DIRECTORATE GENERAL FOR ENERGY (DG XVII)

ENERGY IN EUROPE

A VIEW TO THE FUTURE

SPECIAL ISSUE - SEPTEMBER 1992

COMMISSION OF THE EUROPEAN COMMUNITIES

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ANTÓNIO CARDOSO E CUNHA,
Member of the Commission

What energy policy framework will guide the Community into the 21st century? Politically this must respond to peoples aspirations for a better future for themselves and their children. Current progress towards the creation of a European Union offers a goal worth striving for: a union which expresses cohesion between peoples and states, fosters economic growth through competition and the application of science and technology; cares for the environment and provides a framework for living in peace with our neighbours.

Understanding the economic, social and geopolitical forces influencing energy developments is a prerequisite in facilitating the political debate necessary to build a cohesive and broadly acceptable energy policy. I have no doubt about the importance of the debate: nor any illusions but that it will be difficult. It is however essential to confront, in an objective and constructive way, the key choices before us.

These are controversial, precisely because they affect important issues and interests. The political upheavals in the former Soviet Union and in Eastern Europe are of historic dimensions. The challenge of climate warming implies radical and fundamental changes not only for the energy sector but more importantly for our economic structures and our life styles. The creation of a single market for energy challenges the current organisation of our sector.

Yet against these tremendous changes life goes on: decisions great and small continue to be made. The challenge to the democratic process is to understand the need for change, to communicate this to people and to establish, through leadership, the consensus essential in bringing this about in an orderly and equitable manner. With the publication "Energy in Europe: A View to the Future" I want to push the debate forward and to engage in a wide dialogue to achieve consensus for a Community energy framework - a framework which is commensurate with both the complexity of the problems and our political and social aspirations.

The World Energy Council's 15th Congress, with its central theme "Energy and Life" provides a unique occasion to begin this dialogue.

MR. C.S. MANIATOPOULOS
Director-General for Energy

In July 1990, the Directorate General for Energy of the European Communities published the report "Energy for a New Century: the European Perspective". The report identified a number of major themes which were emerging and which would have importance for the development of the energy sector. Three themes were of particular importance: the changing geopolitical framework, the internal market, and the environment. The report, which was well received, included the analytical work prepared by the Commission services, with the contribution of the group of eminent persons.

These emerging issues have come to the fore of the political agenda, the historic changes in Eastern Europe and the former Soviet Union have fundamentally changed world politics and environmental concerns were prominent at the Rio Conference earlier this year. In this rapidly changing world there is clearly the need to review once again how these issues will influence the long-term development of energy demand and supply.

While the need for better understanding of the factors influencing the future structure of the sector is compelling, the task is very complex. This report identifies and attempts to analyse the external factors which could influence energy futures, and presents projections which we offer as a contribution to the policy debate.

In the coming years and indeed over a longer perspective the Community's energy sector will face far-reaching challenges in response to changes in society and geopolitics. There is already considerable debate on the role the Community can play in shaping the energy dimension of the future. The need for a Community energy policy dimension in the post-Maastricht era clearly emerges and the report offers for discussion some guiding principles which could provide a foundation for this dimension.

Chapter I presents a detailed analysis of the prospects for energy supply and demand trends to 2005. The purpose is not to reach conclusive figures but rather to understand the dynamics of the market, the influence of the new and old factors, the nature of current geopolitical changes and preoccupations and - most importantly - the role played by and the implications of, present policy initiatives.

The analysis shows energy demand growing over the next decade, but at a slower rate as we go into the new century. More striking, however, will be the changing patterns of this demand, differing both across the Community and between end-use sectors. Quality of service will become more important as will the impact of energy production and use on the surrounding environment. Substantial investment will be required; in new and replacement generating capacity, in gas infrastructure and additional sources of supply, in cleaner coal burning technology and in upgrading refinery capacities to new and more stringent envi-

ronmental standards. Energy intensity will decrease but perhaps at a slower rate than we would like. Creating the right climate for investments and laying the foundations for a longer-term energy strategy are certainly two of the more important tasks of public policy in the 1990s. We then turn to a much longer time horizon - to the mid years of the next century. The objective is to illustrate the importance for the energy needs of future generations, of major issues which are already evident. The current debate about the choices and actions we must take to achieve the strategic objective of a sustainable energy system is important. It should guide public policy on research and development for energy technologies.

The Community has begun the task of laying the foundations upon which to construct its future energy development.

The first element is completion of the internal energy market. Given that energy accounts for a significant proportion of the Community's GDP - similar to that of agriculture - and in a number of industrial sectors is a major cost element, the importance of achieving an internal energy market based on competitive principles can be readily appreciated. An integrated energy market would reduce energy costs, and allow advantage to be taken of the complementarities of the Community's energy industries; increasing trade in energy products between Member States, and making an important contribution to security of supply.

The Community has already made substantial progress in opening up the energy markets and removing existing obstacles. Important work has been done on public procurement in the energy equipment sector, on tax structures and standardization of energy equipment and products and towards the liberalisation of electricity and gas markets. In this regard the adoption of the recently tabled proposals would significantly remould the closed and often monopolistic nature of these industries in many Member States by allowing new entrants into the industry, and by a limited opening of networks to certain eligible consumers and distributors. The goals set are certainly ambitious but progress has already been achieved with the opening of national networks to the transit of products and with a significant improvement of price transparency.

A second pillar of the Community energy policy framework is its external energy relations. What we are doing in the Community is of widening appeal to other European countries who wish to become more closely associated with our efforts. Under the European Economic Area agreement, due to enter into force on 1 January 1993, the countries of the European Free Trade Area will take on board most of the Community's existing energy legislation as well as being committed to future legislative developments.

The new democracies of Eastern and Central Europe and the Republics of the former USSR are also looking towards a common energy future with the Community. As they adjust to becoming market economies, the Community - through its co-operation programmes such as PHARE and TACIS, and through its efforts to establish a pan-Europe energy agreement, the European Energy Charter - is contributing to this transition.

In the wider perspective, the Community cannot ignore the fact that it is and will be dependent on imported energy, for half its energy supply. Our analysis shows this dependence is likely to increase as we move into the next century. The Community, therefore, has a vital interest in developing a framework where its energy security is assured. This can be achieved to some extent by developing co-operative relations with energy suppliers, such as the Gulf and southern Mediterranean countries. In this context the Community has also been an active supporter of strengthening links between producers and consumers of energy through intensified dialogue. However, as the Gulf crisis showed, the Community needs also *to examine how it can increase the effectiveness of its existing crisis measures and stock mechanisms and strengthen its relations with other important consuming countries in the forum of the International Energy Agency.*

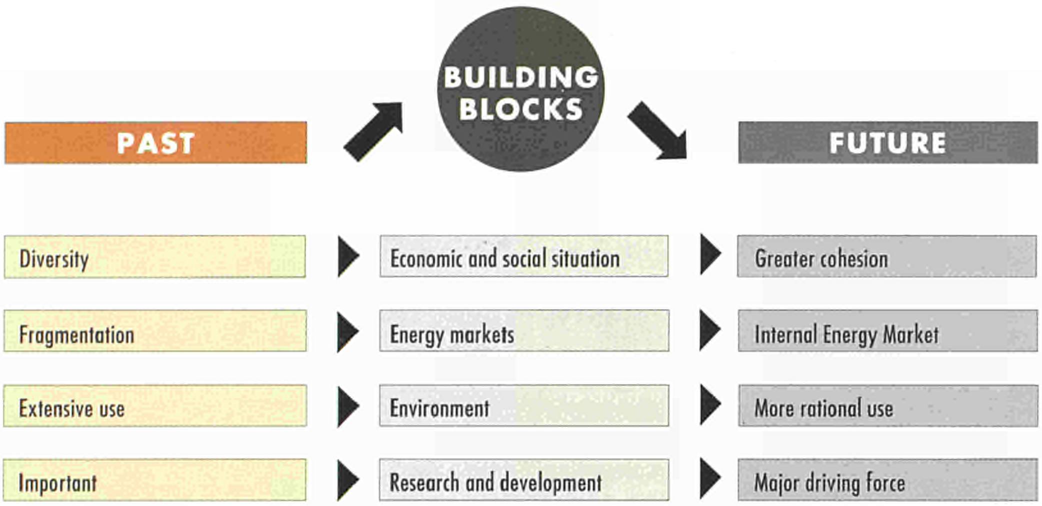
Two other major building blocks of the Community energy policy framework are the environment and energy technology. In the Community, the environmental impact of energy use and production, and in particular its relation to global climate change, has moved to the top of the political agenda. This concern is reflected in a commitment by the Community to stabilize emissions of carbon dioxide, one of the major so-called greenhouse gases, by the year 2000 at 1990 levels, and in its signing of the Climate Convention at the Rio Conference. The Community's strategy towards achieving this objective has many facets. There will be increasing focus on achieving a significant improvement in energy intensity and a shift towards fuels containing less carbon. To this end the Community has already launched a series of ambitious innovative energy technology and energy efficiency programmes - THERMIE, SAVE and ALTENER - which will have significant positive effect in the short to medium term. Over a longer horizon the Community is devoting considerable resources to energy R and D, such as the JOULE programme. All of these programmes could open new frontiers in energy use and production.

Our analysis and experience to date would appear to indicate that the energy policy framework we are constructing is a good basis for further development. However, we cannot afford to be complacent: the energy sector we envisage for the future will require massive investments and we need to get the policy framework right if we are not to squander scarce resources.

Faced with complex changes which have radical implications for the energy sector, policymakers need better information and data not only about specific issues but perhaps more importantly about their dynamic interaction. This poses a challenge to energy analysts; our thinking on this issue is presented in the accompanying report which we hope will act as a catalyst for future debate. A wide participation in this debate is essential if we are to establish a sound and coherent energy policy framework in the Community. To this end we intend to initiate a round of consultations with interested parties.

We are conscious of both the enormous difficulties inherent in such a venture and the limitations of our efforts but I do believe that with open discussion and broadly based consultation, the work can be progressed.

A VIEW TO THE FUTURE



1 INTRODUCTION

Energy cannot be treated in isolation. Energy policy is the energy dimension of other major forces that are at work throughout the global system. It reflects these forces, shaping its role to support, complement and facilitate the attainment of wider objectives:

- contributing to the economic and social aspirations of people;
- meeting environmental imperatives;
- taking account of geopolitical developments.

These wider objectives imply very long-term time horizons, perhaps up to 50-60 years ahead. Science, technology and innovation are the dynamic forces which lead to change. We need new technology to adapt our societies, but innovation and human skills are required to organize and manage these changes in our social structures.

1.1

The importance of energy rests on its meaning for people and society and its ability to improve the quality of life. People want energy services, not fuels.

The demand for energy is derived and the concern is with the services energy provides - heating for homes, mobility, power to manufacture and to communicate. We know the essential energy services required today and we have an idea of what will be required in 50 years time. This will reflect these demand patterns but other services, unknown today, will come to enrich the present portfolio. In any event the basic needs for food, space conditioning, transportation, communication and leisure will continue to dominate. How these will be provided depends on technological progress.

In looking to energy futures the following are useful questions:
• what energy services will be required?
• what technologies will be available to best support and provide these services?
• with what collateral benefits? (increasing economic welfare)
• or what collateral damage? (eg. to the environment).

1.2

Driving forces

A number of key driving forces influence the demand for energy. Leading among these will be the size and structure of the population, changing values and lifestyles - including attitudes to environment, the level of economic activity and the political structures within which these activities take place, and finally, technological development.

As individuals become better off they look for improved quality of life and diversity of services. This greater emphasis on quality will be reflected in the demand for energy services and indeed in the quality of the environmental surroundings in which we live and work. This will call for environmentally benign energy sources with lower acceptability thresholds for polluting emission levels.

The pace of competition is toughening in response to the emerging requirement to enlarge both the range and the degree of specialization of products. The competition ethos includes the wider international field of finance, key technologies and the movement of capital. This trend is likely to continue. The consequence for energy demand is the corresponding requirement for "quality": in terms of ease of handling, cleanliness, comfort, safety and security of energy services.

European integration will be a major driving force in the next decade and indeed beyond. The movement towards an internal market is accelerating. The next stage of political union provides a further impetus in this direction. This process has far reaching implications for energy markets.

1.3

The geopolitics of energy

Development of the Community energy agenda needs to be done in a global context. It is important to understand how other regions will develop, what their preoccupations are, and in what way and instances energy questions will facilitate or hinder political relations. There is a clear political and regional dimension which should be taken into account as we look at energy over the different time horizons.

1.4

The Challenge addressed

The Community is currently seeking measures that give promise of being able to achieve energy and environmental results in the immediate time frame - up to 10 years. But we need to put this in perspective. Attention is required to identify policy strategies which not only hold out promise of making a useful contribution to these various economic, energy and environmental objectives over the next decade or so but which will lead to continuing improvements in living standards and reductions in emission levels as we go into the 21st century.

In identifying the foundations for a long term energy strategy we look to possible energy developments over two different time horizons:

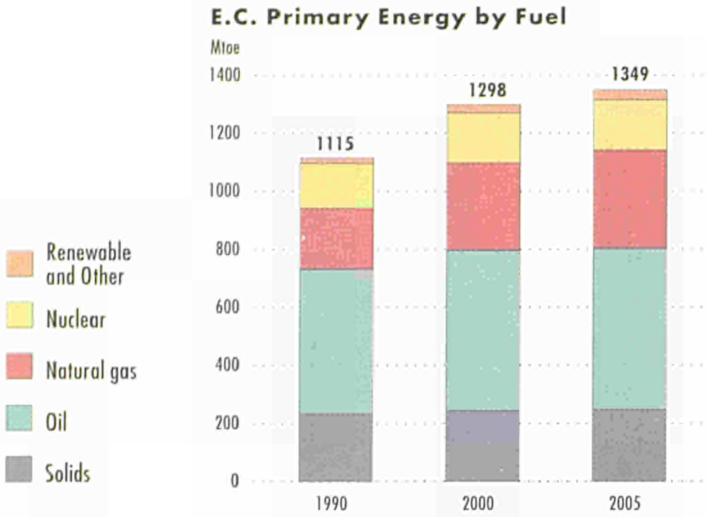
• Towards the New Century: from now to 2005
• The 21st Century Energy System: to 2050

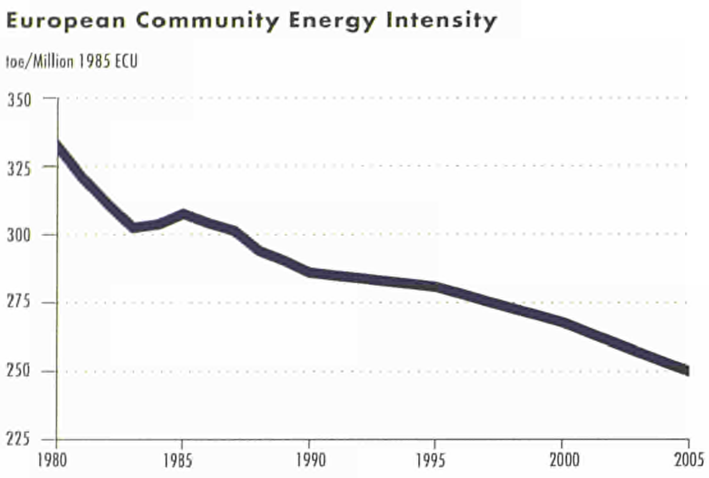
2

TOWARDS THE NEW CENTURY : FROM NOW TO 2005

The issues and current preoccupations which are likely to play fundamental roles in determining the energy structure in the 1990s will reflect wider concerns, but the energy dimension of these concerns might be summarized as follows:

• realizing the Internal Market in a pan-European framework;
• fostering economic growth in the Community, in Eastern Europe and in the former Soviet Union - the European Energy Charter can set a framework for this dimension;
• improving energy security, including how we hold and manage stocks in parallel with the move towards a consumer - producer dialogue ;
• stabilizing CO_2 emissions at 1990 levels by 2000 - the energy environment dimension;
• achieving political and monetary union; and
• creating closer Cohesion between members of the Community.





Total Primary Energy Demand/GDP in 1985 ECU

Principal results for Community Energy

Depending on the assumptions, annual average Community final demand could grow to 2005 by between 1.3 and 1.6% p.a. Growth in final demand for transport is estimated at 2%; for domestic and tertiary 1.4% and for industry at 0.4% p.a.

The final demand for electricity and oil could grow at 2% and 1% respectively. Coal may decline by 1.3% p.a. More uncertainty surrounds the expected substantial increase of primary demand for gas, 3.3% p.a., depending on the rate of gas penetration in power generation. Final demand for gas could grow at nearly 2%.

Energy and carbon intensity will decline over the period by 13% and 16% respectively.

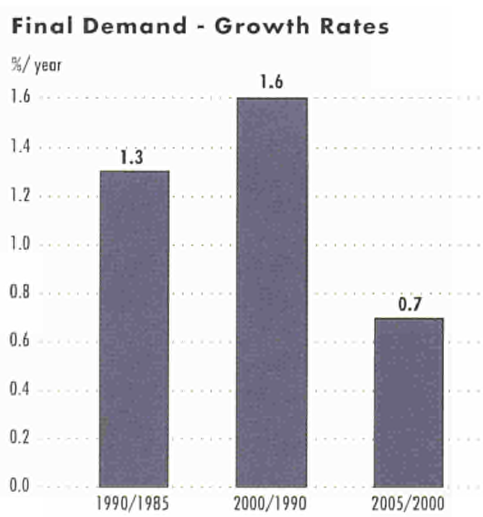
2.1

Community Energy Demand : Principal Results

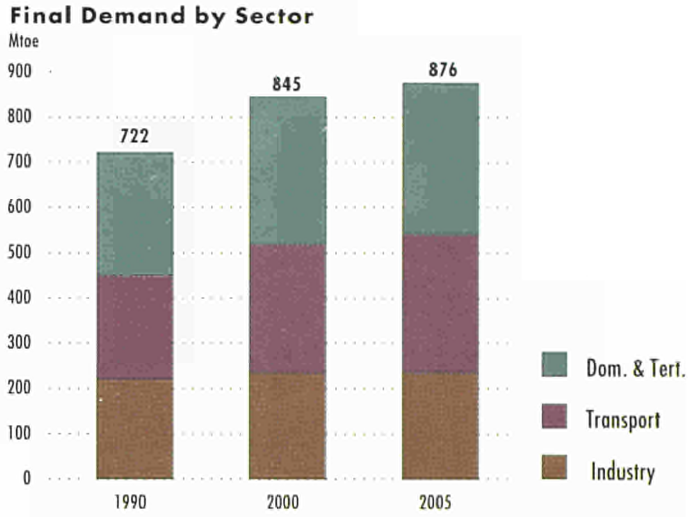
GDP growth is expected to be moderate, yielding an underlying primary energy demand trend of about 1.3% p.a. to 2005. Should we experience a development according to our High Growth Variant then the underlying energy demand would increase to something in the order of 1.6%. These demand estimates already take account of substantial improvements in energy intensity of some 1% p.a. The composition of economic growth within the Community will change and has consequences for energy. Except for chemicals, paper, and non-ferrous metals, the share of heavy industry in the economy is declining with growth being led both by the high value, low volume sectors and by service industries.

Oil prices are expected to remain in the range experienced today up to and beyond the mid-1990s, rising to 23 $/bbl in 2000 and 28 $/bbl at 1990 prices by 2005. This underlying trend of course is subject to fluctuations, both upwards and downwards.

The general economic tendencies linked to oil price expectations will have implications for efficiency and for technical change in the energy system. Efficiency gains are expected in industry and indeed to a lesser extent in the domestic and tertiary sectors. Transport efficiencies will also improve but the growth in the size and number of cars will reduce the impact of technical improvements on the total demand for transportation fuels.



The emerging energy demand profile to 2005 suggests that final demand is increasing. The rate of increase is faster in Portugal, Greece and Spain with lower than average demand growth in Germany and the United Kingdom. In general, direct industrial demand is flat or even declining, but demand for transportation and electricity is growing faster than average. One important uncertainty emerges: is there greater potential for efficiency improvements in the industrial sector or have the bulk of these improvements been achieved in the past decade?



2.2 *Analysis by fuel*

Solids

Solids demand in the Community is likely to increase due to the absence of new nuclear capacity on a significant scale and continuing competitive prices on world markets. But this increase of some 0.4% to 2005 is lower than might have been expected some years ago primarily because of growing competition from gas in power generation.

Hard coal production in the Community is confined essentially to the UK, Germany, France and Spain. The bulk of this coal is produced at a cost well above world market prices. With the expectation that market prices will, in real terms, remain around today's levels into the new century, the competitive position of domestic coal against world coal is likely to deteriorate further. From an economic point of view the volume of competitive Community coal produced at the turn of the century will be substantially lower than today's volumes. The period is therefore one of transition, managing the decline in Community coal production to levels at which governments and societies are prepared to pay for the difference between domestic production costs and world market prices.

Oil

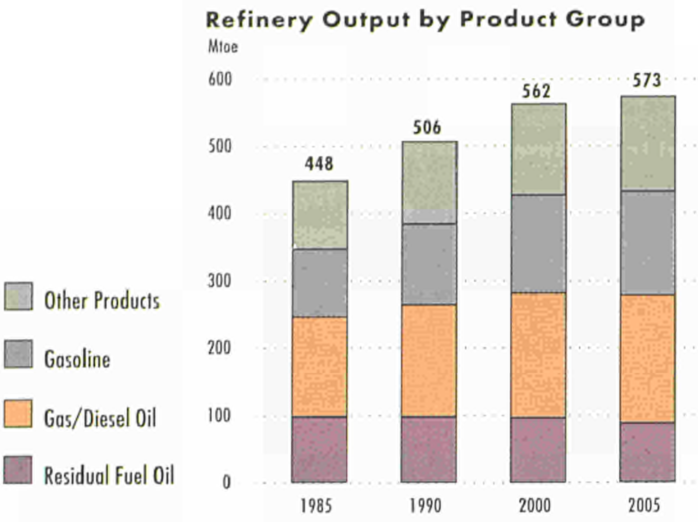
The average growth rate of primary demand to 2005 is estimated at under 1% p.a. To the mid 90s this will be higher at some 1.2% but will gradually decline to 2000 and afterwards overall primary oil demand will be flat. Demand in the industrial sector will decline steadily at about 1.7% p.a.; after the mid 1990s oil will begin a steady but slower decline in the domestic and tertiary sector. However transportation demand will continue to increase, at 2.3% p.a. to the mid 1990s. Afterwards the rate of increase is expected to slow giving an overall long-term average growth rate of 1.8% p.a. to 2005. On the supply side, as much as 40% of the oil production required to meet expected world demand for 2000 has still to be developed. Over the past five years the replacement ratio was barely 50%. Supplies have been sustained thanks only to upward revision of recoverable volumes from existing fields.

If the main issue in the 1980s was the management of surpluses, that of the 1990s will be concerned with tighter supply and demand. The marginal barrel will matter, as will the marginal investment necessary to produce that barrel. Over the next decade, some 250 billion dollars will be required to bring supply into line with demand.

Refineries

During the 1980s there was continuous reduction in Community primary distillation capacity, which stood in 1990 at 568 million tonnes, some 40% lower than in 1980. Cracking capacity has almost doubled since 1980 to 187 million tonnes p.a. The conversion side is increasingly important, with conversion technology becoming more complex and sophisticated to meet changing output patterns and increasing quality requirements.

A major challenge for the refining industry will be the need to adjust to environmental cons-



traints. Environmental legislation is likely to continue to put pressure on refiners to remove sulphur from products. Capacity may prove tight, especially in countries where product demand is expected to grow significantly over the decade and will require further investment in desulphurization.

As the process of refining becomes increasingly complex, so balancing the streams for the various units, in order to meet the demand mix, will continue to place greater constraints on individual refinery systems. Future investments depend on the conversion rate and are a key uncertainty at the moment. Meeting environmental protection requirements could require investments of some 45-55 billion Ecu (European Currency Unit).

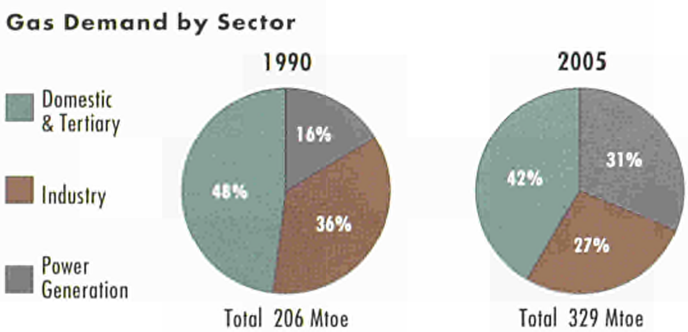
Natural gas

The natural gas market is expected to be the fastest growing energy fuel market. Overall demand for gas could be 60% higher by 2005. While the demand in the traditional gas markets is growing, the power generation sector provides the largest uncertainty factor in determining gas demand and supply patterns over the next 10-15 years.

The attractiveness of gas for power generation stems from:
- the efficiency advantages of combined cycle gas turbine plant in terms both of cost and environmental considerations;
- the fact that traditional competition from both coal and nuclear is under pressure, each for its own reasons;
- savings in capital investment sums, which in the case of gas are some 50% less than, for instance, coal-fired power plants.

Meeting this growing demand will require more than a doubling in imports (today some 80 Mtoe, in 2005 170 Mtoe). The most important influences include:
- political stability and supply reliability of major producers (e.g. Algeria and Russia);
- investment security and profitability depending on market structures;
- major new infrastructures (pipelines, LNG facilities), allowing new suppliers to enter the market: Nigeria, Iran, Qatar.

Substantial investment is needed in order to adapt the infrastructure to future market requirements, externally and internally, and to develop fields.



Major growth is expected in:
- *Italy - power generation and general gas grid expansion*
- *Germany - especially in the new Bundesländer, but also for power generation in the old Bundesländer*
- *UK - especially power generation*
- *fast-growing new markets in southern Europe, especially Spain.*

Renewables

The potential for different types of renewable energies will develop. Biofuels will take on an increasing role in the transportation sector, as indeed will renewables in power generation. Renewables are expected to increase rapidly their share in the Community's energy balance by 2005. The 1990s represent a major challenge in laying the foundations for later development of this resource potential in coming decades.

Electricity

Electricity is a fast growing sector: 2.0% on average to 2005, to the mid 1990s nearer 2.4% p.a. In 1990 electricity represented some 18% of final Community energy demand. At Community level policy developments in new structures and integration of the market and in CO2 stabilization will have important implications for the organization of this sector and the choice of fuel options. Fuel choice options are becoming more complex. In addition new responses in demand side management will be required. While hydro and nuclear capacities are likely to remain constant, there is a major question mark over the volume of gas and coal to be used.

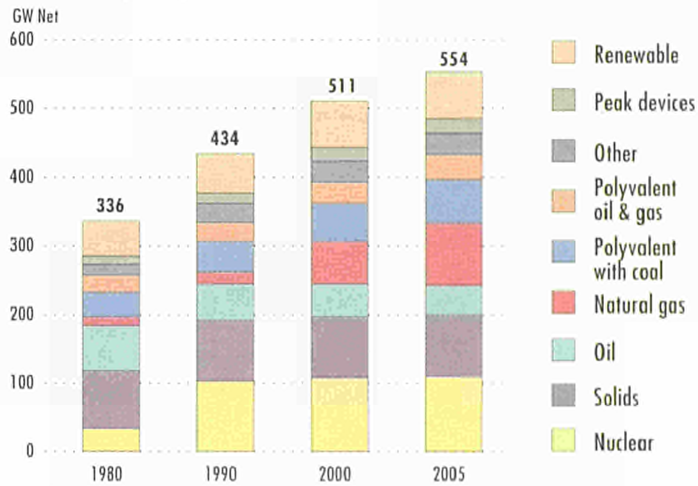
The mix between these fuels depends largely on the availability and timing of clean burn coal technology. In the immediate period gas seems to have a clear advantage, but the medium to longer term implications for coal raise a number of questions, particularly about the timing for clean coal burning technology to penetrate the market. Important investment decisions will be required involving replacements and indeed adding new capacity. In the period to 2005 some 120 GW of net new generating capacity may be needed.

Energy imports

In terms of volume, energy security concerns could increase in response to the growing demand for imported energy. Overall dependency on imported fuels could rise from 50% to just under 60% by 2005. But more favourable relationships between exporting and importing regions can be brought about, in such a way that the level of security actually increases, notwithstanding the volume increase in imported energies. The European Energy Charter and the consumer/producer dialogue are initiatives which could reduce traditional security concerns.

Fuel Inputs into Electricity Production

Electricity Capacities



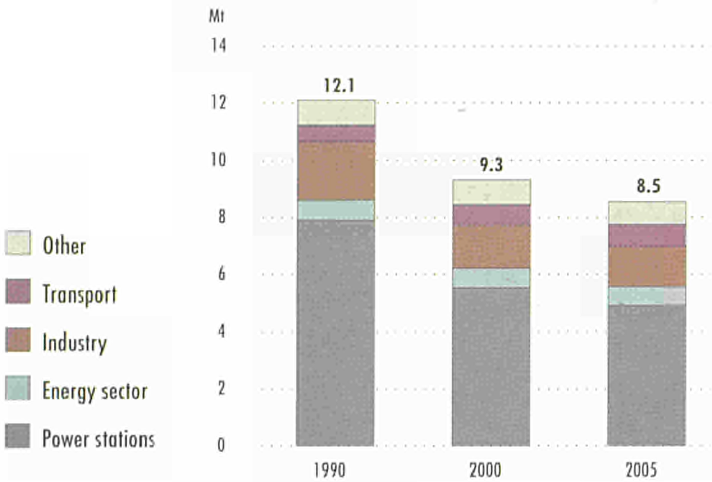
Import Dependency by Fuel

%	1985	1990	2000	2005
Solids	26	33	54	61
Oil	68	78	80	81
Natural gas	32	39	47	50
Total	43	50	56	58

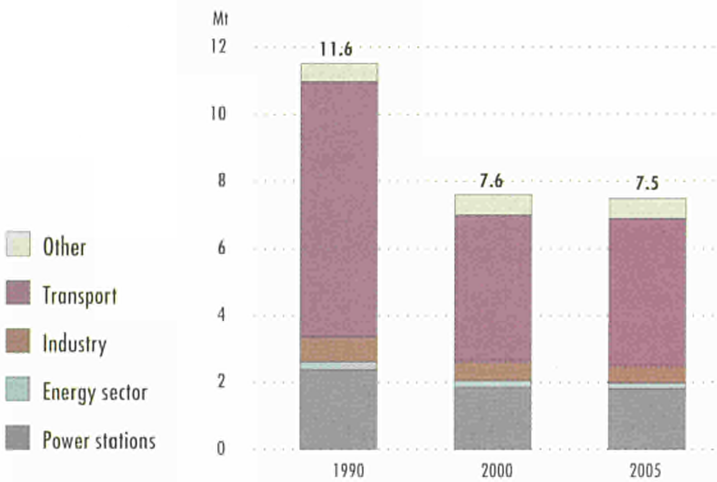
Key Figures for CO_2 Emissions

	1990	2000	2005
Total (Mt of CO_2)	2766	3139	3239
• Per capita (t of CO_2/inhab.)	8.8	9.2	9.4
• By toe of Final Energy Cons.	3.8	3.7	3.7

SO_2 - emissions



NOx - emissions



Sulphur Dioxide is expected to decline over the reference period as indeed will Nitrogen Oxides - but at a slower rate.

The environment

The principle of sustainable development is incorporated both in the Maastricht Treaty and in the Climate Change Convention negotiated at the Rio Conference. Community policy, not only in its internal dimensions but also in its external relationships accepts the translation of sustainable development into the different economic sectors, including energy.

Sustainable development looks to new relationships between on one hand, satisfying social and economic aspirations for higher standards of living, and on the other, better environmental husbandry and integrating energy use in a more efficient way, where the environmental consequences of energy consumption and production are better dealt with. This search for balanced sustainability will be one of the major dynamic elements in the evolution of future energy strategies. Two major directions of future thinking have emerged during 1992:

- the process initiated at the United Nations Conference on Environment and Development in Rio de Janeiro;
- the Fifth Environmental Programme of the European Community.

These general policy directions were recently supported by publication of the Commission's proposals for a Community strategy to stabilize CO_2 emissions at 1990 levels by the year 2000. The fifth programme calls for further progressive reductions in 2005 and 2010. Furthermore measures for methane and nitrous oxide limitation are to be identified not later than 1995 and applied.

Stabilization is a difficult task. Under the logic of our Reference Scenario CO_2 emissions are estimated to increase by 11% over the period 1990 to 2000 for the Community including the new German Länder. Power generation and transportation account for over 80% of the incremental increase of 370 Mt of CO_2.

Without the tax and under the assumptions of our Reference Scenario future trends in CO_2 related indicators are shown in the table "Key Figures for CO_2 Emissions".

Impact of CO_2 Tax

The economic aims of this package of proposals are to increase energy efficiency and lower the carbon intensity of the Community's energy production system. Included in this strategy is the proposal to introduce a carbon-energy tax. This complements and reinforces the non-fiscal dimension of the strategy, increasing energy efficiency and promoting renewable energies. While the initial tax impacts will be gradual and indeed still relatively modest by 2000 when the tax should be fully implemented, there will be accelerated effects both on energy demand and supply. The direct effects of this specific tax proposal are shown in the accompanying table.

The Global Context

While the Community and indeed the OECD's primary energy is set to grow at just over 1% p.a. to 2005 that for world consumption is estimated at 2% p.a.

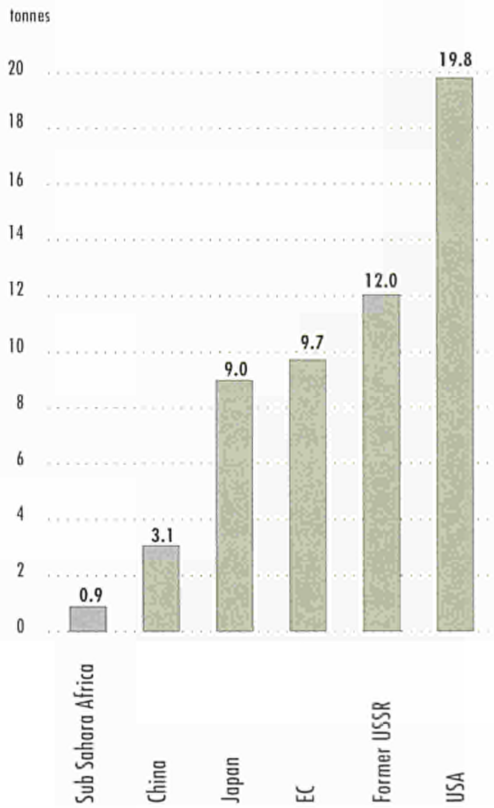
Long-term growth estimates for the former Soviet Union and Eastern Europe are influenced by the severe economic problems presently affecting these regions and over the period to 2005 energy consumption is likely to increase in total by some 16%. Of the incremental increase of 2850 Mtoe in world consumption some 60% is accounted by the developing world with OECD contributing 30%.

Estimated Impact for CO_2 Tax on Energy and CO_2 Emissions

		1990	2000		
			Reference Scenario (a)	Tax Case* (b)	Difference % (b/a)
Gross Inland Consumption	(Mtoe)	1115	1298	1267	- 2.4
Final Energy Consumption	(Mtoe)	722	845	819	- 3.1
CO_2 Emissions	(Mt of CO_2)	2766	3139	3043	- 3.0

* *Based on eight Member States; accounting for 95% of total CO_2 emissions.*

CO_2 Emissions per Capita in 2005



World Oil Production by Region (in Mbd)

	1990	2005	Annual average % Change 1995 to 2005
OECD *	15.9	14.8	-0.5
Non OPEC LDCs	10.1	16.9	3.5
Former CPEs	14.6	14.3	-0.2
Total Non-OPEC	40.6	46.0	0.8
OPEC	25.1	33.8	2.0
WORLD	65.6	79.8	1.3
Stock changes, other	0.5	1.7	-

World Oil Demand by Region (in Mbd)

	1990	2005	Annual average % Change 1995 to 2005
OECD *	37.9	44.1	1.0
LDCs	15.8	23.8	2.8
Former CPEs	12.4	13.6	0.6
Total Non-OECD	28.2	37.4	1.9
WORLD	66.1	81.5	1.4

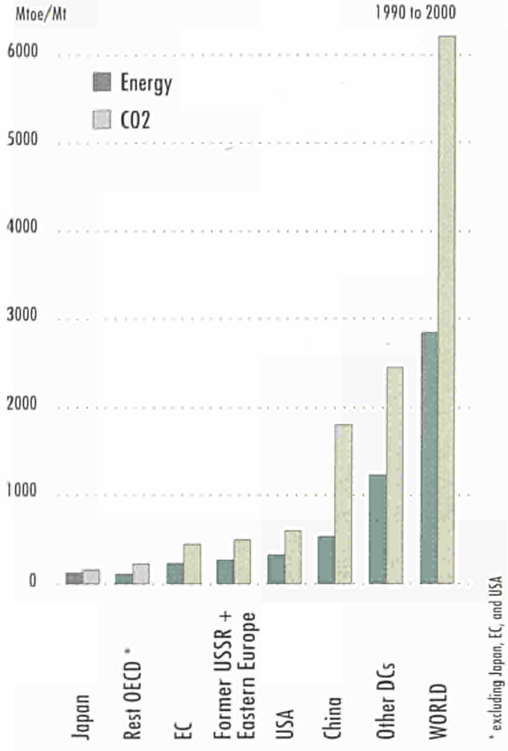
World oil demand is set for a steady increase over the period but growing faster in the second half of the 1990s than in the earlier and later periods.

Solids and natural gas will also grow; the former increasing by an average of 1.6% p.a. and gas by 3% p.a. Nuclear, after growing at 6% p.a. between 1985 and 1990, reports a 1% increase over the period to 2005. Finally renewables are increasing by about 3% p.a., 50% more rapidly than total demand.

With increasing energy consumption CO2 emissions are growing - on average by 1.8% p.a. Of the incremental increase 6200 Mt of CO2, OECD accounts for 24%, the former Soviet Union and Eastern Europe 8%, and the remainder of the world 68% (China with 29%). Average CO2 emissions per head will increase from 3.8 to 3.9 tonnes while the estimate for OECD in 2005 is 12.3 tonnes per head.

The accompanying graph summarises trends in primary energy consumption and CO2 emissions by major regions of the world.

Additional Primary Energy Demand and CO2 Emissions by Major World Regions



These are some of the trends and issues which will preoccupy policy makers in the 1990s. It is in meeting the immediate challenges that the foundations will be laid for the longer-term energy system. The interaction between each of the major policy issues discussed will lead to a new framework for energy investment decisions. Indeed, creating a climate for investments is one of the most important tasks of public policy in the immediate future.

2.3

The 1990s: Emerging themes

Increasing primary demand in the Community, at some 1.3% p.a., calls for replacements and net new capacity to meet the growing demands. This translates into investment decisions. The decade of the 1990s is characterized by the need for investment in coal, power generation (including clean coal burning technology), in exploration and production of oil and gas, in infrastructure and in refinery upgrading capacity.

Energy intensity will improve at a rate of some 1% p.a. Improving further on this trend will require additional efforts by both the private and public sectors.

But the major challenge in Europe could come not from traditional supply and demand issues but rather from growing environmental concerns. These concerns reflect local, regional and global issues. Dealing with traditional emission issues will increase investment requirements. Meeting the challenge of CO2 stabilization requires more radical responses, including the introduction of new market instruments and more effective energy efficiency policies.

What are energy needs over the longer term? What has science to offer and how will this be translated into technology? How do we organize the institutional framework to deal with problems that are not only complex and widely based but lie so far in the future? To help us we need to have some view about longer-term trends. To provide a framework for addressing these questions our report now looks to the strategic energy consequences of population growth, the need for sustained economic development and the challenge posed by climate change.

3

THE 21ST CENTURY ENERGY SYSTEM: TO 2050

3.1

Energy in the year 2050: why do we need to look so far ahead?

We need to look ahead for four reasons:
- world population will grow from 5.3 billion people today to something in the order of 10 billion by the middle of the next century;
- meeting concern about climate warming requires a time horizon reflecting the strategic nature of this problem;
- we need to decide on our research and development strategies; and finally
- the decisions we will take in the 1990s will largely determine our longer-term strategic responses well into the 21st century.

From a policy point of view the requirement is to ensure that actions which are developed for the short and medium term are indeed coherent with longer term needs. The current energy system does not always lend itself to prompt and flexible responses. But the continuation of current trends in energy supply and use is not sustainable in the long run.

Three objectives, generally related to welfare, are critical to the outlook for energy:
- economic growth
- affordable energy services
- environmental protection.

But there can be stresses between these objectives. Two scenarios illustrate the nature of these stresses. Today commercial energy consumption is in the order of 8 billion tonnes of oil equivalent (Gtoe) per year. If energy efficiency improvements and changes in the energy supply mix are effective then we might look to a world in 60 years' time consuming 13 Gtoe, with most of the growth coming from developing countries. However, continuing to implement current approaches to those problems would lead us to a world consuming over 20 Gtoe. Indeed some analysts suggest that growth might be nearer to 30 Gtoe (See Chapter 2).

These two illustrative energy futures imply differing global priorities for these objectives, especially between regions. A conflict of aims is nowhere more likely than in developing countries where the continuing growth in population will mean an increasing need for more and better services that require energy. Without such services, economic and social development will suffer.

Any conceivable increase in energy efficiency will be offset by the growth in population and energy consumption per person in developing countries. Our own efforts in Europe to reduce CO2 emissions will be overshadowed by the increase in developing countries.

The leading question is how to get onto a sustainable growth path that reconciles the social and economic aspirations of the world's peoples for higher welfare while at the same time meeting concern for a cleaner environment and avoiding the dangers of global warming.

3.2

Technological potential

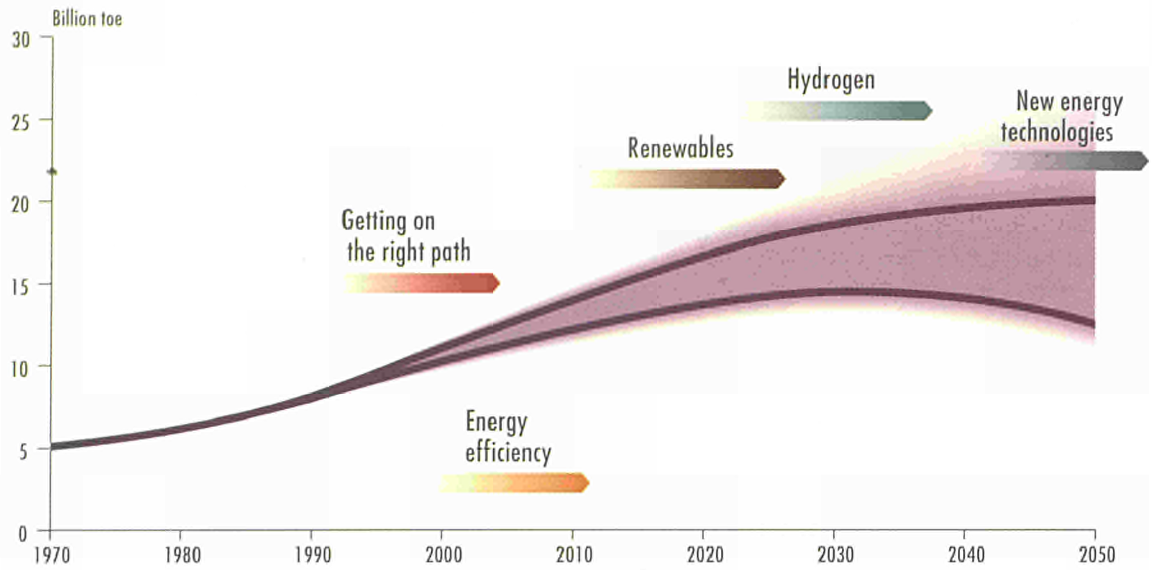
We have sought to look in a thought-provoking way at how technological developments and new ways of organizing the energy sector could meet these enormous challenges. The detail of this reflection is contained in "Technological Options", in Chapter 2. Here the possibilities of future developments in coal, oil, gas, nuclear, renewables and hydrogen are discussed in some depth.

The ultimate choice of technologies will depend on specific conditions over time. But, starting from ideas about the implications of different technologies and systems which could be available, we should seek to create a framework whereby a number of potentially innovative technologies are encouraged. We must increase the range of options. It is not a question so much of picking the winner but rather of encouraging as many alternatives as we can afford. Widening the choice rather than narrowing it is probably the best strategy which can be adopted - even if this means keeping in place fuels which on an initial view seem to be damaging to the environment. Coal is a case in point.

Clean coal technologies are improving. This is particularly important as coal is the most widely available source for power generation. It is likely to continue to play a dominant role in electricity production in countries such as China and India.

Hydrogen and electricity are likely to play major roles in the longer-term energy system. Together they can meet most energy service requirements.

A View to the Future



They will drive electrochemical energy conversion devices, catalytic energy converters, electric motors and the heat pumps of the future. The fundamental key to the hydrogen and electricity tandem is that they can be produced from a variety of non-fossil and fossil sources. While today's sources and the technology routes used for hydrogen production are still limited, the range of future options is very large.

The most important conclusion of the detailed review of the technological options is that both the scientific knowledge and resources to develop the technology to provide the services needed are available today. But conscious decisions have to be taken to select and develop energy technologies that can lead to sustainable development. The principle challenge is:
- creating institutions and frameworks that allow us to convert and implement technologies that can lead to a cleaner world;
- to manage this in a framework of greater democratic participation, contributing to the legitimate economic and social aspirations of people everywhere.

How do we go about establishing a process that will bring us forward?

It is essential to:
- know where we want to go in the long run;
- fix the framework which will encourage diversity of energy supply;
- fix robust criteria for "success".

The likelihood of success will be enhanced where these criteria:
- are economically compatible in terms of cost-effectiveness and finance availability;
- are socially and politically acceptable in terms of people's economic aspirations; and
- are acceptable to different regions of the world, allowing regions to work together.

4
A View to the Future

Taking our best understanding of both the immediate and longer-term future we see that without a substantial change in policy objectives we are presently set on a course which, wherever else it may lead us, will not bring us in the direction of what is considered a "sustainable future". On present trends we may expect to have an energy world of some 20 Gtoe or more by the middle years of the next century.

Such a future implies global carbon emissions increasing from 6 GtC to 13 GtC by 2050. The resulting CO_2 concentrations in the atmosphere could increase from 350 ppmv to 500 ppmv in 2050.

Achieving long-term sustainably low energy demand levels with corresponding reductions in CO_2 emissions requires four revolutions in how we provide energy services:
- striving to achieve in practice levels of energy efficiency, which in engineering terms, are or soon will be available (Best Available Technology);
- starting on a growth path for renewables which ultimately will yield around 40-50% of today's total energy consumption (some 3 Gtoe of renewables);
- laying the foundation for a major contribution from new non-fossil fuel energy systems (e.g. hydrogen); and finally
- preparing the ground, through scientific research, for new energy technologies which for the moment lie at the frontier of knowledge.

This is clearly a long and arduous journey.

5

The foundations for a Long-Term Energy Strategy

An energy strategy needs to reflect our immediate needs and to lay the foundations for the longer term. In its construction it must respond to a wide variety of concerns. In the 1990s it must recognise the huge need for investments and evolving market structures. Over time society itself will change and its value systems will evolve. Research and development will progress, offering new services and radically changing the manner in which we organize and use energy and other finite resources. Some guiding principles are emerging which could provide a foundation for such a strategy.

5.1 The Politics of Energy

Policy should target improvements in the quality of life

It would seem to be a political fact of life that the level of energy services available to consumers should not be compromised. Energy efficiency improvements and the introduction of non-polluting technologies providing the same or better quality of services as before, rather than cutting back people's access to energy services, must be the ultimate objective of any policy which is to have any chance of being implemented.

Emphasize Market Forces

Let the market and its underlying forces find the best technologies/solutions within a clear and consistent set of ground rules. To this end create through public policy a positive climate for innovation and investment by defining and implementing a stable and lasting set of ground rules (i.e. emission taxes, standards, energy system development targets), so that industry (the primary source of useful innovation) knows what to expect.

Maintain Maximum Flexibility

Given the huge uncertainties involved - including the great potential for human ingenuity and innovation which it is impossible to forecast over a period spanning many decades - policy should be aiming to achieve energy structures which will be flexible enough to cope with the inevitable technological, geopolitical, social and environmental surprises that the future holds in store.

The global dimension

Policies should be sound and make sense in global terms, as well as for the Community. Community policies must be an integral part of the international process of energy system adaptation. All efforts should aim to meet the economic development requirements and future energy service needs of a world population of possibly ten billion people in an equitable manner. Any policy which focuses on improvements in Europe alone will not achieve the objectives of sustainability.

This means finding ways to deal with the special problems associated with the developing countries. Closest to home, the energy-environment problems of the Eastern European and Mediterranean countries would seem worthy of special consideration by the Community over the next decade.

5.2 Economic principles

Least-Cost Supply Should Serve as the Guiding Principle

Harnessing the "least-cost approach" will safeguard international competitiveness and secure energy availability. The consequent application of technology life-cycle costs, which must take account of externalities, will best determine what constitutes a least-cost energy option. The objective of public policy should be improved availability of energy services.

Adjust Energy Prices to Reflect External Costs

Introduce the environment as a factor of production through a system of economic incentives or disincentives or, where necessary and appropriate, mandatory standards and regulations. In the former category attention can be given to the concept of "tradeable permits" and a range of tax incentives as well as taxation to encourage end-users to seek more energy efficient products.

5.3

Technology and innovation as dynamic forces

The Concept of Sustainability

The target of a sustainable energy system is in many ways a new concept, needing further thought and work if it is to be harnessed and supported in a useful way.

The starting point for this process is to involve the six basic communities concerned - i.e., environmental, scientific, industrial, financial, political and the media. All six need to be brought into the debate and quest for a solution in order to focus attention and resources and to improve our understanding of the concept in all its ramifications.

Target Performance Improvements and Standards

Where standards are set to encourage efficiency, performance improvements should be targeted across the board - as opposed to trying to impose or favour particular technologies or techniques. In this way the sources of innovation are left free to find the best match of technologies to deal with the problem and the challenges.

Strategic Support for R & D

The full range of non-fossil energy sources should be considered, but special attention should be given to hydrogen-related and electricity production technologies, and to photovoltaic energy conversion. Although the latter may possibly be of limited use in Europe, solar energy may become the supply cornerstone in other regions. Early participation in these technologies may create new business opportunities.

Support and Enhance Development of Best Available Technology (BAT)

The "best available technologies" which are today the world standard in industry need to be revised upward in order to reflect energy and environmental considerations. Only by producing entire new generations of technology with performance and economic characteristics that make them tangibly preferable to what is available on the market today, will the transition be possible.

To make the impact needed such technologies must be transferable to the developing countries in terms of cost as well as from the ecological point of view.

The Community currently faces the challenge of creating a political union which expresses cohesion between Member States, fosters economic growth through competition and the application of science and technology and at the same time cares for the environment while providing a framework for living in peace with our neighbours.

This vision calls for the energy world to develop a framework which is commensurate with both the complexity of the problems and political and social aspirations.

Our analysis has identified many opportunities in meeting these challenges. The geopolitical situation has not been better for many generations. Our understanding of technology and its potential to enlarge these opportunities is substantial.

We are living in times of rapid change, but alongside current uncertainties there are considerable possibilities for developing new energy systems and structures to reconcile the desire for economic welfare with the environmental imperative. Sustainable development is possible.

TOWARDS THE NEW CENTURY:
FROM NOW TO 2005

1

Scope of Analysis and Principal Assumptions

We have developed a Reference Scenario and on this basis provided energy demand and supply estimates for the world, major regions, and in more detail for the Member States of the European Community. The Reference Scenario, broadly representing "conventional wisdom", covers the period up to 2005 and is based on the following assumptions:

GDP Annual Average Growth Rates in the Reference Scenario

	Annual Average % Change of GDP			
	1995/1990	2000/1995	2005/2000	2005/1990
WORLD	2.1	3.2	3.2	2.8
European Community *	2.0	2.5	2.2	2.2
EFTA	2.2	2.6	2.6	2.5
OECD	2.0	2.5	2.5	2.4
Central and Eastern Europe	-0.7	3.6	3.2	2.0
Former USSR	-7.0	5.0	4.2	0.6
Mediterranean Basin - Southern rim	3.5	4.0	4.0	3.8

* *Including the former German Democratic Republic.*

Average Community Import Prices (in constant 1990 US$)

	1985	1990	1995	2000	2005
Crude oil					
in 1990 US$/bbl	33.9	21.6	19.0	23.0	28.0
in 1990 US$/toe	247.4	157.7	138.7	167.9	204.4
Steam coal					
in 1990 US$/tce	61.5	54.3	50.0	52.0	55.0
in 1990 US$/toe	87.9	77.6	71.4	74.3	78.6
Natural gas (average cif Europe)					
in 1990 US$/MBTU	4.8	2.8	3.0	3.6	4.2
in 1990 US$/toe	191.3	112.3	120.6	141.7	167.5

Demographic trends
Low population growth (0.3% p.a.) for the Community to 2005, contrasting with higher rates (around 2% p.a.) in the developing world.

Economic activity
Moderate economic development including relatively prudent GDP growth rates and moderate price inflation, but persistent unemployment in a number of Member States, key uncertainties in Eastern Europe, in the former USSR, and in the countries of the Southern Mediterranean rim.

Energy prices
Nearly stable world energy prices until the end of the century (based on ample supplies of coal and to a lesser extent, oil; with gas prices linked mainly to oil), increasing thereafter.

The world energy outlook is drawn up on the basis of these same scenario assumptions.

Other assumptions:
- substantial continued efficiency improvements;
- probable intensity gains achieved in the case of the Community by existing or proposed programmes, such as ALTENER and THERMIE;
- continuing integration of the Internal Market.

The analysis also includes a balance-sheet for energy-related air pollutants (SO_2, NO_x and CO_2) for the Community.

Two alternatives taking account of relevant current issues are also developed around the Reference Scenario:
- in the Energy/CO_2 Tax Scenario the main direct impacts on energy demand and emission

levels of the Commission's energy/CO2 tax proposal are analysed;
- a sensitivity analysis based on a more favourable economic development assumption as compared to the Reference Scenario, showing the effects on a range of energy demand and supply variables for some individual Member States.

Treatment of Germany in the Scenarios

In view of the problems with statistical data (availability, reliability) following German unification
- separate results are produced for the old German Länder, the new Länder and the whole of Germany up to 2000; and only for the former Federal Republic of Germany up to 2005.
- the EC aggregates include only the former FRG except where stated otherwise.

2

World Energy Trends

Between 1990 and 1995, world energy consumption will remain depressed due to the generally low level of economic growth and the reduction of demand in Eastern Europe and in the former Soviet Union. This offsets continuing expansion in Asia and particularly in South East Asia. Demand growth will accelerate after 1995, driven by higher growth in the LDCs including China and with demand recovering in the ex-USSR and Eastern Europe. Total world primary energy consumption is expected to reach 11,141 mtoe by 2005, which is a third more than the 1990 level, compared to a 50% increase in GDP.

Natural gas provides a full third of the increase yet its share in the world energy balance only rises from 20% to less than one quarter in 2005. Rising gas demand in industrialised countries is mainly the result of substitution for other fuels; in the developing countries it generally comes on stream to meet additional demand. Solids, in abundant supply at moderate prices, are likely to lose little market share in world markets. Oil demand is expected to increase by 16% in the industrialised world but fourfold as much in some newly industrialised countries, where oil is required for strongly increasing transport needs and where it is attractive because of its independence from infrastructure investments. Nuclear programmes are under review world-wide and slower future growth is expected, from 517 mtoe in 1990 to 616 mtoe in 2005.

Global CO2 emissions will continue to increase; from 20.2 billion tonnes in 1990 to 26.4 billion tonnes in 2005 (up by 31%). Our Reference Scenario assumes an increase even for most of the industrialised regions. In China environmental problems largely reflect the dominance of solids in the energy balance. Solids consumption in all sectors is characterized by inefficient combustion technologies and inadequate emissions control equipment.

World Energy Consumption by Fuel

	1990		2005	
	Mtoe	% Shares	Mtoe	% Shares
Solids	2215	27	2831	25
Oil	3133	38	3862	35
Natural gas	1672	20	2620	24
Nuclear	517	6	616	6
Hydro	189	2	324	3
Heat *	25	0	51	0
Renewable **	542	7	831	7
Total	8295	100	11141	100

* *Geothermal energy.*
** *Mainly biomass.*

CO2 Emissions by Region

	1990		2005	
	Mt of CO2	% Shares	Mt of CO2	% Shares
European Community *	3042	15	3494	13
EFTA	220	1	257	1
USA	4822	24	5427	21
Japan	1010	5	1173	4
Rest of OECD	791	4	1023	4
OECD	9886	49	11374	43
Former USSR	3370	17	3831	14
Central and Eastern Europe	1055	5	1097	4
SUM	4424	22	4928	19
North Africa	188	1	320	1
Other Africa	487	2	740	3
Middle East	462	2	782	3
China	2368	12	4172	16
Other Asia	1558	8	2704	10
Latin America	829	4	1392	5
Developing World	5898	29	10120	38
WORLD	20208	100	26423	100

* *Including the former German Democratic Republic.*

Energy-related environmental concerns in the economies of Eastern Europe and in the former Soviet Union are also largely coal-related. In many developing countries, the pressures of high population and energy demand growth, combined with low-efficiency technology and the use of cheap and often heavily polluting forms of energy will have an adverse effect on the global environmental situation.

3

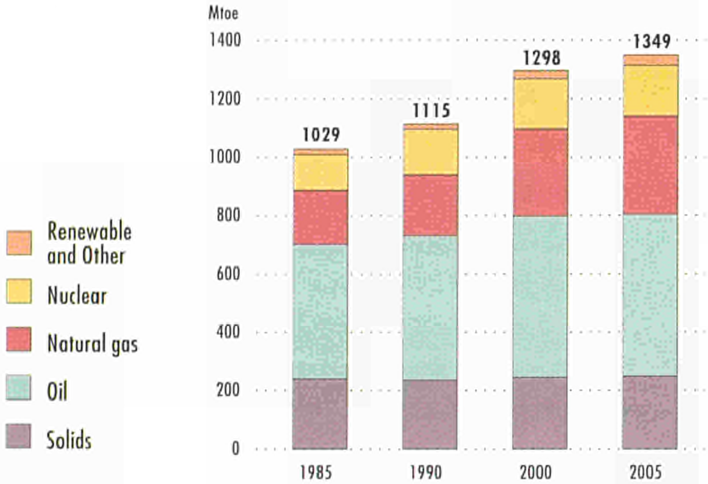
Energy Demand and Supply in the European Community

3.1

Demand

In our Reference Scenario total **primary** energy demand grows moderately throughout the period up to 2005 (1349 mtoe). Demand will increase by about 1.3 % per year on average, reflecting relatively low economic growth expected for the next few years and increasing energy efficiencies in the whole energy system.

Primary Energy demand by Fuel



The future primary energy mix of the Community will be characterized by the continued dominance of oil, with its market share remaining over 40% in 2005. Three factors underlying this trend are:

- energy demand for transport is expected to increase as a result of further increasing car population and the boost in demand for transport services in general resulting from further European integration. Oil remains the only readily available large scale transport fuel;
- in the lower income Member States, which are projected to show rapid growth as they catch up, there is above-average reliance on oil;
- finally, moderate oil prices in the short term are reducing the incentive for oil substitution.

Natural gas will move into second place, replacing coal. This reflects the growing attractiveness of this fuel in terms of environmental and economic considerations. Nuclear power units are coming on stream in France and the United Kingdom, leading to an expected increase in nuclear electricity production. Although renewables are set to triple their share, their contribution in absolute terms will remain modest.

Final energy consumption could reach 876 mtoe by 2005, some 20% more than in 1990. This growth reflects improved efficiencies dampening the underlying upward pressure.

While final energy intensity could decline by almost 1.0% p.a., electricity intensity versus GDP remains more or less constant up to 2000, reflecting faster growth in the use of this energy. After 2000 electricity intensity could decline by 0.6 % p.a.

Incremental Final Energy Demand: 1990 to 2005

Mtoe	Industry	Transport	Domestic and Tertiary	Final Demand
Solids	-6	0	-3	-9
Oil	-10	70	-4	56
Gas	16	0	38	54
Heat	0	0	1	1
Electricity	14	1	31	46
Biofuels	-	7	-	7
Total	14	78	63	155

3.2

Supply

In the light of increasing demand, prospects for Community energy production are less favourable. With production costs remaining higher than in other regions of the world, hard coal production levels will be determined mainly by state aid and other policy measures. Crude oil and - to a lesser extent - gas reserves are not unlimited [1], although they may well be more

(1) See discussion in Chapter 2, Sections 2.2 & 2.3

extensive than appears today. A substantial portion of fields presently in production may be depleted in 10 to 15 years time, but production from new fields should on the other hand largely offset these losses.

In short, domestic energy production will remain more or less constant. Less coal and oil will be produced, being replaced by more gas, nuclear, and some new renewables and hydro. But a fast widening supply gap is still left which has to be met by increasing imports. Import dependency will therefore increase from 50% to almost 60%.

3.3

Energy by Sector

3.3.1 Domestic and tertiary

Consumption is expected to increase some 1.4 % p.a. from 271 to 333 mtoe. Many energy uses, such as space heating and lighting, are common to both these sub-sectors. With millions of individual decision-makers, cost consciousness alone has not been enough to bring about energy efficient behaviour. It typically takes longer for the most efficient available equipment to be adopted through investments. The main reasons for this are:

- on average, residential housing stock has a very long lifetime;
- owner and user of the housing stock are often different individuals or institutions;
- incomes have been rising steadily (a primary influence on demand).

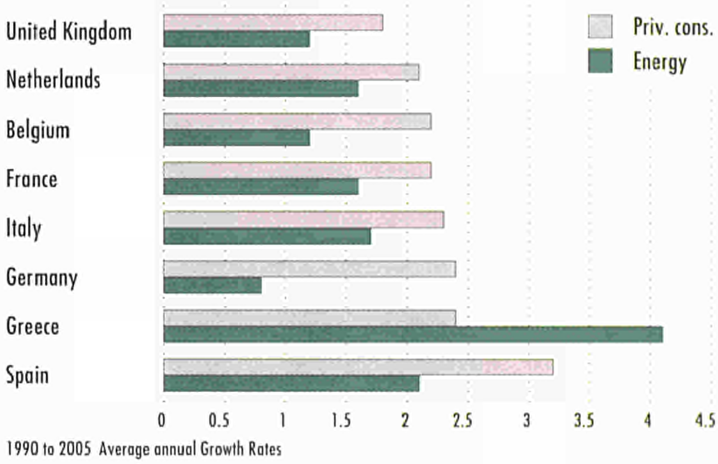
Thus for example in the domestic sector energy intensity gains are expected to average less than half (0.8% p.a.) what they will be in the indus-

Demand for energy increases due to:
- *much higher demand for services;*
- *increasing numbers of households;*
- *larger housing units;*
- *age distribution increasingly skewed towards the older age brackets;*
- *life-style changes including more leisure activities.*

Fuel Mix in the Domestic & Tertiary sector

- *1990 data are influenced by exceptionally high temperatures in a number of Member States;*
- *Solids diminishing;*
- *Oil declining;*
- *Gas increasing after 1995, substituting for oil and solids;*
- *Electricity growing but at a declining rate.*

Comparing Trends in Private Consumption and Energy Demand in the Domestic & Tertiary Sectors

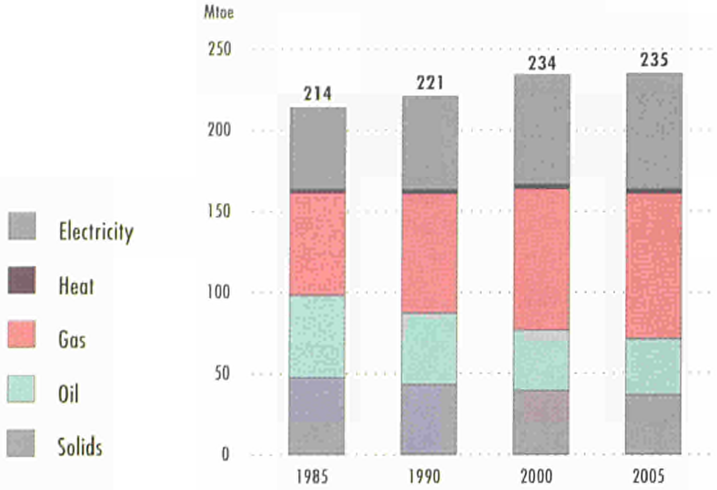


- *Clearly differing across the Community, reflecting climatic and economic differences.*

Energy Consumption in the Domestic and Tertiary Sector

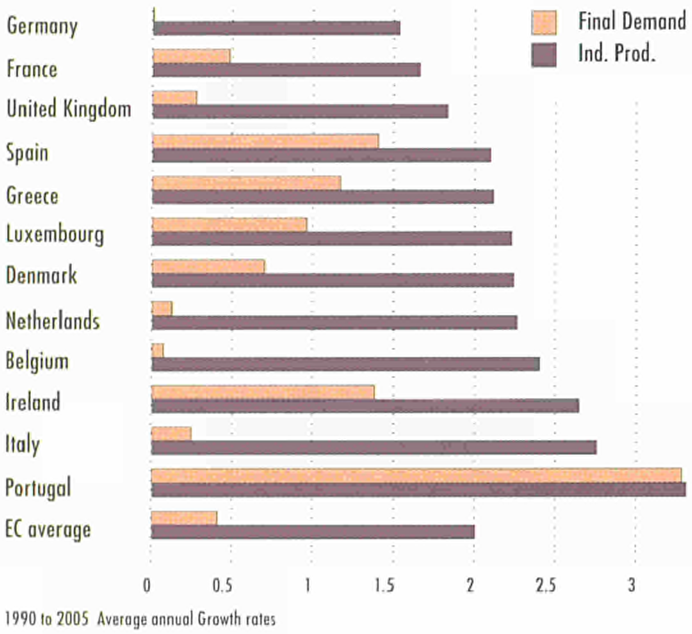
Member State	BE	DK	FR	GE	GR	IR	IT	LX	NL	PO	SP	UK	EC
1990 Mtoe	11.5	5.6	49.2	69.1	4.0	2.9	37.8	0.6	19.2	2.2	12.4	56.5	271.0
2005 Mtoe	13.8	6.3	62.6	77.9	7.3	3.5	48.8	0.6	24.5	3.7	16.9	67.5	333.3
Average Growth Rate %/year	1.2	0.8	1.6	0.8	4.1	1.2	1.7	-0.1	1.6	3.5	2.1	1.2	1.4

Fuel Mix in the Industrial sector



• *The main shift is towards electricity and gas, both of which are driven principally by technology and - to a lesser extent - by prices.*
• *Shares for oil and solids declining further, as seen in domestic and tertiary sectors.*

Comparing Trends in Industrial Production and Final Energy Consumption



• *Only Portugal can expect significant industrial energy demand growth;*
• *Growth also in Ireland, Spain, and Greece but not as rapid.*

trial sector, although they should improve in the latter part of the period. The share of these sectors in total final energy consumption (TFEC) will remain stable at 38%.

3.3.2 Industry

Industry accounts presently for 31% of the Community's TFEC. By 2005 this is expected to have declined to 27%.

Industrial energy demand is expected to grow at 0.6% to 2000, but to practically stagnate beyond then because:

• the industrial base is shifting away from energy-intensive industries such as steel production to less intensive sectors such as electronic equipment;
• the competitive environment will force most industrial users to keep close track of their energy costs, to make their energy menus flexible and to exploit potential opportunities for energy efficiency improvement;
• energy policy measures in individual Member States and at Community level (the SAVE and THERMIE programmes) facilitate energy efficiency improvements.

Thus although industrial production is expected to grow at 2% p.a., significant intensity gains result in average energy demand growth of only 0.4%.

3.3.3 Transport

Transport will continue to be one of the fastest growing markets for energy in the Community, at 2% p.a. Oil products account for 98% of all transport energy needs, and road transport is responsible for about 80% of this amount. The 230 mtoe of fuel consumption of the transport sector in 1990 is roughly split 40:60 between individual and mass/freight transport.

Mobility will continue to be a basic need. This general desire for greater mobility is reflected in the expected increase in the number of cars of more than 25% by 2005. Population and income

Energy Consumption in the Industry

Member State	BE	DK	FR	GE	GR	IR	IT	LX	NL	PO	SP	UK	EC
1990 Mtoe	11.5	2.6	34.6	59.8	3.9	2.1	36.0	1.7	13.2	3.5	18.6	33.6	221.1
2005 Mote	11.6	2.9	37.2	59.7	4.7	2.5	37.4	2.0	13.4	5.7	22.9	35.0	235.0
Average Growth Rate %/year	0.1	0.7	0.5	0.0	1.2	1.4	0.2	1.0	0.1	3.3	1.4	0.3	0.4

levels influence this trend as indeed do other factors such as spatial distribution, urban congestion and transport infrastructure and policy. Accompanying this general trend is the difference in consumption growth rates throughout the Community: higher in Portugal, Spain, Ireland, Greece, and the new German Länder, slower in congested countries such as the Netherlands.

Improved fuel efficiency will restrain growth in fuel demand. Specific fuel consumption of cars has decreased considerably since 1980. This fact is not evident in average efficiencies for actual use partly due to the lag caused by the slow turnover of the vehicle fleet; there are also the counter effects of faster driving on improved motorways, increased congestion in the case of urban driving, and consumer preference for larger cars.

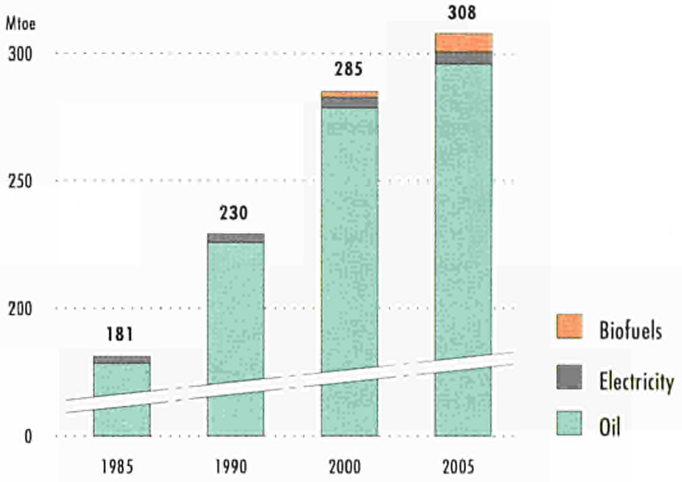
Transportation was responsible for about one third of total final energy consumption in 1990 and for 43% of the demand for oil in the Community. According to a study[2] commissioned by the Directorate General for Energy on the effects of the adoption of Best Available Technologies, about 22% of fuels used can be saved with the best available technologies for cars, trucks, and buses.

New aircraft are 20% more efficient than the average for the existing stock. Increasing size of planes, better occupancy rates and improved jet turbine technology will continue to cut the energy input per passenger km. But overall intensity gains versus GDP will, however, be lower for transport than for any other sector, averaging only 0.2% p.a., but again improving throughout the period.

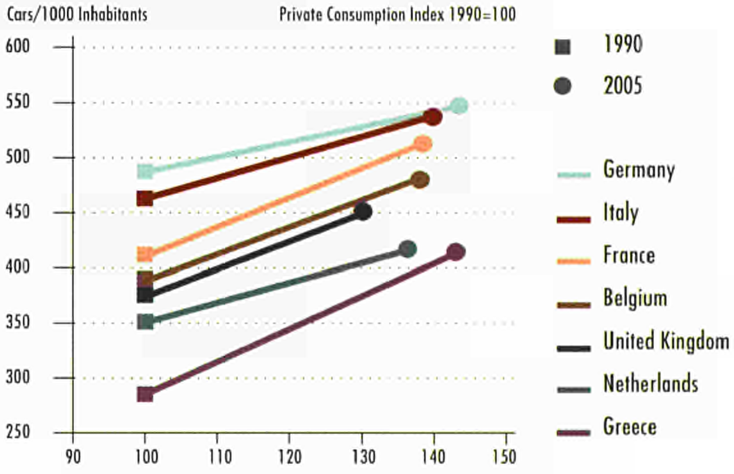
Transportation systems - road, rail, aviation - have been planned, built and enlarged in isolation from one another. Efficiency gains would be achieved by better integration and harmonization of these systems, e.g.
- park and ride systems;
- long-distance transport of heavy goods to be shifted to rail;

(2) Regio-Tech GmbH, Starnberg, 1991

Fuel Mix in the Transport sector



Private Consumption and Car Population in some Member States



Energy Consumption in the Transport Sector

Member State	BE	DK	FR	GE	GR	IR	IT	LX	NL	PO	SP	UK	EC
1990 Mtoe	7.7	4.5	41.9	51.6	5.8	2.0	33.3	1.0	10.3	3.7	22.3	45.3	229.5
2005 Mtoe	10.6	5.8	59.6	63.3	8.4	2.9	48.8	1.4	12.6	6.2	33.4	55.0	308.0
Average Growth Rate %/year	2.1	1.7	2.4	1.4	2.5	2.6	2.6	2.4	1.3	3.4	2.7	1.3	2.0

• increased public transport services including improved comfort;
• better rail-plane inter-connection.

Looking forwards, the future fuel mix changes only marginally in our Reference Scenario. Gasoline will remain by far the predominant transport fuel. Diesel consumption is also expected to continue to grow, reflecting:
• considerable growth in road haulage due to increasingly specialized production processes, growing trade volumes both within the Community and with other regions;
• favourable GDP growth. This growth will, however, favour higher value products as against traditional bulk traffic;
• no significant shift from road to rail.

Aviation fuel demand is expected to continue rising. Presently there is no substitute for this and with world-wide passenger demand rising the outlook is for robust growth.

Earlier this year, the European Commission proposed a draft directive aimed at reducing excise duties by 90% for motor fuels produced from agricultural products. Biofuels are said to release less CO_2 than oil-based motor fuels and the Commission believes biofuels could eventually win 5% of the EC market - the Reference Scenario suggests a market share of 2.5%.
Quality of transportation fuels will improve further:
• increasing octane number of gasoline, presently in conjunction with market penetration of lead free grades;
• optimization between fuel, lubricants and type of engine;
• lowering of aromatic and sulphur levels in diesel fuel, increase in cetane index;
• lowering of benzene level in gasoline;
• reduction of hydrocarbon emissions (volatile organic compounds).

4 Meeting Energy Requirements

4.1 Oil and Refineries

4.1.1 World outlook up to 2005

Following the oil price collapse in 1986, oil demand has been growing considerably, leading to an average rate of 1.7% in the period 1985 to 1991 worldwide. Over the next 15 years, demand is forecast to grow by 1.4% a year. A considerable regional variation in this development is expected with demand growth being almost non-existent in the US, moderate in Western Europe and strong in the Asia and Pacific region.

The oil sector is changing

Lessons of the 1980s: The oil sector is not immune to the laws of economics. Elasticity of demand and of substitution in the longer term was underestimated by producers and others. The main issue was managing surpluses upstream and downstream e.g. idle OPEC production capacities, refining capacities, world tanker fleet capacities and pipeline capacities.

Lessons of the 1990s: We cannot evade the laws of investment. We shall be leaving the period of surplus and entering a period of sufficiency. The marginal barrel will matter, and the marginal investment necessary to produce that barrel. It is a decade of investments! In total, over the next decade, some $ 250 billion will be needed to bring supply into line with demand. Outside OPEC, some $ 80-100 billion will be required to sustain output of over 40 mbd. And in the OPEC countries, investment of over $ 150 billion will be needed in order to maintain output at current levels and to bring on stream the 9 mbd of extra production required .

On capital markets, these sums are not astonishing but the question is: Is the oil sector attractive to investors?

World Oil Balance (Million barrels per day)

Oil Consumption	1985	1990	1991	1995	2000	2005	Annual average % change 1991/1985	1995/1991	2000/1995	2005/2000
OECD *	34.7	37.9	38.0	40.8	43.0	44.1	1.5	1.8	1.1	0.5
LDCs	12.7	15.8	16.3	18.0	20.8	23.8	4.2	2.6	2.9	2.7
Former CPEs	12.7	12.4	12.1	11.7	12.8	13.6	-0.8	-0.9	1.8	1.3
Total Non-OECD	25.4	28.2	28.4	29.7	33.6	37.4	1.9	1.2	2.5	2.1
WORLD	60.1	66.1	66.4	70.5	76.7	81.5	1.7	1.5	1.7	1.2

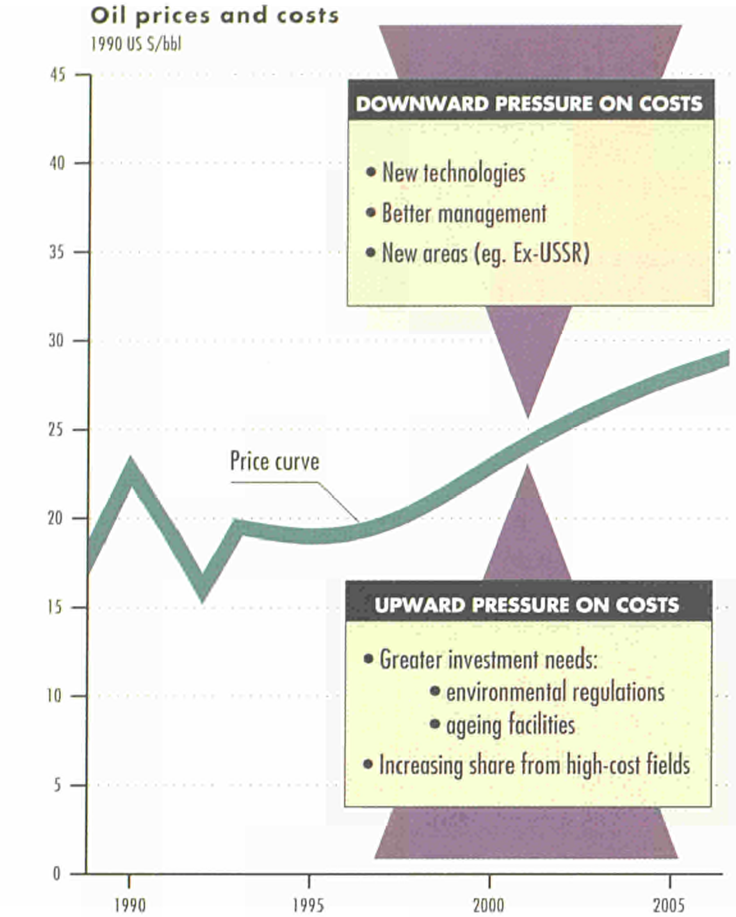
Oil Production	1985	1990	1991	1995	2000	2005	Difference in mbd 1991/1985	1995/1991	2000/1995	2005/2000
OECD *	17.1	15.9	16.2	16.4	15.6	14.8	-0.9	0.2	-0.8	-0.8
Non-OPEC LDCs	8.5	10.1	10.3	11.6	14.5	16.9	1.8	1.3	2.9	2.4
Former CPEs	15.0	14.6	13.5	12.2	13.1	14.3	-1.5	-1.3	0.9	1.2
Total Non-OPEC	40.6	40.6	40.0	40.2	43.2	46.0	-0.6	0.2	3.0	2.8
OPEC	17.6	25.1	25.4	28.8	31.8	33.8	7.9	3.4	3.1	2.0
WORLD	58.1	65.6	65.4	69.0	75.1	79.8	7.3	3.6	6.1	4.7
Refinery Gain	1.1	1.4	1.4	1.5	1.6	1.7	0.3	0.1	0.1	0.1
Stock Withdrawals (**)	-0.9	0.9	0.4	0	0	0				
Total WORLD Supply	60.1	66.1	66.4	70.5	76.7	81.5	6.3	4.1	6.2	4.8
For memo: Former CPEs Net Exports	2.3	2.2	1.4	0.5	0.3	0.6	-0.9	-0.9	-0.2	0.3

* *Beginning in 1990, including former East Germany*
** *Negative values indicate a stock draw; includes statistical discrepancy*

Major trends in future world oil supply are:
- Non-OPEC production levels are likely to remain stable to 1995 and increase thereafter; comparatively high growth in world oil demand will result in increased calls on OPEC;
- Crude oil production in North America will continue to decline. North Sea production is expected to reach its peak in the late 90s, and output in the former USSR could recover slowly after 1994/1995.

In the oil sector, **technology** is a major force in keeping down the costs of finding and producing oil.

Downward pressure is coming from:
- advances in reservoir management, e.g. gas handling programmes;
- horizontal drilling, which is environmentally friendly in that it can permit halving the number of production wells;
- unmanned platforms are reducing operating costs;
- three-dimensional seismic surveying allows operators to target exploration spending much more accurately;
- and a non-technological factor : first-time access to areas with large unexplored potential, e.g. the former Soviet Union.



Upward pressure on costs results from:

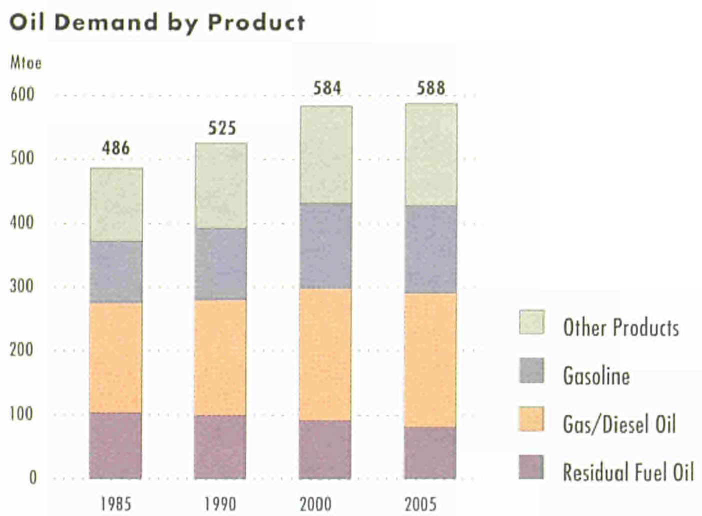
- response to environmental requirements;
- repairing and renewing ageing facilities;
- smaller fields in remote areas and offshore, that is higher costs on a per barrel basis.

In summary, over the next decade investment in finding and developing oil has to be increased dramatically in both the OPEC and non-OPEC areas. This will probably outweigh technology-driven downward pressure. In the medium term however, major findings in unexplored areas such as the former Soviet Union could open up considerable downward potential on costs.

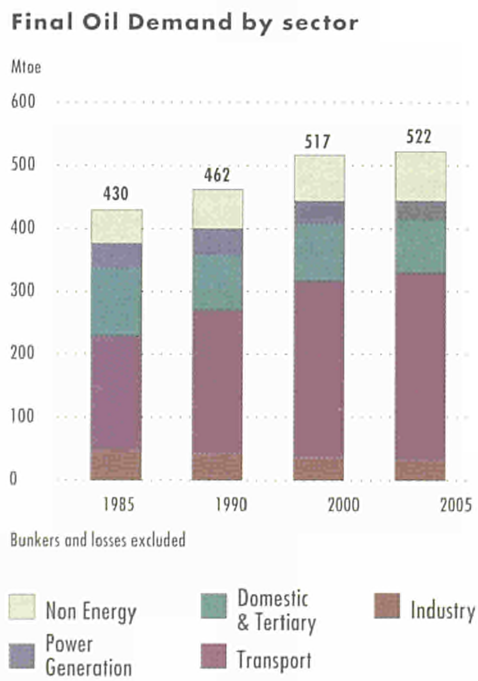
4.1.2 Oil demand in the Community to 2005

Oil, representing 45% of the Community's primary energy demand, is expected to continue growing in absolute terms, but to decline marginally in relative terms. Total oil demand in 2005 will be only slightly higher than in 2000. Moving to the future product structure, one thing is quite clear: light products' share of the barrel will further increase, from 21% to almost one quarter, and the heavier end will continue to decline in importance.

One of the major uncertainties concerning these projections is the extent to which gas, solid fuels and oil, in particular fuel oil, will compete in the power generating and heavy industrial sectors.



- *Industrial demand for oil declining quite rapidly, at about 1.7% p.a.;*
- *Domestic sector demand also declining after 1995 at about 0.9% p.a. due to substitution by gas and electricity;*
- *Total final demand for oil is increasing at 1% between 1990-2005, and at only 0.3% after 2000.*



Oil Demand by Member State

Member State	BE	DK	FR	GE	GR	IR	IT	LX	NL	PO	SP	UK	EC
1990 Mtoe	22.6	9.5	87.0	113.9	15.5	4.5	91.5	1.6	35.2	12.1	48.3	84.2	525.8
2005 Mtoe	25.4	10.1	105.0	128.2	19.0	5.8	91.4	2.0	37.5	12.9	60.6	90.0	587.9
Average Growth Rate %/year	0.8	0.4	1.3	0.8	1.3	1.7	0.0	1.5	0.4	0.4	1.5	0.4	0.7

- *Demand for automotive fuels is expected to continue growing quite strongly in all Member States except in the Western German Länder. Here with private vehicle population and number of kilometres travelled expected to level off, and with vehicle fuel efficiency expected to improve, growth will be minimal.*

- *Demand for diesel will grow faster than that for gasoline, due to the growth in road haulage and also because the proportion of diesel cars in the total stock will continue to grow thanks to the perceived greater fuel efficiency. Tax-based incentives will play an increasing role.*

- *Fuel oil and heating gas oil consumption are expected to fall, depending on the competitive position of gas, and on the problems of removing sulphur from fuel oil so that it can be used in power generation.*

4.1.3. Refineries

There has been a continuous reduction in primary distillation capacity in the Community in the aftermath of the first and second oil crises. Primary capacity in 1990 stood at 568 mt (GDR excluded), almost 40% below its 1980 level.

Utilisation rates of primary capacities have increased since 1981 (59%) and are now at particularly high levels. At certain times of the year, these distillation capacities are working at 95%, with therefore a risk of local shortages at those moments when, for example, cold weather coincides with refinery shutdowns. Usually, however, relatively brief localised shortfalls can be made up quickly simply by buying on the market. In the Reference Scenario, total atmospheric distillation capacity is not expected to grow apart from some minor exceptions in certain Member States.

Cracking capacity has almost doubled since 1980 to 187 mt/year. The conversion side is getting increasingly important, with conversion technology becoming more complex and sophisticated in order to meet changing output patterns and increasing quality requirements. To meet the growing need for higher octane in gasoline there has been an expansion of isomerisation, alkylation and MTBE production capacity. This trend is expected to continue. Desulphurisation capacity will also need to be expanded to meet environmental requirements.

Refinery Output by Product Group

	1990	2005	Annual % Change 2005/1990
Total Refinery Output (Mtoe)	506.1	573.2	0.8
of which (in %):			
Gasoline	23.6	26.9	0.9
Gas/Diesel Oil	32.8	33.2	0.1
Residual Fuel Oil	19.4	15.2	-1.6
Other Products	24.2	24.7	0.1

A major challenge for the refining industry will be that of adjusting to environmental constraints. In this context, the choice of technology is a particular problem. There is no universal solution. For both conversion and product upgrading the solutions will be specific, local and strategic. A correct investment decision today may be invalidated by a modification in standards or introduction of new specifications in the near future. The risks are increasing as the pace of new environmental legislation increases.

Environmental legislation is likely to continue to put pressure on refiners to remove sulphur from products. In particular, reduced sulphur content is already demanded in diesel and gas oil and further measures may be called for - discussion is already under way on the French Memorandum [3]. Capacity may prove tight, especially in countries where product demand is expected to grow significantly over the decade and will require further investment in desulphurisation.

As the process of refining becomes increasingly complex, so balancing the streams for the various units in order to meet market demand will continue to place greater constraints on individual refinery systems. To add flexibility within this ever demanding environment there is likely to be increasing linkage between refineries, even if plants are owned by different companies, in order to make the most rational use of complementary facilities. Additionally, the modern refinery is increasingly producing not only petroleum products but also petrochemicals intermediates such as aromatics, synthesis gas, and hydrogen. Relations between the refining and petrochemical industries can be expected to intensify while becoming more complex.

Adaptation processes can be smooth with environmental policy goals being announced and known at an advanced stage. Economic efficiency requires integration of new measures into existing environmental structures, rather than treating each in isolation.

(3) Memorandum submitted by the French Authorities to the Council of the European Community in June 1990, concerning sulphur reductions in oil products.

Future investments in the refining sector, which are highly dependent on the conversion rate, constitute a key uncertainty. For environmental protection, some industrial estimates put the cost of the measures envisaged or formally proposed, such as sulphur reduction in gas oil, vapour recovery improvements, and new specifications for automotive fuels at between 45 to 55 billion Ecu for the Community as a whole.

4.2

Natural Gas

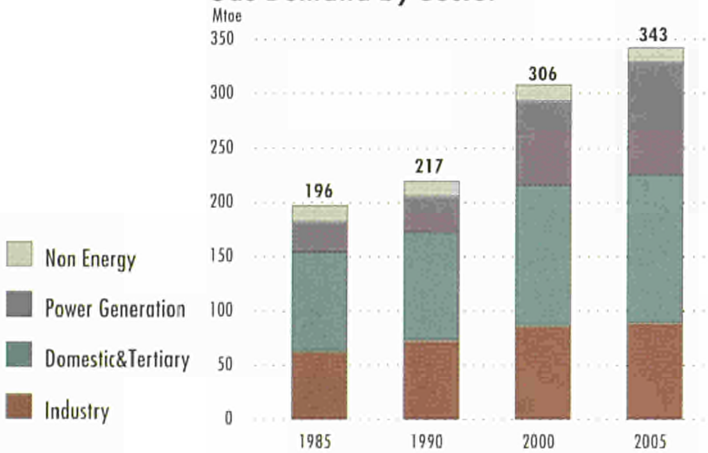
4.2.1 Demand

Growing demand for natural gas is expected to make it the fastest growing fuel in the Community. Demand - according to our Reference Scenario - could be some 60% higher in 2005 than in 1990. Alongside further growth in its main 'traditional' markets, natural gas is increasingly seen as the fuel of choice for new power generation projects. By 2005 gas demand in this sector should exceed that for industry. From an environmental viewpoint, it is expected to make a contribution to reduced sulphur dioxide and CO2 emissions.

The efficiency, convenience and cleanliness of natural gas has been recognized by a growing number of residential and commercial consumers. Gas has proved a cost-effective means of supplying energy service requirements. Natural gas in the residential sector benefits from new designs for gas-fuelled heating systems with efficiency improvements of up to 25%, and better controls for easy and instant management, all designed to meet rising environmental concerns. With continuously expanding transport and distribution infrastructure and judging by the number of new connections to the gas grid, gas will continue to displace other fuels, such as heating oils.

It is short-term economics which determine gas use in the industrial sector. In this sector, to a large extent a boiler-fuel market, competitors to natural gas are hard coal and residual oil. Industrial energy users often have multi-fuel capabilities and thus have the option of instant fuel-switching in line with fuel price changes. Bulk industrial users often operate under interruptible contracts.

Gas Demand by Sector



Derived gases included

Natural Gas Demand by Member State

Member State	BE	DK	FR	GE	GR	IR	IT	LX	NL	PO	SP	UK	EC
1990 Mtoe	8.2	1.8	24.9	48.3	0.1	1.9	39.0	0.4	30.8	0.0	5.0	47.2	207.5
2005 Mtoe	12.7	4.0	41.7	68.0	2.7	3.7	70.0	0.7	38.2	4.0	15.7	76.4	337.8
Average Growth Rate %/year	3.0	5.6	3.5	2.3	22.0	4.6	4.0	3.2	1.4	-	8.0	3.3	3.3

• *Mature gas markets - i.e., Belgium, Germany, France, Italy, Netherlands, UK and Luxembourg - account for more than 95% of present Community gas consumption. Expanding gas markets in Denmark and Spain and developing markets in Portugal, Ireland and Greece will shift this ratio slightly to 91%.*

Easy handling and low maintenance needs give natural gas a competitive advantage over alternative fuels, in particular for small- and medium-sized undertakings. The projected further expansion of transmission and distribution grids, particularly in the Community's peripheral regions, will favour gas penetration in industry in general and in small- and medium-sized undertakings in particular. Nevertheless, the price relations between natural gas and its competitors remain decisive.

The largest increase in gas demand is expected in the power sector, in the light of:

- *the efficiency advantages of combined cycle gas turbine plant;*
- *the environmental drawbacks of coal;*
- *continuing concern about the impact of nuclear;*
- *the fact that short installation times give combined cycle systems a further edge ;*
- *combined cycle gas turbine systems require 50% less capital than coal-fired power plants.*

4.2.2 Future Supply

Community gas production is expected to grow by about 30% up to the year 2005. As demand is growing faster, net imports must more than double. Import dependence will reach 50% over this period. A substantial volume of future gas supplies is already secured under long-term contract but Western Europe may need:

- a further 40-45 mtoe of currently uncontracted imports in 2000;
- as much as 80-85 mtoe by 2005.

These figures assume that the key internal producers, UK and the Netherlands, increase production to 2005 and that those existing contracts expiring after 2000 (e.g. with Algeria and the CIS) can be extended or renewed.

The principal sources of additional imports will be:

- Norway - principally by pipeline to/via Germany and Belgium;
- Algeria - in the form of liquefied natural gas (LNG), and by pipeline to Italy and probably Spain;
- the CIS - pipeline gas via Czechoslovakia and possibly in the medium term via Poland;
- Nigeria - LNG supplies commencing in 1997;
- Libya - currently a small supplier but with potential to increase under more favourable political conditions;
- more distant, high-cost sources such as Qatar or Oman (LNG), or possibly Iran by pipeline via Turkey and SE Europe.

Additional supply needs substantial investment in exploration, production, pipeline and LNG facilities. Natural gas projects are heavily capital-intensive and marked by long payback periods. Major projects in Algeria and the CIS will

Natural Gas Requirements and Supply

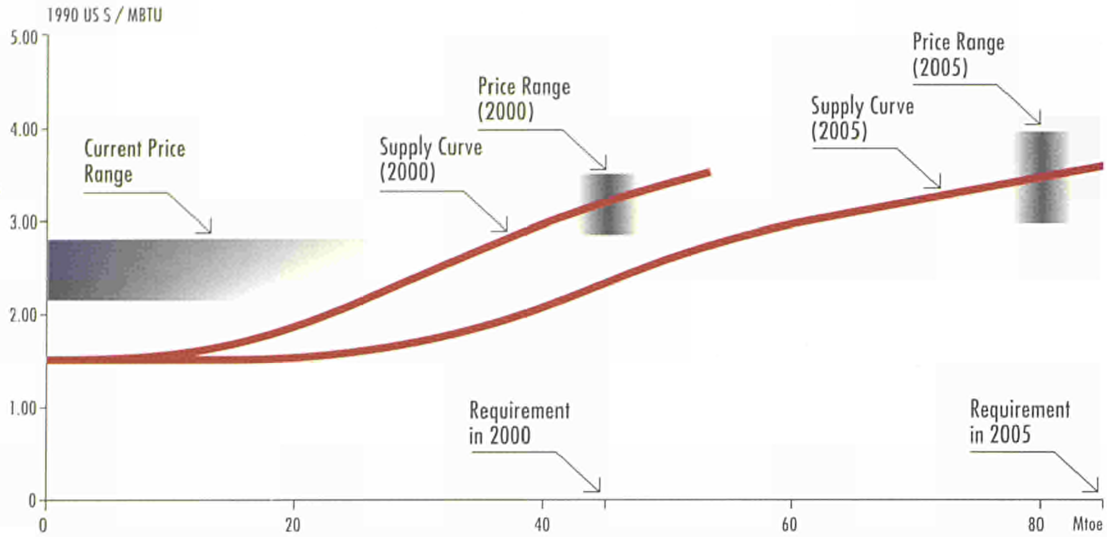
Mtoe	1990	2000	2005	Increments 2000/1990	2005/2000	2005/1990
Total Requirements	208	300	338	92.5	37.7	130.3
Indigenous Production	130	160	168	30.7	7.2	37.9
Net Imports	80	140	170	59.4	30.5	90.0

Indicative Cost of Additional Gas Imports

Cost of gas supplies to EC border

Western Europe as a whole, over and above indigenous production and contracted non-EC imports

Source: Coopers and Lybrand Provisional estimate



require funding, and these areas will be looking to traditional capital markets and creating new arrangements to meet the substantial investment requirements. Within the Community attention is focused on developing the mature market segments and with integrating peripheral regions. Ireland will by the mid-1990s be linked by high-pressure interconnector (undersea pipeline) with the UK. Portugal is developing a network and progress is continuing in Greece.

The most important issues which will influence availabilities over the next decade include:
- the enhanced negotiating position of key producers, which could push up border prices;
- the political stability of Algeria, given its high share of markets in Spain, Italy and France;
- the reliability of Russian supplies following the break-up of the former Soviet Union.

Beyond 2000 the picture is clearly much more uncertain but a number of factors could push gas prices up:
- a move to higher-cost gas reserves within the Community;
- a similar shift in countries such as Norway and Russia, where cost structures will have probably adapted towards 'western' levels;
- the cost of importing LNG from distant sources such as Nigeria and Middle East.

All these questions lead on to the most important one of all: can the expected demand for gas be met and at what cost? Taking into account reserves, technology improvements, cost factors and the pressure on producers to sell, as well as likely price levels, these demand volumes could be economically available. But the very fast penetration in most sectors according to the Reference Scenario is subject to some uncertainties. It is hard to imagine overall demand increasing faster even under different assumptions.

4.3

Solids

Solid fuels were the predominant energy source in the 1950s. Their role declined steadily in the 1960s, but since the first oil shock consumption has more or less stabilised. Coal, an abundant resource and geographically widely dispersed, is an attractive source particularly for power generation. Today this sector accounts for 65% of the market for solids. The domestic and tertiary market is in steep decline, and coking coal demand is dependent on the business cycle of the steel industry and on changing technical processes in this sector.

The use of coal and lignite on a large scale is now acceptable only with vigorous control of dust, SO2 and NOx. While these specific problems appear to be well on the way to being solved, the discussion now focuses on the emission of greenhouse gases, notably CO2. This issue may be crucial as regards the future contribution of coal and lignite, as these contain more carbon than oil or gas, in equivalent energy content.

Solids demand in the Community is likely to remain flat up to 2005 (up about 6%) due to
- the rapid penetration of natural gas in power generation,
- environmental drawbacks. However,
- solid fuel prices are expected to remain com-

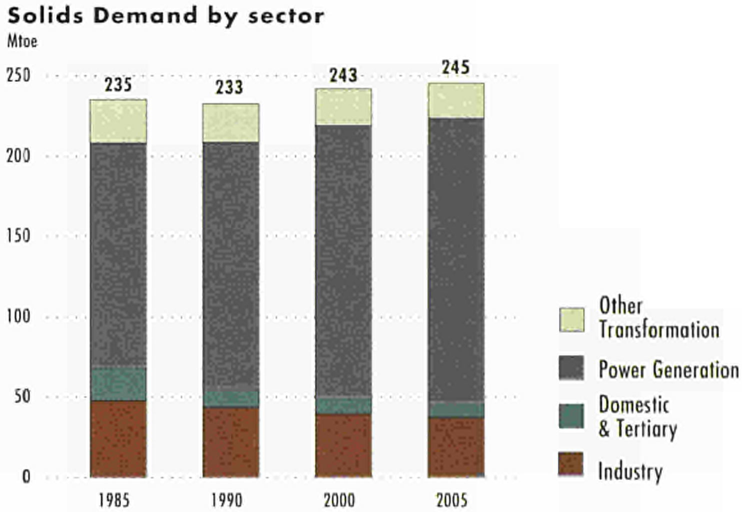
Solids Demand by Member State

Member State	BE	DK	FR	GE	GR	IR	IT	LX	NL	PO	SP	UK	EC
1990 Mtoe	10.2	6.1	20.0	75.2	8.2	3.5	14.6	1.1	9.1	2.6	19.3	64.3	234.1
2005 Mtoe	8.9	7.4	20.9	76.0	13.1	3.1	19.6	1.1	11.2	5.6	25.4	55.4	247.8
Average Growth Rate %/year	-0.9	1.3	0.3	0.1	3.2	- 0.8	2.0	0.1	1.4	5.3	1.9	- 1.0	0.4

- *Decline in certain producer countries (UK and Belgium)*
- *Other producers substituting more fully with imports (Spain, Germany)*
- *Some Member States increasing coal consumption to spread risk (Italy, Portugal).*

petitive. World coal reserves are plentiful and they are being exploited and developed in export-dedicated mines. Even with significantly increasing demand for steam coal, world market prices, which are determined predominantly by coal-to-coal competition, can be expected to remain significantly below the level of other fossil fuels.

Solids Demand by sector



Costs for most coal produced in the Community are substantially higher than world market prices and this disparity is likely to grow in the future. Indigenous production is expected to remain in steady decline. The levels of production assumed in this scenario show a decrease of 38%. On a cost-competitive basis hard coal production would be lower still.

New exporting countries, with even lower production costs than many mines currently producing for export, are entering the market. Additionally, main traditional suppliers of the world coal market are increasing export capacity despite surplus availability and fierce competition. In summary, world coal markets should have the potential to substitute for Community supply cutbacks as well as for increasing demand in some countries.

Clean coal technology will be decisive for future coal consumption in the Community. Coal gasification systems are being developed which would allow coal to be burned cleanly and with high thermal efficiency using combined cycle technology. Success in this effort would greatly strengthen the competitivity of coal versus natural gas and reduce CO2 emissions. Fuel choices could be dictated to a significant extent by the question of when such systems, which could be available commercially by 2005, actually come on stream.

The development of such clean coal technology along with others, such as cleaner burning Pressurised Fluidised Bed Combustion is very important in the case of developing countries like China and India, which use huge volumes of coal. The transfer of these technologies to developing countries which at the moment rely greatly on coal will be an efficient way to limit CO2 emissions on a world scale.

4.4

Electricity

Electricity remains a growing sector. In 1990, electricity represented 18% of Community final energy demand, up from 15% in 1980. By 2005, electricity's share of TFEC is likely to be 20% . However, perhaps more than ever before, the European electricity sector is in flux, under the influence of different forces and trends, several of which are still gathering momentum.

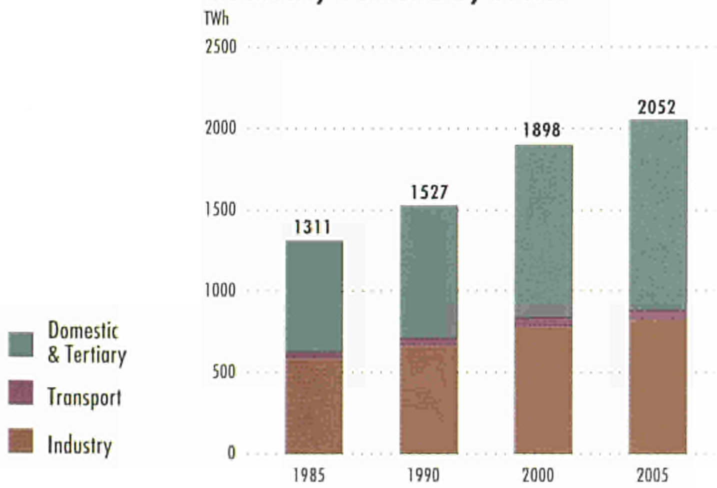
Final **electricity demand** within the EC grew at 2.1% between 1980-1985, and 3.1% between 1985-1990. Our Reference Scenario shows a continuous downward trend in growth, at 2.4% to 1995, 2.0% between 1995-2000, and 1.6% between 2000-2005. But these lower figures mask higher growth in the Southern EC Member States, which in some cases will be as high as 5%.

Electricity demand increases with growth in population, number of households and particularly economic growth. All three factors will show only moderate positive growth to 2005. Demand is also positively linked to levels of appliance penetration and more widespread uses for electricity, either through new uses as with information technology, or through substitution of other fuels for specific uses, such as space-heating, waterheating, and industrial processes.

Increasing end-use efficiency is a prime factor which may reduce electricity demand. Normal turnover to more efficient equipment will reduce underlying demand by about 0.5% p.a. Faster and more widespread adoption of more efficient plants, appliances and industrial processes is necessary to strengthen energy conservation and stabilise pollutant emissions.

Utilities are increasingly seeing the benefits accruing to themselves if demand growth can be limited by direct contact with consumers, instead of automatically investing to meet forecast demand - a process which is taking longer and longer, is costing more for major plant, and is becoming riskier.

Electricity Demand by sector



Deliberate activities by utilities to shape or reduce demand are commonly known as demand-side management (**DSM**). They are often undertaken by utilities as part of an integrated supply-side / demand-side strategy to minimise total supply costs when revenue is constrained and an obligation to supply exists.

DSM efforts can lead to reductions in peak power demand and overall energy demand leading to financial savings and reductions in fossil fuel consumption and emissions. Both the utilities' customers and society as a whole can thereby benefit. It would be wrong though to suggest that all DSM efforts are aimed specifically at reducing emissions. Increasing night-time load could actually increase them - depending on the fuel substituted by the consumer and the fuel for generation - but yields an economic benefit through greater plant utilisation. A reduction in demand from 0.5-1.0% p.a. is potentially achievable in the early years of implementation.

Important strides have been made to improve efficiencies of end-use technologies. However adoption by end-users of more efficient technology is influenced by the importance the user ascribes to energy costs. Firms are sometimes loathe to make energy-saving investments with a payback period of more than two years. Domestic users often expect an energy-saving measure to pay for itself in a year or less. But use of the most efficient technology for some users could lead to electricity savings of up to 80% for lighting, with substantial savings possible also in refrigeration, spaceheating, waterheating, and industrial motors.

For the **domestic** sector, there continue to be considerable gaps between specific consumption in the case of the most efficient versions of the most widely used appliances, and the average consumption of models in the existing stock.

In the **commercial/tertiary** sector, some of the most important loads are information systems (which are relatively low in specific power consumption) and lighting, for which major differences again exist between average and most-efficient equipment. Space-conditioning loads also leave room for greater efficiency.

In the **industrial** sector, there is scope for significant efficiency gains in lighting and also by the more widespread introduction of electronic motor speed controls for the very large existing stock of electric motors. Motors account for three-quarters or more of industrial load.

But not all technological change is aimed at reducing electricity consumption. New applications for electricity in the home continue to be developed; in industry a pattern has emerged in more and more processes of substitution by electricity of other fuels . In the commercial world, the power requirements of information systems are rapidly expanding. And there is considerable scope for increased electrification of public transport.

Electricity/GDP elasticity is set to slow to about 0.7, higher than overall energy/GDP elasticity but lower than it has been in recent years. This lowering itself is due in part to the fact that much viable or likely substitution has already taken place, in part to the efficiency effects of new equipment, and in part to continuing structural economic changes: the less energy-intensive service sectors will represent an increasing large part of the future economy. Nevertheless in some Member States electricity demand will continue to grow faster than GDP.

Meeting Future Demand

Because of uncertainty regarding fuel choices, technologies, and a more competitive market, many producers have adopted a strategy which will allow them some further time before committing themselves to substantial new investments.

Utilities are upgrading existing plants to reduce emissions and to increase their output, often by 5-10%. Other power stations are being brought back into service after having been mothballed. Fuel conversions are continuing towards polyvalent combustion to lessen fuel risk, but do not generally add power. Lastly some older stations are being repowered with larger more efficient plant, often gas-fired. But such actions are not expected entirely to account for the projected increase in demand. Our Reference Scenario suggests an additional need for 120 GW by 2005, on top of replacements.

Regarding future investments the hard questions are not "how much?" but "what types of fuels?" and "when?".

Utilities in most Member States have now made rapid progress in building gas-fired stations. Many countries are seeing a distinct structural shift towards gas because of its perceived benefits - low emissions, higher efficiency (up to 55% in combined-cycle mode and in excess of 80% overall thermal efficiency with combined heat and power), short construction times and lower capital costs.

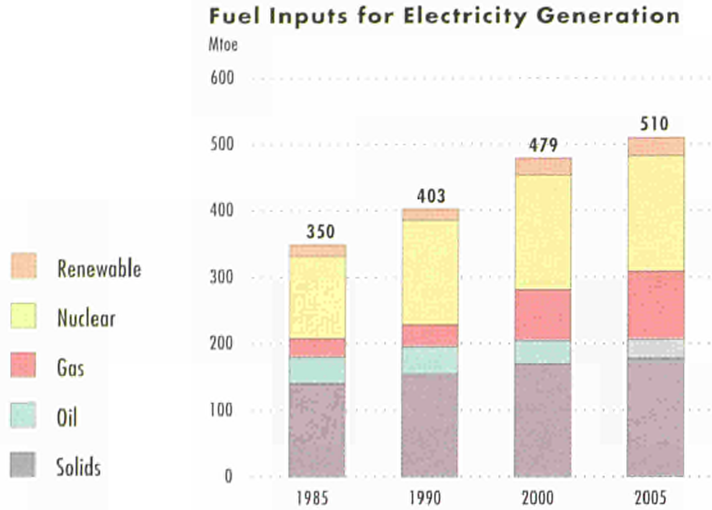
The degree to which this structural shift continues will depend on
- sustained and perceived gas availability at competitive prices,
- the relative attractiveness of other fuels in terms of cost and availability,
- the severity of environmental constraints, particularly on other fuels; and
- security of supply considerations.

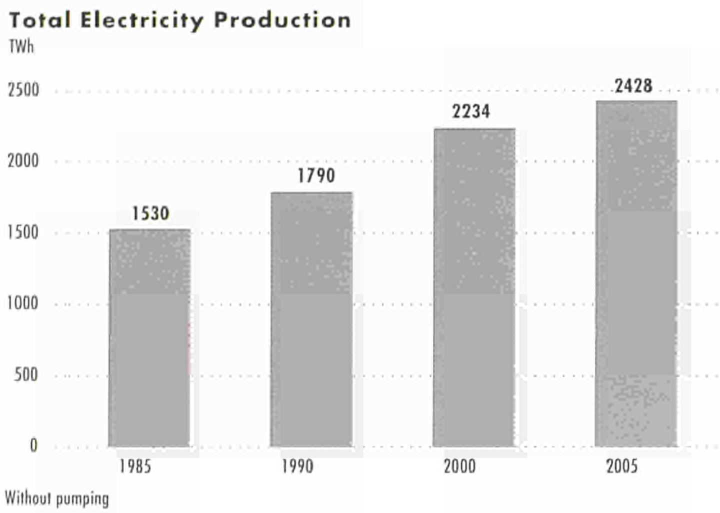
Combined-cycle technology has already proven itself as a very efficient way to burn gas for electricity production. Efficiencies are being improved even further both in the case of individual gas turbine engines, and complete combined cycle steam systems.

Our Reference Scenario shows gas burn increasing rapidly in many Member States, tripling overall to a total of 103 mtoe, representing about 20% of electricity production. Expanded use for

Electricity Generating Capacities

GW Net	1990	2000	2005	Net Capacity 2000/1990	Expansions 2005/1990
Nuclear	102.5	108.4	110.0	5.9	7.5
Monovalents					
Hard coal	69.7	70.9	71.7	1.2	2.0
Lignite	19.1	17.7	18.2	- 1.4	- 0.8
Residual fuel oil	51.6	47.4	42.2	- 4.2	- 9.4
Natural gas *of which*	17.5	63.3	92.5	45.7	74.9
Combined Cycle	*0.2*	*41.8*	*69.3*	*41.6*	*69.1*
Other fuels	6.2	6.4	6.7	0.2	0.4
Polyvalents					
with coal	44.8	55.2	62.6	10.3	17.8
without coal	27.2	30.8	36.1	3.6	8.9
Peak Device	15.5	20.1	20.7	4.7	5.2
Total Thermal	251.6	311.8	350.7	60.2	99.1
Hydro	57.2	62.1	62.8	4.9	5.6
Renewable	1.1	4.7	6.2	3.7	5.1
Total without Pumping	412.4	487.0	529.7	74.7	117.3
Pumping	22.1	24.3	24.4	2.2	2.3
TOTAL	**434.4**	**511.3**	**554.1**	**76.9**	**119.7**





power generation is the key factor in the expected increase in gas consumption.

A major fuel issue in the power sector will be the extent of reliance on **hard coal**, particularly on domestic hard coal in Germany, UK, and Spain. Existing capacities will continue to be used in base or semi-base mode, but expansion of capacities in a competitive market for electricity production may occur only if future coal prices are set to be more competitive with other fuels. One of the strongest advantages of coal is the existence of huge world reserves across a number of regions, offering substantial security of supply, and indeed imports are already increasing.

Coal gasification systems comprising combined cycle technology (IGCC) would greatly strengthen the competitivity of coal vs. natural gas and reduce CO2 emissions.

Lignite will continue to be used in some Greek stations and in West German ones which have already had flue-gas desulphurisation fitted, but when the recent collapse in electricity consumption in the former GDR gives way to a normal growth pattern, more reliance on other fuels (especially gas) will have evolved there due to the prohibitive cost of making lignite stations environmentally acceptable. Overall lignite consumption is set to fall quite markedly.

Oil use for power generation will stabilise until 1995 but will fall thereafter between 3 and 4% p.a. A gradual move towards more costly lower-sulphur fuel oils is already under way and environmental limits on sulphur emissions could be the strongest barrier to the use of heavy fuel oil.

Virtually all major **hydro** sources in the Community have already been tapped. Except for a few projects such as in Greece, Portugal and Spain there is no potential for further significant expansion. In our Reference Scenario we see hydro output rising one third to 17 mtoe in 2005, representing 8% of Community electricity. Hydroelectricity imports from Scandinavia to northern EC countries could become significant: some links are presently under construction.

Nuclear

Nuclear investments have slowed considerably in recent years throughout the Community and elsewhere. Stations are currently being built within the EC only in the UK and France. But unless nuclear construction takes off again in a real way, its contribution to electricity needs is set to rise by a moderate 10% only from 627 TWh (35% of total production) in 1990, to 704 TWh (29% of total production) in 2005, according to our Reference Scenario. The latter assumes no new nuclear stations other than those already under construction.

The major problems facing the nuclear sector now are

- a lack of public confidence that even Western nuclear technology can permanently guarantee safety;
- fears also about the ability to guarantee safe long term storage of high-level waste;
- a perception (not demonstrated) that the full cost of the entire nuclear cycle is greater than suggested to date, when full account is taken of the huge costs involved in the operating, decommissioning, and waste-handling stages for human and biosphere protection.

Nuclear Power Generating Capacities

	New Commissionings				Decommissionings			
MW Net	1990 to 1995	1995 to 2000	2000 to 2005	1990 to 2005	1990 to 1995	1995 to 2000	2000 to 2005	1990 to 2005
Belgium	0	0	0	0	0	0	0	0
Germany	0	0	0	0	0	0	340	340
France	5400	4365	2800	12565	1530	0	0	1530
Netherlands	0	0	0	0	0	56	452	508
Spain	0	0	0	0	0	0	400	400
United Kingdom	1248	0	0	1248	1940	1578	0	3518
EC	6648	4365	2800	13813	3470	1634	1192	6296
EC Net Capacity Additions	*3178*	*2731*	*1608*	*7517*				

Regulations and systems to guarantee safety are being continually improved and a project is underway to develop a passively safe reactor, but otherwise these obstacles remain largely to be overcome if nuclear power is to fulfill its potential to help reduce greenhouse gas emissions.

Commercial risk in such a high capital-cost industry is important but nuclear power could benefit if environmental costs for other fuels are internalised in their prices.

Increases in operational safety levels have been achieved continuously through design changes and extra levels of preventative safety systems, rather than through any quantum leap in reactor technology. France and Germany are now working together on the design and development of a new "passively safe" fission reactor. If it proves viable, it could go a long way towards alleviating public concern, particularly for countries which have already favoured nuclear power.

The fast breeder reactor can burn non-radioactive uranium 238 instead of only radioactive U-235 which accounts for less than 1% of the fuel mass, thus prolonging by decades the period for which uranium reserves will meet energy needs. It can also burn plutonium thus potentially reducing the problem of disposal of high-level waste. Currently, economic and other problems are hindering the development of this type of technology.

Other efforts are currently aimed at finding suitable sites and methods for long term storage of high-level waste. With international agreements on movements of such material, it should not be necessary for each nuclear country to have a site.

Environmental Factors

In the electricity generation sector these factors now appear as a set of constraints with in some cases considerable associated costs, eg specific emissions reduction targets for CO2, NOx, sulphur compounds and particulates; or extended lead times for power stations and transmission lines due to more stringent planning requirements.

Gas is increasingly seen as environmentally-friendly, producing no sulphur, low NOx emissions and the lowest amounts of CO2 per kWh among fossil fuels. Oil is an intermediate fuel on each count, with the likelihood that ever lower sulphur content oils will be used. The main disadvantage of coal use is the associated level of CO2 production, SO2 emissions being already widely under control thanks to flue gas desulphurisation, and/or the use of low-sulphur coals.

Technology improvements driven by the desire to reduce operating costs and emissions per kWh on the supply side will continue to lead to higher transformation efficiencies and reduced system losses.

Use of combined heat and power (**CHP**) by industrial autoproducers and utilities reduces energy costs and environmental emissions per unit of output, delivering at least 80% overall thermal efficiency, substantially better than conventional steam technology for production of electricity only. However, assimilation of CHP onto the public network can face problems somewhat similar to those affecting windpower, in that electricity from CHP plants must be used first on a round-the-clock basis, coming as it does from a plant with a more-or-less constant heat load. This can be an important constraint on the use of other expensive plant, such as base or semi-base plant, affecting cost recovery. Nevertheless, CHP is set to expand further. The importance of auto-producers' contribution to electricity supply will increase accordingly.

4.5

Renewables

Presently, the contribution of statistically accounted renewable energy sources to the Community energy balance accounts for some 2%. We have seen in recent years considerable innovation and development in a number of the technology areas that fall under the heading "renewables" which includes biomass, wind, small hydropower, geothermal, solar (thermal and photovoltaics), tidal energy. In the context of their future role in the evolving sustainable energy system, however, much of this progress is often only marginal and, for many reasons, seems destined to remain so at least in the short term. According to the Reference Scenario, renewable energy sources show the highest growth rates of all energies in the Community.

Biomass deserves special attention among renewable sources. The use of wood, sugar cane, agricultural industry residue or direct energy plantation is at present largely limited to meeting local energy supplies, especially in rural areas. Such consumption is not included in our balance sheets for the Community. The European Commision would like to see biofuels grow to 5% of motor fuel demand by 2005, with the necessary support measures already proposed or adopted. Biogas including for gas turbine electricity generation is a promising application for biomass. The use of biomass is not entirely pollution-free, but properly managed, i.e. grown and harvested sustainably, biomass would not contribute to the greenhouse effect.

Investments by utilities and third parties have expanded in recent years in small hydro and windpower, encouraged mainly by Community and national stipulations that prices paid for net supply of energy to the public grid should be at avoided-cost level or better. The cost of electricity from wind systems now being tested, if operated at good wind sites, can be below that from new fossil fuel plants. An important issue will be the extent to which unit capital costs and kWh costs can be reduced further. In absolute terms investment in renewables is set for strong growth. In the Reference Scenario renewable capacities (except hydro) for power generation will increase by a factor of six by 2005 to 6.2 GW.

4.6

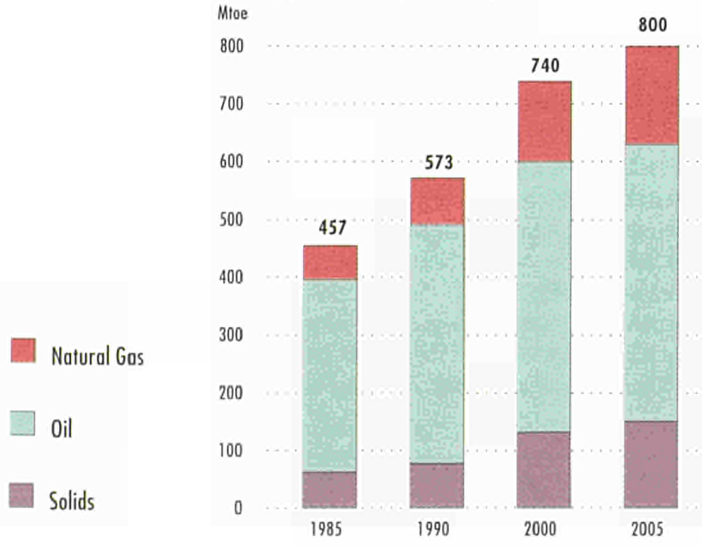
Imports

Import dependence and the associated security of supply considerations have always been a matter of concern for governments and consumers alike. The implications of undue dependence of the European energy system on sources from politically unstable regions have been demonstrated in the past. Undoubtedly, a well balanced and diversified energy import profile remains a key issue.

Oil net imports account for more than 70% of the Community's total energy net imports. In the Reference Scenario, calls on oil imports will increase from 413 mtoe to 479 mtoe by 2005. In terms of relative dependence, the Community's reliance on foreign oil sources is expected to pass from 78 to 81%.

Hard coal imports should increase steadily from 77 mtoe in 1990 to 151 mtoe by 2005. Import

Energy Net Imports by Fuel



dependence rises from 33% to more than 60% in the same period, though to a large extent coal imports originate from politically stable OECD sources. Member States with highest increases in imports will be Germany, UK and Spain.

Natural gas imports should more than double between 1990 and the year 2005 to 170 mtoe. This would require considerable efforts to construct adequate transport and distribution systems. Despite strongly increasing calls on imports, the import dependence for natural gas remains the lowest among all fuels, at about 50% by 2005 (39% in 1990).

In summary, the dependence of the European supply structure on extra-Community sources grows from 50% in 1990 to 58% in 2005, reflecting strongly increasing imports of coal and gas. However, increasing energy imports do not necessarily lead to less supply security. Geopolitical circumstances provide a unique opportunity for creating more favourable relationships between exporting and importing regions. We have the opportunity to improve relationships in such a way that the level of security actually increases, notwithstanding the volume increase in imported energies. The European Energy Charter, and the consumer/producer dialogue are initiatives which will help to allay traditional security concerns.

5

Review of Scenario Alternatives

5.1

Economic development and impact of higher GDP growth

Two scenarios were developed for the period up to 2005 on the basis of a world macroeconomic analysis specially commissioned by the Directorate General for Energy for the purpose [4]. The following assumptions distinguish the two scenarios:

- the assessment made as to how effectively a number of important key macroeconomic issues are dealt with, e.g. GDP growth at 2.2 or 2.5% p.a;
- how the economies in transition adapt more or less efficiently to market-based economic structures;
- success or otherwise in developing a world trading system and other macro policies, such as exchange rate and balance of payments.

Major macroeconomic developments include the following points:

- Internationalisation processes are ongoing, competitive world market structures will be kept in place, gains accruing from exploiting comparative advantages will contribute to global development of the economy.
- Coherent monetary policy aimed at progress towards a Monetary Union is assumed, which would give inflation rates across the Community in the range of 3 to 4% around the year 2000.
- Income development in real terms is expected to remain moderate, but use will be made of labour productivity gains nevertheless.
- The growth of government deficits at a time when the savings rate is still low suggests that real interest rates are not likely to ease significantly in the medium-term. Throughout the world they will remain high as compared with past levels, reflecting heavy investment needs in both public and private sectors during the 90s. This means that companies will give preference to financing of investments with high profitability rates.
- Environmental protection has now been recognized as a priority. Public opinion no longer accepts the idea of making technological progress today and putting off until tomorrow the search for solutions to the resulting quality-of-life problems. Environment and economy can no longer be decoupled.
- Technological and economic progress are inseparably interdependent. With respect to future technological change and the creation of potential for economic growth, attention should be focussed on four groups of key technologies: information technology, advanced materials, flexible manufacturing, and biotechnology. It can be assumed that the process of diffusion of technological progress will accelerate in the future.

A second report [5] contains a detailed analysis for each of the main industrial sectors to 1996. Some particular trends are highlighted:

- Basic materials industries are expected to grow at below average rates: crude steel production is continuing to decline in absolute terms, but cement production will benefit from construction activities in East Germany and some southern economies.
- The chemical industry is gaining importance, growing faster than GDP. It will be driven by plastics and pharmaceuticals, leading to a sub-

(4) Two Macroeconomic Scenarios to 2000, Equipe Mimosa, November 1991 for DG XVII
(5) Europe en 1996, Economic Outlook by Sector, Institut IFO et al, May 1992

stantial growth of non-energy use of oil and gas.
• Industrial activities related to information and communication technology are growing at double the rate of GDP.

In contrast to our Reference Scenario the high GDP growth variant is based on a series of more favourable assumptions:
• the economies in transition will adapt more efficiently to market based economic structures;
• there is more success in developing a world trading system and other macroeconomic policies such as in the area of balance of payments;
• greater benefits derive from the completion of the Internal Market and, moreover, towards the end of the time horizon under review, from Economic and Monetary Union.

Average annual growth rates in Germany, France, United Kingdom and Italy were increased from 2.1% in the Reference Scenario (corresponding to 2.2% for EC), to 2.5% in the high growth variant.

The energy analysis has been developed according to the logic of the Reference Scenario and later assessed to identify the major energy implications of higher economic activity. In the following table the main results are highlighted and compared to the Reference Scenario.

Comparison of "Higher Growth case" with the "Reference Scenario*"

	1990	2000			2005		
Mtoe		Reference	Higher Growth	% Difference	Reference	Higher Growth	% Difference
Gross Inland Consumption							
Solids	174	175	180	2.7	172	181	5.1
Oil	369	404	423	4.5	405	440	8.6
Natural Gas	159	228	234	2.7	256	268	4.8
Other	145	168	170	1.3	175	181	3.5
Total	848	975	1006	3.2	1008	1070	6.2
Inputs into Power Generation	306	358	364	1.7	378	395	4.3
Final Energy Consumption							
Industry	164	170	174	2.0	169	176	3.8
Transports	172	211	222	5.1	227	249	10.0
Dom. & Tert.	213	252	262	4.2	257	274	6.7
Total	549	633	658	3.9	653	699	7.1
Final Electricity Consumption	120	147	151	2.5	157	165	4.6
CO2 Emissions (Mt of CO2)							
Power generation	644	727	745	2.6	764	803	5.1
Energy sector	88	89	90	1.1	88	89	2.1
Industry	394	379	387	2.2	365	379	3.9
Transport	516	628	660	5.1	662	729	10.2
Domestic&Tertiary	434	488	511	4.7	477	513	7.6
Total	2076	2310	2393	3.6	2355	2514	6.7

** For France, Germany, Italy and the United Kingdom.*

• *The higher GDP case is marked by greater consumption of all fossil fuels, producing 7% higher emissions of CO2 in 2005.*
• *Increased consumption is more evident for oil and solid fuels than for gas, reflecting increased pressure on gas supply.*
• *The higher growth would come mainly from transport and the domestic and tertiary sectors.*

5.2

Stabilisation of CO2 Emissions at 1990 levels by 2000

5.2.1 Implications for supply and demand of the energy/CO2 tax proposal

One element of the Community strategy to limit carbon dioxide emissions and to improve energy efficiency, as proposed by the Commission, is the introduction of a new tax modulated as to 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 1993. Each year up to 2000 these amounts would be increased by one third of the nominal tax rates in 1993; rising to 0.7 Ecu/GJ and 9.4 Ecu/t CO2 in 2000.

Other features of the strategy address both energy efficiency improvements and the development of new and renewable energies. Community-level actions in these areas reinforce Member States own programmes.

The economic aims are to increase energy efficiency and lower the carbon intensity of Community energy production. The stabilisation package will set in motion dynamic changes which will take time to make an impact but which by their strategic nature will have major effects on the Community's energy sector. While the initial tax impacts will be gradual and relatively modest, by 2000 when the tax is fully implemented, there will be accelerated effects on both energy demand and supply. These effects will not only be internal to the Community but will also have an impact on world energy relationships.

Comparison of "CO2 Tax case" with the "Reference Scenario*"

Mtoe	1990	2000 Reference	2000 CO2 Tax	% Difference	2005 Reference	2005 CO2 Tax	% Difference
Gross Inland Consumption							
Solids	221	228	221	-3.2	231	221	-4.3
Oil	471	522	506	-3.1	526	510	-2.9
Natural Gas	203	291	286	-1.8	325	319	-1.8
Other	174	199	199	-0.3	206	207	0.5
Total	1069	1240	1211	-2.4	1287	1257	-2.4
Inputs into Power Generation	377	443	439	-1.0	472	466	-1.3
Final Energy Consumption							
Industry	211	222	214	-3.8	222	214	-3.7
Transports	218	270	265	-2.1	292	286	-1.9
Domestic & Tertiary	260	312	301	-3.3	319	309	-3.1
Total	689	804	780	-3.0	833	809	-2.8
Final Electricity Consumption	148	184	182	-1.2	199	196	-1.3
CO2 Emissions (Mt of CO2)							
Power generation	815	940	925	-1.6	1011	984	-2.6
Energy sector	120	124	121	-2.2	122	119	-2.8
Industry	511	496	472	-4.8	480	459	-4.5
Transport	655	804	787	-2.1	854	837	-2.0
Domestic & Tertiary	529	602	574	-4.7	592	566	-4.4
Total	2630	2966	2880	-2.9	3059	2964	-3.1

* *Belgium, France, Germany, Greece, Italy, Netherlands, Spain and the United Kingdom.*

In assessing the direct impact of the tax, the main assumptions remain unchanged vis-à-vis those in the Reference Scenario. As the tax is intended to be fiscally neutral, the presumption adopted is of unchanged macro-economic effects. Similarly, no change in the nuclear programme to 2000 is assumed given the long lead times for new plant construction.

5.2.2 Energy Demand

Growth in energy demand is likely to be strongest for transportation and electricity. Because of the existing high level of taxation on transportation fuels and the low demand response to price increases for automotive fuels the likely impact of the tax will be relatively modest.

In the domestic and tertiary sector, there is an ongoing and important switch away from solid fuels and to a lesser extent from oil for heating use. The tax will accentuate this trend with gas being the likely beneficiary. However, energy management is generally weak in this sector and efficiency increases will be achieved largely from improvements in equipment and the setting of standards.

Industry and particularly heavy industry is an important candidate for significant efficiency improvements over the medium term. 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.

5.2.3 Transformation

Two transformation sectors will be influenced by the tax: refineries and power generation. Oil refineries will look to the end-use markets for different products and could adjust their internal costing to ensure that, in final sales, those products which have the lowest price elasticities will bear the brunt of the tax. Thus the tax incidence will depend upon the internal economies of refineries. The beneficiary of such possible practices is likely to be residual fuel oil.

Over the longer term the impact of the tax on power generation fuel choices could be significant. There is already a substantial interest in gas use in some Member States and this trend could increase further due to the relative change in the cost of different fuels. With the expected pattern of investments this impact is likely to be strongest towards the end of the 1990s and indeed beyond 2000.

5.2.4 Energy Intensity

The energy intensity of the European economy will continue to decline as the structure of the industrial base changes. The Community's strategy supports the improvement of energy efficiency. Energy efficiency and conservation are reinforced by both the price effect on the level of demand and the clear signal the tax offers to equipment manufacturers to attach greater importance to efficient appliances and equipment.

The direct impact of the tax on primary energy demand is a reduction of some 2.4% below that estimated in the Reference Scenario.

5.2.5 CO2 Emissions

Provisional results [6] regarding emissions suggest that the tax could reduce the Community's (including the new German Länder) estimated increase of some 11% in CO2 emissions over the period 1990-2000 by 25%, contributing almost 3 percentage points towards achievement of the target in reducing total emissions.

(6) At the time of going to print, the analysis has been done only for 8 of the larger Member States

Comparison of "CO2 Tax case" with the "Reference Scenario*"

	1990	2000		%	2005		%
Energy Intensity		Reference	CO2 Tax	Difference	Reference	CO2 Tax	Difference
toe/Million 1985 ECU	285	267	260	- 2.4	249	243	- 2.4

** Belgium, France, Germany, Greece, Italy, Netherlands, Spain and the United Kingdom.*

Comparison of "CO2 Tax case" with the "Reference Scenario*"

Indicators	1990	2000 Reference	2000 CO2 Tax	% Difference	2005 Reference	2005 CO2 Tax	% Difference
CO2 per capita (t of CO2/inhabitant)	8.52	9.24	8.96	- 3.0	9.42	9.11	- 3.2
CO2/GDP (t of CO2/Million 1985 Ecu)	701	638	619	- 3.0	591	572	- 3.2
CO2/Primary Energy (t of CO2/toe)	2.46	2.39	2.38	- 0.7	2.38	2.35	- 0.9

** Belgium, France, Germany, Greece, Italy, Netherlands, Spain and the United Kingdom.*

6

The External Energy Dimension

6.1

Enlargement: Potential Members, Longer-term Candidates

The European Community, having grown from six to twelve Members, again faces the exciting challenge of enlargement. Seven countries have applied for membership: Austria, Cyprus, Finland, Malta, Sweden, Switzerland and Turkey, and others have announced their intention to apply.

Policy on enlargement is currently under discussion at the highest political level. The overall implications are very important. New members would accede to a Community with new characteristics:
• the completion of the Single Market, without internal frontiers;
• the creation of the European Union;
• Economic and Monetary Union and the move to a single currency;
• the introduction of a common foreign and security policy.

Enlargement raises fundamental issues going far beyond the energy sector. Nevertheless this sector will make its contribution to the process. It is against this background that the broad implications for the energy sector of a larger Community are reviewed. The following groupings of countries are adopted for the purpose:
• **EFTA**: Austria, Finland, Iceland, Norway, Sweden and Switzerland;
• **Mediterranean**: Cyprus, Malta and Turkey.

The **EFTA** group of countries, along with the Community, are closely enmeshed in the world economy and the world energy system. Their energy policies essentially work along market lines with no fundamental incompatibilities with basic Community policies. During the negociations for the European Economic Area practically the whole of the Community's energy policies were taken on board by EFTA as part of the "acquis communautaire". As regards the introduction of a more competitive framework, many of the EFTA countries, notably Sweden, Finland and Norway, have introduced measures to liberalise their energy sectors that are very closely in line with recent proposals tabled by the Commission.

EFTA countries are members of the International Energy Agency which plays an important role among industrialised countries in energy security and contingency planning measures. These countries are strongly committed to environmental goals and often provide international energy/environment forums. For example, Community and EFTA positions on climate change at the recent Rio conference went along similar lines.

To move to the **Mediterranean**, the impact on Community energy markets of the accession of Malta and Cyprus, given their size and the fact that they are island economies, is not likely to be significant. Turkey however is a large, populous country in a rapid phase of industrial development and expansion. It imports some 50% of primary energy and its major resource, apart from hydropower, is lignite. Turkey forms a land-bridge with important energy producing neighbours - Iran, Iraq, Syria and the Caucasus. The long-term potential exists for developing trans-continental pipelines from these major suppliers.

The role of the state in the Turkish energy economy is quite substantial, and developments in internal market policy would clearly have far-reaching consequences for the structure of its energy industries. Given its energy structure, with heavy dependence on lignite and pressure for economic growth, environmental initiatives such as the stabilisation objective would probably pose serious difficulties.

EFTA: Energy Balance

Mtoe	1990	2000	2005	% Change 2005/90
Energy Production	179	192	198	0.7
Net Imports	-26	-30	-30	0.9
Gross Energy Consumption				
Solids	13	16	18	2.3
Oil	60	65	68	0.8
Natural gas	11	14	16	2.4
Nuclear	29	25	21	-2.1
Hydro	23	23	23	0
Heat *	0	0	1	5.0
Renewable **	15	19	22	2.5
Total	151	162	168	0.7

* *Geothermal energy.*
** *Mainly biomass.*

6.2

Closer Neighbours

6.2.1 Central and Eastern Europe

These countries are now involved in the process of moving from centrally planned to market-based economies. They are experiencing problems associated with this transition. It is clear that if they are to fit into the Community system, market principles will have to be firmly applied in the energy sector to avoid serious distortions in trade and investment. The current negotiations on the European Energy Charter have demonstrated how difficult it is to quickly apply principles such as protection of investments, open access, transit, etc. in countries undergoing such a radical process of change. One should not underestimate the difficulties that the adoption of legal principles in the shape of the "acquis communautaire" could raise for these economies.

There will be benefits in energy efficiency and security of supply as these countries progressively link their energy systems to western countries but this is likely to be a long-term process. Generally these countries are large net importers of energy. On security grounds they will probably try to diversify their suppliers and energy composition as their economic situation improves.

Under their previous economic and industrial system, most East European countries were prodigious users of energy, enormous social and environmental costs often being simply ignored. It has not been possible to quantify these costs: it is clear that the damage will take a long time to put right but there is fortunately substantial potential for environmental improvement during the restructuring process.

The new democracies of Central and Eastern Europe have a different immediate priority list and are looking to their Community partners for finance in solving such problems. This may be particularly acute in the area of nuclear energy where the public is highly sensitive to the use of reactors in East and Central Europe which do not meet Western safety standards. On the other hand there are no immediate supply alternatives available for the countries concerned.

The Community is assisting these countries to restructure their economies and make the necessary transition. Underpinning the transition in the energy sector is the European Energy Charter, facilitating the increase of energy trade and cooperation in Europe.

The EC PHARE and TACIS programmes, as they apply in the energy sector, may be seen as instruments to help bring about the objectives of the Charter, in Central and Eastern Europe and the CIS respectively. They aim to help restructure the energy economies of the beneficiary countries by way of studies, training, and institution building - in short, the transfer of know-how.

Electricity demand is set to grow strongly beyond 1995, creating two common needs for the countries in Eastern Europe:

- firstly for investment in plants, whether to radically upgrade the environmental performance of existing fossil fuel plants; to improve safety mechanisms in those nuclear plants which are deemed safe and efficient enough to be retained; or to build entirely new plant where existing capacities are insufficient to meet demand.

• secondly, investments are required to strengthen and improve existing distribution and transmission networks in order to improve quality of supply.

6.2.2 North Africa

This region, stretching from Morocco to Egypt, today has a population in the order of 116 million. Growing at a rate of 2.2% p.a., this will reach 160 Million by 2005.

Primary energy demand, reflecting growth in population and in per capita consumption (from 0.8 toe per head in 1990 to 0.9 tonnes in 2005) will increase from 88 to 150 mtoe at the end of the period - an average rate of increase of 3.6% p.a. Electricity production will grow at similar rates, responding to a final demand increase of almost 4% p.a. The increased demand for inputs to power generation will largely be met by gas.

Oil production grows steadily at 1.5% p.a. with exports of crude and products growing at 1.4% p.a.. Gas production however grows more quickly, at 3.7 p.a. but consumption is set to increase at an average rate of 6%. Exports of gas could remain constant or indeed decline from today's level of 24 to 20 mtoe by 2005.

CO_2 emissions grow at 3.6% p.a., rising from 188 to 320 Mt of CO_2 over the period. Per capita emissions remain low (1.6 tonnes per head in 1990 - rising to 2.0 tonnes in 2005).

6.2.3 The former Sovier Union

Current statistical sources are not sufficiently robust to permit a distinction between the different republics of the former Soviet Union. Consequently the analysis which follows refers to this geographical area and does not distinguish between the republics of the Commonwealth of Independent States, the Baltic republics, and Georgia (7).

Primary energy demand growth over the period 1990 to 2005 is forecasted to average 1% p.a. . However up to 1995, it may decline at some

(7) A detailed Energy Map of the entire region is attached to this special issue, as a source of the latest available information. The map further supports the special feature "Focus on the East", which appears in Energy in Europe, n° 19, July 1992.

Central and Eastern Europe: Energy Balance

	1990	Mtoe 2000	2005	% Change 2005/90
Energy Production	258	244	243	-0.4
Net Imports	107	132	172	3.2
Gross Energy Consumption				
Solids	179	146	144	-1.4
Oil	88	84	88	0.0
Natural gas	72	118	154	5.2
Nuclear	15	13	13	-0.7
Hydro	4	4	4	0.1
Heat *	0	0	0	0.0
Renewable **	5	8	9	3.7
Total	366	376	415	0.9

* *Geothermal energy.*
** *Mainly biomass.*

• A reduction of high dependency on coal; doubling of gas consumption;
• Eastern Europe will remain a large market for oil. Imports of oil and gas could become more diversified, for example, gas could also come from Iran via a pipeline through Turkey.
• Oil demand will be driven by transportation fuel needs. Car ownership is expected to grow rapidly in the time-horizon 2000-2005, reflecting the increasing purchasing power of the population.
• Nuclear is a key uncertainty after Chernobyl; nuclear programmes are already under review

North Africa: Energy Balance

	1990	Mtoe 2000	2005	% Change 2005/90
Energy Production	239	293	325	2.1
Net Imports	-151	-165	-175	1.0
Gross Energy Consumption				
Solids	3	4	5	4.5
Oil	51	61	66	1.7
Natural gas	31	58	74	6.0
Nuclear	-	-	-	-
Hydro	1	1	1	2.7
Heat *	-	-	-	-
Renewable **	3	3	4	2.0
Total	88	127	150	3.6

* *Geothermal energy.*
** *Mainly biomass.*

Former USSR: Energy Balance

	Mtoe			% Change
	1990	2000	2005	2005/90
Energy Production	1586	1715	2042	1.7
Net Imports	-227	-346	-461	4.8
Gross Energy Consumption				
Solids	278	202	206	-2.0
Oil	415	394	411	-0.1
Natural gas	567	680	866	2.9
Nuclear	55	51	51	-0.5
Hydro	21	21	23	0.7
Heat *	-	-	-	-
Renewable **	25	24	27	0.5
Total	359	1369	1581	1.0

* *Geothermal energy.*
** *Mainly biomass.*

Primary Energy Demand by World Region

	1990		2005	
	Mtoe	% Shares	Mtoe	% Shares
European Community	1226	15	1461	13
EFTA	151	2	168	2
USA	1934	23	2267	20
Japan	433	5	560	5
Rest of OECD	367	4	479	4
OECD	4112	50	4935	44
Former USSR	1359	16	1581	14
Central and Eastern Europe	366	4	415	4
SUM	1724	21	1996	18
Méditerranean	3	0	4	0
North Africa	88	1	150	1
Other Africa	254	3	354	3
Middle East	213	3	365	3
China	713	9	1250	11
Other Asia	717	9	1349	12
Latin America	472	6	739	7
Developing World	2459	30	4210	38
WORLD	8295	100	11141	100

1.5% p.a. with growth resuming after the mid years (under 2% p.a.), and a stronger increase after 2000 (3% p.a.).

Crude oil exports are expected to decline steadily during the 1990s, recovering again after 2000; from 105 mtoe in 1990 to around 25 mtoe in 1995 and 2000. By 2005, they could double to 50 mtoe. Exports of oil products are expected to remain at current levels.

Power generation follows a similar pattern to primary energy demand - declining to 1995 at almost 4% p.a., reversal of this trend by the mid 1990s, and growth of about 2.6% p.a. to 2000, with accelerated growth from 2000 of 4.5% p.a. at least to 2005.

6.3

The Global Picture

Detailed balance sheets for each of the main world regions are presented in the accompanying analysis. World primary energy demand increases by 2% p.a., with corresponding increases of 1.8% in CO_2 emissions.

Growth in consumption in industrialised countries is estimated at about 1% p.a., only half the world average. Developing countries are growing faster with for example Asia growing at 4% p.a.

THE 21st CENTURY ENERGY SYSTEM: TO 2050

1 The Search for a New Energy Strategy

Looking to the longer term two strategic issues emerge: that of growing world population and of possible climate change. Both issues have fundamental implications for energy resources. What will be our energy needs up to the middle of the 21st century? What has science to offer and how will this be transformed into technology? How do we organize the institutional framework to deal with problems which are not only complex, but lie so far in the future?

In addressing these questions two scenarios have been developed to better understand the key implications for energy and environment. Responding to these concerns the remainder of the chapter looks to the potential which science and technology could contribute in meeting the enormous challenges ahead.

1.1 *Two Scenarios to 2050*

Two scenarios illustrate the range of possibilities. Today commercial energy consumption is in the order of 8 billion tonnes of oil equivalent. Let us suppose a future where energy efficiency and changes of mix in the energy supply have proved effective: we might then look to a world in 50 years time consuming 13 billion tonnes of oil equivalent, with most of the growth coming from developing countries. But anything like a continuation of existing ways of approaching energy problems would lead us to a world consuming possibly in excess of 20 billion tonnes of oil equivalent.

1.2 *Detail of Scenarios to 2050*

The future may bring stresses, resulting from the quantities of energy needed. Two scenarios have been developed [1] with the object of providing a rough quantitative impression of demand and supply issues.

Total population is assumed to be around 10 billion in 2050. Population growth is greater in developing countries (DEVC) than in the industrialised countries (INDC), which include the OECD group, and the Commonwealth of Independent States and Eastern Europe (CIS/EE). In 1960, DEVC accounted for less than 70% of the total population. Today this proportion has risen to 77%, and by the year 2050 it will probably be between 85% and 90%. It follows that forecasts for the world energy future depend critically on what assumptions are made about future per capita energy demand in developing countries.

It is widely accepted that the slow-down in the growth of world energy demand experienced since 1973 is evidence of a permanent change. In particular, it is a common belief that the average of zero growth in per capita energy demand in the OECD since 1973 reflects a change towards saturation in demand and greater energy efficiency, which will be continued into the future. This belief is not universally accepted, but for some countries it provides the basis for cur-

(1) Professor R. Eden, Professor Emeritus Cambridge University: Notes on the World Energy and Electricity Scene to 2050. Senior Expert Symposium Helsinki 1991. European Commission, International Atomic Energy Agency et al.

rent targets towards reducing the growth in greenhouse gas emissions.

It is possible that per capita energy demand in the industrialised world as a whole may be the same in 2050 as in 1988, namely about 5toe per capita. Such a view is probably within the 'plausibility range' for many energy analysts. We shall also consider a 'targeted efficiency' scenario (TE) in which the per capita demand in the industrialised group is halved by 2050. Such an outcome is probably near the lower end of any range that would be accepted by most energy analysts.

Developing countries face a difficult dilemma due to the conflict between development, which has traditionally led to greater energy demand, and environmental protection, which seeks to limit the use of fossil fuels. Per capita energy demand for the four billion people in the developing group averages 0.5 toe, only one tenth of the average for the industrialised countries. Continuation of the average growth in per capita demand during 1973-88 would lead to a six-fold increase by the year 2050. Such an increase is most unlikely to come about, and for illustration of a high projection, we shall assume instead a threefold increase in per capita energy use for the TG (targeted growth) scenario for the developing group. As a low projection TE (targeted efficiency), we shall assume that average per capita energy demand in the developing world doubles by 2050.

For several decades before the 1973 crisis, world economic growth was nearly the same as the growth in energy demand. Since 1973, economic growth has been nearly 1% p.a. above energy growth, but in the OECD since 1979, this 'efficiency gain' has been around 2% p.a. If this gain could be continued for the OECD and extended to Eastern and Central Europe and the CIS, the industrialised countries could achieve an economic growth per capita of 2% p.a. according to the TG projection.

For the developing countries, targeted growth implies 1.8% p.a. growth in per capita energy demand. It would be in line with past experience for this to be associated with 2% p.a. economic growth per capita, without any radical change towards greater efficiency in energy use.

The TG projection requires an increase in the world energy supply from 7.9 Gtoe in 1988 to 20.5 Gtoe in the year 2050. An illustrative possibility for energy production to meet this need is shown below. In this oil and gas provide 6 Gtoe, and hydro provides another 1 Gtoe.

With new renewables providing a maximum of 3 Gtoe, this leaves 10.5 Gtoe to be provided by coal and nuclear, currently totalling 2.6 Gtoe. From the viewpoint of global resources and technology, this could be achieved by coal production alone, increasing at about 2.5% p.a., which is well within historical rates of growth. However, such rates of growth in the past have generally been associated mainly with indigenous demand in the major producing countries. Transport costs, particularly for the inland transport of coal, would inhibit its use away from the main producing areas. A maximum of 8 Gtoe for coal production is possible, with 2 -3 Gtoe from nuclear power. This only just meets the residual need, and suggests that severe energy stresses would arise in a TG scenario. The latter would also involve a large increase in carbon emissions with consequent increased risk of climate change, and a widespread renewal of growth in nuclear power. At the present time, both these outcomes appear to be widely unacceptable, socially and politically.

It is unlikely that any target below an average of 1 toe for per capita energy use in developing countries would be acceptable, even under circumstances of extreme environmental concern. With such a low target, equity would demand also that there should be a targeted reduction for the industrialised countries, for example to one

Target growth energy demand (TG)

	Per capita (toe)		Total demand (Gtoe)	
	1988	2050	1988	2050
OECD	5.2	5.2	4.0	4.6
SUEE	4.4	4.4	1.9	2.1
DEVC	0.5	1.5	2.0	13.8
World	1.5	2.0	7.9	20.5

Targeted growth energy supply (TG)

World energy (Gtoe)	1988	2050
Oil	3.1	3.0
Gas	1.7	3.0
Hydro	0.5	1.0
New renewables	-	3.0
Coal	2.2	8.0
Nuclear	0.4	2.5
World	7.9	20.5

half of current levels, giving an average of 2.6 toe in the OECD and 2.2 toe in the CIS/EE area. The targeted efficiency future assumes that this level is achieved by 2050.

With unchanged population projections, the TE future leads to world energy demand in 2050 equivalent to 12.6 Gtoe, or 60% above the level in 1988.

With a TE future, the preferred fuels oil and gas and hydro could provide 7 Gtoe. The remaining requirement of 5.6 Gtoe could be provided entirely by increasing coal production, and indeed this might be the least cost option. With such a choice, carbon emissions would be nearly twice current levels.

Even with reluctance to use coal, it is unlikely that coal production for the TE future in 2050 would be less than 3 Gtoe, since coal is a major resource for future growth in key developing countries, notably China and India. It is also likely to remain an important component for energy production in the USA and the CIS. With plentiful coal supplies, there would be less incentive for developing new renewables, and the option of phasing out nuclear power could be readopted without severe stresses on energy supplies. The stresses in the TE scenario are more likely to arise from failure to reach targeted reductions in per capita energy demand on an equitable basis in the industrialised countries, and from unequal growth in developing countries.

Target efficiency energy demand (TE)

	Per capita (toe)		Total demand (Gtoe)	
	1988	2050	1988	2050
OECD	5.2	2.6	4.0	2.3
CIS/EE	4.4	2.2	1.9	1.1
DEVC	0.5	1.0	2.0	9.2
World	1.5	1.2	7.9	12.6

Targeted efficiency energy supply (TE)

World energy (Gtoe)	1988	2050
Oil	3.1	3.0
Gas	1.7	3.0
Hydro	0.5	1.0
New renewables	-	0.5-1.5
Coal	2.2	3.0-5.0
Nuclear	0.4	0.1-1.5
World	7.9	10.6-15.0

1.3

Resulting Policy Questions

Energy Issues

In both projections - targeted growth and targeted efficiency - there are strong underlying assumptions that energy efficiencies will be improved. Targeted growth requires the industrialised countries (OECD, Eastern Europe and the former Soviet Union) to reduce their energy intensities throughout the period to 2050, at least as fast as the average for the OECD in the 1970s and 1980s. Targeted efficiency requires an additional 1% p.a. better improvement in energy intensities than with targeted growth.

Investment

Improved efficiencies in energy and electricity production and use would require early retirement of capital stock, particularly in industrialised countries. Faster growth in developing countries should generate improved efficiencies provided it is adequately supported by technology transfer. Substantial investment would be required for electricity system improvements, and for all end uses of energy and electricity.

Nuclear power and new renewables

With targeted growth, it is difficult to see how a plausible world energy balance can be derived without inclusion of nuclear power. If nuclear power continues to be viewed in many countries as an unacceptable option, the need for new renewable energy sources (wind, biomass, solar, other) will become more urgent, and improved energy use efficiencies indeed essential.

Flexibility

It is not possible to foresee the full range of needs that require energy, including electricity in the future, nor the full range of options for meeting them. Single or simple solutions to meet these needs may be frustrated or aided by change in perceptions, new technologies, or a changing climate. It would seem prudent to seek flexibility by retaining the widest possible variety of options from which to match future energy needs and changing perceptions to acceptable sources of supply. A decision to close off one option means that its potential contribution must be met by other options. Policy decisions on the development of transformation technologies, taken during the next decade, will determine which options will be available to make significant contributions to electricity supply during the next half century.

Global warming issues

The TG energy scenario would probably not be feasible unless there is a revived acceptability of nuclear power, leading to a substantial contribution from this source to world energy supply by the year 2050, and a similar contribution from new renewables. If together, these sources were to provide 5.5 Gtoe p.a. in 2050, there would still remain a need for 8 Gtoe from coal.

The TG future would therefore mean that global carbon emissions from use of fossil fuels would increase from 6 GtC today to 13 GtC in 2050. The result for CO2 concentrations in the atmosphere would be an increase from 350 ppmv today to more than 500 ppmv in 2050.

The outcome as regards the TE future is more uncertain since it depends on the options chosen to meet 5.6 Gtoe of demand in 2050 from coal, nuclear, or new renewables. A number of important energy and climate warming policy questions emerge from an analysis of the two scenarios.

1.4

Confronting a fundamental clash of objectives

A future delimited by the higher scenario would bring energy stresses that would be particularly severe for those developing countries that do not have indigenous energy resources. Even with constant per capita energy use in industrialised countries, this coupled with continuing economic growth implies the ability to pay higher prices for convenient sources of energy, meaning that gas and oil for example could be traded at higher prices.

Some developing countries will find their economic growth limited both by their inability to pay for energy imports and by problems in adopting innovative technologies and sources of energy. Investment capital will remain a particular problem. Globally higher energy growth (the upper range) would probably not be feasible unless acceptability of nuclear power revives, leading to a substantial nuclear contribution to world energy supply by the year 2050. A substantial increase in the use of coal would also be essential with a corresponding increase in global carbon emissions.

An unresolvable problem?

The conceivable increases in energy efficiency will be offset by growth in population and per capita energy consumption in developing countries. Our own efforts in Europe to reduce CO2 emissions will be dwarfed by the increase in developing countries. The leading question is: how do we get onto a sustainable growth path which meets the social and economic aspirations of the world's peoples for higher welfare, while at the same time meeting the concern for a cleaner environment and avoiding the dangers of global warming? To speak of sustainable development means meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.

1.5

The need for new energy thinking

So far we have been approaching a strategic problem with tactical solutions. The "add on to the tail-pipe" approach will yield some results: greater efficiencies could yield more positive results than we imagine today, and fuel substitution can take place. These and other actions can put us on the right road, but we shall still be only at the beginning of a longer journey.

If we wish to develop an energy system which is compatible with the welfare aspirations of people and also with the environmental imperative we must look elsewhere for longer term strategies. The answer lies in the possibilities of scientific enquiry and resulting technological developments of these scientific possibilities.

2

TECHNOLOGY: OPTIONS FOR THE FUTURE

Two experts [(2)] were invited to prepare a "think piece" on future technological developments that would be:

- scientifically possible
- technologically feasible

(2) H.H. Rogner and F. E. K. Britton: Energy, Growth and the Environment: Towards a Framework for an Energy Strategy, EcoPlan International for DG XVII, December 1991.

• requiring no discontinuities over the coming decades; and
• would meet the energy needs of a world population of some 10 billion people by the mid 21st century.

Their basic ideas are reflected in the following sections.

These provide a brief overview of the main energy sources and technology options available to produce the fuels needed to support the 21st century energy system and cover fossil fuels, nuclear energy, renewables, and hydrogen.

2.1

Coal

Coal will further retreat from decentralised uses in the industrial and commercial sectors. Electricity and district heat production may remain a domain for coal as long as regional-scale environmental disturbances can be avoided. Add-on scrubber and catalytic conversion technologies have demonstrated that coal combustion processes can be adequately cleaned up and that smog and sulphur dioxide emissions can thus largely be avoided.

Perhaps with the exception of CO2 removal, coal-fired electricity and cogeneration production capacity of the 21st century will not rely on scrubbers and similar abatement technologies. Rather, stripping pyrolytic sulphur and other impurities from high sulphur coals will occur during the benefaction stage prior to combustion.

The low sulphur coal would then be burnt in pressurised fluidised-bed combustors (PFC) or integrated coal-gasification combined cycle (IGCC) systems.

Several other new coal conversion technologies also crack coal into its major elemental components, carbon and hydrogen, before any further processing occurs. As with IGCC plants, the synthesis gas can be used either for electricity and/or heat generation, hydrogen production, or for further chemical processing and synthesis of methane (CH4) or methanol (CH3OH). Although substantially cleaner on a regional scale, these approaches do not reduce CO2 emissions beyond those resulting from the efficiency improvements.

Work is in progress to design and develop processes which would produce separate streams of pure hydrocarbon and CO2 or pure carbon.

Electrochemical processes including gasification and/or hydrogenation with the activation energy for the reaction coming from electricity offer one possibility for the pure CO2 approach.

These and similar processes are in an early design stage and are currently far from technological feasibility. Still, over the coming few decades such processes may well reach engineering maturity and thus maintain a window for coal use throughout the 21st century.

From a global perspective coal and other fossil fuel resources are still plentiful. Applying a less restrictive reserve concept, the physical availabilities of fossil energy resources are unlikely to emerge as the limiting factor during most of the 21st century.

Over the next century, the contribution of fossil fuels to total energy supplies will largely depend on ability to meet energy service demands in an environmentally acceptable way. Cleanness, comfort and quality of service, rather than simple availability, will become the benchmarks for coal and other fossil fuels.

2.2

Oil

From a global perspective, oil will remain a leading energy source up to the middle of the 21st century. The attractive properties of oil and its products are storability, transportability, high energy density by volume and weight, as well as versatility of use. Moveover, the relatively low investments required in infrastructure and end-use technology make it an attractive option for the growing energy needs of many developing and newly industrialised countries.

The long-term future of oil in the industrialised world will be highly dependent on a number of demand-side factors:

• the capacity of the automotive industry to decrease automotive consumption further and to develop improved technical solutions to meet local air quality standards;
• the ability of the oil industry to develop cleaner fuels;
• the development and improvement of new generations of car technologies based on electrochemical conversion, such as batteries and fuel

cells, the latter fuelled by hydrogen. This of course will require safe and economical hydrogen production lines and infrastructures;
• consumer choices between old and new transport arrangements and technologies.

The next fifty years will see the emergence of different settlement and workplace structures which will lead to major changes in transport patterns. In part, these changes are an integral part of the approaching post-industrial macro-economic structure, as well as the result of the growing impact of innovative information and communication technologies.

The potential oil markets of the future will increasingly be linked to the transport and chemical feedstock sectors. In both sectors oil is difficult to replace in the medium term. Electric transport will be improved along new lines: in the early stages battery power will be important, but in the longer term hydrogen and fuel cells could be developed.

Looking at the supply side, crude oil is certainly a finite resource but not all of the world's reserves have yet been located. In addition to 135 billion tonnes of proven reserves, there is thought to be about the same amount in the uncertain or yet-to-be-found categories. In the long term, operating experience and technology development will allow more oil to be recovered than originally thought likely. Conventional crude oil could last for at least 80 years even at current rates of consumption.

In addition, unconventional resources such as heavy oil, bitumen, and shale oil are thought to amount to over 700 billion tonnes. Based on a recovery rate of 15% these sources could add yet another 40 years to the world's reserves of crude oil.

Heavy oil is similar to the vacuum residue produced from conventional refining. Current options for using heavy oil are therefore similar to those for refinery residues, viz:

• upgrading to syncrude for use in existing refineries;
• full upgrading to transport-grade fuels;
• power generation both in conventional and in advanced combined cycle power stations in competition with coal.

One of the barriers to heavy oil as a source of motor fuel is the relatively large amount of hydrogen which needs to be added to produce a suitable liquid product. New methods of generating hydrogen more cheaply from natural gas or other sources could improve the economics significantly. Advances in catalysis which use hydrogen more efficiently in the process (e.g. producing less by-product gas. which is rich in hydrogen) or reduce the severity of the operating conditions required could also reduce costs. An ideal would be a gas/heavy oil processing facility which produced liquid fuels by direct combination of hydrogen-rich methane with hydrogen-deficient heavy oil.

On the assumption that energy prices do not rise significantly in real terms, it would be uneconomic to use non-hydrocarbon sources of heat such as nuclear power to convert heavy oil into light products, because of the huge capital requirements. However, the cost equation could change dramatically, if the heat were be provided by new very efficient high temperature nuclear reactors.

In a nutshell, this examination of heavy oil leads us to conclude that:

• large reserves of hydrocarbons are as yet unexploited and these will provide a low-cost route to heat for the world for many years to come;
• barriers to application are economic, not technological. Once the economics become favourable, and given a restriction on light oil supplies, there are almost no technological barriers to the exploitation of heavy oil.

2.3 Natural gas

The resource base of natural gas is large. Advances in the geosciences over past decades have led to a better understanding of the magnitude of natural gas resources. The greater depth of most gas reserves requires different and more advanced drilling techniques as compared with oil production. By the early 21st century these technologies will have matured, and as the disassociation of gas from oil progresses, productivity will increase so as to make the production of methane from fields other than conventional oil domains a commercially viable undertaking.

Furthermore, gas has repeatedly been found in unlikely places. This suggests significantly that gas is more widely distributed geographically than was traditionally thought to be the case.

Natural gas exists as both "free" natural gas in reservoirs, and below ocean depths and permafrost as solid gas hydrates (methane inside a cage of water molecules, CH4.6H20). Gas hydrates are the largest potential source of natural gas but are normally excluded from gas reserves. The largest reserves are in the Arctic regions of Russia, Canada and the USA. Other deposits exist in the Gulf of Mexico, Black Sea, Caspian Sea and Peru Trough. Estimates of the extent of the hydrates vary enormously but the data suggests that they may amount to over ten times the reserves of conventional natural gas.

No commercial processes currently exist to exploit these reserves. Heating, depressurisation and adding an antifreezing agent have all been considered. Gas hydrates are a fascinating subject for scientists and technicians but, some suggest, are unlikely to be a significant source of natural gas until well into the next century.

2.4

Nuclear power

Higher energy growth will probably not be feasible in the long term unless acceptability of nuclear power revives. The option of using nuclear, which will not be limited by its resource basis, should be kept open.

A certain revisiting of nuclear energy is already underway. Several second generation reactor concepts have been tested successfully. These designs avoid engineered safety systems open to many modes of failure, and rely instead on safety without human intervention. Some designs withstand failures such as a total loss of coolant which is considered as a worst case malfunction.

In addition, the new designs seem to have abandoned the "bigger is cheaper" principle. The reactor unit sizes are smaller. However, although smaller in size than the present generation, these new reactors offer higher thermodynamic performance and fuel cycle flexibility.

The reasons for the declining level of public consensus about the future role of nuclear power must be addressed and resolved. Four areas are of importance: improvement of operational safety, safe disposal of nuclear wastes including the decommissioning of currently operating reactors, the risks associated with a plutonium economy and the long-term human effects of low-level radiation.

If nuclear power is to live up to the nuclear community's expectations, two pillar technologies must mature over the next several decades: the breeder reactor and spent fuel reprocessing. Without these two concepts, the nuclear industry will operate on a once-through, throwaway fuel cycle which results in a continuous build-up of irradiated fuel elements thus aggravating the waste disposal problem.

Breeder reactors produce more fissile atoms than they consume by converting non-fissile (unenriched) uranium into fissile plutonium. Uranium utilization theoretically increases by a factor of 100 as compared to present conversion practice. However, reprocessing is a necessary prerequisite for the use of the breeding concept. A long-term energy strategy relying on nuclear fission, therefore, is likely to include breeder reactors, either for fuel independence and optimisation or for waste disposal reasons.

Fundamentally different applications could emerge from the use of high temperature reactors. First, there is the high temperature process heat market in the chemical and metallurgical industries. A second market is the upgrading of high carbon containing fossil fuels such as coal, tar sands or shale oil to gaseous or liquid hydrocarbons. Conventional fossil fuel upgrading, say of coal, decomposes coal into its chemical constituents hydrogen and carbon monoxide (synthesis gas). The energy (process heat) required for this process comes from the partial combustion of coal. This heat can be supplied externally from non-fossil sources such as the high temperature reactor.

Similarly, nuclear process heat can be used for steam methane reforming (SMR). Methane is the major component of natural gas. Conventional SMR using natural gas as a heat source and chemical feedstock is presently the predominant route for hydrogen production world-wide.

District heat and low temperature heat supply could also become future markets for nuclear energy, either through cogeneration or dedicated low temperature heating reactors.

Finally, there is nuclear fusion. Fusion releases energy by uniting atoms rather than by splitting them. A fusion reaction is inherently safe. Indeed one of the "pleasant surprises" would be for fusion technology to prove commercially viable earlier than currently expected - meaning in the first half of the coming century.

2.5

Renewables

Not only is the main potential of renewables definitely capable of development in the long term, but indeed there are several areas in which there is already considerable promise.

Hydraulic and wind sources are unevenly distributed geographically, which limits hydrogen and electricity production from these sources to regions with sufficient hydraulic and wind availability. Since wind-generated electricity represents an intermittent source of energy, hydrogen conversion may help flatten the discontinuities and thus help improve the overall performance of wind converters. One should note, though, that the ever-increasing physical dimensions and accompanying disturbance of hydro power and wind energy projects can cause local environmental concerns to some degree.

An enthusiastic view has been expressed in a recent UN report [3] which suggests that using technology already on the market or at the advanced engineering testing stage, by the middle of the next century renewable sources (including solar, wind, hydro and biomass) could account for 60% of the world's electricity market and 40% of the market for fuels used directly.

The report argues that this could be achieved competitively at energy prices lower than are expected in conventional price forecasts, with the result that CO2 emissions could be reduced 25% relative to 1985 levels, while the world economy might be eight times as large as at present.

In addition to the expected benefits for reducing air pollution and global warming, the authors argue that a "renewables" scenario would:
• improve energy security by increasing fuel supply diversity;
• match social and economic development aspirations in rural areas of the world through the use particularly of biomass;
• the opportunities for growing biomass for energy on degraded land can of themselves provide the incentives and the financing needed to restore such lands.

In the longer term, all renewables are good candidates for cost cuts by organisational learning which is particularly inherent in small plants. The leading principle in terms of size and local conditions should be "appropriate is best".

Renewable energy sources, combined with a system of new technologies, can contribute to a considerable extent to energy requirements in the time horizon beyond 2020. They can also contribute to an energy future which will reconcile the need for economic growth with environmental concerns and energy security, without a significant increase in costs - as compared with conventional fuels - and moreover without fundamental technological breakthroughs.

Alcohol, ethylene, or methanol production from biomass in regions with surplus arable land or forestry may contribute to the supply of transportation fuels. But with world population growing and the enhanced use of fertilizers being under critical review, the diversion of productive agricultural land to energy purposes loses attractiveness. Also, growing plants require large amounts of water. Water itself is becoming a scarce resource and thus could present another limiting factor to energy-designated biomass production.

Direct solar radiation energy is often considered as the ultimate source for electricity and subsequent hydrogen production. Irrespective of the technological concept deployed for solar electricity production, there are fundamental problems which discriminate against solar energy:
• Unsteady energy supply, i.e., low availability and capacity utilization of less than 40% as well as the need for storage and/or back-up capacity;
• Low solar energy densities in the mid-latitudes, in which most of the world's population is located;
• Solar conversion technologies are relatively inefficient. The improvement of conversion efficiency or the reduction in capital cost or both are the critical parameters for closing the cost gap with conventional energy service supplies.

Technologies harvesting solar energy directly fall into two categories: central and decentralised.

Central or solar thermal electricity generating technologies are based on reflective solar collectors that track the sun and concentrate the heat onto a heat exchange fluid. The most promising

(3) Report for the UN Solar Energy Group for Environment and Development "Renewables for Fuels and Electricity" edited by Johansson, Kelly, Reddy and Williams. (To be published as "Renewable Energy: Sources for Fuels and Electricity", by Island Press, USA, Autumn 1992).

concepts to date operate as hybrid systems, i.e., in combination with a fossil back-up system to augment the solar heat as needed.

Decentralised solar technologies include solar panels for low temperature heat generation, usually for space heating or hot water purposes. Because solar heating systems in moderate climate areas still depend on a conventional back-up system or extensive heat storage systems, their future role will depend on adequate passive and active building designs and insulation standards.

Probably the most important solar energy technology, the application of which is independent of scale, is photovoltaic electricity generation. Photovoltaic cells generate electricity with no pollution, noise or moving parts. Because there is no working fluid involved they are independent of water availability and thus ideal to operate in remote sunny and arid locations with minimum maintenance.

It is premature to project which photovoltaic technology will eventually dominate. But over a time horizon of fifty or more years, it seems highly likely that photovoltaics will have positioned themselves as a viable electricity production option. For practical applications under typical conditions efficiencies of 20% to 25% are expected to be reached in the not so distant future. There will be marked regional variations in scale and application.

Transporting hydrogen over large distances is in principle cheaper than electricity transmission. Hydrogen therefore offers not only a storage option for photovoltaic electricity, which is obviously limited in availability to daylight hours, but also provides a link between large-scale remote photovoltaic sites where conditions may favour production costs and the centres of energy use. Moreover, solar hydrogen opens markets other than traditional electric energy services, such as the transportation sector.

In summary, if the relative position of solar technologies in their respective technology life cycles is taken into account, they offer considerable promise for future performance improvements. In particular, this means that present achievements at the laboratory level can be transferred to the field. Solar electricity, combined with its storability as hydrogen, could thus overcome its present disadvantages and be capable of playing an important role in overall energy supply worldwide.

2.6

Along the path to a new Energy System

New energy carriers

Although additional reductions in terms of energy input per unit of energy service generated will in the far-off future be brought about by technologies unknown today, a considerable share over the next several decades will continue to be met from existing sources.

The issue for the future, therefore, is not whether more energy services or economic output can be produced from the same kWh or cubic meter of natural gas. The issue is: how fast and at what cost.

But in spite of the many uncertainties about the deep future, it seems according to the authors of the Ecoplan “think piece”, that the dominant energy sources a century hence will be the complementary pair: hydrogen and electricity.

To a large extent, these sources are mutually reinforcing, up to the point that one can always be the input to, or the output of, the other. Electricity can be produced from hydrogen through fuel cells or through combustion. In turn, hydrogen can be derived from electricity through the electrolysis of water.

This complementarity of hydrogen and electricity is further enhanced by the fact that, unlike electricity, hydrogen can be stored and transported over large distances. Each of these two qualities has major and far-reaching implications.

From an environmental perspective, the greatest advantage of electricity and hydrogen as carriers, versus hydrocarbons, is their cleanliness at the point of energy service production. Electricity has no harmful emissions, hydrogen use generates water as the only by-product.

In the longer run, for most regions the menu of energy sources for the production of hydrogen and electricity could be substantially enriched by solar energy and/or nuclear power, and in certain parts of the world hydro. At the present state of technology development, all three have their limitations.

At a first glance, these difficulties seem of a fundamentally different nature. A closer look, however, reveals one important common factor - technology. At the same time that efforts are under way to improve the efficiency or reduce the investment costs of photovoltaic technology, efforts on a much larger scale are being focused on the development and introduction of second generation nuclear technologies which will be increasingly safe thanks to passive security systems, and beyond those to the possibility of third and even fourth generation nuclear technologies that may ultimately prove capable of leap-frogging many of the limitations that characterise the on-going second generation development work.

The point is that the technology competition is in an early stage and the winner has yet to emerge. No matter which technology "wins", society preference will not be uniform around the globe, but will reflect regional and geographical circumstances.

Unlike the future structure of other segments of the energy system, this picture of the energy service structure possesses a considerable degree of certainty. This certainty is derived from imminent trends or developments which by the mid 21st century will either cause intolerable stresses on sustainability, or more likely will quite simply render the present energy structure obsolete. The more obvious factors are:

- world population growth and rising world demand for energy services;
- the fact that society will be shaped by technologies and associated carriers that provide these services - and less by the sources which produce the carriers;
- increasing environmental pollution moving from regional scale (smog) to the global level (climatic change);
- accelerating depletion of fossil energy sources;
- innovation, technology change and evolving infrastructures.

Electricity and hydrogen

The two energy sources that are likely to have a major role in the far-off future energy system of the mid-21st century are hydrogen and electricity.

Hydrogen and electricity are the only carriers that can, together, meet all energy service requirements and do not contain the carbon atom. In addition, both carriers are truly renewable. Electricity, which may be viewed as an electrical charge separation, returns to a neutral charge when it is used. Hydrogen - by analogy water separation - returns to water when it is used.

It can be anticipated over the period to 2050 that among the most important end-use technologies, we will witness the decline of the internal combustion engine and all other combustion technologies which close their fuel cycle of carbon oxidation through the atmosphere. The carriers hydrogen and electricity will drive the electrochemical energy conversion devices, catalytic energy converters, electric motors and heat pumps of the future.

The fundamental key for the hydrogen and electricity tandem is that they are blind to their sources, i.e., they can be produced from a variety of non-fossil and fossil sources. Today's sources and the technology routes used for hydrogen production are still extremely limited, but the range of future options is very large.

Generating hydrogen and electricity

In a situation where hydrogen and electricity are leading carriers, the legitimate question arises: how will the 21st century energy system go about generating these?

Like electricity, hydrogen can be readily produced from a variety of sources. Thus, both carriers are effectively blind to their sources - and to the manner in which they are produced. This has extremely important implications for the policy framework, giving it great freedom in terms of eventual future developments and uncertainties that put it in sharp contrast to any policy approach which requires picking a specific technology or resource "winner". We refer to this attribute of the proposed target policy frame as its "robustness", connoting both a high degree of independence from any specific outcomes and substantial flexibility to react to changing circumstances.

The reason for this fundamental robustness is that both carriers can be produced in a great variety of ways, including directly from fossil fuels or biomass. Electrolysis allows hydrogen to be generated by any source that produces electricity, including nuclear energy, solar, wind or falling water.

Hydrogen production provides a means of electricity demand management by which designated peak-load electricity capacity could be substantially reduced. This is, of course, an extremely important feature. During off-peak periods electrical energy could be used for hydrogen production causing load levelling - reducing the need for complex flexible electricity rate structures and similar load shifting or clipping efforts.

Electrolytic hydrogen may help pave the way for

In the light of the unknown impacts on global climate of a continued accumulation of CO_2 in the atmosphere, this source flexibility makes the twin carriers hydrogen and electricity the ideal energy policy insurance. Thus, there is no need to embark early on irreversible investment or policy decisions which may foreclose future options.

On the other hand, hydrogen is a relatively dangerous substance:

- It is the lightest of all elements. It is colourless, odourless, tasteless and non-toxic. Consequently, hydrogen escapes detection by human senses. Furthermore, hydrogen does have certain unique properties which must be recognised when handling it. These include a very wide range of inflammability limits in air and oxygen.
- The probability of combustion from a random ignition source is greater for hydrogen leakage into a confined space than it is for other industrial flammable gases or gasoline.
- Also hydrogen penetration through leakage paths such as porous materials, cracked weldings, damaged seals, etc., is higher than for other fuels.

In summary, industry knows the necessity of recognising the unique properties of hydrogen and following the safety codes conscientiously. If hydrogen were to be used on a large scale and distributed through comprehensive networks the overheads and perhaps even the technological feasibility of dealing with the increased hazards could become a limiting factor, at least for a time.

market expansion for energy sources with unsteady or intermittent supply profiles, such as wind power or solar energy. However, the inherent inefficiency of heat-to-electricity conversion limits the overall effectiveness of electrolytic production of hydrogen with the aid of electricity generated from fossil sources.

However other hydrogen production routes can be considered:

- Multi-step thermochemical processes operating at a temperature range of 700-800 degrees C have shown promising hydrogen yields. Attractiveness is usually limited due to the need to use large quantities of toxic chemicals.
- Photolysis uses the energy of incident light and the presence of a photocatalyst to decompose water. The photocatalyst would not be consumed but is fully recycled. Although theoretically intriguing, practical application has yet to demonstrate technical feasibility.
- Finally, photosynthesis within a photochemical fuel cell, in part simulating nature's approach to the production of plant cell material, can be used for hydrogen production. Although a photochemical fuel cell comes closest to nature's energy production, this is a very long shot option and much research needs to be done.

Of all the aforementioned processes, electrolysis could most likely emerge as the dominant hydrogen production method of the 21st century. The complementarity of electricity and hydrogen is compelling.

Any attempt to get a feel for technology in the mid 21st century is necessarily influenced by current technology trends, performance and profiles and clouded by diverging expert opinion. It is not possible to predict with any degree of security what specific types of technology will dominate or what performance profiles will prevail. All we can know with certainty is that the world will continue to witness continuing evolutionary technical change, and periodically, fundamental technology breakthroughs and surprises.

3

Overview and Conclusion

The preceding discussion presents the basic menu of energy supply sources and associated technology options which could be available for the 21st century. The main advantages and disadvantages of each option were briefly sketched. The list of contesting features is certainly incomplete. In particular, technology costs and market prices per unit of energy service production, which eventually will be the main determinant for failure or success, have only been superficially addressed. Looking to technology cost developments is the subject of ongoing work with the Joint Research Centre at Ispra.

It is technology change at the level of energy service production that defines the carriers required, and behind these the sources that produce them. Few people care about energy sources except when disrupted, but more care about energy services.

The transition to a sustainable energy system requires more than just marginal adjustments or the replacement of certain energy sources. The transition must proceed from the level of energy services and end-use technologies.

Efficiency improvements constitute the logical point of departure. Although improvement of existing end-use technologies is an important first step to ease the immediate burden on the environment, it is unlikely that in itself this will lead to a fundamental restructuring of the energy source mix. Long-term sustainability is difficult, if not impossible, to achieve by incrementalism alone.

The long-term policy target for energy system development must be to encourage the transition to energy systems in which the fluxes to and from the system are coherent with nature's fluxes and do not perturb nature's equilibria. Only then will it be possible to provide for economic growth without environmental costs undermining the gains.

The desired energy system must first be developed from end-use technologies and fuel sources. The seemingly more important question as to which sources is not that relevant at this point. Time will tell which sources and which conversion technologies will eventually win. There is no need to rush prematurely to try to decide today.

What is essential is to create a framework whereby a number of potentially competing technologies are encouraged. We must increase our options. We do not need to pick the winner but rather to encourage as many alternatives as we can afford. Widening the choice rather than narrowing it is probably the best strategy to be adopted; even if this means keeping in place fuels which on an initial view seem to be damaging to the environment. Coal is a case in point.

Clean coal technologies are improving. Fluidised bed combustion; or gasification linked with combined cycle generation reduce emissions associated with local and regional air pollution. And, while producing CO2, can do so at much lower levels than done today. This is particularly important as coal is the most widely available source for power generation. It is likely to play a dominant role in electricity production in countries such as China and India.

The most important conclusion of the detailed review of the technical options is that we have the scientific knowledge and resources to develop the technology to provide the services needed. But we must decide to develop and select energy technologies that can lead to sustainable development.

It is essential to :
• know where we want to go in the long run;
• fix the framework which will encourage diversity of energy supply;
• establish robust criteria for "success".

The likelihood of success will be enhance where these criteria :
• are economically compatible in terms of cost effectiveness and finance availability;
• are socially and politically acceptable in terms of people's economic aspirations; and finally
• are acceptable to different regions of the world, allowing regions to work together.

ENVIRONMENT

Environmental issues related to energy production and use emerge on different scales. In addition to local pollution e.g. of particulates, which can normally be tackled straightforwardly as the source is known and can be regulated, there are environmental problems of a regional and global nature. With local pollution problems the concern is more concentrated and there is usually greater willingness to act. Effective action is however not always easy as examples of severe urban air pollution in some southern countries show.

Regional environmental problems like the acid rain issue are more difficult to deal with, as the emissions of SO_2 and NO_x may emanate from sources rather far away, and there may be the problem of transboundary pollution. To the extent that it is necessary to embark on new initiatives in addition to the introduction of cleaner cars, and the reduction of emissions from large combustion plants, which are already taking place, the question arises as to whether for reasons of economic efficiency there would be scope for market-based instruments in addition to regulations. Such instruments could include taxes or tradeable permits, which would leave the decision to abate or not to the polluter, who is of course likely to do so, if this is cheaper than paying the tax or buying the required permits. For the time being, however, there appears to be no need for substantially new reinforced action, other than in places where critical loads are being exceeded. But critical loads and health hazards are precisely those issues which need to be tackled by legislation rather than by relying on economic incentives and mechanisms. Furthermore it is doubtful whether the critical loads concept would justify Community intervention, in the subsidiarity context.

On the contrary, there are global energy-related environmental problems for which it does not matter where emissions occur or where they are avoided and which therefore lend themselves to being tackled with economic instruments. The emission of greenhouse gases, such as CO_2, methane, N_2O etc is such a case. Given the nature of the problem, especially the absence of direct health hazards, economic efficiency suggests that it is in this case preferable to abate emissions where it is cheaper to do so.

Environmental policy in the past seems to have identified one environmental villain after the other, combatting first the pollutant which gave rise to the greatest public concern. In the field of emissions into the air, after the removal of particulates (dust) from flue gases, efforts had been concentrated on sulphur dioxide emissions. At about the same time NO_x emissions had been identified as detrimental to forests and contributing to pollution such as photochemical smog, and several means were introduced for reducing one or the other in a given installation, or indeed for dealing with both at the same time (in power stations for example). However, by using equipment e.g. flue gas desulphurisation, or by adding limestone in fluidised bed combustion, emissions of CO_2 were actually increased through decreasing overall efficiency or through the chemical processes involved.

As far as the main energy-related greenhouse gas CO_2 is concerned, solutions could also emerge which may increase the emissions of other pollutants thus rendering an overall solution more difficult. Examples of this may be very large scale replacement of oil and coal by natural gas, if this were to be produced and transported in a way which allowed large quantities of methane to leak into the atmosphere. Another example could be substitution of biofuels for fossil fuels if the biomass were produced by using large amounts of fertiliser which give rise to N_2O emissions.

There are many interrelations between different pollutants and extracting a maximum amount of one of them out of the energy system may indeed prove to have adverse effects for an overall balanced solution. Moreover, there are pollutants which appear to counterbalance the effects of other emissions into the air. Sulphur emissions seem to be an example where the presence of sulphur aerosols in the atmosphere exerts a countereffect on radiation, so giving rise to some degree of cooling as against global warming caused by greenhouse gases. However, atmospheric lifetimes are an important issue. Whereas CO_2 remains in the atmosphere for some 100 or more years on average, sulphur is washed out of it in a rather short time to be deposited in lakes or soils, or causing other adverse effects.

With all these interrelations, including those where one gas e.g. NO_x is a precursor for a greenhouse gas e.g. ozone, there is a clear need on grounds of economic efficiency for a global view.

A comprehensive strategy encompassing all pollutants and their interrelations is essential in order to arrive at an overall balanced abatement policy.

The Community role with regard to energy and environment

Following the United Nations Conference on Environment and Development in June 1992 in Rio de Janeiro it seems to be generally accepted that the principle of sustainable development needs to be applied with regard to all sectors of our economy, energy included. Sustainable development as well as the challenge of global climate change require substantial and radical alterations in the world's energy production and consumption patterns. Without economic greenhouse gas abatement technologies, long term development away from fossil fuels would be required, representing at present 85% of all energy sources consumed. The environment should become the major constraint of future energy developments.

Even if the Maastricht Treaty on European Union enters into force there will still be no general Energy Chapter in the amended EEC treaty. However through the Single Act and Maastricht process the environmental provisions of the EC treaty have been strengthened in a way directly influencing future energy policy developments.

Article 130r states that "environmental protection requirements shall be a component of the Community's other policies". This formulation highlights the legal requirement to integrate the environmental dimension into energy policy. Such an energy policy would then have to respect the further requirements of Article 130r especially relating to the prudent and rational use of natural resources. This requirement of addressing the environment via energy policy would also be strengthened by the statement in the new Treaty that the "environmental protection requirements must be integrated into the definition and implementation of other Community policies". Furthermore the principle of sustainable development has also been incorporated in the new Treaty, which contains the legally specified aim of dealing with worldwide environmental problems.

Towards sustainability

In March 1992 the Commission presented the Fifth Environmental Programme entitled "Towards Sustainability" translating the above mentioned Treaty provisions into a framework for specific Community Action up to the end of this century.

Five target sectors have been selected for special attention under this programme of which one is ENERGY. These sectors have been chosen because of the significant impacts that they have on the environment and because they have a crucial role to play in the attempt to achieve sustainable development. For the energy sector this means the continued improvement of energy efficiency and the development of strategic technology programmes moving towards a less carbon-intensive structure including, in particular, renewable energies.

Furthermore the Fifth Environmental Programme lays down precise objectives for all major environmental issues, which have to be considered as performance targets for the period up to the year 2000 to indicate directions of development. However, these objectives and targets do not constitute legal commitments but rather performance levels to attain sustainable development.

As regards acidification and air quality it is highlighted that SO_2 and NO_x emissions will most probably exceed the critical loads for certain regions and types of ecosystems in large parts of the Community. Therefore additional SO_2 and NO_x emission reductions are urged, more stringent than the levels fixed in the large combustion plant Directive. As regards volatile organic compounds the target is a 30% reduction (1990 level) in 1999. The overall aim is to avoid critical loads and levels being exceeded.

For the energy sector these targets may translate into the implementation and enforcement of legislation on SO_2, NO_x, lead, particulates and black smoke. Proposals for product standards for coal, fuel oils and residuals may emerge and small combustion plants below 50 MW- th may be covered by legal provisions on emission limits.

As regards climate change, the Community has already agreed to stabilise as a first step its overall CO_2 emissions by the year 2000 at 1990 levels. The relevant proposals have been presented to the Council to achieve this objective. The fifth programme calls for further progressive reductions in 2005 and 2010. Furthermore measures for methane and nitrous oxide limitation are to be identified not later than 1995 and applied.

The objectives on soil and water protection do not give specific indications on detailed constraints that may apply to the energy sector. With regard to waste management the prevention and re-use of waste, including energy recovery, will become a key priority.

For the foreseeable future nuclear installations will continue to be an important source of energy in the Community. Accordingly, a continued effort in nuclear safety and radiation protection, as well as safe arrangements for management of nuclear waste and decommissioning of obsolete plants, is announced in the fifth programme. Up to the year 2000 the updating of existing Community Basic Safety Standards (BSS), the harmonisation of Community nuclear safety requirements, the completion of BSS to include transfers of radioactive waste and a strategic management plan for all radioactive waste are aimed at.

As regards more horizontal measures it is important to know that in order to get energy prices right and to create market-based incentives for environmentally friendly economic behaviour, the Commission foresees increasing recourse to economic and fiscal instruments. The fundamental aim is to internalise external environmental costs.

Ideally, energy consumption in both the commercial and private sectors should be based on full cost energy prices with no subsidies. This seems to be the appropriate approach to get the incentives right for achieving an energy system that provides the energy services required and protects the environment in a balanced way.

This short overview of the medium-term strategic programme on environmental policy actions in the Community indicates continuing pressure on the energy sector via the traditional regulatory instruments as well as through the use of economic and fiscal instruments. The targets and objectives in the fifth programme may be implemented by national or Community legislation and industrial volontary action. The level of intervention will be decided according to the subsidiarity principle.

Climate change

The Council of ministers decided in 1990 to stabilise CO2 emissions in the Community as a whole by the year 2000 at 1990 levels. As a first step the most important greenhouse gas has thus been tackled. With such a short-term objective a signal is given and public perception may be altered.

To achieve this objective a comprehensive strategy was drawn up containing four legal proposals and a political announcement.

The legal proposals are the following :

- a draft framework Directive on the implementation of seven areas of the SAVE programme;
- the proposal for a programme to support the development of renewable energies - ALTENER;
- a draft Directive on the introduction of a Community-wide energy/CO2 tax; and
- a draft Council Decision on the monitoring of CO2 emissions in the Community.

Furthermore, the Commission announced that the next call for tender in the THERMIE programme will cover CO2 limitation technologies as a priority.

The SAVE and ALTENER proposals should reinforce the already existing energy policy objectives of promoting energy efficiency and renewable energies. It is the objective of the draft ALTENER programme to double the share of renewables in the Community's energy balance by the year 2005.

As regards the energy/CO2 (50/50) tax it should by its impact on prices stimulate more efficient use of energy and contribute to a switch to fuels containing less or no carbon. With the exception of renewables, all energies would be taxed including large hydro stations over 10 MW. The tax levels proposed would at the time of introduction translate into: 15.4 ecu/toe gas, 17.6 ecu/toe oil and 19.9 ecu/toe coal.

Most of the OECD-countries other than the USA have taken a CO2 stabilisation or reduction decision. However, the long term effect of successful stabilisation, even into the next century, would still be limited. According to IPCC emission scenarios, cumulative carbon emissions by the year 2100 would be reduced by under 5%, if the emission level of 1990 were to be maintained in the OECD countries until the end of the next century.

In any case, in the absence of strong political action for limiting emissions there would be a tremendous increase due to population and economic growth. The increase would be most pronounced in developing countries, although emission levels per capita are likely to remain rather small.

Energy related emissions of CO2, N2O, NOx, and SO2 worldwide could double by the year 2050 as against 1990 levels; global energy-related methane emissions could increase by half over this period. IPCC has drawn up emission scenarios which result in even higher numbers. Out of the different futures envisaged in the no-deliberate-action case, no scenario (not even among those assuming fairly low population growth) results in a decrease for CO2 and most other greenhouse gas emissions by 2050. And substantial emission reductions are required for stabilising atmospheric concentrations.

The Community (including the ex-GDR) actually emits some 15 % of global energy-related CO2, and whatever action for CO2 stabilisation is taken, its effects can only be limited given the tremendous increase of energy consumption likely in other parts of the world. With world population outside the Community going on to increase substantially and given the sustained pressure to enhance living conditions, the Community share will decrease. This is due in particular to the fact that in the most populated countries like China and India coal is the basis of the energy economy and an increase in energy consumption is most likely to be fed by coal - at least in the absence of specific CO2 measures. Moreover, in their urgent need for economic growth, developing countries might focus on installing additional supply capacities and could neglect aspects of energy efficiency as well as the environment in general. So they might continue to produce and consume energy in a rather inefficient way.

Since for the effects of CO2 it does not matter at all where the emissions are taking place, any reasonable greenhouse strategy has to take into account the substantial potential for the reduction of CO2 (and other greenhouse gases) in developing countries and in Eastern Europe/ ex-USSR. In these countries a unit of CO2 can be abated at much lower costs than in the Community which is presently fairly energy efficient and in addition uses a great deal of low and zero carbon content fuels.

Nevertheless, strong action here in the Community is a prerequisite for others to follow according to their possibilities. Only if the developing world can see that the richer part is also making some effort for solving a global problem, can it reasonably be expected that they take environmental constraints into account when it comes to decisions on their development strategy. There may or may not be a cost associated with deviating from the traditional way of developing an energy economy which is based on using fossil fuels as they are available; it will, however, not be easy to convince poorer people to follow another route for alleviating a problem they do not feel responsible for.

Therefore, in addition to strong action within the Community, support to developing countries seems to be needed for abating CO_2 and especially the transfer of clean and efficient technology is essential.

At the UNCED conference in Rio de Janeiro more than 150 countries and the Community signed the International Climate Change Convention. This convention commits developed nations to return individually or jointly their CO_2 emissions to their 1990 levels. There is no target date when this obligation should be achieved. The overall long-term objective of the Convention is to stabilise atmospheric concentrations of greenhouse gases at a level that would prevent dangerous interference by human activity with the climate system. This objective requires substantial reductions, not stabilisation, of energy related CO_2 and methane emissions. The reporting process foreseen under the Convention will keep global warming for a long period of time in the forefront of policy making.

The adopted Agenda 21 contains recommendations to governments about steps that may be taken in pursuit of sustainable development. The chapter on atmosphere / energy contains notions supporting energy efficient technologies and renewable energies. It calls for fundamental change to bring about sustainable development in the energy sector.

The post-Maastricht and post-Rio situation has given a new impetus to all energy and environment issues. A new form of environmental ethics has developed that will impact not only on policy making but also on company planning and private behaviour. The global environmental problems may require in the long term changes of behaviour and lifestyle; structures may change fundamentally and the dominating fossil energy sources of today may not dominate the second half of the next century. In the Community all these changes will certainly not happen up to the year 2005. However with the pressure from the energy/CO_2 tax and increasingly stringent regulations the first important investment decisions may be taken in this direction.

The IPCC Scientific Assessment of Climate Change

In its 1992 review of work done in 1990, the Intergovernmental Panel on Climate Change (working group I) came to the following conclusions:

- *emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases: carbon dioxide, methane, chlorofluorocarbons, and nitrous oxide;*
- *the evidence from the modelling studies, from observations and the sensitivity analyses indicate that the sensitivity of global mean surface temperature to doubling CO_2 is unlikely to lie outside the range 1.5° to 4.5°C;*
- *there are many uncertainties in our predictions particularly with regard to the timing, magnitude and regional patterns of climate change;*
- *global mean surface temperature has increased by 0.3° to 0.6° C over the last 100 years;*
- *the size of this warming is broadly consistent with predictions of climate models, but it is also of the same magnitude as natural climate variability. Thus the observed increase could be largely due to this natural variability; alternatively this variability and other human factors could have offset a still larger human-induced greenhouse warming;*
- *the unequivocal detection of the enhanced greenhouse effect from observations is not likely for a decade or more; ...*
- *the cooling effect of aerosols resulting from sulphur emissions may have offset a significant part of greenhouse warming in the Northern Hemisphere during the past several decades..."*

The climate change issue is an example of a highly complex, long term, global problem surrounded with uncertainty. It has an important energy dimension, as the energy sector is the largest single contributor to greenhouse gas emissions. Many energy-related gases are involved, including CFCs or their substitutes for use in heat pumps. However, measured by its impact, CO_2 is by far the most important energy-related greenhouse gas. Moreover, response strategies in view of the climate change threat may in turn reshape the energy system, if over time with increasing evidence, present concerns and preoccupations prove to be well-founded.

PRESENTATION OF RESULTS

ANALYSIS

(1) Including the former German Democratic Republic - (2) Excluding the former German Democratic Republic

SOURCES AND METHODS

This presentation of results is in two parts. The first part presents the forecast analysis for several world regions. Given the importance of oil, it also includes a world oil balance in million barrels of oil per day (mbd). In addition, in the light of the current debate on CO2 emissions, this first part presents a summary table and some indicators on these emissions. The second contains the detailed analysis for the European Community and its twelve Member States for a "Reference case"; the consequences of a "Higher Growth case" for four Member States [1] (France, Germany, Italy and the United Kingdom); and the effects of a "CO2 tax" applied to the "Reference case" for eight Member States [1] (Belgium, France, Germany, Greece, Italy, Netherlands, Spain and the United Kingdom).

In the first part, the former German Democratic Republic is included in the European Community data. In the second part, forecasts for the former German Democratic Republic are presented separately and only until 2000. Unless stated, the European Community does not include the former German Democratic Republic.

The World is divided into regions comprising the following countries:

- European Community: Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom;
- EFTA: Austria, Finland, Iceland, Norway, Sweden and Switzerland;
- United States of America
- Japan
- Rest of OECD: Australia, Canada, New Zealand and Turkey;
- Eastern Europe: Albania; Bulgaria, Czechoslovakia, Hungary, Poland, Romania and Yugoslavia;
- Former USSR: Commonwealth of Independent States, Estonia, Georgia, Latvia and Lithuania;
- Mediterranean: Cyprus, Gibraltar and Malta;
- North Africa: Algeria, Egypt, Libya, Morocco and Tunisia;
- Other Africa: all other African countries not included elsewhere;
- Middle East: Bahrain, Israel, Iran, Iraq, Lebanon, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen;
- China
- Other Asia: all other Asian countries not included elsewhere and the pacific islands;
- Latin America: All Central and South American countries.

(1) Results available at time of going to print

1.1

Historical data

Historical data cover the period from 1985 to 1989, or 1990 wherever provisional figures were available. The list of data sources are:

- All European Community and its Member States data were taken from the Statistical Office of the European Communities (SOEC), except for the economic indicators (GDP and population) of the former German Democratic Republic - in this case, estimates provided by the Commission's Directorate General of Economic Affairs (DG II), by the United Nations (UN) and by PLANECON were used, as well as electricity capacity data from the EPIC data base created by ESAP;

- Energy data for all other OECD Countries came from the International Energy Agency (IEA) energy balances; the respective macroeconomic and population data were taken from OECD, UN and IMF statistics;

- All energy data for non-OECD Countries, except Eastern Europe and the former USSR, came from the IEA energy balances; the respective macroeconomic and population data were taken from both UN and IMF statistics.

- All energy data for the Eastern European Countries and the former USSR came from the IEA energy balances with the exception of solid fuels data which were based on PLANECON statistics; the respective macroeconomic and population data were taken from the UN, IMF and PLANECON statistics;

Difficulties in collecting data for non-OECD Countries lead us to advise a degree of caution as regards the data quality in these cases. Thus comparisons between series of absolute values should be regarded as purely indicative.

1.2

Methodology

In developing world energy supply and demand forecasts for each main region, a simple model was used (Mini-World Energy Model). For this model, which is based on the simulation technique, the main input variables are the GDP and Population growth rates and, to a lesser extent, the prices of oil, coal and natural gas.

For the European Community, except four Member States (Denmark, Ireland, Luxembourg and Portugal), the energy demand and supply forecasts for the "Reference case" were analysed in a great detail (up to 2400 variables) using the MIDAS model, which is based on an econometric approach. The above-mentioned four Member States were analysed using much simpler simulation methodology. Two different cases were analysed using the MIDAS model: the "Higher Growth case" (for four Member States - France, Germany, Italy and the United Kingdom); and the "CO2 tax case" (for eight Member States - Belgium, France, Germany, Greece, Italy, the Netherlands, Spain and the United Kingdom).

In the "Reference case", special attention was given to the electricity sector and its capacity investment needs, as well as some indications on the development of the oil refinery sector in each Member State. Some of the most important assumptions are:

• The expansion of electricity generating capacities up to 1995 follows practically that shown by EURELECTRIC in its 1992 annual report; beyond 1995 the expansion of these capacities are DGXVII estimates; the 25% Belgian participation in Chooz 1 and 2 nuclear units was treated as exports of French electricity into Belgium; data concerning these capacities include auto producers whenever possible;

• nuclear generating capacities were decommissioned in Germany after 35 years of life-time, after 30 years in the Netherlands and Spain and between 30 and 35 years in France and the United Kingdom;

• in general, a substantial penetration of renewable energy sources was considered following the Commission's ALTENER programme; the penetration of biofuels in the transport sector was done exogenously and assumed in the range of 1% to 3% of energy demand for road transport between 2000 and 2005; the efficiency to produce these renewable fuels was considered to be 100% and thus primary production equals final demand;

• substantial energy efficiency gains were considered in the industrial sector in line with the Commission's SAVE and THERMIE programmes;

• overall fiscal harmonisation in line with Commission proposal; the assumptions are;

- as of 1.1.1993 all excise taxes currently below the minimum level suggested by the Commission were adapted to minimum level, except if delays have already been announced;
- current excise taxes below the target level suggested by the Commission were increased gradually to attain the target;
- current excise taxes which are equal to the target level suggested by the Commission, maintained that position;
- if the VAT is currently equal or higher than 15%, they were kept at this level, except if any modification has already been announced;
- in the case of Belgium, a special tax on transport fuels has been introduced (following government announcement); but in the "CO2 tax case" this new tax was replaced by the CO2 tax;
- in the case of the Netherlands, a special tax has been introduced after 1993; in the "CO2 tax case" this new tax was partly replaced by the CO2 tax.

1.3

Definitions

Primary hydro-electricity production is considered in terms of net calorific value (1 GWh = 86 Mtoe) and primary nuclear production is calculated in terms of fuel equivalent to produce the same amount of electricity in a power station with a thermal efficiency of 33%.

Biomass data for the OECD Countries (excluding Community Member States) correspond to what the IEA shows in its energy balances under "Other Solid Fuels". Data for all non-OECD Countries correspond to IEA's and UN data under the designation of "Vegetal Fuels". For the Community and according to current SOEC methodology, "Renewable and other" include only the quantities of biomass (mainly urban waste) being used for power generation.

Geothermal is considered as being exclusively used for power generation. Heat shown in the final demand section is exclusively derived from other fuels (power generation and district heating). In the World summary energy balances, "Renewable" input for power generation includes geothermal, biomass and "other renewables".

In the World regional tables, Gross consumption corresponds to the total primary energy consumed including quantities delivered to marine bunkers. Final Energy Consumption (TFEC) does not include quantities used for non-energy purposes.

CO2 emissions are given only on an indicative basis and are calculated using common emission factors by fuel across all countries. CO2 emissions resulting from bunker fuels were not included in the tables.

For the European Community, in particular, the following definitions were used:

• Wind energy for electricity generation is considered in terms of net calorific value (1 GWh = 86 Mtoe) ;

• the efficiency in the electricity production from "Other fuels" is 30% to 40%;

• the efficiency in the electricity production from "geothermal" (such as in Italy) is 14%.

WORLD

ANALYSIS

MACRO ECONOMIC ASSUMPTIONS

GDP	Index (1985 = 100)					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
European Community (1)	100.0	115.8	128.0	145.0	161.4	3.0	2.0	2.5	2.2	2.2
EFTA	100.0	113.5	126.8	144.0	163.5	2.6	2.2	2.6	2.6	2.5
USA	100.0	115.8	125.8	140.6	157.5	3.0	1.7	2.2	2.3	2.1
Japan	100.0	125.3	145.3	171.2	201.3	4.6	3.0	3.3	3.3	3.2
Rest of OECD	100.0	117.8	130.6	147.8	168.9	3.3	2.1	2.5	2.7	2.4
OECD	100.0	117.3	129.7	147.1	166.2	3.2	2.0	2.5	2.5	2.4
Former USSR	100.0	95.7	66.6	85.2	104.7	-0.9	-7.0	5.0	4.2	0.6
Central and Eastern Europe	100.0	99.5	96.0	114.5	134.1	-0.1	-0.7	3.6	3.2	2.0
Mediterranean	100.0	135.3	150.1	169.8	192.2	6.2	2.1	2.5	2.5	2.4
North Africa	100.0	107.4	127.5	155.1	188.7	1.4	3.5	4.0	4.0	3.8
Other Africa	100.0	114.4	133.0	157.8	188.3	2.7	3.1	3.5	3.6	3.4
Middle East	100.0	110.3	131.8	160.3	195.0	2.0	3.6	4.0	4.0	3.9
China	100.0	143.3	196.7	281.1	365.6	7.5	6.5	7.4	5.4	6.4
Other Asia	100.0	138.2	183.2	245.1	328.0	6.7	5.8	6.0	6.0	5.9
Latin America	100.0	108.2	120.6	145.4	175.1	1.6	2.2	3.8	3.8	3.3
WORLD	100.0	116.9	129.5	151.9	177.5	3.2	2.1	3.2	3.2	2.8

POPULATION DEVELOPMENTS

Population	Annual Data					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
European Community (1)	338.0	343.3	349.8	355.2	359.0	0.3	0.4	0.3	0.2	0.3
EFTA	31.7	32.5	32.7	33.0	33.1	0.5	0.2	0.2	0.1	0.1
USA	238.5	250.0	258.8	266.8	274.3	0.9	0.7	0.6	0.6	0.6
Japan	120.8	123.5	126.0	128.5	130.5	0.4	0.4	0.4	0.3	0.4
Rest of OECD	94.5	103.1	111.0	118.1	124.5	1.7	1.5	1.3	1.1	1.3
OECD	*823.5*	*852.3*	*878.3*	*901.7*	*921.4*	*0.7*	*0.6*	*0.5*	*0.4*	*0.5*
Former USSR	277.5	289.3	299.3	309.0	318.6	0.8	0.7	0.6	0.6	0.6
Central and Eastern Europe	121.1	123.7	126.2	128.8	131.2	0.4	0.4	0.4	0.4	0.4
SUM	*398.7*	*413.0*	*425.5*	*437.8*	*449.8*	*0.7*	*0.6*	*0.6*	*0.5*	*0.6*
Mediterranean	1.0	1.1	1.1	1.2	1.2	0.8	0.7	0.6	0.6	0.7
North Africa	100.9	115.9	130.5	145.6	160.9	2.8	2.4	2.2	2.0	2.2
Other Africa	454.8	523.9	611.8	713.7	829.8	2.9	3.2	3.1	3.1	3.1
Middle East	111.6	129.9	148.9	172.3	198.2	3.1	2.8	3.0	2.8	2.9
China	1059.5	1139.4	1222.0	1298.4	1353.2	1.5	1.4	1.2	0.8	1.2
Other Asia	1490.9	1648.1	1838.4	2026.8	2210.5	2.0	2.2	2.0	1.8	2.0
Latin America	401.6	446.6	490.9	535.6	580.1	2.1	1.9	1.8	1.6	1.8
Developing World	*3620.3*	*4004.8*	*4443.7*	*4893.7*	*5333.9*	*2.0*	*2.1*	*1.9*	*1.7*	*1.9*
WORLD	4842.5	5270.1	5747.5	6233.2	6705.1	1.7	1.7	1.6	1.5	1.6

(1) Including the former German Democratic Republic.

INTERNATIONAL FUEL PRICE SCENARIO

	Annual Data					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Crude oil internationally traded										
in 1990 US$/bbl	33.9	21.6	19.0	23.0	28.0	-8.6	-2.5	3.9	4.0	1.7
in 1990 US$/toe	247.4	157.7	138.7	167.9	204.4	-8.6	-2.5	3.9	4.0	1.7
Steam coal internationally traded										
in 1990 US$/tce	61.5	54.3	50.0	52.0	55.0	-2.5	-1.6	0.8	1.1	0.1
in 1990 US$/toe	87.9	77.6	71.4	74.3	78.6	-2.5	-1.6	0.8	1.1	0.1
Natural gas (average cif Europe)										
in 1990 US$/MBTU	4.8	2.8	3.0	3.6	4.2	-10.1	1.4	3.3	3.4	2.7
in 1990 US$/toe	191.3	112.3	120.6	141.7	167.5	-10.1	1.4	3.3	3.4	2.7

WORLD OIL BALANCE

(Million Barrels Per Day)

Oil Consumption	1985	1990	1991	1995	2000	2005	Annual average % change 1991/1985	1995/1991	2000/1995	2005/2000
OECD *	34.7	37.9	38.0	40.8	43.0	44.1	1.5	1.8	1.1	0.5
LDCs	12.7	15.8	16.3	18.0	20.8	23.8	4.2	2.6	2.9	2.7
Former CPEs	12.7	12.4	12.1	11.7	12.8	13.6	-0.8	-0.9	1.8	1.3
Total Non-OECD	25.4	28.2	28.4	29.7	33.6	37.4	1.9	1.2	2.5	2.1
WORLD	60.1	66.1	66.4	70.5	76.7	81.5	1.7	1.5	1.7	1.2
Oil Production	**1985**	**1990**	**1991**	**1995**	**2000**	**2005**	**Difference in mbd 1991/1985**	**1995/1991**	**2000/1995**	**2005/2000**
OECD *	17.1	15.9	16.2	16.4	15.6	14.8	-0.9	0.2	-0.8	-0.8
Non-OPEC LDCs	8.5	10.1	10.3	11.6	14.5	16.9	1.8	1.3	2.9	2.4
Former CPEs	15.0	14.6	13.5	12.2	13.1	14.3	-1.5	-1.3	0.9	1.2
Total Non-OPEC	40.6	40.6	40.0	40.2	43.2	46.0	-0.6	0.2	3.0	2.8
OPEC	17.6	25.1	25.4	28.8	31.8	33.8	7.9	3.4	3.1	2.0
WORLD	58.1	65.6	65.4	69.0	75.1	79.8	7.3	3.6	6.1	4.7
Refinery Gain	1.1	1.4	1.4	1.5	1.6	1.7	0.3	0.1	0.1	0.1
Stock Withdrawals (**)	-0.9	0.9	0.4	0	0	0				
Total WORLD Supply	60.1	66.1	66.4	70.5	76.7	81.5	6.3	4.1	6.2	4.8
For memo: Former CPEs Net Exports	2.3	2.2	1.4	0.5	0.3	0.6	-0.9	-0.9	-0.2	0.3

* Beginning in 1990, including former East Germany

** Negative values indicate a stock draw; includes statistical discrepancy

WORLD PRIMARY ENERGY CONSUMPTION
(In Mtoe)

	Annual Data					Annual Average % Change				Total Change
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
European Community (1)	1146	1226	1307	1405	1461	1.4	1.3	1.5	0.8	19.1
EFTA	142	151	156	162	168	1.2	0.6	0.8	0.7	11.1
USA	1789	1934	2062	2192	2267	1.6	1.3	1.2	0.7	17.2
Japan	367	433	452	510	560	3.4	0.9	2.4	1.9	29.3
Rest of OECD	319	367	401	440	479	2.8	1.8	1.9	1.7	30.5
OECD	3763	4112	4378	4709	4935	1.8	1.3	1.5	0.9	20.0
Former USSR	1277	1359	1259	1369	1581	1.2	-1.5	1.7	2.9	16.4
Central and Eastern Europe	378	366	342	376	415	-0.7	-1.3	1.9	2.0	13.6
SUM	1655	1724	1601	1745	1996	0.8	-1.5	1.7	2.7	15.8
Mediterranean	2	3	3	4	4	8.1	3.1	2.7	2.4	50.0
North Africa	67	88	107	127	150	5.6	3.9	3.6	3.3	69.9
Other Africa	225	254	281	314	354	2.5	2.0	2.3	2.4	39.2
Middle East	195	213	253	306	365	1.8	3.5	3.9	3.6	71.5
China	560	713	849	1042	1250	4.9	3.6	4.2	3.7	75.5
Other Asia	536	717	907	1116	1349	6.0	4.8	4.2	3.9	88.2
Latin America	419	472	531	624	739	2.4	2.4	3.3	3.4	56.7
Developing World	2004	2459	2929	3533	4210	4.2	3.6	3.8	3.6	71.3
WORLD	7422	8295	8908	9986	11141	2.2	1.4	2.3	2.2	34.3

ENERGY CONSUMPTION - SHARES BY REGION
(In % of World total)

	Annual Data				
	1985	1990	1995	2000	2005
European Community (1)	15.4	14.8	14.7	14.1	13.1
EFTA	1.9	1.8	1.7	1.6	1.5
USA	24.1	23.3	23.1	21.9	20.3
Japan	4.9	5.2	5.1	5.1	5.0
Rest of OECD	4.3	4.4	4.5	4.4	4.3
OECD	50.7	49.6	49.1	47.2	44.3
Former USSR	17.2	16.4	14.1	13.7	14.2
Central and Eastern Europe	5.1	4.4	3.8	3.8	3.7
SUM	22.3	20.8	18.0	17.5	17.9
Mediterranean	0.0	0.0	0.0	0.0	0.0
North Africa	0.9	1.1	1.2	1.3	1.3
Other Africa	3.0	3.1	3.1	3.1	3.2
Middle East	2.6	2.6	2.8	3.1	3.3
China	7.5	8.6	9.5	10.4	11.2
Other Asia	7.2	8.6	10.2	11.2	12.1
Latin America	5.6	5.7	6.0	6.2	6.6
Developing World	27.0	29.6	32.9	35.4	37.8
WORLD	100.0	100.0	100.0	100.0	100.0

(1) Including the former German Democratic Republic.

WORLD CO2 EMISSIONS

(in Million tonnes of CO2)

	Annual Data					Annual Average % Change				Total Change
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2000/90
European Community (1)	2952	3042	3175	3375	3494	0.6	0.9	1.2	0.7	10.9
EFTA	233	220	232	243	257	-1.1	1.0	0.9	1.2	10.2
USA	4531	4822	5028	5305	5427	1.3	0.8	1.1	0.5	10.0
Japan	947	1010	1013	1109	1173	1.3	0.1	1.8	1.1	9.8
Rest of OECD	729	791	852	945	1023	1.7	1.5	2.1	1.6	19.4
OECD	9391	9886	10300	10977	11374	1.0	0.8	1.3	0.7	11.0
Former USSR	3255	3370	3019	3297	3831	0.7	-2.2	1.8	3.0	-2.2
Central and Eastern Europe	1166	1055	956	1020	1097	-2.0	-1.9	1.3	1.5	-3.3
SUM	4421	4424	3975	4316	4928	0.0	-2.1	1.7	2.7	-2.4
Mediterranean	5	7	8	9	10	7.4	3.4	2.8	2.4	35.5
North Africa	149	188	228	273	320	4.8	3.9	3.7	3.2	45.3
Other Africa	409	487	551	635	740	3.5	2.5	2.9	3.1	30.3
Middle East	446	462	546	660	782	0.7	3.4	3.8	3.5	42.9
China	1830	2368	2827	3476	4172	5.3	3.6	4.2	3.7	46.8
Other Asia	1144	1558	1942	2311	2704	6.4	4.5	3.5	3.2	48.3
Latin America	754	829	944	1138	1392	1.9	2.6	3.8	4.1	37.4
Developing World	4737	5898	7045	8501	10120	4.5	3.6	3.8	3.5	44.2
WORLD	18549	20208	21320	23795	26423	1.7	1.1	2.2	2.1	17.8

CO2 EMISSIONS - SHARES BY REGION

(in % of World total)

	Annual Data				
	1985	1990	1995	2000	2005
European Community (1)	15.9	15.1	14.9	14.2	13.2
EFTA	1.3	1.1	1.1	1.0	1.0
USA	24.4	23.9	23.6	22.3	20.5
Japan	5.1	5.0	4.8	4.7	4.4
Rest of OECD	3.9	3.9	4.0	4.0	3.9
OECD	50.6	48.9	48.3	46.1	43.0
Former USSR	17.5	16.7	14.2	13.9	14.5
Central and Eastern Europe	6.3	5.2	4.5	4.3	4.2
SUM	23.8	21.9	18.6	18.1	18.7
Mediterranean	0.0	0.0	0.0	0.0	0.0
North Africa	0.8	0.9	1.1	1.1	1.2
Other Africa	2.2	2.4	2.6	2.7	2.8
Middle East	2.4	2.3	2.6	2.8	3.0
China	9.9	11.7	13.3	14.6	15.8
Other Asia	6.2	7.7	9.1	9.7	10.2
Latin America	4.1	4.1	4.4	4.8	5.3
Developing World	25.5	29.2	33.0	35.7	38.3
WORLD	100.0	100.0	100.0	100.0	100.0

(1) Including the former German Democratic Republic.

SUMMARY ENERGY BALANCE AND INDICATORS

WORLD	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	2025	2200	2280	2542	2832	1.7	0.7	2.2	2.2	1.7
Crude oil	2864	3208	3418	3718	3966	2.3	1.3	1.7	1.3	1.4
Natural gas	1426	1672	1863	2195	2620	3.2	2.2	3.3	3.6	3.0
Nuclear	386	517	550	586	616	6.0	1.2	1.3	1.0	1.2
Hydro	175	189	223	267	324	1.6	3.4	3.7	3.9	3.7
Heat (1)	19	25	31	41	51	5.3	4.1	6.0	4.2	4.7
Renewable (2)	505	542	620	718	831	1.4	2.7	3.0	3.0	2.9
Total	7401	8356	8988	10072	11244	2.5	1.5	2.3	2.2	2.0
Gross Consumption										
Solids	2028	2215	2280	2542	2831	1.8	0.6	2.2	2.2	1.6
Oil (3)	2889	3133	3341	3633	3862	1.6	1.3	1.7	1.2	1.4
Natural gas	1419	1672	1863	2195	2620	3.3	2.2	3.3	3.6	3.0
Nuclear	386	517	550	586	616	6.0	1.2	1.3	1.0	1.2
Hydro	175	189	223	267	324	1.5	3.4	3.7	3.9	3.7
Heat (1)	20	25	31	41	51	5.2	4.1	6.0	4.2	4.7
Renewable (2)	505	542	620	718	831	1.4	2.7	3.0	3.0	2.9
Total	7422	8295	8908	9986	11141	2.2	1.4	2.3	2.2	2.0
Power Generation										
Output in TWh										
Nuclear	*1482*	*1985*	*2109*	*2249*	*2365*	*6.0*	*1.2*	*1.3*	*1.0*	*1.2*
Hydro	*2032*	*2197*	*2591*	*3108*	*3766*	*1.6*	*3.4*	*3.7*	*3.9*	*3.7*
Thermal	*6312*	*7424*	*8175*	*9880*	*11826*	*3.3*	*1.9*	*3.9*	*3.7*	*3.2*
Total	*9826*	*11606*	*12875*	*15236*	*17958*	*3.4*	*2.1*	*3.4*	*3.3*	*3.0*
Inputs										
Solids	987	1128	1202	1397	1628	2.7	1.3	3.1	3.1	2.5
Oil (3)	335	313	279	267	257	-1.3	-2.3	-0.9	-0.7	-1.3
Gas (4)	353	472	547	758	1003	6.0	3.0	6.7	5.8	5.2
Nuclear	386	517	550	586	616	6.0	1.2	1.3	1.0	1.2
Hydro	175	189	223	267	324	1.6	3.4	3.7	3.9	3.7
Heat (1)	19	25	31	41	51	5.3	4.1	6.0	4.2	4.7
Renewable (2)	18	17	16	20	25	-0.9	-0.8	3.9	5.0	2.7
Total	2274	2662	2847	3336	3904	3.2	1.4	3.2	3.2	2.6
Final Energy Consumption										
Solids	859	912	887	924	951	1.2	-0.6	0.8	0.6	0.3
Oil (3)	2101	2235	2404	2642	2815	1.2	1.5	1.9	1.3	1.6
Gas (4)	875	979	1080	1172	1321	2.3	2.0	1.7	2.4	2.0
Electricity	698	832	936	1112	1315	3.6	2.4	3.5	3.4	3.1
Heat (5)	164	177	166	191	234	1.4	-1.2	2.9	4.1	1.9
Renewable (2)	470	493	570	671	787	1.0	3.0	3.3	3.2	3.2
Total	5168	5627	6043	6713	7423	1.7	1.4	2.1	2.0	1.9
CO2 Emissions in Mt of CO2	18316	20093	21223	23703	26334	1.9	1.1	2.2	2.1	1.8
Indicators										
Population in Millions	4842	5270	5748	6233	6705	1.7	1.7	1.6	1.5	1.6
GDP Index (1985 = 100)	100	117	129	152	178	3.2	2.1	3.2	3.2	2.8
Gross Consump/GDP (6)	458	438	425	406	387	-0.9	-0.6	-0.9	-0.9	-0.8
Gross Consump/capita (7)	1.53	1.57	1.55	1.60	1.66	0.5	-0.3	0.7	0.7	0.4
Electricity/capita (8)	2029	2202	2240	2444	2678	1.6	0.3	1.8	1.8	1.3
CO2 emissions/capita (9)	3.78	3.81	3.69	3.80	3.93	0.2	-0.6	0.6	0.6	0.2

(1) Geothermal energy.
(2) Mainly biomass.
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(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

OECD	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	842	910	897	918	954	1.6	-0.3	0.5	0.8	0.3
Crude oil	817	754	777	739	701	-1.6	0.6	-1.0	-1.0	-0.5
Natural gas	626	683	739	786	831	1.8	1.6	1.2	1.1	1.3
Nuclear	317	419	449	476	496	5.7	1.4	1.2	0.8	1.1
Hydro	98	98	115	133	156	0.1	3.2	3.0	3.2	3.1
Heat (1)	13	15	18	24	29	3.4	3.7	6.4	3.4	4.5
Renewable (2)	105	102	110	122	137	-0.5	1.5	2.1	2.4	2.0
Total	2817	2983	3110	3204	3309	1.2	0.8	0.6	0.6	0.7
Net Imports										
Solids	22	18	11	31	24	-3.3	-9.6	23.0	-4.9	1.9
Crude oil	694	933	1036	1165	1249	6.1	2.1	2.4	1.4	2.0
Oil products	112	109	97	114	119	-0.5	-2.1	3.3	0.8	0.6
Total oil	805	1041	1134	1279	1368	5.3	1.7	2.4	1.3	1.8
Natural gas	80	115	122	192	229	7.5	1.2	9.6	3.6	4.7
Electricity	-3	1	1	2	4	0.0	0.2	24.1	11.7	11.6
Total	904	1175	1268	1505	1626	5.4	1.5	3.5	1.6	2.2
Gross Consumption										
Solids	887	913	908	949	978	0.6	-0.1	0.9	0.6	0.5
Oil (3)	1633	1783	1916	2023	2073	1.8	1.5	1.1	0.5	1.0
Natural gas	710	782	861	979	1061	1.9	2.0	2.6	1.6	2.1
Nuclear	317	419	449	476	496	5.8	1.4	1.2	0.8	1.1
Hydro	98	98	115	133	156	0.1	3.2	3.0	3.2	3.1
Heat (1)	13	15	18	24	29	3.3	3.7	6.4	3.4	4.5
Renewable (2)	105	102	110	122	137	-0.6	1.5	2.1	2.4	2.0
Total	3763	4112	4378	4709	4935	1.8	1.3	1.5	0.9	1.2
Power Generation										
Output in TWh										
Nuclear	*1215*	*1606*	*1723*	*1827*	*1904*	*5.8*	*1.4*	*1.2*	*0.8*	*1.1*
Hydro	*1136*	*1143*	*1336*	*1550*	*1811*	*0.1*	*3.2*	*3.0*	*3.2*	*3.1*
Thermal	*3640*	*4108*	*4577*	*5214*	*5725*	*2.4*	*2.2*	*2.6*	*1.9*	*2.2*
Total	*5991*	*6858*	*7636*	*8591*	*9439*	*2.7*	*2.2*	*2.4*	*1.9*	*2.2*
Inputs										
Solids	592	638	665	717	765	1.5	0.8	1.5	1.3	1.2
Oil (3)	110	130	122	110	98	3.4	-1.3	-2.1	-2.3	-1.9
Gas (4)	133	142	182	255	300	1.3	5.0	7.0	3.3	5.1
Nuclear	317	419	449	476	496	5.8	1.4	1.2	0.8	1.1
Hydro	98	98	115	133	156	0.1	3.2	3.0	3.2	3.1
Heat (1)	13	15	18	24	29	3.4	3.7	6.4	3.4	4.5
Renewable (2)	5	5	6	7	9	1.9	3.6	3.6	3.8	3.7
Total	1267	1448	1557	1722	1852	2.7	1.5	2.0	1.5	1.7
Final Energy Consumption										
Solids	228	214	185	176	159	-1.3	-2.9	-0.9	-2.0	-2.0
Oil (3)	1258	1308	1399	1492	1533	0.8	1.4	1.3	0.6	1.1
Gas (4)	509	563	600	635	666	2.0	1.3	1.2	0.9	1.1
Electricity	438	513	574	651	719	3.2	2.3	2.5	2.0	2.3
Heat (5)	10	11	17	21	27	1.8	8.8	3.7	5.7	6.0
Renewable (2)	100	95	102	112	125	-1.1	1.4	2.0	2.3	1.9
Total	2544	2704	2876	3087	3230	1.2	1.2	1.4	0.9	1.2
CO2 Emissions in Mt of CO2	9391	9886	10300	10977	11374	1.0	0.8	1.3	0.7	0.9
Indicators										
Population in Millions	823	852	878	902	921	0.7	0.6	0.5	0.4	0.5
GDP Index (1985 = 100)	100	117	130	147	166	3.2	2.0	2.5	2.5	2.4
Gross Consump/GDP (6)	324	302	291	276	256	-1.4	-0.8	-1.0	-1.5	-1.1
Gross Consump/capita (7)	4.57	4.82	4.98	5.22	5.36	1.1	0.7	0.9	0.5	0.7
Electricity/capita (8)	7275	8046	8694	9527	10244	2.0	1.6	1.8	1.5	1.6
CO2 emissions/capita (9)	11.40	11.60	11.73	12.17	12.34	0.3	0.2	0.7	0.3	0.4

(1) Geothermal energy.
(2) Mainly biomass.
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(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

EUROPEAN COMMUNITY (New)	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	238	209	164	139	117	-2.6	-4.7	-3.2	-3.4	-3.8
Crude oil	151	114	123	115	107	-5.5	1.5	-1.3	-1.5	-0.4
Natural gas	131	132	153	160	168	0.1	3.1	1.0	0.9	1.6
Nuclear	127	159	166	172	174	4.5	1.0	0.7	0.2	0.6
Hydro	15	12	16	17	17	-3.1	5.4	0.6	0.3	2.1
Heat (1)	2	2	3	5	6	3.1	9.8	9.8	2.1	7.2
Renewable (2)	2	3	3	6	12	8.5	1.8	16.1	14.2	10.5
Total	665	633	634	620	604	-1.0	0	-0.5	-0.5	-0.3
Net Imports										
Solids	65	78	112	139	162	3.9	7.4	4.5	3.0	5.0
Crude oil	313	404	430	459	478	5.2	1.3	1.3	0.8	1.1
Oil products	32	22	23	32	28	-6.8	0.2	7.5	-2.9	1.5
Total oil	345	426	453	491	506	4.3	1.2	1.6	0.6	1.2
Natural gas	64	85	106	153	188	5.9	4.4	7.7	4.2	5.4
Electricity	1	2	3	2	1	5.7	15.3	-12.6	-13.5	-4.5
Total	475	591	673	785	857	4.5	2.6	3.1	1.8	2.5
Gross Consumption										
Solids	306	291	276	279	279	-1.0	-1.1	0.2	0	-0.3
Oil (3)	500	543	581	611	617	1.6	1.4	1.0	0.2	0.9
Natural gas	193	214	259	314	356	2.1	3.8	3.9	2.5	3.4
Nuclear	127	159	166	172	174	4.5	1.0	0.7	0.2	0.6
Hydro	15	12	16	17	17	-3.1	5.4	0.6	0.3	2.1
Heat (1)	2	2	3	5	6	2.3	9.8	9.8	2.1	7.2
Renewable (2)	2	3	3	6	12	8.5	1.8	16.1	14.2	10.5
Total	1146	1226	1307	1405	1461	1.4	1.3	1.5	0.8	1.2
Power Generation										
Output in TWh										
Nuclear	*488*	*609*	*638*	*661*	*666*	*4.5*	*1.0*	*0.7*	*0.2*	*0.6*
Hydro	*170*	*145*	*188*	*194*	*197*	*-3.1*	*5.4*	*0.6*	*0.3*	*2.1*
Thermal	*1015*	*1131*	*1261*	*1499*	*1720*	*2.2*	*2.2*	*3.5*	*2.8*	*2.8*
Total	*1672*	*1885*	*2088*	*2354*	*2583*	*2.4*	*2.1*	*2.4*	*1.9*	*2.1*
Inputs										
Solids	165	172	177	189	200	0.8	0.5	1.3	1.1	1.0
Oil (3)	40	42	43	36	30	0.9	0.5	-3.4	-3.7	-2.2
Gas (4)	29	34	50	83	111	3.5	7.9	10.5	6.0	8.1
Nuclear	127	159	166	172	174	4.5	1.0	0.7	0.2	0.6
Hydro	15	12	16	17	17	-3.1	5.4	0.6	0.3	2.1
Heat (1)	2	2	3	5	6	3.1	9.8	9.8	2.1	7.2
Renewable (2)	2	3	3	4	4	8.5	1.8	4.7	4.3	3.6
Total	379	424	459	505	541	2.3	1.6	2.0	1.4	1.6
Final Energy Consumption										
Solids	103	88	69	62	54	-3.1	-4.6	-2.2	-2.9	-3.2
Oil (3)	345	368	399	427	438	1.3	1.7	1.3	0.5	1.2
Gas (4)	161	178	204	224	238	2.0	2.8	1.8	1.2	1.9
Electricity	120	138	153	171	186	2.8	2.2	2.2	1.7	2.0
Heat (5)	4	4	5	5	6	0.2	2.4	1.3	1.4	1.7
Renewable (2)	0	0	0	2	7	-	-	-	24.6	-
Total	734	775	832	892	929	1.1	1.4	1.4	0.8	1.2
CO2 Emissions in Mt of CO2	2952	3042	3175	3375	3494	0.6	0.9	1.2	0.7	0.9
Indicators										
Population in Millions	338	343	350	355	359	0.3	0.4	0.3	0.2	0.3
GDP Index (1985 = 100)	100	116	128	145	161	3.0	2.0	2.5	2.2	2.2
Gross Consump/GDP (6)	334	309	298	283	264	-1.6	-0.7	-1.0	-1.4	-1.0
Gross Consump/capita (7)	3.39	3.57	3.74	3.96	4.07	1.1	0.9	1.1	0.6	0.9
Electricity/capita (8)	4946	5490	5970	6628	7194	2.1	1.7	2.1	1.7	1.8
CO2 emissions/capita (9)	8.73	8.86	9.08	9.50	9.73	0.3	0.5	0.9	0.5	0.6

(1) Geothermal energy.
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(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

EFTA	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	1	1	1	1	1	-7.9	0	0	0	0
Crude oil	41	86	87	88	89	16.0	0.3	0.3	0.1	0.2
Natural gas	24	25	30	35	42	0.8	3.2	3.2	3.7	3.4
Nuclear	26	29	28	25	21	2.1	-0.5	-2.0	-3.7	-2.1
Hydro	22	23	23	23	23	1.4	0	0	0	0
Heat (1)	0	0	0	0	1	9.5	5.0	5.0	5.0	5.0
Renewable (2)	13	15	17	19	22	3.2	2.2	2.6	2.6	2.5
Total	127	179	186	192	198	7.1	0.7	0.6	0.6	0.7
Net Imports										
Solids	12	11	14	15	17	-1.4	4.1	1.8	2.5	2.8
Crude oil	4	-31	-32	-31	-29	0	0	0	0	-0.4
Oil products	15	8	7	8	8	-12.0	-0.8	1.2	1.2	0.5
Total oil	19	-23	-24	-23	-21	0	0	0	0	-0.7
Natural gas	-17	-14	-17	-20	-25	-4.1	4.3	3.9	4.6	4.3
Electricity	-1	-1	-3	-2	-1	4.4	31.1	-12.6	-13.5	-0.3
Total	14	-26	-30	-30	-30	0	2.9	-0.3	0.1	0.9
Gross Consumption										
Solids	13	13	15	16	18	-0.6	3.0	1.7	2.3	2.3
Oil (3)	61	60	63	65	68	-0.3	0.8	0.7	0.8	0.8
Natural gas	8	11	13	14	16	8.6	2.4	2.3	2.4	2.4
Nuclear	26	29	28	25	21	2.1	-0.5	-2.0	-3.7	-2.1
Hydro	22	23	23	23	23	1.4	0	0	0	0
Heat (1)	0	0	0	0	1	9.5	5.0	5.0	5.0	5.0
Renewable (2)	13	15	17	19	22	2.7	2.4	2.6	2.6	2.5
Total	142	151	156	162	168	1.2	0.6	0.8	0.7	0.7
Power Generation										
Output in TWh										
Nuclear	*100*	*111*	*108*	*98*	*81*	*2.1*	*-0.5*	*-2.0*	*-3.7*	*-2.1*
Hydro	*252*	*270*	*270*	*270*	*270*	*1.4*	*0*	*0*	*0*	*0*
Thermal	*40*	*37*	*80*	*91*	*112*	*-1.3*	*16.5*	*2.7*	*4.2*	*7.6*
Total	*392*	*418*	*458*	*459*	*463*	*1.3*	*1.8*	*0.0*	*0.2*	*0.7*
Inputs										
Solids	4	3	4	5	7	-8.3	9.4	3.2	4.8	5.8
Oil (3)	2	1	1	1	1	-18.0	7.6	1.7	3.2	4.1
Gas (4)	1	2	3	3	3	3.7	7.9	2.2	3.7	4.6
Nuclear	26	29	28	25	21	2.1	-0.5	-2.0	-3.7	-2.1
Hydro	22	23	23	23	23	1.4	0	0	0	0
Heat (1)	0	0	0	0	1	9.5	5.0	5.0	5.0	5.0
Renewable (2)	2	1	2	2	3	-8.8	8.7	2.7	4.2	5.2
Total	58	59	62	61	59	0.4	0.9	-0.4	-0.5	0.0
Final Energy Consumption										
Solids	7	6	6	6	6	-3.6	0	0	0	0
Oil (3)	51	48	47	48	49	-1.2	-0.3	0.3	0.3	0.1
Gas (4)	5	6	6	7	8	4.8	1.9	2.2	1.7	1.9
Electricity	29	32	33	34	35	1.6	0.6	0.9	0.6	0.7
Heat (5)	4	4	5	6	7	4.7	2.5	2.9	2.9	2.8
Renewable (2)	11	12	13	14	16	1.0	1.7	2.6	2.3	2.2
Total	107	108	110	116	121	0.2	0.4	1.0	0.9	0.8
CO2 Emissions in Mt of CO2	233	220	232	243	257	-1.1	1.0	0.9	1.2	1.0
Indicators										
Population in Millions	32	32	33	33	33	0.5	0.2	0.2	0.1	0.1
GDP Index (1985 = 100)	100	113	127	144	164	2.6	2.2	2.6	2.6	2.5
Gross Consump/GDP (6)	291	272	251	230	209	-1.3	-1.6	-1.7	-1.9	-1.7
Gross Consump/capita (7)	4.49	4.65	4.75	4.91	5.06	0.7	0.4	0.7	0.6	0.6
Electricity/capita (8)	12376	12882	13983	13904	13979	0.8	1.7	-0.1	0.1	0.5
CO2 emissions/capita (9)	7.36	6.78	7.08	7.36	7.77	-1.6	0.9	0.8	1.1	0.9

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

USA	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	466	538	547	574	626	2.9	0.3	1.0	1.8	1.0
Crude oil	507	425	431	390	352	-3.5	0.3	-2.0	-2.0	-1.2
Natural gas	386	414	424	435	448	1.4	0.5	0.5	0.6	0.5
Nuclear	106	159	158	165	170	8.5	-0.1	0.9	0.6	0.4
Hydro	24	24	34	49	66	-0.1	7.0	7.5	6.0	6.8
Heat (1)	9	8	8	9	9	-1.7	1.0	1.0	1.0	1.0
Renewable (2)	67	63	68	73	79	-1.1	1.5	1.5	1.5	1.5
Total	1565	1631	1671	1694	1750	0.8	0.5	0.3	0.6	0.5
Net Imports										
Solids	-57	-65	-75	-83	-118	2.5	2.8	2.2	7.2	4.1
Crude oil	200	344	405	488	536	11.4	3.3	3.8	1.9	3.0
Oil products	30	25	16	19	22	-3.3	-8.2	2.8	3.4	-0.8
Total oil	230	369	421	507	558	9.9	2.7	3.8	1.9	2.8
Natural gas	21	34	43	71	72	10.1	5.1	10.4	0.4	5.2
Electricity	0	0	1	3	4	0.0	40.8	22.2	11.4	24.2
Total	194	338	391	497	517	11.8	2.9	4.9	0.8	2.9
Gross Consumption										
Solids	426	458	472	490	507	1.5	0.6	0.7	0.7	0.7
Oil (3)	742	786	852	897	911	1.1	1.6	1.0	0.3	1.0
Natural gas	412	436	467	506	520	1.1	1.4	1.6	0.6	1.2
Nuclear	106	159	158	165	170	8.5	-0.1	0.9	0.6	0.4
Hydro	24	24	34	49	66	-0.1	7.0	7.5	6.0	6.8
Heat (1)	9	8	8	9	9	-1.7	1.0	1.0	1.0	1.0
Renewable (2)	67	63	68	73	79	-1.1	1.5	1.5	1.5	1.5
Total	1789	1934	2062	2192	2267	1.6	1.3	1.2	0.7	1.1
Power Generation										
Output in TWh										
Nuclear	*407*	*611*	*608*	*635*	*654*	*8.5*	*-0.1*	*0.9*	*0.6*	*0.4*
Hydro	*284*	*283*	*396*	*569*	*762*	*-0.1*	*7.0*	*7.5*	*6.0*	*6.8*
Thermal	*1931*	*2087*	*2287*	*2518*	*2646*	*1.6*	*1.8*	*1.9*	*1.0*	*1.6*
Total	*2622*	*2981*	*3291*	*3722*	*4061*	*2.6*	*2.0*	*2.5*	*1.8*	*2.1*
Inputs										
Solids	354	385	400	419	437	1.7	0.8	0.9	0.8	0.9
Oil (3)	25	29	26	23	19	3.0	-2.6	-2.4	-3.3	-2.8
Gas (4)	71	66	89	117	122	-1.6	6.3	5.6	0.8	4.2
Nuclear	106	159	158	165	170	8.5	-0.1	0.9	0.6	0.4
Hydro	24	24	34	49	66	-0.1	7	8	6	7
Heat (1)	9	8	8	9	9	-1.7	1.0	1.0	1.0	1.0
Renewable (2)	0	1	1	1	1	13.0	1.4	1.6	0.7	1.3
Total	589	672	716	783	824	2.7	1.3	1.8	1.0	1.4
Final Energy Consumption										
Solids	65	64	62	60	58	-0.3	-0.6	-0.6	-0.6	-0.6
Oil (3)	614	641	670	712	723	0.9	0.9	1.2	0.3	0.8
Gas (4)	285	317	322	329	336	2.2	0.3	0.5	0.4	0.4
Electricity	194	226	253	292	322	3.1	2.3	2.9	2.0	2.4
Heat (5)	1	2	2	2	2	3.8	4.1	1.0	1.0	2.0
Renewable (2)	66	63	67	73	78	-1.2	1.5	1.5	1.5	1.5
Total	1225	1312	1377	1467	1521	1.4	1.0	1.3	0.7	1.0
CO2 Emissions in Mt of CO2	4531	4822	5028	5305	5427	1.3	0.8	1.1	0.5	0.8
Indicators										
Population in Millions	238	250	259	267	274	0.9	0.7	0.6	0.6	0.6
GDP Index (1985 = 100)	100	116	126	141	158	3.0	1.7	2.2	2.3	2.1
Gross Consump/GDP (6)	345	322	316	300	277	-1.4	-0.4	-1.0	-1.6	-1.0
Gross Consump/capita (7)	7.50	7.74	7.97	8.21	8.26	0.6	0.6	0.6	0.1	0.4
Electricity/capita (8)	10995	11925	12714	13949	14808	1.6	1.3	1.9	1.2	1.5
CO2 emissions/capita (9)	19.00	19.29	19.42	19.88	19.79	0.3	0.1	0.5	-0.1	0.2

(1) Geothermal energy.
(2) Mainly biomass.
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(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

JAPAN	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	10	5	4	3	2	-13.8	-5.0	-5.0	-5.0	-5.0
Crude oil	1	1	1	1	1	0.7	0	0	0	0
Natural gas	2	2	2	2	2	-1.7	0	0	0	0
Nuclear	42	53	67	81	94	4.9	4.9	4.0	3.0	3.9
Hydro	7	8	9	11	14	1.9	3.6	2.8	6.6	4.3
Heat (1)	1	2	2	5	7	3.1	4.7	20.7	6.6	10.4
Renewable (2)	0	0	0	0	0	0.0	1.0	5.0	10.0	5.3
Total	62	69	84	102	120	2.1	4.0	4.0	3.3	3.8
Net Imports										
Solids	63	69	60	66	64	1.7	-2.8	1.9	-0.6	-0.5
Crude oil	172	199	209	224	240	2.9	1.0	1.4	1.4	1.3
Oil products	38	57	56	61	66	8.3	-0.1	1.6	1.7	1.1
Total oil	210	255	265	285	306	4.0	0.8	1.5	1.4	1.2
Natural gas	33	42	43	57	70	4.8	0.9	5.6	4.3	3.6
Electricity	-	-	-	-	-	-	-	-	-	-
Total	306	366	368	408	440	3.6	0.2	2.1	1.5	1.2
Gross Consumption										
Solids	73	74	63	68	66	0.3	-3.0	1.6	-0.8	-0.8
Oil (3)	209	254	266	286	307	4.0	0.9	1.5	1.4	1.3
Natural gas	35	43	45	59	72	4.3	1.0	5.4	4.2	3.5
Nuclear	42	53	67	81	94	4.9	4.9	4.0	3.0	3.9
Hydro	7	8	9	11	14	1.9	3.6	2.8	6.6	4.3
Heat (1)	1	2	2	5	7	3.1	4.7	20.7	6.6	10.4
Renewable (2)	0	0	0	0	0	0.0	1.0	5.0	10.0	5.3
Total	367	433	452	510	560	3.4	0.9	2.4	1.9	1.7
Power Generation										
Output in TWh										
Nuclear	*160*	*202*	*256*	*312*	*362*	*4.9*	*4.9*	*4.0*	*3.0*	*3.9*
Hydro	*81*	*89*	*107*	*122*	*168*	*1.9*	*3.6*	*2.8*	*6.6*	*4.3*
Thermal	*424*	*559*	*647*	*740*	*826*	*5.7*	*3.0*	*2.7*	*2.2*	*2.6*
Total	*665*	*851*	*1010*	*1174*	*1356*	*5.0*	*3.5*	*3.1*	*2.9*	*3.2*
Inputs										
Solids	21	24	24	31	36	2.6	0.3	4.9	3.3	2.8
Oil (3)	39	53	48	44	42	6.2	-2.2	-1.3	-1.2	-1.6
Gas (4)	26	32	32	43	53	3.9	0.1	6.1	4.5	3.5
Nuclear	42	53	67	81	94	4.9	4.9	4.0	3.0	3.9
Hydro	7	8	9	11	14	1.9	3.6	2.8	6.6	4.3
Heat (1)	1	2	2	5	7	3.1	4.7	20.7	6.6	10.4
Renewable (2)	0	0	0	0	0	0	0	0	0	0
Total	136	170	181	215	247	4.6	1.3	3.4	2.8	2.5
Final Energy Consumption										
Solids	37	39	31	31	25	1.2	-4.7	0.3	-4.7	-3.0
Oil (3)	144	143	161	178	194	-0.2	2.5	2.0	1.7	2.1
Gas (4)	12	15	17	19	22	4.6	2.5	3.0	2.8	2.8
Electricity	51	65	78	90	104	5.1	3.5	3.0	2.9	3.2
Heat (5)	0	0	0	1	5	0	0	0	0	24.9
Renewable (2)	-	-	-	-	-	-	-	-	-	-
Total	244	262	287	320	350	1.4	1.8	2.2	1.8	1.9
CO2 Emissions in Mt of CO2	947	1010	1013	1109	1173	1.3	0.1	1.8	1.1	1.0
Indicators										
Population in Millions	121	124	126	129	131	0.4	0.4	0.4	0.3	0.4
GDP Index (1985 = 100)	100	125	145	171	201	4.6	3.0	3.3	3.3	3.2
Gross Consump/GDP (6)	211	199	179	171	160	-1.2	-2.1	-0.9	-1.3	-1.4
Gross Consump/capita (7)	3.03	3.51	3.59	3.97	4.29	2.9	0.5	2.0	1.6	1.4
Electricity/capita (8)	5505	6886	8019	9139	10387	4.6	3.1	2.6	2.6	2.8
CO2 emissions/capita (9)	7.83	8.18	8.04	8.63	8.99	0.9	-0.3	1.4	0.8	0.6

(1) Geothermal energy.
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(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

REST OF OECD	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	127	157	181	201	208	4.5	2.9	2.1	0.7	1.9
Crude oil	118	129	136	146	153	1.9	1.0	1.4	1.0	1.1
Natural gas	83	111	131	154	172	5.9	3.4	3.4	2.2	3.0
Nuclear	16	19	29	32	37	3.8	9.0	1.7	3.0	4.5
Hydro	30	31	32	34	36	0.4	1.0	1.0	1.0	1.0
Heat (1)	1	3	4	6	7	28.1	5.0	5.0	5.0	5.0
Renewable (2)	23	21	22	23	24	-2.0	1.0	1.0	1.0	1.0
Total	397	471	536	596	637	3.5	2.6	2.2	1.4	2.0
Net Imports										
Solids	-61	-75	-100	-106	-100	4.3	5.7	1.2	-1.1	1.9
Crude oil	4	17	24	25	24	35.0	7.1	0.6	-0.7	2.2
Oil products	-3	-3	-5	-6	-6	4.6	10.5	1.0	0.3	3.8
Total oil	1	14	19	19	18	61.3	6.2	0.4	-1.0	1.8
Natural gas	-21	-32	-54	-69	-76	8.6	10.9	4.9	2.1	5.9
Electricity	-3	0	0	0	0	0	0	0	0	2.0
Total	-84	-94	-135	-155	-158	2.1	7.5	2.9	0.3	3.5
Gross Consumption										
Solids	69	76	81	95	108	2.1	1.3	3.2	2.6	2.3
Oil (3)	121	140	155	165	171	2.9	2.0	1.3	0.8	1.4
Natural gas	63	77	77	86	96	4.2	-0.1	2.3	2.3	1.5
Nuclear	16	19	29	32	37	3.8	9.0	1.7	3.0	4.5
Hydro	30	31	32	34	36	0.4	1.0	1.0	1.0	1.0
Heat (1)	1	3	4	6	7	28.1	5.0	5.0	5.0	5.0
Renewable (2)	23	21	22	23	24	-2.0	1.0	1.0	1.0	1.0
Total	319	367	401	440	479	2.8	1.8	1.9	1.7	1.8
Power Generation										
Output in TWh										
Nuclear	*61*	*73*	*112*	*122*	*141*	*3.8*	*9.0*	*1.7*	*3.0*	*4.5*
Hydro	*349*	*357*	*375*	*394*	*414*	*0.4*	*1.0*	*1.0*	*1.0*	*1.0*
Thermal	*231*	*294*	*302*	*365*	*422*	*5.0*	*0.5*	*3.9*	*2.9*	*2.4*
Total	*640*	*724*	*789*	*881*	*977*	*2.5*	*1.7*	*2.2*	*2.1*	*2.0*
Inputs										
Solids	48	54	59	73	85	2.6	1.7	4.1	3.2	3.0
Oil (3)	4	6	5	6	6	6.8	-0.9	1.8	0.9	0.6
Gas (4)	5	9	8	9	10	11.1	-1.8	3.3	2.5	1.3
Nuclear	16	19	29	32	37	3.8	9.0	1.7	3.0	4.5
Hydro	30	31	32	34	36	0.4	1	1	1	1
Heat (1)	1	3	4	6	7	28.1	5.0	5.0	5.0	5.0
Renewable (2)	0	0	0	1	1	-0.4	1.1	3.9	3.0	2.6
Total	104	122	139	159	181	3.2	2.6	2.8	2.6	2.7
Final Energy Consumption										
Solids	17	17	17	17	17	0.5	-0.4	-0.1	-0.2	-0.2
Oil (3)	103	109	120	127	129	1.1	2.1	1.0	0.4	1.2
Gas (4)	46	47	50	56	62	0.4	1.2	2.0	2.1	1.8
Electricity	44	53	57	64	71	3.6	1.7	2.2	2.0	2.0
Heat (5)	1	1	5	6	8	-9.2	56.2	5.0	5.0	19.9
Renewable (2)	23	20	22	23	24	-2.1	1.0	0.9	0.9	1.0
Total	234	247	271	292	310	1.1	1.9	1.5	1.2	1.5
CO2 Emissions in Mt of CO2	729	791	852	945	1023	1.7	1.5	2.1	1.6	1.7
Indicators										
Population in Millions	95	103	111	118	125	1.7	1.5	1.3	1.1	1.3
GDP Index (1985 = 100)	100	118	131	148	169	3.3	2.1	2.5	2.7	2.4
Gross Consump/GDP (6)	419	409	403	391	373	-0.5	-0.3	-0.6	-1.0	-0.6
Gross Consump/capita (7)	3.38	3.56	3.61	3.73	3.85	1.1	0.3	0.6	0.6	0.5
Electricity/capita (8)	6773	7021	7111	7457	7845	0.7	0.3	1.0	1.0	0.7
CO2 emissions/capita (9)	7.71	7.68	7.68	8.00	8.22	-0.1	0	0.8	0.5	0.5

(1) Geothermal energy.
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(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

FORMER SOVIET UNION	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	306	282	241	253	266	-1.7	-3.1	1.0	1.0	-0.4
Crude oil	598	572	440	471	515	-0.9	-5.1	1.4	1.8	-0.7
Natural gas	520	631	696	895	1160	4.0	2.0	5.1	5.3	4.1
Nuclear	44	55	51	51	51	4.8	-1.6	0	0	-0.5
Hydro	20	21	21	21	23	0.2	0.2	0	2.0	0.7
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	27	25	23	24	27	-2.1	-1.7	1.2	2.1	0.5
Total	1516	1586	1471	1715	2042	0.9	-1.5	3.1	3.6	1.7
Net Imports										
Solids	-13	-3	-37	-51	-60	-23.8	61.2	6.5	3.2	21.0
Crude oil	-105	-105	-24	-27	-52	0.0	-25.5	2.6	13.8	-4.5
Oil products	-48	-53	-46	-50	-52	1.7	-2.5	1.4	0.9	-0.1
Total oil	-153	-157	-71	-77	-104	0.5	-14.8	1.8	6.2	-2.7
Natural gas	-55	-64	-102	-215	-294	3.2	9.8	16.0	6.4	10.7
Electricity	-2	-2	-2	-2	-3	-2.1	-1.3	2.3	2.9	1.3
Total	-224	-227	-212	-346	-461	0.3	-1.3	10.3	5.9	4.8
Gross Consumption										
Solids	290	278	203	202	206	-0.9	-6.1	-0.2	0.4	-2.0
Oil (3)	437	415	369	394	411	-1.0	-2.3	1.3	0.8	-0.1
Natural gas	461	567	594	680	866	4.2	0.9	2.7	5.0	2.9
Nuclear	44	55	51	51	51	4.8	-1.6	0	0	-0.5
Hydro	20	21	21	21	23	0.2	0.2	0	2.0	0.7
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	27	25	23	24	27	-2.1	-1.7	1.2	2.1	0.5
Total	1277	1359	1259	1369	1581	1.2	-1.5	1.7	2.9	1.0
Power Generation										
Output in TWh										
Nuclear	*167*	*211*	*195*	*195*	*195*	*4.8*	*-1.6*	*0*	*0*	*-0.5*
Hydro	*238*	*241*	*243*	*243*	*268*	*0.2*	*0.2*	*0*	*2.0*	*0.7*
Thermal	*1139*	*1253*	*966*	*1161*	*1525*	*1.9*	*-5.1*	*3.8*	*5.6*	*1.3*
Total	*1544*	*1705*	*1404*	*1600*	*1989*	*2.0*	*-3.8*	*2.6*	*4.5*	*1.0*
Inputs										
Solids	124	133	86	80	81	1.3	-8.4	-1.4	0.2	-3.2
Oil (3)	105	67	41	37	37	-8.6	-9.2	-2.0	-0.3	-3.9
Gas (4)	164	234	220	287	398	7.4	-1.3	5.5	6.8	3.6
Nuclear	44	55	51	51	51	4.8	-1.6	0.0	0.0	-0.5
Hydro	20	21	21	21	23	0.2	0	0	2	1
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	11	10	8	9	12	-1.7	-4.4	3.1	5.0	1.2
Total	468	520	427	486	602	2.1	-3.9	2.6	4.4	1.0
Final Energy Consumption										
Solids	148	142	114	118	121	-0.8	-4.2	0.7	0.5	-1.0
Oil (3)	273	273	255	282	299	0.0	-1.4	2.1	1.1	0.6
Gas (4)	228	272	313	331	406	3.6	2.9	1.1	4.2	2.7
Electricity	98	108	92	103	129	2.0	-3.1	2.2	4.7	1.2
Heat (5)	102	112	93	105	131	2.0	-3.8	2.6	4.5	1.0
Renewable (2)	16	15	15	15	15	-2.3	0	0	0	0
Total	865	921	881	954	1102	1.3	-0.9	1.6	2.9	1.2
CO2 Emissions in Mt of CO2	3255	3370	3019	3297	3831	0.7	-2.2	1.8	3.0	0.9
Indicators										
Population in Millions	278	289	299	309	319	0.8	0.7	0.6	0.6	0.6
GDP Index (1985 = 100)	100	106	74	95	116	1.2	-7.0	5.0	4.2	0.6
Gross Consump/GDP (6)	1355	1356	1805	1534	1443	0.0	5.9	-3.2	-1.2	0.4
Gross Consump/capita (7)	4.60	4.70	4.21	4.43	4.96	0.4	-2.2	1.0	2.3	0.4
Electricity/capita (8)	5563	5894	4692	5176	6244	1.2	-4.5	2.0	3.8	0.4
CO2 emissions/capita (9)	11.73	11.65	10.09	10.67	12.03	-0.1	-2.8	1.1	2.4	0.2

(1) Geothermal energy.
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(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

EASTERN EUROPE	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	204	180	171	171	171	-2.5	-1.0	0	0	-0.3
Crude oil	21	16	14	10	8	-5.9	-3.0	-5.0	-5.0	-4.3
Natural gas	46	39	38	38	38	-3.5	-0.5	0	0	-0.2
Nuclear	9	15	13	13	13	9.6	-2.0	0	0	-0.7
Hydro	4	4	4	4	4	-1.2	0.1	0.1	0.1	0.1
Heat (1)	0	0	0	0	0	-34.6	0	0	0	0
Renewable (2)	4	5	7	8	9	5.7	5.0	3.0	3.0	3.7
Total	289	258	246	244	243	-2.2	-0.9	-0.2	-0.1	-0.4
Net Imports										
Solids	-8	-1	-21	-24	-27	-38.7	96.6	3.2	1.9	27.4
Crude oil	73	84	76	84	91	2.7	-1.8	2.0	1.4	0.5
Oil products	-4	-11	-10	-10	-11	21.6	-2.2	0.8	0.4	-0.3
Total oil	69	73	66	74	80	0.9	-1.8	2.2	1.6	0.7
Natural gas	24	33	49	80	116	6.6	7.9	10.4	7.8	8.7
Electricity	2	2	2	2	3	5.6	-1.3	2.3	2.9	1.3
Total	87	107	96	132	172	4.3	-2.2	6.5	5.5	3.2
Gross Consumption										
Solids	198	179	150	146	144	-2.0	-3.5	-0.5	-0.3	-1.4
Oil (3)	90	88	80	84	88	-0.4	-2.0	1.1	0.8	0
Natural gas	70	72	87	118	154	0.5	3.7	6.4	5.5	5.2
Nuclear	9	15	13	13	13	9.6	-2.0	0	0	-0.7
Hydro	4	4	4	4	4	-1.2	0.1	0.1	0.1	0.1
Heat (1)	0	0	0	0	0	-34.6	0	0	0	0
Renewable (2)	4	5	7	8	9	5.7	5.0	3.0	3.0	3.7
Total	378	366	342	376	415	-0.7	-1.3	1.9	2.0	0.9
Power Generation										
Output in TWh										
Nuclear	*35*	*56*	*51*	*51*	*51*	*9.6*	*-2.0*	*0*	*0*	*-0.7*
Hydro	*50*	*47*	*48*	*48*	*48*	*-1.2*	*0.1*	*0.1*	*0.1*	*0.1*
Thermal	*352*	*358*	*334*	*387*	*462*	*0.4*	*-1.4*	*3.0*	*3.6*	*1.7*
Total	*437*	*461*	*432*	*485*	*561*	*1.1*	*-1.3*	*2.3*	*2.9*	*1.3*
Inputs										
Solids	97	87	65	58	54	-2.1	-5.8	-2.0	-1.5	-3.1
Oil (3)	16	12	9	8	7	-5.5	-6.3	-2.4	-1.8	-3.5
Gas (4)	13	26	43	67	96	15.1	10.9	9.2	7.4	9.2
Nuclear	9	15	13	13	13	9.6	-2.0	0	0	-0.7
Hydro	4	4	4	4	4	-1.2	0.1	0.1	0.1	0.1
Heat (1)	0	0	0	0	0	-34.6	0	0	0	0
Renewable (2)	0	0	0	0	1	36.8	-1.3	2.7	3.4	1.5
Total	140	144	135	151	175	0.6	-1.4	2.4	3.0	1.3
Final Energy Consumption										
Solids	67	59	52	55	56	-2.6	-2.4	1.0	0.6	-0.2
Oil (3)	57	55	51	54	55	-0.8	-1.4	1.1	0.5	0.1
Gas (4)	52	32	30	34	39	-9.2	-1.7	3.0	2.7	1.3
Electricity	30	33	31	34	39	1.7	-1.4	2.0	2.9	1.1
Heat (5)	43	40	39	41	45	-1.4	-0.7	1.2	1.6	0.7
Renewable (2)	3	4	5	6	7	1.9	6.9	3.4	3.3	4.5
Total	253	223	207	224	242	-2.5	-1.4	1.6	1.5	0.6
CO2 Emissions in Mt of CO2	1166	1055	956	1020	1097	-2.0	-1.9	1.3	1.5	0.3
Indicators										
Population in Millions	121	124	126	129	131	0.4	0.4	0.4	0.4	0.4
GDP Index (1985 = 100)	100	100	96	115	134	-0.1	-0.7	3.6	3.2	2.0
Gross Consump/GDP (6)	987	959	931	857	809	-0.6	-0.6	-1.6	-1.2	-1.1
Gross Consump/capita (7)	3.12	2.96	2.71	2.92	3.16	-1.1	-1.7	1.5	1.6	0.5
Electricity/capita (8)	3610	3731	3427	3766	4274	0.7	-1.7	1.9	2.6	0.9
CO2 emissions/capita (9)	9.63	8.53	7.58	7.92	8.36	-2.4	-2.3	0.9	1.1	-0.1

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

MEDITERRANEAN	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	-	-	-	-	-	-	-	-	-	-
Crude oil	-	-	-	-	-	-	-	-	-	-
Natural gas	-	-	-	-	-	-	-	-	-	-
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	-	-	-	-
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	0	0	0	0	0	6.4	2.1	2.5	2.5	2.4
Total	0	0	0	0	0	6.4	2.1	2.5	2.5	2.4
Net Imports										
Solids	0	0	0	0	0	6.3	2.4	2.8	2.5	2.6
Crude oil	1	1	1	2	2	8.3	3.0	2.7	2.4	2.7
Oil products	1	1	2	2	2	11.8	3.4	2.7	2.4	2.8
Total oil	2	2	3	3	4	10.1	3.2	2.7	2.4	2.8
Natural gas	-	-	-	-	-	-	-	-	-	-
Electricity	-	-	-	-	-	-	-	-	-	-
Total	2	3	3	4	4	9.7	3.1	2.7	2.4	2.7
Gross Consumption										
Solids	0	0	0	0	0	7.8	2.4	2.8	2.5	2.6
Oil (3)	2	2	3	3	4	8.2	3.2	2.7	2.4	2.8
Natural gas	-	-	-	-	-	-	-	-	-	-
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	-	-	-	-
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	0	0	0	0	0	6.4	2.1	2.5	2.5	2.4
Total	2	3	3	4	4	8.1	3.1	2.7	2.4	2.7
Power Generation										
Output in TWh										
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	-	-	-	-
Thermal	*2*	*3*	*4*	*4*	*5*	*7.6*	*2.5*	*2.9*	*2.5*	*2.6*
Total	*2*	*3*	*4*	*4*	*5*	*7.6*	*2.5*	*2.9*	*2.5*	*2.6*
Inputs										
Solids	0	0	0	0	0	8.1	2.5	2.9	2.5	2.6
Oil (3)	1	1	1	1	1	6.4	2.5	2.9	2.5	2.6
Gas (4)	-	-	-	-	-	-	-	-	-	-
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	-	-	-	-
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	-	-	-	-	-	-	-	-	-	-
Total	1	1	1	1	1	6.7	2.5	2.9	2.5	2.6
Final Energy Consumption										
Solids	0	0	0	0	0	6.9	2.1	2.5	2.5	2.4
Oil (3)	1	1	1	2	2	8.0	4.2	2.7	2.3	3.1
Gas (4)	-	-	-	-	-	-	-	-	-	-
Electricity	0	0	0	0	0	7.2	2.5	3.0	2.5	2.7
Heat (5)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	0	0	0	0	0	6.4	2.1	2.5	2.5	2.4
Total	1	1	2	2	2	7.8	3.9	2.7	2.3	3.0
CO2 Emissions in Mt of CO2	5	7	8	9	10	7.4	3.4	2.8	2.4	2.9
Indicators										
Population in Millions	1	1	1	1	1	0.8	0.7	0.6	0.6	0.7
GDP Index (1985 = 100)	100	135	150	170	192	6.2	2.1	2.5	2.5	2.4
Gross Consump/GDP (6)	383	419	441	445	443	1.8	1.0	0.2	-0.1	0.4
Gross Consump/capita (7)	1.77	2.53	2.84	3.15	3.44	7.3	2.4	2.1	1.8	2.1
Electricity/capita (8)	2068	2878	3136	3513	3858	6.8	1.7	2.3	1.9	2.0
CO2 emissions/capita (9)	4.42	6.08	6.94	7.71	8.41	6.6	2.7	2.1	1.8	2.2

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

NORTH AFRICA	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	0	0	0	0	0	-8.3	0	0	0	0
Crude oil	156	180	194	209	226	2.9	1.5	1.5	1.5	1.5
Natural gas	39	55	66	79	94	6.9	3.7	3.7	3.7	3.7
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	1	1	1	1	1	-5.7	7.0	0.5	0.6	2.7
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	2	3	3	3	4	2.9	2.0	2.0	2.0	2.0
Total	199	239	264	293	325	3.7	2.0	2.1	2.1	2.1
Net Imports										
Solids	2	2	3	4	5	7.2	5.6	5.0	4.3	4.9
Crude oil	-92	-106	-114	-122	-132	2.9	1.4	1.4	1.5	1.4
Oil products	-20	-23	-25	-26	-28	2.4	1.5	1.4	1.2	1.4
Total oil	-112	-129	-139	-149	-159	2.8	1.4	1.4	1.4	1.4
Natural gas	-21	-24	-22	-20	-20	2.9	-1.6	-1.6	-0.4	-1.2
Electricity	-	-	-	-	-	-	-	-	-	-
Total	-132	-151	-158	-165	-175	2.8	0.9	0.9	1.1	1.0
Gross Consumption										
Solids	2	3	3	4	5	8.0	5.0	4.6	4.0	4.5
Oil (3)	44	51	56	61	66	3.3	1.7	1.7	1.7	1.7
Natural gas	19	31	44	58	74	10.8	7.1	6.0	4.9	6.0
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	1	1	1	1	1	-5.7	7.0	0.5	0.6	2.7
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	2	3	3	3	4	2.9	2.0	2.0	2.0	2.0
Total	67	88	107	127	150	5.6	3.9	3.6	3.3	3.6
Power Generation										
Output in TWh										
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	*10*	*7*	*10*	*11*	*11*	*-5.7*	*7.0*	*0.5*	*0.6*	*2.7*
Thermal	*53*	*72*	*85*	*106*	*128*	*6.4*	*3.3*	*4.5*	*4.0*	*3.9*
Total	*63*	*80*	*95*	*116*	*139*	*4.8*	*3.6*	*4.1*	*3.7*	*3.8*
Inputs										
Solids	0	1	1	1	2	13.4	7.9	7.6	6.1	7.2
Oil (3)	8	10	9	8	8	4.2	-1.9	-0.7	-1.2	-1.3
Gas (4)	6	9	13	18	24	6.2	7.7	7.4	5.9	7.0
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	1	1	1	1	1	-5.7	7	0	1	3
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	-	-	-	-	-	-	-	-	-	-
Total	16	20	23	29	35	4.8	3.4	4.3	3.9	3.9
Final Energy Consumption										
Solids	1	2	2	2	3	4.2	4.6	3.7	3.2	3.8
Oil (3)	28	32	36	41	45	2.4	2.7	2.3	2.2	2.4
Gas (4)	6	11	18	24	31	13.8	9.3	6.4	4.8	6.8
Electricity	5	6	7	9	11	5.2	4.2	4.6	4.1	4.3
Heat (5)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	2	3	3	3	4	2.9	2.0	2.0	2.0	2.0
Total	42	53	66	80	93	4.7	4.5	3.7	3.2	3.8
CO2 Emissions in Mt of CO2	149	188	228	273	320	4.8	3.9	3.7	3.2	3.6
Indicators										
Population in Millions	101	116	131	146	161	2.8	2.4	2.2	2.0	2.2
GDP Index (1985 = 100)	100	107	128	155	189	1.4	3.5	4.0	4.0	3.8
Gross Consump/GDP (6)	333	407	415	407	393	4.1	0.4	-0.4	-0.7	-0.2
Gross Consump/capita (7)	0.67	0.76	0.82	0.88	0.93	2.7	1.4	1.4	1.3	1.4
Electricity/capita (8)	625	688	730	799	866	1.9	1.2	1.8	1.6	1.5
CO2 emissions/capita (9)	1.47	1.62	1.75	1.87	1.99	1.9	1.5	1.4	1.2	1.4

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

OTHER AFRICA	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	104	101	109	119	140	-0.7	1.5	1.7	3.3	2.2
Crude oil	115	150	166	183	202	5.5	2.0	2.0	2.0	2.0
Natural gas	3	4	5	7	9	2.9	6.0	6.0	6.0	6.0
Nuclear	1	2	2	3	3	9.8	0.7	3.2	3.2	2.4
Hydro	4	4	5	6	7	-0.3	3.4	3.4	3.4	3.4
Heat (1)	0	0	0	0	0	0	0	0	0	0
Renewable (2)	100	105	112	119	127	1.1	1.3	1.3	1.2	1.2
Total	328	367	399	436	487	2.3	1.7	1.8	2.2	1.9
Net Imports										
Solids	-30	-14	-12	-8	-11	-13.9	-3.0	-8.2	6.4	-1.8
Crude oil	-79	-106	-113	-121	-128	6.0	1.4	1.3	1.2	1.3
Oil products	7	8	8	9	10	3.1	1.4	1.5	1.7	1.6
Total oil	-73	-98	-105	-112	-118	6.3	1.4	1.3	1.1	1.2
Natural gas	0	0	-1	-3	-5	0	0	0	0	22.8
Electricity	-	-	-	-	-	-	-	-	-	-
Total	-102	-113	-119	-122	-134	1.9	1.0	0.7	1.8	1.1
Gross Consumption										
Solids	73	87	97	111	129	3.6	2.2	2.7	3.0	2.7
Oil (3)	44	52	61	71	84	3.5	3.2	3.2	3.3	3.2
Natural gas	3	3	4	4	4	1.7	1.1	1.5	1.7	1.4
Nuclear	1	2	2	3	3	9.8	0.7	3.2	3.2	2.4
Hydro	4	4	5	6	7	-0.3	3.4	3.4	3.4	3.4
Heat (1)	0	0	0	0	0	0	0	0	0	0
Renewable (2)	100	105	112	119	127	1.1	1.3	1.3	1.2	1.2
Total	225	254	281	314	354	2.5	2.0	2.3	2.4	2.2
Power Generation										
Output in TWh										
Nuclear	*16*	*26*	*27*	*31*	*37*	*9.8*	*0.7*	*3.2*	*3.2*	*2.4*
Hydro	*15*	*15*	*18*	*21*	*25*	*-0.3*	*3.4*	*3.4*	*3.4*	*3.4*
Thermal	*170*	*191*	*225*	*271*	*333*	*2.3*	*3.4*	*3.8*	*4.2*	*3.8*
Total	*202*	*231*	*269*	*323*	*394*	*2.8*	*3.1*	*3.7*	*4.0*	*3.6*
Inputs										
Solids	36	49	57	70	86	6.5	3.3	4.0	4.4	3.9
Oil (3)	2	3	3	4	4	3.4	2.1	2.8	3.2	2.7
Gas (4)	2	2	3	3	3	1.8	0.7	1.2	1.5	1.1
Nuclear	1	2	2	3	3	9.8	0.7	3.2	3.2	2.4
Hydro	4	4	5	6	7	-0.3	3.4	3.4	3.4	3.4
Heat (1)	0	0	0	0	0	0	0	0	0	0
Renewable (2)	0	0	0	0	0	1.7	3.1	3.8	4.2	3.7
Total	46	61	70	85	104	5.8	3.0	3.8	4.1	3.6
Final Energy Consumption										
Solids	17	18	19	21	22	0.8	1.5	1.5	1.1	1.4
Oil (3)	35	42	50	58	69	3.5	3.4	3.3	3.4	3.4
Gas (4)	1	1	1	1	1	-2.4	1.0	1.0	1.0	1.0
Electricity	14	17	20	25	31	3.2	3.6	4.2	4.5	4.1
Heat (5)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	100	98	105	111	118	-0.4	1.2	1.2	1.2	1.2
Total	168	176	194	216	240	0.9	2.0	2.1	2.2	2.1
CO2 Emissions in Mt of CO2	409	487	551	635	740	3.5	2.5	2.9	3.1	2.8
Indicators										
Population in Millions	455	524	612	714	830	2.9	3.2	3.1	3.1	3.1
GDP Index (1985 = 100)	100	114	133	158	188	2.7	3.1	3.5	3.6	3.4
Gross Consump/GDP (6)	698	689	655	617	583	-0.3	-1.0	-1.2	-1.1	-1.1
Gross Consump/capita (7)	0.49	0.48	0.46	0.44	0.43	-0.4	-1.1	-0.8	-0.6	-0.9
Electricity/capita (8)	443	442	440	453	475	-0.1	-0.1	0.6	0.9	0.5
CO2 emissions/capita (9)	0.90	0.93	0.90	0.89	0.89	0.6	-0.6	-0.2	0.1	-0.3

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

MIDDLE EAST	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	1	0	0	0	0	-10.6	0	0	0	0
Crude oil	549	853	1086	1299	1431	9.2	5.0	3.6	2.0	3.5
Natural gas	53	83	105	133	176	9.2	4.9	4.9	5.7	5.2
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	1	1	1	2	2	6.8	3.8	3.4	2.7	3.3
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	1	1	1	1	1	-0.1	1.0	0.5	0.2	0.6
Total	604	938	1194	1435	1611	9.2	4.9	3.8	2.3	3.7
Net Imports										
Solids	2	3	4	5	7	6.1	7.1	6.9	5.8	6.6
Crude oil	-353	-642	-848	-1023	-1118	12.7	5.7	3.8	1.8	3.8
Oil products	-64	-82	-92	-106	-120	5.2	2.4	2.8	2.4	2.5
Total oil	-416	-724	-940	-1130	-1238	11.7	5.4	3.7	1.9	3.6
Natural gas	-3	-4	-5	-5	-15	8.9	5.3	0.3	23.6	9.3
Electricity	-	-	-	-	-	-	-	-	-	-
Total	-417	-725	-941	-1129	-1246	11.7	5.4	3.7	2.0	3.7
Gross Consumption										
Solids	3	3	4	6	7	3.1	6.2	6.2	5.4	6.0
Oil (3)	140	129	146	169	193	-1.7	2.6	3.0	2.7	2.7
Natural gas	51	79	100	128	161	9.3	4.9	5.1	4.7	4.9
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	1	1	1	2	2	6.8	3.8	3.4	2.7	3.3
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	1	1	1	1	1	-0.1	1.0	0.5	0.2	0.6
Total	195	213	253	306	365	1.8	3.5	3.9	3.6	3.7
Power Generation										
Output in TWh										
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	*10*	*14*	*17*	*20*	*23*	*6.8*	*3.8*	*3.4*	*2.7*	*3.3*
Thermal	*162*	*219*	*272*	*348*	*432*	*6.2*	*4.5*	*5.0*	*4.4*	*4.6*
Total	*172*	*233*	*289*	*368*	*455*	*6.2*	*4.4*	*4.9*	*4.3*	*4.6*
Inputs										
Solids	2	2	4	5	7	5.4	7.8	7.4	6.1	7.1
Oil (3)	28	20	19	19	18	-6.5	-0.7	-0.2	-0.8	-0.6
Gas (4)	15	26	37	52	70	11.6	7.6	7.2	5.9	6.9
Nuclear	-	-	-	-	-	-	-	-	-	-
Hydro	1	1	1	2	2	6.8	4	3	3	3
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	-	-	-	-	-	-	-	-	-	-
Total	45	49	61	78	96	1.7	4.5	5.0	4.4	4.6
Final Energy Consumption										
Solids	1	1	1	1	1	-2.9	0	0	0	0
Oil (3)	94	89	103	122	141	-1.1	3.1	3.4	3.0	3.2
Gas (4)	20	26	31	38	45	5.8	3.4	3.8	3.7	3.6
Electricity	13	17	21	27	34	5.9	4.8	5.1	4.4	4.8
Heat (5)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	1	1	1	1	1	-0.1	1.0	0.5	0.2	0.6
Total	128	133	157	188	222	0.8	3.3	3.7	3.3	3.4
CO2 Emissions in Mt of CO2	446	462	546	660	782	0.7	3.4	3.8	3.5	3.6
Indicators										
Population in Millions	112	130	149	172	198	3.1	2.8	3.0	2.8	2.9
GDP Index (1985 = 100)	100	110	132	160	195	2.0	3.6	4.0	4.0	3.9
Gross Consump/GDP (6)	324	321	319	318	311	-0.2	-0.1	-0.1	-0.4	-0.2
Gross Consump/capita (7)	1.75	1.64	1.70	1.78	1.84	-1.3	0.7	0.9	0.7	0.8
Electricity/capita (8)	1544	1794	1943	2138	2298	3.0	1.6	1.9	1.5	1.7
CO2 emissions/capita (9)	3.99	3.55	3.67	3.83	3.94	-2.3	0.6	0.9	0.6	0.7

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) In toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

CHINA	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	427	542	629	788	945	4.9	3.0	4.6	3.7	3.8
Crude oil	127	141	155	171	189	2.0	2.0	2.0	2.0	2.0
Natural gas	11	13	16	20	25	3.3	4.0	5.0	5.0	4.7
Nuclear	-	-	3	5	7	-	-	11.6	7.5	-
Hydro	8	11	17	27	42	6.2	9.7	10.0	9.0	9.6
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	42	44	45	47	48	0.6	0.8	0.7	0.5	0.7
Total	616	750	865	1058	1257	4.0	2.9	4.1	3.5	3.5
Net Imports										
Solids	-3	-11	8	0	5	30.1	-	-	-	-
Crude oil	-30	-28	-26	-19	-16	-1.6	-1.3	-6.1	-3.2	-3.5
Oil products	-5	1	2	3	4	0.0	7.7	8.5	6.0	7.4
Total oil	-36	-27	-24	-16	-12	-5.7	-1.9	-7.8	-5.3	-5.0
Natural gas	-	-	-	-	-	-	-	-	-	-
Electricity	-	-	-	-	-	-	-	-	-	-
Total	-39	-37	-16	-16	-7	-0.6	-15.2	-0.1	-15.9	-10.7
Gross Consumption										
Solids	405	531	637	787	951	5.6	3.7	4.3	3.8	4.0
Oil (3)	94	114	131	155	177	3.9	2.8	3.5	2.7	3.0
Natural gas	11	13	16	20	25	3.3	4.0	5.0	5.0	4.7
Nuclear	-	-	3	5	7	-	-	11.6	7.5	-
Hydro	8	11	17	27	42	6.2	9.7	10.0	9.0	9.6
Heat (1)	0	0	0	0	0	-	-	-	-	-
Renewable (2)	42	44	45	47	48	0.6	0.8	0.7	0.5	0.7
Total	560	713	849	1042	1250	4.9	3.6	4.2	3.7	3.8
Power Generation										
Output in TWh										
Nuclear	-	-	*11*	*19*	*27*	*0*	*0*	*11.6*	*7.5*	-
Hydro	*92*	*125*	*198*	*319*	*491*	*6.2*	*9.7*	*10.0*	*9.0*	*9.6*
Thermal	*318*	*529*	*778*	*1176*	*1631*	*10.7*	*8.0*	*8.6*	*6.8*	*7.8*
Total	*411*	*653*	*986*	*1514*	*2148*	*9.7*	*8.6*	*8.9*	*7.3*	*8.3*
Inputs										
Solids	75	125	186	283	393	10.7	8.3	8.7	6.8	7.9
Oil (3)	14	15	16	18	19	1.1	1.6	2.3	0.7	1.6
Gas (4)	0	0	0	1	1	-1.1	8.3	8.7	6.8	7.9
Nuclear	-	-	3	5	7	0.0	0.0	11.6	7.5	-
Hydro	8	11	17	27	42	6.2	10	10	9	10
Heat (1)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	-	-	0	0	0	-	-	0.0	0.0	-
Total	97	151	223	334	461	9.1	8.1	8.4	6.7	7.7
Final Energy Consumption										
Solids	299	367	396	426	457	4.1	1.5	1.5	1.4	1.5
Oil (3)	62	70	80	93	104	2.4	2.7	3.0	2.4	2.7
Gas (4)	8	11	15	19	24	7.5	5.1	5.3	5.1	5.2
Electricity	30	47	73	113	162	9.5	9.0	9.2	7.5	8.6
Heat (5)	9	13	17	24	30	6.6	6.4	6.8	5.1	6.1
Renewable (2)	42	44	45	47	48	0.6	0.8	0.7	0.5	0.7
Total	451	552	626	722	826	4.1	2.6	2.9	2.7	2.7
CO2 Emissions in Mt of CO2	1830	2368	2827	3476	4172	5.3	3.6	4.2	3.7	3.8
Indicators										
Population in Millions	1060	1139	1222	1298	1353	1.5	1.4	1.2	0.8	1.2
GDP Index (1985 = 100)	100	143	197	281	366	7.5	6.5	7.4	5.4	6.4
Gross Consump/GDP (6)	1785	1584	1375	1181	1090	-2.4	-2.8	-3.0	-1.6	-2.5
Gross Consump/capita (7)	0.53	0.63	0.69	0.80	0.92	3.4	2.1	2.9	2.9	2.6
Electricity/capita (8)	388	573	807	1166	1587	8.1	7.1	7.6	6.4	7.0
CO2 emissions/capita (9)	1.73	2.08	2.31	2.68	3.08	3.8	2.2	3.0	2.9	2.7

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

OTHER ASIA	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	127	162	206	261	318	5.0	4.9	4.9	4.0	4.6
Crude oil	134	157	179	205	220	3.2	2.7	2.7	1.4	2.3
Natural gas	60	88	104	124	147	7.9	3.5	3.5	3.6	3.5
Nuclear	13	23	28	34	41	12.0	3.8	3.9	3.9	3.9
Hydro	12	15	20	30	41	5.1	6.0	8.0	6.7	6.9
Heat (1)	4	5	7	9	12	2.4	5.8	6.0	6.0	5.9
Renewable (2)	143	167	220	286	362	3.2	5.6	5.4	4.8	5.3
Total	493	618	764	948	1141	4.6	4.3	4.4	3.8	4.2
Net Imports										
Solids	25	38	47	42	48	8.0	4.5	-2.1	2.4	1.6
Crude oil	45	84	114	139	168	13.3	6.3	4.0	3.9	4.7
Oil products	4	15	20	27	36	31.7	5.8	6.0	6.0	5.9
Total oil	49	99	134	166	204	15.2	6.2	4.3	4.2	4.9
Natural gas	-33	-38	-38	-40	-44	2.9	0.3	0.8	1.8	1.0
Electricity	-	-	-	-	-	-	-	-	-	-
Total	42	99	143	168	208	18.9	7.6	3.3	4.3	5.1
Gross Consumption										
Solids	152	200	253	303	365	5.7	4.8	3.7	3.8	4.1
Oil (3)	185	256	314	371	424	6.7	4.1	3.4	2.7	3.4
Natural gas	27	50	66	84	104	12.9	5.7	4.9	4.4	5.0
Nuclear	13	23	28	34	41	12.0	3.8	3.9	3.9	3.9
Hydro	12	15	20	30	41	5.1	6.0	8.0	6.7	6.9
Heat (1)	4	5	7	9	12	2.4	5.8	6.0	6.0	5.9
Renewable (2)	143	167	220	286	362	3.2	5.6	5.4	4.8	5.3
Total	536	717	907	1116	1349	6.0	4.8	4.2	3.9	4.3
Power Generation										
Output in TWh										
Nuclear	*51*	*90*	*108*	*131*	*159*	*12.0*	*3.8*	*3.9*	*3.9*	*3.9*
Hydro	*135*	*175*	*235*	*345*	*477*	*5.4*	*6.0*	*8.0*	*6.7*	*6.9*
Thermal	*341*	*518*	*706*	*863*	*1060*	*8.8*	*6.4*	*4.1*	*4.2*	*4.9*
Total	*526*	*784*	*1049*	*1339*	*1696*	*8.3*	*6.0*	*5.0*	*4.8*	*5.3*
Inputs										
Solids	57	87	128	165	211	9.0	7.9	5.2	5.1	6.1
Oil (3)	26	31	32	30	29	3.5	1.1	-1.1	-1.0	-0.4
Gas (4)	7	18	24	30	36	18.7	6.8	4.1	4.0	5.0
Nuclear	13	23	28	34	41	12.0	3.8	3.9	3.9	3.9
Hydro	12	15	20	30	41	5.4	6.0	8.0	6.7	6.9
Heat (1)	4	5	7	9	12	2.4	5.8	6.0	6.0	5.9
Renewable (2)	0	0	0	0	0	-8.9	6.4	4.1	4.2	4.9
Total	119	179	240	298	371	8.4	6.0	4.5	4.5	5.0
Final Energy Consumption										
Solids	85	97	105	112	119	2.9	1.5	1.3	1.2	1.3
Oil (3)	134	188	233	278	316	7.0	4.4	3.6	2.6	3.5
Gas (4)	16	23	29	38	47	8.0	4.8	5.3	4.3	4.8
Electricity	36	55	73	93	116	8.5	6.1	4.8	4.6	5.1
Heat (5)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	138	164	217	284	360	3.5	5.8	5.5	4.9	5.4
Total	408	527	657	804	957	5.2	4.5	4.1	3.5	4.1
CO2 Emissions in Mt of CO2	1144	1558	1942	2311	2704	6.4	4.5	3.5	3.2	3.7
Indicators										
Population in Millions	1491	1648	1838	2027	2210	2.0	2.2	2.0	1.8	2.0
GDP Index (1985 = 100)	100	138	183	245	328	6.7	5.8	6.0	6.0	5.9
Gross Consump/GDP (6)	611	591	564	519	468	-0.7	-0.9	-1.7	-2.0	-1.5
Gross Consump/capita (7)	0.36	0.43	0.49	0.55	0.61	3.9	2.5	2.2	2.1	2.3
Electricity/capita (8)	353	475	570	661	767	6.1	3.7	3.0	3.0	3.2
CO2 emissions/capita (9)	0.77	0.95	1.06	1.14	1.22	4.3	2.2	1.5	1.4	1.7

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

SUMMARY ENERGY BALANCE AND INDICATORS

LATIN AMERICA	Annual Data in Mtoe					Annual Average % Change				
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
Production										
Solids	14	23	27	32	37	11.2	3.3	3.3	3.1	3.2
Crude oil	346	385	407	429	474	2.1	1.1	1.1	2.0	1.4
Natural gas	67	77	94	114	139	3.0	4.0	4.0	4.0	4.0
Nuclear	2	3	3	4	5	7.4	0.6	3.0	3.0	2.2
Hydro	27	34	39	44	48	4.8	2.5	2.5	2.0	2.3
Heat (1)	2	5	6	7	9	16.2	3.5	4.8	4.8	4.4
Renewable (2)	81	90	99	108	117	2.2	1.9	1.8	1.6	1.8
Total	539	618	675	739	830	2.8	1.8	1.8	2.3	2.0
Net Imports										
Solids	5	-2	-2	1	8	-	0.3	-	41.1	-
Crude oil	-81	-114	-103	-76	-62	7.1	-2.1	-5.8	-3.9	-4.0
Oil products	-43	-28	-38	-52	-69	-7.8	6.3	6.3	5.8	6.1
Total oil	-124	-143	-141	-129	-132	2.9	-0.2	-1.9	0.5	-0.5
Natural gas	0	-2	-2	11	31	0	-8.1	0	23.4	-
Electricity	0	1	1	1	1	0	3.5	4.8	4.8	4.4
Total	-118	-146	-144	-115	-91	4.3	-0.3	-4.3	-4.6	-3.1
Gross Consumption										
Solids	19	21	25	33	46	2.6	3.5	5.6	6.3	5.2
Oil (3)	221	242	265	301	342	1.9	1.8	2.6	2.6	2.3
Natural gas	67	75	92	125	170	2.3	4.3	6.3	6.3	5.6
Nuclear	2	3	3	4	5	7.4	0.6	3.0	3.0	2.2
Hydro	27	34	39	44	48	4.8	2.5	2.5	2.0	2.3
Heat (1)	2	5	6	7	9	16.2	3.5	4.8	4.8	4.4
Renewable (2)	81	90	99	108	117	2.2	1.9	1.8	1.6	1.8
Total	419	472	531	624	739	2.4	2.4	3.3	3.4	3.0
Power Generation										
Output in TWh										
Nuclear	*9*	*13*	*13*	*15*	*18*	*7.4*	*0.6*	*3.0*	*3.0*	*2.2*
Hydro	*314*	*398*	*450*	*509*	*562*	*4.8*	*2.5*	*2.5*	*2.0*	*2.3*
Thermal	*155*	*187*	*247*	*372*	*552*	*3.7*	*5.8*	*8.6*	*8.2*	*7.5*
Total	*478*	*597*	*710*	*896*	*1131*	*4.5*	*3.5*	*4.8*	*4.8*	*4.4*
Inputs										
Solids	4	6	10	17	29	8.6	11.5	12.4	10.8	11.5
Oil (3)	26	26	27	31	36	0.4	0.5	3.2	2.9	2.2
Gas (4)	12	15	25	45	74	3.9	11.2	12.1	10.6	11.3
Nuclear	2	3	3	4	5	7.4	0.6	3.0	3.0	2.2
Hydro	27	34	39	44	48	4.8	2	2	2	2
Heat (1)	2	5	6	7	9	16.2	3.5	4.8	4.8	4.4
Renewable (2)	2	1	2	3	4	-8.2	5.8	8.7	8.3	7.6
Total	75	90	112	151	206	3.7	4.3	6.3	6.3	5.6
Final Energy Consumption										
Solids	12	13	13	13	13	0.8	-0.4	-0.1	-0.2	-0.2
Oil (3)	160	178	197	221	251	2.2	2.0	2.4	2.5	2.3
Gas (4)	36	39	44	53	63	1.8	2.3	3.6	3.6	3.2
Electricity	35	36	45	57	73	1.0	4.1	5.2	5.1	4.8
Heat (5)	-	-	-	-	-	-	-	-	-	-
Renewable (2)	66	70	78	92	109	1.4	2.0	3.4	3.4	2.9
Total	309	337	376	436	508	1.8	2.2	3.0	3.1	2.8
CO2 Emissions in Mt of CO2	754	829	944	1138	1392	1.9	2.6	3.8	4.1	3.5
Indicators										
Population in Millions	402	447	491	536	580	2.1	1.9	1.8	1.6	1.8
GDP Index (1985 = 100)	100	108	121	145	175	1.6	2.2	3.8	3.8	3.3
Gross Consump/GDP (6)	441	459	463	452	444	0.8	0.2	-0.5	-0.3	-0.2
Gross Consump/capita (7)	1.04	1.06	1.08	1.16	1.27	0.3	0.5	1.5	1.8	1.3
Electricity/capita (8)	1191	1336	1446	1673	1950	2.3	1.6	3.0	3.1	2.6
CO2 emissions/capita (9)	1.88	1.86	1.92	2.13	2.40	-0.2	0.7	2.0	2.5	1.7

(1) Geothermal energy.
(2) Mainly biomass.
(3) Crude oil and finished oil products.
(4) Natural gas and derived gases.
(5) Heat produced in combination with electricity and district heating.
(6) in toe/million 1985 ECU
(7) in toe/inhabitant.
(8) in kWh per inhabitant.
(9) in t of CO2 per inhabitant.

EUROPEAN COMMUNITY

REFERENCE CASE

ANALYSIS

EUROPEAN COMMUNITY - MAIN ASSUMPTIONS

	POPULATION in 1000 inhabitants					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	2005/2000	2005/90
Belgium	9858	9948	9998	10048	10073	0.2	0.1	0.1	0.0	1.3
Denmark	5114	5148	5160	5160	5110	0.1	0.0	0.0	-0.2	-0.7
Germany (old)	61024	62857	65900	67821	68501	0.6	0.9	0.6	0.2	9.0
Former G.D.R.	16640	16230	15670	15240	15000	-0.5	-0.7	-0.6	-0.3	-7.6
Germany (new)	77664	79087	81570	83061	83501	0.4	0.6	0.4	0.1	5.6
Greece	9934	10046	10173	10285	10399	0.2	0.3	0.2	0.2	3.5
Spain	38474	38959	39356	39751	40050	0.3	0.2	0.2	0.1	2.8
France	55170	56420	57838	59291	60481	0.4	0.5	0.5	0.4	7.2
Ireland	3540	3527	3600	3670	3710	-0.1	0.4	0.4	0.2	5.2
Italy	57128	57637	58215	58798	59298	0.2	0.2	0.2	0.2	2.9
Luxembourg	367	377	377	377	377	0.6	0.0	0.0	0.0	0.0
Netherlands	14488	14951	15402	15711	15948	0.6	0.6	0.4	0.3	6.7
Portugal	9648	9808	9848	9931	10015	0.3	0.1	0.2	0.2	2.1
United Kingdom	56618	57394	58257	59134	60024	0.3	0.3	0.3	0.3	4.6
Europe 12 (old)	321363	327072	334123	339978	343986	0.4	0.4	0.3	0.2	5.2
Europe 12 (new)	338003	343302	349793	355218	358986	0.3	0.4	0.3	0.2	4.6

GROSS DOMESTIC PRODUCT in billions ECU (prices and exchange rates						Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	2005/2000	2005/90
Belgium	105.5	123.3	136.3	153.7	172.0	3.2	2.0	2.4	2.3	39.4
Denmark	76.7	82.8	93.1	104.4	115.3	1.5	2.4	2.3	2.0	39.3
Germany (old)	822.2	959.4	1079.9	1201.0	1323.5	3.1	2.4	2.1	2.0	37.9
Greece	43.7	47.0	52.8	59.9	68.8	1.5	2.3	2.6	2.8	46.2
Spain	218.3	272.0	310.6	361.8	417.6	4.5	2.7	3.1	2.9	53.5
France	691.7	797.1	885.0	991.5	1108.1	2.9	2.1	2.3	2.2	39.0
Ireland	24.7	29.9	33.8	38.9	44.2	3.9	2.5	2.8	2.6	47.8
Italy	561.3	650.0	721.6	833.9	936.3	3.0	2.1	2.9	2.3	44.1
Luxembourg	4.6	5.6	6.6	7.5	8.6	4.3	3.1	2.8	2.6	51.9
Netherlands	166.5	190.0	209.2	234.9	261.2	2.7	1.9	2.3	2.2	37.5
Portugal	27.1	33.8	41.3	50.2	59.7	4.5	4.1	4.0	3.5	76.7
United Kingdom	602.8	706.6	744.8	812.5	886.4	3.2	1.1	1.8	1.8	25.4
Europe 12 (old)	3345.1	3897.6	4314.8	4850.2	5401.6	3.1	2.1	2.4	2.2	38.6

GDP (bn DM90)	1985	1990	1995	2000		90/85	95/90	2000/95		2000/90
Former G.D.R.	0	214	225	358		0.0	1.0	9.7		67.4
Germany (new)	0	2617	2930	3367		0.0	2.3	2.8		28.6

	INDEX OF INDUSTRIAL PRODUCTION (1985 = 100)					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	2005/2000	2005/90
Belgium	100.0	118.4	130.2	149.1	169.0	3.4	1.9	2.8	2.5	42.8
Denmark	100.0	107.8	121.3	136.0	150.2	1.5	2.4	2.3	2.0	39.3
Germany (old)	100.0	117.9	132.2	140.8	148.0	3.3	2.3	1.3	1.0	25.5
Greece	100.0	103.2	111.4	124.9	141.2	0.6	1.5	2.3	2.5	36.8
Spain	100.0	116.1	123.9	140.4	158.4	3.0	1.3	2.5	2.4	36.4
France	100.0	113.8	123.1	134.1	145.6	2.6	1.6	1.7	1.7	28.0
Ireland	100.0	143.8	162.6	187.0	212.6	7.5	2.5	2.8	2.6	47.8
Italy	100.0	117.8	128.1	156.9	177.0	3.3	1.7	4.1	2.4	50.2
Luxembourg	100.0	118.0	129.5	146.5	164.1	3.4	1.9	2.5	2.3	39.1
Netherlands	100.0	109.1	122.7	138.4	152.5	1.8	2.4	2.4	2.0	39.8
Portugal	100.0	135.3	152.5	185.6	220.4	6.2	2.4	4.0	3.5	62.9
United Kingdom	100.0	109.3	119.9	131.9	143.4	1.8	1.9	1.9	1.7	31.2
Europe 12 (old)	100.0	115.1	126.4	141.5	154.9	2.9	1.9	2.3	1.8	34.6

EUROPEAN COMMUNITY - MAIN ASSUMPTIONS

	INDEX OF GDP DEFLATOR (1985 = 100)					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	2005/2000	2005/90
Belgium	100.0	116.2	135.2	153.2	171.5	3.1	3.1	2.5	2.3	47.5
Denmark	100.0	122.1	136.6	151.2	165.9	4.1	2.3	2.0	1.9	35.8
Germany (old)	100.0	113.3	137.8	161.2	186.1	2.5	4.0	3.2	2.9	64.2
Greece	100.0	208.3	354.1	458.3	571.2	15.8	11.2	5.3	4.5	174.2
Spain	100.0	142.5	185.4	232.3	290.6	7.3	5.4	4.6	4.6	103.9
France	100.0	119.1	136.7	158.7	183.2	3.6	2.8	3.0	2.9	53.9
Ireland	100.0	120.1	136.8	158.8	183.3	3.7	2.6	3.0	2.9	52.6
Italy	100.0	138.4	177.2	210.5	246.4	6.7	5.1	3.5	3.2	78.0
Luxembourg	100.0	114.9	132.5	146.5	162.0	2.8	2.9	2.0	2.0	40.9
Netherlands	100.0	106.2	122.8	137.3	151.3	1.2	2.9	2.2	2.0	42.4
Portugal	100.0	194.0	300.6	374.6	455.7	14.2	9.2	4.5	4.0	134.9
United Kingdom	100.0	134.5	166.3	201.5	237.9	6.1	4.3	3.9	3.4	76.9
Europe 12 (old)	100.0	126.4	155.9	185.4	217.8	4.8	4.3	3.5	3.3	72.3

	EXCHANGE RATES (1US $ = ...)			
	1985	1990	1995	1996 to 2005
Belgium	59.140	33.951	35.310	35.310
Denmark	10.557	6.180	6.449	6.449
Germany (old)	2.931	1.614	1.690	1.690
Greece	138.0	158.5	243.0	265.0
Spain	169.8	101.8	101.8	101.8
France	8.947	5.446	5.693	5.693
Ireland	0.9420	0.6047	0.6250	0.6250
Italy	1905	1198	1253	1253
Luxembourg	59.140	33.951	35.310	35.310
Netherlands	3.306	1.823	1.890	1.890
Portugal	171.2	142.5	144.5	144.5
United Kingdom	0.7750	0.5630	0.6034	0.6034
ECU	1.310	0.785	0.830	0.830

	EXOGENOUS HARD COAL PRODUCTION				
1000 toe	1985	1990	1995	2000	2005
Belgium	3958	606	*0*	*0*	*0*
Germany (old)	58318	50322	*42118*	*32194*	*24944*
Spain	8950	8936	*7900*	*7500*	*6500*
France	9114	6512	*5000*	*4000*	*3000*
Ireland	29	23	*20*	*20*	*10*
Italy	0	36	*29*	*26*	*24*
Portugal	98	115	*90*	*0*	*0*
United Kingdom	53131	52256	*42497*	*34236*	*27549*
Europe 12 (old)	133598	118806	97654	77976	62027

INTERNATIONAL IMPORT PRICES

US $ Current Prices (CIF)	Annual Data					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	2000/95	2005/00	2005/90
per bbl										
CRUDE OIL	27.75	22.66	22.25	32.55	48.68	-4.0	-0.4	7.9	8.4	114.8
In 1990 Prices	33.02	22.66	19.00	23.00	28.00	-7.3	-3.5	3.9	4.0	23.6
per mt (Spot Rotterdam)										
GASOLINE	273.1	274.9	264.9	398.2	621.7	0.1	-0.7	8.5	9.3	126.2
DIESEL OIL	240.2	214.3	233.6	345.6	524.3	-2.3	1.7	8.2	8.7	144.7
RESIDUAL FUEL OIL	151.4	100.1	79.2	114.3	168.3	-7.9	-4.6	7.6	8.0	68.2
per toe										
STEAM COAL	73.86	77.57	83.65	105.13	136.59	1.0	1.5	4.7	5.4	76.1
METALLURGICAL COAL	89.96	94.80	102.05	128.26	166.64	1.1	1.5	4.7	5.4	75.8
per tce										
STEAM COAL.	51.71	54.30	58.55	73.59	95.62	1.0	1.5	4.7	5.4	76.1
In 1990 Prices.	61.52	54.30	50.00	52.00	55.00	-2.5	-1.6	0.8	1.1	1.3
per Mbtu										
NATURAL GAS										
NORWAY & NETHERLANDS	4.05	2.83	3.56	5.05	7.34	-6.9	4.7	7.2	7.8	158.9
in 1990 Prices	4.82	2.83	3.04	3.57	4.22	-10.1	1.4	3.2	3.4	48.9
per pound										
NUCLEAR RAW MATERIAL	23.58	24.66	25.79	26.97	28.21	0.9	0.9	0.9	0.9	14.4

MAIN INDICATORS : EUROPEAN COMMUNITY (old)

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	3345.1	3897.6	4314.8	4850.2	5401.6	3.1	2.1	2.4	2.2	38.6
per capita (ECU 85/capita)	10409	11917	12914	14266	15703	2.7	1.6	2.0	1.9	31.8
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	3.2	3.4	3.6	3.8	3.9	1.3	1.2	1.0	0.5	15.1
by unit of GDP (toe/MECU 85)	307.6	286.0	280.7	267.7	249.8	-1.4	-0.4	-0.9	-1.4	-12.7
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	202.1	185.1	183.0	174.2	162.2	-1.7	-0.2	-1.0	-1.4	-12.4
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	391.9	391.7	397.8	391.3	379.8	0.0	0.3	-0.3	-0.6	-3.0
CO2 EMISSIONS										
per capita (t)	8.2	8.5	8.9	9.2	9.4	0.6	1.0	0.8	0.4	11.3
by Final Consumption (t/toe)	3.9	3.8	3.8	3.7	3.7	-0.3	-0.4	-0.2	-0.1	-3.6

SUMMARY OIL BALANCE : EUROPEAN COMMUNITY (old)

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	150.92	116.53	127.87	119.74	111.15	-5.0	1.9	-1.3	-1.5	-4.6
Net Imports	333.62	413.85	434.73	467.53	478.56	4.4	1.0	1.5	0.5	15.6
of Crude	294.16	387.70	413.10	440.31	457.97	5.7	1.3	1.3	0.8	18.1
Total Refinery Output	447.72	506.11	543.61	562.13	573.19	2.5	1.4	0.7	0.4	13.3
of which (in %) :										
Gasoline	22.7	23.6	24.9	25.7	26.9	0.8	1.1	0.7	0.9	14.2
Gas/Diesel Oil	33.1	32.8	32.7	33.0	33.2	-0.2	-0.1	0.2	0.1	1.2
Residual Fuel Oil	21.7	19.4	18.5	17.1	15.2	-2.2	-1.0	-1.5	-2.3	-21.6
Other Products	22.5	24.2	24.0	24.2	24.7	1.5	-0.2	0.2	0.4	1.9
Total Oil Consumption	486.56	525.83	560.22	583.75	587.88	1.6	1.3	0.8	0.1	11.8
of which (in %) :										
Gasoline	19.7	21.1	21.8	22.7	23.4	1.4	0.7	0.8	0.6	10.8
Gas/Diesel Oil	35.5	34.6	35.1	35.6	35.8	-0.5	0.3	0.3	0.1	3.6
Residual Fuel Oil	21.3	19.0	17.9	15.6	13.7	-2.3	-1.2	-2.6	-2.6	-27.8
Other Products	23.5	25.4	25.2	26.1	27.1	1.5	-0.1	0.6	0.8	6.9

EUROPEAN COMMUNITY (old)

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	238949	234121	240965	244399	247755	-0.4	0.6	0.3	0.3	5.8
Oil	462487	497415	528818	552414	555373	1.5	1.2	0.9	0.1	11.7
Natural Gas	184700	207543	249772	300050	337797	2.4	3.8	3.7	2.4	62.8
Nuclear	123615	157152	166396	172319	173673	4.9	1.1	0.7	0.2	10.5
Geothermal	1698	1978	3157	5044	5601	3.1	9.8	9.8	2.1	183.1
Electricity	15751	13850	19247	18019	17238	-2.5	6.8	-1.3	-0.9	24.5
Renewable & Other	1766	2650	2887	6088	11833	8.5	1.7	16.1	14.2	346.6
Total	1028966	1114709	1211242	1298334	1349269	1.6	1.7	1.4	0.8	21.0
INDIGENOUS PRODUCTION										
Solids	172570	155448	132671	112497	97029	-2.1	-3.1	-3.2	-2.9	-37.6
Oil	150918	116532	127869	119740	111155	-5.0	1.9	-1.3	-1.5	-4.6
Natural Gas	127117	129749	152270	160431	167638	0.4	3.3	1.0	0.9	29.2
Nuclear	123615	157152	166396	172319	173673	4.9	1.1	0.7	0.2	10.5
Geothermal	1698	1978	3157	5044	5601	3.1	9.8	9.8	2.1	183.1
Hydro	14564	12424	16182	16666	16875	-3.1	5.4	0.6	0.3	35.8
Renewable & Other	1766	2650	2887	6088	11833	8.5	1.7	16.1	14.2	346.6
Total	592248	575931	601432	592785	583804	-0.6	0.9	-0.3	-0.3	1.4
NET IMPORTS										
Solids	62391	77464	108295	131903	150725	4.4	6.9	4.0	2.7	94.6
Oil	333622	413855	434732	467530	478559	4.4	1.0	1.5	0.5	15.6
Natural Gas	59346	80197	97502	139619	170159	6.2	4.0	7.4	4.0	112.2
Electricity	1187	1426	3064	1353	363	3.7	16.5	-15.1	-23.1	-74.6
Total	456545	572942	643593	740404	799806	4.6	2.4	2.8	1.6	39.6
INPUTS INTO POWER GENERATION										
Solids	140370	153602	161734	169516	178209	1.8	1.0	0.9	1.0	16.0
Oil	39429	41371	42103	34762	28051	1.0	0.4	-3.8	-4.2	-32.2
Gas	28185	33490	46602	77035	103027	3.5	6.8	10.6	6.0	207.6
Geothermal	1698	1978	3157	5044	5601	3.1	9.8	9.8	2.1	183.1
Renewable & Other	1766	2650	2887	3637	4484	8.5	1.7	4.7	4.3	69.2
Total	211447	233091	256483	289994	319372	2.0	1.9	2.5	1.9	37.0
FINAL ENERGY CONSUMPTION										
Solids	68096	55090	52832	49548	45513	-4.2	-0.8	-1.3	-1.7	-17.4
Oil	336945	358518	385143	408035	415173	1.2	1.4	1.2	0.3	15.8
Gas	154057	172356	198911	216267	226105	2.3	2.9	1.7	0.9	31.2
Heat	4352	4363	5007	5354	5741	0.1	2.8	1.3	1.4	31.6
Electricity	112734	131292	147601	163209	176449	3.1	2.4	2.0	1.6	34.4
Biofuels	0	0	0	2451	7349	0.0	0.0	0.0	24.6	0.0
Total	676184	721619	789495	844864	876331	1.3	1.8	1.4	0.7	21.4
Industry										
Solids	47665	43463	41297	39609	37225	-1.8	-1.0	-0.8	-1.2	-14.4
Oil	50371	43547	39312	37030	33742	-2.9	-2.0	-1.2	-1.8	-22.5
Gas	63106	73475	81156	86781	89600	3.1	2.0	1.3	0.6	21.9
Heat	2286	2646	2752	2900	2994	3.0	0.8	1.1	0.6	13.2
Electricity	50774	57984	62804	67888	71399	2.7	1.6	1.6	1.0	23.1
Total	214202	221115	227321	234208	234960	0.6	0.6	0.6	0.1	6.3
Transports										
Solids	171	65	72	69	69	-17.6	2.0	-0.7	-0.2	5.5
Oil	178231	225961	252614	278781	296057	4.9	2.3	2.0	1.2	31.0
Gas	240	207	224	223	223	-2.9	1.6	0.0	0.0	7.9
Electricity	2764	3311	3572	3965	4342	3.7	1.5	2.1	1.8	31.1
Biofuels	0	0	0	2451	7349	0.0	0.0	0.0	24.6	0.0
Total	181406	229544	256481	285489	308041	4.8	2.2	2.2	1.5	34.2
Dom. & Tert.										
Solids	20260	11562	11464	9869	8220	-10.6	-0.2	-3.0	-3.6	-28.9
Oil	108343	89011	93217	92225	85374	-3.9	0.9	-0.2	-1.5	-4.1
Gas	90711	98674	117532	129263	136281	1.7	3.6	1.9	1.1	38.1
Heat	2066	1717	2255	2454	2747	-3.6	5.6	1.7	2.3	60.0
Electricity	59196	69997	81226	91356	100708	3.4	3.0	2.4	2.0	43.9
Total	280575	270960	305692	325167	333331	-0.7	2.4	1.2	0.5	23.0
IMPORT DEPENDENCY (%)										
Solids	26.1	33.1	44.9	54.0	60.8					
Oil	68.2	78.1	77.2	79.6	81.2					
Natural Gas	32.1	38.6	39.0	46.5	50.4					
Total	43.2	49.9	51.7	55.5	57.8					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

EUROPEAN COMMUNITY (old)

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	34.070	102.517	105.695	108.426	110.034	68.447	3.178	2.731	1.608	7.517
MONOVALENTS										
HARD COAL	66.285	69.693	68.564	70.923	71.659	3.408	-1.129	2.359	0.736	1.966
LIGNITE	17.779	19.066	18.165	17.709	18.221	1.287	-0.901	-0.456	0.512	-0.845
RESIDUAL FUEL OIL	65.833	51.579	51.566	47.394	42.210	-14.254	-0.013	-4.172	-5.184	-9.369
NATURAL GAS CONV.	13.396	17.350	19.586	21.507	23.207	3.954	2.236	1.921	1.700	5.857
NAT. GAS COMB. CYCLE	0.000	0.200	16.908	41.779	69.270	0.200	16.708	24.871	27.490	69.070
OTHER (1)	2.524	6.243	6.320	6.396	6.687	3.720	0.077	0.076	0.290	0.443
TOTAL	165.817	164.131	181.109	205.708	231.253	-1.685	16.978	24.599	25.545	67.122
POLYVALENTS										
WITH COAL	34.530	44.813	48.502	55.151	62.616	10.283	3.689	6.649	7.465	17.803
WITHOUT COAL	25.066	27.180	27.457	30.783	36.084	2.114	0.277	3.326	5.301	8.904
PEAK DEVICE	12.202	15.477	17.195	20.133	20.726	3.275	1.718	2.938	0.593	5.249
TOTAL THERMAL	237.615	251.601	274.263	311.775	350.679	13.986	22.662	37.512	38.904	99.078
HYDRO	50.401	57.190	60.132	62.083	62.797	6.789	2.942	1.952	0.714	5.608
RENEWABLE	0.462	1.061	2.293	4.745	6.199	0.599	1.232	2.452	1.454	5.138
TOTAL WITHOUT PUMPING	322.548	412.369	442.383	487.030	529.710	89.821	30.014	44.647	42.680	117.341
PUMPING	13.202	22.058	22.813	24.251	24.391	8.856	0.755	1.438	0.140	2.333
TOTAL	335.750	434.427	465.196	511.281	554.101	98.677	30.769	46.085	42.820	119.674

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	477641	627486	672598	697800	704508	5.6	1.4	0.7	0.2	12.3
HARD COAL		540953	593713	637408	682498		1.9	1.4	1.4	26.2
LIGNITE		125132	119123	118250	120787		-1.0	-0.1	0.4	-3.5
RESIDUAL FUEL OIL		169486	168785	140254	113041		-0.1	-3.6	-4.2	-33.3
GAS DIESEL OIL		6453	6811	7562	8197		1.1	2.1	1.6	27.0
NATURAL GAS		128975	199397	377171	531621		9.1	13.6	7.1	312.2
OTHER (1)		41906	42932	43488	45161		0.5	0.3	0.8	7.8
TOTAL THERMAL	887626	1012904	1130761	1324135	1501305	2.7	2.2	3.2	2.5	48.2
HYDRO	162005	145263	188167	193789	196227	-2.2	5.3	0.6	0.3	35.1
RENEWABLE	2820	3906	7856	18275	25955	6.7	15.0	18.4	7.3	564.5
TOTAL WITHOUT PUMPING	1530092	1789559	1999383	2233998	2427995	3.2	2.2	2.2	1.7	35.7
IMPORTATIONS	76609	116954	140207	133335	106820	8.8	3.7	-1.0	-4.3	-8.7
EXPORTATIONS	62811	100367	104577	117600	102600	9.8	0.8	2.4	-2.7	2.2
NET IMPORTS	13797	16587	35631	15735	4220	3.8	16.5	-15.1	-23.1	-74.6
INTERNAL DEMAND (including losses)	1543889	1806146	2035014	2249733	2432215	3.2	2.4	2.0	1.6	34.7
Final Consumption	1310863	1526650	1716300	1897780	2051730	3.1	2.4	2.0	1.6	34.4
Memo Item										
Produced from pumping	13832	14613	16217	17278	17670	1.1	2.1	1.3	0.5	20.9

(1) includes urban waste, derived gas and other petroleum products.

B E L G I U M

ELECTRICITY GENERATING CAPACITIES (GW Net)	1980	1990	1995	2000	2005	Net Capacity Expansions 90-80	95-90	00-95	05-00	2005-90
NUCLEAR	1.666	5.500	5.500	5.500	5.500	3.834	0.000	0.000	0.000	0.000
MONOVALENTS										
HARD COAL	0.155	0.126	0.095	0.795	0.910	-0.029	-0.031	0.700	0.115	0.784
LIGNITE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESIDUAL FUEL OIL	1.133	0.082	0.082	0.082	0.082	-1.051	0.000	0.000	0.000	0.000
NATURAL GAS CONV.	0.008	0.008	0.008	0.008	0.008	0.000	0.000	0.000	0.000	0.000
NAT. GAS COMB. CYCLE	0.000	0.000	1.380	2.313	3.213	0.000	1.380	0.933	0.900	3.213
OTHER (1)	0.396	0.498	0.498	0.498	0.498	0.102	0.000	0.000	0.000	0.000
TOTAL	1.692	0.714	2.063	3.696	4.711	-0.978	1.349	1.633	1.015	3.997
POLYVALENTS										
WITH COAL	2.042	3.567	3.382	2.580	2.930	1.525	-0.185	-0.802	0.350	-0.637
WITHOUT COAL	3.634	2.059	2.016	1.698	1.598	-1.575	-0.043	-0.318	-0.100	-0.461
PEAK DEVICE	0.839	0.894	1.039	1.339	1.339	0.055	0.145	0.300	0.000	0.445
TOTAL THERMAL	8.207	7.234	8.500	9.313	10.578	-0.973	1.266	0.813	1.265	3.344
HYDRO	0.075	0.094	0.094	0.094	0.094	0.019	0.000	0.000	0.000	0.000
RENEWABLE	0.000	0.004	0.014	0.080	0.160	0.004	0.010	0.066	0.080	0.156
TOTAL WITHOUT PUMPING	9.948	12.832	14.108	14.987	16.332	2.884	1.276	0.879	1.345	3.500
PUMPING	1.056	1.307	1.307	1.307	1.307	0.251	0.000	0.000	0.000	0.000
TOTAL	11.004	14.139	15.415	16.294	17.639	3.135	1.276	0.879	1.345	3.500

SUMMARY ELECTRICITY BALANCE (GWh Gross)						Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	34601	42722	43054	43110	43135	4.3	0.2	0.0	0.0	1.0
HARD COAL		17099	16731	17363	19950		-0.4	0.7	2.8	16.7
LIGNITE		0	0	0	0		0.0	0.0	0.0	0.0
RESIDUAL FUEL OIL		1304	1494	1230	169		2.8	-3.8	-32.8	-87.0
GAS DIESEL OIL		11	12	11	15		1.7	-1.2	5.5	33.5
NATURAL GAS		5407	9418	14644	17275		11.7	9.2	3.4	219.5
OTHER (1)		3399	3490	3490	3490		0.5	0.0	0.0	2.7

MAIN INDICATORS : BELGIUM

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	105.5	123.3	136.3	153.7	172.0	3.2	2.0	2.4	2.3	39.4
per capita (ECU 85/capita)	10702	12398	13630	15299	17071	3.0	1.9	2.3	2.2	37.7
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	4.4	4.8	5.1	5.3	5.4	1.6	1.4	0.8	0.4	13.9
by unit of GDP (toe/MECU 85)	412.4	384.7	375.8	348.5	318.2	-1.4	-0.5	-1.5	-1.8	-17.3
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	271.8	248.9	246.1	228.5	209.6	-1.7	-0.2	-1.5	-1.7	-15.8
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	458.9	470.8	481.0	469.7	443.5	0.5	0.4	-0.5	-1.1	-5.8
CO2 EMISSIONS										
per capita (t)	10.6	11.3	11.8	12.1	12.2	1.2	1.0	0.5	0.2	8.8
by Final Consumption (t/toe)	3.6	3.6	3.5	3.5	3.4	0.0	-0.7	-0.3	-0.2	-6.2

SUMMARY OIL BALANCE : BELGIUM

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
Net Imports	19.21	22.17	24.76	25.65	25.70	2.9	2.2	0.7	0.0	15.9
of Crude	20.44	26.82	30.13	31.75	32.08	5.6	2.4	1.1	0.2	19.6
Total Refinery Output	20.39	27.15	30.33	31.95	32.27	5.9	2.2	1.0	0.2	18.9
of which (in %) :										
Gasoline	19.9	20.4	21.6	22.6	23.6	0.5	1.1	0.9	0.9	15.6
Gas/Diesel Oil	36.3	38.1	38.7	38.7	38.7	0.9	0.3	0.0	0.0	1.7
Residual Fuel Oil	20.9	19.8	19.2	17.6	16.1	-1.0	-0.7	-1.6	-1.8	-18.7
Other Products	22.8	21.7	20.6	21.1	21.6	-1.0	-1.1	0.5	0.5	-0.5
Total Oil Consumption	19.66	22.57	24.52	25.39	25.44	2.8	1.7	0.7	0.0	12.7
of which (in %) :										
Gasoline	13.4	12.7	12.8	13.3	13.9	-1.0	0.2	0.8	0.8	9.4
Gas/Diesel Oil	41.7	40.6	42.0	41.7	41.8	-0.5	0.7	-0.1	0.0	3.0
Residual Fuel Oil	24.2	24.8	23.2	22.0	20.2	0.5	-1.3	-1.1	-1.7	-18.3
Other Products	20.8	21.9	21.9	22.9	24.1	1.1	0.0	0.9	1.0	9.7

B E L G I U M

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	9886	10196	9598	9185	8923	0.6	-1.2	-0.9	-0.6	-12.5
Oil	17433	18436	20452	21328	21529	1.1	2.1	0.8	0.2	16.8
Natural Gas	7328	8169	10091	11727	12708	2.2	4.3	3.1	1.6	55.6
Nuclear	8703	10706	10764	10777	10784	4.2	0.1	0.0	0.0	0.7
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	20	-297	70	225	250	0.0	0.0	26.3	2.1	-184.2
Renewable & Other	142	242	240	328	523	11.3	-0.2	6.5	9.7	115.8
Total	43512	47453	51215	53571	54716	1.7	1.5	0.9	0.4	15.3
INDIGENOUS PRODUCTION										
Solids	4368	1085	357	283	249	-24.3	-19.9	-4.5	-2.6	-77.1
Oil	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Natural Gas	34	10	0	0	0	-22.3	-100.0	0.0	0.0	-100.0
Nuclear	8703	10706	10764	10777	10784	4.2	0.1	0.0	0.0	0.7
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	24	24	31	39	40	-0.7	6.0	4.2	0.6	69.3
Renewable & Other	142	242	240	328	523	11.3	-0.2	6.5	9.7	115.8
Total	13271	12066	11392	11428	11595	-1.9	-1.1	0.1	0.3	-3.9
NET IMPORTS										
Solids	5566	9487	9241	8902	8674	11.3	-0.5	-0.7	-0.5	-8.6
Oil	19210	22171	24762	25651	25697	2.9	2.2	0.7	0.0	15.9
Natural Gas	7286	8217	10091	11727	12708	2.4	4.2	3.1	1.6	54.7
Electricity	-4	-320	39	186	210	140.7	0.0	37.0	2.4	0.0
Total	32057	39555	44132	46466	47289	4.3	2.2	1.0	0.4	19.6
INPUTS INTO POWER GENERATION										
Solids	2825	3875	3737	3829	4344	6.5	-0.7	0.5	2.6	12.1
Oil	948	318	355	293	62	-19.6	2.2	-3.8	-26.7	-80.6
Gas	1236	1983	2674	3528	3855	9.9	6.2	5.7	1.8	94.4
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	142	242	240	248	259	11.3	-0.2	0.7	0.9	6.9
Total	5151	6418	7006	7898	8519	4.5	1.8	2.4	1.5	32.7
FINAL ENERGY CONSUMPTION										
Solids	4340	3953	3657	3326	2865	-1.9	-1.5	-1.9	-2.9	-27.5
Oil	12984	14290	15727	16347	16620	1.9	1.9	0.8	0.3	16.3
Gas	6965	7249	8270	8905	9457	0.8	2.7	1.5	1.2	30.5
Heat	219	212	241	262	278	-0.6	2.6	1.7	1.2	31.1
Electricity	4163	4994	5638	6209	6559	3.7	2.5	1.9	1.1	31.3
Biofuels	0	0	0	80	264	0.0	0.0	0.0	26.8	0.0
Total	28672	30698	33532	35128	36043	1.4	1.8	0.9	0.5	17.4
Industry										
Solids	3179	3408	3147	2899	2508	1.4	-1.6	-1.6	-2.9	-26.4
Oil	1784	1554	1305	1296	1275	-2.7	-3.4	-0.1	-0.3	-18.0
Gas	2982	3731	4181	4284	4318	4.6	2.3	0.5	0.2	15.7
Heat	187	187	209	226	236	0.0	2.3	1.5	0.9	26.0
Electricity	2209	2633	2954	3215	3301	3.6	2.3	1.7	0.5	25.4
Total	10341	11513	11797	11921	11638	2.2	0.5	0.2	-0.5	1.1
Transports										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	5958	7596	8591	9460	10150	5.0	2.5	1.9	1.4	33.6
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	102	107	129	154	183	1.0	3.8	3.7	3.5	71.4
Biofuels	0	0	0	80	264	0.0	0.0	0.0	26.8	0.0
Total	6060	7703	8720	9695	10597	4.9	2.5	2.1	1.8	37.6
						0.0	0.0	0.0	0.0	0.0
Dom. & Tert.										
Solids	1161	545	509	426	357	-14.0	-1.3	-3.5	-3.5	-34.5
Oil	5242	5140	5831	5590	5195	-0.4	2.6	-0.8	-1.5	1.1
Gas	3984	3518	4089	4620	5140	-2.5	3.1	2.5	2.2	46.1
Heat	32	25	31	36	42	-4.8	4.7	3.0	3.0	69.1
Electricity	1852	2254	2555	2839	3074	4.0	2.5	2.1	1.6	36.4
Total	12270	11482	13016	13513	13808	-1.3	2.5	0.8	0.4	20.3
IMPORT DEPENDENCY (%)										
Solids	56.3	93.0	96.3	96.9	97.2					
Oil	97.3	98.4	100.0	100.0	100.0					
Natural Gas	99.4	100.6	100.0	100.0	100.0					
Total	70.0	83.4	79.5	80.3	80.3					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

MAIN INDICATORS : DENMARK

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	76.7	82.8	93.1	104.4	115.3	1.5	2.4	2.3	2.0	39.3
per capita (ECU 85/capita)	14999	16077	18039	20231	22556	1.4	2.3	2.3	2.2	40.3
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	3.6	3.3	3.8	4.0	4.1	-2.0	2.8	1.1	0.6	25.1
by unit of GDP (toe/MECU 85)	243.2	205.5	210.6	198.7	183.2	-3.3	0.5	-1.2	-1.6	-10.8
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	182.7	153.5	148.5	140.5	130.2	-3.4	-0.7	-1.1	-1.5	-15.2
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	330.5	353.8	364.8	357.5	344.0	1.4	0.6	-0.4	-0.8	-2.8
CO2 EMISSIONS										
per capita (t)	12.0	10.3	12.1	12.7	12.8	-3.0	3.3	0.9	0.2	24.2
by Final Consumption (t/toe)	4.4	4.2	4.5	4.5	4.4	-0.9	1.6	-0.3	-0.5	4.3

SUMMARY OIL BALANCE : DENMARK

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	2.92	6.06	6.50	6.50	5.30	15.7	1.4	0.0	-4.0	-12.6
Net Imports	8.19	3.04	3.64	3.73	4.87	-17.9	3.6	0.5	5.5	60.0
of Crude	4.03	1.92	1.88	2.18	3.38	-13.8	-0.4	3.0	9.2	76.4
Total Refinery Output	7.00	7.94	8.30	8.60	8.60	2.5	0.9	0.7	0.0	8.4
of which (in %) :										
Gasoline	18.1	17.5	22.0	24.0	25.0	-0.7	4.7	1.8	0.8	43.2
Gas/Diesel Oil	43.6	41.9	41.5	40.5	41.0	-0.8	-0.2	-0.5	0.2	-2.1
Residual Fuel Oil	27.2	26.7	22.0	20.0	17.5	-0.4	-3.8	-1.9	-2.6	-34.5
Other Products	11.2	13.9	14.5	15.5	16.5	4.6	0.8	1.3	1.3	18.4
Total Oil Consumption	11.24	9.47	10.06	10.15	10.09	-3.4	1.2	0.2	-0.1	6.5
of which (in %) :										
Gasoline	14.7	17.8	19.8	20.4	20.1	4.0	2.1	0.6	-0.3	12.8
Gas/Diesel Oil	48.4	48.1	47.8	50.2	51.0	-0.1	-0.1	1.0	0.3	6.1
Residual Fuel Oil	21.3	16.5	15.1	10.6	8.9	-4.9	-1.8	-6.9	-3.3	-46.0
Other Products	15.7	17.6	17.3	18.8	19.9	2.3	-0.3	1.8	1.1	13.5

DENMARK

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	7383	6110	7494	7701	7377	-3.7	4.2	0.5	-0.9	20.7
Oil	10656	8438	9201	9305	9271	-4.6	1.7	0.2	-0.1	9.9
Natural Gas	566	1785	2650	3431	4040	25.8	8.2	5.3	3.3	126.3
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	48	609	123	93	93	66.3	-27.4	-5.4	0.0	-84.7
Renewable & Other	0	67	136	210	340	0.0	15.2	9.1	10.1	407.5
Total	18652	17009	19605	20741	21121	-1.8	2.9	1.1	0.4	24.2
INDIGENOUS PRODUCTION										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	2917	6061	6500	6500	5300	15.7	1.4	0.0	-4.0	-12.6
Natural Gas	970	2736	4000	4800	5500	23.1	7.9	3.7	2.8	101.0
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	8	3	3	3	3	-18.3	0.0	0.0	0.0	0.0
Renewable & Other	0	67	136	210	340	0.0	15.2	9.1	10.1	407.5
Total	3895	8867	10639	11513	11143	17.9	3.7	1.6	-0.7	25.7
NET IMPORTS										
Solids	7701	6234	7494	7701	7377	-4.1	3.7	0.5	-0.9	18.3
Oil	8187	3045	3641	3725	4871	-17.9	3.6	0.5	5.5	60.0
Natural Gas	-396	-927	-1350	-1369	-1460	18.5	7.8	0.3	1.3	57.5
Electricity	40	606	120	90	90	72.6	-27.7	-5.6	0.0	-85.1
Total	15531	8958	9906	10148	10878	-10.4	2.0	0.5	1.4	21.4
INPUTS INTO POWER GENERATION										
Solids	6494	5548	7054	7296	7017	-3.1	4.9	0.7	-0.8	26.5
Oil	346	246	325	64	64	-6.6	5.7	-27.8	0.3	-73.8
Gas	76	136	692	1255	1727	12.5	38.4	12.6	6.6	1169.7
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	0	67	136	170	200	0.0	15.2	4.6	3.3	198.5
Total	6916	5997	8207	8785	9008	-2.8	6.5	1.4	0.5	50.2
FINAL ENERGY CONSUMPTION										
Solids	779	461	440	405	360	-10.0	-0.9	-1.6	-2.3	-21.9
Oil	9463	7587	8070	8410	8370	-4.3	1.2	0.8	-0.1	10.3
Gas	505	1502	1720	1910	2030	24.3	2.7	2.1	1.2	35.2
Heat	1087	636	670	690	700	-10.2	1.0	0.6	0.3	10.1
Electricity	2180	2518	2920	3210	3410	2.9	3.0	1.9	1.2	35.4
Biofuels	0	0	0	40	140	0.0	0.0	0.0	28.5	0.0
Total	14014	12704	13820	14665	15010	-1.9	1.7	1.2	0.5	18.2
Industry										
Solids	287	251	260	265	260	-2.6	0.7	0.4	-0.4	3.6
Oil	1530	1070	1100	1060	970	-6.9	0.6	-0.7	-1.8	-9.3
Gas	131	526	620	720	810	32.1	3.3	3.0	2.4	54.0
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	647	757	798	831	850	3.2	1.1	0.8	0.5	12.3
Total	2595	2604	2778	2876	2890	0.1	1.3	0.7	0.1	11.0
Transports										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	3621	4480	5020	5500	5670	4.3	2.3	1.8	0.6	26.6
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	12	19	22	24	26	9.6	3.0	1.8	1.6	36.8
Biofuels	0	0	0	40	140	0.0	0.0	0.0	28.5	0.0
Total	3633	4499	5042	5564	5836	4.4	2.3	2.0	1.0	29.7
Dom. & Tert.										
Solids	492	210	180	140	100	-15.6	-3.0	-4.9	-6.5	-52.4
Oil	4312	2037	1950	1850	1730	-13.9	-0.9	-1.0	-1.3	-15.1
Gas	374	976	1100	1190	1220	21.1	2.4	1.6	0.5	25.0
Heat	1087	636	670	690	700	-10.2	1.0	0.6	0.3	10.1
Electricity	1521	1742	2100	2355	2534	2.7	3.8	2.3	1.5	45.5
Total	7786	5601	6000	6225	6284	-6.4	1.4	0.7	0.2	12.2
IMPORT DEPENDENCY (%)										
Solids	104.3	102.0	100.0	100.0	100.0					
Oil	74.0	32.4	35.9	36.4	47.9					
Natural Gas	-70.0	-51.9	-50.9	-39.9	-36.1					
Total	81.5	49.9	48.2	46.8	49.4					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

DENMARK

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MONOVALENTS										
HARD COAL	1.053	0.107	0.087	0.087	0.387	-0.946	-0.020	0.000	0.300	0.280
LIGNITE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESIDUAL FUEL OIL	2.165	0.807	0.807	0.807	0.807	-1.358	0.000	0.000	0.000	0.000
NATURAL GAS CONV.	0.000	0.022	0.562	0.562	0.562	0.022	0.540	0.000	0.000	0.540
NAT. GAS COMB. CYCLE	0.000	0.000	0.000	0.407	0.962	0.000	0.000	0.407	0.555	0.962
OTHER (1)	0.000	0.024	0.059	0.059	0.059	0.024	0.035	0.000	0.000	0.035
TOTAL	3.218	0.960	1.515	1.922	2.777	-2.258	0.555	0.407	0.855	1.817
POLYVALENTS										
WITH COAL	3.391	7.429	7.484	7.310	7.128	4.038	0.055	-0.174	-0.182	-0.301
WITHOUT COAL	0.000	0.106	0.163	0.163	0.092	0.106	0.057	0.000	-0.071	-0.014
PEAK DEVICE	0.290	0.289	0.289	0.277	0.267	-0.001	0.000	-0.012	-0.010	-0.022
TOTAL THERMAL	6.899	8.784	9.451	9.672	10.264	1.885	0.667	0.221	0.592	1.480
HYDRO	0.000	0.011	0.011	0.011	0.011	0.011	0.000	0.000	0.000	0.000
RENEWABLE	0.000	0.350	0.670	0.920	1.170	0.350	0.320	0.250	0.250	0.820
TOTAL WITHOUT PUMPING	6.899	9.145	10.132	10.603	11.445	2.246	0.987	0.471	0.842	2.300
PUMPING	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	6.899	9.145	10.132	10.603	11.445	2.246	0.987	0.471	0.842	2.300

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
HARD COAL		23856	30759	32239	31413		5.2	0.9	-0.5	31.7
LIGNITE		0	0	0	0		0.0	0.0	0.0	0.0
RESIDUAL FUEL OIL		1008	1340	260	267		5.9	-28.0	0.5	-73.5
GAS DIESEL OIL		30	39	14	14		5.4	-18.5	0.0	-53.3
NATURAL GAS		183	3217	6565	9636		77.4	15.3	8.0	5165.6
OTHER (1)		11	227	233	236		83.2	0.5	0.3	2045.5
TOTAL THERMAL	28968	25088	35582	39311	41566	-2.8	7.2	2.0	1.1	65.7
HYDRO	33	32	35	35	35	-0.6	1.8	0.0	0.0	9.4
RENEWABLE	63	625	1000	1395	1744	58.2	9.9	6.9	4.6	179.0
TOTAL WITHOUT PUMPING	29064	25745	36617	40741	43345	-2.4	7.3	2.2	1.2	68.4
IMPORTATIONS	3154	11971	4419	3837	3837	30.6	-18.1	-2.8	0.0	-67.9
EXPORTATIONS	2694	4924	3023	2791	2791	12.8	-9.3	-1.6	0.0	-43.3
NET IMPORTS	460	7047	1395	1047	1047	72.6	-27.7	-5.6	0.0	-85.1
INTERNAL DEMAND (including losses)	29524	32792	38012	41788	44392	2.1	3.0	1.9	1.2	35.4
Final Consumption	25348	29281	33953	37326	39651	2.9	3.0	1.9	1.2	35.4
Memo Item										
Produced from pumping	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : FRANCE

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	691.7	797.1	885.0	991.5	1108.1	2.9	2.1	2.3	2.2	39.0
per capita (ECU 85/capita)	12538	14128	15301	16722	18321	2.4	1.6	1.8	1.8	29.7
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	3.5	3.8	4.0	4.3	4.4	1.5	1.3	1.1	0.7	16.7
by unit of GDP (toe/MECU 85)	280.0	267.1	263.8	254.7	240.5	-0.9	-0.3	-0.7	-1.1	-10.0
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	175.9	157.7	157.7	151.3	143.8	-2.2	0.0	-0.8	-1.0	-8.8
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	365.6	380.5	404.1	397.1	386.2	0.8	1.2	-0.4	-0.6	1.5
CO2 EMISSIONS										
per capita (t)	6.9	6.5	7.0	7.3	7.5	-1.1	1.5	0.8	0.6	15.7
by Final Consumption (t/toe)	3.1	2.9	2.9	2.9	2.8	-1.3	-0.1	-0.2	-0.2	-2.1

SUMMARY OIL BALANCE : FRANCE

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	3.51	3.43	1.69	1.12	1.12	-0.5	-13.2	-7.8	0.0	-67.2
Net Imports	81.24	86.92	95.29	101.48	104.40	1.4	1.9	1.3	0.6	20.1
of Crude	76.14	76.37	80.94	85.82	86.70	0.1	1.2	1.2	0.2	13.5
Total Refinery Output	77.00	77.34	81.97	86.32	87.19	0.1	1.2	1.0	0.2	12.7
of which (in %) :										
Gasoline	23.1	23.9	26.3	26.8	28.2	0.7	1.9	0.4	1.0	17.9
Gas/Diesel Oil	36.4	36.1	35.2	34.9	35.2	-0.1	-0.5	-0.2	0.1	-2.7
Residual Fuel Oil	18.1	15.1	14.4	14.0	12.3	-3.5	-1.0	-0.4	-2.6	-18.6
Other Products	22.5	24.9	24.2	24.2	24.4	2.0	-0.6	0.0	0.1	-2.0
Total Oil Consumption	83.43	87.01	96.51	102.10	105.01	0.8	2.1	1.1	0.6	20.7
of which (in %) :										
Gasoline	22.7	22.1	21.1	21.7	22.4	-0.6	-0.9	0.5	0.7	1.6
Gas/Diesel Oil	40.4	41.8	42.0	42.4	43.3	0.7	0.1	0.2	0.4	3.5
Residual Fuel Oil	13.3	10.8	11.8	10.6	8.8	-4.1	1.8	-2.2	-3.6	-18.3
Other Products	23.5	25.3	25.0	25.3	25.5	1.5	-0.2	0.2	0.1	0.6

F R A N C E

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	24402	20000	20432	20307	20916	-3.9	0.4	-0.1	0.6	4.6
Oil	84211	87973	94281	99652	102303	0.9	1.4	1.1	0.5	16.3
Natural Gas	24272	24881	29916	36210	41671	0.5	3.8	3.9	2.8	67.5
Nuclear	57272	79131	87077	94832	98301	6.7	1.9	1.7	0.7	24.2
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	3369	740	1465	693	1262	-26.1	14.6	-13.9	12.7	70.4
Renewable & Other	159	212	236	787	2015	5.9	2.2	27.2	20.7	851.4
Total	193686	212936	233407	252481	266468	1.9	1.9	1.6	1.1	25.1
INDIGENOUS PRODUCTION										
Solids	10447	7671	5859	4640	3710	-6.0	-5.2	-4.6	-4.4	-51.6
Oil	3511	3430	1687	1124	1124	-0.5	-13.2	-7.8	0.0	-67.2
Natural Gas	4537	2421	2500	1200	700	-11.8	0.6	-13.7	-10.2	-71.1
Nuclear	57272	79131	87077	94832	98301	6.7	1.9	1.7	0.7	24.2
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	5378	4674	6058	6058	6058	-2.8	5.3	0.0	0.0	29.6
Renewable & Other	159	212	236	787	2015	5.9	2.2	27.2	20.7	851.4
Total	81304	97539	103416	108641	111909	3.7	1.2	1.0	0.6	14.7
NET IMPORTS										
Solids	12559	13009	14573	15668	17206	0.7	2.3	1.5	1.9	32.3
Oil	81242	86918	95295	101476	104401	1.4	1.9	1.3	0.6	20.1
Natural Gas	20183	24371	27416	35010	40971	3.8	2.4	5.0	3.2	68.1
Electricity	-2008	-3934	-4593	-5365	-4796	14.4	3.1	3.2	-2.2	21.9
Total	111975	120364	132691	146789	157782	1.5	2.0	2.0	1.5	31.1
INPUTS INTO POWER GENERATION										
Solids	9316	7366	8603	9205	10736	-4.6	3.2	1.4	3.1	45.8
Oil	1460	1756	3858	3156	1770	3.8	17.0	-3.9	-10.9	0.8
Gas	1534	1424	2260	5776	8834	-1.5	9.7	20.6	8.9	520.3
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	159	212	236	327	470	5.9	2.2	6.7	7.5	121.8
Total	12469	10758	14957	18463	21810	-2.9	6.8	4.3	3.4	102.7
FINAL ENERGY CONSUMPTION										
Solids	11409	9055	8475	7820	6992	-4.5	-1.3	-1.6	-2.2	-22.8
Oil	65801	66890	72567	77525	81300	0.3	1.6	1.3	1.0	21.5
Gas	22703	23694	27741	30307	32684	0.9	3.2	1.8	1.5	37.9
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	21747	26083	30757	33857	36805	3.7	3.4	1.9	1.7	41.1
Biofuels	0	0	0	460	1545	0.0	0.0	0.0	27.4	0.0
Total	121659	125722	139541	149970	159327	0.7	2.1	1.5	1.2	26.7
Industry										
Solids	8578	7366	6878	6504	5974	-3.0	-1.4	-1.1	-1.7	-18.9
Oil	9651	6651	5827	5334	4673	-7.2	-2.6	-1.8	-2.6	-29.7
Gas	10079	10829	12751	13833	14498	1.4	3.3	1.6	0.9	33.9
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	8655	9776	10689	11478	12041	2.5	1.8	1.4	1.0	23.2
Total	36964	34621	36145	37150	37187	-1.3	0.9	0.5	0.0	7.4
Transports										
Solids	6	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Oil	32843	41144	46498	52014	57136	4.6	2.5	2.3	1.9	38.9
Gas	1	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Electricity	655	762	834	859	871	3.1	1.8	0.6	0.3	14.3
Biofuels	0	0	0	460	1545	0.0	0.0	0.0	27.4	0.0
Total	33505	41906	47331	53334	59551	4.6	2.5	2.4	2.2	42.1
Dom. & Tert.										
Solids	2824	1689	1597	1316	1018	-9.8	-1.1	-3.8	-5.0	-39.7
Oil	23307	19095	20243	20177	19492	-3.9	1.2	-0.1	-0.7	2.1
Gas	12622	12866	14990	16474	18186	0.4	3.1	1.9	2.0	41.4
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	12436	15545	19235	21520	23894	4.6	4.4	2.3	2.1	53.7
Total	51190	49194	56065	59486	62589	-0.8	2.6	1.2	1.0	27.2
IMPORT DEPENDENCY (%)										
Solids	51.5	65.0	71.3	77.2	82.3					
Oil	93.8	96.1	98.3	98.9	98.9					
Natural Gas	83.2	98.0	91.6	96.7	98.3					
Total	57.1	55.9	56.2	57.5	58.5					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

F R A N C E

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	14.394	55.750	59.620	63.985	66.785	41.356	3.870	4.365	2.800	11.035
MONOVALENTS										
HARD COAL	2.583	4.273	4.213	4.213	4.662	1.690	-0.060	0.000	0.449	0.389
LIGNITE	0.627	0.747	0.630	0.000	0.000	0.120	-0.117	-0.630	0.000	-0.747
RESIDUAL FUEL OIL	10.768	6.262	8.197	8.197	8.197	-4.506	1.935	0.000	0.000	1.935
NATURAL GAS CONV.	0.550	0.136	0.136	0.736	1.542	-0.414	0.000	0.600	0.806	1.406
NAT. GAS COMB. CYCLE	0.000	0.000	0.000	1.940	5.001	0.000	0.000	1.940	3.061	5.001
OTHER (1)	1.263	1.283	1.300	1.300	1.425	0.020	0.017	0.000	0.125	0.142
TOTAL	15.791	12.701	14.476	16.386	20.827	-3.090	1.775	1.910	4.441	8.126
POLYVALENTS										
WITH COAL	9.817	7.054	6.935	7.701	9.172	-2.763	-0.119	0.766	1.471	2.118
WITHOUT COAL	2.513	1.445	1.445	2.069	2.946	-1.068	0.000	0.624	0.877	1.501
PEAK DEVICE	0.911	1.473	2.049	4.049	4.749	0.562	0.576	2.000	0.700	3.276
TOTAL THERMAL	29.032	22.673	24.905	30.204	37.694	-6.359	2.232	5.299	7.490	15.021
HYDRO	17.671	20.694	20.832	20.832	20.832	3.023	0.138	0.000	0.000	0.138
RENEWABLE	0.000	0.000	0.000	0.150	0.350	0.000	0.000	0.150	0.200	0.350
TOTAL WITHOUT PUMPING	61.097	99.117	105.357	115.172	125.661	38.020	6.240	9.815	10.489	26.544
PUMPING	1.614	4.293	4.293	4.293	4.293	2.679	0.000	0.000	0.000	0.000
TOTAL	62.711	103.410	109.650	119.465	129.954	40.699	6.240	9.815	10.489	26.544

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	224100	314081	353900	386383	401520	7.0	2.4	1.8	0.8	27.8
HARD COAL		29033	38328	42812	50560		5.7	2.2	3.4	74.1
LIGNITE		2441	969	0	0		-16.9	0.0	0.0	-100.0
RESIDUAL FUEL OIL		8782	18154	14751	8160		15.6	-4.1	-11.2	-7.1
GAS DIESEL OIL		111	140	192	188		4.8	6.6	-0.4	70.0
NATURAL GAS		2854	6485	26075	43372		17.8	32.1	10.7	1419.7
OTHER (1)		5020	5694	5694	6242		2.6	0.0	1.9	24.3
TOTAL THERMAL	55935	48241	69770	89525	108522	-2.9	7.7	5.1	3.9	125.0
HYDRO	46748	54363	70442	70442	70442	3.1	5.3	0.0	0.0	29.6
RENEWABLE	0	0	0	1051	2453	0.0	0.0	0.0	18.5	0.0
TOTAL WITHOUT PUMPING	326783	416685	494111	547401	582936	5.0	3.5	2.1	1.3	39.9
IMPORTATIONS	5519	6673	10542	13200	2370	3.9	9.6	4.6	-29.1	-64.5
EXPORTATIONS	28873	52418	63953	75581	58140	12.7	4.1	3.4	-5.1	10.9
NET IMPORTS	-23354	-45745	-53412	-62382	-55770	14.4	3.1	3.2	-2.2	21.9
INTERNAL DEMAND (including losses)	303430	370940	440699	485019	527167	4.1	3.5	1.9	1.7	42.1
Final Consumption	252867	303289	357645	393682	427968	3.7	3.4	1.9	1.7	41.1
Memo Item										
Produced from pumping	1724	3604	4533	4533	4533	15.9	4.7	0.0	0.0	25.8

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : GERMANY (old)

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	822.2	959.4	1079.9	1201.0	1323.5	3.1	2.4	2.1	2.0	37.9
per capita (ECU 85/capita)	13474	15263	16387	17709	19321	2.5	1.4	1.6	1.8	26.6
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	4.4	4.3	4.4	4.5	4.5	-0.1	0.4	0.5	0.0	4.3
by unit of GDP (toe/MECU 85)	323.5	284.3	269.8	255.8	234.3	-2.6	-1.0	-1.1	-1.7	-17.6
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	216.5	188.2	178.0	167.5	151.8	-2.8	-1.1	-1.2	-1.9	-19.3
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	425.2	396.8	387.0	377.3	360.4	-1.4	-0.5	-0.5	-0.9	-9.2
CO2 EMISSIONS										
per capita (t)	12.0	11.6	11.7	11.8	11.6	-0.7	0.1	0.2	-0.3	0.4
by Final Consumption (t/toe)	4.1	4.0	4.0	4.0	4.0	-0.4	-0.2	-0.1	-0.1	-1.7

SUMMARY OIL BALANCE : GERMANY (old)

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	4.32	4.18	4.30	3.15	2.06	-0.7	0.6	-6.0	-8.1	-50.7
Net Imports	106.23	107.74	116.24	125.43	125.49	0.3	1.5	1.5	0.0	16.5
of Crude	64.47	72.42	79.55	85.22	90.08	2.4	1.9	1.4	1.1	24.4
Total Refinery Output	84.64	84.30	91.09	95.42	99.86	-0.1	1.6	0.9	0.9	18.5
of which (in %) :										
Gasoline	25.0	26.3	27.4	28.1	28.7	1.0	0.8	0.5	0.4	8.8
Gas/Diesel Oil	40.8	41.5	40.5	40.3	38.8	0.4	-0.5	-0.1	-0.8	-6.6
Residual Fuel Oil	13.1	9.5	9.7	9.5	9.4	-6.2	0.4	-0.3	-0.3	-0.7
Other Products	21.1	22.6	22.4	22.1	23.2	1.4	-0.2	-0.3	1.0	2.2
Total Oil Consumption	115.00	113.92	121.19	128.61	128.21	-0.2	1.2	1.2	-0.1	12.5
of which (in %) :										
Gasoline	22.0	25.9	25.6	25.7	25.5	3.3	-0.3	0.1	-0.1	-1.3
Gas/Diesel Oil	45.8	43.7	43.3	41.7	39.6	-0.9	-0.2	-0.8	-1.0	-9.5
Residual Fuel Oil	10.7	7.9	7.9	8.3	8.2	-6.1	0.0	1.0	-0.1	4.6
Other Products	21.5	22.5	23.3	24.4	26.7	1.0	0.7	0.9	1.8	18.4

G E R M A N Y (old)

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	82340	75192	79300	79029	75992	-1.8	1.1	-0.1	-0.8	1.1
Oil	108671	110746	118498	126434	125412	0.4	1.4	1.3	-0.2	13.2
Natural Gas	41235	48270	53718	61350	68032	3.2	2.2	2.7	2.1	40.9
Nuclear	31329	36161	36135	36135	35586	2.9	0.0	0.0	-0.3	-1.6
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	1551	1280	2589	2467	1979	-3.8	15.1	-1.0	-4.3	54.6
Renewable & Other	871	1081	1111	1786	3140	4.4	0.6	10.0	11.9	190.5
Total	265996	272729	291352	307201	310141	0.5	1.3	1.1	0.2	13.7
INDIGENOUS PRODUCTION										
Solids	82974	71927	62841	52461	44210	-2.8	-2.7	-3.5	-3.4	-38.5
Oil	4323	4178	4297	3149	2060	-0.7	0.6	-6.0	-8.1	-50.7
Natural Gas	12553	11737	14500	13500	13300	-1.3	4.3	-1.4	-0.3	13.3
Nuclear	31329	36161	36135	36135	35586	2.9	0.0	0.0	-0.3	-1.6
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	1336	1368	1370	1392	1533	0.5	0.0	0.3	2.0	12.1
Renewable & Other	871	1081	1111	1786	3140	4.4	0.6	10.0	11.9	190.5
Total	133387	126452	120254	108422	99829	-1.1	-1.0	-2.1	-1.6	-21.1
NET IMPORTS										
Solids	-1446	2340	16459	26568	31782	0.0	47.7	10.1	3.6	1258.1
Oil	106227	107739	116241	125426	125492	0.3	1.5	1.5	0.0	16.5
Natural Gas	29614	36726	39218	47850	54732	4.4	1.3	4.1	2.7	49.0
Electricity	215	-88	1219	1075	445	0.0	0.0	-2.5	-16.2	
Total	134611	146717	173138	200919	212452	1.7	3.4	3.0	1.1	44.8
INPUTS INTO POWER GENERATION										
Solids	51624	51635	55197	56109	54589	0.0	1.3	0.3	-0.5	5.7
Oil	2618	2722	3559	4672	4749	0.8	5.5	5.6	0.3	74.5
Gas	7528	10286	11636	16807	22958	6.4	2.5	7.6	6.4	123.2
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	871	1081	1111	1274	1565	4.4	0.6	2.8	4.2	44.8
Total	62641	65724	71504	78862	83861	1.0	1.7	2.0	1.2	27.6
FINAL ENERGY CONSUMPTION										
Solids	19791	15606	14847	13963	12810	-4.6	-1.0	-1.2	-1.7	-17.9
Oil	87747	87676	92986	96994	94578	0.0	1.2	0.8	-0.5	7.9
Gas	37627	41749	45302	47444	47570	2.1	1.6	0.9	0.1	13.9
Heat	2749	2775	3161	3280	3380	0.2	2.6	0.7	0.6	21.8
Electricity	30063	32743	35942	38967	41019	1.7	1.9	1.6	1.0	25.3
Biofuels	0	0	0	512	1574	0.0	0.0	0.0	25.2	0.0
Total	177977	180549	192238	201160	200932	0.3	1.3	0.9	0.0	11.3
Industry										
Solids	15297	13584	12855	12312	11517	-2.3	-1.1	-0.9	-1.3	-15.2
Oil	9050	7321	6118	5761	5511	-4.2	-3.5	-1.2	-0.9	-24.7
Gas	19722	21540	23116	23220	22656	1.8	1.4	0.1	-0.5	5.2
Heat	1814	1719	1708	1753	1775	-1.1	-0.1	0.5	0.3	3.3
Electricity	14161	15652	16669	17667	18267	2.0	1.3	1.2	0.7	16.7
Total	60043	59816	60465	60714	59727	-0.1	0.2	0.1	-0.3	-0.1
Transports										
Solids	149	65	71	69	68	-15.3	1.9	-0.7	-0.2	4.9
Oil	41052	50583	54436	58735	60242	4.3	1.5	1.5	0.5	19.1
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	959	972	1147	1267	1377	0.3	3.4	2.0	1.7	41.7
Biofuels	0	0	0	512	1574	0.0	0.0	0.0	25.2	0.0
Total	42160	51620	55654	60582	63262	4.1	1.5	1.7	0.9	22.6
						0.0	0.0	0.0	0.0	
Dom. & Tert.										
Solids	4345	1957	1921	1582	1224	-14.7	-0.4	-3.8	-5.0	-37.4
Oil	37645	29772	32433	32498	28825	-4.6	1.7	0.0	-2.4	-3.2
Gas	17905	20208	22186	24223	24914	2.4	1.9	1.8	0.6	23.3
Heat	935	1056	1453	1527	1605	2.5	6.6	1.0	1.0	52.0
Electricity	14943	16119	18126	20033	21375	1.5	2.4	2.0	1.3	32.6
Total	75774	69112	76119	79864	77943	-1.8	2.0	1.0	-0.5	12.8
IMPORT DEPENDENCY (%)										
Solids	-1.8	3.1	20.8	33.6	41.8					
Oil	95.3	95.5	96.4	97.6	98.4					
Natural Gas	71.8	76.1	73.0	78.0	80.5					
Total	50.1	53.4	59.0	65.0	68.0					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

G E R M A N Y (old)

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	8.607	22.406	22.406	22.406	22.066	13.799	0.000	0.000	-0.340	-0.340
MONOVALENTS										
HARD COAL	14.560	21.562	22.013	24.345	24.647	7.002	0.451	2.332	0.302	3.085
LIGNITE	12.997	11.315	10.573	10.373	9.873	-1.682	-0.742	-0.200	-0.500	-1.442
RESIDUAL FUEL OIL	12.265	7.026	7.026	7.106	5.930	-5.239	0.000	0.080	-1.176	-1.096
NATURAL GAS CONV.	10.664	12.933	12.703	13.049	12.930	2.269	-0.230	0.346	-0.119	-0.003
NAT. GAS COMB. CYCLE	0.000	0.000	0.403	5.564	11.620	0.000	0.403	5.161	6.056	11.620
OTHER (1)	0.726	1.063	1.086	1.086	1.175	0.337	0.024	0.000	0.088	0.112
TOTAL	51.212	53.899	53.804	61.523	66.174	2.687	-0.094	7.719	4.651	12.275
POLYVALENTS										
WITH COAL	12.251	9.914	9.914	13.989	14.446	-2.337	0.000	4.075	0.457	4.532
WITHOUT COAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PEAK DEVICE	4.249	4.763	4.749	5.249	5.749	0.514	-0.014	0.500	0.500	0.986
TOTAL THERMAL	67.712	68.576	68.467	80.761	86.369	0.864	-0.108	12.293	5.608	17.793
HYDRO	2.666	2.851	2.965	3.040	3.340	0.185	0.114	0.075	0.300	0.489
RENEWABLE	0.000	0.000	0.049	0.319	0.719	0.000	0.049	0.270	0.400	0.719
TOTAL WITHOUT PUMPING	78.985	93.832	93.887	106.525	112.493	14.847	0.055	12.638	5.968	18.661
PUMPING	3.785	4.017	4.021	4.021	4.021	0.232	0.004	0.000	0.000	0.004
TOTAL	82.770	97.849	97.908	110.546	116.514	15.079	0.059	12.638	5.968	18.665

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	125902	147159	147060	147060	144829	3.2	0.0	0.0	-0.3	-1.6
HARD COAL		140544	164273	172448	171682		3.2	1.0	-0.1	22.2
LIGNITE		82590	77152	75693	72044		-1.4	-0.4	-1.0	-12.8
RESIDUAL FUEL OIL		7912	10704	15233	15396		6.2	7.3	0.2	94.6
GAS DIESEL OIL		1867	1941	2189	2417		0.8	2.4	2.0	29.5
NATURAL GAS		35897	42807	72031	108417		3.6	11.0	8.5	202.0
OTHER (1)		15159	15096	15096	15797		-0.1	0.0	0.9	4.2
TOTAL THERMAL	265191	283969	311973	352689	385754	1.4	1.9	2.5	1.8	35.8
HYDRO	15534	15908	15930	16187	17830	0.5	0.0	0.3	2.0	12.1
RENEWABLE		0	343	2236	5039	0.0	0.0	45.5	17.6	0.0
TOTAL WITHOUT PUMPING	406627	447036	475307	518172	553451	1.9	1.2	1.7	1.3	23.8
IMPORTATIONS	18923	25357	37436	36921	31921	6.0	8.1	-0.3	-2.9	25.9
EXPORTATIONS	16423	26382	23256	24419	26744	9.9	-2.5	1.0	1.8	1.4
NET IMPORTS	2500	-1025	14180	12503	5177			-2.5	-16.2	
INTERNAL DEMAND (including losses)	409127	446011	489487	530675	558628	1.7	1.9	1.6	1.0	25.2
Final Consumption	349567	380734	417936	453104	476970	1.7	1.9	1.6	1.0	25.3
Memo Item										
Produced from pumping	2079	2458	2498	2535	2574	3.4	0.3	0.3	0.3	4.7

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : GREECE

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	43.7	47.0	52.8	59.9	68.8	1.5	2.3	2.6	2.8	46.2
per capita (ECU 85/capita)	4396	4680	5188	5822	6611	1.3	2.1	2.3	2.6	41.3
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	1.8	2.1	2.4	2.8	3.1	3.8	2.7	2.9	2.3	47.8
by unit of GDP (toe/MECU 85)	400.1	453.0	466.2	480.2	473.9	2.5	0.6	0.6	-0.3	4.6
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	265.7	292.3	302.2	307.1	295.6	1.9	0.7	0.3	-0.8	1.1
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	545.4	605.3	635.9	679.5	698.2	2.1	1.0	1.3	0.5	15.4
CO2 EMISSIONS										
per capita (t)	5.9	7.3	8.2	9.4	10.6	4.6	2.3	2.7	2.4	44.4
by Final Consumption (t/toe)	5.0	5.4	5.2	5.3	5.4	1.3	-0.4	0.0	0.6	1.1

SUMMARY OIL BALANCE : GREECE

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	1.32	0.83	0.94	0.31	0.00	-8.8	2.4	-20.0	-100.0	-100.0
Net Imports	10.52	14.22	16.71	17.56	19.14	6.2	3.3	1.0	1.7	34.6
of Crude	10.54	14.60	16.22	17.35	18.90	6.7	2.1	1.4	1.7	29.4
Total Refinery Output	12.04	16.51	17.86	18.52	19.89	6.5	1.6	0.7	1.4	20.5
of which (in %) :										
Gasoline	17.1	21.5	21.6	23.3	23.9	4.8	0.1	1.5	0.5	11.0
Gas/Diesel Oil	27.1	22.4	22.6	21.7	21.4	-3.7	0.1	-0.8	-0.3	-4.4
Residual Fuel Oil	35.2	32.4	32.0	31.5	31.4	-1.6	-0.2	-0.3	-0.1	-3.0
Other Products	20.7	23.7	23.8	23.5	23.3	2.8	0.1	-0.3	-0.2	-1.7
Total Oil Consumption	11.96	15.51	17.49	17.74	18.95	5.3	2.4	0.3	1.3	22.2
of which (in %) :										
Gasoline	15.8	16.5	17.0	18.9	19.7	0.8	0.6	2.1	0.9	19.7
Gas/Diesel Oil	33.6	34.1	35.3	38.3	39.0	0.3	0.7	1.6	0.4	14.4
Residual Fuel Oil	33.0	31.8	30.6	25.2	24.2	-0.8	-0.8	-3.8	-0.8	-24.0
Other Products	17.5	17.6	17.2	17.7	17.1	0.1	-0.5	0.6	-0.7	-2.9

G R E E C E

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	6080	8203	8913	10927	13078	6.2	1.7	4.2	3.7	59.4
Oil	11016	12745	15162	15190	16254	3.0	3.5	0.0	1.4	27.5
Natural Gas	71	138	146	2185	2707	14.0	1.1	71.9	4.4	1866.3
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	305	213	380	325	344	-6.9	12.3	-3.1	1.2	61.5
Renewable & Other	0	0	1	130	197	0.0	0.0	146.0	8.7	0.0
Total	17472	21299	24602	28757	32581	4.0	2.9	3.2	2.5	53.0
INDIGENOUS PRODUCTION										
Solids	4838	7212	7687	8536	10517	8.3	1.3	2.1	4.3	45.8
Oil	1319	833	936	307	0	-8.8	2.4	-20.0	-100.0	-100.0
Natural Gas	71	138	146	51	0	14.0	1.1	-19.0	-100.0	-100.0
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	241	152	245	268	285	-8.8	10.0	1.8	1.3	87.4
Renewable & Other	0	0	1	130	197	0.0	0.0	146.0	8.7	0.0
Total	6470	8335	9015	9292	11000	5.2	1.6	0.6	3.4	32.0
NET IMPORTS										
Solids	1228	987	1225	2391	2560	-4.3	4.4	14.3	1.4	159.4
Oil	10518	14215	16710	17559	19137	6.2	3.3	1.0	1.7	34.6
Natural Gas	0	0	0	2135	2707	0.0	0.0	0.0	4.9	
Electricity	63	61	136	57	59	-0.7	17.3	-16.0	0.8	-3.0
Total	11809	15263	18071	22141	24463	5.3	3.4	4.1	2.0	60.3
INPUTS INTO POWER GENERATION										
Solids	4807	6890	7571	9518	11593	7.5	1.9	4.7	4.0	68.3
Oil	1635	1799	2110	1541	1658	1.9	3.2	-6.1	1.5	-7.9
Gas	0	31	27	639	670	0.0	-2.7	88.0	1.0	2045.5
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	0	0	1	19	34	0.0	0.0	67.3	12.4	0.0
Total	6442	8720	9710	11717	13954	6.2	2.2	3.8	3.6	60.0
FINAL ENERGY CONSUMPTION										
Solids	1262	1231	1338	1405	1480	-0.5	1.7	1.0	1.1	20.2
Oil	8283	10048	11708	12289	13127	3.9	3.1	1.0	1.3	30.6
Gas	9	15	16	1085	1420	11.2	2.1	131.1	5.5	9484.7
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	2049	2447	2886	3500	4128	3.6	3.4	3.9	3.4	68.7
Biofuels	0	0	0	111	163	0.0	0.0	0.0	8.0	0.0
Total	11602	13742	15948	18389	20320	3.4	3.0	2.9	2.0	47.9
Industry										
Solids	1211	1190	1296	1366	1444	-0.3	1.7	1.1	1.1	21.4
Oil	1408	1679	1889	1358	1212	3.6	2.4	-6.4	-2.3	-27.8
Gas	6	8	8	646	815	4.0	0.3	142.7	4.8	10680.7
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	947	1041	1118	1154	1190	1.9	1.4	0.6	0.6	14.3
Total	3572	3918	4311	4524	4661	1.9	1.9	1.0	0.6	19.0
Transports										
Solids	2	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Oil	4670	5805	6672	7416	8175	4.4	2.8	2.1	2.0	40.8
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	2	10	5	27	32	38.0	-11.7	38.3	3.4	221.0
Biofuels	0	0	0	111	163	0.0	0.0	0.0	8.0	0.0
Total	4674	5815	6677	7554	8371	4.5	2.8	2.5	2.1	43.9
Dom. & Tert.										
Solids	49	42	42	39	36	-3.2	0.0	-1.3	-1.5	-13.0
Oil	2205	2564	3147	3515	3740	3.1	4.2	2.2	1.2	45.9
Gas	2	7	9	439	605	23.9	3.9	118.6	6.7	8239.3
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	1100	1396	1762	2318	2906	4.9	4.8	5.6	4.6	108.2
Total	3356	4009	4960	6311	7288	3.6	4.4	4.9	2.9	81.8
IMPORT DEPENDENCY (%)										
Solids	20.2	12.0	13.7	21.9	19.6					
Oil	86.8	93.1	94.7	98.3	100.0					
Natural Gas	0.0	0.0	0.0	97.7	100.0					
Total	63.6	64.1	66.7	70.4	69.0					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

GREECE

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MONOVALENTS										
HARD COAL	0.000	0.000	0.000	0.600	0.600	0.000	0.000	0.600	0.000	0.600
LIGNITE	1.939	4.533	4.533	5.183	6.232	2.594	0.000	0.650	1.049	1.699
RESIDUAL FUEL OIL	1.191	1.378	1.418	1.438	1.438	0.187	0.040	0.020	0.000	0.060
NATURAL GAS CONV.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NAT. GAS COMB. CYCLE	0.000	0.000	0.000	1.382	1.382	0.000	0.000	1.382	0.000	1.382
OTHER (1)	0.000	0.141	0.191	0.241	0.241	0.141	0.050	0.050	0.000	0.100
TOTAL	3.130	6.052	6.142	8.844	9.894	2.922	0.090	2.702	1.049	3.841
POLYVALENTS										
WITH COAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WITHOUT COAL	0.144	0.000	0.000	0.000	0.000	-0.144	0.000	0.000	0.000	0.000
PEAK DEVICE	0.401	0.622	0.737	0.787	0.887	0.221	0.115	0.050	0.100	0.265
TOTAL THERMAL	3.675	6.674	6.879	9.631	10.781	2.999	0.205	2.752	1.149	4.106
HYDRO	1.414	1.986	2.523	2.820	2.980	0.572	0.537	0.297	0.160	0.994
RENEWABLE	0.000	0.000	0.002	0.031	0.056	0.000	0.002	0.029	0.025	0.056
TOTAL WITHOUT PUMPING	5.089	8.660	9.405	12.482	13.817	3.571	0.745	3.078	1.334	5.156
PUMPING	0.000	0.315	0.315	0.615	0.615	0.315	0.000	0.300	0.000	0.300
TOTAL	5.089	8.975	9.720	13.097	14.432	3.886	0.745	3.378	1.334	5.456

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
HARD COAL		0	990	5791	6346		0.0	42.4	1.8	0.0
LIGNITE		25167	27302	30409	37720		1.6	2.2	4.4	49.9
RESIDUAL FUEL OIL		5752	6711	3927	4201		3.1	-10.2	1.4	-27.0
GAS DIESEL OIL		1313	1378	1594	1913		1.0	3.0	3.7	45.7
NATURAL GAS		92	85	3842	4087		-1.6	114.3	1.2	4342.8
OTHER (1)		680	921	1162	1162		6.3	4.8	0.0	70.8
TOTAL THERMAL	24935	33004	37388	46724	55430	5.8	2.5	4.6	3.5	67.9
HYDRO	2805	1769	2845	3113	3314	-8.8	10.0	1.8	1.3	87.3
RENEWABLE	0	1	17	220	395	0.0	75.8	67.3	12.4	39421.6
TOTAL WITHOUT PUMPING	27740	34774	40250	50057	59139	4.6	3.0	4.5	3.4	70.1
IMPORTATIONS	949	1330	2158	1591	1852	7.0	10.2	-5.9	3.1	39.3
EXPORTATIONS	211	619	581	930	1163	24.0	-1.2	9.9	4.6	87.9
NET IMPORTS	738	711	1577	661	689	-0.7	17.3	-16.0	0.8	-3.0
INTERNAL DEMAND (including losses)	28478	35485	41827	50718	59828	4.5	3.3	3.9	3.4	68.6
Final Consumption	23821	28457	33560	40693	48004	3.6	3.4	3.9	3.4	68.7
Memo Item										
Produced from pumping	0	231	230	498	503	0.0	0.0	16.7	0.2	118.3

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : IRELAND

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	24.7	29.9	33.8	38.9	44.2	3.9	2.5	2.8	2.6	47.8
per capita (ECU 85/capita)	6988	8482	9392	10598	11919	4.0	2.1	2.4	2.4	40.5
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	2.5	2.8	3.1	3.3	3.4	2.8	1.5	1.3	0.9	20.1
by unit of GDP (toe/MECU 85)	354.4	335.2	326.7	308.4	286.4	-1.1	-0.5	-1.1	-1.5	-14.6
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	247.3	233.2	227.7	215.6	202.0	-1.2	-0.5	-1.1	-1.3	-13.4
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	394.5	396.5	419.4	412.3	398.1	0.1	1.1	-0.3	-0.7	0.4
CO2 EMISSIONS										
per capita (t)	7.4	8.7	9.4	9.8	9.9	3.3	1.5	0.8	0.2	13.5
by Final Consumption (t/toe)	4.3	4.4	4.4	4.3	4.1	0.6	-0.1	-0.5	-0.9	-6.8

SUMMARY OIL BALANCE : IRELAND

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
Net Imports	4.07	5.01	5.41	5.76	5.81	4.2	1.6	1.3	0.2	16.1
of Crude	1.25	2.02	1.87	1.98	2.07	10.0	-1.5	1.1	0.9	2.4
Total Refinery Output	1.30	1.73	1.85	1.95	2.04	5.8	1.4	1.1	0.9	18.0
of which (in %) :										
Gasoline	25.6	20.7	21.0	22.0	23.5	-4.2	0.3	0.9	1.3	13.6
Gas/Diesel Oil	33.7	36.1	37.1	37.0	39.5	1.4	0.5	0.0	1.3	9.4
Residual Fuel Oil	35.7	34.3	33.0	32.0	28.0	-0.8	-0.7	-0.6	-2.6	-18.3
Other Products	5.0	9.0	8.9	9.0	9.0	12.2	-0.1	0.2	0.0	0.4
Total Oil Consumption	4.01	4.47	5.38	5.73	5.78	2.2	3.8	1.3	0.2	29.4
of which (in %) :										
Gasoline	22.0	20.8	19.3	20.1	21.4	-1.1	-1.5	0.8	1.3	3.0
Gas/Diesel Oil	33.2	38.4	38.7	41.7	45.7	3.0	0.2	1.5	1.9	18.9
Residual Fuel Oil	27.2	20.3	23.3	20.5	15.4	-5.6	2.8	-2.6	-5.5	-24.0
Other Products	17.6	20.4	18.6	17.8	17.4	3.0	-1.8	-0.9	-0.4	-14.7

I R E L A N D

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	2585	3499	3431	3372	3083	6.2	-0.4	-0.3	-1.8	-11.9
Oil	4164	4595	5388	5735	5787	2.0	3.2	1.3	0.2	25.9
Natural Gas	1946	1873	2167	2807	3672	-0.8	3.0	5.3	5.5	96.0
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	71	60	60	60	60	-3.4	0.0	0.0	0.0	0.0
Renewable & Other	0	0	0	20	65	0.0	0.0	0.0	26.6	0.0
Total	8766	10028	11046	11995	12666	2.7	2.0	1.7	1.1	26.3
INDIGENOUS PRODUCTION										
Solids	764	1353	1107	913	539	12.1	-3.9	-3.8	-10.0	-60.2
Oil	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Natural Gas	1943	1873	2167	1087	232	-0.7	3.0	-12.9	-26.6	-87.6
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	71	60	60	60	60	-3.4	0.0	0.0	0.0	0.0
Renewable & Other	0	0	0	20	65	0.0	0.0	0.0	26.6	0.0
Total	2778	3286	3334	2080	896	3.4	0.3	-9.0	-15.5	-72.7
NET IMPORTS										
Solids	1264	2070	2324	2459	2544	10.4	2.3	1.1	0.7	22.9
Oil	4067	5005	5408	5757	5810	4.2	1.6	1.3	0.2	16.1
Natural Gas	0	0	0	1720	3440	0.0	0.0	454.1	14.9	0.0
Electricity	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Total	5331	7076	7732	9937	11793	5.8	1.8	5.1	3.5	66.7
INPUTS INTO POWER GENERATION										
Solids	818	1942	1929	1913	1785	18.9	-0.1	-0.2	-1.4	-8.1
Oil	538	337	719	681	464	-8.9	16.3	-1.1	-7.4	37.4
Gas	1273	841	1034	1442	1965	-8.0	4.2	6.9	6.4	133.7
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	0	0	0	5	15	0.0	0.0	0.0	24.6	0.0
Total	2629	3120	3682	4041	4229	3.5	3.4	1.9	0.9	35.5
FINAL ENERGY CONSUMPTION										
Solids	1751	1517	1480	1440	1280	-2.8	-0.5	-0.5	-2.3	-15.6
Oil	3240	3865	4370	4740	5000	3.6	2.5	1.6	1.1	29.4
Gas	287	574	630	810	1090	14.9	1.9	5.2	6.1	89.9
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	839	1020	1220	1379	1514	4.0	3.6	2.5	1.9	48.4
Biofuels	0	0	0	15	50	0.0	0.0	0.0	27.2	0.0
Total	6117	6976	7700	8384	8934	2.7	2.0	1.7	1.3	28.1
Industry										
Solids	253	393	450	490	500	9.2	2.7	1.7	0.4	27.2
Oil	950	910	890	870	800	-0.9	-0.4	-0.5	-1.7	-12.1
Gas	223	371	420	520	680	10.7	2.5	4.4	5.5	83.3
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	309	386	450	500	550	4.6	3.1	2.1	1.9	42.5
Total	1735	2060	2210	2380	2530	3.5	1.4	1.5	1.2	22.8
Transports										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	1690	1967	2280	2570	2830	3.1	3.0	2.4	1.9	43.9
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	1	1	2	2	3	0.0	8.4	5.9	8.4	200.0
Biofuels	0	0	0	15	50	0.0	0.0	0.0	27.2	0.0
Total	1691	1968	2282	2587	2883	3.1	3.0	2.5	2.2	46.5
Dom. & Tert.										
Solids	1499	1124	1030	950	780	-5.6	-1.7	-1.6	-3.9	-30.6
Oil	600	988	1200	1300	1370	10.5	4.0	1.6	1.1	38.7
Gas	64	203	210	290	410	26.1	0.7	6.7	7.2	102.0
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	529	633	768	877	961	3.6	3.9	2.7	1.8	51.8
Total	2692	2948	3208	3417	3521	1.8	1.7	1.3	0.6	19.4
IMPORT DEPENDENCY (%)										
Solids	48.9	59.2	67.7	72.9	82.5					
Oil	97.0	108.5	100.0	100.0	100.0					
Natural Gas	0.0	0.0	0.0	61.3	93.7					
Total	60.6	70.4	69.9	82.7	92.9					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

IRELAND

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MONOVALENTS										
HARD COAL	0.014	0.014	0.014	0.000	0.000	0.000	0.000	-0.014	0.000	-0.014
LIGNITE	0.355	0.437	0.395	0.353	0.316	0.082	-0.042	-0.042	-0.037	-0.121
RESIDUAL FUEL OIL	1.307	0.609	0.819	1.009	1.009	-0.698	0.210	0.190	0.000	0.400
NATURAL GAS CONV.	0.000	0.257	0.257	0.257	0.257	0.257	0.000	0.000	0.000	0.000
NAT. GAS COMB. CYCLE	0.000	0.000	0.000	0.379	0.856	0.000	0.000	0.379	0.477	0.856
OTHER (1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	1.676	1.317	1.485	1.998	2.438	-0.359	0.168	0.513	0.440	1.121
POLYVALENTS										
WITH COAL	0.000	0.856	0.856	0.856	0.856	0.856	0.000	0.000	0.000	0.000
WITHOUT COAL	0.172	0.762	0.762	0.762	0.762	0.590	0.000	0.000	0.000	0.000
PEAK DEVICE	0.000	0.359	0.359	0.359	0.359	0.359	0.000	0.000	0.000	0.000
TOTAL THERMAL	1.848	3.294	3.462	3.975	4.415	1.446	0.168	0.513	0.440	1.121
HYDRO	0.220	0.220	0.220	0.220	0.220	0.000	0.000	0.000	0.000	0.000
RENEWABLE	0.000	0.000	0.000	0.020	0.050	0.000	0.000	0.020	0.030	0.050
TOTAL WITHOUT PUMPING	2.068	3.514	3.682	4.215	4.685	1.446	0.168	0.533	0.470	1.171
PUMPING	0.292	0.293	0.293	0.293	0.293	0.001	0.000	0.000	0.000	0.000
TOTAL	2.360	3.807	3.975	4.508	4.978	1.447	0.168	0.533	0.470	1.171

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
HARD COAL		5918	6259	6561	6809		1.1	0.9	0.7	15.1
LIGNITE		2245	1884	1556	872		-3.4	-3.8	-10.9	-61.2
RESIDUAL FUEL OIL		1428	3094	2952	2021		16.7	-0.9	-7.3	41.5
GAS DIESEL OIL		0	0	0	0		0.0	0.0	0.0	0.0
NATURAL GAS		3941	5048	7379	10510		5.1	7.9	7.3	166.7
OTHER (1)		0	0	0	0		0.0	0.0	0.0	0.0
TOTAL THERMAL	10908	13532	16285	18448	20212	4.4	3.8	2.5	1.8	49.4
HYDRO	833	697	698	698	698	-3.5	0.0	0.0	0.0	0.1
RENEWABLE	0	0	0	58	174	0.0	0.0	0.0	24.6	0.0
TOTAL WITHOUT PUMPING	11741	14229	16983	19204	21084	3.9	3.6	2.5	1.9	48.2
IMPORTATIONS	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
EXPORTATIONS	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
NET IMPORTS	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
INTERNAL DEMAND (including losses)	11741	14229	16983	19204	21084	3.9	3.6	2.5	1.9	48.2
Final Consumption	9758	11861	14186	16035	17605	4.0	3.6	2.5	1.9	48.4
Memo Item										
Produced from pumping	350	286	350	350	350	-4.0	4.1	0.0	0.0	22.4

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : ITALY

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	561.3	650.0	721.6	833.9	936.3	3.0	2.1	2.9	2.3	44.1
per capita (ECU 85/capita)	9825	11277	12395	14183	15790	2.8	1.9	2.7	2.2	40.0
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	2.3	2.6	2.8	3.1	3.2	2.4	1.5	1.9	0.9	23.8
by unit of GDP (toe/MECU 85)	235.7	231.6	227.1	218.2	204.8	-0.3	-0.4	-0.8	-1.3	-11.6
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	167.2	164.9	163.4	155.2	144.1	-0.3	-0.2	-1.0	-1.5	-12.6
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	309.4	329.4	332.4	328.3	321.8	1.3	0.2	-0.3	-0.4	-2.3
CO2 EMISSIONS										
per capita (t)	6.2	7.0	7.3	7.9	8.2	2.6	0.9	1.6	0.8	17.5
by Final Consumption (t/toe)	3.7	3.8	3.6	3.6	3.6	0.1	-0.8	-0.1	0.1	-4.0

SUMMARY OIL BALANCE : ITALY

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	2.39	4.70	4.70	4.50	4.30	14.5	0.0	-0.9	-0.9	-8.6
Net Imports	81.22	89.14	85.76	88.72	87.20	1.9	-0.8	0.7	-0.3	-2.2
of Crude	73.40	83.54	83.72	87.08	87.25	2.6	0.0	0.8	0.0	4.4
Total Refinery Output	72.49	87.32	88.29	91.44	91.42	3.8	0.2	0.7	0.0	4.7
of which (in %) :										
Gasoline	21.4	21.6	24.1	26.0	28.0	0.2	2.2	1.5	1.5	29.7
Gas/Diesel Oil	31.1	33.0	32.1	32.0	31.5	1.2	-0.5	-0.1	-0.3	-4.5
Residual Fuel Oil	28.8	25.7	22.7	20.9	18.3	-2.2	-2.5	-1.6	-2.6	-28.9
Other Products	18.7	19.6	21.1	21.0	22.1	1.0	1.4	0.0	1.0	12.6
Total Oil Consumption	82.85	91.48	90.33	93.08	91.36	2.0	-0.3	0.6	-0.4	-0.1
of which (in %) :										
Gasoline	15.1	16.3	20.7	22.6	23.9	1.6	4.9	1.8	1.1	46.9
Gas/Diesel Oil	32.7	30.1	30.8	32.0	32.8	-1.6	0.5	0.8	0.5	8.9
Residual Fuel Oil	33.3	32.5	28.5	24.8	22.0	-0.5	-2.6	-2.7	-2.3	-32.3
Other Products	18.9	21.1	20.0	20.5	21.2	2.2	-1.0	0.5	0.7	0.9

I T A L Y

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	15160	14621	16099	17703	19645	-0.7	1.9	1.9	2.1	34.4
Oil	80478	89076	88012	90862	89225	2.1	-0.2	0.6	-0.4	0.2
Natural Gas	27197	39016	48727	60901	69965	7.5	4.5	4.6	2.8	79.3
Nuclear	1979	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Geothermal	1698	1978	3157	5044	5601	3.1	9.8	9.8	2.1	183.1
Electricity	5568	5699	7702	6843	5921	0.5	6.2	-2.3	-2.9	3.9
Renewable & Other	224	174	174	573	1445	-4.9	0.0	26.8	20.3	729.0
Total	132304	150565	163871	181926	191801	2.6	1.7	2.1	1.1	27.4
INDIGENOUS PRODUCTION										
Solids	332	337	349	30	27	0.3	0.7	-38.9	-1.8	-92.0
Oil	2391	4704	4700	4500	4300	14.5	0.0	-0.9	-0.9	-8.6
Natural Gas	11538	14030	14693	15443	15500	4.0	0.9	1.0	0.1	10.5
Nuclear	1979	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Geothermal	1698	1978	3157	5044	5601	3.1	9.8	9.8	2.1	183.1
Hydro	3533	2719	4266	4509	4509	-5.1	9.4	1.1	0.0	65.8
Renewable & Other	224	174	174	573	1445	-4.9	0.0	26.8	20.3	729.0
Total	21695	23942	27341	30098	31382	2.0	2.7	1.9	0.8	31.1
NET IMPORTS										
Solids	14767	13771	15749	17674	19617	-1.4	2.7	2.3	2.1	42.5
Oil	81222	89141	85761	88720	87197	1.9	-0.8	0.7	-0.3	-2.2
Natural Gas	16040	25311	34033	45458	54465	9.6	6.1	6.0	3.7	115.2
Electricity	2035	2980	3436	2334	1412	7.9	2.9	-7.4	-9.6	-52.6
Total	114064	131202	138979	154186	162691	2.8	1.2	2.1	1.1	24.0
INPUTS INTO POWER GENERATION										
Solids	5920	7075	8967	10991	13456	3.6	4.9	4.2	4.1	90.2
Oil	16149	21528	18742	16759	14611	5.9	-2.7	-2.2	-2.7	-32.1
Gas	5917	8903	11298	18507	25086	8.5	4.9	10.4	6.3	181.8
Geothermal	1698	1978	3157	5044	5601	3.1	9.8	9.8	2.1	183.1
Renewable & Other	224	174	174	175	175	-4.9	0.0	0.0	0.0	0.5
Total	29907	39658	42339	51475	58930	5.8	1.3	4.0	2.7	48.6
FINAL ENERGY CONSUMPTION										
Solids	5123	4380	3797	3525	3210	-3.1	-2.8	-1.5	-1.9	-26.7
Oil	52582	54693	56625	60301	60493	0.8	0.7	1.3	0.1	10.6
Gas	21217	29680	36850	41662	44073	6.9	4.4	2.5	1.1	48.5
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	14934	18414	20629	23541	25909	4.3	2.3	2.7	1.9	40.7
Biofuels	0	0	0	398	1270	0.0	0.0	0.0	26.1	0.0
Total	93856	107167	117901	129427	134954	2.7	1.9	1.9	0.8	25.9
Industry										
Solids	4890	4279	3747	3475	3160	-2.6	-2.6	-1.5	-1.9	-26.2
Oil	8936	8488	6373	5505	4657	-1.0	-5.6	-2.9	-3.3	-45.1
Gas	9201	13715	15586	17438	17972	8.3	2.6	2.3	0.6	31.0
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	7986	9537	10102	11113	11565	3.6	1.2	1.9	0.8	21.3
Total	31013	36019	35807	37531	37354	3.0	-0.1	0.9	-0.1	3.7
Transports										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	27093	32655	39026	44508	46565	3.8	3.6	2.7	0.9	42.6
Gas	239	207	224	223	223	-2.8	1.6	0.0	0.0	7.9
Electricity	418	482	547	656	778	2.9	2.6	3.7	3.5	61.4
Biofuels	0	0	0	398	1270	0.0	0.0	0.0	26.1	0.0
Total	27750	33344	39796	45785	48836	3.7	3.6	2.8	1.3	46.5
						0.0	0.0	0.0	0.0	
Dom. & Tert.										
Solids	233	101	50	50	50	-15.5	-13.1	0.0	0.0	-50.3
Oil	16553	13550	11226	10289	9271	-3.9	-3.7	-1.7	-2.1	-31.6
Gas	11777	15758	21041	24000	25877	6.0	6.0	2.7	1.5	64.2
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	6530	8395	9981	11773	13566	5.2	3.5	3.4	2.9	61.6
Total	35093	37804	42297	46111	48764	1.5	2.3	1.7	1.1	29.0
IMPORT DEPENDENCY (%)										
Solids	97.4	94.2	97.8	99.8	99.9					
Oil	96.8	97.2	94.8	95.2	95.3					
Natural Gas	59.0	64.9	69.8	74.6	77.8					
Total	84.1	85.6	83.6	83.7	83.8					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

I T A L Y

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	1.424	0.000	0.000	0.000	0.000	-1.424	0.000	0.000	0.000	0.000
MONOVALENTS										
HARD COAL	0.000	0.026	0.176	0.516	0.518	0.026	0.150	0.340	0.002	0.492
LIGNITE	0.061	0.234	0.234	0.000	0.000	0.173	0.000	-0.234	0.000	-0.234
RESIDUAL FUEL OIL	15.427	15.638	14.668	13.353	12.353	0.211	-0.970	-1.315	-1.000	-3.285
NATURAL GAS CONV.	0.470	0.447	1.707	1.817	1.854	-0.023	1.260	0.110	0.037	1.407
NAT. GAS COMB. CYCLE	0.000	0.000	4.300	7.263	10.346	0.000	4.300	2.963	3.083	10.346
OTHER (1)	0.000	0.930	0.930	0.930	0.930	0.930	0.000	0.000	0.000	0.000
TOTAL	15.958	17.275	22.015	23.879	26.002	1.317	4.740	1.864	2.123	8.727
POLYVALENTS										
WITH COAL	4.626	6.861	10.935	12.849	16.718	2.235	4.074	1.914	3.869	9.857
WITHOUT COAL	7.097	10.976	12.199	13.855	17.467	3.879	1.223	1.656	3.612	6.491
PEAK DEVICE	1.465	2.170	2.744	2.712	2.687	0.705	0.574	-0.032	-0.025	0.517
TOTAL THERMAL	29.146	37.282	47.893	53.294	62.874	8.136	10.611	5.401	9.579	25.592
HYDRO	12.176	12.582	13.023	13.444	13.444	0.406	0.441	0.421	0.000	0.862
RENEWABLE	0.428	0.496	0.771	1.201	1.301	0.068	0.275	0.430	0.100	0.805
TOTAL WITHOUT PUMPING	43.174	50.360	61.687	67.939	77.619	7.186	11.327	6.252	9.679	27.259
PUMPING	3.650	6.188	6.938	7.938	7.938	2.538	0.750	1.000	0.000	1.750
TOTAL	46.824	56.548	68.625	75.877	85.557	9.724	12.077	7.252	9.679	29.009

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
HARD COAL		30876	40217	52372	65636		5.4	5.4	4.6	112.6
LIGNITE		1166	1281	0	0		1.9	-100.0	0.0	-100.0
RESIDUAL FUEL OIL		99419	79991	73127	65776		-4.3	-1.8	-2.1	-33.8
GAS DIESEL OIL		1530	1633	1820	1953		1.3	2.2	1.4	27.7
NATURAL GAS		39082	54395	96447	132194		6.8	12.1	6.5	238.2
OTHER (1)		6517	6517	6517	6517		0.0	0.0	0.0	0.0
TOTAL THFRMAL	116909	178590	184034	230283	272077	8.8	0.6	4.6	3.4	52.3
HYDRO	49548	31626	49605	52430	52430	-8.6	9.4	1.1	0.0	65.8
RENEWABLE	2753	3222	5140	8212	9117	3.2	9.8	9.8	2.1	183.0
TOTAL WITHOUT PUMPING	169210	213438	238780	290925	333624	4.8	2.3	4.0	2.8	56.3
IMPORTATIONS	25100	35571	40878	28067	17347	7.2	2.8	-7.2	-9.2	-51.2
EXPORTATIONS	1436	922	930	930	930	-8.5	0.2	0.0	0.0	0.9
NET IMPORTS	23665	34649	39948	27137	16416	7.9	2.9	-7.4	-9.6	-52.6
INTERNAL DEMAND (including losses)	192875	248087	278728	318062	350040	5.2	2.4	2.7	1.9	41.1
Final Consumption	173652	214119	239875	273735	301268	4.3	2.3	2.7	1.9	40.7
Memo Item										
Produced from pumping	3503	3453	3785	4541	4890	-0.3	1.9	3.7	1.5	41.6

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : LUXEMBOURG

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	4.6	5.6	6.6	7.5	8.6	4.3	3.1	2.8	2.6	51.9
per capita (ECU 85/capita)	12463	14966	17417	19996	22735	3.7	3.1	2.8	2.6	51.9
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	8.5	9.4	10.6	11.2	11.6	2.0	2.4	1.1	0.8	23.6
by unit of GDP (toe/MECU 85)	681.2	626.5	607.0	557.9	509.7	-1.7	-0.6	-1.7	-1.8	-18.6
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	645.5	585.5	563.5	519.2	466.8	-1.9	-0.8	-1.6	-2.1	-20.3
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	827.6	729.9	743.6	717.0	712.1	-2.5	0.4	-0.7	-0.1	-2.4
CO2 EMISSIONS										
per capita (t)	33.2	33.2	35.3	36.4	37.0	0.0	1.2	0.6	0.4	11.6
by Final Consumption (t/toe)	4.1	3.8	3.6	3.5	3.5	-1.7	-1.0	-0.5	-0.1	-7.9

SUMMARY OIL BALANCE : LUXEMBOURG

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
Net Imports	1.07	1.62	1.90	2.01	2.00	8.6	3.2	1.1	-0.1	23.3
of Crude	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
Total Refinery Output	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
of which (in %) :										
Gasoline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas/Diesel Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual Fuel Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Oil Consumption	1.04	1.60	1.90	2.01	2.00	9.0	3.4	1.1	-0.1	24.6
of which (in %) :										
Gasoline	30.5	26.9	28.5	28.7	28.5	-2.5	1.1	0.1	-0.1	5.9
Gas/Diesel Oil	50.6	47.5	47.6	45.9	45.5	-1.3	0.0	-0.7	-0.2	-4.3
Residual Fuel Oil	7.2	14.7	13.6	14.7	13.8	15.3	-1.5	1.6	-1.4	-6.1
Other Products	11.6	10.9	10.3	10.7	12.2	-1.4	-1.1	0.9	2.6	12.4

L U X E M B O U R G

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	1417	1129	1141	1136	1144	-4.4	0.2	-0.1	0.1	1.3
Oil	1057	1609	1897	2006	1997	8.8	3.3	1.1	-0.1	24.1
Natural Gas	303	430	509	575	689	7.2	3.5	2.5	3.7	60.5
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	311	342	410	460	510	1.9	3.7	2.3	2.1	49.1
Renewable & Other	25	27	30	30	30	1.3	2.3	0.0	0.0	11.9
Total	3113	3536	3987	4207	4370	2.6	2.4	1.1	0.8	23.6
INDIGENOUS PRODUCTION										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Natural Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	7	6	10	10	10	-2.2	11.4	0.0	0.0	71.2
Renewable & Other	25	27	30	30	30	1.3	2.3	0.0	0.0	11.9
Total	32	33	40	40	40	0.6	4.1	0.0	0.0	22.5
NET IMPORTS										
Solids	1417	1129	1141	1136	1144	-4.4	0.2	-0.1	0.1	1.3
Oil	1074	1620	1897	2006	1997	8.6	3.2	1.1	-0.1	23.3
Natural Gas	303	430	509	575	689	7.2	3.5	2.5	3.7	60.5
Electricity	304	336	400	450	500	2.0	3.5	2.4	2.1	48.7
Total	3099	3514	3947	4167	4330	2.6	2.3	1.1	0.8	23.2
INPUTS INTO POWER GENERATION										
Solids	12	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Oil	4	8	9	8	12	14.9	1.4	-0.6	7.3	47.8
Gas	104	163	172	168	240	9.3	1.0	-0.4	7.3	46.9
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	25	27	30	30	30	1.3	2.3	0.0	0.0	11.9
Total	146	198	210	207	281	6.3	1.2	-0.4	6.4	42.2
FINAL ENERGY CONSUMPTION										
Solids	989	753	762	767	772	-5.3	0.2	0.1	0.1	2.5
Oil	1022	1575	1864	1968	1945	9.0	3.4	1.1	-0.2	23.5
Gas	614	622	655	715	760	0.2	1.1	1.8	1.2	22.3
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	325	354	420	465	525	1.7	3.5	2.1	2.5	48.2
Biofuels	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Total	2950	3304	3701	3915	4002	2.3	2.3	1.1	0.4	21.1
Industry										
Solids	965	743	750	755	760	-5.1	0.2	0.1	0.1	2.3
Oil	127	267	294	338	310	16.0	1.9	2.8	-1.7	16.1
Gas	461	481	496	550	580	0.9	0.6	2.1	1.1	20.6
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	216	225	260	295	330	0.8	2.9	2.6	2.3	46.7
Total	1769	1716	1800	1938	1980	-0.6	1.0	1.5	0.4	15.4
Transports										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	595	1002	1300	1400	1435	11.0	5.3	1.5	0.5	43.2
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	3	4	10	10	10	5.9	20.1	0.0	0.0	150.0
Biofuels	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Total	598	1006	1310	1410	1445	11.0	5.4	1.5	0.5	43.6
Dom. & Tert.										
Solids	24	10	12	12	12	-15.3	3.2	0.0	0.0	17.2
Oil	300	306	270	230	200	0.4	-2.5	-3.2	-2.8	-34.6
Gas	153	141	159	165	180	-1.7	2.5	0.7	1.8	28.0
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	106	125	150	160	185	3.3	3.7	1.3	2.9	47.7
Total	583	582	591	567	577	0.0	0.3	-0.8	0.4	-0.9
IMPORT DEPENDENCY (%)										
Solids	100.0	100.0	100.0	100.0	100.0					
Oil	101.6	100.7	100.0	100.0	100.0					
Natural Gas	100.0	100.0	100.0	100.0	100.0					
Total	99.5	99.4	99.0	99.0	99.1					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

L U X E M B O U R G

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MONOVALENTS										
HARD COAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LIGNITE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESIDUAL FUEL OIL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NATURAL GAS CONV.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NAT. GAS COMB. CYCLE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OTHER (1)	0.000	0.000	0.001	0.003	0.005	0.000	0.001	0.002	0.002	0.005
TOTAL	0.000	0.000	0.001	0.003	0.005	0.000	0.001	0.002	0.002	0.005
POLYVALENTS										
WITH COAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WITHOUT COAL	0.085	0.096	0.096	0.096	0.096	0.011	0.000	0.000	0.000	0.000
PEAK DEVICE	0.010	0.010	0.040	0.050	0.060	0.000	0.030	0.010	0.010	0.050
TOTAL THERMAL	0.095	0.106	0.137	0.149	0.161	0.011	0.031	0.012	0.012	0.055
HYDRO	0.028	0.028	0.038	0.038	0.038	0.000	0.010	0.000	0.000	0.010
RENEWABLE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL WITHOUT PUMPING	0.123	0.134	0.175	0.187	0.199	0.011	0.041	0.012	0.012	0.065
PUMPING	1.096	1.104	1.104	1.104	1.104	0.008	0.000	0.000	0.000	0.000
TOTAL	1.219	1.238	1.279	1.291	1.303	0.019	0.041	0.012	0.012	0.065

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
HARD COAL		0	0	0	0		0.0	0.0	0.0	0.0
LIGNITE		0	0	0	0		0.0	0.0	0.0	0.0
RESIDUAL FUEL OIL		27	40	40	40		8.4	0.0	0.0	49.9
GAS DIESEL OIL		0	0	0	0		0.0	0.0	0.0	0.0
NATURAL GAS		49	250	290	330		38.3	3.0	2.6	567.5
OTHER (1)		508	460	460	460		-2.0	0.0	0.0	-9.5
TOTAL THERMAL	432	584	750	790	830	6.2	5.1	1.0	1.0	42.1
HYDRO	87	70	116	116	116	-4.3	10.8	0.0	0.0	66.6
RENEWABLE	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
TOTAL WITHOUT PUMPING	519	654	866	906	946	4.7	5.8	0.9	0.9	44.7
IMPORTATIONS	3971	4664	4651	5233	5814	3.3	-0.1	2.4	2.1	24.7
EXPORTATIONS	433	755	0	0	0	11.8	-100.0	0.0	0.0	-100.0
NET IMPORTS	3538	3909	4651	5233	5814	2.0	3.5	2.4	2.1	48.7
INTERNAL DEMAND (including losses)	4057	4563	5517	6139	6760	2.4	3.9	2.2	1.9	48.1
Final Consumption	3782	4120	4884	5407	6105	1.7	3.5	2.1	2.5	48.2
Memo Item										
Produced from pumping	424	1050	1000	1000	1000	19.9	-1.0	0.0	0.0	-4.8

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : NETHERLANDS

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	166.5	190.0	209.2	234.9	261.2	2.7	1.9	2.3	2.2	37.5
per capita (ECU 85/capita)	11495	12709	13580	14948	16381	2.0	1.3	1.9	1.8	28.9
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	4.2	4.4	4.7	4.9	4.9	1.0	1.3	0.5	0.1	9.8
by unit of GDP (toe/MECU 85)	367.6	349.2	347.9	324.9	297.4	-1.0	-0.1	-1.4	-1.8	-14.8
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	254.1	224.8	228.5	212.1	193.4	-2.4	0.3	-1.5	-1.8	-14.0
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	368.9	386.8	389.7	380.9	368.9	1.0	0.1	-0.5	-0.6	-4.6
CO2 EMISSIONS										
per capita (t)	10.0	10.5	11.1	11.3	11.6	0.9	1.0	0.5	0.4	9.9
by Final Consumption (t/toe)	3.4	3.7	3.6	3.6	3.6	1.4	-0.6	0.0	0.4	-0.9

SUMMARY OIL BALANCE : NETHERLANDS

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	4.10	4.03	3.75	3.65	3.35	-0.3	-1.5	-0.5	-1.7	-17.0
Net Imports	24.57	31.04	33.40	34.54	34.29	4.8	1.5	0.7	-0.1	10.5
of Crude	38.69	48.12	52.92	54.84	55.75	4.5	1.9	0.7	0.3	15.9
Total Refinery Output	42.81	51.83	56.52	58.35	58.95	3.9	1.7	0.6	0.2	13.7
of which (in %) :										
Gasoline	18.9	18.1	18.3	18.5	19.1	-0.9	0.2	0.3	0.6	5.8
Gas/Diesel Oil	31.3	28.7	30.5	31.6	34.1	-1.7	1.3	0.7	1.5	19.0
Residual Fuel Oil	22.3	19.8	19.1	17.6	14.3	-2.3	-0.8	-1.6	-4.0	-27.7
Other Products	27.5	33.5	32.1	32.2	32.5	4.0	-0.8	0.1	0.1	-3.0
Total Oil Consumption	29.22	35.23	37.03	38.07	37.52	3.8	1.0	0.6	-0.3	6.5
of which (in %) :										
Gasoline	10.5	9.5	9.5	9.9	10.2	-1.9	0.0	0.9	0.6	8.1
Gas/Diesel Oil	23.0	22.8	23.0	22.8	22.8	-0.2	0.1	-0.2	0.0	-0.1
Residual Fuel Oil	26.9	27.3	27.9	26.0	23.6	0.3	0.4	-1.4	-1.9	-13.6
Other Products	39.6	40.4	39.6	41.3	43.3	0.4	-0.4	0.8	1.0	7.4

N E T H E R L A N D S

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	6590	9072	8344	9598	11215	6.6	-1.7	2.8	3.2	23.6
Oil	20799	24580	25565	26695	26953	3.4	0.8	0.9	0.2	9.7
Natural Gas	32324	30810	36894	37921	38194	-1.0	3.7	0.6	0.1	24.0
Nuclear	977	880	871	775	0	-2.1	-0.2	-2.3	-96.8	-100.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	441	802	863	831	690	12.7	1.5	-0.8	-3.7	-14.0
Renewable & Other	82	206	241	473	639	20.2	3.2	14.4	6.2	210.4
Total	61213	66351	72777	76293	77691	1.6	1.9	0.9	0.4	17.1
INDIGENOUS PRODUCTION										
Solids	69	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Oil	4105	4034	3749	3649	3349	-0.3	-1.5	-0.5	-1.7	-17.0
Natural Gas	59520	54613	65000	70000	72500	-1.7	3.5	1.5	0.7	32.8
Nuclear	977	880	871	775	0	-2.1	-0.2	-2.3	-96.8	-100.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	0	11	9	13	13	111.3	-2.5	6.2	0.0	18.9
Renewable & Other	82	206	241	473	639	20.2	3.2	14.4	6.2	210.4
Total	64753	59744	69870	74910	76501	-1.6	3.2	1.4	0.4	28.0
NET IMPORTS										
Solids	6596	9485	8344	9598	11215	7.5	-2.5	2.8	3.2	18.2
Oil	24575	31037	33397	34537	34291	4.8	1.5	0.7	-0.1	10.5
Natural Gas	-27207	-23799	-28106	-32079	-34306	-2.6	3.4	2.7	1.4	44.1
Electricity	441	792	853	818	677	12.4	1.5	-0.8	-3.7	-14.5
Total	4404	17514	14488	12874	11877	31.8	-3.7	-2.3	-1.6	-32.2
INPUTS INTO POWER GENERATION										
Solids	3174	5698	5572	7014	8805	12.4	-0.4	4.7	4.7	54.5
Oil	597	701	778	576	492	3.3	2.1	-5.8	-3.1	-29.8
Gas	8567	7651	9463	9291	9455	-2.2	4.3	-0.4	0.3	23.6
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	82	206	241	393	389	20.2	3.2	10.3	-0.2	88.7
Total	12421	14256	16053	17274	19140	2.8	2.4	1.5	2.1	34.3
FINAL ENERGY CONSUMPTION										
Solids	2028	1692	1426	1310	1209	-3.6	-3.4	-1.7	-1.6	-28.6
Oil	12187	13190	14063	14526	14489	1.6	1.3	0.6	-0.1	9.8
Gas	22567	21244	24857	25631	25475	-1.2	3.2	0.6	-0.1	19.9
Heat	253	269	430	577	810	1.2	9.9	6.1	7.0	201.1
Electricity	5284	6321	7010	7692	8288	3.7	2.1	1.9	1.5	31.1
Biofuels	0	0	0	80	251	0.0	0.0	0.0	25.5	0.0
Total	42319	42717	47786	49817	50521	0.2	2.3	0.8	0.3	18.3
Industry										
Solids	1988	1668	1421	1306	1206	-3.5	-3.1	-1.7	-1.6	-27.7
Oil	1765	1365	1246	1136	994	-5.0	-1.8	-1.8	-2.6	-27.2
Gas	7366	7033	7401	7492	7296	-0.9	1.0	0.2	-0.5	3.7
Heat	253	269	330	377	410	1.2	4.2	2.7	1.7	52.4
Electricity	2430	2858	3083	3336	3532	3.3	1.5	1.6	1.1	23.6
Total	13801	13192	13481	13648	13437	-0.9	0.4	0.2	-0.3	1.9
Transports										
Solids	1	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Oil	8706	10207	11113	11867	12220	3.2	1.7	1.3	0.6	19.7
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	95	109	113	119	126	2.8	0.7	1.1	1.1	15.9
Biofuels	0	0	0	80	251	0.0	0.0	0.0	25.5	0.0
Total	8802	10316	11225	12066	12597	3.2	1.7	1.5	0.9	22.1
Dom. & Tert.										
Solids	39	25	5	3	3	-8.7	-28.5	-5.9	-2.0	-87.5
Oil	1716	1618	1705	1523	1276	-1.2	1.0	-2.2	-3.5	-21.2
Gas	15201	14211	17456	18139	18178	-1.3	4.2	0.8	0.0	27.9
Heat	0	0	100	200	400	0.0	0.0	14.9	14.9	0.0
Electricity	2759	3354	3814	4237	4630	4.0	2.6	2.1	1.8	38.0
Total	19715	19208	23079	24102	24487	-0.5	3.7	0.9	0.3	27.5
IMPORT DEPENDENCY (%)										
Solids	100.1	104.6	100.0	100.0	100.0					
Oil	83.4	87.7	89.9	90.4	91.1					
Natural Gas	-84.2	-77.2	-76.2	-84.6	-89.8					
Total	6.3	22.7	17.2	14.7	13.4					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

N E T H E R L A N D S

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	0.498	0.508	0.508	0.452	0.000	0.010	0.000	-0.056	-0.452	-0.508
MONOVALENTS										
HARD COAL	0.000	0.000	0.250	0.250	0.250	0.000	0.250	0.000	0.000	0.250
LIGNITE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESIDUAL FUEL OIL	0.742	0.000	0.000	0.000	0.000	-0.742	0.000	0.000	0.000	0.000
NATURAL GAS CONV.	1.704	3.547	3.983	4.388	3.680	1.843	0.436	0.405	-0.708	0.133
NAT. GAS COMB. CYCLE	0.000	0.200	0.825	3.215	6.273	0.200	0.625	2.390	3.058	6.073
OTHER (1)	0.000	1.001	0.944	0.843	0.793	1.001	-0.057	-0.101	-0.050	-0.208
TOTAL	2.446	4.748	6.002	8.696	10.996	2.302	1.254	2.694	2.300	6.248
POLYVALENTS										
WITH COAL	1.864	3.767	4.109	5.098	6.581	1.903	0.342	0.989	1.483	2.814
WITHOUT COAL	10.180	7.985	6.675	4.622	3.217	-2.195	-1.310	-2.053	-1.405	-4.768
PEAK DEVICE	0.373	0.390	0.257	0.124	0.050	0.017	-0.133	-0.133	-0.074	-0.340
TOTAL THERMAL	14.863	16.890	17.043	18.540	20.844	2.027	0.153	1.497	2.304	3.954
HYDRO	0.000	0.037	0.037	0.050	0.050	0.037	0.000	0.013	0.000	0.013
RENEWABLE	0.034	0.211	0.604	1.516	1.565	0.177	0.393	0.912	0.049	1.354
TOTAL WITHOUT PUMPING	15.395	17.646	18.192	20.558	22.459	2.251	0.546	2.366	1.901	4.813
PUMPING	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	15.395	17.646	18.192	20.558	22.459	2.251	0.546	2.366	1.901	4.813

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	3899	3500	3442	3063	0	-2.1	-0.3	-2.3	-96.8	-100.0
HARD COAL		25013	25430	32624	41464		0.3	5.1	4.9	65.8
LIGNITE		0	0	0	0		0.0	0.0	0.0	0.0
RESIDUAL FUEL OIL		1221	1766	1091	833		7.7	-9.2	-5.2	-31.8
GAS DIESEL OIL		94	58	25	8		-9.3	-15.7	-19.8	-91.4
NATURAL GAS		36615	43680	45190	49119		3.6	0.7	1.7	34.2
OTHER (1)		5261	4962	4431	4168		-1.2	-2.2	-1.2	-20.8
TOTAL THERMAL	59045	68204	75896	83360	95592	2.9	2.2	1.9	2.8	40.2
HYDRO	3	119	108	146	146	108.9	-2.0	6.2	0.0	21.9
RENEWABLE	0	50	635	2656	2742	0.0	66.3	33.1	0.6	5394.1
TOTAL WITHOUT PUMPING	62947	71873	80081	89225	98479	2.7	2.2	2.2	2.0	37.0
IMPORTATIONS	6041	9677	10447	10038	8399	9.9	1.5	-0.8	-3.5	-13.2
EXPORTATIONS	916	471	523	523	523	-12.5	2.1	0.0	0.0	11.1
NET IMPORTS	5125	9206	9924	9515	7875	12.4	1.5	-0.8	-3.7	-14.5
INTERNAL DEMAND (including losses)	68072	81079	90005	98739	106355	3.6	2.1	1.9	1.5	31.2
Final Consumption	61439	73500	81508	89444	96369	3.7	2.1	1.9	1.5	31.1
Memo Item										
Produced from pumping	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : PORTUGAL

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	27.1	33.8	41.3	50.2	59.7	4.5	4.1	4.0	3.5	76.7
per capita (ECU 85/capita)	2804	3444	4193	5059	5958	4.2	4.0	3.8	3.3	73.0
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	1.1	1.5	1.8	2.1	2.4	7.6	3.0	3.7	1.9	53.1
by unit of GDP (toe/MECU 85)	380.7	447.3	425.7	424.1	395.9	3.3	-1.0	-0.1	-1.4	-11.5
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	276.7	279.6	277.5	279.7	261.1	0.2	-0.2	0.2	-1.4	-6.6
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	643.0	696.8	739.5	744.6	722.7	1.6	1.2	0.1	-0.6	3.7
CO2 EMISSIONS										
per capita (t)	2.7	4.1	4.7	5.7	6.3	8.5	3.1	3.9	2.0	55.4
by Final Consumption (t/toe)	3.5	4.2	4.1	4.1	4.1	3.9	-0.7	-0.1	0.0	-3.8

SUMMARY OIL BALANCE : PORTUGAL

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
Net Imports	8.51	12.37	12.49	13.88	13.00	7.8	0.2	2.1	-1.3	5.1
of Crude	7.19	11.37	12.99	14.56	14.56	9.6	2.7	2.3	0.0	28.1
Total Refinery Output	7.17	11.05	12.93	14.50	14.50	9.0	3.2	2.3	0.0	31.3
of which (in %) :										
Gasoline	12.4	16.2	17.6	18.4	18.4	5.6	1.7	0.8	0.0	13.2
Gas/Diesel Oil	27.4	27.3	26.1	26.5	26.5	-0.1	-0.9	0.3	0.0	-3.0
Residual Fuel Oil	35.6	33.0	31.6	30.4	30.4	-1.5	-0.9	-0.8	0.0	-7.8
Other Products	24.6	23.5	24.6	24.7	24.7	-0.9	0.9	0.1	0.0	5.3
Total Oil Consumption	8.77	12.07	12.40	13.79	12.91	6.6	0.5	2.2	-1.3	6.9
of which (in %) :										
Gasoline	10.2	11.9	14.9	15.2	17.4	3.0	4.6	0.4	2.7	46.1
Gas/Diesel Oil	23.6	22.4	24.5	25.0	28.0	-1.0	1.8	0.4	2.3	24.8
Residual Fuel Oil	40.5	34.9	30.5	29.9	22.5	-2.9	-2.7	-0.4	-5.5	-35.7
Other Products	25.6	30.8	30.1	29.9	32.2	3.7	-0.5	-0.1	1.4	4.6

PORTUGAL

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	665	2580	3833	4239	5600	31.1	8.2	2.0	5.7	117.1
Oil	8416	11622	11916	13312	12450	6.7	0.5	2.2	-1.3	7.1
Natural Gas	0	0	389	2323	4000	0.0	0.0	43.0	11.5	0.0
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	1118	790	1270	1200	1230	-6.7	10.0	-1.1	0.5	55.7
Renewable & Other	99	115	170	230	340	3.0	8.1	6.2	8.1	195.7
Total	10299	15107	17577	21304	23621	8.0	3.1	3.9	2.1	56.4
INDIGENOUS PRODUCTION										
Solids	98	115	90	0	0	3.3	-4.8	-100.0	0.0	-100.0
Oil	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Natural Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Nuclear	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	925	787	970	1060	1110	-3.2	4.3	1.8	0.9	41.0
Renewable & Other	99	115	170	230	340	3.0	8.1	6.2	8.1	195.7
Total	1122	1017	1230	1290	1450	-1.9	3.9	1.0	2.4	42.6
NET IMPORTS										
Solids	937	2790	3743	4239	5600	24.4	6.1	2.5	5.7	100.7
Oil	8511	12375	12486	13882	13000	7.8	0.2	2.1	-1.3	5.1
Natural Gas	0	0	389	2323	4000	0.0	0.0	43.0	11.5	0.0
Electricity	193	3	300	140	120	-56.5	151.2	-14.1	-3.0	3900.0
Total	9642	15168	16917	20584	22721	9.5	2.2	4.0	2.0	49.8
INPUTS INTO POWER GENERATION										
Solids	219	2028	3020	3345	4639	56.0	8.3	2.1	6.8	128.8
Oil	1508	2102	1495	1608	1010	6.9	-6.6	1.5	-8.9	-52.0
Gas	16	19	12	1157	1534	3.9	-8.1	147.5	5.8	7977.9
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	99	115	170	180	190	3.0	8.1	1.1	1.1	65.2
Total	1842	4264	4697	6290	7373	18.3	2.0	6.0	3.2	72.9
FINAL ENERGY CONSUMPTION										
Solids	430	603	700	780	850	7.0	3.0	2.2	1.7	41.0
Oil	5435	6688	7650	8860	8570	4.2	2.7	3.0	-0.7	28.1
Gas	95	103	456	1114	2270	1.7	34.6	19.6	15.3	2103.9
Heat	32	26	27	30	30	-4.1	0.6	2.3	0.0	15.4
Electricity	1496	2024	2626	3217	3708	6.2	5.3	4.1	2.9	83.2
Biofuels	0	0	0	50	150	0.0	0.0	0.0	24.6	0.0
Total	7487	9444	11459	14052	15578	4.8	3.9	4.2	2.1	65.0
Industry										
Solids	419	602	700	780	850	7.5	3.1	2.2	1.7	41.2
Oil	1825	1801	1700	1900	1200	-0.3	-1.1	2.2	-8.8	-33.4
Gas	48	51	350	850	1850	1.3	47.0	19.4	16.8	3527.5
Heat	32	26	27	30	30	-4.1	0.6	2.3	0.0	15.4
Electricity	776	1051	1400	1610	1800	6.2	5.9	2.8	2.3	71.3
Total	3100	3531	4177	5170	5730	2.6	3.4	4.4	2.1	62.3
Transports										
Solids	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Oil	2635	3707	4700	5400	6020	7.1	4.9	2.8	2.2	62.4
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	23	26	26	27	28	2.5	0.0	0.8	0.9	8.5
Biofuels	0	0	0	50	150	0.0	0.0	0.0	24.6	0.0
Total	2658	3733	4726	5477	6198	7.0	4.8	3.0	2.5	66.0
						0.0	0.0	0.0	0.0	
Dom. & Tert.										
Solids	11	1	0	0	0	-38.1	-100.0	0.0	0.0	-100.0
Oil	975	1180	1250	1560	1350	3.9	1.2	4.5	-2.9	14.4
Gas	47	52	106	264	420	2.1	15.3	20.1	9.7	707.7
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	697	947	1200	1580	1880	6.3	4.8	5.7	3.5	98.5
Total	1729	2180	2556	3405	3650	4.7	3.2	5.9	1.4	67.4
IMPORT DEPENDENCY (%)										
Solids	140.9	108.1	97.7	100.0	100.0					
Oil	95.8	101.2	100.0	100.0	100.0					
Natural Gas	#DIV/0!	100.0	100.0	100.0	100.0					
Total	89.5	96.5	93.2	94.1	94.0					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

P O R T U G A L

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MONOVALENTS										
HARD COAL	0.000	1.172	1.738	2.014	2.950	1.172	0.566	0.276	0.936	1.778
LIGNITE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESIDUAL FUEL OIL	1.236	1.702	1.702	1.702	1.467	0.466	0.000	0.000	-0.235	-0.235
NATURAL GAS CONV.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NAT. GAS COMB. CYCLE	0.000	0.000	0.000	0.900	1.350	0.000	0.000	0.900	0.450	1.350
OTHER (1)	0.000	0.490	0.515	0.540	0.565	0.490	0.025	0.025	0.025	0.075
TOTAL	1.236	3.364	3.955	5.156	6.332	2.128	0.591	1.201	1.176	2.968
POLYVALENTS										
WITH COAL	0.135	0.132	0.132	0.000	0.000	-0.003	0.000	-0.132	0.000	-0.132
WITHOUT COAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PEAK DEVICE	0.165	0.329	0.329	0.304	0.171	0.164	0.000	-0.025	-0.133	-0.158
TOTAL THERMAL	1.536	3.825	4.416	5.460	6.503	2.289	0.591	1.044	1.043	2.678
HYDRO	2.163	2.453	3.356	3.616	3.870	0.290	0.903	0.260	0.254	1.417
RENEWABLE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL WITHOUT PUMPING	3.699	6.278	7.772	9.076	10.373	2.579	1.494	1.304	1.297	4.095
PUMPING	0.071	0.554	0.554	0.692	0.832	0.483	0.000	0.138	0.140	0.278
TOTAL	3.770	6.832	8.326	9.768	11.205	3.062	1.494	1.442	1.437	4.373

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
HARD COAL		8744	13386	15016	21349		8.9	2.3	7.3	144.2
LIGNITE		315	483	541	769		8.9	2.3	7.3	144.1
RESIDUAL FUEL OIL		9314	6721	7275	4598		-6.3	1.6	-8.8	-50.6
GAS DIESEL OIL		85	58	63	40		-7.4	1.7	-8.7	-52.9
NATURAL GAS		0	2	6262	8740		0.0	400.2	6.9	0.0
OTHER (1)		734	1015	1154	1137		6.7	2.6	-0.3	54.9
TOTAL THERMAL	8113	19192	21665	30311	36633	18.8	2.5	6.9	3.9	90.9
HYDRO	10614	9162	11279	12326	12907	-2.9	4.2	1.8	0.9	40.9
RENEWABLE	4	0	58	174	291	-100.0	0.0	24.6	10.8	0.0
TOTAL WITHOUT PUMPING	18731	28354	33002	42811	49831	8.6	3.1	5.3	3.1	75.7
IMPORTATIONS	3529	1733	5000	2791	2558	-13.3	23.6	-11.0	-1.7	47.6
EXPORTATIONS	1284	1696	1512	1163	1163	5.7	-2.3	-5.1	0.0	-31.4
NET IMPORTS	2246	37	3488	1628	1395	-56.0	148.1	-14.1	-3.0	3661.8
INTERNAL DEMAND (including losses)	20977	28391	36490	44439	51226	6.2	5.1	4.0	2.9	80.4
Final Consumption	17395	23532	30535	37407	43116	6.2	5.3	4.1	2.9	83.2
Memo Item										
Produced from pumping	89	146	200	200	200	10.4	6.5	0.0	0.0	37.0

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : SPAIN

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	218.3	272.0	310.6	361.8	417.6	4.5	2.7	3.1	2.9	53.5
per capita (ECU 85/capita)	5675	6983	7891	9101	10428	4.2	2.5	2.9	2.8	49.3
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	1.8	2.2	2.4	2.7	2.9	3.9	1.9	1.9	1.3	29.4
by unit of GDP (toe/MECU 85)	321.8	316.6	308.3	294.2	274.4	-0.3	-0.5	-0.9	-1.4	-13.3
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	200.0	195.8	193.5	185.6	175.3	-0.4	-0.2	-0.8	-1.1	-10.5
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	470.8	459.2	465.8	462.0	453.2	-0.5	0.3	-0.2	-0.4	-1.3
CO2 EMISSIONS										
per capita (t)	4.8	5.4	6.0	6.5	7.1	2.4	2.0	1.8	1.8	31.9
by Final Consumption (t/toe)	4.2	4.0	3.9	3.9	3.9	-1.3	-0.2	-0.2	0.2	-1.3

SUMMARY OIL BALANCE : SPAIN

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	2.44	0.79	1.20	0.95	0.70	-20.2	8.6	-4.6	-5.9	-11.7
Net Imports	38.65	49.57	54.03	58.21	60.25	5.1	1.7	1.5	0.7	21.5
of Crude	43.72	53.66	57.46	61.78	65.86	4.2	1.4	1.5	1.3	22.7
Total Refinery Output	44.99	52.53	57.82	61.30	66.27	3.1	1.9	1.2	1.6	26.2
of which (in %) :										
Gasoline	15.7	18.5	19.7	19.8	22.1	3.3	1.3	0.1	2.3	19.9
Gas/Diesel Oil	25.8	27.9	26.2	28.5	29.7	1.6	-1.3	1.7	0.8	6.2
Residual Fuel Oil	32.4	27.0	28.2	24.4	20.9	-3.6	0.9	-2.9	-3.0	-22.5
Other Products	26.1	26.6	26.0	27.3	27.3	0.4	-0.5	1.0	0.0	2.5
Total Oil Consumption	40.15	48.32	54.33	57.66	60.59	3.8	2.4	1.2	1.0	25.4
of which (in %) :										
Gasoline	15.1	17.6	18.8	20.4	21.4	3.0	1.3	1.6	1.0	22.1
Gas/Diesel Oil	30.6	32.2	32.9	35.4	37.0	1.0	0.4	1.5	0.9	15.0
Residual Fuel Oil	25.8	19.5	19.7	15.4	13.1	-5.5	0.2	-4.8	-3.2	-32.9
Other Products	28.4	30.7	28.6	28.8	28.4	1.6	-1.4	0.1	-0.3	-7.5

S P A I N

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	19678	19266	20674	23177	25404	-0.4	1.4	2.3	1.9	31.9
Oil	38103	45949	51079	54360	56126	3.8	2.1	1.3	0.6	22.1
Natural Gas	2352	4970	7116	11181	15705	16.1	7.4	9.5	7.0	216.0
Nuclear	7375	13701	13984	13984	13185	13.2	0.4	0.0	-1.2	-3.8
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	2596	2147	2761	3246	3243	-3.7	5.2	3.3	0.0	51.0
Renewable & Other	164	90	123	506	931	-11.3	6.5	32.8	13.0	938.6
Total	70267	86124	95738	106455	114593	4.2	2.1	2.1	1.5	33.1
INDIGENOUS PRODUCTION										
Solids	13940	11693	10510	10100	8970	-3.5	-2.1	-0.8	-2.3	-23.3
Oil	2444	793	1200	950	700	-20.2	8.6	-4.6	-5.9	-11.7
Natural Gas	230	1273	1350	1450	1500	40.9	1.2	1.4	0.7	17.8
Nuclear	7375	13701	13984	13984	13185	13.2	0.4	0.0	-1.2	-3.8
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	2688	2183	2704	2799	2799	-4.1	4.4	0.7	0.0	28.2
Renewable & Other	164	90	123	506	931	-11.3	6.5	32.8	13.0	938.6
Total	26841	29733	29871	29789	28086	2.1	0.1	-0.1	-1.2	-5.5
NET IMPORTS										
Solids	5226	7038	10165	13078	16434	6.1	7.6	5.2	4.7	133.5
Oil	38652	49573	54031	58214	60254	5.1	1.7	1.5	0.7	21.5
Natural Gas	2137	3690	5766	9731	14205	11.5	9.3	11.0	7.9	285.0
Electricity	-92	-36	57	447	443	0.0	0.0	51.0	-0.2	
Total	45924	60264	70018	81470	91336	5.6	3.0	3.1	2.3	51.6
INPUTS INTO POWER GENERATION										
Solids	13011	13669	14583	17262	19587	1.0	1.3	3.4	2.6	43.3
Oil	1974	2170	3095	1166	617	1.9	7.4	-17.7	-12.0	-71.6
Gas	733	486	1421	4333	7769	-7.9	23.9	25.0	12.4	1499.9
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	164	90	123	212	272	-11.3	6.5	11.5	5.1	203.6
Total	15882	16414	19221	22973	28244	0.7	3.2	3.6	4.2	72.1
FINAL ENERGY CONSUMPTION										
Solids	4246	4008	4039	3904	3832	-1.1	0.2	-0.7	-0.4	-4.4
Oil	28019	33598	37376	41245	44107	3.7	2.2	2.0	1.4	31.3
Gas	2552	4903	6233	7321	8332	13.9	4.9	3.3	2.6	69.9
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	8841	10743	12441	14376	16277	4.0	3.0	2.9	2.5	51.5
Biofuels	0	0	0	294	659	0.0	0.0	0.0	17.5	0.0
Total	43658	53252	60088	67140	73207	4.1	2.4	2.2	1.7	37.5
Industry										
Solids	3782	3541	3639	3514	3452	-1.3	0.5	-0.7	-0.4	-2.5
Oil	6368	5538	5400	5389	5244	-2.8	-0.5	0.0	-0.5	-5.3
Gas	2003	4043	4942	5637	6297	15.1	4.1	2.7	2.2	55.8
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	4871	5439	6170	7056	7869	2.2	2.6	2.7	2.2	44.7
Total	17024	18560	20151	21596	22862	1.7	1.7	1.4	1.1	23.2
Transports										
Solids	9	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Oil	14810	22010	25376	29155	32298	8.2	2.9	2.8	2.1	46.7
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	241	318	360	412	467	5.7	2.5	2.7	2.6	46.9
Biofuels	0	0	0	294	659	0.0	0.0	0.0	17.5	0.0
Total	15060	22328	25736	29861	33424	8.2	2.9	3.0	2.3	49.7
						0.0	0.0	0.0	0.0	
Dom. & Tert.										
Solids	455	467	400	390	380	0.5	-3.0	-0.5	-0.5	-18.5
Oil	6841	6051	6599	6702	6565	-2.4	1.8	0.3	-0.4	8.5
Gas	549	860	1291	1684	2035	9.4	8.5	5.5	3.9	136.6
Heat	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	3729	4986	5911	6908	7941	6.0	3.5	3.2	2.8	59.3
Total	11574	12364	14202	15683	16921	1.3	2.8	2.0	1.5	36.9
IMPORT DEPENDENCY (%)										
Solids	26.6	36.5	49.2	56.4	64.7					
Oil	94.9	99.6	97.5	98.4	98.9					
Natural Gas	90.9	74.2	81.0	87.0	90.4					
Total	63.0	67.0	70.0	73.2	76.5					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

S P A I N

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	1.065	7.000	7.000	7.000	6.600	5.935	0.000	0.000	-0.400	-0.400
MONOVALENTS										
HARD COAL	3.482	8.115	8.115	9.740	10.872	4.633	0.000	1.625	1.132	2.757
LIGNITE	1.800	1.800	1.800	1.800	1.800	0.000	0.000	0.000	0.000	0.000
RESIDUAL FUEL OIL	6.996	6.180	5.920	2.920	1.120	-0.816	-0.260	-3.000	-1.800	-5.060
NATURAL GAS CONV.	0.000	0.000	0.000	0.460	2.144	0.000	0.000	0.460	1.684	2.144
NAT. GAS COMB. CYCLE	0.000	0.000	0.000	1.220	3.710	0.000	0.000	1.220	2.490	3.710
OTHER (1)	0.000	0.353	0.335	0.335	0.335	0.353	-0.018	0.000	0.000	-0.018
TOTAL	12.278	16.448	16.170	16.475	19.981	4.170	-0.278	0.305	3.506	3.533
POLYVALENTS										
WITH COAL	0.404	0.000	0.000	0.000	0.000	-0.404	0.000	0.000	0.000	0.000
WITHOUT COAL	1.241	1.241	1.591	4.881	7.122	0.000	0.350	3.290	2.241	5.881
PEAK DEVICE	0.000	1.042	1.242	1.542	1.542	1.042	0.200	0.300	0.000	0.500
TOTAL THERMAL	13.923	18.730	19.002	22.897	28.645	4.807	0.272	3.895	5.748	9.915
HYDRO	13.175	14.850	15.645	16.531	16.531	1.675	0.795	0.886	0.000	1.681
RENEWABLE	0.000	0.000	0.155	0.420	0.620	0.000	0.155	0.265	0.200	0.620
TOTAL WITHOUT PUMPING	28.163	40.580	41.802	46.848	52.396	12.417	1.222	5.046	5.548	11.816
PUMPING	0.000	1.200	1.200	1.200	1.200	1.200	0.000	0.000	0.000	0.000
TOTAL	28.163	41.780	43.002	48.048	53.596	13.617	1.222	5.046	5.548	11.816

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	28044	54273	55286	55286	52127	14.1	0.4	0.0	-1.2	-4.0
HARD COAL		47887	53558	66401	78733		2.3	4.4	3.5	64.4
LIGNITE		11208	10052	10052	9382		-2.2	0.0	-1.4	-16.3
RESIDUAL FUEL OIL		7964	13425	4788	2174		11.0	-18.6	-14.6	-72.7
GAS DIESEL OIL		469	394	361	443		-3.4	-1.8	4.2	-5.5
NATURAL GAS		1271	5528	21275	40736		34.2	30.9	13.9	3105.0
OTHER (1)		1385	1319	1319	1319		-1.0	0.0	0.0	-4.7
TOTAL THERMAL	66286	70184	84276	104196	132788	1.1	3.7	4.3	5.0	89.2
HYDRO	31287	26165	31446	32548	32548	-3.5	3.7	0.7	0.0	24.4
RENEWABLE	0	0	434	1472	2172	0.0	0.0	27.6	8.1	0.0
TOTAL WITHOUT PUMPING	125617	150622	171443	193502	219635	3.7	2.6	2.5	2.6	45.8
IMPORTATIONS	3926	3207	4732	9269	9226	-4.0	8.1	14.4	-0.1	187.6
EXPORTATIONS	5000	3627	4070	4070	4070	-6.2	2.3	0.0	0.0	12.2
NET IMPORTS	-1074	-420	662	5199	5156	0.0		51.0	-0.2	
INTERNAL DEMAND (including losses)	124543	150202	172105	198701	224791	3.8	2.8	2.9	2.5	49.7
Final Consumption	102802	124918	144659	167159	189272	4.0	3.0	2.9	2.5	51.5
Memo Item										
Produced from pumping	1766	775	950	950	950	-15.2	4.2	0.0	0.0	22.6

(1) includes urban waste, derived gas and other petroleum products.

MAIN INDICATORS : UNITED KINGDOM

	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
GDP										
in billions ECU 85	602.8	706.6	744.8	812.5	886.4	3.2	1.1	1.8	1.8	25.4
per capita (ECU 85/capita)	10647	12312	12785	13739	14768	2.9	0.8	1.5	1.5	20.0
GROSS INLAND CONSUMPTION										
per capita (toe/capita)	3.6	3.7	3.9	3.9	4.0	0.5	1.0	0.3	0.2	8.2
by unit of GDP (toe/MECU 85)	337.9	299.4	303.5	287.3	270.2	-2.4	0.3	-1.1	-1.2	-9.8
FINAL CONSUMPTION										
by unit of GDP (toe/MECU 85)	208.8	191.5	195.7	188.1	177.7	-1.7	0.4	-0.8	-1.1	-7.2
ELECTRICITY CONSUMPTION										
by unit of GDP (Mwh/MECU 85)	401.5	388.9	392.1	383.5	371.3	-0.6	0.2	-0.4	-0.6	-4.5
CO2 EMISSIONS										
per capita (t)	9.8	10.1	10.4	10.4	10.3	0.6	0.5	0.1	-0.2	2.1
by Final Consumption (t/toe)	4.4	4.3	4.1	4.0	3.9	-0.6	-0.7	-0.6	-0.5	-8.2

SUMMARY OIL BALANCE : UNITED KINGDOM

(Mtoe)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 2005/90
Indigenous Production	129.91	92.50	104.80	99.56	94.32	-6.6	2.5	-1.0	-1.1	2.0
Net Imports	-49.86	-8.98	-14.90	-9.42	-3.59	-29.0	10.6	-8.8	-17.6	-60.1
of Crude	-45.72	-3.13	-4.59	-2.26	1.34	-41.5	8.0	-13.2		
Total Refinery Output	77.88	88.41	96.65	93.78	92.20	2.6	1.8	-0.6	-0.3	4.3
of which (in %) :										
Gasoline	30.0	31.8	31.8	33.2	34.6	1.1	0.0	0.8	0.8	8.8
Gas/Diesel Oil	28.2	26.7	28.7	28.9	29.5	-1.0	1.4	0.1	0.4	10.4
Residual Fuel Oil	17.5	16.4	15.1	13.0	10.9	-1.3	-1.6	-2.9	-3.5	-33.2
Other Products	24.3	25.1	24.3	24.9	25.0	0.7	-0.6	0.5	0.1	-0.6
Total Oil Consumption	79.25	84.18	89.09	89.41	90.01	1.2	1.1	0.1	0.1	6.9
of which (in %) :										
Gasoline	27.1	30.4	30.1	31.5	32.2	2.3	-0.2	0.9	0.4	6.0
Gas/Diesel Oil	23.6	24.1	24.9	25.5	25.7	0.4	0.6	0.5	0.1	6.6
Residual Fuel Oil	23.4	17.9	16.3	12.5	10.0	-5.3	-1.8	-5.1	-4.4	-43.9
Other Products	25.9	27.6	28.7	30.4	32.1	1.3	0.8	1.2	1.1	16.1

UNITED KINGDOM

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2005/90
GROSS INLAND CONSUMPTION										
Solids	62765	64253	61706	58024	55378	0.5	-0.8	-1.2	-0.9	-13.8
Oil	77484	81645	87366	87536	88065	1.1	1.4	0.0	0.1	7.9
Natural Gas	47106	47201	57449	69438	76414	0.0	4.0	3.9	1.9	61.9
Nuclear	15980	16573	17566	15816	15816	0.7	1.2	-2.1	0.0	-4.6
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	352	1464	1554	1576	1658	33.0	1.2	0.3	1.0	13.3
Renewable & Other	0	436	424	1014	2168	0.0	-0.6	19.1	16.4	397.1
Total	203687	211572	226065	233403	239500	0.8	1.3	0.6	0.5	13.2
INDIGENOUS PRODUCTION										
Solids	54740	54054	43871	35535	28807	-0.3	-4.1	-4.1	-4.1	-46.7
Oil	129907	92499	104801	99561	94322	-6.6	2.5	-1.0	-1.1	2.0
Natural Gas	35721	40919	47914	52900	58406	2.8	3.2	2.0	2.0	42.7
Nuclear	15980	16573	17566	15816	15816	0.7	1.2	-2.1	0.0	-4.6
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Hydro	352	437	456	456	456	4.4	0.8	0.0	0.0	4.3
Renewable & Other	0	436	424	1014	2168	0.0	-0.6	19.1	16.4	397.1
Total	236700	204918	215030	205282	199975	-2.8	1.0	-0.9	-0.5	-2.4
NET IMPORTS										
Solids	6577	9124	17836	22489	26572	6.8	14.3	4.7	3.4	191.2
Oil	-49864	-8984	-14896	-9423	-3588	-29.0	10.6	-8.8	-17.6	-60.1
Natural Gas	11385	6178	9536	16537	18008	-11.5	9.1	11.6	1.7	191.5
Electricity	0	1027	1098	1120	1202	0.0	1.3	0.4	1.4	17.1
Total	-31902	7346	13573	30724	42194	0.0	13.1	17.7	6.6	474.4
INPUTS INTO POWER GENERATION										
Solids	42149	47876	45501	43034	41658	2.6	-1.0	-1.1	-0.6	-13.0
Oil	11652	7684	7058	4238	2544	-8.0	-1.7	-9.7	-9.7	-66.9
Gas	1201	1567	5914	14133	18936	5.5	30.4	19.0	6.0	1108.0
Geothermal	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Renewable & Other	0	436	424	605	885	0.0	-0.6	7.4	7.9	102.8
Total	55003	57564	58896	62009	64022	0.9	0.5	1.0	0.6	11.2
FINAL ENERGY CONSUMPTION										
Solids	15949	11830	11872	10903	9853	-5.8	0.1	-1.7	-2.0	-16.7
Oil	50182	58418	62136	64830	66574	3.1	1.2	0.9	0.5	14.0
Gas	38917	41021	46182	49364	50944	1.1	2.4	1.3	0.6	24.2
Heat	12	445	478	514	543	106.0	1.4	1.5	1.1	22.1
Electricity	20814	23631	25113	26797	28306	2.6	1.2	1.3	1.1	19.8
Biofuels	0	0	0	409	1284	0.0	0.0	0.0	25.7	0.0
Total	125873	135345	145780	152817	157503	1.5	1.5	0.9	0.6	16.4
Industry										
Solids	6817	6439	6154	5943	5593	-1.1	-0.9	-0.7	-1.2	-13.1
Oil	6977	6903	7170	7082	6897	-0.2	0.8	-0.2	-0.5	-0.1
Gas	10885	11148	11287	11590	11827	0.5	0.2	0.5	0.4	6.1
Heat	0	445	478	514	543	0.0	1.4	1.5	1.1	22.1
Electricity	7567	8629	9111	9632	10102	2.7	1.1	1.1	1.0	17.1
Total	32246	33563	34199	34760	34963	0.8	0.4	0.3	0.1	4.2
Transports										
Solids	4	0	0	0	0	-100.0	0.0	0.3	0.2	0.0
Oil	34558	44805	47602	50756	53317	5.3	1.2	1.3	1.0	19.0
Gas	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Electricity	253	501	378	409	440	14.6	-5.5	1.6	1.5	-12.2
Biofuels	0	0	0	409	1284	0.0	0.0	0.0	25.7	0.0
Total	34815	45306	47981	51574	55041	5.4	1.2	1.5	1.3	21.5
						0.0	0.0	0.0	0.0	
Dom. & Tert.										
Solids	9128	5391	5718	4960	4260	-10.0	1.2	-2.8	-3.0	-21.0
Oil	8647	6710	7364	6992	6360	-4.9	1.9	-1.0	-1.9	-5.2
Gas	28032	29874	34896	37774	39116	1.3	3.2	1.6	0.7	30.9
Heat	12	0	0	0	0	-100.0	0.0	0.0	0.0	0.0
Electricity	12993	14500	15623	16757	17763	2.2	1.5	1.4	1.2	22.5
Total	58812	56475	63600	66483	67499	-0.8	2.4	0.9	0.3	19.5
IMPORT DEPENDENCY (%)										
Solids	10.5	14.2	28.9	38.8	48.0					
Oil	-62.4	-10.7	-16.6	-10.5	-4.0					
Natural Gas	24.2	13.1	16.6	23.8	23.6					
Total	-15.5	3.4	5.9	13.0	17.4					

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

UNITED KINGDOM

	ELECTRICITY GENERATING CAPACITIES (GW Net)					Net Capacity Expansions				
	1980	1990	1995	2000	2005	90-80	95-90	00-95	05-00	2005-90
NUCLEAR	6.416	11.353	10.661	9.083	9.083	4.937	-0.692	-1.578	0.000	-2.270
MONOVALENTS										
HARD COAL	44.438	34.298	31.863	28.363	25.863	-10.140	-2.435	-3.500	-2.500	-8.435
LIGNITE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESIDUAL FUEL OIL	12.603	11.895	10.927	10.780	9.807	-0.708	-0.968	-0.147	-0.973	-2.088
NATURAL GAS CONV.	0.000	0.000	0.230	0.230	0.230	0.000	0.230	0.000	0.000	0.230
NAT. GAS COMB. CYCLE	0.000	0.000	10.000	17.198	24.557	0.000	10.000	7.198	7.359	24.557
OTHER (1)	0.139	0.461	0.461	0.561	0.661	0.322	0.000	0.100	0.100	0.200
TOTAL	57.180	46.654	53.481	57.132	61.118	-10.526	6.827	3.651	3.986	14.464
POLYVALENTS										
WITH COAL	0.000	5.233	4.755	4.769	4.784	5.233	-0.478	0.014	0.016	-0.449
WITHOUT COAL	0.000	2.510	2.510	2.637	2.784	2.510	0.000	0.127	0.147	0.274
PEAK DEVICE	3.499	3.136	3.361	3.341	2.866	-0.363	0.225	-0.020	-0.475	-0.270
TOTAL THERMAL	60.679	57.533	64.107	67.878	71.552	-3.146	6.574	3.771	3.674	14.019
HYDRO	0.813	1.384	1.388	1.388	1.388	0.571	0.004	0.000	0.000	0.004
RENEWABLE	0.000	0.000	0.028	0.088	0.208	0.000	0.028	0.060	0.120	0.208
TOTAL WITHOUT PUMPING	67.908	70.270	76.184	78.437	82.231	2.362	5.914	2.253	3.794	11.961
PUMPING	1.638	2.787	2.788	2.788	2.788	1.149	0.001	0.000	0.000	0.001
TOTAL	69.546	73.057	78.972	81.225	85.019	3.511	5.915	2.253	3.794	11.962

	SUMMARY ELECTRICITY BALANCE (GWh Gross)					Annual Average % Change				% Change
Generation	1985	1990	1995	2000	2005	90/85	95/90	2000/95	05/2000	2005/90
NUCLEAR	61095	65751	69856	62898	62898	1.5	1.2	-2.1	0.0	-4.3
HARD COAL		211983	203782	193782	188556		-0.8	-1.0	-0.5	-11.1
LIGNITE		0	0	0	0		0.0	0.0	0.0	0.0
RESIDUAL FUEL OIL		25355	25344	15581	9406		0.0	-9.3	-9.6	-62.9
GAS DIESEL OIL		943	1157	1294	1205		4.2	2.3	-1.4	27.8
NATURAL GAS		3584	28483	77171	107203		51.4	22.1	6.8	2891.4
OTHER (1)		3231	3231	3931	4632		0.0	4.0	3.3	43.4
TOTAL THERMAL	229533	245096	261997	291758	311004	1.3	1.3	2.2	1.3	26.9
HYDRO	4225	5085	5298	5298	5298	3.8	0.8	0.0	0.0	4.2
RENEWABLE	0	0	196	617	1458	0.0	0.0	25.7	18.8	0.0
TOTAL WITHOUT PUMPING	294853	315933	337347	360571	380657	1.4	1.3	1.3	1.1	20.5
IMPORTATIONS	0	11988	12868	13129	14078	0.0	1.4	0.4	1.4	17.4
EXPORTATIONS	0	47	100	100	100	0.0	16.3	0.0	0.0	112.9
NET IMPORTS	0	11941	12768	13029	13978	0.0	1.3	0.4	1.4	17.1
INTERNAL DEMAND (including losses)	294853	327873	350116	373599	394635	2.1	1.3	1.3	1.1	20.4
Final Consumption	242022	274774	292006	311593	329137	2.6	1.2	1.3	1.1	19.8
Memo Item										
Produced from pumping	2831	1979	1980	1980	1980	-6.9	0.0	0.0	0.0	0.0

(1) includes urban waste, derived gas and other petroleum products.

E U R O P E A N   C O M M U N I T Y (new)

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2000/90
GROSS INLAND CONSUMPTION										
Solids	306152	291402	275859	278560		-1.0	-1.1	0.2		-4.4
Oil	473099	510055	546410	575580		1.5	1.4	1.0		12.8
Natural Gas	192748	214308	258815	313764		2.1	3.8	3.9		46.4
Nuclear	127151	158664	166396	172319		4.5	1.0	0.7		8.6
Geothermal	1698	1978	3157	5044		3.1	9.8	9.8		155.0
Electricity	15779	14021	19420	18334		-2.3	6.7	-1.1		30.8
Renewable & Other	1766	2650	2897	6114		8.5	1.8	16.1		130.7
Total	1118393	1193078	1272955	1369717		1.3	1.3	1.5		14.8
INDIGENOUS PRODUCTION										
Solids	238389	208893	164236	139237		-2.6	-4.7	-3.2		-33.3
Oil	150980	116585	127894	119760		-5.0	1.9	-1.3		2.7
Natural Gas	130699	131575	153000	160439		0.1	3.1	1.0		21.9
Nuclear	127151	158664	166396	172319		4.5	1.0	0.7		8.6
Geothermal	1698	1978	3157	5044		3.1	9.8	9.8		155.0
Hydro	14578	12439	16201	16688		-3.1	5.4	0.6		34.2
Renewable & Other	1766	2650	2897	6114		8.5	1.8	16.1		130.7
Total	665261	632782	633782	619601		-1.0	0.0	-0.5		-2.1
NET IMPORTS										
Solids	64506	78291	111623	139323		3.9	7.4	4.5		78.0
Oil	344974	425933	452699	491076		4.3	1.2	1.6		15.3
Natural Gas	64089	85218	105815	153326		5.9	4.4	7.7		79.9
Electricity	1201	1582	3219	1646		5.7	15.3	-12.6		4.0
Total	474769	591024	673356	785370		4.5	2.6	3.1		32.9
INPUTS INTO POWER GENERATION										
Solids	165490	172301	176849	188747		0.8	0.5	1.3		9.5
Oil	39812	41715	42768	35902		0.9	0.5	-3.4		-13.9
Gas	29022	34406	50259	82978		3.5	7.9	10.5		141.2
Geothermal	1698	1978	3157	5044		3.1	9.8	9.8		155.0
Renewable & Other	1766	2650	2887	3637		8.5	1.7	4.7		37.3
Total	237801	253065	275940	316330		1.3	1.7	2.8		25.0
FINAL ENERGY CONSUMPTION										
Solids	102766	87735	69479	62155		-3.1	-4.6	-2.2		-29.2
Oil	345284	367564	399466	427040		1.3	1.7	1.3		16.2
Gas	161479	178076	204464	224064		2.0	2.8	1.8		25.8
Heat	4415	4451	5007	5354		0.2	2.4	1.3		20.3
Electricity	119862	137672	153210	170966		2.8	2.2	2.2		24.2
Biofuels	0	0	0	2451		0.0	0.0	0.0		0.0
Total	733806	775498	831625	892029		1.1	1.4	1.4		15.0
Industry										
Solids	62241	55232	46556	44207		-2.4	-3.4	-1.0		-20.0
Oil	51639	44545	40250	38352		-2.9	-2.0	-1.0		-13.9
Gas	68114	76964	83906	90276		2.5	1.7	1.5		17.3
Heat	2305	2673	2752	2900		3.0	0.6	1.1		8.5
Electricity	54678	60939	64629	70570		2.2	1.2	1.8		15.8
Total	238977	240353	238092	246305		0.1	-0.2	0.7		2.5
Transports										
Solids	313	79	73	69		-24.1	-1.6	-1.0		-12.2
Oil	182982	232070	260807	289077		4.9	2.4	2.1		24.6
Gas	240	207	224	223		-2.9	1.6	0.0		7.9
Electricity	2935	3514	3760	4169		3.7	1.4	2.1		18.6
Biofuels	0	0	0	2451		0.0	0.0	0.0		0.0
Total	186470	235870	264863	295990		4.8	2.3	2.2		25.5
Dom. & Tert.										
Solids	40212	32424	22850	17879		-4.2	-6.8	-4.8		-44.9
Oil	110663	90950	98409	99610		-3.8	1.6	0.2		9.5
Gas	93125	100905	120335	133564		1.6	3.6	2.1		32.4
Heat	2110	1778	2255	2454		-3.4	4.9	1.7		38.0
Electricity	62249	73219	84822	96227		3.3	3.0	2.6		31.4
Total	308358	299275	328670	349735		-0.6	1.9	1.3		16.9
IMPORT DEPENDENCY (%)										
Solids	21.1	26.9	40.5	50.0						
Oil	68.9	78.4	77.9	80.4						
Natural Gas	33.2	39.8	40.9	48.9						
Total	41.4	48.2	51.5	55.9						

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

FORMER G. D. R.

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2000/90
GROSS INLAND CONSUMPTION										
Solids	67203	57281	34894	34161		-3.1	-9.4	-0.4		-40.4
Oil	10612	12640	17592	23166		3.6	6.8	5.7		83.3
Natural Gas	8048	6765	9043	13715		-3.4	6.0	8.7		102.7
Nuclear	3536	1512	0	0		-15.6	-100.0	0.0		-100.0
Geothermal	0	0	0	0		0.0	0.0	0.0		0.0
Electricity	28	171	174	315		43.6	0.3	12.6		84.2
Renewable & Other	0	0	10	26		0.0	0.0	22.2		0.0
Total	89427	78369	61713	71383		-2.6	-4.7	3.0		-8.9
INDIGENOUS PRODUCTION										
Solids	65819	53445	31565	26740		-4.1	-10.0	-3.3		-50.0
Oil	62	53	25	20		-3.1	-14.0	-4.4		-62.3
Natural Gas	3582	1826	731	7		-12.6	-16.7	-60.0		-99.6
Nuclear	3536	1512	0	0		-15.6	-100.0	0.0		-100.0
Geothermal	0	0	0	0		0.0	0.0	0.0		0.0
Hydro	14	15	19	22		1.4	5.0	3.0		47.9
Renewable & Other	0	0	10	26		0.0	0.0	22.2		0.0
Total	73013	56851	32350	26816		-4.9	-10.7	-3.7		-52.8
NET IMPORTS										
Solids	2115	827	3329	7420		-17.1	32.1	17.4		797.3
Oil	11352	12078	17967	23546		1.2	8.3	5.6		94.9
Natural Gas	4743	5021	8312	13707		1.1	10.6	10.5		173.0
Electricity	14	156	155	293		62.0	-0.2	13.6		87.7
Total	18224	18082	29763	44966		-0.2	10.5	8.6		148.7
INPUTS INTO POWER GENERATION										
Solids	25120	18699	15115	19232		-5.7	-4.2	4.9		2.9
Oil	383	344	665	1140		-2.1	14.1	11.4		231.3
Gas	837	916	3657	5943		1.8	31.9	10.2		548.7
Geothermal	0	0	0	0		0.0	0.0	0.0		0.0
Renewable & Other	0	0	0	0		0.0	0.0	0.0		0.0
Total	26354	19974	19457	26336		-5.4	-0.5	6.2		31.9
FINAL ENERGY CONSUMPTION										
Solids	34670	32645	16646	12607		-1.2	-12.6	-5.4		-61.4
Oil	8339	9046	14322	19004		1.6	9.6	5.8		110.1
Gas	7422	5720	5553	7797		-5.1	-0.6	7.0		36.3
Heat	63	88	0	0		6.9	-100.0	0.0		-100.0
Electricity	7128	6380	5609	7757		-2.2	-2.5	6.7		21.6
Biofuels	0	0	0	0		0.0	0.0	0.0		0.0
Total	57622	53879	42130	47165		-1.3	-4.8	2.3		-12.5
Industry										
Solids	14576	11769	5259	4597		-4.2	-14.9	-2.7		-60.9
Oil	1268	998	937	1322		-4.7	-1.3	7.1		32.5
Gas	5008	3489	2750	3495		-7.0	-4.7	4.9		0.2
Heat	19	27	0	0		7.3	-100.0	0.0		-100.0
Electricity	3904	2955	1825	2682		-5.4	-9.2	8.0		-9.2
Total	24775	19238	10771	12097		-4.9	-11.0	2.3		-37.1
Transports										
Solids	142	14	1	0		-37.1	-38.8	-30.0		-98.6
Oil	4751	6109	8193	10297		5.2	6.0	4.7		68.6
Gas	0	0	0	0		0.0	0.0	0.0		0.0
Electricity	171	203	188	204		3.5	-1.5	1.6		0.3
Biofuels	0	0	0	0		0.0	0.0	0.0		0.0
Total	5064	6326	8382	10501		4.6	5.8	4.6		66.0
						0.0	0.0	0.0		
Dom. & Tert.										
Solids	19952	20862	11386	8010		0.9	-11.4	-6.8		-61.6
Oil	2320	1939	5193	7385		-3.5	21.8	7.3		280.9
Gas	2414	2231	2803	4301		-1.6	4.7	8.9		92.8
Heat	44	61	0	0		6.8	-100.0	0.0		-100.0
Electricity	3053	3222	3596	4871		1.1	2.2	6.3		51.2
Total	27783	28315	22978	24568		0.4	-4.1	1.3		-13.2
IMPORT DEPENDENCY (%)										
Solids	3.1	1.4	9.5	21.7						
Oil	101.3	92.4	99.9	99.9						
Natural Gas	58.9	74.2	91.9	99.9						
Total	20.2	22.9	47.9	62.6						

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

G E R M A N Y (new)

	Annual Data in 1000 toe					Annual Average % Change				% Change
	1985	1990	1995	2000	2005	90/85	95/90	00/95	05/00	2000/90
GROSS INLAND CONSUMPTION										
Solids	149543	132473	114194	113190		-2.4	-2.9	-0.2		-14.6
Oil	119283	123386	136090	149600		0.7	2.0	1.9		21.2
Natural Gas	49283	55035	62761	75065		2.2	2.7	3.6		36.4
Nuclear	34865	37673	36135	36135		1.6	-0.8	0.0		-4.1
Geothermal	0	0	0	0		0.0	0.0	0.0		0.0
Electricity	1579	1451	2763	2782		-1.7	13.8	0.1		91.8
Renewable & Other	871	1081	1121	1812		4.4	0.7	10.1		67.7
Total	355423	351098	353065	378584		-0.2	0.1	1.4		7.8
INDIGENOUS PRODUCTION										
Solids	148793	125372	94406	79201		-3.4	-5.5	-3.5		-36.8
Oil	4385	4231	4322	3169		-0.7	0.4	-6.0		-25.1
Natural Gas	16135	13563	15231	13507		-3.4	2.3	-2.4		-0.4
Nuclear	34865	37673	36135	36135		1.6	-0.8	0.0		-4.1
Geothermal	0	0	0	0		0.0	0.0	0.0		0.0
Hydro	1350	1383	1389	1414		0.5	0.1	0.4		2.3
Renewable & Other	871	1081	1121	1812		4.4	0.7	10.1		67.7
Total	206400	183303	152604	135238		-2.3	-3.6	-2.4		-26.2
NET IMPORTS										
Solids	669	3167	19788	33989		36.5	44.3	11.4		973.2
Oil	117579	119817	134208	148972		0.4	2.3	2.1		24.3
Natural Gas	34357	41747	47531	61557		4.0	2.6	5.3		47.5
Electricity	229	68	1374	1368		-21.6	82.5	-0.1		1916.0
Total	152835	164799	202901	245886		1.5	4.2	3.9		49.2
INPUTS INTO POWER GENERATION										
Solids	76744	70334	70313	75341		-1.7	0.0	1.4		7.1
Oil	3001	3066	4224	5812		0.4	6.6	6.6		89.6
Gas	8365	11202	15293	22749		6.0	6.4	8.3		103.1
Geothermal	0	0	0	0		0.0	0.0	0.0		0.0
Renewable & Other	871	1081	1111	1274		4.4	0.6	2.8		17.9
Total	88995	85698	90960	105199		-0.8	1.2	3.0		22.8
FINAL ENERGY CONSUMPTION										
Solids	54461	48251	31494	26570		-2.4	-8.2	-3.3		-44.9
Oil	96086	96722	107309	115998		0.1	2.1	1.6		19.9
Gas	45049	47469	50854	55240		1.1	1.4	1.7		16.4
Heat	2812	2863	3161	3280		0.4	2.0	0.7		14.6
Electricity	37191	39123	41551	46724		1.0	1.2	2.4		19.4
Biofuels	0	0	0	512		0.0	0.0	0.0		0.0
Total	235599	234428	234369	248326		-0.1	0.0	1.2		5.9
Industry										
Solids	29873	25353	18114	16910		-3.2	-6.5	-1.4		-33.3
Oil	10318	8319	7055	7083		-4.2	-3.2	0.1		-14.9
Gas	24730	25029	25865	26716		0.2	0.7	0.6		6.7
Heat	1833	1746	1708	1753		-1.0	-0.4	0.5		0.4
Electricity	18065	18607	18494	20350		0.6	-0.1	1.9		9.4
Total	84818	79054	71236	72811		-1.4	-2.1	0.4		-7.9
Transports										
Solids	291	79	73	69		-23.0	-1.7	-1.0		-12.7
Oil	45803	56692	62628	69032		4.4	2.0	2.0		21.8
Gas	0	0	0	0		0.0	0.0	0.0		0.0
Electricity	1130	1175	1335	1470		0.8	2.6	2.0		25.1
Biofuels	0	0	0	512		0.0	0.0	0.0		0.0
Total	47224	57946	64036	71083		4.2	2.0	2.1		22.7
Dom. & Tert.										
Solids	24297	22819	13307	9592		-1.2	-10.2	-6.3		-58.0
Oil	39965	31711	37625	39883		-4.5	3.5	1.2		25.8
Gas	20319	22439	24989	28525		2.0	2.2	2.7		27.1
Heat	979	1117	1453	1527		2.7	5.4	1.0		36.7
Electricity	17996	19341	21722	24904		1.5	2.3	2.8		28.8
Total	103557	97427	99097	104431		-1.2	0.3	1.1		7.2
IMPORT DEPENDENCY (%)										
Solids	0.4	2.4	17.3	30.0						
Oil	95.8	95.2	96.9	97.9						
Natural Gas	69.7	75.9	75.7	82.0						
Total	42.6	46.6	57.1	64.5						

Dependency = Net Imports/(Gross Inland Consumption + Bunkers)

E N V I R O N M E N T

CO2 EMISSIONS (Mtons)

EUROPE12 (old)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	792.1	865.4	930.2	1008.4	1083.9	1.8	1.5	1.6	1.5	16.5
ENERGY SECTOR	113.9	123.3	126.9	128.2	127.0	1.6	0.6	0.2	-0.2	4.0
INDUSTRY	557.8	537.1	528.8	526.0	510.3	-0.8	-0.3	-0.1	-0.6	-2.1
TRANSPORTS	543.2	688.7	769.9	849.6	902.2	4.9	2.3	2.0	1.2	23.4
DOM. & TERT.	628.9	551.4	608.4	626.4	615.2	-2.6	2.0	0.6	-0.4	13.6
TOTAL	2635.9	2765.9	2964.2	3138.6	3238.6	1.0	1.4	1.1	0.6	13.5

BELGIUM	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	20.2	24.6	25.7	27.8	29.8	4.0	0.9	1.6	1.4	13.2
ENERGY SECTOR	5.3	5.6	5.9	6.0	5.8	1.2	1.1	0.2	-0.7	6.8
INDUSTRY	30.8	32.3	30.7	29.2	27.2	0.9	-1.0	-1.0	-1.4	-9.5
TRANSPORTS	18.2	23.2	26.2	28.9	31.0	5.0	2.5	2.0	1.4	24.6
DOM. & TERT.	30.2	26.3	29.6	29.8	29.5	-2.7	2.4	0.1	-0.2	13.3
TOTAL	104.6	112.0	118.2	121.7	123.4	1.4	1.1	0.6	0.3	8.7

DENMARK	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	26.9	23.0	30.6	32.0	32.0	-3.1	5.9	0.9	0.0	39.1
ENERGY SECTOR	0.9	1.3	1.4	1.5	1.5	8.5	1.7	0.9	0.3	14.2
INDUSTRY	6.3	5.7	6.0	6.1	6.0	-2.2	1.2	0.4	-0.4	8.4
TRANSPORTS	11.0	13.7	15.3	16.8	17.3	4.4	2.3	1.8	0.6	22.6
DOM. & TERT.	16.4	9.4	9.3	9.1	8.6	-10.4	-0.2	-0.6	-1.0	-3.9
TOTAL	61.4	53.1	62.7	65.5	65.5	-2.9	3.4	0.9	0.0	23.3

FRANCE	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	52.0	44.4	58.6	66.7	75.9	-3.1	5.7	2.6	2.6	50.3
ENERGY SECTOR	16.1	17.4	17.8	18.2	17.7	1.6	0.4	0.5	-0.5	4.6
INDUSTRY	97.5	83.0	82.5	81.8	79.1	-3.2	-0.1	-0.2	-0.7	-1.4
TRANSPORTS	100.0	125.5	141.9	158.8	174.5	4.7	2.5	2.3	1.9	26.5
DOM. & TERT.	112.6	95.4	103.7	105.8	106.5	-3.3	1.7	0.4	0.1	10.9
TOTAL	378.1	365.7	404.5	431.4	453.7	-0.7	2.0	1.3	1.0	17.9

ENVIRONMENT

CO2 EMISSIONS (Mtons)

GERMANY (old)	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	248.7	255.7	274.6	293.7	302.4	0.6	1.4	1.4	0.6	14.9
ENERGY SECTOR	25.5	23.3	23.1	23.2	23.4	-1.8	-0.1	0.0	0.2	-0.6
INDUSTRY	157.4	147.9	144.4	141.0	135.1	-1.2	-0.5	-0.5	-0.9	-4.6
TRANSPORTS	125.4	154.2	165.9	178.9	183.5	4.2	1.5	1.5	0.5	16.1
DOM. & TERT.	176.6	147.6	160.2	163.8	152.6	-3.5	1.7	0.4	-1.4	11.0
TOTAL	733.5	728.6	768.3	800.6	797.0	-0.1	1.1	0.8	-0.1	9.9

GREECE	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	26.2	35.8	39.7	47.3	56.7	6.4	2.1	3.5	3.7	32.3
ENERGY SECTOR	1.3	1.9	2.3	3.2	3.6	8.2	3.3	6.8	2.7	64.0
INDUSTRY	9.4	10.2	11.3	11.4	11.6	1.5	2.1	0.2	0.4	12.0
TRANSPORTS	14.2	17.7	20.4	22.7	25.0	4.4	2.9	2.1	2.0	28.2
DOM. & TERT.	7.0	8.1	9.9	12.0	13.1	2.9	4.1	4.0	1.7	48.5
TOTAL	58.2	73.7	83.6	96.6	110.1	4.8	2.6	2.9	2.7	31.1

IRELAND	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	8.3	11.0	12.6	13.3	13.3	5.9	2.8	1.1	-0.1	21.2
ENERGY SECTOR	0.1	0.2	0.3	0.3	0.4	22.6	2.5	4.0	4.3	37.9
INDUSTRY	4.5	5.3	5.6	5.9	6.1	3.2	1.0	1.2	0.6	11.4
TRANSPORTS	5.1	6.0	6.9	7.8	8.6	3.1	3.0	2.4	1.9	30.7
DOM. & TERT.	8.2	8.3	8.5	8.6	8.4	0.2	0.6	0.3	-0.6	4.5
TOTAL	26.2	30.8	33.9	36.0	36.7	3.3	1.9	1.2	0.4	17.0

ITALY	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	94.1	122.8	126.8	145.1	163.2	5.5	0.6	2.7	2.4	18.1
ENERGY SECTOR	17.0	18.9	18.5	18.8	18.3	2.1	-0.4	0.4	-0.5	-0.5
INDUSTRY	77.9	82.1	76.2	76.4	73.5	1.1	-1.5	0.0	-0.8	-7.0
TRANSPORTS	82.9	99.8	119.1	135.8	142.0	3.8	3.6	2.7	0.9	36.1
DOM. & TERT.	79.7	78.8	83.9	88.0	89.2	-0.2	1.3	0.9	0.3	11.7
TOTAL	351.5	402.4	424.5	464.0	486.3	2.7	1.1	1.8	0.9	15.3

E N V I R O N M E N T

CO2 EMISSIONS (Mtons)

LUXEMBOURG	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	1.1	1.5	1.6	1.6	2.2	7.1	1.1	-0.4	7.0	3.6
ENERGY SECTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INDUSTRY	7.9	6.6	6.5	6.7	6.3	-3.4	-0.4	0.7	-1.3	1.5
TRANSPORTS	1.8	3.1	4.0	4.3	4.4	11.0	5.3	1.5	0.5	39.7
DOM. & TERT.	1.4	1.3	1.3	1.1	1.1	-1.0	-0.9	-1.8	-1.0	-12.8
TOTAL	12.2	12.5	13.3	13.7	14.0	0.6	1.2	0.6	0.4	9.6

NETHERLANDS	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	37.3	45.8	49.7	53.9	60.9	4.2	1.6	1.7	2.5	17.6
ENERGY SECTOR	8.7	13.1	12.8	13.4	13.5	8.5	-0.3	0.9	0.1	2.6
INDUSTRY	32.4	29.2	28.2	27.6	26.4	-2.1	-0.7	-0.4	-0.9	-5.2
TRANSPORTS	26.2	30.8	33.6	35.9	37.0	3.3	1.7	1.3	0.6	16.4
DOM. & TERT.	40.8	38.4	46.2	47.2	46.6	-1.2	3.8	0.4	-0.3	23.0
TOTAL	145.4	157.3	170.4	178.1	184.3	1.6	1.6	0.9	0.7	13.2

PORTUGAL	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	6.1	15.2	17.2	21.7	25.7	19.9	2.5	4.7	3.4	42.3
ENERGY SECTOR	1.0	1.4	1.8	2.3	2.6	7.1	5.5	4.7	2.6	64.3
INDUSTRY	7.9	8.4	9.3	11.3	11.7	1.2	2.2	3.9	0.7	35.2
TRANSPORTS	8.1	11.3	14.3	16.5	18.4	7.1	4.8	2.8	2.2	45.5
DOM. & TERT.	3.0	3.6	3.9	5.2	5.0	3.4	2.0	5.8	-1.0	46.4
TOTAL	26.1	39.9	46.7	57.0	63.4	8.9	3.2	4.1	2.1	42.9

SPAIN	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	62.7	64.4	73.0	84.1	99.4	0.5	2.5	2.9	3.4	30.6
ENERGY SECTOR	9.0	11.6	12.2	12.0	11.8	5.3	1.0	-0.3	-0.3	3.2
INDUSTRY	44.2	45.6	48.0	49.1	50.0	0.7	1.0	0.5	0.3	7.7
TRANSPORTS	45.3	67.3	77.6	89.1	98.6	8.3	2.9	2.8	2.1	32.3
DOM. & TERT.	23.6	21.7	24.2	25.5	26.0	-1.6	2.2	1.1	0.4	17.4
TOTAL	184.8	210.7	235.0	259.8	285.9	2.7	2.2	2.0	1.9	23.3

ENVIRONMENT

CO2 EMISSIONS (Mtons)

UNITED KINGDOM	1985	1990	1995	2000	2005	Annual Average % Change 90/85	95/90	00/95	05/00	% Change 00/90
POWER GENERATION	208.7	221.1	220.0	221.2	222.4	1.2	-0.1	0.1	0.1	0.0
ENERGY SECTOR	29.1	28.4	30.7	29.3	28.2	-0.4	1.6	-1.0	-0.7	2.9
INDUSTRY	81.7	81.0	80.1	79.2	77.4	-0.2	-0.2	-0.2	-0.5	-2.1
TRANSPORTS	104.9	136.1	144.6	154.2	162.0	5.3	1.2	1.3	1.0	13.3
DOM. & TERT.	129.4	112.5	127.6	130.2	128.5	-2.8	2.5	0.4	-0.3	15.7
TOTAL	553.8	579.2	603.1	614.1	618.5	0.9	0.8	0.4	0.1	6.0

EUROPE12 (new)	1985	1990	1995	2000	Annual Average % Change 90/85	95/90	00/95	% Change 00/90
POWER GENERATION	905.4	950.6	1006.5	1108.0	1.0	1.1	1.9	16.6
ENERGY SECTOR	120.1	129.5	131.9	133.7	1.5	0.4	0.3	3.2
INDUSTRY	639.3	601.1	561.6	558.5	-1.2	-1.4	-0.1	-7.1
TRANSPORTS	558.3	707.5	795.1	881.2	4.8	2.4	2.1	24.6
DOM. & TERT.	728.6	653.6	680.4	693.9	-2.1	0.8	0.4	6.2
TOTAL	2951.6	3042.3	3175.5	3375.3	0.6	0.9	1.2	10.9

FORMER G.D.R.	1985	1990	1995	2000	Annual Average % Change 90/85	95/90	00/95	% Change 00/90
POWER GENERATION	113.3	85.2	76.3	99.5	-5.5	-2.2	5.4	16.8
ENERGY SECTOR	6.2	6.2	4.9	5.5	0.2	-4.5	2.2	-11.5
INDUSTRY	81.5	64.0	32.7	32.6	-4.7	-12.5	-0.1	-49.1
TRANSPORTS	15.1	18.8	25.1	31.6	4.4	6.0	4.7	68.1
DOM. & TERT.	99.7	102.2	72.0	67.5	0.5	-6.7	-1.3	-33.9
TOTAL	315.8	276.4	211.2	236.8	-2.6	-5.2	2.3	-14.3

GERMANY (new)	1985	1990	1995	2000	Annual Average % Change 90/85	95/90	00/95	% Change 00/90
POWER GENERATION	361.9	340.9	351.0	393.3	-1.2	0.6	2.3	15.3
ENERGY SECTOR	31.6	29.5	28.1	28.7	-1.4	-1.0	0.4	-2.9
INDUSTRY	238.9	211.8	177.2	173.6	-2.4	-3.5	-0.4	-18.0
TRANSPORTS	140.6	173.0	191.0	210.5	4.2	2.0	2.0	21.7
DOM. & TERT.	276.3	249.8	232.3	231.3	-2.0	-1.4	-0.1	-7.4
TOTAL	1049.3	1005.0	979.6	1037.4	-0.9	-0.5	1.2	3.2

E N V I R O N M E N T

SO2 EMISSIONS (1000 tons)

EUROPE12 (old)	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	7900	6631	5527	4923	-3.4	-3.6	-2.3	-37.7
ENERGY SECTOR	712	717	682	647	0.1	-1.0	-1.0	-9.1
INDUSTRY	2048	1633	1532	1428	-4.4	-1.3	-1.4	-30.3
TRANSPORTS	560	632	699	753	2.4	2.0	1.5	34.5
DOM. & TERT.	897	946	888	800	1.1	-1.3	-2.1	-10.8
TOTAL	12117	10559	9328	8551	-2.7	-2.4	-1.7	-29.4

BELGIUM	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	120	114	92	81	-1.0	-4.2	-2.5	-32.5
ENERGY SECTOR	22	23	22	21	0.9	-0.9	-0.9	-4.5
INDUSTRY	62	54	52	50	-2.7	-0.8	-0.8	-19.4
TRANSPORTS	17	19	21	23	2.2	2.0	1.8	35.3
DOM. & TERT.	37	39	36	32	1.1	-1.6	-2.3	-13.5
TOTAL	258	249	223	207	-0.7	-2.2	-1.5	-19.8

DENMARK	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	101	128	130	121	4.9	0.3	-1.4	19.8
ENERGY SECTOR	1	1	0	0	0.0	-100.0	0.0	-100.0
INDUSTRY	16	16	15	13	0.0	-1.3	-2.8	-18.8
TRANSPORTS	10	11	12	13	1.9	1.8	1.6	30.0
DOM. & TERT.	13	11	10	8	-3.3	-1.9	-4.4	-38.5
TOTAL	141	167	167	155	3.4	0.0	-1.5	9.9

FRANCE	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	329	453	420	339	6.6	-1.5	-4.2	3.0
ENERGY SECTOR	165	166	172	168	0.1	0.7	-0.5	1.8
INDUSTRY	318	241	221	196	-5.4	-1.7	-2.4	-38.4
TRANSPORTS	135	159	179	199	3.3	2.4	2.1	47.4
DOM. & TERT.	199	206	197	182	0.7	-0.9	-1.6	-8.5
TOTAL	1146	1225	1189	1084	1.3	-0.6	-1.8	-5.4

E N V I R O N M E N T

SO2 EMISSIONS (1000 tons)

GERMANY (old)	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	378	250	240	232	-7.9	-0.8	-0.7	-38.6
ENERGY SECTOR	59	52	52	54	-2.5	0.0	0.8	-8.5
INDUSTRY	323	199	189	177	-9.2	-1.0	-1.3	-45.2
TRANSPORTS	86	92	98	101	1.4	1.3	0.6	17.4
DOM. & TERT.	162	178	170	147	1.9	-0.9	-2.9	-9.3
TOTAL	1008	771	749	711	-5.2	-0.6	-1.0	-29.5

GREECE	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	480	319	309	326	-7.8	-0.6	1.1	-32.1
ENERGY SECTOR	19	28	22	27	8.1	-4.7	4.2	42.1
INDUSTRY	120	135	87	99	2.4	-8.4	2.6	-17.5
TRANSPORTS	17	18	20	22	1.1	2.1	1.9	29.4
DOM. & TERT.	18	21	22	23	3.1	0.9	0.9	27.8
TOTAL	654	521	460	497	-4.4	-2.5	1.6	-24.0

IRELAND	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	61	74	68	57	3.9	-1.7	-3.5	-6.6
ENERGY SECTOR	1	1	1	2	0.0	0.0	14.9	100.0
INDUSTRY	41	41	41	38	0.0	0.0	-1.5	-7.3
TRANSPORTS	7	9	10	11	5.2	2.1	1.9	57.1
DOM. & TERT.	29	29	27	25	0.0	-1.4	-1.5	-13.8
TOTAL	139	154	147	133	2.1	-0.9	-2.0	-4.3

ITALY	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	1504	1268	1020	790	-3.4	-4.3	-5.0	-47.5
ENERGY SECTOR	133	127	125	115	-0.9	-0.3	-1.7	-13.5
INDUSTRY	370	269	237	206	-6.2	-2.5	-2.8	-44.3
TRANSPORTS	75	87	99	104	3.0	2.6	1.0	38.7
DOM. & TERT.	90	85	78	70	-1.1	-1.7	-2.1	-22.2
TOTAL	2172	1836	1559	1285	-3.3	-3.2	-3.8	-40.8

ENVIRONMENT

SO2 EMISSIONS (1000 tons)

LUXEMBOURG	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	0	0	0	0	0.0	0.0	0.0	0.0
ENERGY SECTOR	0	0	0	0	0.0	0.0	0.0	0.0
INDUSTRY	10	11	12	12	1.9	1.8	0.0	20.0
TRANSPORTS	2	3	3	3	8.4	0.0	0.0	50.0
DOM. & TERT.	1	1	1	1	0.0	0.0	0.0	0.0
TOTAL	13	15	16	16	2.9	1.3	0.0	23.1

NETHERLANDS	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	36	31	31	31	-2.9	0.0	0.0	-13.9
ENERGY SECTOR	13	13	13	11	0.0	0.0	-3.3	-15.4
INDUSTRY	38	30	26	21	-4.6	-2.8	-4.2	-44.7
TRANSPORTS	20	22	23	24	1.9	0.9	0.9	20.0
DOM. & TERT.	6	6	6	5	0.0	0.0	-3.6	-16.7
TOTAL	113	102	99	92	-2.0	-0.6	-1.5	-18.6

PORTUGAL	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	214	146	122	92	-7.4	-3.5	-5.5	-57.0
ENERGY SECTOR	15	17	17	17	2.5	0.0	0.0	13.3
INDUSTRY	64	72	83	56	2.4	2.9	-7.6	-12.5
TRANSPORTS	16	20	23	26	4.6	2.8	2.5	62.5
DOM. & TERT.	8	10	12	11	4.6	3.7	-1.7	37.5
TOTAL	317	265	257	202	-3.5	-0.6	-4.7	-36.3

SPAIN	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	2209	1986	1557	1436	-2.1	-4.8	-1.6	-35.0
ENERGY SECTOR	138	147	138	131	1.3	-1.3	-1.0	-5.1
INDUSTRY	307	192	199	204	-9.0	0.7	0.5	-33.6
TRANSPORTS	73	82	94	105	2.4	2.8	2.2	43.8
DOM. & TERT.	73	74	75	75	0.3	0.3	0.0	2.7
TOTAL	2800	2481	2063	1951	-2.4	-3.6	-1.1	-30.3

ENVIRONMENT

SO2 EMISSIONS (1000 tons)

UNITED KINGDOM	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	2468	1862	1538	1418	-5.5	-3.8	-1.6	-42.5
ENERGY SECTOR	146	142	120	101	-0.6	-3.3	-3.4	-30.8
INDUSTRY	379	373	370	356	-0.3	-0.2	-0.8	-6.1
TRANSPORTS	102	110	117	122	1.5	1.2	0.8	19.6
DOM. & TERT.	261	286	254	221	1.8	-2.3	-2.7	-15.3
TOTAL	3356	2773	2399	2218	-3.7	-2.9	-1.6	-33.9

EUROPE12 (new)	1990	1995	2000		Annual Average % Change 95/90	00/95	05/00	% Change 2000/90
POWER GENERATION	9176	5993	4431		-8.2	-5.9		-51.7
ENERGY SECTOR	756	747	698		-0.2	-1.3		-7.7
INDUSTRY	2771	1942	1677		-6.9	-2.9		-39.5
TRANSPORTS	570	646	719		2.5	2.2		26.1
DOM. & TERT.	2282	1722	1437		-5.5	-3.6		-37.0
TOTAL	15555	11050	8962		-6.6	-4.1		-42.4

FORMER G.D.R.	1990	1995	2000		Annual Average % Change 95/90	00/95	05/00	% Change 2000/90
POWER GENERATION	1276	509	72		-16.8	-32.4		-94.4
ENERGY SECTOR	44	30	16		-7.4	-11.8		-63.6
INDUSTRY	723	309	145		-15.6	-14.0		-79.9
TRANSPORTS	10	14	20		7.0	7.4		100.0
DOM. & TERT.	1385	776	549		-10.9	-6.7		-60.4
TOTAL	3438	1638	802		-13.8	-13.3		-76.7

GERMANY (new)	1990	1995	2000		Annual Average % Change 95/90	00/95	05/00	% Change 2000/90
POWER GENERATION	1654	759	312		-14.4	-16.3		-81.1
ENERGY SECTOR	103	82	68		-4.5	-3.7		-34.0
INDUSTRY	1046	508	334		-13.5	-8.0		-68.1
TRANSPORTS	96	106	118		2.0	2.2		22.9
DOM. & TERT.	1547	954	719		-9.2	-5.5		-53.5
TOTAL	4446	2409	1551		-11.5	-8.4		-65.1

ENVIRONMENT

NOX EMISSIONS (1000 tons)

EUROPE12 (old)	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	2363	1918	1837	1791	-4.1	-0.9	-0.5	-24.2
ENERGY SECTOR	240	225	198	174	-1.3	-2.5	-2.6	-27.5
INDUSTRY	751	669	584	507	-2.3	-2.7	-2.8	-32.5
TRANSPORTS	7630	6592	4358	4407	-2.9	-7.9	0.2	-42.2
DOM. & TERT.	536	600	620	604	2.3	0.7	-0.5	12.7
TOTAL	11520	10004	7597	7483	-2.8	-5.4	-0.3	-35.0

BELGIUM	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	63	50	36	34	-4.5	-6.4	-1.1	-46.0
ENERGY SECTOR	8	7	6	5	-2.6	-3.0	-3.6	-37.5
INDUSTRY	35	32	28	24	-1.8	-2.6	-3.0	-31.4
TRANSPORTS	243	211	135	139	-2.8	-8.5	0.6	-42.8
DOM. & TERT.	20	23	23	23	2.8	0.0	0.0	15.0
TOTAL	369	323	228	225	-2.6	-6.7	-0.3	-39.0

DENMARK	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	79	101	103	97	5.0	0.4	-1.2	22.8
ENERGY SECTOR	3	3	3	2	0.0	0.0	-7.8	-33.3
INDUSTRY	10	9	9	7	-2.1	0.0	-4.9	-30.0
TRANSPORTS	139	119	75	73	-3.1	-8.8	-0.5	-47.5
DOM. & TERT.	7	7	7	6	0.0	0.0	-3.0	-14.3
TOTAL	238	239	197	185	0.1	-3.8	-1.2	-22.3

FRANCE	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	106	138	139	132	5.4	0.1	-1.0	24.5
ENERGY SECTOR	38	34	32	27	-2.2	-1.2	-3.3	-28.9
INDUSTRY	131	107	94	79	-4.0	-2.6	-3.4	-39.7
TRANSPORTS	1455	1298	882	921	-2.3	-7.4	0.9	-36.7
DOM. & TERT.	148	158	158	154	1.3	0.0	-0.5	4.1
TOTAL	1878	1735	1305	1313	-1.6	-5.5	0.1	-30.1

ENVIRONMENT

NOX EMISSIONS (1000 tons)

GERMANY (old)	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	450	206	209	209	-14.5	0.3	0.0	-53.6
ENERGY SECTOR	42	41	34	31	-0.5	-3.7	-1.8	-26.2
INDUSTRY	179	174	142	124	-0.6	-4.0	-2.7	-30.7
TRANSPORTS	1920	1601	1008	1010	-3.6	-8.8	0.0	-47.4
DOM. & TERT.	113	126	129	121	2.2	0.5	-1.3	7.1
TOTAL	2704	2148	1522	1495	-4.5	-6.7	-0.4	-44.7

GREECE	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	53	62	73	87	3.2	3.3	3.6	64.2
ENERGY SECTOR	5	6	5	6	3.7	-3.6	3.7	20.0
INDUSTRY	22	22	14	15	0.0	-8.6	1.4	-31.8
TRANSPORTS	172	142	93	94	-3.8	-8.1	0.2	-45.3
DOM. & TERT.	6	7	8	9	3.1	2.7	2.4	50.0
TOTAL	258	239	193	211	-1.5	-4.2	1.8	-18.2

IRELAND	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	35	40	27	26	2.7	-7.6	-0.8	-25.7
ENERGY SECTOR	0	0	0	1	0.0	0.0	0.0	0.0
INDUSTRY	8	7	7	6	-2.6	0.0	-3.0	-25.0
TRANSPORTS	42	36	22	22	-3.0	-9.4	0.0	-47.6
DOM. & TERT.	4	5	5	5	4.6	0.0	0.0	25.0
TOTAL	89	88	61	60	-0.2	-7.1	-0.3	-32.6

ITALY	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	384	321	275	236	-3.5	-3.0	-3.0	-38.5
ENERGY SECTOR	35	32	29	25	-1.8	-1.9	-2.9	-28.6
INDUSTRY	122	99	89	76	-4.1	-2.1	-3.1	-37.7
TRANSPORTS	1093	1017	735	725	-1.4	-6.3	-0.3	-33.7
DOM. & TERT.	66	73	77	78	2.0	1.1	0.3	18.2
TOTAL	1700	1542	1205	1140	-1.9	-4.8	-1.1	-32.9

E N V I R O N M E N T

NOX EMISSIONS (1000 tons)

LUXEMBOURG	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	0	0	0	0	0.0	0.0	0.0	0.0
ENERGY SECTOR	0	0	0	0	0.0	0.0	0.0	0.0
INDUSTRY	5	5	5	4	0.0	0.0	-4.4	-20.0
TRANSPORTS	32	33	20	19	0.6	-9.5	-1.0	-40.6
DOM. & TERT.	1	1	1	1	0.0	0.0	0.0	0.0
TOTAL	38	39	26	24	0.5	-7.8	-1.6	-36.8

NETHERLANDS	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	90	20	23	28	-26.0	2.8	4.0	-68.9
ENERGY SECTOR	28	23	22	20	-3.9	-0.9	-1.9	-28.6
INDUSTRY	43	38	33	27	-2.4	-2.8	-3.9	-37.2
TRANSPORTS	329	278	180	177	-3.3	-8.3	-0.3	-46.2
DOM. & TERT.	33	40	41	41	3.9	0.5	0.0	24.2
TOTAL	523	399	299	293	-5.3	-5.6	-0.4	-44.0

PORTUGAL	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	54	50	49	58	-1.5	-0.4	3.4	7.4
ENERGY SECTOR	3	4	4	5	5.9	0.0	4.6	66.7
INDUSTRY	14	15	18	17	1.4	3.7	-1.1	21.4
TRANSPORTS	142	112	96	109	-4.6	-3.0	2.6	-23.2

E N V I R O N M E N T

NOX EMISSIONS (1000 tons)

UNITED KINGDOM	1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
POWER GENERATION	798	700	678	664	-2.6	-0.6	-0.4	-16.8
ENERGY SECTOR	52	50	41	34	-0.8	-3.9	-3.7	-34.6
INDUSTRY	85	77	69	60	-2.0	-2.2	-2.8	-29.4
TRANSPORTS	1323	1092	669	660	-3.8	-9.3	-0.3	-50.1
DOM. & TERT.	97	111	114	113	2.7	0.5	-0.2	16.5
TOTAL	2355	2030	1571	1531	-2.9	-5.0	-0.5	-35.0

EUROPE12 (new)	1990	1995	2000		Annual Average % Change 95/90	00/95	05/00	% Change 2000/90
POWER GENERATION	2509	1991	1896		-4.5	-1.0		-24.4
ENERGY SECTOR	254	235	207		-1.5	-2.5		-18.5
INDUSTRY	867	731	630		-3.4	-2.9		-27.3
TRANSPORTS	7869	6839	4533		-2.8	-7.9		-42.4
DOM. & TERT.	635	663	677		0.9	0.4		6.6
TOTAL	12134	10459	7943		-2.9	-5.4		-34.5

FORMER G.D.R.	1990	1995	2000		Annual Average % Change 95/90	00/95	05/00	% Change 2000/90
POWER GENERATION	146	73	59		-12.9	-4.2		-59.6
ENERGY SECTOR	14	10	9		-6.5	-2.1		-35.7
INDUSTRY	116	62	46		-11.8	-5.8		-60.3
TRANSPORTS	239	247	175		0.7	-6.7		-26.8
[illegible]	[illegible]	[illegible]	57		-8.6	-2.0		-42.4

EUROPEAN COMMUNITY

HIGHER GROWTH CASE

ANALYSIS

MAIN ASSUMPTIONS : HIGHER GROWTH CASE

	POPULATION in 1000 inhabitants				Annual Average % change			% Change
	1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Germany (old)	62857	65900	67821	68501	0.9	0.6	0.2	9.0
France	56420	57838	59291	60481	0.5	0.5	0.4	7.2
Italy	57637	58215	58798	59298	0.2	0.2	0.2	2.9
United Kingdom	57394	58257	59134	60024	0.3	0.3	0.3	4.6
Europe 4 (old)	234308	240209	245044	248304	0.5	0.4	0.3	6.0

GROSS DOMESTIC PRODUCT in billions ECU (prices and exchange rates						Annual Average % change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Germany (old)	Reference	959.4	1079.9	1201.0	1323.5	2.4	2.1	2.0	37.9
	Higher Growth	959.4	1095.3	1242.4	1392.0	2.7	2.6	2.3	45.1
	% var.		1.4	3.4	5.2				
France	Reference	797.1	885.0	991.5	1108.1	2.1	2.3	2.2	39.0
	Higher Growth	797.1	898.2	1043.1	1197.5	2.4	3.0	2.8	50.2
	% var.		1.5	5.2	8.1				
Italy	Reference	650.0	721.6	833.9	936.3	2.1	2.9	2.3	44.1
	Higher Growth	650.0	732.3	880.1	1023.2	2.4	3.7	3.1	57.4
	% var.		1.5	5.5	9.3				
United Kingdom	Reference	706.6	744.8	812.5	886.4	1.1	1.8	1.8	25.4
	Higher Growth	706.6	750.3	826.7	912.3	1.2	2.0	2.0	29.1
	% var.		0.7	1.8	2.9				
Europe 4 (old)	Reference	3113.1	3431.3	3838.9	4254.3	2.0	2.3	2.1	36.7
	Higher Growth	3113.1	3476.0	3992.3	4525.0	2.2	2.8	2.5	45.4
	% var.		1.3	4.0	6.4				

PRIVATE CONSUMPTION in billions ECU (prices and exchange rates 19						Annual Average % change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Germany (old)	Reference	602.7	674.9	771.6	856.1	2.3	2.7	2.1	42.0
	Higher Growth	602.7	680.3	790.2	889.7	2.5	3.0	2.4	47.6
	% var.		0.8	2.4	3.9				
France	Reference	492.1	549.5	611.4	681.7	2.2	2.2	2.2	38.5
	Higher Growth	492.1	554.2	638.5	729.5	2.4	2.9	2.7	48.3
	% var.		0.9	4.4	7.0				
Italy	Reference	416.5	475.5	528.5	583.6	2.7	2.1	2.0	40.1
	Higher Growth	416.5	480.3	563.4	644.2	2.9	3.2	2.7	54.7
	% var.		1.0	6.6	10.4				
United Kingdom	Reference	460.9	485.1	547.9	605.0	1.0	2.5	2.0	31.2
	Higher Growth	460.9	487.1	555.4	619.2	1.1	2.7	2.2	34.3
	% var.		0.4	1.4	2.4				
Europe 4 (old)	Reference	1972.2	2185.0	2459.5	2726.3	2.1	2.4	2.1	38.2
	Higher Growth	1972.2	2202.0	2547.4	2882.6	2.2	3.0	2.5	46.2
	% var.		0.8	3.6	5.7				

MAIN ASSUMPTIONS : HIGHER GROWTH CASE

	INDEX OF INDUSTRIAL PRODUCTION (1985 = 100)					Annual Average % change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Germany (old)	Reference	117.9	132.2	140.8	148.0	2.3	1.3	1.0	25.5
	Higher Growth	117.9	135.1	147.8	159.2	2.8	1.8	1.5	35.1
	% var.		2.2	4.9	7.6				
France	Reference	113.8	123.1	134.1	145.6	1.6	1.7	1.7	28.0
	Higher Growth	113.8	125.5	138.7	154.6	2.0	2.0	2.2	35.9
	% var.		1.9	3.5	6.2				
Italy	Reference	117.8	128.1	156.9	177.0	1.7	4.1	2.4	50.2
	Higher Growth	117.8	130.6	164.5	190.7	2.1	4.7	3.0	61.9
	% var.		2.0	4.9	7.8				
United Kingdom	Reference	109.3	119.9	131.9	143.4	1.9	1.9	1.7	31.2
	Higher Growth	109.3	121.1	134.3	147.7	2.1	2.1	1.9	35.1
	% var.		1.0	1.8	3.0				
Europe 4 (old)	Reference	114.8	126.2	140.6	152.6	1.9	2.2	1.7	32.9
	Higher Growth	114.8	128.5	146.0	162.2	2.3	2.6	2.1	41.2
	% var.		1.8	3.9	6.3				

	INDEX OF GDP DEFLATOR (1985 = 100)					Annual Average % change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Germany (old)	Reference	113.3	137.8	161.2	186.1	4.0	3.2	2.9	64.2
	Higher Growth	113.3	139.9	172.7	212.1	4.3	4.3	4.2	87.1
	% var.		1.5	7.1	14.0				
France	Reference	119.1	136.7	158.7	183.2	2.8	3.0	2.9	53.9
	Higher Growth	119.1	137.2	164.8	200.6	2.9	3.7	4.0	68.4
	% var.		0.4	3.9	9.5				
Italy	Reference	138.4	177.2	210.5	246.4	5.1	3.5	3.2	78.0
	Higher Growth	138.4	179.2	225.7	285.3	5.3	4.7	4.8	106.2
	% var.		1.1	7.2	15.8				
United Kingdom	Reference	134.5	166.3	201.5	237.9	4.3	3.9	3.4	76.9
	Higher Growth	134.5	168.3	210.7	261.3	4.6	4.6	4.4	94.3
	% var.		1.2	4.6	9.8				
Europe 4 (old)	Reference	124.9	152.0	179.8	209.4	4.0	3.4	3.1	67.7
	Higher Growth	124.9	153.6	190.2	235.5	4.2	4.4	4.4	88.6
	% var.		1.1	5.8	12.5				

HIGHER GROWTH CASE: EUROPE 4

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	644.1	680.0	726.7	763.9	1.1	1.3	1.0	18.6
	Higher Growth	644.1	684.7	745.2	803.2	1.2	1.7	1.5	24.7
	% var.		0.7	2.6	5.1				
Energy Sector	Reference	88.1	90.1	89.4	87.7	0.5	-0.2	-0.4	-0.4
	Higher Growth	88.1	90.4	90.5	89.5	0.5	0.0	-0.2	1.6
	% var.		0.4	1.1	2.1				
Industry	Reference	393.9	383.3	378.5	365.0	-0.5	-0.3	-0.7	-7.3
	Higher Growth	393.9	386.5	387.0	379.3	-0.4	0.0	-0.4	-3.7
	% var.		0.8	2.2	3.9				
Transports	Reference	515.6	571.6	627.7	662.0	2.1	1.9	1.1	28.4
	Higher Growth	515.6	576.7	660.0	729.2	2.3	2.7	2.0	41.4
	% var.		0.9	5.1	10.2				
Dom. & Tert.	Reference	434.3	475.4	487.7	476.9	1.8	0.5	-0.4	9.8
	Higher Growth	434.3	478.3	510.7	513.3	1.9	1.3	0.1	18.2
	% var.		0.6	4.7	7.6				
TOTAL	Reference	2075.9	2200.5	2310.1	2355.4	1.2	1.0	0.4	13.5
	Higher Growth	2075.9	2216.6	2393.4	2514.4	1.3	1.5	1.0	21.1
	% var.		0.7	3.6	6.7				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	174.1	177.5	175.1	171.9	0.4	-0.3	-0.4	-1.2
	Higher Growth	174.1	178.4	179.8	180.6	0.5	0.2	0.1	3.8
	% var.		0.5	2.7	5.1				
Oil	Reference	369.4	388.2	404.5	405.0	1.0	0.8	0.0	9.6
	Higher Growth	369.4	391.6	422.7	439.9	1.2	1.5	0.8	19.1
	% var.		0.9	4.5	8.6				
Natural Gas	Reference	159.4	189.8	227.9	256.1	3.6	3.7	2.4	60.7
	Higher Growth	159.4	191.4	234.1	268.3	3.7	4.1	2.8	68.4
	% var.		0.8	2.7	4.8				
Other	Reference	144.9	159.2	167.6	174.9	1.9	1.0	0.9	20.7
	Higher Growth	144.9	159.7	169.8	181.0	2.0	1.2	1.3	24.9
	% var.		0.3	1.3	3.5				
Total	Reference	847.8	914.7	975.0	1007.9	1.5	1.3	0.7	18.9
	Higher Growth	847.8	921.1	1006.4	1069.9	1.7	1.8	1.2	26.2
	% var.		0.7	3.2	6.2				
Internal Electricity Demand	Reference	119.9	134.1	146.8	157.4	2.3	1.8	1.4	31.3
	Higher Growth	119.9	135.0	150.6	164.7	2.4	2.2	1.8	37.4
	% var.		0.7	2.5	4.6				
Inputs into Power Generation	Reference	305.6	328.5	357.6	378.3	1.5	1.7	1.1	23.8
	Higher Growth	305.6	330.2	363.7	394.8	1.6	2.0	1.7	29.2
	% var.		0.5	1.7	4.3				
Final Energy Consumption	Reference	548.8	595.5	633.4	652.7	1.6	1.2	0.6	18.9
	Higher Growth	548.8	599.9	658.0	699.0	1.8	1.9	1.2	27.4
	% var.		0.7	3.9	7.1				
Industry	Reference	164.0	166.6	170.2	169.2	0.3	0.4	-0.1	3.2
	Higher Growth	164.0	167.9	173.6	175.6	0.5	0.7	0.2	7.0
	% var.		0.8	2.0	3.8				
Transports	Reference	172.2	190.8	211.3	226.7	2.1	2.1	1.4	31.7
	Higher Growth	172.2	192.4	222.0	249.4	2.2	2.9	2.4	44.8
	% var.		0.9	5.1	10.0				
Dom. & Tert.	Reference	212.6	238.1	251.9	256.8	2.3	1.1	0.4	20.8
	Higher Growth	212.6	239.5	262.4	274.1	2.4	1.8	0.9	28.9
	% var.		0.6	4.2	6.7				

HIGHER GROWTH CASE: FRANCE

CO2 Emissions		Annual Data in Mt of CO2				Annual Average % Change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Power Generation	Reference	44.4	58.6	66.7	75.9	5.7	2.6	2.6	71.0
	Higher Growth	44.4	59.4	69.8	80.4	6.0	3.3	2.9	81.2
	% var.		1.3	4.6	6.0				
Energy Sector	Reference	17.4	17.8	18.2	17.7	0.4	0.5	-0.5	1.7
	Higher Growth	17.4	17.8	18.0	17.4	0.4	0.3	-0.7	0.0
	% var.		0.0	-1.2	-1.7				
Industry	Reference	83.0	82.5	81.8	79.1	-0.1	-0.2	-0.7	-4.7
	Higher Growth	83.0	83.1	83.5	82.0	0.0	0.1	-0.4	-1.1
	% var.		0.7	2.0	3.8				
Transports	Reference	125.5	141.9	158.8	174.5	2.5	2.3	1.9	39.0
	Higher Growth	125.5	143.8	171.7	202.3	2.8	3.6	3.3	61.2
	% var.		1.3	8.1	16.0				
Dom. & Tert.	Reference	95.4	103.7	105.8	106.5	1.7	0.4	0.1	11.6
	Higher Growth	95.4	104.2	111.3	115.4	1.8	1.3	0.7	21.0
	% var.		0.6	5.2	8.4				
TOTAL	Reference	365.7	404.5	431.4	453.7	2.0	1.3	1.0	24.0
	Higher Growth	365.7	408.3	454.3	497.6	2.2	2.2	1.8	36.0
	% var.		0.9	5.3	9.7				

Energy Balance Sheet		Annual Data in Mtoe				Annual Average % Change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Gross Inland Consumption									
Solids	Reference	20.0	20.4	20.3	20.9	0.4	-0.1	0.6	4.6
	Higher Growth	20.0	20.6	20.9	22.1	0.6	0.3	1.1	10.4
	% var.		0.9	3.1	5.6				
Oil	Reference	88.0	94.3	99.7	102.3	1.4	1.1	0.5	16.3
	Higher Growth	88.0	95.3	105.8	114.4	1.6	2.1	1.6	30.1
	% var.		1.1	6.2	11.8				
Natural Gas	Reference	24.9	29.9	36.2	41.7	3.8	3.9	2.8	67.5
	Higher Growth	24.9	30.1	37.4	43.8	3.9	4.4	3.2	75.8
	% var.		0.7	3.4	5.0				
Other	Reference	80.1	88.8	96.3	101.6	2.1	1.6	1.1	26.8
	Higher Growth	80.1	89.1	97.8	107.1	2.2	1.9	1.8	33.8
	% var.		0.4	1.6	5.5				
Total	Reference	212.9	233.4	252.5	266.5	1.9	1.6	1.1	25.1
	Higher Growth	212.9	235.1	262.0	287.4	2.0	2.2	1.9	35.0
	% var.		0.7	3.8	7.9				
Internal Electricity Demand	Reference	31.9	37.9	41.7	45.3	3.5	1.9	1.7	42.2
	Higher Growth	31.9	38.2	43.0	48.1	3.7	2.4	2.2	50.7
	% var.		0.7	3.2	6.0				
Inputs into Power Generation	Reference	89.9	102.0	113.3	120.1	2.6	2.1	1.2	33.6
	Higher Growth	89.9	102.5	115.1	126.3	2.7	2.3	1.9	40.5
	% var.		0.4	1.6	5.1				
Final Energy Consumption	Reference	125.7	139.5	150.0	159.3	2.1	1.5	1.2	26.7
	Higher Growth	125.7	140.8	157.7	175.0	2.3	2.3	2.1	39.2
	% var.		0.9	5.2	9.8				
Industry	Reference	34.6	36.1	37.1	37.2	0.9	0.5	0.0	7.4
	Higher Growth	34.6	36.4	37.7	38.4	1.0	0.7	0.4	11.0
	% var.		0.7	1.6	3.4				
Transports	Reference	41.9	47.3	53.3	59.6	2.5	2.4	2.2	42.1
	Higher Growth	41.9	47.9	57.6	69.0	2.7	3.7	3.7	64.5
	% var.		1.3	8.0	15.8				
Dom. & Tert.	Reference	49.2	56.1	59.5	62.6	2.6	1.2	1.0	27.2
	Higher Growth	49.2	56.4	62.4	67.6	2.8	2.0	1.6	37.4
	% var.		0.6	4.9	8.0				

HIGHER GROWTH CASE: GERMANY (old)

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	255.7	274.6	293.7	302.4	1.4	1.4	0.6	18.3
	Higher Growth	255.7	276.7	301.2	323.2	1.6	1.7	1.4	26.4
	% var.		0.7	2.5	6.9				
Energy Sector	Reference	23.3	23.1	23.2	23.4	-0.1	0.0	0.2	0.5
	Higher Growth	23.3	23.2	23.4	23.6	-0.1	0.1	0.2	1.5
	% var.		0.4	0.9	1.0				
Industry	Reference	147.9	144.4	141.0	135.1	-0.5	-0.5	-0.9	-8.7
	Higher Growth	147.9	145.8	144.2	140.0	-0.3	-0.2	-0.6	-5.3
	% var.		0.9	2.2	3.7				
Transports	Reference	154.2	165.9	178.9	183.5	1.5	1.5	0.5	19.0
	Higher Growth	154.2	167.0	184.1	193.9	1.6	2.0	1.0	25.8
	% var.		0.7	2.9	5.7				
Dom. & Tert.	Reference	147.6	160.2	163.8	152.6	1.7	0.4	-1.4	3.4
	Higher Growth	147.6	161.5	172.1	165.5	1.8	1.3	-0.8	12.1
	% var.		0.8	5.1	8.5				
TOTAL	Reference	728.6	768.3	800.6	797.0	1.1	0.8	-0.1	9.4
	Higher Growth	728.6	774.2	824.9	846.3	1.2	1.3	0.5	16.1
	% var.		0.8	3.0	6.2				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	75.2	79.3	79.0	76.0	1.1	-0.1	-0.8	1.1
	Higher Growth	75.2	79.8	81.4	81.4	1.2	0.4	0.0	8.2
	% var.		0.6	3.1	7.1				
Oil	Reference	110.7	118.5	126.4	125.4	1.4	1.3	-0.2	13.2
	Higher Growth	110.7	119.5	131.0	134.0	1.5	1.9	0.4	21.0
	% var.		0.8	3.6	6.8				
Natural Gas	Reference	48.3	53.7	61.3	68.0	2.2	2.7	2.1	40.9
	Higher Growth	48.3	54.3	62.4	70.5	2.4	2.8	2.5	46.1
	% var.		1.2	1.8	3.6				
Other	Reference	38.5	39.8	40.4	40.7	0.7	0.3	0.2	5.7
	Higher Growth	38.5	40.0	40.9	40.8	0.8	0.5	-0.1	5.9
	% var.		0.4	1.4	0.2				
Total	Reference	272.7	291.4	307.2	310.1	1.3	1.1	0.2	13.7
	Higher Growth	272.7	293.6	315.8	326.7	1.5	1.5	0.7	19.8
	% var.		0.8	2.8	5.3				
Internal Electricity Demand	Reference	38.3	42.1	45.6	48.0	1.9	1.6	1.0	25.3
	Higher Growth	38.3	42.5	46.9	50.3	2.1	2.0	1.4	31.2
	% var.		1.0	2.8	4.7				
Inputs into Power Generation	Reference	101.9	107.6	115.0	119.4	1.1	1.3	0.8	17.2
	Higher Growth	101.9	108.3	116.9	125.1	1.2	1.5	1.4	22.8
	% var.		0.6	1.7	4.7				
Final Energy Consumption	Reference	180.5	192.2	201.2	200.9	1.3	0.9	0.0	11.3
	Higher Growth	180.5	193.8	207.7	212.2	1.4	1.4	0.4	17.5
	% var.		0.8	3.2	5.6				
Industry	Reference	59.8	60.5	60.7	59.7	0.2	0.1	-0.3	-0.1
	Higher Growth	59.8	61.0	62.0	62.0	0.4	0.3	0.0	3.6
	% var.		0.9	2.2	3.8				
Transports	Reference	51.6	55.7	60.6	63.3	1.5	1.7	0.9	22.6
	Higher Growth	51.6	56.0	62.3	66.7	1.6	2.1	1.4	29.3
	% var.		0.7	2.8	5.5				
Dom. & Tert.	Reference	69.1	76.1	79.9	77.9	2.0	1.0	-0.5	12.8
	Higher Growth	69.1	76.7	83.4	83.5	2.1	1.7	0.0	20.8
	% var.		0.8	4.4	7.1				

HIGHER GROWTH CASE: ITALY

CO2 Emissions		Annual Data in Mt of CO2				Annual Average % Change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Power Generation	Reference	122.8	126.8	145.1	163.2	0.6	2.7	2.4	32.8
	Higher Growth	122.8	127.9	151.0	174.4	0.8	3.4	2.9	42.0
	% var.		0.9	4.1	6.9				
Energy Sector	Reference	18.9	18.5	18.8	18.3	-0.4	0.4	-0.5	-2.9
	Higher Growth	18.9	18.6	19.7	20.0	-0.3	1.1	0.3	5.9
	% var.		0.9	4.9	9.1				
Industry	Reference	82.1	76.2	76.4	73.5	-1.5	0.0	-0.8	-10.5
	Higher Growth	82.1	77.0	78.7	77.5	-1.3	0.4	-0.3	-5.7
	% var.		1.0	3.0	5.4				
Transports	Reference	99.8	119.1	135.8	142.0	3.6	2.7	0.9	42.3
	Higher Growth	99.8	120.7	147.7	165.4	3.9	4.1	2.3	65.8
	% var.		1.3	8.7	16.5				
Dom. & Tert.	Reference	78.8	83.9	88.0	89.2	1.3	0.9	0.3	13.3
	Higher Growth	78.8	84.7	94.8	100.7	1.5	2.3	1.2	27.8
	% var.		0.9	7.8	12.8				
TOTAL	Reference	402.4	424.5	464.0	486.3	1.1	1.8	0.9	20.8
	Higher Growth	402.4	428.9	491.8	537.9	1.3	2.8	1.8	33.7
	% var.		1.0	6.0	10.6				

Energy Balance Sheet		Annual Data in Mtoe				Annual Average % Change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Gross Inland Consumption									
Solids	Reference	14.6	16.1	17.7	19.6	1.9	1.9	2.1	34.4
	Higher Growth	14.6	16.2	18.7	21.3	2.0	3.0	2.6	45.3
	% var.		0.3	5.6	8.2				
Oil	Reference	89.1	88.0	90.9	89.2	-0.2	0.6	-0.4	0.2
	Higher Growth	89.1	89.1	97.0	100.6	0.0	1.7	0.7	13.0
	% var.		1.2	6.7	12.8				
Natural Gas	Reference	39.0	48.7	60.9	70.0	4.5	4.6	2.8	79.3
	Higher Growth	39.0	49.2	63.7	75.3	4.8	5.3	3.4	93.1
	% var.		1.0	4.5	7.7				
Other	Reference	7.9	11.0	12.5	13.0	7.0	2.5	0.8	65.1
	Higher Growth	7.9	11.0	12.6	13.4	7.1	2.6	1.2	70.4
	% var.		0.1	1.0	3.2				
Total	Reference	150.6	163.9	181.9	191.8	1.7	2.1	1.1	27.4
	Higher Growth	150.6	165.5	191.9	210.6	1.9	3.0	1.9	39.9
	% var.		1.0	5.5	9.8				
Internal Electricity Demand	Reference	21.3	24.0	27.4	30.1	2.4	2.7	1.9	41.1
	Higher Growth	21.3	24.1	28.2	31.8	2.5	3.2	2.5	49.1
	% var.		0.7	3.0	5.7				
Inputs into Power Generation	Reference	39.7	42.3	51.5	58.9	1.3	4.0	2.7	48.6
	Higher Growth	39.7	42.7	53.3	62.5	1.5	4.5	3.2	57.6
	% var.		0.9	3.5	6.0				
Final Energy Consumption	Reference	107.2	117.9	129.4	135.0	1.9	1.9	0.8	25.9
	Higher Growth	107.2	119.1	137.5	150.1	2.1	2.9	1.8	40.1
	% var.		1.0	6.2	11.2				
Industry	Reference	36.0	35.8	37.5	37.4	-0.1	0.9	-0.1	3.7
	Higher Growth	36.0	36.2	38.6	39.3	0.1	1.3	0.4	9.1
	% var.		1.0	2.8	5.2				
Transports	Reference	33.3	39.8	45.8	48.8	3.6	2.8	1.3	46.5
	Higher Growth	33.3	40.3	49.7	56.7	3.9	4.3	2.7	70.1
	% var.		1.3	8.6	16.1				
Dom. & Tert.	Reference	37.8	42.3	46.1	48.8	2.3	1.7	1.1	29.0
	Higher Growth	37.8	42.6	49.2	54.1	2.4	2.9	1.9	43.0
	% var.		0.8	6.6	10.9				

HIGHER GROWTH CASE: UNITED KINGDOM

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	221.1	220.0	221.2	222.4	-0.1	0.1	0.1	0.6
	Higher Growth	221.1	220.7	223.3	225.2	0.0	0.2	0.2	1.8
	% var.		0.3	1.0	1.2				
Energy Sector	Reference	28.4	30.7	29.3	28.2	1.6	-1.0	-0.7	-0.8
	Higher Growth	28.4	30.8	29.4	28.4	1.6	-1.0	-0.7	-0.1
	% var.		0.2	0.4	0.7				
Industry	Reference	81.0	80.1	79.2	77.4	-0.2	-0.2	-0.5	-4.4
	Higher Growth	81.0	80.6	80.6	79.7	-0.1	0.0	-0.2	-1.5
	% var.		0.6	1.7	3.0				
Transports	Reference	136.1	144.6	154.2	162.0	1.2	1.3	1.0	19.0
	Higher Growth	136.1	145.2	156.6	167.6	1.3	1.5	1.4	23.2
	% var.		0.4	1.5	3.5				
Dom. & Tert.	Reference	112.5	127.6	130.2	128.5	2.5	0.4	-0.3	14.2
	Higher Growth	112.5	127.9	132.5	131.7	2.6	0.7	-0.1	17.0
	% var.		0.2	1.8	2.4				
TOTAL	Reference	579.2	603.1	614.1	618.5	0.8	0.4	0.1	6.8
	Higher Growth	579.2	605.2	622.4	632.6	0.9	0.6	0.3	9.2
	% var.		0.3	1.4	2.3				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	64.3	61.7	58.0	55.4	-0.8	-1.2	-0.9	-13.8
	Higher Growth	64.3	61.8	58.7	55.9	-0.8	-1.0	-1.0	-13.0
	% var.		0.2	1.2	1.0				
Oil	Reference	81.6	87.4	87.5	88.1	1.4	0.0	0.1	7.9
	Higher Growth	81.6	87.8	88.9	90.9	1.5	0.2	0.4	11.3
	% var.		0.5	1.5	3.2				
Natural Gas	Reference	47.2	57.4	69.4	76.4	4.0	3.9	1.9	61.9
	Higher Growth	47.2	57.7	70.6	78.7	4.1	4.1	2.2	66.7
	% var.		0.4	1.6	3.0				
Other	Reference	18.5	19.5	18.4	19.6	1.1	-1.2	1.3	6.3
	Higher Growth	18.5	19.5	18.4	19.7	1.1	-1.2	1.4	6.6
	% var.		0.0	0.1	0.3				
Total	Reference	211.6	226.1	233.4	239.5	1.3	0.6	0.5	13.2
	Higher Growth	211.6	226.9	236.6	245.2	1.4	0.8	0.7	15.9
	% var.		0.4	1.4	2.4				
Internal Electricity Demand	Reference	28.3	30.1	32.1	33.9	1.3	1.3	1.1	20.0
	Higher Growth	28.3	30.2	32.4	34.5	1.3	1.4	1.3	22.0
	% var.		0.3	0.9	1.6				
Inputs into Power Generation	Reference	74.1	76.5	77.8	79.8	0.6	0.4	0.5	7.7
	Higher Growth	74.1	76.7	78.5	80.9	0.7	0.5	0.6	9.1
	% var.		0.3	0.8	1.3				
Final Energy Consumption	Reference	135.3	145.8	152.8	157.5	1.5	0.9	0.6	16.4
	Higher Growth	135.3	146.3	155.1	161.7	1.6	1.2	0.8	19.5
	% var.		0.3	1.5	2.7				
Industry	Reference	33.6	34.2	34.8	35.0	0.4	0.3	0.1	4.2
	Higher Growth	33.6	34.4	35.2	35.8	0.5	0.5	0.3	6.8
	% var.		0.5	1.4	2.5				
Transports	Reference	45.3	48.0	51.6	55.0	1.2	1.5	1.3	21.5
	Higher Growth	45.3	48.2	52.4	56.9	1.2	1.7	1.7	25.7
	% var.		0.4	1.5	3.4				
Dom. & Tert.	Reference	56.5	63.6	66.5	67.5	2.4	0.9	0.3	19.5
	Higher Growth	56.5	63.7	67.5	69.0	2.5	1.2	0.4	22.1
	% var.		0.2	1.6	2.2				

EUROPEAN COMMUNITY

CO2 TAX CASE

ANALYSIS

MAIN ASSUMPTIONS

In the tax scenario reflecting the Commission proposal for introducing a CO2 tax, a mixed carbon/energy tax with the following main features has been modelled:

• the tax is based 50% on the carbon content and 50% on the energy content of fossil fuels;

• renewables except for hydro power are not taxed;

• while the introduction of the tax is conditional on other OECD countries implementing similar measures, for this analysis it has been assumed that the tax is introduced in all Member States in 1993 with rates of 0.21 ECU/GJ for the energy part and 2.81 ECU/t of CO2 for the carbon part; this gives a total equivalent to 3 $/bbl;

• each year until the year 2000 the tax rates are increased by one third of the value of the year 1993 resulting in tax rates of 0.7 ECU/GJ and 9.4 ECU/t CO2 in 2000 which corresponds to a total of 10 $/bbl;

• these tax rates are nominal, i.e. there is no adaptation according to inflation;

• the currencies of the Member States have been used for modelling, i.e. stable exchange rates through 2000 have been assumed;

• the carbon / energy tax is to be applied over and above existing taxes on energy products;

• an input tax is applied for electricity in respect of the carbon element;

• the energy part of the tax on electricity is uniform across fossil fuels and nuclear, but it is lower for hydro reflecting its higher conversion efficiency;

• hydro and nuclear energy which are used only for electricity generation are taxed with 0.76 ECU/ MWh and 2.1 ECU/MWh in the first year;

• notwithstanding the provision to refund the tax paid by industries which invest in energy efficiency improvement or CO2 reduction and other potential forms of exempting certain industries, in this analysis the tax has been applied to all industries;

• the tax is revenue neutral minimising macro-economic effects and therefore feedback from the overall economy has not been modelled.

CO2 TAX CASE : EUROPE 8

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	814.7	868.2	939.8	1010.8	1.3	1.6	1.5	24.1
	CO2 Tax	814.7	863.5	925.1	984.1	1.2	1.4	1.2	20.8
	% var.		-0.5	-1.6	-2.6				
Energy Sector	Reference	120.3	123.3	124.0	122.4	0.5	0.1	-0.3	1.8
	CO2 Tax	120.3	122.3	121.2	118.9	0.3	-0.2	-0.4	-1.1
	% var.		-0.8	-2.2	-2.8				
Industry	Reference	511.2	501.4	495.9	480.2	-0.4	-0.2	-0.6	-6.1
	CO2 Tax	511.2	490.2	472.2	458.6	-0.8	-0.7	-0.6	-10.3
	% var.		-2.2	-4.8	-4.5				
Transports	Reference	654.6	729.4	804.2	853.6	2.2	2.0	1.2	30.4
	CO2 Tax	654.6	721.2	787.0	836.8	2.0	1.8	1.2	27.8
	% var.		-1.1	-2.1	-2.0				
Dom. & Tert.	Reference	528.8	585.4	602.3	592.1	2.1	0.6	-0.3	12.0
	CO2 Tax	528.8	575.2	574.2	566.0	1.7	0.0	-0.3	7.0
	% var.		-1.7	-4.7	-4.4				
TOTAL	Reference	2629.6	2807.7	2966.3	3059.0	1.3	1.1	0.6	16.3
	CO2 Tax	2629.6	2772.4	2879.8	2964.4	1.1	0.8	0.6	12.7
	% var.		-1.3	-2.9	-3.1				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	220.8	225.1	228.0	230.6	0.4	0.3	0.2	4.4
	CO2 Tax	220.8	222.6	220.6	220.6	0.2	-0.2	0.0	-0.1
	% var.		-1.1	-3.2	-4.3				
Oil	Reference	471.2	500.4	522.1	525.9	1.2	0.9	0.1	11.6
	CO2 Tax	471.2	492.7	505.7	510.5	0.9	0.5	0.2	8.3
	% var.		-1.5	-3.1	-2.9				
Natural Gas	Reference	203.5	244.1	290.9	325.4	3.7	3.6	2.3	59.9
	CO2 Tax	203.5	242.6	285.7	319.5	3.6	3.3	2.3	57.0
	% var.		-0.6	-1.8	-1.8				
Other	Reference	173.6	189.5	199.2	205.7	1.8	1.0	0.6	18.5
	CO2 Tax	173.6	189.1	198.5	206.7	1.7	1.0	0.8	19.1
	% var.		-0.2	-0.3	0.5				
Total	Reference	1069.0	1159.0	1240.1	1287.5	1.6	1.4	0.8	20.4
	CO2 Tax	1069.0	1147.1	1210.6	1257.2	1.4	1.1	0.8	17.6
	% var.		-1.0	-2.4	-2.4				
Internal Electricity Demand	Reference	148.4	166.7	183.9	198.6	2.3	2.0	1.5	33.8
	CO2 Tax	148.4	165.9	181.7	196.0	2.2	1.8	1.5	32.0
	% var.		-0.5	-1.2	-1.3				
Inputs into Power Generation	Reference	376.7	406.1	443.0	472.2	1.5	1.8	1.3	25.4
	CO2 Tax	376.7	404.5	438.5	466.1	1.4	1.6	1.2	23.8
	% var.		-0.4	-1.0	-1.3				
Final Energy Consumption	Reference	689.2	752.8	803.8	832.8	1.8	1.3	0.7	20.8
	CO2 Tax	689.2	742.8	779.6	809.1	1.5	1.0	0.7	17.4
	% var.		-1.3	-3.0	-2.8				
Industry	Reference	211.2	216.4	221.8	221.8	0.5	0.5	0.0	5.0
	CO2 Tax	211.2	212.6	213.5	213.6	0.1	0.1	0.0	1.1
	% var.		-1.7	-3.8	-3.7				
Transports	Reference	218.3	243.1	270.5	291.7	2.2	2.2	1.5	33.6
	CO2 Tax	218.3	240.4	264.8	286.0	1.9	1.9	1.6	31.0
	% var.		-1.1	-2.1	-1.9				
Dom. & Tert.	Reference	259.6	293.3	311.6	319.3	2.5	1.2	0.5	23.0
	CO2 Tax	259.6	289.7	301.3	309.5	2.2	0.8	0.5	19.2
	% var.		-1.2	-3.3	-3.1				

CO2 TAX CASE : BELGIUM

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	24.6	25.7	27.8	29.8	0.9	1.6	1.4	21.3
	CO2 Tax	24.6	25.8	27.0	28.6	1.0	0.9	1.2	16.5
	% var.		0.3	-3.1	-4.0				
Energy Sector	Reference	5.6	5.9	6.0	5.8	1.1	0.2	-0.7	3.1
	CO2 Tax	5.6	5.9	5.9	5.7	1.0	0.1	-0.7	1.9
	% var.		-0.5	-1.1	-1.1				
Industry	Reference	32.3	30.7	29.2	27.2	-1.0	-1.0	-1.4	-15.7
	CO2 Tax	32.3	29.8	27.3	25.4	-1.6	-1.7	-1.4	-21.5
	% var.		-3.0	-6.7	-6.9				
Transports	Reference	23.2	26.2	28.9	31.0	2.5	2.0	1.4	33.7
	CO2 Tax	23.2	26.3	28.7	30.8	2.6	1.7	1.4	33.0
	% var.		0.4	-0.6	-0.6				
Dom. & Tert.	Reference	26.3	29.6	29.8	29.5	2.4	0.1	-0.2	12.3
	CO2 Tax	26.3	28.4	27.0	27.1	1.5	-1.0	0.1	3.0
	% var.		-4.2	-9.3	-8.3				
TOTAL	Reference	112.0	118.2	121.7	123.4	1.1	0.6	0.3	10.2
	CO2 Tax	112.0	116.1	115.9	117.6	0.7	0.0	0.3	5.1
	% var.		-1.7	-4.8	-4.6				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	10.2	9.6	9.2	8.9	-1.2	-0.9	-0.6	-12.5
	CO2 Tax	10.2	9.4	8.8	8.4	-1.6	-1.5	-0.9	-18.0
	% var.		-1.8	-4.6	-6.3				
Oil	Reference	18.4	20.5	21.3	21.5	2.1	0.8	0.2	16.8
	CO2 Tax	18.4	20.1	20.3	20.7	1.7	0.3	0.4	12.3
	% var.		-1.9	-4.7	-3.9				
Natural Gas	Reference	8.2	10.1	11.7	12.7	4.3	3.1	1.6	55.6
	CO2 Tax	8.2	10.1	11.3	12.3	4.2	2.3	1.7	50.8
	% var.		-0.3	-3.7	-3.1				
Other	Reference	10.7	11.1	11.3	11.6	0.8	0.5	0.4	8.5
	CO2 Tax	10.7	11.1	11.3	11.5	0.8	0.4	0.4	8.4
	% var.		0.0	-0.1	-0.1				
Total	Reference	47.5	51.2	53.6	54.7	1.5	0.9	0.4	15.3
	CO2 Tax	47.5	50.6	51.7	52.9	1.3	0.4	0.5	11.5
	% var.		-1.2	-3.5	-3.3				
Internal Electricity Demand	Reference	5.7	6.5	7.1	7.5	2.5	1.9	1.1	31.3
	CO2 Tax	5.7	6.5	7.0	7.3	2.5	1.5	1.1	28.5
	% var.		0.2	-2.0	-2.2				
Inputs into Power Generation	Reference	17.1	17.8	18.7	19.3	0.7	1.0	0.7	12.7
	CO2 Tax	17.1	17.8	18.3	18.9	0.8	0.6	0.6	10.5
	% var.		0.1	-1.7	-1.9				
Final Energy Consumption	Reference	30.7	33.5	35.1	36.0	1.8	0.9	0.5	17.4
	CO2 Tax	30.7	32.9	33.5	34.5	1.4	0.3	0.6	12.3
	% var.		-1.8	-4.7	-4.3				
Industry	Reference	11.5	11.8	11.9	11.6	0.5	0.2	-0.5	1.1
	CO2 Tax	11.5	11.5	11.2	11.0	0.0	-0.5	-0.5	-4.9
	% var.		-2.5	-5.7	-5.9				
Transports	Reference	7.7	8.7	9.7	10.6	2.5	2.1	1.8	37.6
	CO2 Tax	7.7	8.8	9.6	10.5	2.6	1.9	1.8	36.8
	% var.		0.4	-0.6	-0.5				
Dom. & Tert.	Reference	11.5	13.0	13.5	13.8	2.5	0.8	0.4	20.3
	CO2 Tax	11.5	12.7	12.6	13.0	2.0	-0.1	0.6	13.2
	% var.		-2.7	-6.8	-5.9				

CO2 TAX CASE : FRANCE

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	44.4	58.6	66.7	75.9	5.7	2.6	2.6	71.0
	CO2 Tax	44.4	58.1	65.7	68.0	5.6	2.5	0.7	53.3
	% var.		-0.8	-1.6	-10.3				
Energy Sector	Reference	17.4	17.8	18.2	17.7	0.4	0.5	-0.5	1.7
	CO2 Tax	17.4	17.6	17.8	17.3	0.2	0.2	-0.6	-0.8
	% var.		-0.8	-2.5	-2.5				
Industry	Reference	83.0	82.5	81.8	79.1	-0.1	-0.2	-0.7	-4.7
	CO2 Tax	83.0	79.7	76.2	74.0	-0.8	-0.9	-0.6	-10.9
	% var.		-3.4	-6.9	-6.4				
Transports	Reference	125.5	141.9	158.8	174.5	2.5	2.3	1.9	39.0
	CO2 Tax	125.5	139.8	154.7	170.5	2.2	2.0	2.0	35.9
	% var.		-1.5	-2.6	-2.3				
Dom. & Tert.	Reference	95.4	103.7	105.8	106.5	1.7	0.4	0.1	11.6
	CO2 Tax	95.4	100.9	98.6	99.3	1.1	-0.5	0.1	4.1
	% var.		-2.6	-6.8	-6.8				
TOTAL	Reference	365.7	404.5	431.4	453.7	2.0	1.3	1.0	24.0
	CO2 Tax	365.7	396.2	412.9	429.1	1.6	0.8	0.8	17.3
	% var.		-2.1	-4.3	-5.4				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	20.0	20.4	20.3	20.9	0.4	-0.1	0.6	4.6
	CO2 Tax	20.0	20.0	19.3	18.2	0.0	-0.7	-1.1	-8.8
	% var.		-2.2	-5.1	-12.8				
Oil	Reference	88.0	94.3	99.7	102.3	1.4	1.1	0.5	16.3
	CO2 Tax	88.0	92.3	95.6	98.5	1.0	0.7	0.6	12.0
	% var.		-2.1	-4.0	-3.7				
Natural Gas	Reference	24.9	29.9	36.2	41.7	3.8	3.9	2.8	67.5
	CO2 Tax	24.9	29.8	35.4	40.4	3.7	3.5	2.7	62.5
	% var.		-0.3	-2.1	-3.0				
Other	Reference	80.1	88.8	96.3	101.6	2.1	1.6	1.1	26.8
	CO2 Tax	80.1	88.5	95.9	102.8	2.0	1.6	1.4	28.3
	% var.		-0.3	-0.4	1.2				
Total	Reference	212.9	233.4	252.5	266.5	1.9	1.6	1.1	25.1
	CO2 Tax	212.9	230.7	246.3	260.0	1.6	1.3	1.1	22.1
	% var.		-1.2	-2.5	-2.4				
Internal Electricity Demand	Reference	31.9	37.9	41.7	45.3	3.5	1.9	1.7	42.2
	CO2 Tax	31.9	37.7	41.4	45.0	3.4	1.9	1.7	41.1
	% var.		-0.5	-0.7	-0.8				
Inputs into Power Generation	Reference	89.9	102.0	113.3	120.1	2.6	2.1	1.2	33.6
	CO2 Tax	89.9	101.7	112.7	119.2	2.5	2.1	1.1	32.7
	% var.		-0.3	-0.5	-0.7				
Final Energy Consumption	Reference	125.7	139.5	150.0	159.3	2.1	1.5	1.2	26.7
	CO2 Tax	125.7	137.0	144.3	153.7	1.7	1.0	1.3	22.2
	% var.		-1.8	-3.8	-3.6				
Industry	Reference	34.6	36.1	37.1	37.2	0.9	0.5	0.0	7.4
	CO2 Tax	34.6	35.2	35.1	35.2	0.4	-0.1	0.0	1.6
	% var.		-2.5	-5.4	-5.4				
Transports	Reference	41.9	47.3	53.3	59.6	2.5	2.4	2.2	42.1
	CO2 Tax	41.9	46.6	52.0	58.2	2.2	2.2	2.3	38.9
	% var.		-1.5	-2.6	-2.2				
Dom. & Tert.	Reference	49.2	56.1	59.5	62.6	2.6	1.2	1.0	27.2
	CO2 Tax	49.2	55.2	57.2	60.3	2.3	0.7	1.0	22.5
	% var.		-1.6	-3.8	-3.7				

CO2 TAX CASE : GERMANY (old)

		Annual Data in Mt of CO2				Annual Average % Change			% Change
CO2 Emissions		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Power Generation	Reference	255.7	274.6	293.7	302.4	1.4	1.4	0.6	18.3
	CO2 Tax	255.7	273.2	289.2	296.1	1.3	1.1	0.5	15.8
	% var.		-0.5	-1.5	-2.1				
Energy Sector	Reference	23.3	23.1	23.2	23.4	-0.1	0.0	0.2	0.5
	CO2 Tax	23.3	23.1	22.5	22.1	-0.2	-0.5	-0.4	-5.3
	% var.		-0.3	-2.9	-5.7				
Industry	Reference	147.9	144.4	141.0	135.1	-0.5	-0.5	-0.9	-8.7
	CO2 Tax	147.9	140.8	133.1	127.7	-1.0	-1.1	-0.8	-13.6
	% var.		-2.5	-5.6	-5.4				
Transports	Reference	154.2	165.9	178.9	183.5	1.5	1.5	0.5	19.0
	CO2 Tax	154.2	164.1	175.5	180.6	1.3	1.4	0.6	17.1
	% var.		-1.1	-1.9	-1.6				
Dom. & Tert.	Reference	147.6	160.2	163.8	152.6	1.7	0.4	-1.4	3.4
	CO2 Tax	147.6	156.9	153.8	144.0	1.2	-0.4	-1.3	-2.5
	% var.		-2.1	-6.1	-5.7				
TOTAL	Reference	728.6	768.3	800.6	797.0	1.1	0.8	-0.1	9.4
	CO2 Tax	728.6	758.1	774.2	770.4	0.8	0.4	-0.1	5.7
	% var.		-1.3	-3.3	-3.3				

		Annual Data in Mtoe				Annual Average % Change			% Change
Energy Balance Sheet		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Gross Inland Consumption									
Solids	Reference	75.2	79.3	79.0	76.0	1.1	-0.1	-0.8	1.1
	CO2 Tax	75.2	78.6	76.2	72.9	0.9	-0.6	-0.9	-3.0
	% var.		-0.9	-3.5	-4.1				
Oil	Reference	110.7	118.5	126.4	125.4	1.4	1.3	-0.2	13.2
	CO2 Tax	110.7	116.6	121.6	121.2	1.0	0.9	-0.1	9.5
	% var.		-1.6	-3.8	-3.3				
Natural Gas	Reference	48.3	53.7	61.3	68.0	2.2	2.7	2.1	40.9
	CO2 Tax	48.3	53.3	60.8	67.2	2.0	2.7	2.0	39.2
	% var.		-0.7	-0.9	-1.3				
Other	Reference	38.5	39.8	40.4	40.7	0.7	0.3	0.2	5.7
	CO2 Tax	38.5	39.8	40.2	40.7	0.7	0.2	0.2	5.6
	% var.		-0.1	-0.4	-0.1				
Total	Reference	272.7	291.4	307.2	310.1	1.3	1.1	0.2	13.7
	CO2 Tax	272.7	288.3	298.9	302.0	1.1	0.7	0.2	10.7
	% var.		-1.1	-2.7	-2.6				
Internal Electricity Demand	Reference	38.3	42.1	45.6	48.0	1.9	1.6	1.0	25.3
	CO2 Tax	38.3	41.9	45.2	47.5	1.8	1.5	1.0	24.0
	% var.		-0.4	-1.0	-1.0				
Inputs into Power Generation	Reference	101.9	107.6	115.0	119.4	1.1	1.3	0.8	17.2
	CO2 Tax	101.9	107.3	114.2	118.2	1.0	1.3	0.7	16.0
	% var.		-0.4	-0.7	-1.1				
Final Energy Consumption	Reference	180.5	192.2	201.2	200.9	1.3	0.9	0.0	11.3
	CO2 Tax	180.5	189.3	193.9	194.1	1.0	0.5	0.0	7.5
	% var.		-1.5	-3.6	-3.4				
Industry	Reference	59.8	60.5	60.7	59.7	0.2	0.1	-0.3	-0.1
	CO2 Tax	59.8	59.3	58.0	56.9	-0.2	-0.4	-0.4	-4.8
	% var.		-2.0	-4.5	-4.7				
Transports	Reference	51.6	55.7	60.6	63.3	1.5	1.7	0.9	22.6
	CO2 Tax	51.6	55.1	59.5	62.3	1.3	1.5	0.9	20.7
	% var.		-1.0	-1.8	-1.6				
Dom. & Tert.	Reference	69.1	76.1	79.9	77.9	2.0	1.0	-0.5	12.8
	CO2 Tax	69.1	75.0	76.4	74.9	1.6	0.4	-0.4	8.4
	% var.		-1.5	-4.3	-3.9				

CO2 TAX CASE : GREECE

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	35.8	39.7	47.3	56.7	2.1	3.5	3.7	58.6
	CO2 Tax	35.8	40.0	47.3	56.5	2.3	3.4	3.6	57.9
	% var.		0.6	0.1	-0.4				
Energy Sector	Reference	1.9	2.3	3.2	3.6	3.3	6.8	2.7	87.1
	CO2 Tax	1.9	2.3	3.1	3.6	3.0	6.6	2.7	82.4
	% var.		-1.6	-2.9	-2.6				
Industry	Reference	10.2	11.3	11.4	11.6	2.1	0.2	0.4	14.5
	CO2 Tax	10.2	11.3	11.4	11.6	2.1	0.2	0.4	14.5
	% var.		0.0	0.0	0.0				
Transports	Reference	17.7	20.4	22.7	25.0	2.9	2.1	2.0	41.3
	CO2 Tax	17.7	20.2	22.3	24.5	2.7	2.0	1.9	38.5
	% var.		-1.0	-1.6	-2.0				
Dom. & Tert.	Reference	8.1	9.9	12.0	13.1	4.1	4.0	1.7	61.7
	CO2 Tax	8.1	9.8	11.6	12.6	3.9	3.4	1.7	55.9
	% var.		-0.8	-3.4	-3.6				
TOTAL	Reference	73.7	83.6	96.6	110.1	2.6	2.9	2.7	49.5
	CO2 Tax	73.7	83.5	95.7	108.8	2.5	2.8	2.6	47.7
	% var.		-0.1	-0.9	-1.2				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	8.2	8.9	10.9	13.1	1.7	4.2	3.7	59.4
	CO2 Tax	8.2	8.8	10.6	12.6	1.3	4.0	3.4	53.4
	% var.		-1.6	-2.6	-3.8				
Oil	Reference	12.7	15.2	15.2	16.3	3.5	0.0	1.4	27.5
	CO2 Tax	12.7	14.8	14.6	15.7	3.0	-0.3	1.5	23.3
	% var.		-2.4	-3.8	-3.3				
Natural Gas	Reference	0.1	0.1	2.2	2.7	1.1	71.9	4.4	1866.3
	CO2 Tax	0.1	0.1	2.1	2.6	1.1	69.9	5.0	1811.5
	% var.		0.0	-5.7	-2.8				
Other	Reference	0.2	0.4	0.5	0.5	12.4	3.6	3.6	154.1
	CO2 Tax	0.2	0.4	0.5	0.5	10.9	4.7	3.5	151.8
	% var.		-6.2	-0.8	-0.9				
Total	Reference	21.3	24.6	28.8	32.6	2.9	3.2	2.5	53.0
	CO2 Tax	21.3	24.1	27.8	31.5	2.5	2.9	2.5	47.7
	% var.		-2.1	-3.4	-3.4				
Internal Electricity Demand	Reference	3.1	3.6	4.4	5.1	3.4	3.9	3.4	68.7
	CO2 Tax	3.1	3.6	4.3	5.1	3.2	3.9	3.4	67.7
	% var.		-0.5	-0.8	-0.6				
Inputs into Power Generation	Reference	8.7	9.7	11.7	14.0	2.2	3.8	3.6	60.0
	CO2 Tax	8.7	9.8	11.8	14.0	2.4	3.7	3.5	60.6
	% var.		1.3	0.6	0.3				
Final Energy Consumption	Reference	13.7	15.9	18.4	20.3	3.0	2.9	2.0	47.9
	CO2 Tax	13.7	15.8	18.1	20.0	2.9	2.7	2.0	45.4
	% var.		-0.6	-1.5	-1.7				
Industry	Reference	3.9	4.3	4.5	4.7	1.9	1.0	0.6	19.0
	CO2 Tax	3.9	4.3	4.5	4.7	1.9	1.0	0.6	19.0
	% var.		0.0	0.0	0.0				
Transports	Reference	5.8	6.7	7.6	8.4	2.8	2.5	2.1	43.9
	CO2 Tax	5.8	6.6	7.4	8.2	2.6	2.4	2.0	41.1
	% var.		-1.0	-1.6	-2.0				
Dom. & Tert.	Reference	4.0	5.0	6.3	7.3	4.4	4.9	2.9	81.8
	CO2 Tax	4.0	4.9	6.2	7.1	4.2	4.6	2.9	77.5
	% var.		-0.7	-2.4	-2.4				

CO2 TAX CASE : ITALY

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	122.8	126.8	145.1	163.2	0.6	2.7	2.4	32.8
	CO2 Tax	122.8	126.0	143.4	160.7	0.5	2.6	2.3	30.8
	% var.		-0.6	-1.2	-1.5				
Energy Sector	Reference	18.9	18.5	18.8	18.3	-0.4	0.4	-0.5	-2.9
	CO2 Tax	18.9	18.3	18.3	17.8	-0.7	0.1	-0.6	-5.7
	% var.		-1.0	-2.4	-2.9				
Industry	Reference	82.1	76.2	76.4	73.5	-1.5	0.0	-0.8	-10.5
	CO2 Tax	82.1	75.5	74.4	71.4	-1.7	-0.3	-0.8	-13.0
	% var.		-0.9	-2.6	-2.8				
Transports	Reference	99.8	119.1	135.8	142.0	3.6	2.7	0.9	42.3
	CO2 Tax	99.8	117.4	132.3	138.9	3.3	2.4	1.0	39.2
	% var.		-1.5	-2.6	-2.2				
Dom. & Tert.	Reference	78.8	83.9	88.0	89.2	1.3	0.9	0.3	13.3
	CO2 Tax	78.8	82.9	85.7	87.1	1.0	0.7	0.3	10.6
	% var.		-1.1	-2.6	-2.4				
TOTAL	Reference	402.4	424.5	464.0	486.3	1.1	1.8	0.9	20.8
	CO2 Tax	402.4	420.1	454.2	476.0	0.9	1.6	0.9	18.3
	% var.		-1.0	-2.1	-2.1				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	14.6	16.1	17.7	19.6	1.9	1.9	2.1	34.4
	CO2 Tax	14.6	16.0	17.5	19.3	1.9	1.7	2.0	32.0
	% var.		-0.4	-1.4	-1.8				
Oil	Reference	89.1	88.0	90.9	89.2	-0.2	0.6	-0.4	0.2
	CO2 Tax	89.1	86.9	88.6	86.9	-0.5	0.4	-0.4	-2.4
	% var.		-1.3	-2.4	-2.6				
Natural Gas	Reference	39.0	48.7	60.9	70.0	4.5	4.6	2.8	79.3
	CO2 Tax	39.0	48.4	60.0	69.1	4.4	4.4	2.9	77.2
	% var.		-0.6	-1.5	-1.2				
Other	Reference	7.9	11.0	12.5	13.0	7.0	2.5	0.8	65.1
	CO2 Tax	7.9	11.0	12.4	12.9	7.0	2.4	0.8	64.5
	% var.		-0.1	-0.3	-0.4				
Total	Reference	150.6	163.9	181.9	191.8	1.7	2.1	1.1	27.4
	CO2 Tax	150.6	162.4	178.5	188.3	1.5	1.9	1.1	25.0
	% var.		-0.9	-1.9	-1.8				
Internal Electricity Demand	Reference	21.3	24.0	27.4	30.1	2.4	2.7	1.9	41.1
	CO2 Tax	21.3	23.8	27.1	29.8	2.3	2.6	2.0	39.9
	% var.		-0.5	-1.0	-0.9				
Inputs into Power Generation	Reference	39.7	42.3	51.5	58.9	1.3	4.0	2.7	48.6
	CO2 Tax	39.7	42.1	50.9	58.1	1.2	3.9	2.7	46.6
	% var.		-0.7	-1.1	-1.3				
Final Energy Consumption	Reference	107.2	117.9	129.4	135.0	1.9	1.9	0.8	25.9
	CO2 Tax	107.2	116.7	126.6	132.2	1.7	1.6	0.9	23.4
	% var.		-1.1	-2.2	-2.0				
Industry	Reference	36.0	35.8	37.5	37.4	-0.1	0.9	-0.1	3.7
	CO2 Tax	36.0	35.5	36.8	36.6	-0.3	0.7	-0.1	1.5
	% var.		-0.8	-2.0	-2.1				
Transports	Reference	33.3	39.8	45.8	48.8	3.6	2.8	1.3	46.5
	CO2 Tax	33.3	39.2	44.6	47.8	3.3	2.6	1.4	43.3
	% var.		-1.4	-2.5	-2.1				
Dom. & Tert.	Reference	37.8	42.3	46.1	48.8	2.3	1.7	1.1	29.0
	CO2 Tax	37.8	41.9	45.2	47.9	2.1	1.5	1.2	26.6
	% var.		-0.9	-2.0	-1.8				

CO2 TAX CASE : NETHERLANDS

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	45.8	49.7	53.9	60.9	1.6	1.7	2.5	32.9
	CO2 Tax	45.8	49.3	52.9	59.5	1.5	1.4	2.4	29.9
	% var.		-0.7	-1.9	-2.3				
Energy Sector	Reference	13.1	12.8	13.4	13.5	-0.3	0.9	0.1	3.1
	CO2 Tax	13.1	12.8	13.3	13.3	-0.4	0.8	0.0	2.1
	% var.		-0.1	-0.5	-0.9				
Industry	Reference	29.2	28.2	27.6	26.4	-0.7	-0.4	-0.9	-9.5
	CO2 Tax	29.2	27.4	26.2	25.3	-1.2	-0.9	-0.7	-13.3
	% var.		-2.7	-5.2	-4.2				
Transports	Reference	30.8	33.6	35.9	37.0	1.7	1.3	0.6	20.0
	CO2 Tax	30.8	33.2	34.9	36.0	1.5	1.0	0.6	16.9
	% var.		-1.2	-2.7	-2.6				
Dom. & Tert.	Reference	38.4	46.2	47.2	46.6	3.8	0.4	-0.3	21.3
	CO2 Tax	38.4	45.4	45.8	45.5	3.4	0.2	-0.1	18.5
	% var.		-1.7	-3.0	-2.3				
TOTAL	Reference	157.3	170.4	178.1	184.3	1.6	0.9	0.7	17.2
	CO2 Tax	157.3	168.1	173.1	179.7	1.3	0.6	0.7	14.2
	% var.		-1.4	-2.8	-2.5				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	9.1	8.3	9.6	11.2	-1.7	2.8	3.2	23.6
	CO2 Tax	9.1	8.3	9.5	11.1	-1.8	2.7	3.1	22.0
	% var.		-0.6	-1.0	-1.3				
Oil	Reference	24.6	25.6	26.7	27.0	0.8	0.9	0.2	9.7
	CO2 Tax	24.6	25.3	26.1	26.4	0.6	0.6	0.2	7.5
	% var.		-1.0	-2.1	-2.0				
Natural Gas	Reference	30.8	36.9	37.9	38.2	3.7	0.6	0.1	24.0
	CO2 Tax	30.8	36.3	36.7	37.2	3.3	0.2	0.2	20.6
	% var.		-1.6	-3.2	-2.7				
Other	Reference	1.9	2.0	2.1	1.3	0.9	1.0	-8.6	-29.6
	CO2 Tax	1.9	2.0	2.1	1.3	0.7	1.2	-8.6	-30.1
	% var.		-0.9	-0.1	-0.6				
Total	Reference	66.4	72.8	76.3	77.7	1.9	0.9	0.4	17.1
	CO2 Tax	66.4	71.9	74.4	76.0	1.6	0.7	0.4	14.5
	% var.		-1.2	-2.5	-2.2				
Internal Electricity Demand	Reference	7.0	7.7	8.5	9.1	2.1	1.9	1.5	31.2
	CO2 Tax	7.0	7.7	8.3	8.9	1.9	1.6	1.4	27.8
	% var.		-1.0	-2.4	-2.6				
Inputs into Power Generation	Reference	15.1	16.9	18.0	19.1	2.3	1.3	1.2	26.5
	CO2 Tax	15.1	16.8	17.6	18.6	2.1	1.0	1.1	23.0
	% var.		-0.8	-2.5	-2.7				
Final Energy Consumption	Reference	42.7	47.8	49.8	50.5	2.3	0.8	0.3	18.3
	CO2 Tax	42.7	47.0	48.2	49.1	1.9	0.5	0.4	14.9
	% var.		-1.7	-3.3	-2.8				
Industry	Reference	13.2	13.5	13.6	13.4	0.4	0.2	-0.3	1.9
	CO2 Tax	13.2	13.1	13.0	12.8	-0.1	-0.3	-0.2	-2.8
	% var.		-2.6	-5.1	-4.6				
Transports	Reference	10.3	11.2	12.1	12.6	1.7	1.5	0.9	22.1
	CO2 Tax	10.3	11.1	11.7	12.3	1.5	1.2	0.9	19.0
	% var.		-1.2	-2.7	-2.6				
Dom. & Tert.	Reference	19.2	23.1	24.1	24.5	3.7	0.9	0.3	27.5
	CO2 Tax	19.2	22.8	23.5	24.0	3.4	0.6	0.4	24.9
	% var.		-1.4	-2.6	-2.0				

CO2 TAX CASE : SPAIN

CO2 Emissions		Annual Data in Mt of CO2				Annual Average % Change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Power Generation	Reference	64.4	73.0	84.1	99.4	2.5	2.9	3.4	54.4
	CO2 Tax	64.4	72.6	82.2	96.2	2.4	2.5	3.2	49.3
	% var.		-0.6	-2.3	-3.3				
Energy Sector	Reference	11.6	12.2	12.0	11.8	1.0	-0.3	-0.3	1.7
	CO2 Tax	11.6	12.0	11.7	11.6	0.6	-0.5	-0.2	-0.4
	% var.		-1.6	-2.5	-2.0				
Industry	Reference	45.6	48.0	49.1	50.0	1.0	0.5	0.3	9.4
	CO2 Tax	45.6	48.0	49.1	50.0	1.0	0.5	0.3	9.4
	% var.		0.0	0.0	0.0				
Transports	Reference	67.3	77.6	89.1	98.6	2.9	2.8	2.1	46.5
	CO2 Tax	67.3	76.8	86.7	95.7	2.7	2.5	2.0	42.1
	% var.		-1.0	-2.6	-3.0				
Dom. & Tert.	Reference	21.7	24.2	25.5	26.0	2.2	1.1	0.4	19.7
	CO2 Tax	21.7	24.1	25.2	25.6	2.1	0.9	0.3	18.0
	% var.		-0.6	-1.2	-1.4				
TOTAL	Reference	210.7	235.0	259.8	285.9	2.2	2.0	1.9	35.6
	CO2 Tax	210.7	233.5	255.0	279.0	2.1	1.8	1.8	32.4
	% var.		-0.6	-1.9	-2.4				

Energy Balance Sheet		Annual Data in Mtoe				Annual Average % Change			% Change
		1990	1995	2000	2005	95/90	00/95	05/00	2005/90
Gross Inland Consumption									
Solids	Reference	19.3	20.7	23.2	25.4	1.4	2.3	1.9	31.9
	CO2 Tax	19.3	20.5	22.6	24.0	1.2	2.0	1.2	24.5
	% var.		-0.9	-2.6	-5.6				
Oil	Reference	45.9	51.1	54.4	56.1	2.1	1.3	0.6	22.1
	CO2 Tax	45.9	50.5	53.1	54.8	1.9	1.0	0.6	19.3
	% var.		-1.1	-2.3	-2.3				
Natural Gas	Reference	5.0	7.1	11.2	15.7	7.4	9.5	7.0	216.0
	CO2 Tax	5.0	7.3	11.0	16.0	8.0	8.7	7.7	222.1
	% var.		2.4	-1.2	2.0				
Other	Reference	15.9	16.9	17.7	17.4	1.1	1.0	-0.4	8.9
	CO2 Tax	15.9	16.9	17.7	17.3	1.1	1.0	-0.4	8.8
	% var.		0.0	-0.2	-0.1				
Total	Reference	86.1	95.7	106.5	114.6	2.1	2.1	1.5	33.1
	CO2 Tax	86.1	95.1	104.4	112.1	2.0	1.9	1.4	30.2
	% var.		-0.6	-1.9	-2.1				
Internal Electricity Demand	Reference	12.8	14.8	17.1	19.3	2.9	2.9	2.5	50.5
	CO2 Tax	12.8	14.7	16.8	19.0	2.8	2.6	2.5	48.0
	% var.		-0.4	-1.7	-1.6				
Inputs into Power Generation	Reference	30.1	33.2	37.0	41.4	2.0	2.2	2.3	37.6
	CO2 Tax	30.1	33.1	36.3	40.6	1.9	1.9	2.3	34.9
	% var.		-0.4	-1.7	-1.9				
Final Energy Consumption	Reference	53.3	60.1	67.1	73.2	2.4	2.2	1.7	37.5
	CO2 Tax	53.3	59.8	66.0	71.9	2.3	2.0	1.7	35.0
	% var.		-0.6	-1.7	-1.8				
Industry	Reference	18.6	20.2	21.6	22.9	1.7	1.4	1.1	23.2
	CO2 Tax	18.6	20.1	21.6	22.8	1.6	1.4	1.1	23.0
	% var.		-0.1	-0.1	-0.1				
Transports	Reference	22.3	25.7	29.9	33.4	2.9	3.0	2.3	49.7
	CO2 Tax	22.3	25.5	29.1	32.4	2.7	2.7	2.2	45.3
	% var.		-1.0	-2.6	-2.9				
Dom. & Tert.	Reference	12.4	14.2	15.7	16.9	2.8	2.0	1.5	36.9
	CO2 Tax	12.4	14.1	15.4	16.6	2.7	1.7	1.5	34.1
	% var.		-0.5	-2.0	-2.0				

CO2 TAX CASE : UNITED KINGDOM

CO2 Emissions		Annual Data in Mt of CO2 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Power Generation	Reference	221.1	220.0	221.2	222.4	-0.1	0.1	0.1	0.6
	CO2 Tax	221.1	218.4	217.4	218.5	-0.2	-0.1	0.1	-1.2
	% var.		-0.7	-1.7	-1.8				
Energy Sector	Reference	28.4	30.7	29.3	28.2	1.6	-1.0	-0.7	-0.8
	CO2 Tax	28.4	30.4	28.6	27.6	1.3	-1.2	-0.7	-3.0
	% var.		-1.1	-2.2	-2.2				
Industry	Reference	81.0	80.1	79.2	77.4	-0.2	-0.2	-0.5	-4.4
	CO2 Tax	81.0	77.7	74.6	73.2	-0.8	-0.8	-0.4	-9.5
	% var.		-3.0	-5.9	-5.4				
Transports	Reference	136.1	144.6	154.2	162.0	1.2	1.3	1.0	19.0
	CO2 Tax	136.1	143.4	151.9	159.7	1.0	1.2	1.0	17.4
	% var.		-0.9	-1.5	-1.4				
Dom. & Tert.	Reference	112.5	127.6	130.2	128.5	2.5	0.4	-0.3	14.2
	CO2 Tax	112.5	126.8	126.4	124.8	2.4	-0.1	-0.2	10.9
	% var.		-0.7	-2.9	-2.9				
TOTAL	Reference	579.2	603.1	614.1	618.5	0.8	0.4	0.1	6.8
	CO2 Tax	579.2	596.7	598.8	603.8	0.6	0.1	0.2	4.3
	% var.		-1.1	-2.5	-2.4				

Energy Balance Sheet		Annual Data in Mtoe 1990	1995	2000	2005	Annual Average % Change 95/90	00/95	05/00	% Change 2005/90
Gross Inland Consumption									
Solids	Reference	64.3	61.7	58.0	55.4	-0.8	-1.2	-0.9	-13.8
	CO2 Tax	64.3	61.1	56.2	54.1	-1.0	-1.7	-0.7	-15.8
	% var.		-1.1	-3.2	-2.3				
Oil	Reference	81.6	87.4	87.5	88.1	1.4	0.0	0.1	7.9
	CO2 Tax	81.6	86.2	85.6	86.2	1.1	-0.1	0.1	5.5
	% var.		-1.3	-2.2	-2.2				
Natural Gas	Reference	47.2	57.4	69.4	76.4	4.0	3.9	1.9	61.9
	CO2 Tax	47.2	57.2	68.4	74.6	3.9	3.6	1.8	58.1
	% var.		-0.4	-1.5	-2.4				
Other	Reference	18.5	19.5	18.4	19.6	1.1	-1.2	1.3	6.3
	CO2 Tax	18.5	19.5	18.4	19.6	1.1	-1.2	1.3	6.1
	% var.		0.0	-0.1	-0.2				
Total	Reference	211.6	226.1	233.4	239.5	1.3	0.6	0.5	13.2
	CO2 Tax	211.6	224.1	228.6	234.5	1.2	0.4	0.5	10.8
	% var.		-0.9	-2.1	-2.1				
Internal Electricity Demand	Reference	28.3	30.1	32.1	33.9	1.3	1.3	1.1	20.0
	CO2 Tax	28.3	29.9	31.6	33.2	1.1	1.1	1.0	17.5
	% var.		-0.6	-1.5	-2.0				
Inputs into Power Generation	Reference	74.1	76.5	77.8	79.8	0.6	0.4	0.5	7.7
	CO2 Tax	74.1	76.0	76.7	78.4	0.5	0.2	0.4	5.8
	% var.		-0.6	-1.4	-1.8				
Final Energy Consumption	Reference	135.3	145.8	152.8	157.5	1.5	0.9	0.6	16.4
	CO2 Tax	135.3	144.3	149.0	153.7	1.3	0.6	0.6	13.5
	% var.		-1.0	-2.5	-2.4				
Industry	Reference	33.6	34.2	34.8	35.0	0.4	0.3	0.1	4.2
	CO2 Tax	33.6	33.5	33.3	33.7	-0.1	-0.1	0.2	0.3
	% var.		-2.1	-4.1	-3.8				
Transports	Reference	45.3	48.0	51.6	55.0	1.2	1.5	1.3	21.5
	CO2 Tax	45.3	47.6	50.8	54.3	1.0	1.3	1.3	19.8
	% var.		-0.8	-1.5	-1.4				
Dom. & Tert.	Reference	56.5	63.6	66.5	67.5	2.4	0.9	0.3	19.5
	CO2 Tax	56.5	63.2	64.9	65.7	2.3	0.5	0.3	16.4
	% var.		-0.6	-2.4	-2.6				

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STUDIES CONSULTED

ERECO, France
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Belgium, Denmark, France, Germany, Italy, Netherlands, Spain.

For the rest of the Member States, the publication "Annual Energy Policies and programmes of IEA Countries" of the OECD/IEA was consulted.

For the investment forecasts of all Member States' electricity sector: the annual EURELECTRIC report.

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Coherence, Belgium (D. Gusbin)
HECTOR model, update and calculation of SO2 and NOx emissions

Coopers & Lybrand, London
Gas analysis study

Dulbea, (Department of Applied Economics, ULB) Belgium (I. Lebrun), Midas model. Maintenance and development, preparation of variants

Dulbea, Belgium (B. Lange)
Mini World Energy Model, development and historical data update

EcoPlan International, France
(F.E.K. Britton and H.H. Rogner)
Energy, Growth and the Environment: Towards a Framework for an Energy Strategy

ESAP, Belgium (J.-F. Guilmot)
SIMELEC model, development and use for electricity sector's investment forecasts in the cases of Denmark, Ireland and Portugal

NTUA, (National Technical University of Athens), Greece (P. Capros, P. Karadeloglou, L. Mantzos and G. Mentzas)
Development of MIDAS model for eight Member States, data-bases and energy tax variants

OFCE/CEPII, France
Macro-economic forecasts to 2000

The scenarios to 2050 were prepared by ***Professor Richard Eden, Professor Emeritus***, Cambridge University and first published in 1991 at the Senior Expert Symposium on Electricity and Environment, Helsinki : European Commission, International Atomic Energy Agency et al.

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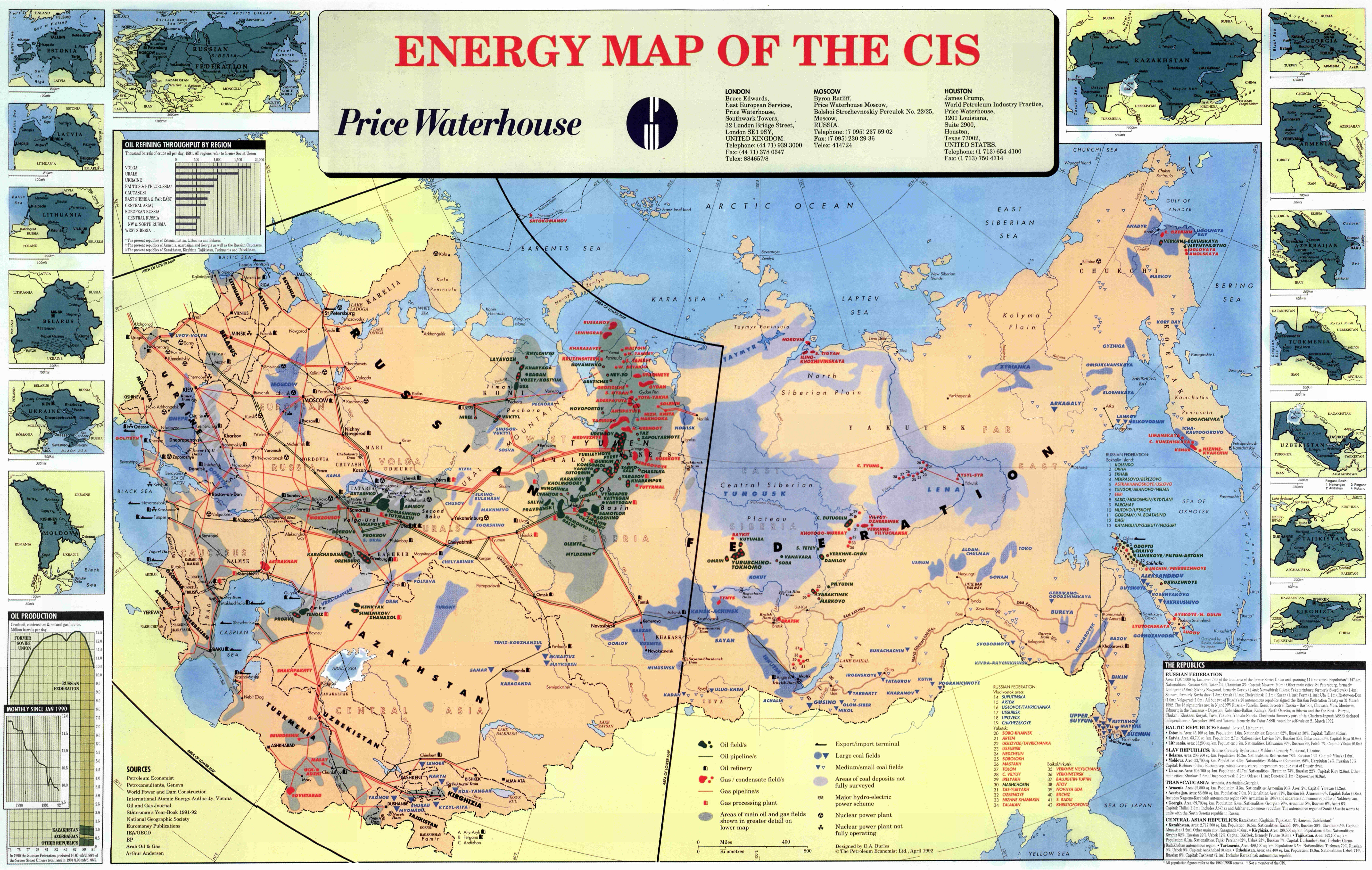

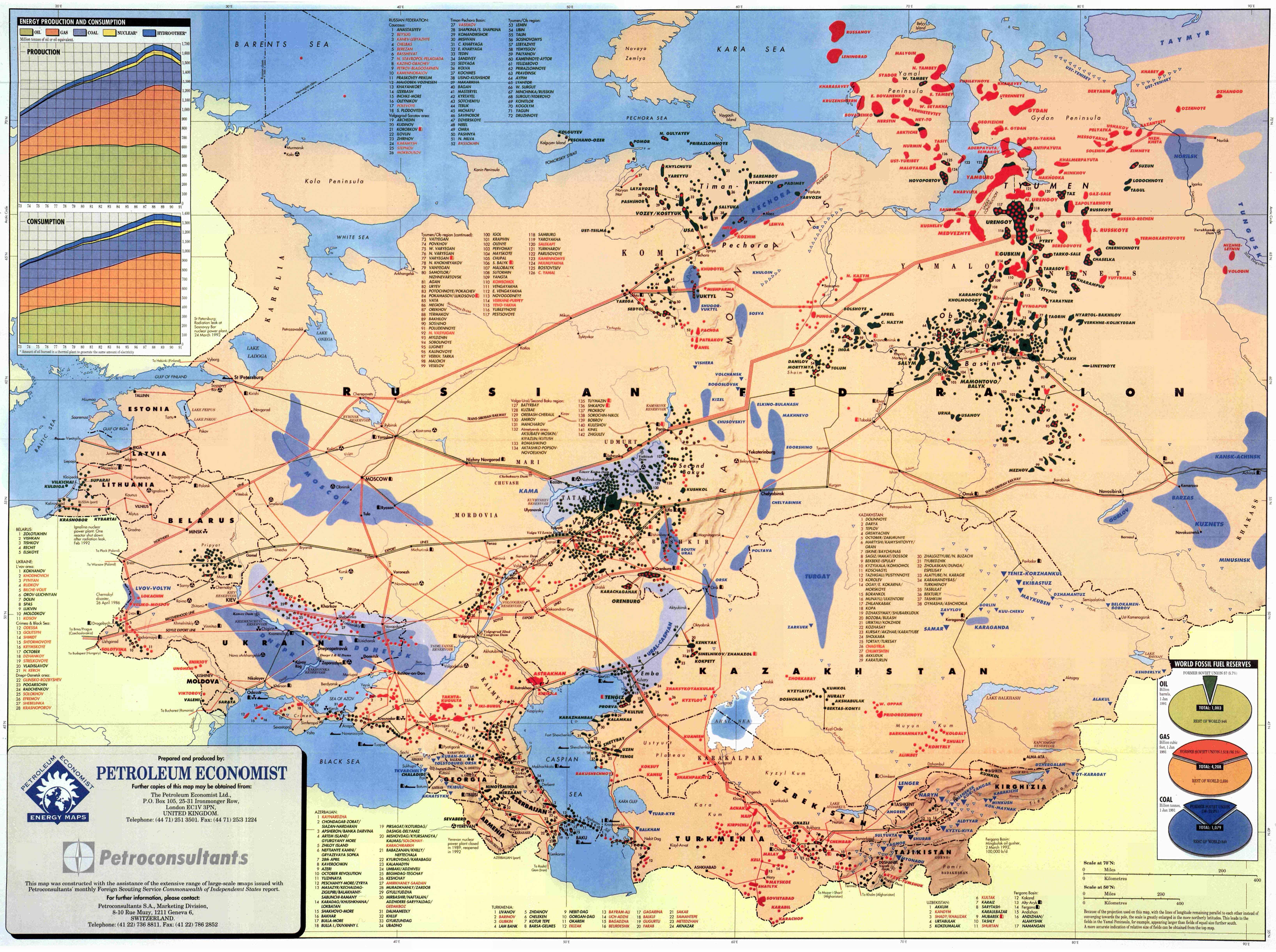

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