised in 1982 for individual building elements with direct outdoor exposure such as ceiling and floors. Compared to other Member States they are still relatively low (see figure 1). The municipal by-law contains regulations with regard (mainly for ground level floors) to the insulation of dwellings, hotels and offices.

The United Kingdom also adopted 35 to 40 % stricter building codes, which now are in line with the common practice of EC countries if degree days are taken as the predominant influencing factor (see Figure 1).

During the last two years, there has been a significant harmonization of building codes. The actual permitted values, however, appear to be still too high for most European countries if additional costs for additional insulation of new buildings are compared with additional benefits from saved energy costs during the life-time of these buildings. This argument most probably holds for all EC countries.(see Figure 1). The two Member countries with highest and lowest degree day values (Denmark and Greece) have actually enforced the strictest building codes, especially for large buildings with a high volume-to-area relation.

In Figure 1, the colder locations appear on the right and should consequently have lowest Um values for good insulation to avoid heat loss. The scatter of points on the graph illustrates widely different standards for cities having similar climates.

Figure 1: U_m-values of specified buildings and mean degree days of EC countries



Considerable evidence suggests that stricter building codes induce negative effects such as

- making the construction of new houses more costly,
- reduced sales of heating and air-conditioning equipment because of reduced energy needs,
- depressing demand for particular construction materials such as bricks, lime sandstone, and pumice stone, because these materials have rather high heat transmission coefficients.

Care has to be taken to ease impacts of these negative effects. Extending the time-span between the introduction of stricter regulations and the time of enforcement to cover several years gives enough time for structural changes within the industries concerned to adapt and to train construction workers.

In the EC countries construction methods, the costs for insulation and heating habits vary greatly. Consequently, it is difficult to make a general recommendation for the design of economically optimal building standards. Local climatic conditions, local or regional construction and installation costs, national purchasing power, regional or national markets of housing space, and national energy prices must be taken into consideration. The Commission is preparing an "Action Programme for Energy Savings in Buildings", in which these questions are dealt with in more detail.

In any case the nationally distinct considerations should not dissuade

- those countries which have not yet enforced any regulations for particular types of buildings (i.e. office buildings or industrial buildings with an inside temperature of less than 19°C) from introducing building standards,
- the EC countries from examining the costs and benefits of stricter standards, especially for large buildings, and extension of these standards to cases such as significant modernization of buildings or the replacement or addition of parts of building.

1.2. Requirements for heating systems and new boilers

Comparing the actual situation of enforced regulations (see Table 2) one notes that

- almost all countries demand minimum insulation of pipes, ducts, etc.

- a few countries do not demand any kind of control installations for central heating systems (Belgium, Greece, Ireland, Luxembourg) or only for non-domestic buildings (United Kingdom). This situation can partly be explained by the fact that in these countries central heating systems are less widespread than in the other EC countries;
- no country requires outdoor temperature related control for single family houses. If the pay-back time of outdoor temperature related control is compared to that of double or triple glazing, outdoor temperature control is much more cost-effective.

Table 2: Requirements for heating systems and new boilers, in the EC countries

	B	D	DK	F	GR	I	IRL	LUX	NL	UK
Requirements for heating systems										
- present standards in force since:	-	1981	1981	1978	-	1976	-	-	1980	1981
- range of application (residential, commercial, public)	-	all	all	all	-	all	-	-	all	all
- minimum insulation of pipes, ducts etc.	-	+	+	+	-	+	-	-	+	+
- control installations for central boilers										
o time switches, indoor temperature	-	1 fam. houses	1 fam. houses	1 fam. houses	-	-	-	-	-	non-domestic buildings
o outdoor temperature	-	other buildings	other buildings	other buildings	-	>58 kW boilers	-	-	-	-
Requirements for new boilers										
- in force since:	-1)	1981	-1)	1975	1982	1976	-	1979	1980	1983[3]
- range of application (fuel capacity limits)	oil, coal	all	oil	all fuels	domestic boilers	all	-	gasoil	gas <35kW	all
- minimum boiler performance	-	+2)	-	+2)	80 %	+2)	-	+	83.3 %	+2)

1) indirect minimum requirements through boiler-operation standards

2) depends on type of fuel and capacity

3) refers to implementing act of 1981; first regulations in 1983

Considering the actual regulations and the techno-economic facts, the contribution of control installations to energy conservation seems to be underestimated, especially in regions with degree day values of more than 2,500 (on the basis of 18°C).

Stricter building codes reduce the annual energy requirement of new buildings and hence increase the pay-back time of control installations. But the predominant area of requirements for control installations are buildings already constructed, even though their profitability is often limited by additional cost-effective insulation of the outer shell of the building.

Only very few countries demand a minimum boiler performance without any capacity limits and for all types of fuel. This is partly explained by the fact that several countries enforced operating standards and periodic maintenance controls, thus indirectly introducing minimum performance standards for new boilers.

In general, the minimum standard requirements can easily be met by the boiler or burner producers. France tries to develop, inter alia, the efficiency of heating systems in the framework of its general objective to reduce energy consumption of new buildings by 50 % by 1985. However, no EC country has explicitly introduced a high combustion efficiency standard announced some years prior to its enforcement so as to give producers enough time for development. This would spur technical innovation and is already common practice in environmental legislation, especially in the United States.

1.3. Operating standards of boilers

Design and installation of heating systems in buildings can be excellent, but poor maintenance of the boiler and incompetent handling of control installations may cause very low heat generation efficiencies. Surveys in the residential, commercial, public and industrial sectors in the Federal Republic of Germany, for instance, concluded that 10 % to 30 % of the boilers examined did not comply with existing standards for operation. Compliance of gas-fired boilers was better than of oil-fired boilers.

Table 3 : Operating standards for boilers and mandatory individual heat metering in apartment buildings, in EC countries

	B	D	DK	F	GR	I	IRL	LUX	NL	UK
Operating standards for boilers										
- present standards in force since:	1978	1978	1981	1977	1979[7]	1981	-	1979	-	-
- range of regulated boiler capacity										
o oil	+	>11 KW	unlimited	≤900 kW	-	unlimited	-	+	-	-
o gas	-		-		-		-	-	-	-
o coal	+		-		-	-	-	-	-	-
- max. exhaust losses[1]										
o small boilers		14 %[2]	12.5 %	-	+	-	-		-	-
o large boilers		11 %[2]	12 %	-	-	-	-[4]		-	-
- min. boiler performance[1]										
o small boilers	-	-	84 %	74 %	80 %	85 %	-	-	-	-
o large boilers	-	-	88 %	-	-	89 %	-	-	-	-
Individual heat metering in apartment buildings										
- in force since:	-	1981	1982[3]	1979	-	-	[5]	-	[6]	-
- 100 % application envisaged in:	-	June 1984	-	1985	-	-	-	-	-	-

1) under steady load
2) after January 1st, 1983
3) the Law of Rent allows individual heat metering on a majority vote of tenants
4) 99 % have been inspected by heat consultants
5) not important for this country. only 2 % of the population live in apartment houses
6) is actually considered by legislative bodies
7) for environment reasons (restraint)

Six of the EC countries introduced operating standards for boilers and mandatory periodic control by approved firms (see Table 3). Denmark and Luxembourg restricted the regulations to oil boilers. The German regulations lowered the maximum permitted exhaust losses stepwise over several years. Again, standards can easily be met if maintenance is carried out by technically trained personnel and/or new high-efficiency boilers are installed.

1.4. Individual heat metering in apartment buildings

Energy savings by individual heat metering have been estimated in Germany, on the basis of empirical findings, in the range between 10 and 20 %. Even if only a 10 % saving is assumed, because of influences of increasing energy prices during the period concerned, individual heat metering is still to be judged as a very cost-effective measure. But only in two countries, France and Germany, is this measure being enforced for complience by 1985 in all existing buildings (see Table 3).

This regulation is certainly less important in countries where few people live in apartment buildings (e.g. Ireland) or in areas with low heating costs (i.e. in the southern parts of Italy and Greece).

1.5. Temperature limits in buildings

The convenience of centrally heated buildings and relatively cheap energy in the 1960ies changed heating and clothing customs in many countries: The buildings were kept at summer indoor temperatures even in winter. As energy savings per degree centigrade reduction are about 5 % to 7 %, almost all EC countries required temperature limits for public buildings, at least (see Table 4). In three countries, France, Italy, and the United Kingdom, the regulations cover all non-domestic buildings.

In Italy the regulations also include centrally heated buildings in the residential sector; and France, makes no exception even in the residential sector, where the limit of 19°C is applied.

The control of temperature limits may be easy in the case of public buildings. Sporadic checks in the commercial sector is one way, limitation of heating oil delivery to the consumers in the commercial and residential sectors is another method (Belgium, France).

Table 4 : Temperature limits in buildings, energy labelling, and speed limits, in the EC countries

	B	D	DK	F	GR	I	IRL	LUX	NL	UK
Temperature limits in buildings										
- in force since:	1981	1979	1981	1979	1979	1977	-	1979	1981	1980
- public buildings	19 °C	20 °C	20 °C	19 °C	18 °C	20 °C	-	20 °C	20 °C[1]	19 °C
- private homes	-	-	-	19 °C	-	20 °C[2]	-	-	-	-
- commercial buildings	-	-	-	19 °C	-	20 °C	-	-	-	19 °C
Energy labelling										
- in force since:	1981[6]	-	1982[6]	1977	-	1982[6]	-	-	-[4]	1977
- major domestic appliances	+[6]	-	+[6]	+	-	+[6]	-	-	-	-
- cars	+[3]	+[3]	+	+[3]	-	-	-	+[3]	+[3]	+
Speed limits										
- in force since:	1975	1972	1979	1974	1975	1977	1979	1974	1974	1974
- motorways/roads	120/90	-/100	100/80	130/90	100/100	80/90[5] 110/140	88/88	120/90	100/80	113/113

1) regulation was converted into a recommendation
2) centrally heated buildings
3) voluntary widely applied
4) in preparation
5) for small cars (900 cm^3) and big cars (1300 cm^3) respectively
6) framework directive additional regulations for electrical ovens only.

1.6. Energy labelling

This measure has been designed by the European Community to increase market transparency by better information of the consumer about the energy consumption of major appliances[2]. Up to now only four countries (Belgium, Denmark, France, Italy) have transposed the EC directives into their legislation. In Germany there exist technical specifications for voluntary labelling, whereas the Netherlands have declared, in a energy saving bill, their intention to introduce the labelling of domestic appliances.

Energy labelling for cars has been mandatory in the United Kingdom since 1977. In France, since 1976 advertisements have mentioned the gasoline consumption of new cars. In a few other countries energy labelling for cars is widely applied voluntarily by meeting the EC measurement standard[3] (see Table 4).

1.7. Speed limits

The enforcement of speed limits took place in or after the year of drastic energy price increases in almost all EC countries. They vary between Member States (see Table 4); no harmonisation at Community level could be reached. This measure can find additional justification in reduced incidence of serious road accidents.

1.8. Other regulations

Additional regulations are implemented in only a few EC countries. Some were designed to deal with specific national conditions such as balance of foreign trade, oil dependence, power generation capacity.

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[2] Framework directive CEE/530/79 and application directive CEE/531/79 for electric ovens

[3] Directive CEE 80/1268

- Industry and commerce

Except for boiler operation standards, most EC countries have no specific energy saving regulations for industry. However, there are a few exceptions :

In Italy all firms with more than 1,000 employees or an energy consumption of more than 10,000 toe per year have to appoint an energy manager who is responsible for energy saving.

Greek firms consuming high or medium voltage electricity or certain yearly quantities of oil products have to undertake energy auditing and report to the Ministry (in other countries audits have been done on voluntary basis). In addition, new or expanding firms with more than 50 employees have to set aside 3 % of their total investment for energy conservation purposes.

- Rational use and saving of electricity

There are only very few regulations concerning a more rational use or saving of electricity although the importance of electricity in relation to primary energy consumption is high because of its high generation losses of more than 60 % and transmission losses of around 6 % to 8 %.

Daylight-saving time has been introduced in all EC countries; the electricity savings, however, are estimated to be less than 0.3 % of final energy consumption so that positive effects on leisure seem to be more important than on energy saving.

- Belgium, France, and Greece enforced regulations for commercial lighting including technical requirements (ionized gas or fluorescent tubes) or time limits for illuminated advertisements. Belgium restricted highway lighting. The French Government tried to limit advertisements which would promote energy consumption.

- Ventilation and air-conditioning

There is almost no information available on heat losses by mechanical ventilation and electricity consumption for air-conditioning. Although the share of additional energy necessary for ventilation and air-conditioning may vary greatly among the EC countries, technical energy saving potentials are extremely high (20 % to 80 %).

It was this factor which led Denmark and Italy to introduce regulations for buildings with mechanical ventilation. In Italy, buildings have to be equipped with an energy recuperation plant to recover the waste heat in certain cases. In Denmark, there exist general recommendations for heat recovery in mechanical ventilation. The decision is left to the investor.

- Space heating

Italy restricted operating time of all boilers producing space heat to a maximum permitted operating period during the heating season and to maximum permitted daily operating hours. The regulation distinguishes six climatic zones (the same as for building codes).

2. Financial support

2.1. Quantitative comparison

A comparison of the financial aid with regard to the funds per year and capita is difficult because :

- In some countries detailed data on programme budgets are not available for all programmes.
- Some programmes cover several sectors, and so cannot be attributed to each sector separately: it is attributed to the sector considered most affected.
- In addition, some countries have programmes intended to support energy saving and at the same time other goals such as environmental protection, employment, etc. (especially Denmark, France and the Netherlands). In this report such expenditures are attributed to rational use of energy.

Grants play by far the most important role among financial measures. The modest recourse to low interest loans is surprising because they should be effective and less costly to public authorities than outright grants. A considerably high figure in the Federal Republic of Germany results from one loan programme (the 6.3 Billion DM Loan Programme). Its funds were available for applicants over a period of only 14 months. Funds per year and per capita would be smaller if the programme had been in operation for longer.

Some kinds of tax relief such as the reduction of V.A.T. (Value Added Tax) have a very similar effect to that of grants. However, the prevailing type of tax relief in the EC countries is income-tax relief.

The average amount spent on financial aids (as far as they are known) in the ten community countries in 1982 is 8.6 ECU per year, per capita. Denmark and the Netherlands have by far the highest figures. The Federal Republic of Germany is also above the average. France is about the average, whereas all other countries offer grants per year and capita far below the EC average (see Figure 2). It is worth noting that Danish public spending has, however, been lower in 1983 than in 1982. Some other Member States have probably also reduced their budgets in 1983, whereas Belgium has considerably increased its public spending for energy saving purposes (see Annex II).

Broken down by sectors, Table 5 shows that in most countries both the amount of programme funds and the variety of programmes concentrate on the residential and industrial sectors. Separate programmes for agriculture have been implemented only rarely; the subsidies offered to agriculture are sometimes included in the programmes for the industrial sector. With regard to the public sector, considerable amounts have been spent mainly in Denmark, the Federal Republic of Germany and the UK. Their subsidies per capita have been above average in 1982. It is worth noting that the UK started actions in this field as early as 1972.

Table 5 : Financial support programmes for energy saving in the EC countries : ECU per capita in 1982 [1]

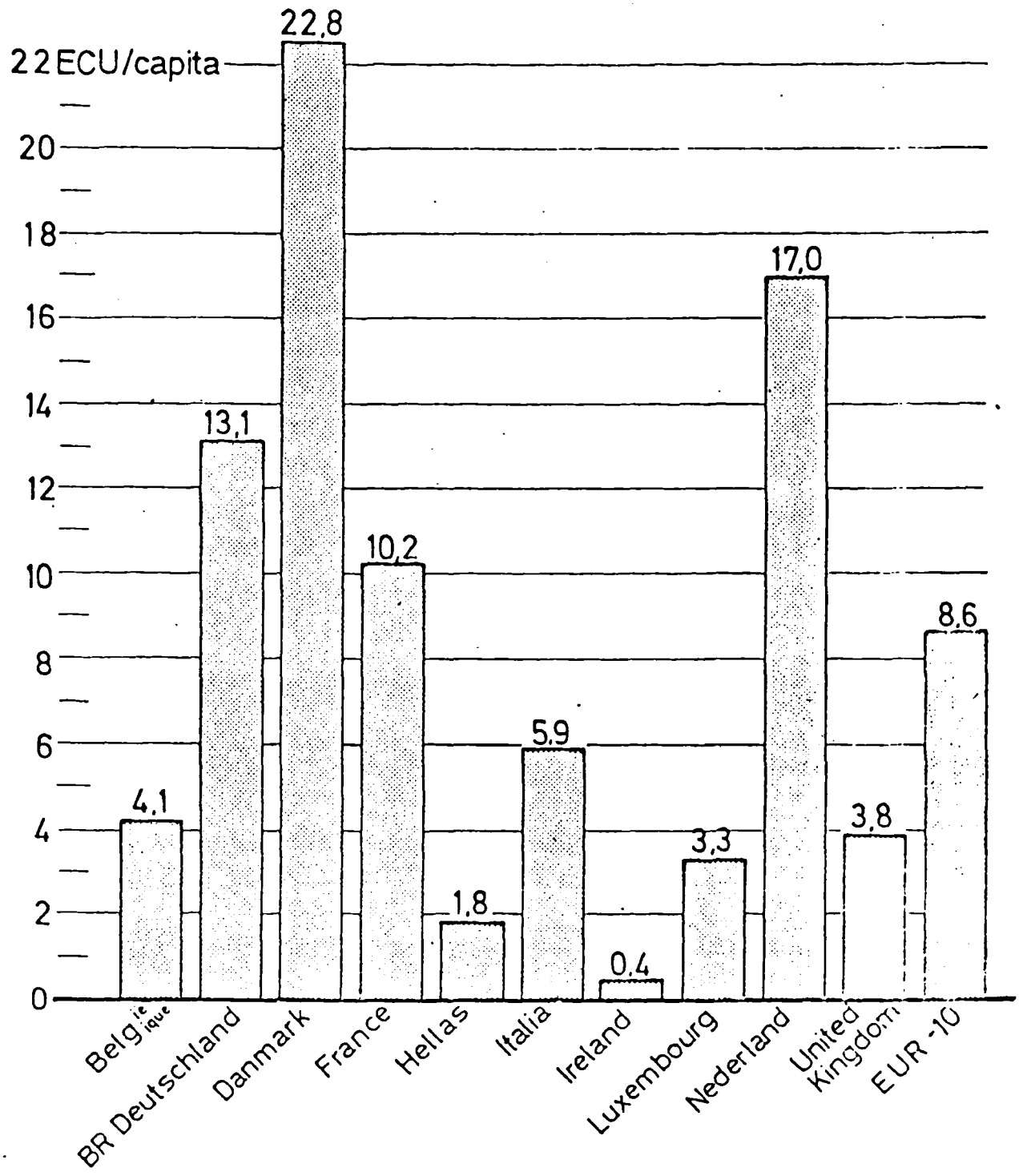
	B	D	DK	F	GR	I	IRL	LUX	NL	UK[2]	EUR 10
Residential sector	2.0	6.0	16.7	5.9			0.2	3.3	6.9	1.2	3.5
Industry + Agriculture	2.1	2.1	1.8	1.8	1.8	4.0[3]	0.2		7.8	0.1	2.3
Public sector		2.6	2.4	1.2		0.03[3]			1.3	2.5	1.5
District heating and CHP		2.4	1.9	1.3		1.9			1.0		1.3
Total (ECU per capita) [4]	4.1	13.1	22.8	10.2	1.8	5.9	0.4	3.3	17.0	3.8	8.6
Note : Total (MECU) [4] [5]	41	810	116	544,5	17	337,5	1.6	1.3	241	208	2,318.1

1) R, D + D programmes not included
2) Budgets 1981/82
3) Not yet implemented
4) Information programmes not included (see table 9)
5) See Annex II, tables A 1 to A 10

Figure 2

FINANCIAL SUPPORT TO ENERGY CONSERVATION IN EEC PER CAPITA IN 1982

(R,D + D and information programmes excluded)



2.2. Qualitative comparison

Because of incomplete data, the criteria for comparison have been selected in accordance with what is available. The results are summarized in Table 6, but should only be considered as a rough indication of the main features of the different financial aid systems.

Table 6 : Qualitative Comparison of Financial Programmes for Energy Saving in EC-Countries

	B	D	DK	F	GR	I	IRL	LUX	NL	UK
Goals and main objects of fin. support										
- General energy savings	+	++		++	+		+			
- Insulation	+	++	+	+			+	++	++	+
- Renewable energy sources and new technologies[1]		+	++	+		++			+	
- District heating, combined heat and power production		+	+	+		+				
- Consulting, feasibility studies		+	+	++			+			++
- Oil or gas substitution		+	++			++	+		++	+
Further criteria										
- Support dependent on savings expected			+	++		+			++	
- Social aspects taken into account			+	++						+
Financial support particularly embedded in the overall economic policy		+	+	++					+	+

+ above average ++ most salient characteristics

1) excluding demonstration projects

As far as political goal setting is concerned on the allocation of subsidies, two main strategies were found: One is primarily to substitute oil, the other is to save energy in general. Denmark and Italy for example seem to have laid stress on the first strategy. Both countries are highly dependent on oil imports. Oil substitution is achieved through further development of district heating and, in particular, through promoting the use of renewable energy sources. For climatic reasons solar energy use is highly suitable in Italy whereas Denmark benefits from its advanced technical know-how (on district heating, straw incinerators, wind energy).

The Federal Republic of Germany and France, for example, have attached importance to the second strategy. They have of course also promoted oil substitution but a great emphasis lay on overall energy saving. All energy-saving techniques have been supported to a similar extent, with insulation measures being given priority in Germany and consulting in France. Similar strategies have been adopted in the Netherlands to conserve indiginous gas; and to some extent in Belgium and Ireland.

When discussing financial support measures two problems remain to be solved: insufficient information for, and insufficient liquidity of the investor in the residential sector and in small and medium-sized firms.

As the assumption of a well-informed, rationally deciding investor often is wrong in practice, in some countries a great deal of attention is paid to providing information and practical know-how, as is the case, for example, in the Federal Republic of Germany, the United Kingdom, Denmark and, above all, in France. France even has stopped a grant programme for the residential sector in 1982, and replaced it by subsidized consultation to promote better decisions on investments.

On the other hand the restricted availability of capital curtails energy saving investments. For investors - especially in small and medium sized firms - already credit limited it may be impossible to obtain a further loan for energy saving investments. Many energy saving investments generally would pay for themselves because of their high profitability, but such investors could only obtain further credit if a warranty were given by the government or by an other institution. Often, significant energy savings may be achieved by changed production processes, enabling rationalization and/or economies of

scale. Such investments often constitute major barriers especially for small and medium-sized enterprises, by far exceeding their normal level of financing ("take-off investments").

France is the only country providing a warranty programme especially designed for energy saving investments and has furthermore enabled banks to reduce reserve limits and to raise the amount of credits given for these investments, thus raising the amount of capital available.

A close relationship between energy conservation programmes and the overall objectives of the economic policy seems to be drawn mainly by the Governments of large or more wealthy EC countries, depending on the general philosophy of the economic policy. For example, the United Kingdom emphasized the proper functioning of the market, both in production and consumption of fuels. Thus, a key element of the Government's approach is energy pricing, reflecting long-term costs of supply. The present Government has cut some of the former financial programmes, particularly for private households and companies. The energy saving policy is designed to supplement their price message given to consumers by focusing on the provision of information, advisory services, subsidies for consultation and the like.

France tries to solve both problems of saving energy and of unemployment with a combined policy. Financial incentives and activities in the public sector are partly directed at creating jobs in the field of energy conservation, through, for example, modernization of grant-aided dwellings. Similar efforts were found in the Netherlands, Denmark and the Federal Republic of Germany. These countries' energy conservation programmes are particularly conceived as part of their overall economic policy.

In general, energy saving programmes reveal a certain concentration on space heating and process heat, neglecting to some extent the more efficient use of electricity which could lead to worthwhile savings of primary energy.

2.3. Achieved Energy Savings

Yearly energy savings per 1,000 ECU invested were estimated in several countries (see Table 7). They range between

- 0.25 and 1.3 toe/1,000 ECU per year in the residential and public sector

Table 7 : Estimated yearly energy savings per 1,000 ECU invested of subsidy programmes

Sector	Energy savings (toe) per year and 1,000 ECU investment as prerequisite for support	 estimates of achieved savings
Residential		
- dwellings	(F) [1]	0.94 (D) [4] 0.47 (DK) 0.25 (F) 1.3 (NL) 1.2 (IRL) [2]
- high-efficiency boilers, economizers		0.48 (NL)
Public buildings	> 0.6 (NL)	
Commercial, non-profit institutions	> 1.03 (NL)	
Industry and agriculture		2.2 (D) [4] 1.37 (DK) 2.8 (F) [3] 1.5 (F) 2.1 (NL) 1.5 (UK)
	> 0.96 (NL)	
Horticulture	> 0.4 (NL	

1) minimum energy savings per m^2: 0.004 to 0.01 toe/a (F)
2) assumed energy price 1981/82: 420 ECU/toe
3) small and medium-sized firms
4) primary energy savings

- 1.2 and 2.8 toe/1,000 ECU per year in the industrial, commercial and agricultural sectors.

Even if the different energy price levels in the sectors are taken into account, the profitability of the investments in industry and commerce is twice as high as in the residential and public sector. A reason for this may be misguided investment priorities (see 2.6.)

2.4. Free-rider effects

Given that many investments in energy saving equipment pay back in a reasonable time period it might be asked if any financial incentive to invest should be necessary at all. A well-informed, rationally deciding investor would be expected to invest without any public incentive. Given this type of investor, grants or any other financial subsidy would be cost-effective only for cases in which pay-back times are too long or for investors that have more urgent investment priorities. A very important consideration in this context is the free-rider effect. Free-riders take advantage of financial aid although they would have made the planned investment without such aid. The free-riders lower the cost-effectiveness of subsidies. Although information on the magnitude of this effect is scarce, it is remarkable that high-income households and large companies claim for subsidies more often than others.

The assessment of the free-rider effect is an important, but very difficult part of any evaluation. A clear statement about the proportion of free-riders was only found in two cases. A study done in U.S.A. estimated that 43 % of subsidized investments would have occurred without financial aid. A telephone survey in Germany about the impact of a 6.3 billion DM loan programme suggested a free-rider effect of over 80 %. However, the latter enquiry may be open to criticism because political motivation of the enquiry may have partly obscured the objectivity of a scientifically conducted representative enquiry.

Some French evaluations comment in general terms on the free-rider effects as being important. A unrepresentative Swedish study calculated the proportion of free-riders to be 20 % to 25 %. Free-rider effects estimated by a study for the German government are rather high; with regard to grant schemes, they vary between 30 % to more than 75 %. A similarly high assessment is made by this German study, as far as building codes and standards for new boilers and

hot-water production are concerned, 10 % up to 30 % 'overcomply' with actual standards for economic reasons. On the other hand, around 10 % do not meet the standards.

Though lacking in precision, there is no doubt that free-rider effects significantly reduce the effectiveness of public authority financial support.

Some countries have made efforts to increase cost-effectiveness of the subsidies. E.g. in France, a number of subsidies concentrate on economically disadvantaged people or companies with scarce financial resources. The Danish Government not only makes the approval of subsidies in the residential sector dependent on achieved energy savings but also tries to take into account different motivation of building owners to increase the capital stock and, hence, to alleviate the conflict of interest between tenants and landlords (landlords pay for energy-saving investments, tenants pay for heating costs): Owners of rented dwellings receive a higher percentage of subsidies than owner-occupiers (a similar procedure was found in the Netherlands). In addition, expected increases of energy prices are taken into account by reducing the percentage of subsidies each year. Resulting effects such as premature replacements are favoured for overall economic reasons.

In some countries, subsidies are limited to certain technologies with rather low profitability (renewables, combined heat and power generation, district heating). Exclusion of highly profitable technologies lowers the proportion of free-riders obtaining subsidies, but it also limits the investor's energy saving options and it increases also administration costs for approving subsidies.

Such measures cannot help to avoid free-rider effects completely. However, compared to other countries with comprehensive subsidizing policies, Denmark and France are shown to have made the most effort to allocate public funds in a cost-effective way with due regard to overall budget stringency. At present no conclusive statements can be made on the proportion of free-riders in the EC countries.

However, it can be inferred that the share of free-riders increases when

- the subsidies cover only a small share of the costs; if they are below 15 % to 20 %, the increase in profitability they effect is minimal and the subsidy cannot be expected to have a specific promoting effect. Consequently, such low subsidies should be avoided;

- profitability is high for an investment even without subsidy; consequently some programmes exclude investments with short pay-back times;
- criteria for grants do not include the financial situation of the applicants; to counterbalance this some programmes are restricted to low-income households or small and medium-sized companies;
- the duration of the programme is short. There is some evidence that the free-riders invest more often in the first two or three years of a subsidized programme, subsequently the proportion of free-riders tends to decrease. Consequently, subsidy programmes should have a minimum duration of 4 to 5 years. Exceptions to this rule occur for programmes designed to promote rapid market introduction of a defined, marketable product or technology (e.g. economizer, high-efficiency gas boiler).

2.5. Premature replacements

Some Member States (e.g. Denmark) pursue a grant policy promoting premature replacement, i.e. reinvestments in energy-saving technologies several years before the end of the usual technical life time. Although this effect is rather similar to free-rider effects, this policy may have some advantages in cases of reducing mid-term unemployment or of periods of stagnating energy prices. During this period, reinvestments can be made more profitable by the subsidy which may influence the investor's decision. Premature replacements dampen the impact on the balance of foreign trade in the event of price increases for imported energy. Premature replacements, however, may also produce negative effects such as economic distortions of particular markets and high inflation rates for particular products and services.

Although several subsidy programmes were explicitly or implicitly designed to promote premature replacement effects, no evaluation study took up this topic nor any related mid-term effects such as economic effects upon the markets concerned.

2.6. Misguided Investment Priorities

In the residential sector and among small and medium-sized firms, there is a lack of both technical energy-related know-how and market knowledge. As many grant schemes limit the subsidy to certain technologies, this may lead to unwise choices as follows :

- As the investor is not aware of the causal links of individual energy-saving investments, he may choose the wrong sequence of investment (e.g. first a new boiler and then insulation of the outer shell of the building instead of vice versa).

- As investors can choose one of several alternatives, their decision may lead to less profitable investment because investors tend to decide on the basis of past investment habits or other pressures (one example is window replacement instead of many other more profitable investments).

- Finally, the grant may result in less profitable investments because the investor does not know the degree of profitability of each of the measures from which he is to choose (e.g., in many cases it is more profitable to invest first in non-subsidized control equipment than in other subsidized equipment such as heat exchangers).

Table 8: Share of different types of energy saving investments in the residential sector subsidized by public programmes in some EC countries

	Country, D	DK	F
Programme	4.35 Bill. Programme	Grant Scheme	AFE Grant Scheme
Evaluation period	1978/79	1981	1980
Type of investment			
Insulation	40.4	36.0	36.0
- roof, cellar	10.1	26.0	-
- walls	25.8	10.0	-
- shutters	4.5	-	-
Conventional heating equipment	5.1	12.0	17.0
Connection to district heating	0.4	n. a.[1]	n. a.[1]
Solar systems heat pumps	4.8	n. a.[1]	6.0
Both, insulation and heating equipment	11.4	-	-
Windows, doors	38.4	36.0	28.0
Draught excluders	-	5.0	-
Others	n. a.	11.0	13.0[2]

n. a.: not applicable for the considered subsidy programme

[1] separate subsidy programme exists [2] 12 % maintenance

As Table 8 indicates, home and building owners obviously choose the wrong type of investment because of insufficient knowledge of profitability in many cases: The misguided ranking of investment into window and door replacement brought about an unintended and unnecessarily low benefit-cost ratio of the public subsidies involved.
Misguided choices of investment priorities and, hence, avoidable losses of possible energy savings could be reduced by the following possibilities :

- individual consultation prior to application or the actual investment decision by the owner; this measure has been in use in Denmark since 1981. Some 800 energy consultants suggest an investment plan to the home-owner on the basis of an individual heat inspection. This consulting is subsidized by the Danish government with 700 DKr (86 ECU) per dwelling. As the distinct decrease of per capita energy consumption in the Danish residential sector since 1980 cannot entirely be explained by high energy price jumps, there seems to be some evidence that heat inspection prior to investments makes the subsidy programme much more cost-effective. Danish experts estimate that the consultation doubled the cost-effectiveness of the invested capital.

- A second possibility is an economic incentive:
  France, for instance, did not give the grant on the basis of a certain percentage of investment cost but on the basis of expected energy savings : 400 FF (61 ECU) per toe saved per year. This condition forced the owner to think about a proper ranking of his energy-saving investments. The French programme, however, was terminated in 1982 because the grant which amounted to around 2 % to 3 % of the investment produced a high percentage of free-riders and high administration costs. Furthermore, firms which made proposals and tenders were sometimes not qualified to estimate expected savings or their proposals were influenced by self-interest. Finally, investments were partly mis-channelled on the basis of short-term profitability considerations (new boiler) instead of long-term profitability (reduction of heat demand by insulation).

  Most of the Dutch grant schemes demand as prerequisite minimum energy savings per Hfl invested. All these prerequisites reduce misguided investment priorities but also increase free-rider effects, which again can be reduced by defining profitability limits or excluding highly profitable investments.

3. Information Programmes

A solid basis of information is a prerequisite for any voluntary energy saving activities. The consumer should at least be sufficiently aware of and informed about

- the necessity of making more efficient use of energy, either for cost-saving or political and economic reasons,
- their present energy consumption and saving potentials,
- concrete actions to be taken or investments to be made and expected savings as a result of these activities.

Prior to the first oil price crisis in 1973, after many years of considerable economic growth and of carelessly consumed low-priced energy in households and less energy-intensive industries, little need was felt for energy conservation. Consequently, energy awareness and energy-related knowledge were often lacking.

In view of this background, one of the first activities of the Governments in almost all EC countries (except Greece) to promoting energy saving was to implement a general information and publicity campaign. In recent years, however, it has been realized that this kind of information does not suffice, especially as a means of encouraging energy-saving investments. It tends to lead to avoiding energy waste more than promoting investments.

In the past ten years the EC countries' central Governments have developed several information strategies which will be classified into four categories below. As far as information policies are concerned it is very important to keep in mind that the amount of activities based on private, local or regional initiatives (industrial associations, chambers of commerce, local and regional authorities, associations of engineers, architects, etc.) and coordinated programmes by governments and other institutions strongly influence the need for centralized information strategies.

3.1. Information campaigns

Besides initial publicity campaigns which aim at encouraging a different attitude towards energy consumption through the mass media, advertisements or leaflets, a comparison between the EC countries revealed the following types of campaigns:

- special campaigns about individual topics which also provide comprehensive technical information or even a form of checklist for energy conservation for households, especially on the following topics:
  - o Belgium: insulation of dwellings
  - o Federal Republic of Germany: insulation, use of household appliances, driving behaviour
  - o France: energy saving in dwellings, weather information to help achieve optimal switch-on/off time of heating systems, economical driving and installing energy-saving devices in cars
  - o Italy: "Agenda for Space Heating Plants Operation"
  - o Ireland: manuals on energy saving options in buildings
  - o Luxembourg: recommendation of insulation standards for new dwellings
  - o United Kingdom: insulation, use of central heating controls, checklist for motorists

- detailed information and checklists for industries, especially in Belgium, Italy (provided by national fuel and electricity companies), Ireland, United Kingdom (partly included in topic 4: education and training). In France and especially in Ireland industrial managers responsible for energy are personally contacted by the National Energy Agency or the Ministry respectively. The United Kingdom actively supports energy managers, with among other activities, an annual conference, and a free "Energy Management" newspaper

- special information for local authorities or other public administrations (France, Ireland)

- accompanying campaigns for other governmental measures, especially
  - o regulations: 19°C temperature limit in France
  - o financial support: leaflets on financial aid in several countries

- campaigns addressed to specific groups who function as intermediaries such as building experts, driving schools, associations (see topic 4: education and training)

- government funds for information campaigns are also spent on subsidizing institutions who test energy-consuming and energy-saving appliances (Federal Republic of Germany) and consumers associations (Germany, Netherlands, United Kingdom).

3.2. External advisory services

In addition most EC countries have implemented advisory services. There are two types of services:

- an external service which offers advice by telephone, replies to inquiries or maintains information centres and
- an "on-the-spot" advisory service.

As far as external services are concerned, all ministries or agencies responsible for energy saving programmes answer consumer inquiries regarding energy saving. All external advisory services of this kind are free for the user. The following types of services are available:

- telephone advice for households in Belgium, Netherlands and especially in Ireland ("Energy Conservation Hotline"); similar service in Denmark on experimental basis
- telephone advice for firms, especially in Belgium (Energy Conservation Agency), Netherlands (Foundation for Energy Information) and the United Kingdom ("Energy Quick Advice Service", till 1982)
- support for voluntary consumer organisations which offer advice in their energy information centres (e.g. Federal Republic of Germany: Arbeitsgemeinschaft der Verbraucher).

3.3. Energy audits

A further informational measure in the field of information even more directly aimed at concrete action is the provision of advice for people "on-the-spot". There are four main types of measure which can be attributed to this heading:

- free advice from national institutions given by trained personnel for boiler tests in industry (Ireland), inspection of heat equipment and buildings in the residential sector (Denmark), inspection of energy-consuming production equipment in energy-intensive industries (Greece)
- in the framework of the Energy Bus Programme of the European Community, financing of well-equipped energy buses for comprehensive technical measuring in industrial sectors in Belgium and in the Netherlands (two energy buses each); subsidized development of buses in the Federal Republic of Germany and in Italy, where bus services are provided by private enterprises

- free energy audits carried out by government approved consultants (France, Netherlands) and subsidized energy advice given by private consultants (Federal Republic of Germany, United Kingdom).
- "Regional Energy Conservation Officers" in Ireland provide on-the-spot advice to energy users in industry and public buildings.

3.4. Education and training

This measure aims at middle and long-term effects on energy saving rather than at immediate investments or behavioural changes. Four principal types of activities were found in the EC countries:

- establishment of energy saving agencies or other information centres which organize seminars, courses etc. on request (Denmark, France, Netherlands)
- central or regional organization of seminars, meetings, visits to firms which are well equipped with energy-saving devices; establishment of formal energy management systems, appointment of regional officers, etc., who organize educational and training workshops and distribute information materials to specific categories of users (Denmark, France, Ireland, United Kingdom)
- publishing handbooks and energy guides for energy saving in specific areas, especially for industrial and commercial sectors with high total energy consumption (Denmark, Federal Republic of Germany, France, Ireland, Netherlands, United Kingdom)
- adaptation of energy saving aspects to existing educational institutions and procedures such as high schools, universities, vocational training driving schools and others (to varying degrees implemented in all EC countries).

3.5. A tentative comparison between the EC countries

Table 9 shows which type of information programme was implemented for all EC countries. It also includes data of total yearly funds per capita in 1982. It must be pointed out, however, that great caution must be used in comparing these figures for the following reasons:

- First, in some countries with a central institution responsible for energy saving, the funds for information activities are included either partially or completely in the total budget of this institution (France, Greece, to some extent in Belgium, Denmark, and the Netherlands). In addition,

education and training measures are sometimes part of the information campaigns where, for example, they are addressed to specific groups such as managers or school teachers.

- Secondly, blank categories in Table 9 do not necessarily mean that no activities exist in the countries but rather that there are no centralized and government financed programmes.

Informational initiatives to promote energy saving often take place with no or only indirect governmental actions. For instance, in some countries institutions or companies providing information are traditionally state-owned and hence more or less controlled by the Government anyway (e.g. fuel and electricity companies in Italy, banks in France and Greece). The funds spent on information on energy saving, however, are not budgeted separately.

The most important factor to be taken into account is the traditional structure of information and communication channels. Roughly speaking, there are two types of structures:

- In France, for example, all types of information and advice are concentrated in the Energy Conservation Agency, AFME. This institution not only prepares the implementation of programmes but also monitors and carries out the measures. Local and regional activities also take place under the directive of AFME.

Table 9 : Information programmes for energy saving in the EC countries

	B	D	DK	F
(1) Information campaigns				
Sectors	all	residential transport	residential	all
Started in	1975	1977	1974	1974
Main activities	mass media, leaflets, advertisements, specific groups	mass media, leaflets, advertisements, support for testing institute	mass media, leaflets, advertisements, energy guides	mass media, leaflets, advertisements, campaigns for special topics
External advisory services				
Sectors	residential, industry	residential, transport		all sectors
Started in	1979	1978		1974
Type of services	free tel. service for firms, free advisory service for households	support for 120 advisory services, of the Consumers Association		telephone advice written answers
(3) Energy audits				
Sectors	industry	commercial industry	residential	residential comm., industry
Started in	1981	1978	1975	1979
Type of services	2 busses, trained personal, 2-days free audits	grants for consulting	inspection of heat equipment and buildings	free audits for small consumers and firms < 5,000 toe/a
(4) Education and training				
Sectors			all	industry
Started in				1977
Main activities		(regional and private activities)	information centre organizes seminars etc. on request	information and training for managers
Total funds 1982 (ECU per 100 capita)	12	22	39	35
Total funds 1982 (MECU)	1.2	13.5	2	19

a) NEC: National Energy Council
b) SVEN: National Foundation for Energy Information

GR	I	IRL	LUX	NL	UK
residential	residential, comm., transport	all, mainly residential	all	all	all
1979 only	1976 - 1980	1974	1978	1974	1975
leaflets, booklet, TV, films	mass media, leaflets advertisements, checklists	mass media, leaflets manuals	leaflets advertisements, specific groups	mass media, leaflets advertisements, specific groups	mass media, leaflets, advertisements
industry	all	all, mainly residential		residential, industry	all non-domestic
1976 - 1980	1975	1980		1977	1977 - 1982
telephone advice	assistance, advice by the National Electricity Board	telephone advice		telephone service of SVEN[b]	telephone advice
industry		industry, commerce	residential	industry	industry, commerce
1976 - 1980		1980 - 1981	1979	1977	1976
visits in energy-intensive industry		all boilers tested by trained staff	thermovision	2 energy busses	grants for consulting
		industry, commerce		all	
		1979		1974, 1979	
		"Energy management Association", seminars, Regional officers		- SVEN organizes seminars etc. - brochures and study day for industries	Energy Management Programmes, schools programme
included in the NEC budget[a]	?	15	30	63	14
		0.5	0.12	9	8

- The situation in the Federal Republic of Germany, for example, is quite different. The Federal Government provides information only on a very broad level. Responsibility for detailed information, i.e., campaigns for special groups, external advisory services, energy audits, education and training traditionally belong to other bodies (such as Länder, chambers of commerce, local authorities) or private institutions and companies such as private associations, organizations and vocational federations (Engineers' Association and others).

Such differences partly explain why the funds spent on information programmes are so different. France, for example, has by far the highest budget of all EC countries.

Activities on the local level are not dealt with here when not coordinated by the central governments. Especially in the field of information this kind of activity, however, is commonly considered very important, in particular for the residential sector.

Information programmes are intended to overcome some of the main constraints for taking energy-saving measures. National differences notwithstanding, in the industrial and commercial sectors particular attention has been paid to small and medium-sized firms. Many of them do not have their own engineer concerned with energy questions; the owners are overburdened with day-to-day problems of production and sales and are consequently often not well enough informed about the main sources of energy consumption, energy flows, and heat losses. In addition there is, what might be called a general information "overload", in the field of energy saving in particular. In all EC countries, therefore, programmes for the industrial and commercial sectors focus on advisory help rather than offering information on a more general level.

In some countries, especially in Belgium, France, Greece and Ireland particular attention has been paid to advisory services for energy-intensive industries.

As far as private households are concerned, little effort is made to reach specific consumer groups through information programmes, in particular the low-income groups who need them most. Obviously, amongst the higher social

classes awareness of the energy problem, of energy-saving potentials and of measures to be taken is higher than amongst less literate groups in the Community.

Particularly for households, personal contact is considered important. Special attention is paid to this aspect in Denmark (home energy checks) and in the Federal Republic of Germany (support for energy information centres). It should be pointed out here again, however, that private or decentralized local activities exist in many countries, which are considered important but are not included in this analysis.

There is a noticeable lack of one type of information, namely feed-back strategies. For example, heat metering takes place "in the dark corner" and only once a year, and heat cost accounts or electricity bills are not clear enough in general, there are no programmes for immediate, clear feedback to people on how much energy they have used or saved.

Comparison of Energy Saving Programmes of EC Member States

ANNEX II

Energy Saving Programmes 1982/83

Energy Saving Programmes 1982/83

This annex will give a brief overview on the general political framework for energy conservation in each Member State, as well as a listing of measures in force in 1982/1983. It does not include R, D + D programmes.

1. Belgium

The Belgian energy policy can be characterized as strongly market-oriented, the Government taking responsibility primarily for the supply side, especially through the implementation of a significant nuclear programme. First energy saving measures have been taken since 1975 when a "calory man" was installed for information about a more rational use of energy. In 1976 the first financial subsidies for energy investments were granted. Governmental White Papers on energy saving have been presented since 1975 and a "National Programme for Reorientation and Rational Use of Energy" has been adopted in 1980.

The appointment of a "Secretary of State for Energy" at the Ministry of Economic Affairs is supposed to give more importance to energy problems and especially to a more rational use of energy.

Among the number of measures for energy saving taken in recent years the Government established the Belgian Energy Conservation Service at the Ministry of Economic Affairs (SCE Service pour la Conservation des Energies) in October 1979. It is responsible for
- directing education campaigns,
- circulating information on conservation techniques,
- preparing governmental measures towards energy saving,
and has largely taken publicity measures in order to acquaint consumers with the need for energy saving.

At present, Belgium's energy saving policy is integrated in a wider political framework, in particular that of the economic redeployment policy.

Besides intensifying financial aids, the Government took a new action called "Energy = new industry", which aims at industrial redeployment towards these key technologies and to set out a framework for cooperation between enterprises, universities and Government.

The Belgian energy saving programmes include all three types of measures under study. Compared to other EC countries, tax relief received pronounced attention by the Belgian energy conversation policy, whereas regulations, especially for buildings, seem to be underdeveloped.

In 1983, the increasing importance of the energy saving policy has found its expression in new programmes and higher public budgets. The Government introduced aids for non-profit making industries and institutions, as well as for development, demonstration and commercialisation of energy saving products. Taking a new grant scheme for energy saving in public buildings also into account, public spending has, in 1983, probably increased to nearly 120 MECU (i.e. about 12 ECU per capita), and has probably been above the 1983 EC average.

List of energy saving measures in force in Belgium

Regulations

1.1. Thermal Insulation Standards for new public buildings, since 1981.

1.2. Temperature limit in all public buildings : 19°C on the average, measured in the middle of the room and near the walls (since 1981).

1.3. Maintenance of Heating Equipment (since 1978) :
- mandatory yearly maintenance of oil and coal fired heating equipment,
- max. exhaust losses of oil fired boilers

1.4. Energy consumption labels for major household appliances : framework law 1981 (according to EC norm) - Regulation inforce for electric ovens (since July 1983)

1.5. Lighting limits :
- limits for commercial neon lighting (1979-82)
- lighting limits on highways (since 1979).

1.6. Speed limits for motor vehicles (since 1975).

Financial programmes

1.7. Grant for insulation of new and existing houses 10,000 - 18,000 FB per case (220-400 ECU), since 1979.

1.8. Tax relief of 40% of insulation investment costs in houses (25,000 FB - 300,000 FB/550-6600 ECU), since 1981, available for owner-occupied dwellings.

1.9. Reduction of V.A.T. from 17% to 6% for modernization and energy saving investments, since March 1982.

1.10 Grant scheme for energy saving in public buildings (since 1983).

1.11 Tax deduction for energy saving investments in industry either legal amortization + additional 35% deduction in the first year or legal amortization on the basis of 135% of investment costs (since 1982)

1.12 Grant of 31 % of deductible energy saving investment costs (equivalent to 11 % of total investment costs) for non-profit making industry (since 1983).

1.13 Grant of 20 % of energy saving investment costs for non-commercial institutions (since 1983).

1.14 Grant of 50 % for studies related to energy saving investments (since 1983).

1.15 Grant of 25 % for commercialisation of energy saving materials or products (since 1983).

1.16 Grant for energy saving investment/oil substitution equipment in agriculture, horticulture and deep-sea fishing (1981-1983).

Information Programmes

1.17 Intensive information campaigns since 1979.

1.18 Energy Audits (Energy Bus) since 1981.

Table A.1: Energy saving programmes in Belgium : 1982 budgets (MECU)

Grants for Insulation of Homes (Wallonia)	2
Tax relief for households	18 (*)
Reduction of V.A.T. for energy saving investments	?
Tax relief for industry	15 (*)
Grants for agriculture	6
Information campaigns	0,7
Energy Audits	0,5
	42,2

(*) estimated

2. Denmark

Denmark's first Energy Plan was published in 1976 and formed the basis for energy policy and important decisions until 1981, when the last plan was worked out.

The target of the Government's energy saving policy - calculated from the forecasts of the "Energy Plan '81" - is to improve the overall energy efficiency by 20 % between 1980 and 1990 and by 30 % by 2000. The projections assume the highest energy savings in the space heating sector (30 % to 40 % between 1980 and 1990) and in the transportation sector (25 % to 35 % until 1990). Surprisingly low expected savings are projected in the industrial, agricultural, fishing, and construction sector (6 % to 24 % between 1980 and 1990).

The "Energy Plan 81" will intensify information, consulting, and regulation measures. High public deficits, the fact that high energy prices and additional taxes enforce additional energy saving, and insufficient knowledge and maintenance in the residential, commercial and public sector seem to be main reasons for this policy. The Energy Plan 81 included

- tightening existing building codes and extension of the control schemes for technical installations,
- the grant scheme for houses and the programme for public buildings which have to be in an "acceptable state of thermal efficiency" before the end of 1987.

Energy pricing plays an important role for energy saving as well as diversification. Residual fuel oil and gas oil prices are by far the highest in the EC. Future district heat and gas prices will be determined by costs and supervised by the Gas and Heat Pricing Committee.

The annual energy conservation funds in 1982 were almost 1,000 Mill. DKr (116 Mill. ECU), i.e. about 22 ECU per capita. High public financial deficits make it difficult to continue these grant schemes in the near future. In fact the 1983 budget has probably been considerably lower than in the previous year. The fact that the grant scheme for renewables is as large as those for energy saving in industry or for utilization of excess heat is an indication of the importance so far placed on developing domestic energy resources in the Danish energy policy.

The regulations apply for the most part to the space heating sector. In particular building codes, first set up in 1961, are the strictest of all EC countries.

Information programmes are mainly coordinated by the Danish Energy Conservation Committee. The National Building Agency runs a special information programme for energy saving in buildings. The total annual information budget is, compared to most EC countries, relatively high (0.39 ECU/cap). In 1983, however, it has possibly been reduced.

Denmark is one of the first countries to have made voluntary consultation fully subsidized before home-owners or tenants may apply for a grant. This seems to be very important to reduce low-return investments as a result of insufficient technical knowledge on the part of the investor.

Four out of thirteen programmes of energy saving started before or in 1975. Five programmes started in the period of 1977-79 and four programmes after the second oil price crisis. Although the Danish energy intensity is relatively low, changes in overall energy efficiency have been surprisingly high since 1973. Denmark seems to be a good candidate to trace significant shares of realized savings to energy saving policy and not just to other factors.

Denmark has a Ministry of Energy responsible for overall energy policy, including energy saving. Conservation policy is implemented and coordinated with other main policy issues by several ministries (Housing, Agriculture and Fishery) and their subordinate institutions (Building Agency, Agency of Technology, Energy Agency).

List of energy saving measures in force in Denmark

Regulations

2.1. Building codes, since 1961; revision in Feb. 1979 and April 1983; each individual part of a newly constructed building must meet the limit values of transmission coefficients.

2.2. After 1 January 1985, the purchaser of a property has to be presented with either an "energy certificate" of the building or with a report by an energy consultant about the energy saving measures to be carried out if the building is to attain the thermal efficiency standards of new buildings.

2.3. Yearly maintenance control of oil-fired boilers :
- for boilers less than 120 KW since 1978
- for large boilers since 1981.

2.4. Energy labelling of domestic appliances, hot water boilers and space heating appliances, motor vehicles: framework law June 1982; so far regulations are in force for electric ovens only.

2.5. Act on reduction of energy consumption in public buildings: since 1975 for state buildings, since 1981 for all public buildings which should be in "good energy condition" by the end of 1987.

2.6. Speed limits for motor vehicles (since 1979).

Financial Programmes

2.7. Grant scheme for house owners and tenants, since 1975, revised in May and December 1982; grant declines for
. owner-occupied residences and apartments from 20% (June 81 - Aug 83) to 10% (Sep 83 - Dec 84)
. rented dwellings from 30% (June 81 - Aug 83) to 15% (Sep 83 - Dec 84).
Grant per dwelling max. 7,000 DKr (860 ECU) incl. costs for heat inspection.

2.8. Grant for oil substitution and energy saving by utilization of excess heat, max. 25% of investment costs; 1977-83.

2.9. Grant scheme for renewables (since 1979)
. 30% of total investment costs
. 10% of total investment costs for heat pumps.
(wood and strawburners excluded)

2.10 Grant scheme for energy saving investments (since 1977):
- up to 40% of total investment costs, max. 800,000 DKr (100,000 ECU); projects with pay-back time shorter than two years are excluded;
- max. 30% for district heating, insulation of industrial buildings constructed before 1974 (max. 12,500 ECU).

2.11 Grant and loan scheme for new energy technology 1982-83 (introduction of new products and processes):
- loans to investments in new equipment
- direct investment in new established enterprises.

Information programmes

2.12 Information campaigns for house owners and tenants since 1974.

Table A.2: Energy saving programmes in Denmark : 1982 budgets (MECU)

Energy Saving in the Home	95
Energy Saving in Industry (*)	9
Public Buildings	12
Information programmes	2
Total	118

(*) includes demonstration programme

3. Federal Republic of Germany

In the Federal Republic of Germany, an overall concept of energy policy has been available in published form since 1973. It is based on detailed reports by renowned institutes and revised at intervals. The most recent revision from November 1981 contains the political guidelines, elements of energy supply and demand, and research and development for energy.

Judging by the financial volume of the governmental measures, the emphasis continues to be laid on the supply side (promotion of coal and nuclear energy), although it must be taken into consideration that these measures also incorporate other aims such as national supply security and labour market considerations. The weight given to energy demand policies, has, however, increased successively, from aiming originally at the "introduction and application" of rational use of energy (Energy Programme, 1973) to aiming at "restricting the

growth of energy consumption by an economical and rational use of energy" (2nd Revision of Energy Programme, 1977), and finally expressing the postulate that policies for energy conservation would continue to take priority (3rd Revision of Energy Programme, 1981).

According to assessments by the Federal Government "the fundamental regulation of energy supplies on the basis of market forces has proved its worth" (Deutscher Bundestag, 1982) and therefore will be continued. This is also felt to be the case in the energy saving policy too. The various governmental measures therefore do not consist of hard-hitting interventions into existing market structures such as changing the tariff autonomy to abolish degressive tariffs, or restricting private transport in favour of public transport. Likewise, taxes on certain energies are levied exclusively as part of the fiscal policy, not as part of an energy saving policy. Thus the energy saving policy, apart from promoting research and development, is based on measures such as information, subsidies, and regulation.

The majority of the measures are aimed at the residential sector, public buildings and district heating. For industry, besides some financial incentives mainly advisory services are employed.

None of the measures used (except moderate speed limits) is directly aimed at the transport sector. There are voluntary agreements instead, like the voluntary commitment of industry to reduce the specific energy consumption of motor cars by 15 % between 1979 and 1985 and the establishment of a DIN norm by which the specific energy consumption of cars is registered for three different speeds.

In keeping with Germany's federal structure, both the Länder and the municipalities also contribute to energy policy; the federal authorities, however, have the final conceptual and financial say.

List of energy saving measures in force in the Federal Republic of Germany

Regulations

3.1. Building codes since 1977, revised 1982
- either total medium value
- or separate values of certain parts of buildings.

3.2. Standards for new boilers and hot water production since 1978, revised 1982.

3.3. Standards of operation for space heating and hot water production, since 1978.

3.4. Mandatory individual heat metering: 50-70% of total cost are calculated according to the consumption
- for new building since 1.7.81
- for existing buildings by 30.6.84.

3.5. Speed limits for motor vehicles, since 1972.

Financial Programmes

3.6. Grant programme for energy saving in dwellings (owners only), since 1978, either 25% of investment costs (till 31.12.82) or 10% tax credit for 10 years (till 30.6.83). The tax benefits will probably be continued till 1987 with regard to new technologies and connection to district heating systems.

3.7. Funds for energy saving investments in federally owned buildings, 1982-85.

3.8. Grants of 7.5% of total investment costs of heating plants, hydro-electric plants, waste incineration, heat pumps, solar and wind energy use, heat recovery, district heating network; since 1975.

3.9. Grant scheme for coal fired heating and power plants and district heating, 1981-85, up to 35% of investment costs.

3.10 Grants of 25% of investment costs for energy saving in greenhouses (insulation, oil substitution by coal, gas, district heating).

Information Programmes

3.11 Support of energy consultation of small and medium-sized firms, up to 20 days within 5 years; 25-75% of consultant's fee; 25% for a first visit. Funds for seminars, meetings, training centres; since 1978, revised 1981.

3.12 Information campaigns for consumers, since 1977; Advisory Service for Consumers, since 1978.

Table A.3 : Energy saving programmes in the Federal Republic of Germany : 1982 budgets (MECU)

DM 4.35 Bill. Grant Programme for energy savings in dwellings		370
Investment Allowance Act § 4 a		50
Programme for energy saving investments in federally-owned buildings		160
Grant scheme for coal-fired heating and power plants, district heating		150
Investment loan programme, Interest subsidy	ca.	75
Accelerated introduction of energy saving technologies and products	ca.	5
Grants for investments in greenhouses		?
Grants for consultations		2
Information campaigns for consumers :		
Federal Ministry of Economics		8.5
Information for consumers : Stiftung Warentest		1.5
Advisory service for consumers : Consumers' Association		1.5
Total :		823.5

4. France

For historical reasons France always paid considerable attention to energy self-sufficiency. Prior to the first oil crisis in 1973, the French energy policy was part of the general framework of economic policy. In 1974/75 a coherent concept for an energy policy was developed in a concise form, setting quantitative goals and covering all sectors of the economy.

(5)

In October 1981 a new energy programme "Plan d'indépendance énergétique" was adopted by Parliament which gave particular emphasis to the topics of national independence in energy supply and economic and social improvements. Its goal of 60 Mtoe annual energy savings by 1990 (i.e. about 50 % of the 1981 final energy consumption) should be achieved through investments and behavioural changes. At the end of 1983, the French government indicated the following still ambitious objectives for supplementary annual energy savings :

- residential sector	16-20 Mtoe
- industry	10 Mtoe
- transport	8-10 Mtoe

This would represent a considerable increase of the annual investments in the rational use of energy from 15 Bill FF (2.2 Bill ECU) in 1982 to 35-40 Bill FF (5.1-5.9 Bill ECU) in the period 1983/90.

Until recently, the main bodies responsible for energy saving programmes were : AEE (Agence pour les Economies d'Energie) and COMES (Commissariat pour l'Energie Solaire). To improve the prerequisites for realizing energy conservation policies these bodies were amalgamated to a large agency AFME (Agence Française pour la Maîtrise de l'Energie) with regional offices.The AFME, established in 1982, has a yearly budget of 1,250 M. FF/191 MECU (1982) which covers personnel cost, expenses for information campaigns, advisory services, and some of the grants.

In the industrial and agricultural sector, the government is offering credit and fiscal facilities for the firms investing in energy saving; the banking restrictions concerning credit are not applicable for energy saving investments; specialized regional institutions for financing and leasing or rent of energy-saving equipment have been created; low interest loans and tax relief are granted. In addition, the Government promotes intensive consulting. Different actions are taken for small and medium-sized firms (with an annual energy consumption of less than 5,000 toe) and large-scale firms, which are incited to negotiate agreements directly with the AFME.

The wide range of measures taken in the residential and commercial sector is due to the variety of energy consumers in this sector. Half of the public funds spent in this sector come from the AFME and half from the Ministry of Urban Development and Housing and other institutions owning public buildings. In 1982

a special fund (Fonds Spécial de Grands Travaux) has been created. It is financed since 1983 by a tax on motor-fuel (2.7 centimes per litre) and covers grants mainly for social and public housing as well as for district heating.

Besides this, the AFME concentrates its activities on free diagnosis, approval of consulting firms, training of consultants, and information campaigns.

In the transport sector the AFME spends about the same funds on research and development programmes as on information and training of the public. Free consulting services are offered for transport firms with high energy consumption. A special programme is implemented for the fishing fleet.

To develop the French energy saving policy further, the Government tries to improve the energy consciousness by means of information campaigns and to reach a better cost-effectiveness by allocating financial incentives to intermediaries rather than direct to consumers.

Summing up, the French Government has been very active both with regard to the great variety of measures and their comprehensiveness. With the creation of AFME the conception of the French energy saving policy has become clearer but, considering the multitude of measures, there still seems to be a need for integration, taking into account the interdependence of the different measures.

In 1982, according to information given by AFME, about 560 MECU have been spent as grants and tax reliefs and about 360 MECU as low interest loans.
The following table gives an approximate idea of the budgets for the different programmes.

List of energy saving measures in force in France

Regulations

4.1. Thermal insulation standards for new buildings taking into account: 3 climatic zones, 7 types of dwellings, electric heating and coal, fuel oil or gas heating; since 1974, revised September 1982.

4.2. Mandatory standards for heating systems for all new commercial buildings (since 1978) and all residential buildings (since 1974).

4.3. Mandatory checking of heating systems (since 1977).

4.4. Mandatory individual metering of heating and hot water costs, since 1975 (existing buildings since 1979).

4.5. Temperature limits 1974-78: 20°C; since 1979: 19°C.

4.6. Labelling of domestic appliances since 1976; mandatory for boilers, frigidaires, washing-machines, TV sets, ovens, vacuum cleaner.

4.7. Restrictions for commercial lighting since 1974, strengthened 1979.

4.8. Restrictions for the delivery of fuel oil since 1974, strengthened 1980 and 1982 (mandatory book-keeping for suppliers; limited delivery of fuel oil based products for consumers).

4.9. Limited advertisement for energy consuming appliances, since 1974, strengthened in 1979.

4.10 Minimum performance standards for all boilers, since 1975.

4.11 Speed limits for motor-vehicles, since 1974.

4.12 Standards for testing and publication of gasoline consumption of new cars, since 1975.

4.13 Standards for testing energy saving devices in private cars, since 1976.

Financial Programmes

4.14 Tax deduction for energy saving investment in buildings (in new buildings only for solar appliances and heat-pumps), for owners and tenants; per year: 8,000 FF + 1,000 FF per person (1,200 + 150 ECU), since 1982; for interest payments: deduction of 7,000 F + 1,000 F (1,070 + 150 ECU).

4.15 Grants for energy saving in existing buildings
- ANAH (since 1975, revised 1982): 40%, up to 60% for owner-occupiers of apartment houses built before 1975
- PALULOS (since 1979, rev. 1982): 40%, up to 21,000 F (3,200 ECU) for rented social housing
- DDE (since 1979): 20-25%, up to 17,510 F (3,000 ECU) for low-income people.

4.16 Grants for investments in public buildings between 20% and 70%; since 1982.

4.17 Loan programmes :
- special loan for new buildings with higher standards for "energy performance" (since 1980, strengthened 1982)
- special loan for solar use in buildings
- special loan for energy saving investment in industry and agriculture (1977-31.12.82).

4.18 Grants for installation of heat pumps
- one family houses max. 3,500 F (530 ECU) till Dec. 82
- apartments max. 1,500 F (230 ECU) till Dec. 83.

4.19 Grants for district heating (since 1982) per distributed toe:
600 F (92 ECU) per 5,000 F investment and
12% of 5,000-9,000 F investment.

4.20 Aid for reconversion to coal
- 25% grant of additional expenditure up to 250 F (38 ECU)/toe reconverted and 50% grant for preliminary studies
- interest subsidy for long-term loans.

4.21 State warranties and leasing (SOFERGIE)

4.22 Special tax relief for energy saving investments 10% (1980-85) and subsidized loans.

4.23 Accelerated tax depreciation for energy saving investments (since 1977).

4.24 Grants of 20% of energy saving investment costs for small and medium sized firms (since 1981).

4.25 Grants for energy saving investments in fishing boats (till Dec. 82): 50% (1981) and 25% (1982).

Information programmes

4.26 Grants for energy audits and studies (since 1981).

4.27 Grants for thermal diagnosis of social dwellings (since 1982).

4.28 Grants of 50% for engineering studies not leading to investment (since 1979).

4.29 Information campaigns for energy-saving in existing buildings (since 1974, strengthened 1979).

4.30 Information campaigns for the industry since 1976.

4.31 Information and training of specialized consulting firms (since 1979).

Table A.4 : Energy saving programmes in France : 1982 budgets (MECU)

Buildings :	ca.
Subsidy for low interest loans (loan sum 1982 for new buildings : 15 MECU; for existing buildings : 8 MECU)	0.5
Tax relief	90
Grants	200
Promotion of new energies	26
Special programme for public buildings	64
District heating	69
Industry and Agriculture :	
Accelerated depreciation	20
Subsidy for low interest loans (loan sum 1982 : ca 335 MECU)	9
Leasing or rent	?
Grants	66
Publicity campaigns and consulting	19
Total	563.5

5. Greece

As far as overall energy savings are concerned, some isolated measures to save energy do exist, but a comprehensive energy saving policy covering all types of measures including financial incentives is lacking. For the three types of programmes considered - regulations, financial support, information - the following measures have been taken :

- In the residential sector mainly two regulations are in force: building cod for new houses and limits on room temperatures. Financial incentives are only available for the installation of solar heaters (the Government promotes the provision of loans and allows longer repayment periods, but does not subsidize the interest rates).

- Energy consumption in industry has been given more attention by the Government as reflected by measures such as mandatory energy auditing in energy-intensive industries and mandatory 3 % investments of the capital for machinery installed for energy-saving measures both in new and expanding old industries. One main problem here, however, is the Government's inadequate facilities (lack of staffing) to ensure that regulations are observed. In addition some information activities are being pursued by the Committee for Energy Conservation in Industry (CECI) which also suffers from insufficient public funding. Financial incentives have been offered to industries since 1978. Until recently (1982), grants covered both energy saving investments and general restructuring and expansion of industries (Law No. 1116). The same applies to the new Development Law No. 1262/82 which is now in force.

- The transport sector in Greece consumes the highest percentage of the final energy consumption compared with all other EC countries. Severe problems are the rapid increase in private motorization and the inadequacy of public transport facilities (especially the lack of an adequate railway system, bus priority tracks, etc.) together with the concentration of working places in the cities. In addition to measures such as progressive taxation on cars and improvements in public transport (electrification) as well as relatively high gasoline prices there are some regulations affecting private car use such as speed limits and driving restrictions, however, these are not too effective. One reason is that high prices of new cars due to high taxation does not encourage people to replace the old, low-efficient cars with new ones.

Until recently, one of the main purposes in awarding grants was to support investments in less developed regions, whereas saving energy was considered of only secondary importance. Another measure which has more impact on environment protection than on energy saving is the prohibition of heavy oil for heating purposes (all new boilers; old boilers only in the cities of Athens, Saloniki and Patras; in force since 1975).

The overall responsibility for energy conservation policy is in the hands of the Ministry of Energy and Natural Resources. The body principally involved in planning energy programmes is the National Energy Council (NEC) which advises the Government with regard to current programmes and suggests new energy conservation policies to the Ministries. The National Energy Council, established in 1975 (and also suffering financial constraints), has put forward many recommendations for an improved and more comprehensive energy conservation policy, but these have never been fully adopted by the Government. In particular, measures such as mandatory thermostats, individual heat metering, and grants for retrofitting have been suggested for the residential sector but have not been realized (National Energy Council, 1982).

A Ministerial Decision (237/1980) says that the following energy-saving goals should be reached :

- in old residential buildings, 10 % of oil used for space heating per year has to be saved
- in the public sector 15 % per year
- in the industrial sector 5 % per year

compared to the 1978 consumption.

There are, however, no concrete proposals as to how to realize these objectives.

List of energy saving measures in force in Greece

Regulations

5.1. Building codes for new residential and public buildings (three climatic zones) since 1979.

5.2. Operation standards for domestic boilers since Sept. 1982.

5.3. Firms with more than 50 employees have to spend 3% of total investment on engineering equipment on energy saving, otherwise they have to pay the sum as tax by the end of 1984; since 1980.

5.4. Mandatory auditing for firms with high or medium voltage electricity or using oil based liquid fuels; since 1979.

5.5. Lighting limits and closing hours (since 1975).

5.6. Temperature limit: 18°C for centrally heated office buildings, since 1979.

5.7. Speed limits for motor-vehicles (since 1975).

Financial Programmes

5.8. Loans for solar water heaters (with longer repayment period) and tax relief of 30,000 Dr (450 ECU); since 1980.

5.9. Up to 70% loan of total costs for solar heaters in hotels; longer repayment period (5 years); 1980-82.

5.10 50% grants for investments in alternative energies (coal, waste heat, etc) or energy conservation, in 1981 and 1982.

Table A.5 : Energy saving programmes in Greece : 1982 budgets (MECU)

Grants for investments	17

Total	17
	===

6. Italy

The main activity of the Italian energy saving policy after the first oil crisis of 1973 was the preparation of a first National Energy Plan. This was proposed in 1975 but not fully implemented. As a result, some information activities were started, and a law (No. 373/1976) was passed regulating the insulation of buildings and installation and operation of heating systems. The law has been in force since 1977.

In answer to the overall economic crisis which began in 1975, the Restructuring and Reconversion of Industry Law (No. 675/1977) was approved. It provided funds for industrial investments including improvements in energy efficiency. No findings are available as to the extent of energy saved through this measure.

A revised version of the National Energy Plan appeared in 1977. Its main emphasis was on three topics :

- energy saving (regulations and information)
- pricing
- development of indigenous energy sources and nuclear power.

The plan does not include financial incentives to encourage energy saving investments, the assumption being that increasing energy prices were sufficient economic incentive to take energy saving measures. In addition, it is argued that in Italy the overall energy consumption level is quite low compared with other EC countries, even considering climatic differences.

At the end of 1981, a new and comprehensive National Energy Plan has been approved. As far as energy saving is concerned, the plan has led to the approval of Law No. 308 (1982) which, for the first time, provides financial incentives to promote energy saving investments in all sectors.

With the exception of the energy transformation sector (district heating and industrial heat/power production), the effectiveness of this law, however, still depends on regulations governing implementation which have not yet been formulated. The responsibility lies with the Ministry for Industry and CIPE (Interministerial Committee for Economic Programmes) which also awards the grants.

The goals for savings through the National Energy Plan are 15 Mtoe per year by 1985 and 20 Mtoe per year by 1990 which represent approximately 12 % and 15 % respectively of the primary energy consumption of 1982.

The governmental information campaigns were not continued since 1981. The main responsibility for information programmes has been delegated to the National Electricity Board (ENEL, Ente Nazionale per l'Energia Elettrica) which supplies about 90 % of electricity in Italy. The ENEL philosophy is not to sell electricity but to sell a service. With Law No. 308, ENEL's responsibilities have been extended to the active promotion of energy saving and increased use of renewable sources. From 1983 on, the public should be able to purchase solar equipment and heat pumps from ENEL and pay for them with their regular electricity bill.

Additional information programmes are carried out by Agip Petroli, a subsidiary of ENI (Ente Nazionale Idrocarburi) which offers local energy advice services in all sectors, and ENEA (Ente Nazionale per la Ricerca e lo Sviluppo dell' Energia Nucleare e delle Energie Alternative) which provides technical and scientific advice to public authorities.

List of energy saving measures in force in Italy

Regulations

6.1. Insulation standards for all new and essientially modernized residential and office buildings (six climatic zones) since 1978.

6.2. Standards for boilers for heating and hot water production, since 1978.

6.3. Operation limits for boilers (according to climatic zones), since 1980.

6.4. Efficiency standards for boilers since 1981.

6.5. Temperature limits in new buildings (since 1978)
- 20°C (not in production premises)
- 48°C for central heated hot water.

6.6. Energy labelling (according to CEE norm), framework decree for domestic appliances and application for electric ovens in 1982.

6.7. Appointment of Energy Managers in industries with more than 1.000 employees or more than 10,000 toe consumption per year, by April 30th, 1982.

6.8. Speed limits for motor-vehicles (since 1977), according to engine size.

Financial Programmes

6.9. 30% grants for energy saving investments: buildings, CHP, alternative sources; 1981-83 (not yet implemented).

6.10 25% grants (up to 500 Mill. lire) or 10-year loans with interest subsidy for energy saving equipment with hydrocarbon or electricity savings; 1981-83 (not yet implemented).

6.11 50% grants or loans with interest subsidy for use of renewable energy sources; 1981-83 (not yet implemented).

6.12 30% grants for production, recovery and distribution of heat by cogeneration or renewable energy sources; 1981-83.

6.13 30% grants for small hydroelectric plants; 1981-83.

6.14 20% grant for municipalities for the purchase of electric cars or cars using mix of gasoline and alcohol 1982/83; (not yet implemented).

Information Programmes

6.15 Information campaigns by energy authorities (ENEL, ENI, AGIP), since 1975.

Table A.6 : Energy saving programmes in Italy : 1982 budgets (MECU)

Grants for energy saving investments (*)	119
Loans or grants for investments, Interest subsidy (*)	25
Grants and loans for using renewables (*)	68
Grants for combined heat and power production	109
Grants for hydroelectric plants	15
Incentives for the purchase of electric cars (*)	1.5
Energy authorities' information campaigns	?
	337.5

(*) not yet implemented

7. Ireland

The Irish energy saving policy is characterized by two main issues :

- achieving cost-effective energy savings
- switching away from heavy dependence on oil and switching to solid fuels whenever possible.

Saving programmes commenced in 1974. The emphasis lies on voluntary cooperation rather than mandatory measures. The crucial point is to provide information to industry, especially small firms, public sector and to households. In the public sector area conservation measures are being taken in Government Buildings, Health Board Buildings, schools and by Local authorities.

The Department of Industry and Energy, set up in September 1981 as a combination of the Department of Energy (established in 1980) and the Department of Industry, is responsible for all action taken and receives cooperation where appropriate from other Departments (Transport, Environment) and State Agencies.

Governmental energy saving activities focus on information and advice (e.g. publicity campaigns and telephone service for all sectors, especially households, National Boiler Testing Service, replaced in 1983 by Steam Plant Audit Service, Energy Management Programmes, programmes for public buildings), on some financial support schemes (Home Improvement Grant Scheme, tax relief on labour cost of insulation in dwellings, Fuel Efficiency Survey Grant Scheme) and only to a small degree on regulations (thermal insulation standards, speed limits)

In addition, the Dublin Transportation Authority has been set up which shall improve the public transportation services. In the transport sector, energy saving activities are rather limited.

In the residential sector, the main constraint for energy saving efforts is shortage of disposable income. Above all, households should preferably burn solid fuels in closed rather than open fires (90 % of dwellings are still heated by open fire with coal, peat or wood).
Financial allocation for conservation activities already the lowest per capita in the Community, was cut in 1983 due to budgetary constraints.

List of energy saving measures in force in Ireland

Regulations

7.1. Thermal insulation standards (since 1979, revised 1982) for local authority and grant aided housing.

7.2. Speed limits for motor-vehicles.

Financial Programmes

7.3. 33% grants for insulation of attics, lagging of hot-water cylinders and/or weather stripping of doors and windows, max. 50 IR£ (73 ECU); since 1980.

7.4. Home Improvement Scheme : 66% grant for building of a chimney and provision of a fireplace with back-boiler; max. 600 IR£ (875 ECU); since 1981.

7.5. Tax relief on labour cost of insulation; 50 IR£ to 450/900 IR£ (single/-married), since 1979.

Information Programmes

7.6. Fuel Efficiency Survey: 33% grant for industrial consultants, since 1980.

7.7. Yearly publicity campaigns, since 1974.

7.8. Energy Conservation Hotline : telephone advisory service for all sectors, since 1980.

7.9. Steam Plant Audit Service : Testing of steam traps and boilers in larger steam using industries (replaced National Boiler Testing Service in 1983)

7.10 Energy Management Association and Regional Energy Conservation Officers, since 1979.

7.11 Conservation programme for public buildings: manuals, audits and surveys; since 1980.

Table A.7: Energy saving programmes in Ireland : 1982 budgets (MECU)

Grant scheme for insulation of domestic dwellings	0.8
Tax relief of labour cost of insulation	?
Energy Saving in Industry	0.8
Energy Saving in Transport	0.03
Information programmes	0.5
	2.13

8. Luxembourg

The Government of Luxembourg has not yet implemented an overall energy saving policy nor set any quantitative objective for energy saving. One reason for this delay is the economic structure of Luxembourg, especially characterized by the energy intensive iron and steel industry which alone consumed 88 % of the total final industrial energy in 1980.

Energy taxes like most other indirect taxes are rather low compared to other countries. Diesel, gasoline and electricity prices have significant lower prices as in most other EC countries.

Since 1979 the Luxembourg Government has taken steps to promote energy saving and substitution. The Ministry of Energy aims at the following objectives:

- more rational use of energy,
- diversification of energy sources, especially oil product substitution,
- improvement of distribution networks.

Measures provided by the Government are relatively few compared to average practice of the EC countries. They concern information campaigns and some financial support. Regulations are only in force for public buildings and for the transport sector; besides mandatory checking of boilers there is no regulation in the residential, commercial, or industrial areas.

List of energy saving measures in force in Luxembourg

Regulations

8.1. Thermal insulation standards for all new public buildings, since 1979 (Recommended insulation standards for private houses).

8.2. Yearly controls of heating installations burning fuel-oil, since 1979.

8.3. Temperature limits in public buildings: 20°C, since 1979.

8.4. Speed limits for motor-vehicles (since 1974).

Financial programmes

8.5. 25% grants
- up to 15,000 FLux (330 ECU) per dwelling for insulation of roof/floor and installation of heating control systems (since 1979)
- up to 20,000 FLux (440 ECU) for double-glazed windows and insulation of outer walls (since 1980).

8.6. 40% grant for thermovision of private houses (since 1979).

Information programmes

8.7. Information campaigns since 1978.

Table A.8: Energy saving programmes in Luxembourg : 1982 budgets (MECU)

Grants for energy saving investments in private houses	1.3
Grants for Thermovision of private houses	0.1
Information campaign	0.02
	1.42

9. Netherlands

As the natural gas reserves of the Netherlands will dwindle rapidly in the next 20 to 30 years, the government stressed the importance of energy saving in its first Energy Memorandum issued in September 1974 and, more insistently, in its second Memorandum of September 1979.

In the Memorandum of 1979, the energy saving policy sets targets that by 1985, energy efficiency would improve 10 % compared to 1977, by 1990 20 % and until 2000 by more than 30 %. These targets are broken down for several sectors of consumption.

The targets are supported by an energy saving policy which focuses on information and subsidies (mainly grants for investments), but also promotes research and development and uses energy pricing to some extent. Specific energy savings required as a minimum achievement or estimated range from 0.6 toe per 1,000 ECU (central government programme) to 2.1 toe per 1,000 ECU (energy grant programme for industrial sectors).

Energy-saving targets of the Dutch Government broken down by sector of consumption, 1980 - 2000

Sector	Share of TFC 1) 1977	Efficiency improvement, targets on the basis of 1977 1985	1990	2000
Residential heating	15 %	20 %	33 %	45 %
Other residential consumption	7 %	5 %	10 %	20 %
Commercial and Public Sectors	18 %	15 %	20 %	35 %
Transportation	13 %	10 %	15 %	25 %
Industry, incl. building trade	47 %	10 %	15 %	30 %
1) Total Final Consumption	100 %	10 %	20 %	30 %

Source: Ministry of Economic Affairs, 1979

Information programmes are coordinated by the Netherlands Energy Saving Information Foundation (SVEN) which also carries out energy audits, 50 % of which are financed by industry.

At present, regulations exist only in four cases (building codes for newly built houses and for office buildings, efficiency standards for gas boilers, and speed limits). Further spheres in which regulations are currently being considered are individual heat metering, efficiency standards, energy labels.

Four programmes started immediately after the first oil price increase, a further three started in 1977/78, and another seven programmes (five of them subsidies) have started since 1980 during or after the second oil price increase

Most of the programmes are implemented by the Dutch Ministry of Economic Affairs or local and governmental institutions. Municipalities are empowered to set their own building regulations.

List of energy saving measures in force in the Netherlands

Regulations

9.1. Building codes for new houses, which are financed or subsidized by government or municipalities since 1977, revised in 1981 and 1982. Municipal by-law contains regulations mainly for ground level floor.

9.2. Building codes for new office buildings since 1981.

9.3. Minimum efficiency standards for gas boilers since 1972, several revisions.

9.4. Speed limits for motor vehicles.

Financial Programmes

9.5. Grants for insulation of existing dwellings (since 1978):
- 25% (houses)/30% (apartments) for wall, roof, and ground floor insulation
- 15% (houses)/25% (rented apartments) for double glazing and secondary panes.

9.6. Subsidies for district heating: grants (variable percentage), long-term loans; since 1978.

9.7. Grant of 250 Hfl (96 ECU) for economizers and high-efficiency central heating boilers, since Sept. 1981 (supposed to be temporary).

9.8. 10% grant for energy saving investments, additional 10% for period Feb. 1982 - December 1983; 25% grant for solar and wind energy use in industry and 15% grant for coal conversion.

9.9. 25% grant for energy saving investment in the non-profit sector up to 2 mio Hfl (0.77 MECU); since 1981.

9.10 Special loans for large energy investments from Dutch Investment Bank, since 1982

9.11 Energy saving programme for governmental buildings, since 1980

9.12 Grant of max. 25% of energy saving investments in greenhouses; 1981-84.

Information programmes

9.13 50% grant for consulting costs and energy audits (busses) up to 5,000 Hfl (1,900 ECU) for industry and commercial sector (since 1977).

9.14 Information campaigns since 1974 with increasing intensity.

Table A.9: Energy saving programmes in the Netherlands : 1982 budgets

Subsidy scheme for insulation in dwellings	97
Subsidies for district heating	14
Energy grant - Law of Investment	54
Grant for economizers (high-efficiency boilers)	6
Subsidies for the non-profit sector	13
Energy conservation by the central government	19
Grant for energy conservation in greenhouses	38
Information campaigns	3.5
Grant for conservation consulting	4.5
Energy audits for industry and commercials	0.5
	249.5

10 United Kingdom

The British energy saving policy includes four major elements :

"Economic pricing" of energy is considered the most important measure. It is central to the market-oriented approach of the government that energy should be priced realistically, i.e. the policy aims to have energy prices reflecting long-term costs of supply and underline the true value of resources.

Information and advice, mainly publicity campaigns ("Make the most of energy") and support of energy managers (Regional Energy Conservation Officers, Energy Manager Groups, National Energy Management Conferences, and publicity including

free newspapers). Compared to other Member States, the central government's budget for information seems to be relatively low per capita (see Annex I, table 9).

Financial incentives concentrate on promoting cost effective saving measures (Coal Firing Scheme, Tax allowance for insulation in industries, Home Insulation Scheme) or are combined with information (Energy Surveys Scheme, Energy Thrift Scheme). Per capita, they are lower than EC average (see Annex I, table 5).

Regulations are rarely used:
- thermal insulation codes for new buildings
- temperature limit for new domestic buildings
- energy efficiency standards for new heat generating appliances
- mandatory fuel consumption testing and labelling for new cars.

In addition, great attention is paid to energy saving in Government buildings. As a preliminary result, total energy savings of 40 % have been achieved in this sector over the past nine years.

The responsibility for energy saving programmes was fragmented through 12 bodies; the main responsibilities lay with the Department of Energy, the Department of the Environment (buildings), the Department of Industry, and the Property Services Agency (public buildings). The activities of the new "Energy Efficiency Office" created in 1983, focus mainly on information and consultation.

List of energy saving measures in force in the United Kingdom

Regulations

10.1. Thermal insulation standards for dwellings and non-dwellings (roofs and walls) since 1979, revised 1982.

10.2. New heating plants in non-domestic buildings must be equipped with control systems (since April 1982).

10.3. Mandatory insulation of new pipes, ducts and storage vessels (since April 1982).

10.4. Temperature limit for non-domestic buildings: 19°C (since 1980).

10.5. Mandatory energy labelling for cars (since 1976).

10.6. Speed limits for motor-vehicles (since 1974).

Financial Programmes

10.7. Homes Insulation Scheme:
- 66% grant (max. 69 £/125 ECU) for basic insulation of lofts, pipes, tanks (since 1978)
- 90% grants for elderly (since 1980) or severely disabled on low incomes (since 1982); max. 95 £/170 ECU.

10.8. Tax allowance of 100% in the first year for insulation expenditures of existing industrial buildings (since 1974).

10.9. Coal Firing Scheme (1981-March 1983): 25% grant for industrial switching from oil to coal; since 1982 also for switching from gas to coal.

10.10 Grants for energy saving in the public sector (local authority dwellings), since 1978.

10.11 Energy saving in government's estate through investments, better maintenance and training; since 1972.

Information programmes

10.12 Energy Survey Scheme:
- grants up to 75 £/136 ECU for one day surveys of industrial, commercial, public organisations, since 1976;
- 50% grants for longer surveys and CHP feasibility studies (max. 10,000 £/18,000 ECU), since 1978.

10.13 Grants for voluntary organisations for promoting and preparing of Home Insulation Projects.

10.14 Publicity campaigns, education and training; since 1975.

Table A.10 : Energy saving programmes in the United Kingdom : 1981/1982 budgets (MECU)

Energy Saving in the Home	65
Energy Saving in Industry	4
Energy Saving in Offices and Commerce	138
Energy Saving in Transport	1
Information	8
Total	216