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CONSEQUENCES OF THE PROPOSED CARBON/ENERGY TAX

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Energy in Europe

TO OUR READERS

We are pleased to send you a copy of the Commission report to the Council on the Energy Consequences of the proposed Carbon/Energy tax. A condensed version appeared in No 20 which you will have received at the beginning of this year (pages 10-18), and will appear in German in No 21 (which will be published this summer).

Regrettably, producing the full version in further languages would have brought about delays which would have reduced its interest. However, the original document SEC (92) 1996 was of course produced in all nine languages for forwarding to the Council, and can be obtained from Community delegations in the Member States and elsewhere in the world, from European Documentation Centres.

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THE ENERGY CONSEQUENCES OF THE PROPOSED CARBON/ENERGY TAX

SUMMARY

In its conclusion the Joint Energy/Environmental Council of 13 December 1991 recognised that the introduction of Community-wide taxation would pose a wide range of complex issues requiring further study by Ministers. Among these issues are the energy policy consequences. The Commission services have prepared the attached analysis to facilitate this work.

In May of this year the Commission proposed a Community strategy for stabilizing CO2 emissions at the 1990 levels for the year 2000. The economic aims of this strategy are to increase energy efficiency and lower the carbon emissions of Community energy production and use. This constitutes a comprehensive approach combining specific proposals on energy efficiency, renewables and an energy/carbon tax.

The following analysis presents quantitative simulations and assessments in particular of the impact of the proposed carbon/energy tax.

The combined results of this Community strategy and those of the Member States' own complementary programmes are designed to achieve the stabilization objective. Indeed the tax will make an important contribution to this effort by offering a clear signal to the markets for immediate and longer-term changes in energy production and use. As the Commission study shows, the tax by itself will not be sufficient to achieve the objective, unless combined with the other elements of the strategy. These measures are designed to be mutually reinforcing. Adoption and intensive implementation of the SAVE and ALTENER proposals on energy efficiency and renewables are a pre-requisite. Similarly, the THERMIE and JOULE programmes will each make their contribution.

In the accompanying analysis the reference scenario shows that an increase of about 11% of CO2 emissions up to the year 2000 needs to be avoided in order to achieve the Community's CO2 stabilization objective at 1990 level. Compared with the 1990 baseline the growth of emissions could be reduced from 11% to 7% in the tax scenario. The contribution of the tax to the stabilization objective could therefore amount to nearly 4%, which represents more than one third of the total CO2 abatement effort to be made.

In the model simulations these tax effects would result mainly from changes in energy intensity, but substitution has also an important role to play. Such substitution would however only marginally change the energy balance of the Community in the year 2000.

The effects of carbon/energy taxation in the various demand sectors differ quite substantially. Transport and power generation, the main Community CO2 emitters, respond only moderately to the introduction of the tax and continue to show considerable CO2 emission growth. Already existing high taxation on transport fuels and the long lead times involved to replace the power generation stock seem to be the main reasons. Within the domestic and tertiary sectors CO2 emissions (excluding indirect ones through electricity consumption) would be practically stabilized due to the tax and in industry there would be a substantial CO2 emission decrease in the tax case.

In addition to the effects which can be modelled there are others, for example, the tax incentives foreseen in Article 11 and targeted implementation measures in the framework of tax neutrality (as illustrated in the explanatory memorandum) which would increase the efficiency of the CO2 abatement impact of the proposal.

Finally, simulations up to the year 2005 show that the tax instrument would generate more marked effects in the long run. A longer time horizon with regard to CO2 abatement better reflects the constraints in the energy sector with regard to technological and structural changes away from high carbon content fossil fuels.

THE ENERGY CONSEQUENCES OF THE PROPOSED CARBON/ENERGY TAX

INTRODUCTION

1. On 29 October 1990 the joint Energy/Environment Council decided 'to take actions aiming at reaching stabilization of the total CO2 emissions by 2000 at 1990 level in the Community as a whole'. This Community CO2 stabilization objective was confirmed by the joint Energy/Environment Council on 13 December 1991, and most recently at the United Nations Conference on Environment and Development, the Community and its Member States reaffirmed this objective when signing the Convention on Climate Change.
In order to contribute to the achievement of the CO2 stabilization objective the Commission this May made formal proposals in the frame of 'A Community strategy to limit carbon dioxide emissions and to improve energy efficiency'[1]. This strategy had already been outlined in October 1991[2], and it covers the following proposals:

- Specific actions for greater penetration for renewable energy sources (ALTENER)[3];
- Council Directive to limit CO2 emissions by improving energy efficiency (SAVE programme)[4];
- Council Decision for a monitoring mechanism of Community CO2 and other greenhouse gas emissions[5];
- Proposal for a Council Directive introducing a tax on carbon dioxide emissions and energy[6];
- 1993 call for tender in the frame of the THERMIE programme focussing on the reduction of CO2 emissions[7].

2. The joint Energy/Environment Council on 13 December 1991, recognised that the introduction of Community-wide taxation of energy consumption is likely to be needed in order to achieve the CO2 stabilization objective. It was also recognised that this would pose a wide range of complex issues, including the energy policy consequences of the proposed tax. The Council therefore invited the Commission to study the energy consequences of the proposed carbon/energy tax.

3. The following analysis is submitted to the Council in reply to this request. It describes the energy-related CO2 emissions in the base year 1990 broken down by Member state, sector of activity and fuel (chapter 1); it summarizes the principal routes and instruments for achieving CO2 emission stabilization as well as the energy implications of the stabilization objective (chapter 2). Chapter 3 illustrates these issues by showing how CO2 emission stabilization (indeed reduction) actually occurred between 1980 and 1990. The following two chapters deal with this decade showing the results of the Commission's most recent reference scenario to 2000 as well as a scenario reflecting the introduction of Community wide carbon/energy taxation.

1 *COM(92) 246 final, 1 June 1992.*
2 *SEC(91) 1744 final, 14 October 1991.*
3 *COM(92) 180 final, 29 June 1992.*
4 *COM(92) 182 final, 26 June 1992.*
5 *COM(92) 181 final, 1 June 1992.*
6 *COM(92) 226 final, 30 June 1992.*
7 *OJ C179, 16 July 1992, p.14.*

I. THE 1990 BASE YEAR SITUATION

4. Energy-related CO2 emissions in 1990 in the Community (former GDR included) amounted to 3042 Mt CO2. A breakdown of these emissions per Member State is shown in the following table.

Table 1: Energy-related CO2 emissions in 1990

	Mt CO2	%
Belgium	112.0	3.7
Denmark	53.1	1.7
Germany	1005.0	33.0
Greece	73.7	2.4
Spain	210.7	6.9
France	365.7	12.0
Ireland	30.8	1.0
Italy	402.4	13.2
Luxembourg	12.5	0.4
Netherlands	157.3	5.2
Portugal	39.9	1.3
United Kingdom	579.2	19.0
Community	3042.3	100

For detailed tables: see annex 1

CO2 emissions per capita or per unit of GDP vary widely between Member States. Per capita emissions range from 4.1 tonnes in Portugal to 12.7 tonnes in Germany (the special case of Luxembourg - 33.2 tonnes excluded); the Community average amounts to 8.9 tonnes per capita.

Table 2: Energy-related CO2 emissions per capita (tonnes)

P	ES	F	IT	EL	IRL	COM	UK	DK	NL	B	D	LUX
4.1	5.4	6.5	7.0	7.3	8.7	8.9	10.1	10.3	10.5	11.3	12.7	33.2

Reasons for such variations in per capita emissions include differences of industrial structures, different structures of energy balances, different climatic conditions and differences in the level of economic activity across Member States.
Related to economic activity, CO2 emissions per unit of GDP show a somewhat more even picture, and the positioning of Member States is also changed.

Table 3: Energy-related CO2 emissions per unit of GDP (tonnes CO2/1000 ECU)

F	IT	DK	ES	COM	NL	B	UK	D	P	IRL	EL	LUX
0.39	0.47	0.51	0.54	0.63	0.72	0.74	0.75	0.79	0.85	0.92	1.42	1.82

5. In 1990 power generation was the most important source of CO2 emissions (31%), followed by transport (23%), domestic and tertiary (21%) and industry (20%). It is only in Belgium, France, Luxembourg and Spain that CO2 emissions are not dominated by power generation.

Table 4: Community CO2 emissions by sector 1990

	Mt CO2	%
Power generation	950.6	31.2
Energy sector	129.5	4.3
Industry	601.1	19.8
Transport	707.5	23.3
Domestic and tertiary	653.6	21.5
Total	3042.3	100.0

6. In 1990 oil was the major energy source of CO2 emissions in the Community. The second place was taken by solid fuels and natural gas was in third position. Waste incineration contributed only marginally.

Table 5: Community CO2 emissions by energy source 1990

	Mt CO2	Share in CO2 emissions	Share in primary energy consumption
Oil	1355.5	44.6%	42.8%
Solid fuels	1077.5	35.4%	24.4%
Gas	603.1	19.8%	18.0%
Waste	6.1	0.2%	0.2%
Total	3042.3	100.0%	85.4%

The share of solid fuels in CO2 emissions is significantly higher than their share in energy consumption. This is due to the fact that the specific emissions of lignite and coal are higher than those of other fuels. Specific emissions from natural gas are particularly low. Energy sources not emitting CO2 (e.g. nuclear, hydro, solar and wind) contributed only some 15% to the 1990 energy supply.

7. It should be noted that the 1990 base year was one of the warmest years on record in the Community. The reference scenario as presented in chapter 4 assumes normal weather conditions for the year 2000. It is clear that the growth in CO2 emissions would be somewhat reduced if in 2000 the same weather conditions would prevail as in the 1990 base year.

II. Principal Ways for Stabilizing CO2 Emissions, Possible Instruments and Implications of CO2 Stabilization for the Energy Balance

8. In the absence of economic technical means for the removal of carbon (e.g. from flue gases) CO2 emissions are necessarily produced from the combustion of fossil fuels, and therefore CO2 emission stabilization can only be achieved in one of the following ways:

- either there is no increase in fossil fuel consumption
- or in the case of an increase in fossil fuel consumption there is a sufficient fuel switching away from high carbon content fuels towards low carbon fuels.

These fundamentals are independent of the instrument chosen for achieving CO2 stabilization.

The problem of restraining fossil fuel consumption becomes more complicated with increasing demand for energy services stemming from economic growth. To the extent that our growing needs for energy services can be met with higher energy efficiency or with an increased contribution of zero carbon content fuels like renewables and nuclear, there is a reduced need for increasing fossil fuel consumption. Consequently, the requirement for replacing carbon rich fuels for reasons of CO2 stabilization is more limited the more the growth in fossil fuel consumption can be restrained. Such restraint on CO2 emissions and fossil fuel consumption is aimed at in the proposed CO2 strategy through programmes such as SAVE, THERMIE, JOULE and ALTENER, to be complemented by the implementation of a combined carbon/energy tax.

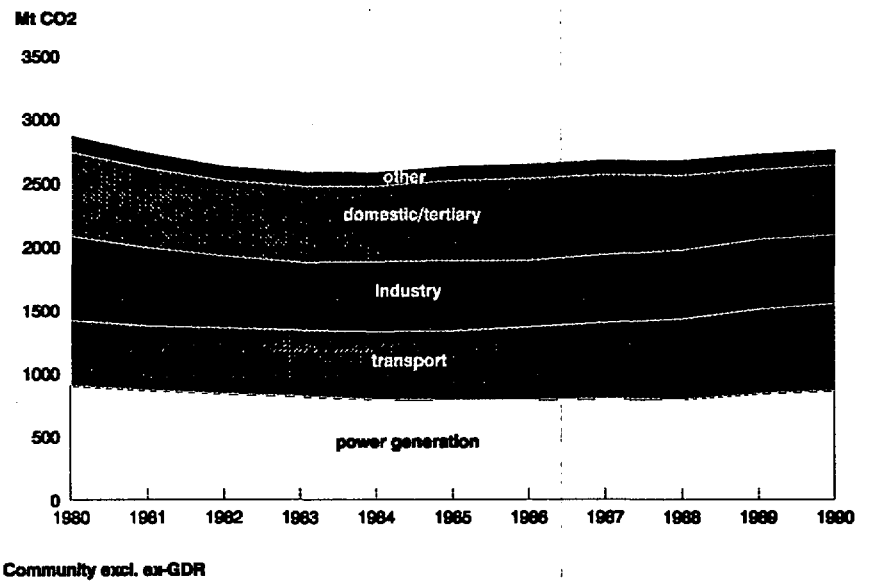
9. Energy efficiency improvements can generally be achieved within shorter time horizons than fuel switching which indeed may change the structure of energy supplies. Energy efficiency improvements include behavioural change as well as the adoption of more efficient equipment. While turnover of end-use equipment takes some time, longer lead times are usually involved when it comes to changes in the supply structure. As an example, due to the quasi moratorium on nuclear and the long construction time for building power stations, no significant additional CO2 reduction can be expected from nuclear energy by the year 2000. A greater contribution of renewables appears to require a lot more years for further development and increasing market penetration, which is indeed to be promoted by specific Community action (ALTENER). The ALTENER programme, if adopted by the Council, would therefore show substantial CO2 reductions only after the year 2000.
Given the short time horizon until the year 2000, measures to improve energy efficiency appear to be more promising in achieving the stabilization target for 2000, whereas in the longer term beyond 2000 fuel substitution might have a greater role to play in limiting CO2 emissions.

10. As to the measures for improving efficiency or encouraging fuel switching, there exists a variety of economic and other instruments. Economic instruments like energy taxation reach all energy consumers through the market price. They offer a permanent incentive to reduce energy consumption and emissions, and this might go beyond existing standards, when appropriate energy efficient technology becomes available. This is done by harnessing the self-interest of economic agents for using best available technology which is economic from the individual's point of view. Whether a technological solution is economic, in turn, depends on energy prices and therefore also on energy taxation.
No market works perfectly and the one for energy is no exception. It has its own characteristics, some of which render the intended effects of a fiscal measure less efficient. These include the paucity of relevant information to the consumer (in particular the domestic consumer), the grid-bound nature of some energy supplies etc.
Non-fiscal measures may be best suited to overcome such problems. For example the failure of the price signal to reach certain consumers is one problem tackled in the currently proposed SAVE Directive.
With present fossil fuel prices and in spite of specific action for the market penetration of renewables, the deployment of renewable techniques may remain rather limited for some time. The more fossil fuel prices at the consumer level would in fact increase, the more the economic potential for renewable technologies would improve.
Thus, fiscal and non-fiscal measures related to the energy sector, including THERMIE as a prerequisite for a better market penetration of innovative technologies, and JOULE for the necessary R&D to make available new energy technologies, are mutually reinforcing through synergetic effects, and the overall strategy is expected to combine the various advantages of taxation and of specific actions like ALTENER, SAVE and THERMIE.

III. Lessons to be Learnt from Past Experience: The 1980s was one of the rare periods in which CO2 emissions did not increase in the Community. Why?

11. Since the industrial revolution which brought fossil fuels into the energy system, CO2 emissions were nearly always on the increase, except for times of war and other major crises. Only in the period following the oil price shocks of the 1970s was there a slow-down in the growth of emissions or indeed a temporary decrease in emission levels. This issue is highlighted for the decade of the 1980s in what follows.

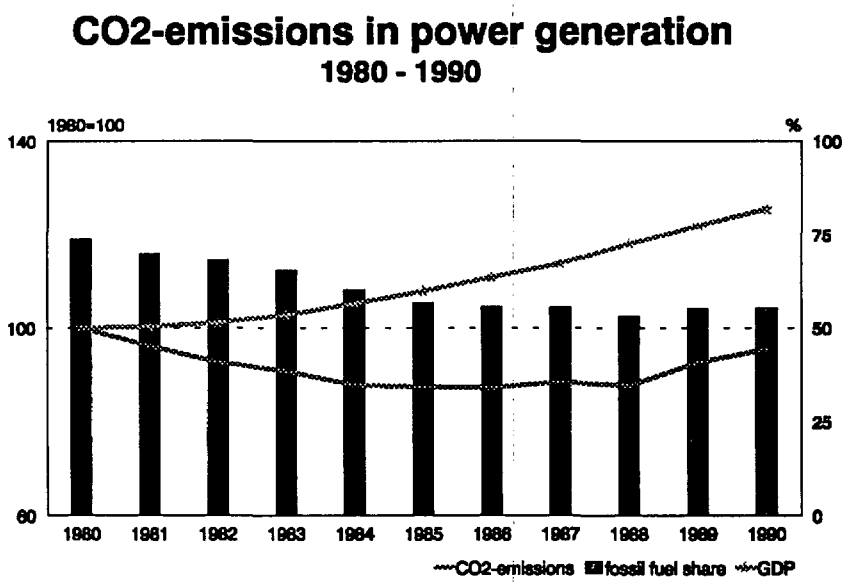
Chart 1: CO2 emissions by sector between 1980 and 1990



Despite GDP being 25% higher in 1990 compared with 1980, CO2 emissions decreased by 4% in the Community of twelve (without ex-GDR) from 2.87 bill. t CO2 to reach 2.77 bill. t in 1990. The decline was particularly marked in the first half of the last decade with emissions in 1985 being 8% lower than in 1980. In effect, after 1985, when oil prices collapsed and economic growth slowly resumed its pace of former years, emissions once again started to increase.

12. CO2 emissions from **power generation** decreased by nearly 5% between 1980 and 1990. This was particularly due to the major inroads made by CO2-free power generation, especially by nuclear, in that period. In effect, non-fossil power generation increased its share from 26% in 1980 to 45% in 1990 with nuclear accounting for 12% in 1980 and 35% at the end of the decade.

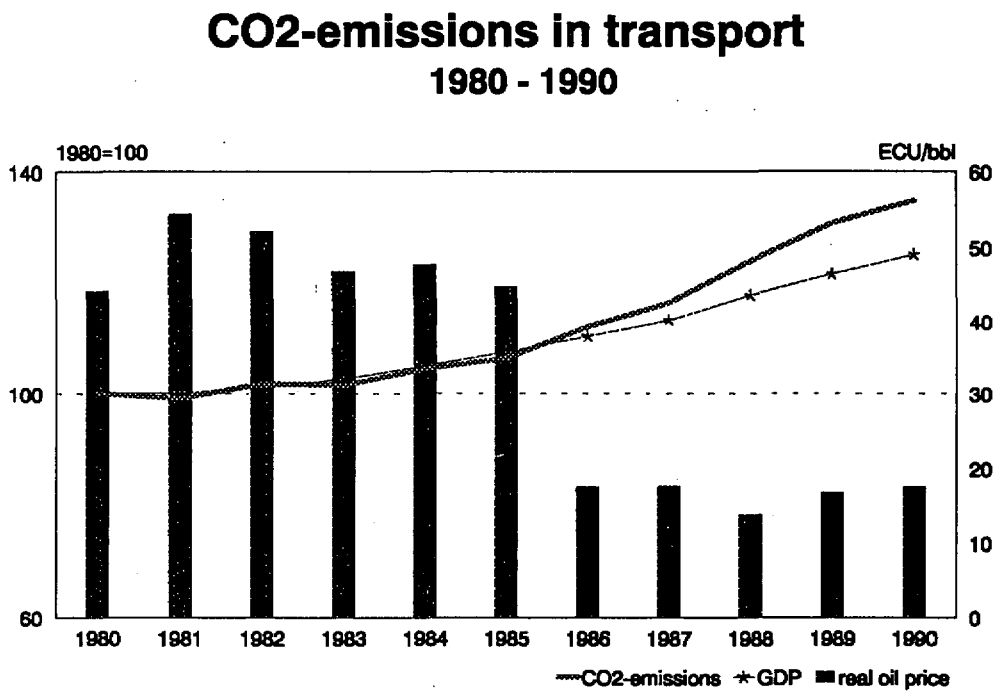
Chart 2: CO2 emissions in power generation



Under the hypothesis of no substitution, i.e. no change in the share of fuels in power generation compared with 1980, CO2 emissions from electricity production in 1990 would have been nearly 300 Mt or 34% higher than they had actually been in 1990. This illustrates clearly that fuel switching, especially in power generation, is a major policy area for achieving CO2 stabilization.

13. CO2 emissions from the **transport** sector increased in parallel with GDP in the first half of the last decade, but when oil prices plunged after 1985 emissions rose faster than GDP. In 1990, CO2 emissions were up 35% compared with 1980.

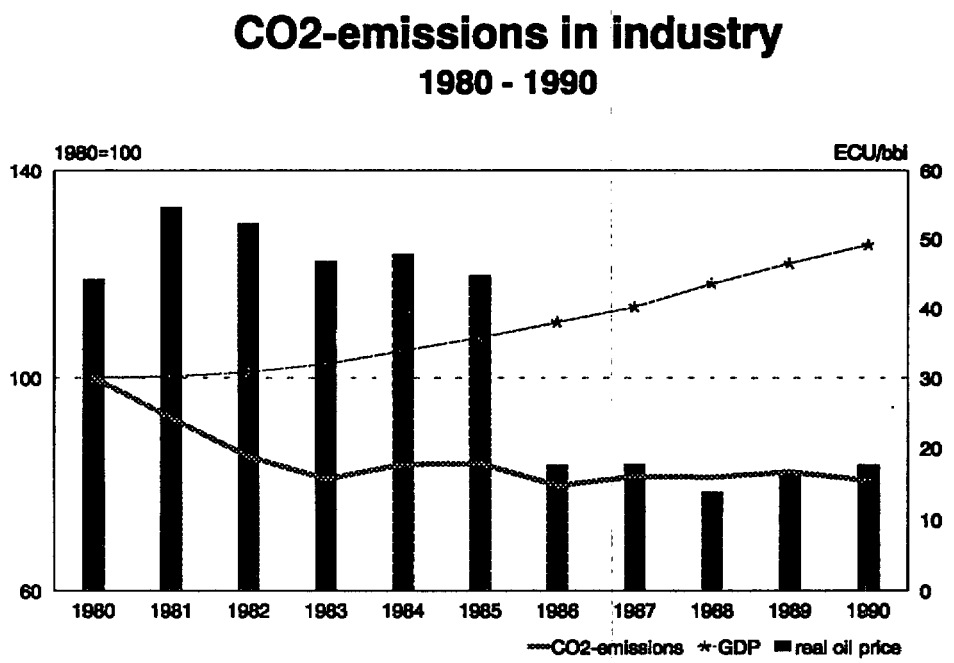
Chart 3: CO2 emissions in transport



In effect, high oil prices had triggered additional efforts for energy efficiency improvements, which restrained CO2 emissions. At the end of the last decade energy efficiency improvements slowed down with lower fuel costs, considerable income growth and a subsequent move to more powerful cars and a tendency to more congestion, which is indeed connected to a basic underlying factor - car ownership - which has been continuing to increase. Energy efficiency improvements measured in fuel consumption per 100 km, which can be brought about by more fuel efficient engines, better traffic management or by a shift to means of transport with a lower CO2 output per passenger/km or tonne/km, is indeed the key factor for restraining CO2 emissions in transport. Options for large-scale fuel switching virtually do not exist at present.

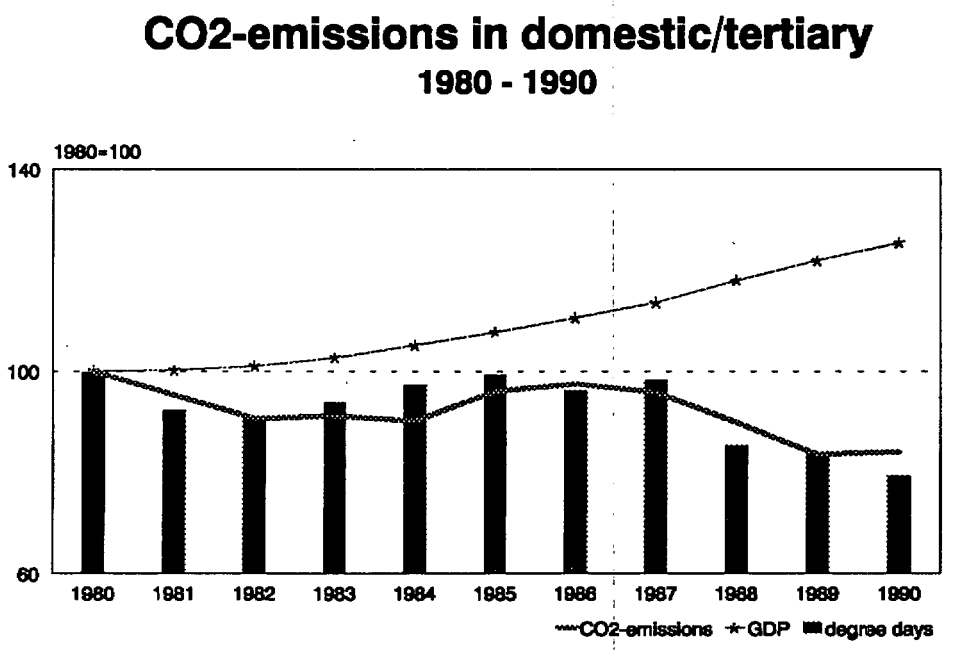
14. In **industry**, CO2 emissions decreased by 19% during the last decade. Most of the decrease occurred in the early 1980s when industry underwent a marked restructuring away from heavy industries as a result of economic recession and high fuel costs. Since 1983 emissions have remained more or less at the same level, indicating that energy intensity change and substitution of gas and electricity for oil and solid fuels have been sufficient to prevent emissions from growing with industrial production. Energy intensity reduction, however, was due both to improved efficiencies and changes in the structure of industrial production.

Chart 4: CO2 emissions in industry



15. In the **domestic and tertiary sector**, CO2 emissions declined by 16% between 1980 and 1990. In addition to energy efficiency improvements and a marked shift from solid fuels and oil to natural gas and electricity, this decrease was also due to changing weather conditions. Average yearly temperatures were higher than in 1980 throughout virtually the whole decade. The years 1988 to 1990 in particular were extremely warm and CO2 emissions from the domestic sector were down accordingly.

Chart 5: CO2 emissions in domestic and tertiary sector



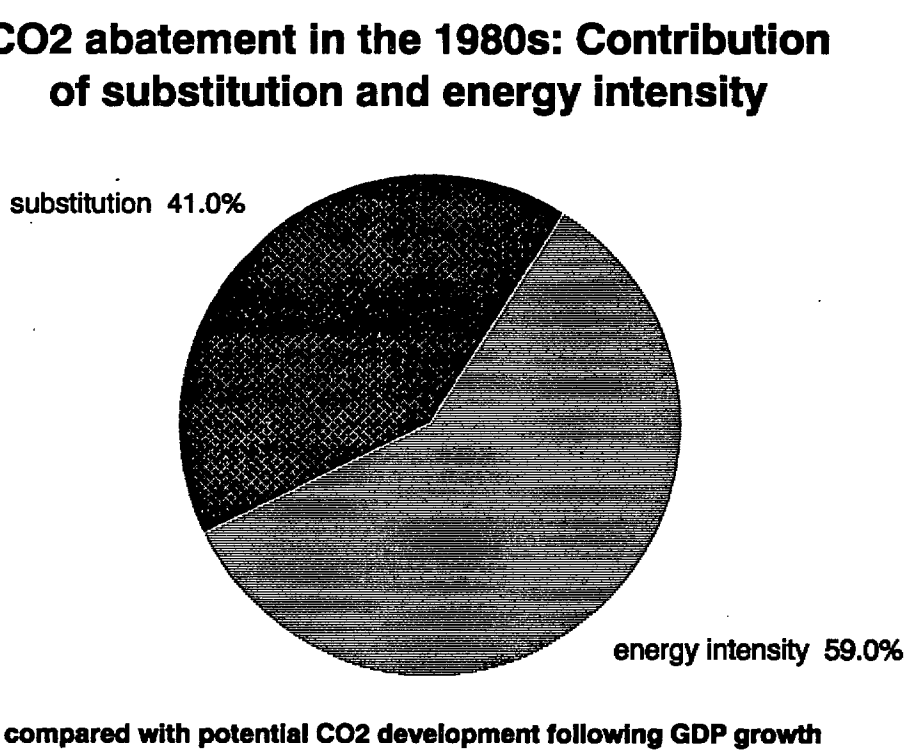
16. In summary, a stabilization objective for the 1980s would have been achieved - indeed even overachieved (reduction of nearly 4%). The main reasons for this are:

- low economic growth at the beginning of the decade;
- high oil prices until 1985;
- extremely warm years from 1988 to 1990;
- strong gains in energy efficiency in the early years of the decade and thereafter resuming the 1% per year long-term trend;
- fuel switching with increased penetration of electricity, solid fuels static or declining, oil declining, increase of natural gas and a substantial increase in nuclear.

These driving forces will remain important for the future; i.e. economic growth, energy prices, fuel switching, efficiency and weather will largely determine future emissions. However, some of them are difficult to forecast and even more difficult to influence: weather and indeed world market prices for oil, gas and coal. Economic growth will be determined by factors outside of energy and environment. Therefore, the areas for policy attention remain fuel switching and energy efficiency - and, to the extent to which taxation comes into play, price change to encourage improvements in these policy fields.

17. CO2 emissions in 1990 would have been 0.84 bill. t higher than observed, if emissions had increased in line with GDP growth since 1980. Due to fuel substitution and a decrease in energy intensity this emission increase could be avoided. Fuel substitution contributed 41%, while energy intensity decrease accounted for 59%.

Chart 6: Contribution of fuel substitution and energy intensity decrease



IV. THE REFERENCE SCENARIO UP TO 2000

18. Having identified the factors which prevented CO2 emissions from growing in the last decade it is worthwhile examining what is likely to be different in the 1990s. The extent to which such CO2 reducing circumstances like high oil prices and options like nuclear will be absent determines the effort to be made in other fields for returning CO2 emissions to 1990 levels. Moreover, such basic factors are important ingredients for constructing a reference scenario on the likely development up to 2000. Against the background of such a scenario the effectiveness of carbon/energy taxation as well as the energy consequences can be evaluated.

Table 6: Basic assumptions and implications for the 1990s compared with recorded values for the 1980s (Community excl. ex-GDR)

	1980/1990	1990/2000
GDP growth p.a.	2.3%	2.2%
Population growth p.a	0.3%	0.4%
Real oil price (1990 ECU)		
first half	49 ECU/bbl	16 ECU/bbl
second half	19.5 ECU $/bbl	17.5 ECU/bbl
Additional capacity		
nuclear/hydro/renewables	76 GW	14 GW
fossil fuels	14 GW	60 GW
Energy intensity* p.a.	-1.5%	-0.7%
Carbon intensity** p.a.	-1.2%	-0.2%
CO2 emissions p.a.	-0.4%	1.3%

* *gross energy consumption/GDP*
** *CO2 emissions/gross energy consumption*

The Commission (DG XVII) prepared in September 1992 scenarios showing possible energy supply demand developments in the Community and the world up to 2005. A detailed description of the assumptions driving the scenarios is contained in the document: *Energy in Europe, A View to the Future*, Special Issue - September 1992. The following analysis for the 1990s is based on these scenarios, the most pertinent parameters of which are shown in the table above for the **no tax reference case**. Since comparable data for the 1980s are not available for the ex-GDR, this comparison needs to be based on the Community excluding the new German Länder.

On account of the present recession only moderate economic growth is expected for the period up to 1995: 2.1% p.a.; the corresponding figure for the period 1985 to 1990 in the Community (excluding the ex-GDR) had been 3.1%. Economic growth for the 1990s is forecast to be slightly lower than was experienced in the 1980s.

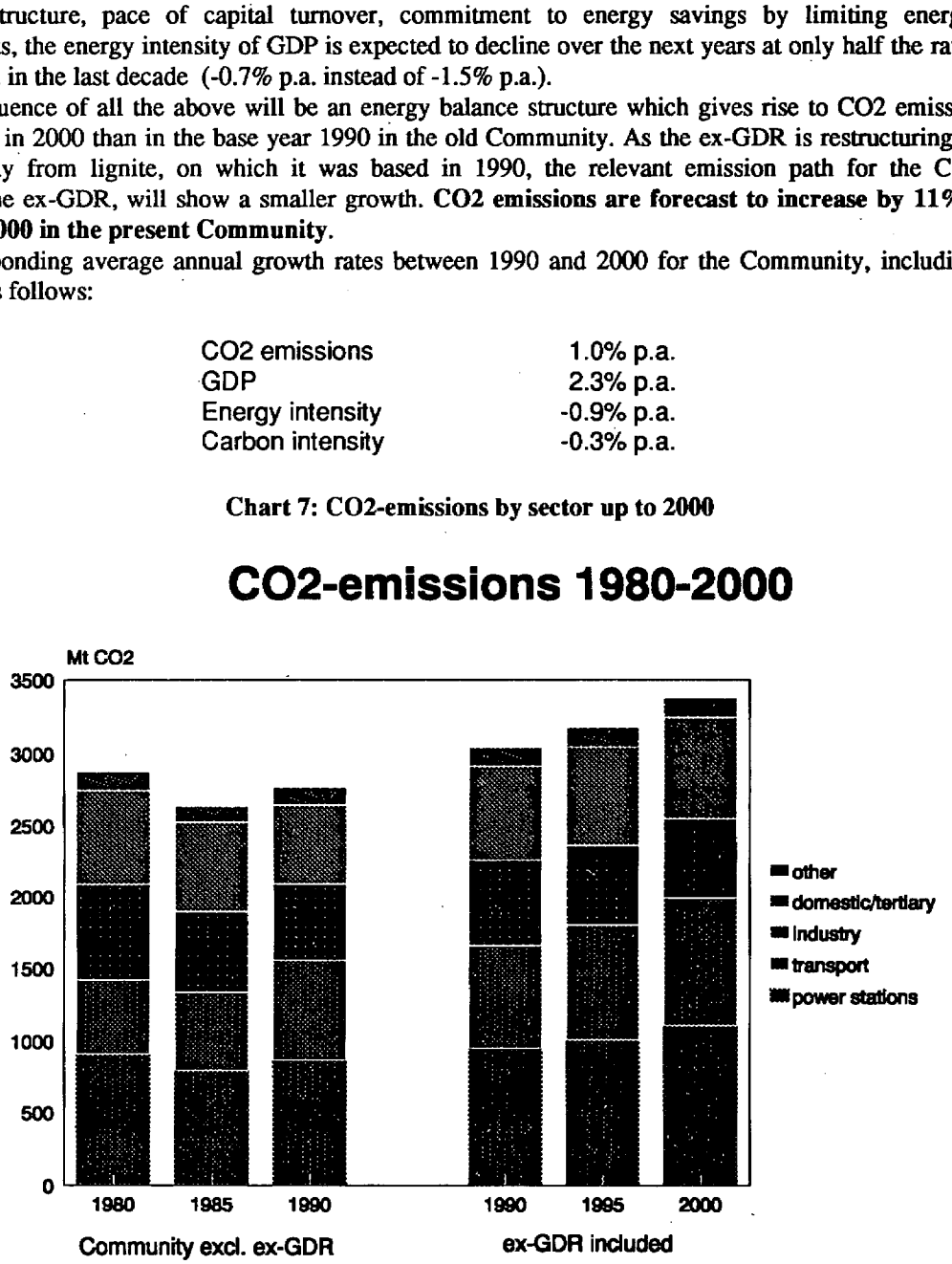
As opposed to the first half of the 1980s oil prices are expected to remain low in this decade, as they were for most of the second half of the 1980s. Prices for other fuels should remain at comparatively low levels as well.

Investment in power generation equipment, which predetermines energy structures for quite a long time, is expected to be governed by particular caution as regards fuel choices and capital commitment in general. Overall investment expenditure is likely to be lower in the 1990s and to be much more concentrated on fossil fuel technologies than in the 1980s. In effect, whereas between 1980 and 1990 there was a net increase in CO2-free generating capacity of some 76 GW, in this decade only one fifth of that investment in zero carbon equipment can be expected. By comparison, investments in fossil fuel plants will be about four times as high in this decade as they were in the 1980s. However, new fossil fuel investment is concentrated on combined cycle gas power stations, whereas it had been based on coal and lignite burning power stations, which emit much more CO2 per kWh.

As a result of the above, CO2 emissions per unit of energy consumed will decrease at a much slower pace in the 1990s (-0.2% p.a.) as compared to the 1980s (-1.2% p.a.). Moreover, due to factors such as change in the industrial structure, pace of capital turnover, commitment to energy savings by limiting energy service requirements, the energy intensity of GDP is expected to decline over the next years at only half the rate that was experienced in the last decade (-0.7% p.a. instead of -1.5% p.a.).
The consequence of all the above will be an energy balance structure which gives rise to CO2 emissions being 13% higher in 2000 than in the base year 1990 in the old Community. As the ex-GDR is restructuring its energy system away from lignite, on which it was based in 1990, the relevant emission path for the Community, including the ex-GDR, will show a smaller growth. **CO2 emissions are forecast to increase by 11% between 1990 and 2000 in the present Community.**
The corresponding average annual growth rates between 1990 and 2000 for the Community, including the ex-GDR, are as follows:

CO2 emissions	1.0% p.a.
GDP	2.3% p.a.
Energy intensity	-0.9% p.a.
Carbon intensity	-0.3% p.a.

Chart 7: CO2-emissions by sector up to 2000



19. This increase of 11% over the value of 1990 is the yardstick to assess the amount of CO2 emissions to be avoided by the year 2000 in order to stabilise emissions at 1990 level. According this reference scenario, final energy demand will increase by 15.0% between 1990 and 2000. GDP is expected to increase faster and the ratio of final energy demand to GDP is continuing to improve at an average annual rate of 0.9%.

20. Demand will increase most for **transportation** (25.5%). Most of this increase of 60 Mtoe will be accounted for by oil which remains the only readily available large scale transport fuel. Biofuels are expected to increase only by 2 Mtoe, and the additional contribution of electricity will be below 1 Mtoe. CO2 emissions in transport are therefore bound to increase substantially by 24.6%.
Mobility remains a basic need and car ownership will continue to increase. Energy demand in transport is influenced by population and income levels as well as by other factors such as spatial distribution, urban congestion and transport infrastructure and policy. Improved fuel efficiency will restrain growth in fuel demand.

Specific fuel consumption has indeed decreased considerably, but it takes several years before the average efficiency of the fleet is significantly improved on account of rather slow turn-over rates. In addition, there are counter effects of faster driving, increased congestion and consumer preference for larger cars.

21. In the **domestic and tertiary** sector, energy demand is expected to grow by 16.9%, also above the average. Energy demand in this sector rises due to the much higher demand for services and an increasing number of households with larger housing units. Moreover, an age distribution increasingly skewed towards the older age brackets and life-style changes including more leisure activities contribute to rising energy demand.
With millions of individual decision makers cost-consciousness has not been sufficient to ensure a rapid penetration of energy efficient equipment mainly on account of

- residential housing stocks having on average very long lifetimes;
- owner and user of housing stocks often being different individuals or institutions.

In the 1990s solids continue to diminish, especially in the ex-GDR where energy consumption in this and other sectors had been based on lignite. Oil demand will increase (mainly driven by substitution in the new German Länder). Gas and electricity demand are expected to be buoyant with growth of 32% and 31% respectively. With this replacement of high carbon fuels by less CO2 intensive energies, CO2 emissions should increase by only 6.2%, which is less than half the rate of energy demand growth.

22. **Industrial** energy consumption is forecast to increase only marginally (+2.5%) and industry's share is continuing to decline. The industrial base is shifting away from energy-intensive branches such as steel production to less energy-intensive sectors such as electronic equipment. Furthermore, the competitive environment, reinforced by the completion of the internal market, will force most industrial users to keep close track of their energy costs. Significant energy-intensity gains can therefore be expected for the industrial sector.
The fuel mix will continue to change throughout this decade. Solid fuels and oil should decline; gas and electricity will increase their contribution. The shift towards electricity and gas are driven principally by technology and - to a lesser extent - by prices. Owing to this replacement of carbon rich fuels, CO2 emissions are indeed expected to decrease by 7.1%.

23. This analysis of CO2 emissions related to final energy demand sectors could be somewhat misleading, as the CO2 emissions produced while generating the **electricity** used in the various sectors have not been accounted for in the respective sectors. Although these emissions are quite substantial, they cannot be partitioned among sectors in an unambiguous way, since the origin of the electricity consumed cannot in general be traced back to its origin.
Electricity consumption is rising at a fast pace, increasing 24% by the year 2000. This increase of 33 Mtoe is for the most part due to the domestic and tertiary sector (over two-thirds) and for the rest almost exclusively to industry.
Inputs into **power generation** are undergoing significant shifts. While solid fuels burn will increase, their relative contribution will decrease. Oil consumption is declining further. On the other hand, the use of gas in power stations is expected to more than double. It is indeed this substantial switching to natural gas, which prevents emissions from power generation from growing as fast as electricity demand. Emissions growth from power stations should indeed be restricted to 17% in spite of a growth in electricity demand of about one-quarter in this decade.
Only a few years ago such developments were not foreseen. It was coal which was expected to make up for increased demand and shortcomings in the construction of nuclear plants. Power generation from natural gas in a combined cycle mode has indeed been recognised to offer several advantages compared with coal-fired electricity generation. These include a significantly higher efficiency, less environmental drawbacks, short installation times and the requirement for substantially less capital expenditure.
Overall the electricity generation picture is forecast to change by the year 2000 in the following way:

Table 7: Electricity generation in the Community by fuel

	1990	2000
Nuclear	33%	29%
Hydro	8%	8%
Solid fuels	40%	36%
Oil	10%	7%
Natural gas	7%	17%
Other*	2%	3%
Total	100%	100%

** derived gas, urban waste and renewables*

24. With these trends in the final demand sectors and in power generation gross energy consumption is expected to change significantly in this decade. Overall, total energy consumption is forecast to rise by 14.8%. The growth foreseen for total energy consumption exceeds the growth rate of CO2 emissions (10.9%), thus indicating that there will be substitution of low and zero carbon content energies for carbon-rich fuels.
The structure of gross energy consumption is shifting as follows:

Table 8: Structure of gross inland consumption by energy source

	1990	2000
Solid fuels	24.4%	20.3%
Oil	42.8%	42.0%
Natural gas	18.0%	22.9%
Nuclear	13.3%	12.6%
Hydro/others	1.6%	2.2%
Total	100%	100%

Natural gas can be expected to have the highest growth rate. In some regions of the Community it is being introduced, in the ex-GDR it should play a major role in the restructuring of the energy economy, and in general natural gas is considered to be an attractive alternative for power generation. The contribution of gas in the Community could therefore increase from 18% in 1990 to 23% by 2000 even without a specific CO2 policy. By 2000, it should move into second place after oil, replacing solid fuels.
Oil consumption is expected to increase somewhat slower than overall energy demand, and its share should therefore decrease slightly by nearly one percentage point to reach 42%.
The demand for solid fuels is bound to decrease by 2000, especially due to the restructuring of the ex-GDR away from lignite. In the old Community, solid fuel consumption is slightly increasing owing to the virtual absence of significant additional nuclear capacity up to the year 2000. With growing overall energy demand the share of solids is thus expected to decrease from around 24% in 1990 to 20% in 2000.
Finally, nuclear, hydro and other minor primary energies should increase their contribution broadly in line with the overall growth of energy consumption so that their share could remain at about 15%.

25. Under the reference scenario CO2 emissions by the year 2000 will have increased by 10.9% to reach 3375 Mt. The development broken down by Member State is as follows:

Table 9: Energy related CO2 emissions in 2000

	2000 Mt CO2	2000 %	2000/1990 % emission growth
Belgium	121.7	3.6	+8.7
Denmark	65.5	1.9	+23.3
Germany	1037.4	30.7	+3.2
Greece	96.6	2.9	+31.1
Spain	259.8	7.7	+23.3
France	431.4	12.8	+17.9
Ireland	36.0	1.1	+17.0
Italy	464.0	13.7	+15.3
Luxembourg	13.7	0.4	+9.6
Netherlands	178.1	5.3	+13.2
Portugal	57.0	1.7	+42.9
United Kingdom	614.1	18.2	+6.0
Community	3375.3	100	+10.9

Emissions are forecast to rise particularly strongly in Portugal, Greece, Spain and Denmark. While this reflects high economic growth expectations in the Southern Member States, the Danish case is particular as far as the base year 1990 is concerned: electricity imports had been very high thus substituting for coal-based power generation, such import levels are not foreseen around 2000.
These differences in growth rates lead to a modification in the break down of emissions by Member State. Greece, Spain, France, Italy and Portugal will increase their shares by between 0.4 and 0.8 percentage points, whereas the share of Germany decreases by 2.3 percentage points. However, in 2000 as well, Germany is the largest emitter accounting for over 30% of total Community CO2 emissions.

26. Energy related CO2 emissions per capita will increase under the reference scenario in all Member States with the exception of Germany, where a slight decrease can be expected. The Community average is forecast to rise by 7% to reach 9.5 tonnes of CO2 per head.

Table 10: Energy related CO2 emissions per capita in 2000 in tonnes

P	E	F	IT	EL	COM	IRL	UK	NL	B	D	DK	LUX
5.7	6.5	7.3	7.9	9.4	9.5	9.8	10.4	11.3	12.1	12.5	12.7	36.4

In 2000 CO2 emissions per capita continue to vary widely between Member States. However, compared with the 1990 situation the variation is somewhat reduced (variation coefficient falling from 32.4% to 26.0%) thus indicating some narrowing around the Community average.
CO2 emissions per unit of GDP are expected to decrease by 2000 in all Member States except for Greece, where a slight increase is due to occur under the reference scenario. The Community average will be down 13% to reach 0.55 tonnes of CO2 per 1000 ECU.

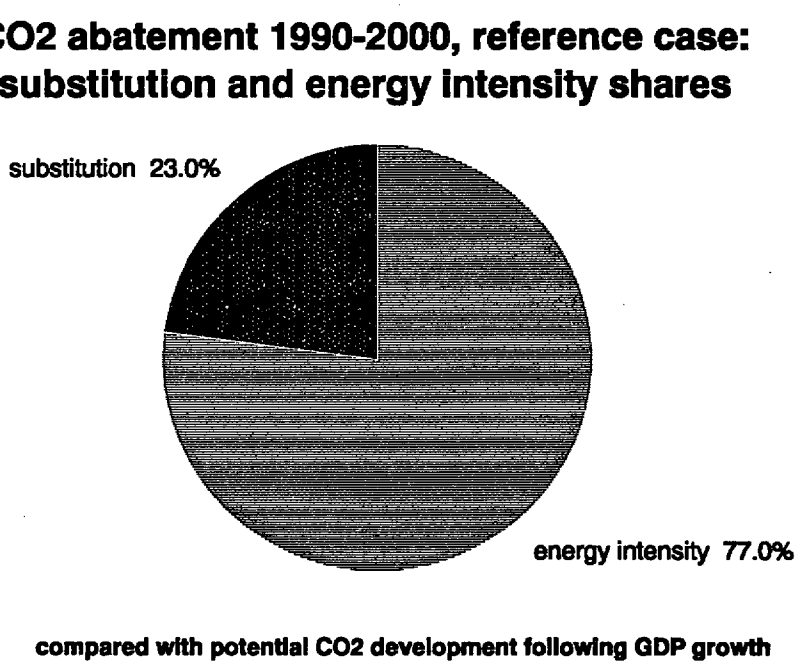
Table 11: CO2 emissions per unit of GDP in 2000 (tonnes CO2/1000 ECU)

F	IT	DK	ES	COM	D	B	NL	UK	P	IRL	EL	LUX
0.37	0.42	0.50	0.50	0.55	0.63	0.64	0.66	0.69	0.82	0.83	1.46	1.49

Emissions per unit of GDP remain widely dispersed among Member States, but their variation around the Community average is slightly narrower in 2000 than in 1990 (variation coefficient decreasing from 30.2% to 29.5%).

27. If CO2 emissions were to increase in line with GDP, they would then rise at a much faster pace, but fuel-switching and energy-intensity decrease are expected to bring about a CO2 abatement of some 0.45 bill t. Substitution should contribute one quarter, while energy intensity accounts for three quarters.

Chart 8: Share of fuel substitution and energy intensity in the reference case



V. THE CARBON/ENERGY TAX SCENARIO - COMMUNITY ENERGY DEMAND

INTRODUCTION

28. One of the key elements of the Community strategy to limit carbon dioxide emissions and to improve energy efficiency, proposed by the Commission is the introduction of a new tax modulated 50% according to the energy content and 50% according to the carbon content of fuels. Such a tax is to be introduced in steps, beginning with 0.21 ECU/GJ and 2.81 ECU/t CO2 in the first year. In each of the following seven years these amounts would be increased by one-third of the tax rates in the initial year; in the last year (that is in 2000 at the earliest) these rates would therefore have reached 0.7 ECU/GJ and 9.4 ECU/t CO2. For analytical purposes an introduction of the tax already in 1993 has been assumed.

The assumptions for the following analysis have been made in a way which reflects as closely a possible the tax proposal as laid down in the draft tax Directive (COM (92) 226 final).

For this analysis tax rates in real terms have been assumed. This allows inflation to be deliberately excluded from the analysis. For some key variables a comparison with the same tax in nominal terms will be presented further below.

Per tonne of oil equivalent the tax rates can be illustrated as follows:

Table 12: Illustrative tax rates in ECU/toe (1993 ECU)

	Initial year	Final year
	ECU/toe	
Petrol	17.3	57.5
Diesel/heating oil	17.5	58.3
Residual fuel oil	18.0	59.9
Natural gas	15.4	51.3
Hard coal	19.9	66.2
Lignite	21.1	70.5

Energy prices would not only increase by these amounts, but as with all excise taxes the overall price increase would be somewhat higher according to the VAT rates applied in each Member State.
Electricity will be taxed in a somewhat different way. For the carbon part of the tax, the inputs in power stations are taxed according to the carbon content of the fuels used. As regards the energy part, the tax rate is fixed in terms of ECU per MWh. These rates are uniform for fossil fuels and nuclear, but they are lower for hydro power above 10 MW installed capacity. Small hydro and other renewables are exempt from the tax. Electricity prices in the initial year of the tax could therefore increase in the following way (first order effects not including the effects of any change in behaviour of market participants):

Table 13: Illustrative first order electricity price effects in the initial year

	Energy part	Carbon part	Total
		ECU/MWh	
Nuclear	2.10	0	2.10
Hydro (large)	0.76	0	0.76
Renewables	0	0	0
Coal	2.10	2.73	4.83
Oil	2.10	2.14	4.24
Natural gas	2.10	1.49	3.59

29. As to the analysis of the effects of such taxation, it is crucial to start from some **key assumptions** on the nature of the tax. Firstly, it is not a revenue raising tax, but a tax intended to change behaviour. It is therefore announced well in advance and introduced in steps. Moreover, the tax revenue is to be recycled into the economy, thus keeping the overall tax burden unchanged. In this energy analysis it is assumed that thanks to the revenue neutrality of the tax there are no negative feedbacks to the overall economic development.
The conditionality of the tax on other OECD countries undertaking similar measures together with the safeguard clause of Art. 10 should prevent to a large extent negative competition effects and dislocation of energy intensive industries outside the Community. The analysis focuses therefore on the pure effects on energy demand and supply including world markets and no attempt has been made to include uncertain effects outside the energy sector into this energy policy analysis. For the purpose of this analysis **the industrial production index has been retained as in the reference case.**
The possibilities for special treatment and tax reduction/refunding as foreseen in Articles 10 and 11 of the draft tax Directive are not automatically granted but depend on specific conditions and procedures which cannot be defined in advance. In this analysis the tax has been applied to all industries.

30. **A partial energy sector model (MIDAS)** has been used for highlighting the energy consequences. The following analysis is based on the results of the MIDAS model for eleven Member States. The model does not exist for Luxembourg and in the case of Germany only the old Federal Republic could be modelled, since econometric estimation based on the statistical data for the former centrally planned GDR would not be a sensible approach. In the case of Luxembourg a similar reaction to the tax has been assumed as in the other Benelux countries, while for the new German Länder the tax effects have been estimated by taking into account the pertinent results of the recent energy scenario analysis by Prognos commissioned by the German government.

OVERALL RESULTS OF THE CARBON/ENERGY TAX

31. The new tax would give support to some ongoing trends like increased contribution of natural gas and it is expected to contribute to the improvement of energy efficiency. In the event of carbon/energy taxation, total primary energy demand would therefore be 2.8% lower for 2000 than in the no tax reference case. The increase of primary energy demand between 1990 and 2000 would be reduced from 14.8% as foreseen in the reference scenario to a rise of 11.6% in the case of carbon energy taxation.
CO2 emissions would grow at a lower pace in the Community and would be 3.5% below the reference case results for the year 2000 or compared with the base year emissions of 1990 they would be some 7.1% higher in 2000. In the no tax reference case CO2 emissions are forecast to increase by 10.9% and **the contribution of the tax to the stabilization objective therefore amounts to 3.8%, which represents 35% of the effort to be made.**

Table 14: Energy consumption and CO2 emissions

	1990	2000		1990/2000	
		reference	tax	reference	tax
Primary energy (Mtoe)	1193	1370	1331	+14.8%	+11.6%
Fossil fuels (Mtoe)	1016	1168	1130	+15.0%	+11.3%
CO2 emissions (Mt)	3042	3375	3257	+10.9%	+7.1%

The growth of CO2 emissions in both the reference and the tax case is more limited than that of primary energy demand, which indicates that there is some replacement of carbon rich by low carbon fuels. Fossil fuel consumption in both cases is increasing broadly in line with total primary energy, from which it can be deducted that CO2 abatement from fuel switching is mainly a result of intra-fossil fuel substitution.
Therefore, in addition to its effect on the level of energy consumption, the proposed carbon/energy tax would have impacts on the structure of the Community energy balance. These impacts will be analysed starting with a comparison between the tax and the no tax case for the target year 2000 and followed by highlighting key issues of the development between 1990 and 2000 under the hypothesis of carbon/energy taxation.

TAX EFFECTS IN THE YEAR 2000 COMPARED WITH A NO CARBON/ENERGY TAX REFERENCE CASE

32. In the year 2000 the tax would bring about a reduction in energy demand and CO2 emissions. The magnitude of change varies across sectors and fuels according to different elasticities and fuel mixes.
Because of the existing high level of taxation on **transport** fuels and the low demand response to price increases for automotive fuels the impact of the tax would be relatively modest. In fact, transportation fuel demand, nearly exclusively oil, is expected to decrease by only 2.6% on account of taxation; CO2 emissions in 2000 are reduced accordingly.

33. In the **domestic and tertiary** sector there is already an ongoing and important switch away from solid fuels and from oil used in heating. The tax will accentuate this trend with gas being the likely beneficiary. In effect, while oil and solids could both loose some 8% compared with the no tax reference case, gas would only loose about 2%. The effects on electricity and heat demand would be even smaller (under 1%). The overall CO2 decrease resulting from these reductions would be 5.5%.

3)

Table 15: 2000: energy consumption and CO2 emissions: tax versus reference case

	Reference case	Tax case	Change
Energy consumption	Mtoe	Mtoe	%
transport	296	288	-2.6
domestic/tertiary	350	336	-3.9
industry	246	234	-4.8
power stations	488	482	-1.3
Total primary	1370	1331	-2.8
CO2 emissions	Mt CO2	Mt CO2	%
transport	881	858	-2.6
domestic/tertiary	694	656	-5.5
industry	558	525	-5.9
power stations	1108	1087	-1.9
energy sector	134	130	-2.5
Total	3375	3257	-3.5

34. **Industry** and particularly heavy industry is an important candidate over the medium term for significant efficiency improvements. Notwithstanding the substantial changes in energy intensity observed over the past years there remains an important potential for further efficiency improvements, and, over the longer term, for fuel substitution. In 2000, the tax would bring about a demand reduction by nearly 5%. CO2 emissions would be reduced even more by about 6%, as solids and liquids would be affected more markedly (drop of almost 11% for solids and 9% for liquids), while both gas and electricity demand would be lower only 2%.

35. Charging electricity inputs with the carbon tax means that the **power station** fuel input costs are most markedly increased for solids, followed by the cost increase for burning oil and gas, and consequently solid fuels should be replaced on account of taxation. Compared to the reference case, the input of solid fuels in the electricity production of the year 2000 would diminish by 2.0%. Oil and gas demand would decrease by 1.9% and 1.5% respectively. **The power generation sector does not show a pronounced reaction to the proposed taxation by the year 2000.** CO2 emissions are reduced by just under 2%.
Reasons for this include the tailoring of the energy part of the tax as an average rate for all fossil fuels and nuclear, by which price increases for fuels used in less efficient power stations have been limited and which does not by itself give incentives for fuel switching. Moreover, for power stations with lifetimes of several decades the time left until 2000 is particularly short; energy consuming equipment in other sectors is replaced at a much faster pace. Finally the reference case contains already a massive switch to natural gas in power generation, leaving little room for further increases in new gas facilities to replace older CO2 intensive generation capacities in the tax case.

36. As regards the Community fuel mix some changes towards low carbon fuels would occur for the year 2000. Such changes could however be more pronounced beyond 2000, when the existing energy capital stock is due for replacement or had already been replaced with low CO2 technology.

Table 16: The Community fuel mix in the reference and tax case in the year 2000

	Energy consumption		Percentage change
	Reference	Tax	
	Mtoe		
Solid fuels	279	268	-3.8
Oil	576	555	-3.6
Natural gas	314	308	-2.0
Nuclear	172	172	-0.2
Other	29	29	-1.5
Total primary	1370	1331	-2.8

The contribution of **solid fuels** would be 3.8% lower mainly on account of substitution in the industrial sector.
Total **oil** demand would be lower by 3.6%; this decrease is mainly due to reduced demand in the domestic/tertiary and transport sectors. In power generation, input of oil drops less than solid fuel input, as oil would gain advantage over coal and lignite.
Gas demand would decrease least of all fossil fuels by 2.0%. Carbon/energy taxation would reduce domestic/tertiary and industrial gas demand by 2.3% and 2.4%, while the reduction in power generation compared with the no tax reference case is less pronounced (-1.5%).
As a result of the price induced consumption drop of **electricity** of about 1.4%, for the most part in industry and the domestic/tertiary sectors, there would be a decrease in primary electricity production from hydro and nuclear of 0.2%.

37. The replacement of high carbon with low carbon fuels due to the carbon weighting of the tax is dependent on the outcome that the potential price advantage for low carbon fuels materializes at the level of the consumer. To the extent there is an alignment of the price of a low carbon fuel (e.g. natural gas) to the price of fuels which are taxed at a higher rate (e.g. oil), the expected substitution and CO2 reduction effects may not fully materialize. For natural gas such kind of alignment has been a widespread practice in the absence of direct gas to gas competition. Moreover, refineries producing different fuels from crude oil are in principle free to charge any final product with a smaller or larger portion of the crude oil price. Thus, in case of different reactions of consumers to price increases on different product markets, refiners may decide to shift some part of the additional tax charge for e.g. residual fuel oil to transportation fuels, for which the price elasticity of demand is normally significantly lower than for other oil products. Therefore, it cannot be taken for granted that the price increase for each oil products will reflect fully the tax amounts; for some products experiencing strong competition the increase may be lower, while it could be higher for products having a low price elasticity of demand. In this analysis these effects could not be taken into account.

38. Over and above the effects which can be modelled there are others which tend to increase tax effects in terms of CO2 reduction and energy impacts, such as the tax incentives foreseen in Article 11 and targeted implementation measures in the framework of tax neutrality (as illustrated in the explanatory memorandum) as well as voluntary agreements.

39. The tax instrument would also reduce CO2 emissions per capita and per unit of GDP in the year 2000.

Table 17: Energy related CO2 emissions per capita in 2000 in the case of taxation - in tonnes

P	ES	F	IT	EL	COM	IRL	UK	NL	B	D	DK	LUX
5.6	6.4	6.9	7.7	9.0	9.2	9.4	10.1	11.0	11.5	12.0	12.3	34.1

Per capita CO2 emissions are reduced in all Member States through carbon/energy taxation. The Community average decreases from 9.5 tonnes without tax to reach 9.2 tonnes in the tax case. However, per capita emissions continue to vary widely between Member States, but compared with the reference case the variation is slightly

reduced (variation coefficient falling from 26.0% to 25.8%) thus indicating some narrowing around the Community average.
CO2 emissions per unit of GDP would be reduced by the taxation instrument in all Member States. The Community average would decrease from 0.55 tonnes of CO2 per 1000 ECU in the reference case to reach 0.53 tonnes.

Table 18: CO2 emissions per unit of GDP in 2000 in the tax case (tonnes CO2/1000 ECU)

F	IT	DK	ES	COM	D	B	NL	UK	P	IRL	LUX	EL
0.35	0.41	0.49	0.49	0.53	0.61	0.61	0.63	0.67	0.79	0.80	1.40	1.40

Emissions per unit of GDP, however, remain widely dispersed among Member States. Their variation around the Community average would be unchanged in the tax case (variation coefficient constant at 29.5%).

THE TAX CONTRIBUTION TO THE STABILIZATION TASK: HOW DOES CARBON/ENERGY TAXATION CHANGE THE DEVELOPMENT PATH OF CO2 EMISSIONS BETWEEN 1990 AND 2000?

40. In summarizing the likely development under the reference scenario and the effects of taxation the following developments up to 2000 should emerge in the case of implementing the carbon/energy tax in 1993.

- Total CO2 emission would increase by 7.1% instead of 10.9% under the reference case; the tax would therefore contribute 3.8 percentage points to the stabilization objective for 2000
- CO2 emissions in all sectors would be abated:
  - in transport they are down by 3.3% percentage points, which leaves an considerable emission growth of 21.3%;
  - in industry emission are curbed by 5.5 percentage points, which means an even more pronounced emission reduction compared with 1990 (12.6% decrease in the tax case);
  - in the domestic and tertiary sectors emission growth would be reduced by 5.9 percentage points to achieve sectoral stabilization (+0.3 %);
  - in power generation after tax emission growth would be lower by only 2.2 percentage points to reach still 14.4%.
- The development of energy consumption would be somewhat altered with gas and oil demand growing slightly slower than in the reference case and solid fuels declining somewhat faster.

41. CO2 abatement through fuel switching is one side of the coin, changes in the present energy structure, which had been brought about by market forces and policy intervention, is the other side. Between 1990 and 2000 there is some change in the structure of total energy consumption already in the reference case; this change would be reinforced in the tax case as can be seen from the following table.

Table 19: Structure of gross inland consumption (in %)

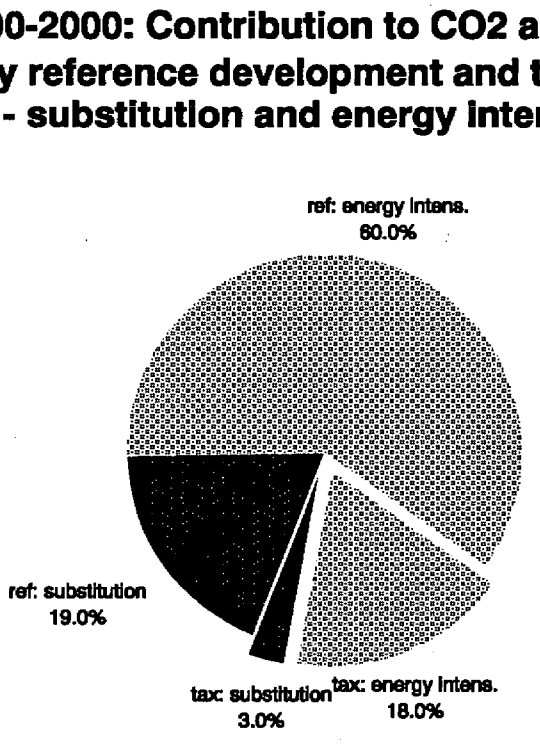
	1990	2000 reference	2000 tax
Solids	24.4	20.3	20.1
Oil	42.8	42.0	41.7
Gas	18.0	22.9	23.1
Nuclear	13.3	12.6	12.9
Other*	1.6	2.2	2.2
Total	100.0	100.0	100.0

* *includes hydro, waste, geothermal, other renewables and net electricity imports*

In fact, changes stemming from taxation are not dramatic and taking into account the overall reduction in gross inland demand due to the tax, the absolute contribution of no single fossil energy source will be higher in the tax case than in the reference case.
The contribution of non-fossil energy sources is foreseen to increase until 2000 broadly in line with overall growth of energy demand, and its share will therefore remain constant at 15%. Interestingly, carbon/energy taxation is likely to increase only slightly the relative contribution of energy sources not emitting CO2 by the year 2000. This is due to the long lead times involved in power generation investment and the present de facto moratorium on nuclear in many Member States. Moreover, for renewables it also takes several years before any tax induced competitive advantage could translate into investment decisions, as various technical and non technical obstacles have still to be tackled (ALTENER and THERMIE).

42. Between 1990 and 2000, a considerable amount of CO2 abatement through the decline in energy and carbon intensity is already foreseen in the reference case. The new carbon/energy tax would produce a further reduction in the energy intensity and give rise to some substitution. As can be seen from the following graph, by the year 2000 the tax would improve the CO2 situation for the most part through changes in energy intensity; fuel substitution would play a minor role.

Chart 9: 1990-2000 tax case - contribution to CO2 abatement of energy intensity and fuel substitution



The above graph is based on a comparison between potential CO2 emissions following exactly the growth in GDP and the developments of CO2 emissions under the assumptions of the reference and tax case. With non-fiscal Community measures and complementary national action the CO2 abatement would be more marked and the relative contribution of substitution and energy intensity could be somewhat changed.

EFFECTS OF A TAX IN NOMINAL TERMS

43. In the event of a carbon/energy tax in nominal terms the effects of the tax would be lower. Simulations of a nominal tax in the year 2000 for the total of all Member States, for which MIDAS is available (this represents more than 90% of Community CO2 emissions), show the following:

- CO2 abatement in 2000 would be some 3% instead of about 3.5% in case of a tax rate in real terms;
- the difference between both taxes is lowest for the power generation sector (0.3 percentage points)

- in the industrial and domestic/tertiary sectors the difference is highest (0.9 and 0.8 percentage points respectively)
- in transport the difference amounts to 0.5 percentage points.

44. **Comparison with other models on carbon/energy taxation**

A DRI study undertaken for the Commission on the effects of the Community CO2 strategy (close to the state of play in October 1991) has shown a similar order of magnitude for the effects of a carbon/energy tax - after having allowed for some differences in the assumptions (e.g. DRI: simulation of the energy and economic effects of an entire strategy of non-fiscal and fiscal measures including considerable vehicle taxation; MIDAS: pure simulation of the carbon/energy tax in the frame of an energy model; DRI: real 1990 ECU; MIDAS: real 1993 ECU and different exchange rates, which brings down the carbon/energy tax rate for the MIDAS simulation to some 80 to 85% of the DRI rate).

MIDAS and other econometric models of this type are based on the estimation of parameters from observations of past behaviour, and therefore the representation of expectations of economic agents might be incomplete. However, one of the main advantages of the proposed tax is its pre-announcement and phasing-in, so that economic agents can better anticipate future prices when they take investment decisions today. It is indeed this longer run effect on investment which should bring about substantial CO2 abatement.

As concerns the long run effect of the proposed tax, there are various studies and models (e.g. the OECD GREEN model) dealing with the effects of carbon taxes, which show that over longer time periods changes in relative energy prices (between sources and vis-à-vis other production factors) can trigger substantial shifts in the way of using and producing energy which result in substantial CO2 reduction compared with the underlying trend following GDP growth.

Nevertheless, such models do not focus on the energy sector as such, and they may overestimate its short or medium term flexibility. MIDAS, on the other hand, has a very detailed representation of the energy sector and its inertia with up to 2400 variables by country. However, econometric modelling is not suited for capturing the long term.

EXPECTED LONGER TERM EFFECTS OF CARBON/ENERGY TAXATION

45. While the energy impacts resulting from taxation might indeed be limited up to 2000 nonetheless the longer term implications are likely to be of importance with a marked preference being expressed by electricity producers away from higher carbon intensive fuels.

Given the long life-times and depreciation periods for power stations as well as the high costs of changing energy equipment before it has reached the end of its economic life-time, the impacts of changes in relative energy prices on fuel choices may only materialise with a time lag of several years. In the case of power stations such a time-lag could probably be measured in decades. Since the electricity generation sector is both the highest emitter of CO2 (over 30%) and the main outlet for the carbon rich solid fuels (over 70% of solid fuel consumption), the tax impacts in terms of CO2 and the Community fuel mix are very likely to be even more pronounced after 2000.

In the long term, as the existing energy equipment is turned over, and various new technologies are further developed, fuel switching away from high carbon content fuels to low or zero carbon content energy carriers is possible. To what extent these low carbon energies will enter the market is primarily a question of their costs compared to those of the fossil fuels. Energy/carbon taxation increases fossil fuel prices considerably and gives a strong incentive for reducing CO2 emissions to both energy users and equipment manufacturers of energy consumption equipment, which should increase over time. It is crucial that sufficient time is available for developing and introducing more efficient equipment and for the penetration of fuels with lower specific carbon emissions.

Simulations with the MIDAS model for the year 2005 exhibit that the same tax as in the year 2000 would bring about a more pronounced reduction in CO2 emissions. For example the tax induced reduction of total CO2 emissions from the reference development would amount to over 4% in 2005 compared with about 3.5% for an identical tax in 2000. This result has been derived for the total of all Member States for which MIDAS is available. No simulations had been undertaken for the years after 2005.

■

Annex 1: Tables

CO2-emissions 1990 by sector

1990	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
	- mill. t CO2 -												
final energy consumption	81.8	28.8	634.6	35.9	134.7	303.9	19.5	260.7	11.0	98.4	23.3	329.6	*1962.2*
Industry	32.3	5.7	211.8	10.2	45.6	83.0	5.3	82.1	6.6	29.2	8.4	81.0	*601.1*
transport	23.2	13.7	173.0	17.7	67.3	125.5	6.0	99.8	3.1	30.8	11.3	136.1	*707.5*
domestic/tertiary	26.3	9.4	249.8	8.1	21.7	95.4	8.3	78.8	1.3	38.4	3.6	112.5	*653.6*
power generation	24.6	23.0	340.9	35.8	64.4	44.4	11.0	122.8	1.5	45.8	15.2	221.1	*950.6*
energy sector	5.6	1.3	29.5	1.9	11.6	17.4	0.2	18.9	0.0	13.1	1.4	28.4	*129.5*
gross consumption	*112.0*	*53.1*	*1005.0*	*73.7*	*210.7*	*365.7*	*30.8*	*402.4*	*12.5*	*157.3*	*39.9*	*579.2*	*3042.3*

CO2-emissions 2000 by sector: reference case

2000 reference case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- mill. t CO2 -						
final energy consumption	87.9	32.0	615.5	46.1	163.7	346.5	22.3	300.2	12.2	110.7	33.0	363.6	*2133.7*
industry	29.2	6.1	173.6	11.4	49.1	81.8	5.9	76.4	6.7	27.6	11.3	79.2	*558.5*
transport	28.9	16.8	210.5	22.7	89.1	158.8	7.8	135.8	4.3	35.9	16.5	154.2	*881.2*
domestic/tertiary	29.8	9.1	231.3	12.0	25.5	105.8	8.6	88.0	1.1	47.2	5.2	130.2	*693.9*
power generation	27.8	32.0	393.3	47.3	84.1	66.7	13.3	145.1	1.6	53.9	21.7	221.2	*1108.0*
energy sector	6.0	1.5	28.7	3.2	12.0	18.2	0.3	18.8	0.0	13.4	2.3	29.3	*133.7*
gross consumption	*121.7*	*65.5*	*1037.4*	*96.6*	*259.8*	*431.4*	*36.0*	*464.0*	*13.7*	*178.1*	*57.0*	*614.1*	*3375.3*

CO2-emissions 2000 by sector: tax case

2000 tax case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
	- mill. t CO2 -												
final energy consumption	82.3	30.3	585.9	43.1	159.3	327.0	21.2	290.4	11.4	106.3	31.5	350.5	*2039.3*
industry	27.0	5.8	163.9	9.3	47.6	75.5	5.7	74.0	6.2	26.0	10.7	73.7	*525.4*
transport	28.6	16.0	205.7	22.3	86.5	153.9	7.6	131.3	4.2	34.8	15.9	151.2	*858.0*
domestic/tertiary	26.6	8.5	216.3	11.5	25.2	97.6	7.9	85.1	1.0	45.5	4.9	125.7	*655.9*
power generation	27.5	31.9	385.6	46.4	82.1	65.3	13.1	143.0	1.5	52.6	21.5	217.0	*1087.4*
energy sector	5.9	1.4	27.9	3.1	11.6	17.7	0.3	18.2	0.0	13.3	2.3	28.5	*130.4*
gross consumption	*115.6*	*63.6*	*999.3*	*92.6*	*253.0*	*410.0*	*34.6*	*451.7*	*12.9*	*172.3*	*55.3*	*596.1*	*3257.1*

Development of CO2-emissions between 1990 and 2000 by sector: reference case

2000/1990 reference case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
final energy consumption	7.5	11.1	-3.0	28.2	21.5	14.0	14.4	15.1	10.4	12.6	41.9	10.3	*8.7*
Industry	-9.5	8.4	-18.0	12.0	7.7	-1.4	11.4	-7.0	1.5	-5.3	35.2	-2.1	*-7.1*
transport	24.6	22.6	21.7	28.2	32.3	26.5	30.7	36.1	39.7	16.4	45.5	13.3	*24.6*
domestic/tertiary	13.3	-3.9	-7.4	48.5	17.4	10.9	4.5	11.7	-12.9	23.0	46.4	15.7	*6.2*
power generation	13.3	39.1	15.3	32.3	30.6	50.3	21.2	18.1	3.6	17.7	42.3	0.0	*16.6*
energy sector	6.8	14.2	-2.9	64.1	3.2	4.6	38.1	-0.5	0.0	2.6	64.3	2.9	*3.2*
gross consumption	*8.7*	*23.3*	*3.2*	*31.1*	*23.3*	*17.9*	*17.0*	*15.3*	*9.6*	*13.2*	*42.9*	*6.0*	*10.9*

Development of CO2-emissions between 1990 and 2000 by sector: tax case

2000/1990 tax case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
final energy consumption	0.6	5.3	-7.7	20.0	18.3	7.6	8.4	11.4	3.4	8.1	35.4	6.4	*3.9*
Industry	-16.3	2.9	-22.6	-8.0	4.3	-9.0	6.9	-10.0	-6.9	-10.9	27.5	-9.0	*-12.6*
transport	23.2	16.9	18.9	25.8	28.5	22.6	27.2	31.6	36.8	13.0	40.7	11.1	*21.3*
domestic/tertiary	1.3	-10.0	-13.4	42.6	15.9	2.2	-4.3	8.1	-22.3	18.6	37.2	11.7	*0.3*
power generation	11.7	38.6	13.1	29.8	27.4	47.3	19.3	16.4	-2.5	14.8	41.0	-1.9	*14.4*
energy sector	5.6	4.5	-5.5	58.3	0.1	1.8	37.3	-3.4	0.0	2.2	63.5	0.2	*0.7*
gross consumption	*3.3*	*19.7*	*-0.6*	*25.8*	*20.1*	*12.1*	*12.5*	*12.2*	*2.7*	*9.6*	*38.5*	*2.9*	*7.1*

2000 CO2-emissions: tax case versus reference case (percentage change)

2000: tax over reference case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
final energy consumption	-6.4	-5.2	-4.8	-6.4	-2.7	-5.6	-5.2	-3.2	-6.4	-4.0	-4.6	-3.6	-4.4
industry	-7.4	-5.1	-5.6	-17.8	-3.1	-7.7	-4.0	-3.2	-8.3	-5.9	-5.7	-7.0	-5.9
transport	-1.1	-4.7	-2.3	-1.9	-2.8	-3.1	-2.6	-3.3	-2.1	-3.0	-3.3	-2.0	-2.6
domestic/tertiary	-10.6	-6.4	-6.5	-4.0	-1.3	-7.8	-8.4	-3.2	-10.8	-3.6	-6.2	-3.5	-5.5
power generation	-1.3	-0.4	-2.0	-1.9	-2.4	-2.0	-1.6	-1.4	-5.9	-2.5	-1.0	-1.9	-1.9
energy sector	-1.1	-8.5	-2.7	-3.5	-3.0	-2.7	-0.6	-2.9	0.0	-0.4	-0.5	-2.6	-2.5
gross consumption	-5.0	-2.9	-3.7	-4.1	-2.6	-4.9	-3.8	-2.7	-6.3	-3.2	-3.0	-2.9	-3.5

Structure of CO2-emissions 1990 by sector

1990	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
final energy consumption	73.1	54.2	63.1	48.8	63.9	83.1	63.5	64.8	88.0	62.5	58.3	56.9	*64.5*
industry	28.9	10.7	21.1	13.8	21.7	22.7	17.2	20.4	53.0	18.5	20.9	14.0	*19.8*
transport	20.7	25.8	17.2	24.0	31.9	34.3	19.4	24.8	24.4	19.6	28.3	23.5	*23.3*
domestic/tertiary	23.5	17.8	24.9	11.0	10.3	26.1	26.8	19.6	10.5	24.4	9.0	19.4	*21.5*
power generation	22.0	43.3	33.9	48.6	30.6	12.1	35.7	30.5	12.0	29.1	38.2	38.2	*31.2*
energy sector	5.0	2.5	2.9	2.6	5.5	4.8	0.8	4.7	0.0	8.3	3.5	4.9	*4.3*
gross consumption	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Structure of CO2-emissions 2000 by sector: reference case

	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
2000 reference case							- % -						
final energy consumption	72.2	48.9	59.3	47.7	63.0	80.3	62.0	64.7	88.7	62.2	57.9	59.2	*63.2*
industry	24.0	9.4	16.7	11.8	18.9	19.0	16.4	16.5	49.1	15.5	19.8	12.9	*16.5*
transport	23.7	25.6	20.3	23.5	34.3	36.8	21.7	29.3	31.1	20.1	28.9	25.1	*26.1*
domestic/tertiary	24.5	13.9	22.3	12.5	9.8	24.5	23.9	19.0	8.4	26.5	9.2	21.2	*20.6*
power generation	22.9	48.8	37.9	49.0	32.4	15.5	37.0	31.3	11.3	30.3	38.1	36.0	*32.8*
energy sector	4.9	2.3	2.8	3.3	4.6	4.2	0.9	4.1	0.0	7.5	4.1	4.8	*4.0*
gross consumption	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Structure of CO2-emissions 2000 by sector: tax case

	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
2000 tax case							- % -						
final energy consumption	71.1	47.7	58.6	46.6	63.0	79.7	61.1	64.3	88.6	61.7	56.9	58.8	62.6
industry	23.4	9.2	16.4	10.1	18.8	18.4	16.4	16.4	48.1	15.1	19.3	12.4	16.1
transport	24.7	25.2	20.6	24.0	34.2	37.5	22.0	29.1	32.5	20.2	28.8	25.4	26.3
domestic/tertiary	23.0	13.4	21.6	12.5	10.0	23.8	22.8	18.9	8.0	26.4	8.9	21.1	20.1
power generation	23.8	50.1	38.6	50.1	32.4	15.9	37.9	31.7	11.4	30.5	38.9	36.4	33.4
energy sector	5.1	2.2	2.8	3.3	4.6	4.3	1.0	4.0	0.0	7.7	4.2	4.8	4.0
gross consumption	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(5)

Per capita CO2-emissions 1990 by sector

1990	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- tons -						
final energy consumption	8.2	5.6	8.0	3.6	3.5	5.4	5.5	4.5	29.2	6.6	2.4	5.7	*5.7*
industry	3.2	1.1	2.7	1.0	1.2	1.5	1.5	1.4	17.6	2.0	0.9	1.4	*1.8*
transport	2.3	2.7	2.2	1.8	1.7	2.2	1.7	1.7	8.1	2.1	1.2	2.4	*2.1*
domestic/tertiary	2.6	1.8	3.2	0.8	0.6	1.7	2.3	1.4	3.5	2.6	0.4	2.0	*1.9*
power generation	2.5	4.5	4.3	3.6	1.7	0.8	3.1	2.1	4.0	3.1	1.6	3.9	*2.8*
energy sector	0.6	0.3	0.4	0.2	0.3	0.3	0.1	0.3	0.0	0.9	0.1	0.5	*0.4*
gross consumption	*11.3*	*10.3*	*12.7*	*7.3*	*5.4*	*6.5*	*8.7*	*7.0*	*33.2*	*10.5*	*4.1*	*10.1*	*8.9*

Per capita CO2-emissions 2000 by sector: reference case

	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
2000 reference case							- tons -						
final energy consumption	8.8	6.2	7.4	4.5	4.1	5.8	6.1	5.1	32.3	7.0	3.3	6.1	*6.0*
Industry	2.9	1.2	2.1	1.1	1.2	1.4	1.6	1.3	17.9	1.8	1.1	1.3	*1.6*
transport	2.9	3.3	2.5	2.2	2.2	2.7	2.1	2.3	11.3	2.3	1.7	2.6	*2.5*
domestic/tertiary	3.0	1.8	2.8	1.2	0.6	1.8	2.4	1.5	3.0	3.0	0.5	2.2	*2.0*
power generation	2.8	6.2	4.7	4.6	2.1	1.1	3.6	2.5	4.1	3.4	2.2	3.7	*3.1*
energy sector	0.6	0.3	0.3	0.3	0.3	0.3	0.1	0.3	0.0	0.9	0.2	0.5	*0.4*
gross consumption	*12.1*	*12.7*	*12.5*	*9.4*	*6.5*	*7.3*	*9.8*	*7.9*	*36.4*	*11.3*	*5.7*	*10.4*	*9.5*

Per capita CO2-emissions 2000 by sector: tax case

2000 tax case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- tons -						
final energy consumption	8.2	5.9	7.1	4.2	4.0	5.5	5.8	4.9	30.2	6.8	3.2	5.9	5.7
industry	2.7	1.1	2.0	0.9	1.2	1.3	1.5	1.3	16.4	1.7	1.1	1.2	1.5
transport	2.8	3.1	2.5	2.2	2.2	2.6	2.1	2.2	11.1	2.2	1.6	2.6	2.4
domestic/tertiary	2.7	1.6	2.6	1.1	0.6	1.6	2.2	1.4	2.7	2.9	0.5	2.1	1.8
power generation	2.7	6.2	4.6	4.5	2.1	1.1	3.6	2.4	3.9	3.3	2.2	3.7	3.1
energy sector	0.6	0.3	0.3	0.3	0.3	0.3	0.1	0.3	0.0	0.8	0.2	0.5	0.4
gross consumption	11.5	12.3	12.0	9.0	6.4	6.9	9.4	7.7	34.1	11.0	5.6	10.1	9.2

Gross energy consumption 1990 by fuel

1990	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- mtoe -						
fossil fuels	36.8	16.3	310.9	21.1	70.2	132.9	10.0	142.7	3.2	64.5	14.2	193.1	*1015.8*
solids	10.2	6.1	132.5	8.2	19.3	20.0	3.5	14.6	1.1	9.1	2.6	64.3	*291.4*
oil	18.4	8.4	123.4	12.7	45.9	88.0	4.6	89.1	1.6	24.6	11.6	81.6	*510.1*
natural gas	8.2	1.8	55.0	0.1	5.0	24.9	1.9	39.0	0.4	30.8	0.0	47.2	*214.3*
nuclear	10.7	0.0	37.7	0.0	13.7	79.1	0.0	0.0	0.0	0.9	0.0	16.6	*158.7*
electricity *	-0.3	0.6	1.5	0.2	2.1	0.7	0.1	5.7	0.3	0.8	0.8	1.5	*14.0*
renewables/other **	0.2	0.1	1.1	0.0	0.1	0.2	0.0	2.2	0.0	0.2	0.1	0.4	*4.6*
gross consumption	*47.5*	*17.0*	*351.1*	*21.3*	*86.1*	*212.9*	*10.0*	*150.6*	*3.5*	*66.4*	*15.1*	*211.6*	*1193.1*

* Includes hydro and net electricity imports

** Includes waste and geothermal

Gross energy consumption 2000 by fuel: reference case

2000 reference case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- mtoe -						
fossil fuels	42.2	20.4	337.9	28.3	88.7	156.2	11.9	169.5	3.7	74.2	19.9	215.0	*1167.9*
solids	9.2	7.7	113.2	10.9	23.2	20.3	3.4	17.7	1.1	9.6	4.2	58.0	*278.6*
oil	21.3	9.3	149.6	15.2	54.4	99.7	5.7	90.9	2.0	26.7	13.3	87.5	*575.6*
natural gas	11.7	3.4	75.1	2.2	11.2	36.2	2.8	60.9	0.6	37.9	2.3	69.4	*313.8*
nuclear	10.8	0.0	36.1	0.0	14.0	94.8	0.0	0.0	0.0	0.8	0.0	15.8	*172.3*
electricity *	0.2	0.1	2.8	0.3	3.2	0.7	0.1	6.8	0.5	0.8	1.2	1.6	*18.3*
renewables/other	0.3	0.2	1.8	0.1	0.5	0.8	0.0	5.6	0.0	0.5	0.2	1.0	*11.2*
gross consumption	*53.6*	*20.7*	*378.6*	*28.8*	*106.5*	*252.5*	*12.0*	*181.9*	*4.2*	*76.3*	*21.3*	*233.4*	*1369.7*

* Includes hydro and net electricity imports

** Includes waste and geothermal

Gross energy consumption 2000 by fuel: tax case

2000 tax case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- mtoe -						
fossil fuels	40.3	19.9	325.9	27.1	86.5	149.4	11.6	165.2	3.5	72.0	19.3	209.4	*1130.2*
solids	8.7	7.5	108.3	10.6	22.5	19.2	3.2	17.4	1.0	9.4	4.1	56.1	*268.0*
oil	20.2	9.0	143.3	14.5	53.0	94.9	5.5	88.1	1.9	26.1	13.0	85.2	*554.6*
natural gas	11.4	3.4	74.3	2.0	11.1	35.3	2.8	59.7	0.6	36.5	2.3	68.1	*307.6*
nuclear	10.8	0.0	36.1	0.0	14.0	94.4	0.0	0.0	0.0	0.8	0.0	15.8	*171.9*
electricity *	0.2	0.1	2.6	0.3	3.2	0.6	0.1	6.8	0.4	0.8	1.2	1.6	*18.0*
renewables/other	0.3	0.2	1.8	0.1	0.5	0.8	0.0	5.6	0.0	0.5	0.2	1.0	*11.1*
gross consumption	*51.7*	*20.2*	*366.4*	*27.6*	*104.2*	*245.2*	*11.6*	*177.6*	*4.0*	*74.1*	*20.8*	*227.8*	*1331.2*

* Includes hydro and net electricity imports

** Includes waste and geothermal

Development of gross energy consumption between 1990 and 2000 by fuel: reference case

2000/1990 reference case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
fossil fuels	14.8	25.1	8.7	34.2	26.4	17.5	19.5	18.7	17.3	15.1	39.9	11.3	*15.0*
solids	-9.9	26.0	-14.6	33.2	20.3	1.5	-3.6	21.1	0.6	5.8	64.3	-9.7	*-4.4*
oil	15.7	10.3	21.2	19.2	18.3	13.3	24.8	2.0	24.7	8.6	14.5	7.2	*12.8*
natural gas	43.6	92.2	36.4	1483.3	125.0	45.5	49.9	56.1	33.7	23.1	x	47.1	*46.4*
nuclear	0.7	0.0	-4.1	0.0	2.1	19.8	0.0	0.0	0.0	-11.9	0.0	-4.6	*8.6*
hydro	-175.8	-84.7	91.7	52.6	51.2	-6.4	0.0	20.1	34.5	3.6	51.9	7.7	*30.8*
renewables/other	35.5	213.4	67.6	x	462.2	271.2	x	161.0	11.1	129.6	100.0	132.6	*141.1*
gross consumption	*12.9*	*21.9*	*7.8*	*35.0*	*23.6*	*18.6*	*19.6*	*20.8*	*18.9*	*15.0*	*41.0*	*10.3*	*14.8*

x = energy source consumed in 2000 but zero consumption in 1990

Development of gross energy consumption between 1990 and 2000 by fuel: tax case

2000/1990 tax case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
fossil fuels	9.6	21.8	4.8	28.6	23.3	12.5	16.0	15.8	10.8	11.8	36.2	8.4	11.3
solids	-14.2	22.5	-18.3	29.1	16.7	-4.2	-8.6	19.1	-8.4	4.1	58.5	-12.7	-8.0
oil	9.4	6.4	16.1	13.8	15.3	7.9	20.1	-1.1	19.0	6.0	11.5	4.3	8.7
natural gas	39.9	92.2	35.0	1362.2	122.6	41.9	51.9	53.1	30.6	18.6	x	44.3	43.5
nuclear	0.6	0.0	-4.1	0.0	2.1	19.3	0.0	0.0	0.0	-11.9	0.0	-4.6	8.4
electricity	-176.7	-84.7	80.3	51.1	49.8	-23.3	0.0	19.6	30.9	3.6	51.9	6.9	28.1
renewables/other	35.2	209.4	66.4	x	449.9	264.3	x	160.4	11.1	127.0	100.0	129.9	139.4
gross consumption	8.9	18.7	4.4	29.4	21.0	15.1	16.1	18.0	12.8	11.7	37.5	7.7	11.6

2000 gross energy consumption: tax versus reference case

2000 tax versus reference case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
fossil fuels	-4.5	-2.7	-3.6	-4.2	-2.5	-4.3	-2.9	-2.5	-5.5	-2.9	-2.7	-2.6	-3.2
solids	-4.8	-2.8	-4.3	-3.1	-3.0	-5.7	-5.1	-1.6	-8.9	-1.7	-3.6	-3.3	-3.8
oil	-5.5	-3.6	-4.2	-4.5	-2.5	-4.7	-3.7	-3.1	-4.5	-2.4	-2.6	-2.7	-3.6
natural gas	-2.6	0.0	-1.0	-7.7	-1.1	-2.5	1.4	-1.9	-2.3	-3.7	-1.3	-1.9	-2.0
nuclear	-0.1	0.0	0.0	0.0	0.0	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	-0.2
electricity	1.2	-0.1	-6.0	-1.0	-0.9	-18.1	0.0	-0.4	-2.7	-0.1	0.0	-0.7	-2.0
renewables/other	-0.3	-1.3	-0.7	-1.9	-2.2	-1.9	-2.6	-0.2	0.0	-1.2	0.0	-1.2	-0.7
gross consumption	-3.6	-2.7	-3.2	-4.1	-2.1	-2.9	-2.9	-2.4	-5.2	-2.9	-2.5	-2.4	-2.8

Structure of energy consumption 1990 by fuel

1990	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
fossil fuels	77.6	96.0	88.5	99.0	81.5	62.4	99.4	94.8	89.6	97.2	94.0	91.3	*85.1*
solids	21.5	35.9	37.7	38.5	22.4	9.4	34.9	9.7	31.9	13.7	17.1	30.4	*24.4*
oil	38.9	49.6	35.1	59.8	53.4	41.3	45.8	59.2	45.5	37.0	76.9	38.6	*42.8*
natural gas	17.2	10.5	15.7	0.6	5.8	11.7	18.7	25.9	12.2	46.4	0.0	22.3	*18.0*
nuclear	22.6	0.0	10.7	0.0	15.9	37.2	0.0	0.0	0.0	1.3	0.0	7.8	*13.3*
hydro	-0.6	3.6	0.4	1.0	2.5	0.3	0.6	3.8	9.7	1.2	5.2	0.7	*1.2*
renewables/other	0.5	0.4	0.3	0.0	0.1	0.1	0.0	1.4	0.8	0.3	0.8	0.2	*0.4*
gross consumption	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Structure of energy consumption 2000 by fuel: reference case

2000 reference case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
fossil fuels	78.9	98.5	89.2	98.4	83.3	61.9	99.3	93.2	88.4	97.3	93.3	92.1	*85.3*
solids	17.1	37.1	29.9	38.0	21.8	8.0	28.1	9.7	27.0	12.6	19.9	24.9	*20.3*
oil	39.8	44.9	39.5	52.8	51.1	39.5	47.8	49.9	47.7	35.0	62.5	37.5	*42.0*
natural gas	21.9	16.5	19.8	7.6	10.5	14.3	23.4	33.5	13.7	49.7	10.9	29.8	*22.9*
nuclear	20.1	0.0	9.5	0.0	13.1	37.6	0.0	0.0	0.0	1.0	0.0	6.8	*12.6*
hydro	0.4	0.4	0.7	1.1	3.0	0.3	0.5	3.8	10.9	1.1	5.6	0.7	*1.3*
renewables/other	0.6	1.0	0.5	0.5	0.5	0.3	0.2	3.1	0.7	0.6	1.1	0.4	*0.8*
gross consumption	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Structure of energy consumption 2000 by fuel: tax case

2000 tax case	B	DK	D	EL	ES	F	IRL	IT	LUX	NL	P	UK	*EUR-12*
							- % -						
fossil fuels	78.1	98.5	88.9	98.4	83.0	60.9	99.3	93.0	88.0	97.2	93.1	91.9	84.9
solids	16.9	37.1	29.6	38.4	21.6	7.8	27.5	9.8	25.9	12.7	19.7	24.6	20.1
oil	39.0	44.5	39.1	52.6	50.8	38.7	47.4	49.6	48.0	35.2	62.4	37.4	41.7
natural gas	22.1	17.0	20.3	7.3	10.6	14.4	24.4	33.6	14.1	49.3	11.0	29.9	23.1
nuclear	20.8	0.0	9.9	0.0	13.4	38.5	0.0	0.0	0.0	1.0	0.0	6.9	12.9
hydro	0.4	0.5	0.7	1.2	3.1	0.2	0.5	3.8	11.2	1.1	5.8	0.7	1.3
renewables/other	0.6	1.0	0.5	0.5	0.5	0.3	0.2	3.2	0.8	0.6	1.1	0.4	0.8
gross consumption	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

BELGIUM

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	15.3	1.0	7.7	0.6	*24.6*
energy sector	0.0	4.0	1.6	0.0	*5.6*
industry	14.9	5.0	12.4	0.0	*32.3*
transport	0.0	23.2	0.0	0.0	*23.2*
domestic/tertiary	2.2	15.9	8.2	0.0	*26.3*
total	*32.3*	*49.1*	*29.9*	*0.6*	*112.0*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	15.1	0.9	11.3	0.5	*27.8*
energy sector	0.0	4.5	1.4	0.0	*6.0*
industry	12.7	4.2	12.3	0.0	*29.2*
transport	0.0	28.9	0.0	0.0	*28.9*
domestic/tertiary	1.7	17.3	10.8	0.0	*29.8*
total	*29.4*	*55.9*	*35.9*	*0.5*	*121.7*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	14.9	0.9	11.1	0.5	*27.5*
energy sector	0.0	4.5	1.4	0.0	*5.9*
industry	11.3	3.9	11.8	0.0	*27.0*
transport	0.0	28.6	0.0	0.0	*28.6*
domestic/tertiary	1.5	14.4	10.7	0.0	*26.6*
total	*27.8*	*52.3*	*35.1*	*0.5*	*115.6*

BELGIUM

Reference case: development of CO2 emissions by sector and fuel: 2000/1990

	solids	oil	gas	other	*total*
power generation	-1.2%	-7.9%	45.8%	-4.2%	13.2%
energy sector	-82.8%	14.0%	-9.5%	0.0%	6.8%
industry	-14.9%	-16.4%	-0.2%	0.0%	-9.5%
transport	0.0%	24.6%	0.0%	0.0%	24.6%
domestic/tertiary	-21.7%	8.8%	31.3%	0.0%	13.3%
total	-9.0%	13.7%	19.9%	-4.2%	8.7%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990

	solids	oil	gas	other	*total*
power generation	-2.0%	-14.8%	43.5%	-4.2%	11.7%
energy sector	-83.6%	12.7%	-10.5%	0.0%	5.6%
industry	-24.1%	-22.6%	-4.2%	0.0%	-16.3%
transport	0.0%	23.2%	0.0%	0.0%	23.2%
domestic/tertiary	-30.6%	-9.1%	29.7%	0.0%	1.3%
total	-14.2%	6.4%	17.1%	-4.2%	3.3%

2000: tax case versus reference case (percentage reduction)

	solids	oil	gas	other	*total*
power generation	-0.9%	-7.4%	-1.5%	0.0%	-1.3%
energy sector	-4.7%	-1.1%	-1.1%	0.0%	-1.1%
industry	-10.7%	-7.5%	-4.0%	0.0%	-7.4%
transport	0.0%	-1.1%	0.0%	0.0%	-1.1%
domestic/tertiary	-11.3%	-16.4%	-1.3%	0.0%	-10.6%
total	-5.7%	-6.4%	-2.3%	0.0%	-5.0%

DENMARK

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	21.8	0.8	0.3	0.0	*23.0*
energy sector	0.0	0.9	0.4	0.0	*1.3*
industry	1.0	3.4	1.2	0.0	*5.7*
transport	0.0	13.7	0.0	0.0	*13.7*
domestic/tertiary	0.8	6.3	2.3	0.0	*9.4*
total	*23.7*	*25.1*	*4.3*	*0.0*	*53.1*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	28.7	0.2	2.9	0.1	*32.0*
energy sector	0.0	0.9	0.6	0.0	*1.5*
industry	1.1	3.4	1.7	0.0	*6.1*
transport	0.0	16.8	0.0	0.0	*16.8*
domestic/tertiary	0.6	5.7	2.8	0.0	*9.1*
total	*30.3*	*27.1*	*8.0*	*0.1*	*65.5*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	28.7	0.2	2.9	0.1	*31.9*
energy sector	0.0	0.9	0.5	0.0	*1.4*
industry	0.7	3.4	1.7	0.0	*5.8*
transport	0.0	16.0	0.0	0.0	*16.0*
domestic/tertiary	0.0	5.5	3.0	0.0	*8.5*
total	*29.4*	*26.0*	*8.0*	*0.1*	*63.6*

DENMARK

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	31.5%	-74.2%	822.3%	254.5%	39.1%
energy sector	0.0%	5.2%	32.1%	0.0%	14.2%
industry	5.6%	-0.9%	36.8%	0.0%	8.4%
transport	0.0%	22.6%	0.0%	0.0%	22.6%
domestic/tertiary	-33.5%	-9.3%	21.8%	0.0%	-3.9%
total	28.1%	7.7%	86.7%	254.5%	23.3%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	31.4%	-74.7%	797.4%	254.5%	38.6%
energy sector	0.0%	3.0%	7.6%	0.0%	4.5%
industry	-26.3%	0.0%	34.8%	0.0%	2.9%
transport	0.0%	16.9%	0.0%	0.0%	16.9%
domestic/tertiary	-100.0%	-12.9%	30.4%	0.0%	-10.0%
total	24.3%	3.7%	86.3%	254.5%	19.7%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-0.1%	-1.8%	-2.7%	0.0%	-0.4%
energy sector	0.0%	-2.1%	-18.6%	0.0%	-8.5%
industry	-30.2%	0.9%	-1.4%	0.0%	-5.1%
transport	0.0%	-4.7%	0.0%	0.0%	-4.7%
domestic/tertiary	-100.0%	-3.9%	7.1%	0.0%	-6.4%
total	-3.0%	-3.7%	-0.2%	0.0%	-2.9%

GERMANY

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	292.9	9.5	36.0	2.5	*340.9*
energy sector	3.3	15.8	10.4	0.0	*29.5*
industry	109.0	26.1	76.7	0.0	*211.8*
transport	0.3	172.6	0.0	0.0	*173.0*
domestic/tertiary	99.1	97.9	52.8	0.0	*249.8*
total	*504.6*	*322.0*	*175.9*	*2.5*	*1005.0*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	310.3	18.2	62.2	2.5	*393.3*
energy sector	2.1	16.4	10.2	0.0	*28.7*
industry	72.3	22.1	79.2	0.0	*173.6*
transport	0.3	210.2	0.0	0.0	*210.5*
domestic/tertiary	41.3	123.0	67.0	0.0	*231.3*
total	*426.2*	*390.0*	*218.6*	*2.5*	*1037.4*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	300.0	19.0	64.0	2.5	*385.6*
energy sector	2.0	15.8	10.1	0.0	*27.9*
industry	67.5	19.3	77.0	0.0	*163.9*
transport	0.3	205.5	0.0	0.0	*205.7*
domestic/tertiary	39.3	111.6	65.5	0.0	*216.3*
total	*409.0*	*371.1*	*216.7*	*2.5*	*999.3*

GERMANY

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	5.9%	91.1%	72.8%	0.1%	15.3%
energy sector	-36.6%	3.7%	-2.3%	0.0%	-2.9%
industry	-33.7%	-15.2%	3.3%	0.0%	-18.0%
transport	-13.4%	21.8%	0.0%	0.0%	21.7%
domestic/tertiary	-58.3%	25.6%	26.9%	0.0%	-7.4%
total	-15.5%	21.1%	24.3%	0.1%	3.2%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	2.4%	99.4%	78.0%	0.1%	13.1%
energy sector	-39.3%	-0.3%	-2.9%	0.0%	-5.5%
industry	-38.1%	-26.0%	0.4%	0.0%	-22.6%
transport	-13.4%	19.0%	0.0%	0.0%	18.9%
domestic/tertiary	-60.4%	13.9%	23.9%	0.0%	-13.4%
total	-18.9%	15.2%	23.2%	0.1%	-0.6%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-3.3%	4.3%	3.0%	0.0%	-2.0%
energy sector	-4.2%	-3.9%	-0.5%	0.0%	-2.7%
industry	-6.6%	-12.7%	-2.8%	0.0%	-5.6%
transport	0.0%	-2.3%	0.0%	0.0%	-2.3%
domestic/tertiary	-5.0%	-9.3%	-2.3%	0.0%	-6.5%
total	-4.0%	-4.8%	-0.9%	0.0%	-3.7%

GREECE

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	30.0	5.7	0.1	0.0	*35.8*
energy sector	0.0	1.9	0.1	0.0	*1.9*
industry	4.8	5.3	0.0	0.0	*10.2*
transport	0.0	17.7	0.0	0.0	*17.7*
domestic/tertiary	0.2	7.9	0.0	0.0	*8.1*
total	*35.0*	*38.5*	*0.2*	*0.0*	*73.7*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	40.9	4.9	1.5	0.0	*47.3*
energy sector	0.0	2.3	0.9	0.0	*3.2*
industry	5.5	4.3	1.5	0.0	*11.4*
transport	0.0	22.7	0.0	0.0	*22.7*
domestic/tertiary	0.2	10.8	1.0	0.0	*12.0*
total	*46.6*	*45.0*	*5.0*	*0.0*	*96.6*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	40.7	4.4	1.3	0.0	*46.4*
energy sector	0.0	2.2	0.9	0.0	*3.1*
industry	4.4	3.6	1.4	0.0	*9.3*
transport	0.0	22.3	0.0	0.0	*22.3*
domestic/tertiary	0.2	10.4	1.0	0.0	*11.5*
total	*45.2*	*42.9*	*4.6*	*0.0*	*92.6*

GREECE

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	36.3%	-13.6%	1950.7%	0.0%	32.3%
energy sector	0.0%	21.0%	1352.4%	0.0%	64.0%
industry	14.8%	-18.7%	7873.7%	0.0%	12.0%
transport	0.0%	28.2%	0.0%	0.0%	28.2%
domestic/tertiary	-6.1%	37.0%	5622.2%	0.0%	48.5%
total	33.1%	17.0%	2765.3%	0.0%	31.1%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	35.6%	-21.8%	1657.4%	0.0%	29.8%
energy sector	0.0%	17.4%	1281.1%	0.0%	58.3%
industry	-9.2%	-33.3%	7360.2%	0.0%	-8.0%
transport	0.0%	25.8%	0.0%	0.0%	25.8%
domestic/tertiary	-6.1%	31.5%	5405.9%	0.0%	42.6%
total	29.2%	11.3%	2536.7%	0.0%	25.8%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-0.5%	-9.6%	-14.3%	0.0%	-1.9%
energy sector	0.0%	-3.0%	-4.9%	0.0%	-3.5%
industry	-20.9%	-17.9%	-6.4%	0.0%	-17.8%
transport	0.0%	-1.9%	0.0%	0.0%	-1.9%
domestic/tertiary	0.0%	-4.1%	-3.8%	0.0%	-4.0%
total	-2.9%	-4.8%	-8.0%	0.0%	-4.1%

SPAIN

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	55.0	7.1	2.1	0.2	*64.4*
energy sector	0.4	9.9	1.4	0.0	*11.6*
industry	14.9	18.8	12.0	0.0	*45.6*
transport	0.0	67.3	0.0	0.0	*67.3*
domestic/tertiary	1.8	17.8	2.1	0.0	*21.7*
total	*72.1*	*120.9*	*17.5*	*0.2*	*210.7*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	69.0	3.8	11.1	0.2	*84.1*
energy sector	0.4	10.1	1.4	0.0	*12.0*
industry	14.8	18.3	16.0	0.0	*49.1*
transport	0.0	89.1	0.0	0.0	*89.1*
domestic/tertiary	1.5	20.0	4.0	0.0	*25.5*
total	*85.8*	*141.3*	*32.6*	*0.2*	*259.8*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	68.2	3.4	10.2	0.2	*82.1*
energy sector	0.4	9.9	1.4	0.0	*11.6*
industry	13.5	17.6	16.5	0.0	*47.6*
transport	0.0	86.5	0.0	0.0	*86.5*
domestic/tertiary	1.3	19.9	4.0	0.0	*25.2*
total	*83.5*	*137.3*	*32.0*	*0.2*	*253.0*

SPAIN

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	25.5%	-46.4%	417.0%	-4.8%	30.6%
energy sector	2.2%	2.9%	5.8%	0.0%	3.2%
Industry	-0.7%	-2.5%	34.1%	0.0%	7.7%
transport	0.0%	32.3%	0.0%	0.0%	32.3%
domestic/tertiary	-16.5%	12.0%	94.9%	0.0%	17.4%
total	18.9%	16.9%	85.9%	-4.8%	23.3%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	24.1%	-51.4%	374.6%	-4.8%	27.4%
energy sector	-7.4%	0.5%	-1.0%	0.0%	0.1%
industry	-9.3%	-6.3%	38.0%	0.0%	4.3%
transport	0.0%	28.5%	0.0%	0.0%	28.5%
domestic/tertiary	-27.2%	11.3%	94.2%	0.0%	15.9%
total	15.7%	13.6%	82.8%	-4.8%	20.1%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-1.2%	-9.3%	-8.2%	0.0%	-2.4%
energy sector	-9.4%	-2.3%	-6.5%	0.0%	-3.0%
industry	-8.7%	-3.9%	2.9%	0.0%	-3.1%
transport	0.0%	-2.8%	0.0%	0.0%	-2.8%
domestic/tertiary	-12.8%	-0.6%	-0.3%	0.0%	-1.3%
total	-2.7%	-2.8%	-1.7%	0.0%	-2.6%

FRANCE

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	29.3	5.7	8.9	0.5	*44.4*
energy sector	0.3	14.5	2.7	0.0	*17.4*
industry	30.9	21.8	30.2	0.0	*83.0*
transport	0.0	125.5	0.0	0.0	*125.5*
domestic/tertiary	6.7	58.5	30.2	0.0	*95.4*
total	*67.2*	*226.2*	*71.9*	*0.5*	*365.7*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	36.2	10.3	19.6	0.6	*66.7*
energy sector	0.2	15.6	2.5	0.0	*18.2*
industry	27.6	17.1	37.1	0.0	*81.8*
transport	0.0	158.8	0.0	0.0	*158.8*
domestic/tertiary	5.3	61.9	38.6	0.0	*105.8*
total	*69.3*	*263.7*	*97.8*	*0.6*	*431.4*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	35.6	9.8	19.4	0.6	*65.3*
energy sector	0.2	15.1	2.4	0.0	*17.7*
industry	24.4	15.0	36.1	0.0	*75.5*
transport	0.0	153.9	0.0	0.0	*153.9*
domestic/tertiary	4.3	55.5	37.7	0.0	*97.6*
total	*64.5*	*249.3*	*95.7*	*0.6*	*410.0*

FRANCE

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	23.8%	79.5%	121.0%	11.5%	50.3%
energy sector	-18.5%	7.3%	-7.8%	0.0%	4.6%
industry	-11.0%	-21.5%	23.0%	0.0%	-1.4%
transport	0.0%	26.5%	0.0%	0.0%	26.5%
domestic/tertiary	-21.8%	5.8%	28.1%	0.0%	10.9%
total	3.1%	16.6%	36.1%	11.5%	17.9%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	21.7%	69.9%	118.7%	11.5%	47.3%
energy sector	-35.8%	4.3%	-8.3%	0.0%	1.8%
industry	-21.1%	-31.3%	19.6%	0.0%	-9.0%
transport	0.0%	22.6%	0.0%	0.0%	22.6%
domestic/tertiary	-35.7%	-5.2%	25.0%	0.0%	2.2%
total	-4.0%	10.2%	33.1%	11.5%	12.1%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-1.7%	-5.3%	-1.1%	0.0%	-2.0%
energy sector	-21.2%	-2.8%	-0.6%	0.0%	-2.7%
industry	-11.4%	-12.5%	-2.8%	0.0%	-7.7%
transport	0.0%	-3.1%	0.0%	0.0%	-3.1%
domestic/tertiary	-17.8%	-10.3%	-2.4%	0.0%	-7.8%
total	-6.8%	-5.5%	-2.2%	0.0%	-4.9%

IRELAND

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	7.9	1.1	2.0	0.0	*11.0*
energy sector	0.0	0.2	0.1	0.0	*0.2*
industry	1.6	2.9	0.9	0.0	*5.3*
transport	0.0	6.0	0.0	0.0	*6.0*
domestic/tertiary	4.7	3.1	0.5	0.0	*8.3*
total	*14.2*	*13.2*	*3.4*	*0.0*	*30.8*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	7.7	2.2	3.4	0.0	*13.3*
energy sector	0.0	0.2	0.1	0.0	*0.3*
industry	1.9	2.7	1.2	0.0	*5.9*
transport	0.0	7.8	0.0	0.0	*7.8*
domestic/tertiary	3.9	4.0	0.7	0.0	*8.6*
total	*13.6*	*17.0*	*5.4*	*0.0*	*36.0*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	7.7	2.1	3.3	0.0	*13.1*
energy sector	0.0	0.2	0.1	0.0	*0.3*
industry	1.9	2.4	1.3	0.0	*5.7*
transport	0.0	7.6	0.0	0.0	*7.6*
domestic/tertiary	3.2	4.0	0.7	0.0	*7.9*
total	*12.8*	*16.4*	*5.5*	*0.0*	*34.6*

IRELAND

Reference case: development of CO2 emissions by sector and fuel: 2000/1990

	solids	oil	gas	other	*total*
power generation	-2.6%	102.2%	71.6%	0.0%	21.2%
energy sector	0.0%	23.6%	74.3%	0.0%	38.1%
industry	24.1%	-4.3%	40.1%	0.0%	11.4%
transport	0.0%	30.7%	0.0%	0.0%	30.7%
domestic/tertiary	-16.6%	30.3%	42.9%	0.0%	4.5%
total	-4.3%	28.9%	59.5%	0.0%	17.0%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990

	solids	oil	gas	other	*total*
power generation	-2.6%	89.3%	68.3%	0.0%	19.3%
energy sector	0.0%	19.1%	82.5%	0.0%	37.3%
industry	20.2%	-14.6%	54.1%	0.0%	6.9%
transport	0.0%	27.2%	0.0%	0.0%	27.2%
domestic/tertiary	-31.9%	29.5%	46.6%	0.0%	-4.3%
total	-9.7%	23.7%	61.9%	0.0%	12.5%

2000: tax case versus reference case (percentage reduction)

	solids	oil	gas	other	*total*
power generation	0.0%	-6.4%	-1.9%	0.0%	-1.6%
energy sector	0.0%	-3.6%	4.7%	0.0%	-0.6%
industry	-3.1%	-10.8%	10.0%	0.0%	-4.0%
transport	0.0%	-2.6%	0.0%	0.0%	-2.6%
domestic/tertiary	-18.4%	-0.6%	2.6%	0.0%	-8.4%
total	-5.7%	-4.0%	1.5%	0.0%	-3.8%

ITALY

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	28.0	70.2	24.3	0.4	*122.8*
energy sector	0.3	13.3	5.3	0.0	*18.9*
industry	18.6	28.9	34.6	0.0	*82.1*
transport	0.0	99.3	0.5	0.0	*99.8*
domestic/tertiary	0.4	41.4	37.0	0.0	*78.8*
total	*47.3*	*253.0*	*101.7*	*0.4*	*402.4*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	43.3	54.6	46.8	0.4	*145.1*
energy sector	0.2	13.6	4.9	0.0	*18.8*
industry	15.2	18.2	43.0	0.0	*76.4*
transport	0.0	135.3	0.5	0.0	*135.8*
domestic/tertiary	0.2	31.5	56.3	0.0	*88.0*
total	*59.0*	*253.1*	*151.5*	*0.4*	*464.0*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	43.3	53.3	46.0	0.4	*143.0*
energy sector	0.2	13.3	4.7	0.0	*18.2*
industry	14.6	17.0	42.4	0.0	*74.0*
transport	0.0	130.8	0.5	0.0	*131.3*
domestic/tertiary	0.2	30.0	54.9	0.0	*85.1*
total	*58.3*	*244.4*	*148.5*	*0.4*	*451.7*

ITALY

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	54.7%	-22.2%	92.7%	0.2%	18.1%
energy sector	-9.1%	2.3%	-6.9%	0.0%	-0.5%
industry	-18.2%	-37.1%	24.2%	0.0%	-7.0%
transport	0.0%	36.2%	8.0%	0.0%	36.1%
domestic/tertiary	-50.2%	-23.9%	52.2%	0.0%	11.7%
total	24.7%	0.0%	49.0%	0.2%	15.3%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	54.7%	-24.0%	89.3%	0.2%	16.4%
energy sector	-12.9%	-0.3%	-10.6%	0.0%	-3.4%
industry	-21.5%	-41.3%	22.4%	0.0%	-10.0%
transport	0.0%	31.7%	5.7%	0.0%	31.6%
domestic/tertiary	-50.2%	-27.3%	48.5%	0.0%	8.1%
total	23.3%	-3.4%	46.1%	0.2%	12.2%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	0.0%	-2.3%	-1.7%	0.0%	-1.4%
energy sector	-4.3%	-2.5%	-4.0%	0.0%	-2.9%
industry	-4.1%	-6.7%	-1.4%	0.0%	-3.2%
transport	0.0%	-3.3%	-2.1%	0.0%	-3.3%
domestic/tertiary	0.0%	-4.5%	-2.5%	0.0%	-3.2%
total	-1.1%	-3.4%	-2.0%	0.0%	-2.7%

LUXEMBOURG

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	0.0	0.0	1.4	0.1	*1.5*
energy sector	0.0	0.0	0.0	0.0	*0.0*
industry	3.3	0.9	2.5	0.0	*6.6*
transport	0.0	3.1	0.0	0.0	*3.1*
domestic/tertiary	0.0	0.9	0.3	0.0	*1.3*
total	*3.3*	*4.9*	*4.2*	*0.1*	*12.5*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	0.0	0.0	1.5	0.1	*1.6*
energy sector	0.0	0.0	0.0	0.0	*0.0*
industry	3.3	1.1	2.3	0.0	*6.7*
transport	0.0	4.3	0.0	0.0	*4.3*
domestic/tertiary	0.1	0.7	0.4	0.0	*1.1*
total	*3.4*	*6.1*	*4.2*	*0.1*	*13.7*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	0.0	0.0	1.4	0.1	*1.5*
energy sector	0.0	0.0	0.0	0.0	*0.0*
industry	3.0	1.0	2.2	0.0	*6.2*
transport	0.0	4.2	0.0	0.0	*4.2*
domestic/tertiary	0.0	0.6	0.4	0.0	*1.0*
total	*3.0*	*5.8*	*3.9*	*0.1*	*12.9*

LUXEMBOURG

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	0.0%	8.0%	3.3%	11.1%	3.7%
energy sector	0.0%	0.0%	0.0%	0.0%	0.0%
industry	1.2%	26.7%	-6.7%	0.0%	1.5%
transport	0.0%	39.7%	0.0%	0.0%	39.7%
domestic/tertiary	18.2%	-24.8%	17.3%	0.0%	-12.8%
total	1.4%	24.8%	-1.5%	11.1%	9.6%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	0.0%	4.8%	-3.1%	11.1%	-2.4%
energy sector	0.0%	0.0%	0.0%	0.0%	0.0%
industry	-9.0%	17.0%	-12.5%	0.0%	-6.9%
transport	0.0%	36.8%	0.0%	0.0%	36.8%
domestic/tertiary	4.7%	-36.3%	14.5%	0.0%	-22.2%
total	-8.8%	19.0%	-7.3%	0.0%	2.7%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	0.0%	-3.0%	-6.2%	0.0%	-5.9%
energy sector	0.0%	0.0%	0.0%	0.0%	0.0%
industry	-10.0%	-7.6%	-6.3%	0.0%	-8.3%
transport	0.0%	-2.1%	0.0%	0.0%	-2.1%
domestic/tertiary	-11.4%	-15.3%	-2.4%	0.0%	-10.8%
total	-10.0%	-4.6%	-5.9%	0.0%	-6.3%

NETHERLANDS

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	22.4	2.1	20.8	0.5	*45.8*
energy sector	0.0	10.0	3.0	0.0	*13.1*
industry	7.1	4.0	18.1	0.0	*29.2*
transport	0.0	30.8	0.0	0.0	*30.8*
domestic/tertiary	0.1	5.0	33.3	0.0	*38.4*
total	*29.6*	*51.9*	*75.3*	*0.5*	*157.3*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	27.6	1.7	24.2	0.4	*53.9*
energy sector	0.0	9.8	3.6	0.0	*13.4*
industry	5.6	3.4	18.6	0.0	*27.6*
transport	0.0	35.9	0.0	0.0	*35.9*
domestic/tertiary	0.0	4.7	42.5	0.0	*47.2*
total	*33.2*	*55.5*	*88.9*	*0.4*	*178.1*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	27.4	1.7	23.1	0.4	*52.6*
energy sector	0.0	9.8	3.6	0.0	*13.3*
industry	5.3	3.1	17.5	0.0	*26.0*
transport	0.0	34.8	0.0	0.0	*34.8*
domestic/tertiary	0.0	4.2	41.4	0.0	*45.5*
total	*32.7*	*53.6*	*85.6*	*0.4*	*172.3*

NETHERLANDS

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	23.1%	-17.7%	16.2%	-20.1%	17.6%
energy sector	0.0%	-1.8%	17.2%	0.0%	2.6%
industry	-20.4%	-16.1%	3.0%	0.0%	-5.3%
transport	0.0%	16.4%	0.0%	0.0%	16.4%
domestic/tertiary	-86.0%	-5.8%	27.6%	0.0%	23.0%
total	12.3%	6.9%	18.1%	-20.1%	13.2%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	22.1%	-18.6%	11.0%	-20.1%	14.8%
energy sector	0.0%	-2.3%	16.9%	0.0%	2.2%
industry	-24.8%	-22.4%	-2.9%	0.0%	-10.9%
transport	0.0%	13.0%	0.0%	0.0%	13.0%
domestic/tertiary	-89.8%	-16.5%	24.2%	0.0%	18.6%
total	10.5%	3.2%	13.7%	-20.1%	9.5%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-0.8%	-1.1%	-4.5%	0.0%	-2.5%
energy sector	0.0%	-0.5%	-0.2%	0.0%	-0.4%
industry	-5.6%	-7.4%	-5.8%	0.0%	-5.9%
transport	0.0%	-3.0%	0.0%	0.0%	-2.9%
domestic/tertiary	-27.0%	-11.3%	-2.7%	0.0%	-3.6%
total	-1.6%	-3.4%	-3.7%	0.0%	-3.2%

PORTUGAL

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	8.0	6.9	0.1	0.3	*15.2*
energy sector	0.0	1.4	0.0	0.0	*1.4*
industry	2.4	5.7	0.2	0.0	*8.4*
transport	0.0	11.3	0.0	0.0	*11.3*
domestic/tertiary	0.0	3.4	0.1	0.0	*3.6*
total	*10.4*	*28.7*	*0.5*	*0.3*	*39.9*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	13.2	5.2	2.9	0.4	*21.7*
energy sector	0.0	2.0	0.3	0.0	*2.3*
industry	3.2	6.1	2.0	0.0	*11.3*
transport	0.0	16.5	0.0	0.0	*16.5*
domestic/tertiary	0.0	4.6	0.6	0.0	*5.2*
total	*16.3*	*34.5*	*5.8*	*0.4*	*57.0*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	13.2	5.1	2.9	0.4	*21.5*
energy sector	0.0	2.0	0.3	0.0	*2.3*
industry	2.6	6.1	2.0	0.0	*10.7*
transport	0.0	15.9	0.0	0.0	*15.9*
domestic/tertiary	0.0	4.3	0.6	0.0	*4.9*
total	*15.8*	*33.4*	*5.8*	*0.4*	*55.3*

PORTUGAL

Reference case: development of CO2 emissions by sector and fuel: 2000/1990

	solids	oil	gas	other	*total*
power generation	64.9%	-23.5%	2021.2%	43.3%	42.3%
energy sector	0.0%	43.7%	0.0%	0.0%	64.3%
industry	29.5%	7.7%	774.3%	0.0%	35.2%
transport	0.0%	45.5%	0.0%	0.0%	45.5%
domestic/tertiary	-100.0%	34.0%	384.4%	0.0%	46.4%
total	56.6%	20.1%	1077.6%	43.3%	42.9%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990

	solids	oil	gas	other	*total*
power generation	64.9%	-26.2%	2002.3%	43.3%	40.9%
energy sector	0.0%	42.9%	0.0%	0.0%	63.5%
industry	7.4%	6.4%	764.1%	0.0%	27.5%
transport	0.0%	40.7%	0.0%	0.0%	40.7%
domestic/tertiary	-100.0%	25.2%	367.3%	0.0%	37.3%
total	51.4%	16.2%	1063.2%	43.3%	38.5%

2000: tax case versus reference case (percentage reduction)

	solids	oil	gas	other	*total*
power generation	0.0%	-3.5%	-0.9%	0.0%	-1.0%
energy sector	0.0%	-0.6%	0.0%	0.0%	-0.5%
industry	-17.1%	-1.3%	-1.2%	0.0%	-5.7%
transport	0.0%	-3.3%	0.0%	0.0%	-3.3%
domestic/tertiary	0.0%	-6.6%	-3.5%	0.0%	-6.2%
total	-3.3%	-3.2%	-1.2%	0.0%	-3.0%

UNITED KINGDOM

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	188.4	25.0	6.6	1.0	*221.1*
energy sector	0.6	18.6	9.2	0.0	*28.4*
industry	26.9	21.6	32.4	0.0	*81.0*
transport	0.0	136.1	0.0	0.0	*136.1*
domestic/tertiary	21.8	20.7	70.0	0.0	*112.5*
total	*237.8*	*222.0*	*118.3*	*1.0*	*579.2*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	169.4	13.8	37.0	1.1	*221.2*
energy sector	0.5	17.9	10.9	0.0	*29.3*
industry	24.6	22.0	32.6	0.0	*79.2*
transport	0.0	154.2	0.0	0.0	*154.2*
domestic/tertiary	20.0	21.6	88.6	0.0	*130.2*
total	*214.5*	*229.4*	*169.0*	*1.1*	*614.1*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	166.2	13.7	36.1	1.1	*217.0*
energy sector	0.4	17.3	10.7	0.0	*28.5*
industry	21.2	20.0	32.5	0.0	*73.7*
transport	0.0	151.1	0.0	0.0	*151.2*
domestic/tertiary	19.2	19.9	86.6	0.0	*125.7*
total	*207.1*	*222.1*	*165.8*	*1.1*	*596.1*

UNITED KINGDOM

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	-10.1%	-45.0%	456.2%	5.3%	0.0%
energy sector	-23.4%	-3.8%	18.2%	0.0%	2.9%
industry	-8.5%	1.9%	0.6%	0.0%	-2.1%
transport	44.4%	13.3%	0.0%	0.0%	13.3%
domestic/tertiary	-8.3%	4.5%	26.4%	0.0%	15.7%
total	-9.8%	3.3%	42.9%	5.3%	6.0%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	-11.8%	-45.3%	442.5%	5.3%	-1.9%
energy sector	-28.5%	-6.9%	16.5%	0.0%	0.2%
industry	-21.3%	-7.2%	0.1%	0.0%	-9.0%
transport	44.4%	11.1%	0.0%	0.0%	11.1%
domestic/tertiary	-12.1%	-3.8%	23.6%	0.0%	11.7%
total	-12.9%	0.0%	40.2%	5.3%	2.9%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-1.9%	-0.5%	-2.5%	0.0%	-1.9%
energy sector	-6.7%	-3.1%	-1.4%	0.0%	-2.6%
industry	-13.9%	-8.9%	-0.5%	0.0%	-7.0%
transport	0.0%	-2.0%	0.0%	0.0%	-2.0%
domestic/tertiary	-4.1%	-7.9%	-2.2%	0.0%	-3.5%
total	-3.5%	-3.2%	-1.9%	0.0%	-2.9%

1990: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	699.0	135.1	110.5	6.1	*950.6*
energy sector	4.9	90.4	34.2	0.0	*129.5*
industry	235.5	144.5	221.1	0.0	*601.1*
transport	0.3	706.6	0.5	0.0	*707.5*
domestic/tertiary	137.9	278.9	236.9	0.0	*653.6*
total	*1077.5*	*1355.5*	*603.1*	*6.1*	*3042.3*

2000 reference case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	761.3	115.9	224.4	6.3	*1108.0*
energy sector	3.4	93.4	36.8	0.0	*133.7*
industry	187.8	123.1	247.7	0.0	*558.5*
transport	0.3	880.4	0.5	0.0	*881.2*
domestic/tertiary	74.7	305.9	313.4	0.0	*693.9*
total	*1027.6*	*1518.6*	*822.8*	*6.3*	*3375.3*

2000 tax case: CO2 emissions by sector and fuel (mill. t CO2)

	solids	oil	gas	other	*total*
power generation	745.8	113.6	221.7	6.3	*1087.4*
energy sector	3.2	91.0	36.2	0.0	*130.4*
industry	170.5	112.4	242.4	0.0	*525.4*
transport	0.3	857.2	0.5	0.0	*858.0*
domestic/tertiary	69.2	280.3	306.4	0.0	*655.9*
total	*989.1*	*1454.5*	*807.1*	*6.3*	*3257.1*

Reference case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	8.9%	-14.2%	103.2%	3.2%	16.6%
energy sector	-29.4%	3.3%	7.7%	0.0%	3.2%
industry	-20.3%	-14.8%	12.0%	0.0%	-7.1%
transport	-8.8%	24.6%	8.0%	0.0%	24.6%
domestic/tertiary	-45.8%	9.7%	32.3%	0.0%	6.2%
total	-4.6%	12.0%	36.4%	3.2%	10.9%

Tax case: development of CO2 emissions by sector and fuel: 2000/1990					
	solids	oil	gas	other	*total*
power generation	6.7%	-15.9%	100.7%	3.2%	14.4%
energy sector	-33.9%	0.6%	5.7%	0.0%	0.7%
industry	-27.6%	-22.2%	9.6%	0.0%	-12.6%
transport	-8.8%	21.3%	5.7%	0.0%	21.3%
domestic/tertiary	-49.8%	0.5%	29.3%	0.0%	0.3%
total	-8.2%	7.3%	33.8%	3.2%	7.1%

2000: tax case versus reference case (percentage reduction)					
	solids	oil	gas	other	*total*
power generation	-2.0%	-2.0%	-1.2%	0.0%	-1.9%
energy sector	-6.3%	-2.6%	-1.9%	0.0%	-2.5%
industry	-9.2%	-8.6%	-2.1%	0.0%	-5.9%
transport	0.0%	-2.6%	-2.1%	0.0%	-2.6%
domestic/tertiary	-7.3%	-8.4%	-2.2%	0.0%	-5.5%
total	-3.7%	-4.2%	-1.9%	0.0%	-3.5%

BELGIUM

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	10.20	9.19	8.75	-9.9%	-14.2%	-4.8%
oil	18.44	21.33	20.17	15.7%	9.4%	-5.5%
gas	8.17	11.73	11.43	43.6%	39.9%	-2.6%
nuclear	10.71	10.78	10.77	0.7%	0.6%	-0.1%
electricity	-0.30	0.23	0.23	-175.8%	-176.7%	1.2%
other	0.24	0.33	0.33	35.5%	35.2%	-0.3%
total	47.45	53.57	51.66	12.9%	8.9%	-3.6%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	3.88	3.83	3.80	-1.2%	-2.0%	-0.9%
lignite	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	0.32	0.29	0.27	-7.9%	-14.6%	-7.3%
gas	1.32	2.88	2.82	118.5%	113.9%	-2.1%
nuclear	10.71	10.78	10.77	0.7%	0.6%	-0.1%
other	0.24	0.25	0.25	2.5%	2.5%	0.0%
total	16.46	18.03	17.91	9.5%	8.8%	-0.7%

BELGIUM

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	3.41	2.90	2.56	-14.9%	-25.0%	-11.8%
oil	1.55	1.30	1.20	-16.6%	-22.8%	-7.5%
gas	3.73	4.28	4.09	14.8%	9.6%	-4.6%
electricity	2.63	3.22	3.10	22.1%	17.6%	-3.7%
other	0.19	0.23	0.22	20.9%	15.6%	-4.4%
total	11.51	11.92	11.15	3.5%	-3.1%	-6.4%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	7.60	9.46	9.35	24.5%	23.1%	-1.1%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.11	0.15	0.15	43.9%	43.9%	0.0%
other	0.00	0.08	0.08	x	x	-1.1%
total	7.70	9.69	9.59	25.8%	24.4%	-1.1%
domestic/tertiary						
solid fuels	0.55	0.43	0.38	-21.8%	-30.7%	-11.3%
oil	5.14	5.59	4.67	8.8%	-9.1%	-16.4%
gas	3.52	4.62	4.56	31.3%	29.7%	-1.3%
electricity	2.25	2.84	2.91	26.0%	29.2%	2.6%
other	0.03	0.04	0.04	44.0%	44.0%	0.0%
total	11.48	13.51	12.56	17.7%	9.4%	-7.0%
total final demand						
solid fuels	3.95	3.33	2.93	-15.9%	-25.8%	-11.8%
oil	14.29	16.35	15.22	14.4%	6.5%	-6.9%
gas	7.25	8.90	8.65	22.8%	19.3%	-2.9%
electricity	4.99	6.21	6.16	24.3%	23.4%	-0.8%
other	0.21	0.34	0.33	61.3%	56.3%	-3.1%
total	30.70	35.13	33.30	14.4%	8.5%	-5.2%

DENMARK

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	6.11	7.70	7.48	26.0%	22.5%	-2.8%
oil	8.44	9.31	8.97	10.3%	6.4%	-3.6%
gas	1.79	3.43	3.43	92.2%	92.2%	0.0%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.61	0.09	0.09	-84.7%	-84.7%	-0.1%
other	0.07	0.21	0.21	213.4%	209.4%	-1.3%
total	17.01	20.74	20.19	21.9%	18.7%	-2.7%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	5.55	7.30	7.29	31.5%	31.3%	-0.1%
lignite	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	0.25	0.06	0.06	-73.9%	-74.3%	-1.8%
gas	0.14	1.26	1.22	822.8%	798.0%	-2.7%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
other	0.01	0.17	0.17	1114.3%	1114.3%	0.0%
total	5.94	8.79	8.74	47.8%	47.1%	-0.5%

DENMARK

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	0.25	0.27	0.18	5.6%	-26.3%	-30.2%
oil	1.07	1.06	1.07	-0.8%	0.1%	0.9%
gas	0.53	0.72	0.71	36.9%	34.9%	-1.4%
electricity	0.76	0.83	0.83	9.8%	9.0%	-0.7%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	2.60	2.88	2.79	10.5%	7.2%	-3.0%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	4.48	5.50	5.24	22.7%	17.0%	-4.7%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.02	0.02	0.02	26.3%	26.3%	0.0%
other	0.00	0.04	0.04	x	x	-4.7%
total	4.50	5.56	5.30	23.6%	17.9%	-4.7%
domestic/tertiary						
solid fuels	0.21	0.14	0.00	-33.3%	-100.0%	-100.0%
oil	2.04	1.85	1.78	-9.2%	-12.7%	-3.9%
gas	0.98	1.19	1.27	21.9%	30.6%	7.1%
electricity	1.74	2.36	2.34	35.2%	34.4%	-0.6%
other	0.64	0.69	0.69	8.5%	8.5%	0.0%
total	5.60	6.23	6.08	11.1%	8.6%	-2.3%
total final demand						
solid fuels	0.46	0.41	0.18	-12.1%	-59.9%	-54.3%
oil	7.59	8.41	8.09	10.8%	6.6%	-3.8%
gas	1.50	1.91	1.98	27.2%	32.1%	3.9%
electricity	2.52	3.21	3.19	27.5%	26.7%	-0.6%
other	0.64	0.73	0.73	14.8%	14.5%	-0.3%
total	12.70	14.67	14.18	15.4%	11.6%	-3.3%

GERMANY

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	132.47	113.19	108.28	-14.6%	-18.3%	-4.3%
oil	123.39	149.60	143.28	21.2%	16.1%	-4.2%
gas	55.04	75.07	74.31	36.4%	35.0%	-1.0%
nuclear	37.67	36.14	36.14	-4.1%	-4.1%	0.0%
electricity	1.45	2.78	2.62	91.7%	80.3%	-6.0%
other	1.08	1.81	1.80	67.6%	66.4%	-0.7%
total	351.10	378.58	366.41	7.8%	4.4%	-3.2%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	32.25	42.47	41.08	31.7%	27.4%	-3.3%
lignite	38.09	32.87	31.75	-13.7%	-16.6%	-3.4%
oil	3.07	5.81	6.06	89.6%	97.7%	4.3%
gas	11.20	22.75	23.44	103.1%	109.2%	3.0%
nuclear	37.67	36.14	36.14	-4.1%	-4.1%	0.0%
other	1.08	1.27	1.27	17.9%	17.9%	0.0%
total	123.36	141.31	139.74	14.6%	13.3%	-1.1%

GERMANY

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	25.35	16.91	15.27	-33.3%	-39.8%	-9.7%
oil	8.32	7.08	6.18	-14.9%	-25.7%	-12.7%
gas	25.03	26.72	25.79	6.7%	3.0%	-3.5%
electricity	18.61	20.35	19.95	9.4%	7.2%	-1.9%
other	1.75	1.75	1.70	0.4%	-2.9%	-3.3%
total	79.05	72.81	68.89	-7.9%	-12.9%	-5.4%
transport						
solid fuels	0.08	0.07	0.07	-12.7%	-12.7%	0.0%
oil	56.69	69.03	67.47	21.8%	19.0%	-2.3%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	1.18	1.47	1.47	25.2%	25.2%	0.0%
other	0.00	0.51	0.50	x	x	-2.4%
total	57.95	71.08	69.51	22.7%	20.0%	-2.2%
domestic/tertiary						
solid fuels	22.82	9.59	9.11	-58.0%	-60.1%	-5.0%
oil	31.71	39.88	36.18	25.8%	14.1%	-9.3%
gas	22.44	28.52	27.86	27.1%	24.2%	-2.3%
electricity	19.34	24.90	24.67	28.8%	27.6%	-0.9%
other	1.12	1.53	1.53	36.7%	36.7%	0.0%
total	97.43	104.43	99.35	7.2%	2.0%	-4.9%
total final demand						
solid fuels	48.25	26.57	24.45	-44.9%	-49.3%	-8.0%
oil	96.72	116.00	109.83	19.9%	13.6%	-5.3%
gas	47.47	55.24	53.65	16.4%	13.0%	-2.9%
electricity	39.12	46.72	46.09	19.4%	17.8%	-1.3%
other	2.86	3.79	3.72	32.4%	30.0%	-1.8%
total	234.43	248.32	237.74	5.9%	1.4%	-4.3%

GREECE

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	8.20	10.93	10.59	33.2%	29.1%	-3.1%
oil	12.75	15.19	14.51	19.2%	13.8%	-4.5%
gas	0.14	2.19	2.02	1483.3%	1362.2%	-7.7%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.21	0.33	0.32	52.6%	51.1%	-1.0%
other	0.00	0.13	0.13	x	x	-1.9%
total	21.30	28.76	27.57	35.0%	29.4%	-4.1%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	0.00	1.35	1.30	x	x	-3.7%
lignite	6.89	8.17	8.17	18.6%	18.6%	0.0%
oil	1.80	1.54	1.42	-14.3%	-21.0%	-7.8%
gas	0.03	0.64	0.55	1961.3%	1666.5%	-14.3%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
other	0.00	0.02	0.02	x	x	0.0%
total	8.72	11.72	11.46	34.4%	31.4%	-2.2%

GREECE

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	1.19	1.37	1.08	14.8%	-9.2%	-20.9%
oil	1.68	1.36	1.11	-19.1%	-33.6%	-17.9%
gas	0.01	0.65	0.60	7975.0%	7455.8%	-6.4%
electricity	1.04	1.15	1.08	10.9%	4.0%	-6.2%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	3.92	4.52	3.88	15.5%	-0.9%	-14.2%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	5.81	7.42	7.28	27.8%	25.4%	-1.9%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.01	0.03	0.03	170.0%	165.8%	-1.6%
other	0.00	0.11	0.11	x	x	-1.9%
total	5.82	7.55	7.41	29.9%	27.5%	-1.9%
domestic/tertiary						
solid fuels	0.04	0.04	0.04	-7.1%	-7.1%	0.0%
oil	2.56	3.52	3.66	37.1%	42.7%	4.1%
gas	0.01	0.44	0.46	6171.4%	6409.1%	3.8%
electricity	1.40	2.32	2.34	66.0%	67.9%	1.1%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	4.01	6.31	6.50	57.4%	62.0%	2.9%
total final demand						
solid fuels	1.23	1.41	1.12	14.0%	-9.1%	-20.3%
oil	10.05	12.29	12.05	22.3%	19.9%	-2.0%
gas	0.02	1.09	1.06	7133.3%	6967.3%	-2.3%
electricity	2.45	3.50	3.45	43.0%	41.1%	-1.3%
other	0.00	0.11	0.11	x	x	-1.9%
total	13.74	18.39	17.79	33.8%	29.5%	-3.3%

SPAIN

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	19.27	23.18	22.48	20.3%	16.7%	-3.0%
oil	45.95	54.36	52.99	18.3%	15.3%	-2.5%
gas	4.97	11.18	11.06	125.0%	122.6%	-1.1%
nuclear	13.70	13.98	13.98	2.1%	2.1%	0.0%
electricity	2.15	3.25	3.22	51.2%	49.8%	-0.9%
other	0.09	0.51	0.49	462.2%	449.9%	-2.2%
total	86.12	106.45	104.23	23.6%	21.0%	-2.1%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	10.78	14.64	14.44	35.8%	34.0%	-1.4%
lignite	2.89	2.62	2.62	-9.3%	-9.3%	0.0%
oil	2.17	1.17	1.06	-46.3%	-51.3%	-9.3%
gas	0.49	4.33	3.95	791.6%	711.8%	-9.0%
nuclear	13.70	13.98	13.98	2.1%	2.1%	0.0%
other	0.09	0.21	0.21	135.6%	135.6%	0.0%
total	30.12	36.96	36.26	22.7%	20.4%	-1.9%

SPAIN

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	3.54	3.51	3.21	-0.8%	-9.4%	-8.7%
oil	5.54	5.39	5.18	-2.7%	-6.5%	-4.0%
gas	4.04	5.64	5.88	39.4%	45.4%	4.3%
electricity	5.44	7.06	7.02	29.7%	29.0%	-0.6%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	18.56	21.60	21.28	16.4%	14.6%	-1.5%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	22.01	29.16	28.33	32.5%	28.7%	-2.8%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.32	0.41	0.41	29.6%	29.6%	0.0%
other	0.00	0.29	0.29	x	x	-2.8%
total	22.33	29.86	29.03	33.7%	30.0%	-2.8%
domestic/tertiary						
solid fuels	0.47	0.39	0.34	-16.5%	-27.2%	-12.8%
oil	6.05	6.70	6.66	10.8%	10.1%	-0.6%
gas	0.86	1.68	1.68	95.8%	95.2%	-0.3%
electricity	4.99	6.91	6.68	38.5%	33.9%	-3.3%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	12.36	15.68	15.36	26.9%	24.2%	-2.1%
total final demand						
solid fuels	4.01	3.90	3.55	-2.6%	-11.5%	-9.1%
oil	33.60	41.25	40.17	22.8%	19.5%	-2.6%
gas	4.90	7.32	7.56	49.3%	54.1%	3.2%
electricity	10.74	14.38	14.11	33.8%	31.3%	-1.9%
other	0.00	0.29	0.29	x	x	-2.8%
total	53.25	67.14	65.66	26.1%	23.3%	-2.2%

FRANCE

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	20.00	20.31	19.16	1.5%	-4.2%	-5.7%
oil	87.97	99.65	94.94	13.3%	7.9%	-4.7%
gas	24.88	36.21	35.30	45.5%	41.9%	-2.5%
nuclear	79.13	94.83	94.43	19.8%	19.3%	-0.4%
electricity	0.74	0.69	0.57	-6.4%	-23.3%	-18.1%
other	0.21	0.79	0.77	271.2%	264.3%	-1.9%
total	212.94	252.48	245.17	18.6%	15.1%	-2.9%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	6.72	9.21	9.05	37.0%	34.7%	-1.7%
lignite	0.65	0.00	0.00	-100.0%	-100.0%	0.0%
oil	1.76	3.16	2.99	79.7%	70.1%	-5.4%
gas	1.42	5.78	5.69	305.6%	299.5%	-1.5%
nuclear	79.13	94.83	94.43	19.8%	19.3%	-0.4%
other	0.21	0.33	0.33	54.2%	54.2%	0.0%
total	89.89	113.30	112.49	26.0%	25.1%	-0.7%

FRANCE

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	7.37	6.50	5.72	-11.7%	-22.4%	-12.1%
oil	6.65	5.33	4.66	-19.8%	-30.0%	-12.7%
gas	10.83	13.83	13.39	27.7%	23.7%	-3.2%
electricity	9.78	11.48	11.11	17.4%	13.7%	-3.2%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	34.62	37.15	34.88	7.3%	0.7%	-6.1%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	41.14	52.01	50.38	26.4%	22.4%	-3.1%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.76	0.86	0.86	12.7%	12.7%	0.0%
other	0.00	0.46	0.45	x	x	-2.8%
total	41.91	53.33	51.69	27.3%	23.3%	-3.1%
domestic/tertiary						
solid fuels	1.69	1.32	0.94	-22.1%	-44.6%	-29.0%
oil	19.10	20.18	17.86	5.7%	-6.5%	-11.5%
gas	12.87	16.47	15.98	28.0%	24.2%	-3.0%
electricity	15.55	21.52	21.49	38.4%	38.2%	-0.2%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	49.20	59.49	56.26	20.9%	14.4%	-5.4%
total final demand						
solid fuels	9.06	7.82	6.65	-13.6%	-26.5%	-14.9%
oil	66.89	77.53	72.90	15.9%	9.0%	-6.0%
gas	23.70	30.31	29.37	27.9%	24.0%	-3.1%
electricity	26.08	33.86	33.46	29.8%	28.3%	-1.2%
other	0.00	0.46	0.45	x	x	-2.8%
total	125.72	149.97	142.83	19.3%	13.6%	-4.8%

IRELAND

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	3.50	3.37	3.20	-3.6%	-8.6%	-5.1%
oil	4.60	5.74	5.52	24.8%	20.1%	-3.7%
gas	1.87	2.81	2.85	49.9%	51.9%	1.4%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.06	0.06	0.06	0.0%	0.0%	0.0%
other	0.00	0.02	0.02	x	x	-2.6%
total	10.03	11.99	11.65	19.6%	16.1%	-2.9%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	1.25	1.43	1.43	14.4%	14.4%	0.0%
lignite	0.69	0.48	0.48	-30.7%	-30.7%	0.0%
oil	0.34	0.68	0.64	102.1%	89.2%	-6.4%
gas	0.84	1.44	1.41	71.5%	68.1%	-1.9%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
other	0.00	0.01	0.01	x	x	0.0%
total	3.12	4.04	3.97	29.4%	27.2%	-1.8%

IRELAND

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	0.39	0.49	0.47	24.7%	20.8%	-3.1%
oil	0.91	0.87	0.78	-4.4%	-14.7%	-10.8%
gas	0.37	0.52	0.57	40.2%	54.1%	10.0%
electricity	0.39	0.50	0.49	29.5%	27.3%	-1.7%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	2.06	2.38	2.31	15.5%	12.3%	-2.8%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	1.97	2.57	2.50	30.7%	27.2%	-2.6%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.00	0.00	0.00	100.0%	100.0%	0.0%
other	0.00	0.02	0.01	x	x	-2.6%
total	1.97	2.59	2.52	31.5%	28.0%	-2.6%
domestic/tertiary						
solid fuels	1.12	0.95	0.78	-15.5%	-31.0%	-18.4%
oil	0.99	1.30	1.29	31.4%	30.7%	-0.6%
gas	0.20	0.29	0.30	42.9%	46.6%	2.6%
electricity	0.63	0.88	0.86	38.5%	35.8%	-2.0%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	2.95	3.42	3.23	15.9%	9.4%	-5.6%
total final demand						
solid fuels	1.52	1.44	1.25	-5.1%	-17.6%	-13.2%
oil	3.87	4.74	4.57	22.6%	18.2%	-3.6%
gas	0.57	0.81	0.87	41.1%	51.5%	7.3%
electricity	1.02	1.38	1.35	35.2%	32.7%	-1.9%
other	0.00	0.02	0.01	x	x	-2.6%
total	6.98	8.38	8.06	20.2%	15.5%	-3.9%

ITALY

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	14.62	17.70	17.41	21.1%	19.1%	-1.6%
oil	89.08	90.86	88.08	2.0%	-1.1%	-3.1%
gas	39.02	60.90	59.72	56.1%	53.1%	-1.9%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	5.70	6.84	6.81	20.1%	19.6%	-0.4%
other	2.15	5.62	5.60	161.0%	160.4%	-0.2%
total	150.56	181.93	177.63	20.8%	18.0%	-2.4%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	6.78	10.99	10.99	62.1%	62.1%	0.0%
lignite	0.29	0.00	0.00	-100.0%	-100.0%	0.0%
oil	21.53	16.76	16.37	-22.2%	-23.9%	-2.3%
gas	8.90	18.51	18.16	107.9%	104.0%	-1.9%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
other	2.15	5.22	5.22	142.5%	142.5%	0.0%
total	39.66	51.48	50.74	29.8%	28.0%	-1.4%

ITALY

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	4.28	3.48	3.34	-18.8%	-22.0%	-4.0%
oil	8.49	5.51	5.14	-35.1%	-39.5%	-6.7%
gas	13.72	17.44	17.17	27.1%	25.2%	-1.5%
electricity	9.54	11.11	10.93	16.5%	14.6%	-1.7%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	36.02	37.53	36.58	4.2%	1.6%	-2.5%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	32.66	44.51	43.05	36.3%	31.8%	-3.3%
gas	0.21	0.22	0.22	7.7%	7.7%	0.0%
electricity	0.48	0.66	0.66	36.1%	36.1%	0.0%
other	0.00	0.40	0.38	x	x	-3.4%
total	33.34	45.79	44.32	37.3%	32.9%	-3.2%
domestic/tertiary						
solid fuels	0.10	0.05	0.05	-50.5%	-50.5%	0.0%
oil	13.55	10.29	9.82	-24.1%	-27.5%	-4.5%
gas	15.76	24.00	23.41	52.3%	48.6%	-2.5%
electricity	8.40	11.77	11.66	40.2%	38.9%	-1.0%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	37.80	46.11	44.94	22.0%	18.9%	-2.5%
total final demand						
solid fuels	4.38	3.53	3.39	-19.5%	-22.7%	-4.0%
oil	54.69	60.30	58.01	10.3%	6.1%	-3.8%
gas	29.68	41.66	40.81	40.4%	37.5%	-2.0%
electricity	18.41	23.54	23.25	27.8%	26.2%	-1.3%
other	0.00	0.40	0.38	x	x	-3.4%
total	107.17	129.43	125.84	20.8%	17.4%	-2.8%

LUXEMBOURG

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	1.13	1.14	1.03	0.6%	-8.4%	-8.9%
oil	1.61	2.01	1.92	24.7%	19.0%	-4.5%
gas	0.43	0.58	0.56	33.7%	30.6%	-2.3%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.34	0.46	0.45	34.5%	30.9%	-2.7%
other	0.03	0.03	0.03	11.1%	11.1%	0.0%
total	3.54	4.21	3.99	18.9%	12.8%	-5.2%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	0.00	0.00	0.00	0.0%	0.0%	0.0%
lignite	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	0.01	0.01	0.01	0.0%	-3.0%	-3.0%
gas	0.16	0.17	0.16	3.1%	0.9%	-2.1%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
other	0.03	0.03	0.03	11.1%	11.1%	0.0%
total	0.20	0.21	0.20	4.0%	2.1%	-1.8%

LUXEMBOURG

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	0.74	0.76	0.68	1.6%	-8.5%	-10.0%
oil	0.27	0.34	0.31	26.6%	17.0%	-7.6%
gas	0.48	0.55	0.52	14.3%	8.0%	-5.6%
electricity	0.23	0.30	0.28	31.1%	25.5%	-4.3%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	1.72	1.94	1.79	12.9%	4.5%	-7.4%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	1.00	1.40	1.37	39.7%	36.8%	-2.1%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.00	0.01	0.01	150.0%	150.0%	0.0%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	1.01	1.41	1.38	40.2%	37.2%	-2.1%
domestic/tertiary						
solid fuels	0.01	0.01	0.01	20.0%	6.3%	-11.4%
oil	0.31	0.23	0.19	-24.8%	-36.3%	-15.3%
gas	0.14	0.17	0.16	17.0%	14.2%	-2.4%
electricity	0.13	0.16	0.16	28.0%	28.4%	0.3%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	0.58	0.57	0.53	-2.6%	-9.5%	-7.1%
total final demand						
solid fuels	0.75	0.77	0.69	1.9%	-8.3%	-10.0%
oil	1.58	1.97	1.88	25.0%	19.2%	-4.6%
gas	0.62	0.72	0.68	15.0%	9.4%	-4.9%
electricity	0.35	0.47	0.45	31.4%	27.9%	-2.6%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	3.30	3.92	3.70	18.5%	12.0%	-5.5%

NETHERLANDS

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	9.07	9.60	9.44	5.8%	4.1%	-1.7%
oil	24.58	26.70	26.06	8.6%	6.0%	-2.4%
gas	30.81	37.92	36.54	23.1%	18.6%	-3.7%
nuclear	0.88	0.78	0.78	-11.9%	-11.9%	0.0%
electricity	0.80	0.83	0.83	3.6%	3.6%	-0.1%
other	0.21	0.47	0.47	129.6%	127.0%	-1.2%
total	66.35	76.29	74.11	15.0%	11.7%	-2.9%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	5.70	7.01	6.96	23.1%	22.1%	-0.8%
lignite	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	0.70	0.58	0.57	-17.8%	-18.7%	-1.0%
gas	7.65	9.29	8.83	21.4%	15.4%	-5.0%
nuclear	0.88	0.78	0.78	-11.9%	-11.9%	0.0%
other	0.21	0.39	0.39	90.3%	90.3%	0.0%
total	15.14	18.05	17.52	19.2%	15.8%	-2.9%

NETHERLANDS

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	1.67	1.31	1.23	-21.7%	-26.3%	-5.9%
oil	1.37	1.14	1.05	-16.8%	-23.2%	-7.7%
gas	7.03	7.49	7.03	6.5%	0.0%	-6.2%
electricity	2.86	3.34	3.17	16.7%	11.1%	-4.9%
other	0.27	0.38	0.36	40.1%	35.3%	-3.5%
total	13.19	13.65	12.85	3.4%	-2.6%	-5.9%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	10.21	11.87	11.52	16.3%	12.9%	-2.9%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.11	0.12	0.12	9.2%	9.2%	0.0%
other	0.00	0.08	0.08	x	x	-3.5%
total	10.32	12.07	11.72	17.0%	13.6%	-2.9%
domestic/tertiary						
solid fuels	0.03	0.00	0.00	-88.0%	-91.2%	-27.0%
oil	1.62	1.52	1.35	-5.9%	-16.5%	-11.3%
gas	14.21	18.14	17.64	27.6%	24.2%	-2.7%
electricity	3.35	4.24	4.19	26.3%	24.8%	-1.2%
other	0.00	0.20	0.19	x	x	-5.0%
total	19.21	24.10	23.37	25.5%	21.7%	-3.0%
total final demand						
solid fuels	1.69	1.31	1.23	-22.7%	-27.3%	-5.9%
oil	13.19	14.53	13.92	10.1%	5.5%	-4.2%
gas	21.24	25.63	24.68	20.7%	16.2%	-3.7%
electricity	6.32	7.69	7.48	21.7%	18.3%	-2.8%
other	0.27	0.66	0.63	144.2%	134.6%	-3.9%
total	42.72	49.82	47.93	16.6%	12.2%	-3.8%

PORTUGAL

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	200000.0% tax/reference
solid fuels	2.58	4.24	4.09	64.3%	58.5%	-3.6%
oil	11.62	13.31	12.96	14.5%	11.5%	-2.6%
gas	0.00	2.32	2.29	x	x	-1.3%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.79	1.20	1.20	51.9%	51.9%	0.0%
other	0.12	0.23	0.23	100.0%	100.0%	0.0%
total	15.11	21.30	20.77	41.0%	37.5%	-2.5%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	200000.0% tax/reference
coal	2.03	3.35	3.35	64.9%	64.9%	0.0%
lignite	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	2.10	1.61	1.55	-23.5%	-26.2%	-3.5%
gas	0.02	1.16	1.15	5989.5%	5933.5%	-0.9%
nuclear	0.00	0.00	0.00	0.0%	0.0%	0.0%
other	0.12	0.18	0.18	56.5%	56.5%	0.0%
total	4.26	6.29	6.22	47.5%	45.9%	-1.1%

PORTUGAL

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	200000.0% tax/reference
industry						
solid fuels	0.60	0.78	0.65	29.6%	7.5%	-17.1%
oil	1.80	1.90	1.88	5.5%	4.1%	-1.3%
gas	0.05	0.85	0.84	1566.7%	1547.0%	-1.2%
electricity	1.05	1.61	1.60	53.2%	52.2%	-0.6%
other	0.03	0.03	0.03	15.4%	15.4%	0.0%
total	3.53	5.17	4.99	46.4%	41.4%	-3.4%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	3.71	5.40	5.22	45.7%	40.9%	-3.3%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.03	0.03	0.03	3.8%	3.8%	0.0%
other	0.00	0.05	0.05	x	x	-3.3%
total	3.73	5.48	5.30	46.7%	41.9%	-3.3%
domestic/tertiary						
solid fuels	0.00	0.00	0.00	-100.0%	-100.0%	0.0%
oil	1.18	1.56	1.46	32.2%	23.5%	-6.6%
gas	0.05	0.26	0.25	407.7%	389.8%	-3.5%
electricity	0.95	1.58	1.57	66.8%	65.8%	-0.6%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	2.18	3.40	3.28	56.1%	50.5%	-3.6%
total final demand						
solid fuels	0.60	0.78	0.65	29.4%	7.3%	-17.1%
oil	6.69	8.86	8.56	32.5%	27.9%	-3.4%
gas	0.10	1.11	1.09	981.6%	962.8%	-1.7%
electricity	2.02	3.22	3.20	58.9%	58.0%	-0.6%
other	0.03	0.08	0.08	207.7%	201.4%	-2.1%
total	9.44	14.05	13.57	48.8%	43.7%	-3.4%

UNITED KINGDOM

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	64.25	58.02	56.10	-9.7%	-12.7%	-3.3%
oil	81.65	87.54	85.18	7.2%	4.3%	-2.7%
gas	47.20	69.44	68.13	47.1%	44.3%	-1.9%
nuclear	16.57	15.82	15.82	-4.6%	-4.6%	0.0%
electricity	1.46	1.58	1.56	7.7%	6.9%	-0.7%
other	0.44	1.01	1.00	132.6%	129.9%	-1.2%
total	211.57	233.40	227.79	10.3%	7.7%	-2.4%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	47.88	43.03	42.22	-10.1%	-11.8%	-1.9%
lignite	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	7.68	4.24	4.22	-44.8%	-45.1%	-0.5%
gas	1.57	14.13	13.74	801.9%	776.9%	-2.8%
nuclear	16.57	15.82	15.82	-4.6%	-4.6%	0.0%
other	0.44	0.61	0.61	38.8%	38.8%	0.0%
total	74.14	77.83	76.60	5.0%	3.3%	-1.6%

UNITED KINGDOM

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	6.44	5.94	5.11	-7.7%	-20.6%	-14.0%
oil	6.90	7.08	6.45	2.6%	-6.5%	-8.9%
gas	11.15	11.59	11.52	4.0%	3.4%	-0.6%
electricity	8.63	9.63	9.45	11.6%	9.5%	-1.9%
other	0.45	0.51	0.49	15.5%	10.3%	-4.5%
total	33.56	34.76	33.03	3.6%	-1.6%	-5.0%
transport						
solid fuels	0.00	0.00	0.00	0.0%	0.0%	0.0%
oil	44.81	50.76	49.76	13.3%	11.1%	-2.0%
gas	0.00	0.00	0.00	0.0%	0.0%	0.0%
electricity	0.50	0.41	0.41	-18.4%	-18.4%	0.0%
other	0.00	0.41	0.40	x	x	-2.5%
total	45.31	51.57	50.57	13.8%	11.6%	-1.9%
domestic/tertiary						
solid fuels	5.39	4.96	4.76	-8.0%	-11.8%	-4.1%
oil	6.71	6.99	6.44	4.2%	-4.1%	-7.9%
gas	29.87	37.77	36.94	26.4%	23.6%	-2.2%
electricity	14.50	16.76	16.49	15.6%	13.7%	-1.6%
other	0.00	0.00	0.00	0.0%	0.0%	0.0%
total	56.48	66.48	64.62	17.7%	14.4%	-2.8%
total final demand						
solid fuels	11.83	10.90	9.87	-7.8%	-16.6%	-9.5%
oil	58.42	64.83	62.65	11.0%	7.2%	-3.4%
gas	41.02	49.36	48.46	20.3%	18.1%	-1.8%
electricity	23.63	26.80	26.35	13.4%	11.5%	-1.7%
other	0.45	0.92	0.89	107.4%	99.9%	-3.6%
total	135.35	152.82	148.21	12.9%	9.5%	-3.0%

Gross inland consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
solid fuels	291.40	278.56	268.02	-4.4%	-8.0%	-3.8%
oil	510.05	575.58	554.58	12.8%	8.7%	-3.6%
gas	214.31	313.76	307.63	46.4%	43.5%	-2.0%
nuclear	158.66	172.32	171.91	8.6%	8.4%	-0.2%
electricity	14.02	18.33	17.96	30.8%	28.1%	-2.0%
other	4.63	11.16	11.08	141.1%	139.4%	-0.7%
total	1193.08	1369.71	1331.18	14.8%	11.6%	-2.8%

Power generation

	power station input (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
coal	122.80	144.61	141.90	17.8%	15.6%	-1.9%
lignite	49.50	44.14	43.02	-10.8%	-13.1%	-2.5%
oil	41.71	35.90	35.22	-13.9%	-15.6%	-1.9%
gas	33.74	82.33	81.12	144.0%	140.4%	-1.5%
nuclear	158.66	172.32	171.91	8.6%	8.4%	-0.2%
other	4.58	8.68	8.68	89.7%	89.7%	0.0%
total	411.00	487.98	481.85	18.7%	17.2%	-1.3%

EUR-12

Final energy consumption

	energy consumption (mtoe)			percentage change		
	1990	2000 reference	2000 tax	1990/2000 reference	1990/2000 tax	2000 tax/reference
industry						
solid fuels	55.23	44.21	39.50	-20.0%	-28.5%	-10.7%
oil	44.54	38.35	35.00	-13.9%	-21.4%	-8.7%
gas	76.97	90.28	88.12	17.3%	14.5%	-2.4%
electricity	60.94	70.57	69.01	15.8%	13.2%	-2.2%
other	2.67	2.90	2.80	8.5%	4.6%	-3.6%
total	240.35	246.30	234.42	2.5%	-2.5%	-4.8%
transport						
solid fuels	0.08	0.07	0.07	-12.7%	-12.7%	0.0%
oil	232.07	289.08	281.48	24.6%	21.3%	-2.6%
gas	0.21	0.22	0.22	7.7%	7.7%	0.0%
electricity	3.51	4.17	4.17	18.7%	18.7%	0.0%
other	0.00	2.45	2.38	x	x	-2.7%
total	235.87	295.99	288.32	25.5%	22.2%	-2.6%
domestic/tertiary						
solid fuels	32.42	17.88	16.40	-44.9%	-49.4%	-8.3%
oil	90.95	99.61	91.36	9.5%	0.5%	-8.3%
gas	100.91	133.56	130.51	32.4%	29.3%	-2.3%
electricity	73.22	96.23	95.36	31.4%	30.2%	-0.9%
other	1.78	2.45	2.44	38.0%	37.4%	-0.4%
total	299.28	349.73	336.08	16.9%	12.3%	-3.9%
total final demand						
solid fuels	87.74	62.15	55.97	-29.2%	-36.2%	-10.0%
oil	367.57	427.04	407.84	16.2%	11.0%	-4.5%
gas	178.08	224.06	218.85	25.8%	22.9%	-2.3%
electricity	137.67	170.97	168.54	24.2%	22.4%	-1.4%
other	4.45	7.80	7.62	75.3%	71.2%	-2.3%
total	775.50	892.02	858.83	15.0%	10.7%	-3.7%