EUROPEAN COMMISSION

ENERGY IN EUROPE

1999 - ANNUAL ENERGY REVIEW

SPECIAL ISSUE - JANUARY 2000

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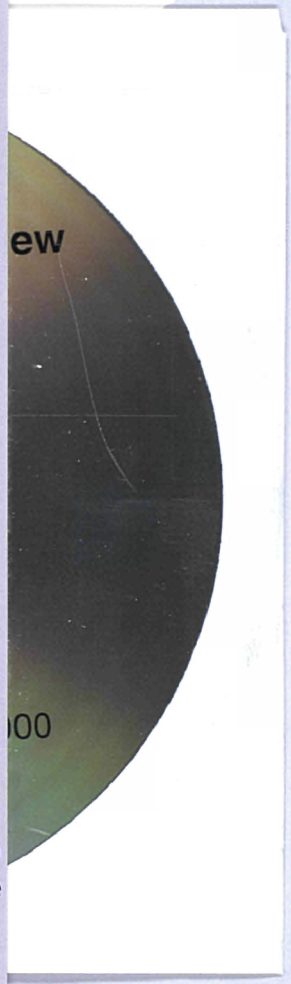

DIRECTORATE-GENERAL FOR ENERGY

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Includes a CD-Rom with global energy balances and indicators for 127 countries in the world

EUROPEAN COMMISSION

CONTENTS

CONTENTS

ABBREVIATIONS, DEFINITIONS AND UNITS

CIS	Community of Independent States
DG II	Directorate-General for Economic and Financial Affairs of the European Commission
DG XVII	Directorate-General for Energy of the European Commission
EFTA	European Free Trade Association
Energy Intensity	Ratio of Energy Consumption to GDP
EU	European Union
GCC	Gulf Co-operation Council
GDP	Gross Domestic Product
GIC	Gross Inland Consumption
GW	GigaWatt, or 10^9 Watt
IEA	International Energy Agency
IMF	International Monetary Fund
Kgoe	Kilogram oil equivalent
kl	Thousand litre
km	Kilometer
kWh	Thousand Watt.hour
l	Litre
MEUR	Million EURO
Mt	Million metric tonne
Mtoe	Million toe
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-operation and Development (excluding Hungary, Czech Republic and Poland)
OLADE	Organizacion Latinoamericana de Energia
SOEC	Statistical Office of the European Communities
STEO	Short-Term Energy Outlook for the European Union
t	Metric tonne, or 1.000 kilograms
toe	Tonne of oil equivalent, or 10^7 kilocalories, or 41.86 GJ
TWh	Tera Watt.hour, or 10^{12} Watt.hour
UN	United Nations
WB	World Bank

FOREWORD BY VICE PRESIDENT de PALACIO del VALLE-LERSUNDI (RELATIONS WITH THE EUROPEAN PARLIAMENT, TRANSPORT AND ENERGY)

Energy policy contribution to sustainable development and the challenge of climate change feature prominently on the energy agenda at the turn of the millennium. Implementation of the internal market continues to be a key issue. Security of supply, both in the short and long term, is a crucial issue in an energy world where globalisation shapes our views. The external dimension is therefore an essential component of our policy objectives.

In mapping the challenges of the next decades, a close co-operation between Member States, industry, NGOs and other stakeholders together with international organisations ensures the best way to understand how the energy world is changing.

On the eve of the new millennium there is a temptation to look back and reflect. The Annual Energy Review has indeed an interesting period to report upon. Energy policy and energy markets have developed substantially over the 90's as response to changing economic and political realities. German reunification, EU enlargement, changes in Central and Eastern Europe and the former Soviet Union, are just some of the important events that have taken place. The capacity of the energy sector to adapt to changing circumstances and adopt new ways of working is striking.

The internal market directives on electricity and gas and the White Paper on energy policy are the culmination of long and continuous preparation in developing Community energy policy. In the area of environment protection, climate change emerged as a key challenge to energy production, transport and use. The Kyoto Protocol registered this challenge in quantitative terms. The detailed response to the need to integrate environmental concerns into energy policy, and in particular

outlining an efficient energy contribution to Kyoto is to the fore in the policy debate. The issues I have outlined above confirm that while we are about to enter a new millennium we will do so with a substantial heritage from the final years of the old century. There is widespread agreement on the need for soundly based analytical inputs to the policy process. Information systems and particularly the internet will facilitate disseminating and sharing information. However, paradoxically, we see a substantial deterioration in the availability, timeliness and range of information available. Changing market structures, budget constraints and the resulting diminishing available expertise are putting at risk the quality and quantity of information we require. This dilemma requires innovative thinking and new actions if we are to ensure a guaranteed quality information base.

The Annual Energy Review, an established Commission publication on energy development, seeks to report on matters of policy relevance. Addressing the information challenges mentioned above is done in co-operation with the International Energy Agency and with the Agency and indeed other concerned bodies we look forward to developing new thinking on how to improve the statistical basis and the analytical support to policy formulation.

There is growing emphasises in the policy debate on the usefulness for not only monitoring market developments and trends but also of leading policy indicators. Indeed the need for continuous monitoring is well illustrated by recent trends in market conditions. We have seen the price of oil decline substantially this year and yet within a matter of months it has doubled in value again. The medium- and long-term implications of this price volatility require ongoing analysis.

The development in carbon dioxide trends is particularly important. The Community undertook in 1992 to stabilise CO2 emissions at 1990 levels by the year 2000. Present forecasts suggest we are within striking distance of this important objective. This is an example of a leading indicator which has been regularly monitored and commented on in the Annual Review over the years.

It will be one of my priorities to ensure that those concerned with policy development, as it impacts on competitiveness, environment and contacts with third countries have available the shared analysis of which this report is a contribution. May I extend to you my best wishes for a successful start to a new millennium.

ENERGY HIGHLIGHTS...

... IN THE EUROPEAN UNION:

- Energy consumption increased by 1.8% in 1998 after falling 0.3% in 1997. Since 1995 fluctuations in energy consumption have been mainly related to climatic conditions;
- The share of gas in gross inland consumption reached 21.5% in 1997 compared with only 16.5% in 1990;
- Indigenous energy production declined slowly in 1997 after the peak reached in 1996;
- Since 1997, the transport sector contributed only 50% of the total increase of final energy demand, the balance arising from the tertiary-domestic sector;
- Energy intensity improved by 0.6% per year on average since 1990;
- CO_2 emissions in 1997 were 1% below their 1990 level;
- By combining the forecast growth of the European economy and the return to long-term average temperatures, the short-term energy outlook predicts a 1.3% growth of primary energy demand between 1999 and 2001.

... AND IN THE WORLD:

- Energy demand grew by only 1.1% in 1997 despite world economic growth of 3.3%. It increased more rapidly in the Middle East, Asia and Latin America;
- Financial crises will have their full effect in 1998, with preliminary statistics indicating a slow decline of world energy demand;
- Final energy demand was driven by the transport and tertiary-domestic sectors and the potential for further demand growth remains enormous in the developing regions;
- The fuel mix is changing in favour of gas but oil still remains predominant;
- The world power market is marked by privatisation and structural reforms;
- OECD increased its contribution to world energy production;
- World-wide CO_2 emissions have increased by 8% since 1990.

WORLD

PRIMARY ENERGY CONSUMPTION IS GROWING:

• Between 1990 and 1997 world primary energy consumption grew by 1.4% per year on average, following different regional trends:

  • Energy needs continued to increase in the OECD area by 1.5% per year on average;

  • In the non-OECD world, growth in demand was limited to 1.3% annually due to the significant decreases in Central and Eastern Europe (-2% per year on average) and the former USSR (-5.4%);

  • Demand grew rapidly in the Middle East (+4.8%), in Asia (+4.5%) and in Latin America (+3.6%);

  • Structurally the weight of Asia increased substantially since 1980 to represent in 1997 24.5% of world energy consumption against only 15.8% in 1980. On the other hand, the share of CIS declined from 15.6% to 9.5%, that of CEEC from 4.9% to 3%, while the contribution of OECD as a whole decreased from 52.9% in 1980 to 49.1% in 1997.

MARKED DEVELOPMENT SINCE 1995

• As a consequence of the stabilisation of consumption, since 1994, in CEEC and CIS considered as a whole, energy consumption rebounded in 1995 and 1996 to reach a growth of about 2.7% per year, contrasting with a limited increase of only 0.7% annually between 1990 and 1994.

• In 1997 the increase in global energy consumption was limited to only 1.2% despite growth of the world economy by 3.3%. This resulted from the favourable climatic conditions in the Western Hemisphere and from the initial effects of the financial crisis that affected first South East Asia and subsequently major countries in Latin America and CIS with a rebound effect on CEEC.

• This financial crisis will have its full effect in 1998, preliminary statistics indicating a slight fall in world primary energy consumption.

FINAL ENERGY CONSUMPTION DRIVEN BY TRANSPORT AND DOMESTIC SECTORS

• The final energy consumption by sector showed very contrasting trends since 1980:

• Energy consumption for transport, still the minor contributor, has increased regularly since 1980 by about 2.0% per year in the OECD and 2.3% in the non-OECD region, the share of OECD still accounting for about 69% in 1996. The near future will be marked by two major factors: the increasing contribution of transport in final energy demand (from 22.2% in 1980 to 25.1% in 1996) and the very sustained growth in emerging regions where the potential for development remains enormous (7.6% increase per year since 1990 in Asia, 6.7% in the Middle East and 5.1% in Latin America);

• Energy consumption in the tertiary and domestic sector depends heavily on climatic conditions. It increased on average by 1.8% since 1980, but with a contrasting evolution between the OECD region (+1.1% per year) and non-OECD region (+2.2% per year) in relation to increasing living standards and growing urbanisation in emerging regions. Consequently, the share of the OECD region declined from 44% in 1980 to 40% in 1996. But this evolution was not uniform. Since 1990, energy consumption by the tertiary-domestic sector in the OECD region, stimulated by rising incomes, increased faster (+2.3% per year on average) than in the rest of the world (+1.8%);

• Energy consumption by industry was only 2.6% higher in 1996 than in 1980 and still 3.3% below the peak reached in 1988. Even though this is the consequence of the sharp decline in CEEC and CIS, the long-term evolution reflects all the efforts made by industry to reduce specific energy consumption. Although consumption declined in the OECD region by 1% on average per year since 1980, it grew by 0.8% in non-OECD regions. As a result, the latter's share rose from 52% in 1980 to 60% in 1995. The growth was spectacular in Asia, driven by China and South East Asia, reaching 4.4% per year on average since 1980. In 1996, Asia, excluding Japan and New Zealand, absorbed 33% of world energy consumption for industry.

THE FUEL MIX IS CHANGING IN FAVOUR OF GAS BUT OIL REMAINS PREDOMINANT

• Since 1990, natural gas consumption has grown faster than overall energy consumption despite the stagnation registered in 1997 following major increases in 1995 and 1996. This resulted from warm climatic conditions in the Western Hemisphere and continuous decline in the CIS and CEEC. In recent years the bulk of consumption growth arose from power generation. Demand accelerated in developing countries, mainly in Asia and the Middle East, but also in the European Union;

• Oil remains the predominant energy source, keeping its share of 37% since 1990. Oil demand accelerated significantly in 1996 and 1997. Developing regions - Asia, Latin America and the Middle East - which increased their share in world oil consumption from 22.5% in 1990 to 30.2% in 1997, are driving oil consumption. The near future will be marked by the increasing contribution of transport in final demand sustained by the enormous potential for development in the emerging regions;

• Solid fuels have been steadily losing market share since 1990, principally in the European Union. The consumption, increasingly concentrated in the power sector, was progressively located close to the main producers. Asia, in particular, absorbed 41.3% of the world consumption in 1997 against 32.7% in 1990. Consumption also increased substantially in the NAFTA region in 1996 and 1997;

• The carbon-free energy sources (nuclear and renewables) increased by 2.0% per year on average since 1990. Renewable energy sources accounted for 13.5% of total needs in 1997, showing a small increase since 1990. More than 55% of world biomass production remained located in Asia.

WORLD POWER MARKET MARKED BY PRIVATISATION AND REFORMS

• Electricity is, and will continue to be, the fastest growing component of final energy demand. In the OECD region, electricity demand has shown strong growth since 1980 at 2.7% per year on average in contrast to 0.8% annual growth in total final energy demand. Electricity consumption in the rest of the world grew by 3.9% per year since 1980 although total final demand increased by only 1.8%. Since 1990, electricity generation increased by 2.1% world-wide:

  • Nuclear production grew fastest even though capacity has increased by only 7% since 1990. Historically an initial slowdown of nuclear production was registered in 1997 due to power plant closures in the United States and Canada;

  • Hydro production continued to increase, with major developments in Asia and Latin America, but also in the NAFTA region;

  • Since 1995 the contribution of thermal generation has accelerated. Solid fuels largely dominated fuel consumption, with a major predominance in producing countries (United States, China, CIS) where its use increased substantially in 1996 and 1997. Gas utilisation has doubled since 1980, and this trend will be accentuated by the increasing contribution of Independent Private Producers (IPPs) based on combined cycle gas turbine plants.

• Privatisation and electricity reform measures continued apace in 1997. Central and South America have led the developing world in the privatisation of electricity and implementation of electricity reform. This essential evolution continued in 1997 even though the financial crisis in Southeast Asia slowed down the development of the power industry. The pace of foreign investment in developing nations' electricity sectors hinged strongly on the implementation of electricity reform and the application of transparent and consistent regulatory and investment policies.

INCREASING CONTRIBUTION OF OECD IN WORLD ENERGY PRODUCTION:

• In 1997, to cover the requirements, energy production increased by 1.9%, the major developments being located in oil producing regions: the Middle East and Latin America;

• Since 1990, OECD energy production has grown by 1.6% per year, against 1.2% in the non-OECD region. Major gains occurred in the EFTA region (+8% per year since 1990), Latin America (+5.2%), OECD Pacific (+3.9%), Middle East (+3.4%) and Asia (+3.2%);

• The 1990's were marked by substantial cutbacks of energy production in CEEC and CIS countries. Although production stabilised in CEEC in 1995, it continued to decline in CIS. Since 1990 CIS energy production has declined by 28%!

• The OECD production gains were mainly in oil (+14% since 1990), gas (+22%) and nuclear (+19%), while non-OECD countries primarily increased their solid fuel production (+8%) and renewables (+8%).

OECD ABSORBED 80% OF WORLD INTERREGIONAL EXCHANGES OF ENERGY:

• The European Union remains by far the largest net energy importer with a steady annual growth of 2.3% since 1985, achieving a 1997 level comparable to 1980. OECD Pacific is the second ranking with a relatively stable level since 1980. NAFTA imports, the third largest, have grown more than four times since 1985;

• In 1997, OECD absorbed about 80% of world inter-regional net exchanges but all these exchanges represented only 20% of total world energy consumption;

• Asia continuously increased its imports from a negligible level in 1980 to reach 284 Mtoe in 1997, a level comparable with NAFTA;

• Net exporters remained, traditionally, the Middle East (854 Mtoe in 1997), Africa (366 Mtoe), CIS (257 Mtoe) and EFTA (172 Mtoe); all four are mainly exporters of hydrocarbons;

• OPEC continued to dominate the oil market; and Russia accounted for 40% of natural gas trade in 1997.

WORLD ENERGY INTENSITY DECREASED BY 2.1% IN 1997

• World energy intensity improved by about 0.8% per year between 1990 and 1994, remained stable between 1994 and 1996, but improved by 2.1% in 1997;

• OECD regions with the lowest energy intensity improved their performance marginally (-0.4%) since 1990, except for the OECD Pacific region where energy intensity increased;

• The rest of the world was characterised by a substantial reduction of its energy intensity (-1.8% per year on average since 1990) despite the marked increase in CIS (+2.2% per year) and in the Middle East (+1.8% per year). Asia demonstrated the largest improvement since 1990, at about 2.9% per year on average.

WORLD-WIDE CO_2 EMISSIONS INCREASED BY 8% SINCE 1990

• World-wide emissions of CO_2 increased steadily but by only 0.5% between 1990 and 1994, benefiting from the rapid decline in CIS (-8.1% per year on average). Driven by economic growth and cold weather conditions in the Western Hemisphere, world-wide CO_2 emissions increased by 2.4% in both 1995 and 1996. In contrast, warm climatic conditions limited the increase of CO_2 emissions in 1997 to only 0.7%. This illustrates the great sensitivity of short-term variations in CO_2 emissions to the climatic conditions in the industrialised part of the world;

• Since 1990, CO_2 emissions have been increasing in almost all regions in the world, in some cases by more than 5% per year (Asia and Middle East), with the exception of former Centrally Planned Economies due to the substantial reduction of energy consumption observed in these countries since 1990;

• The European Union (-0.1% per year) was the best performer amongst industrialised regions. It benefited from energy efficiency and carbon intensity improvements as the climatic conditions of 1990 and 1997 were similar;

• CO_2 emissions per capita showed a reduction of 0.4% a year on average since 1990 at the world level and carbon intensity declined steadily, the main improvement being observed in industry (-18% since 1990) and the tertiary-domestic sector (-15%).

EUROPEAN UNION

SINCE 1995 CHANGES IN ENERGY CONSUMPTION WERE MAINLY RELATED TO CLIMATIC CONDITIONS

• In 1997, final energy demand declined by 0.8% mainly due to warmer weather conditions which led to a 12% decline in degree-days compared to 1996. This compensated for the increasing consumption induced in industry and transport by the sustained economic growth;

• Since 1995, after an apparent stabilisation of final energy demand between 1990 and 1994, major variations in energy consumption were related to climatic conditions: colder in 1995 and 1996, warmer in 1997;

• Gross inland consumption was 9.0% higher in 1998 than in 1990 (excluding the effects of EU expansion), while GDP showed 15.0% growth, indicating a 5.0% energy intensity improvement since 1990, or a fall of about 0.7% per year;

• Since 1994, industrial consumption of energy has grown at 1.6% per year on average while industrial production has increased by 2.0% on average. In 1997 energy demand increased by 0.6% and industrial production by 4.0% inducing an improvement of energy intensity by 3.3%. Significant differences exist between Member States and the greater improvements of energy intensity occurred with sustained industrial production growth;

• Transport energy demand grew at an average annual rate of 1.9% since 1990. In 1997, transport energy demand represented 31% of total energy demand compared with only 24.6% in 1985. Between 1990 and 1997 transport contributed 50% of the total increase of final energy demand, the balance arising from the tertiary-domestic sector. Since 1993 energy demand has grown more slowly than before and the energy intensity, measured against GDP, has diminished;

• Energy consumption in the domestic and tertiary sector increased by 0.5% annually on average since 1985 driven by the continual increase of specific uses (electrical appliances…) and living standards (central heating and house size). Year-to-year changes of energy demand in this sector continue to be strongly tied to the weather. In 1997, energy consumption slowed down by 3.5% after adjusting for the prevailing weather conditions.

FUEL SWITCHING IN FAVOUR OF GAS

• Natural gas demand increased by about 4.5% per year on average since 1990, demonstrating continuous growth. Increases were spectacular in the three main markets: +91% in the power sector, +31% for the tertiary-domestic sector and +17% in industry. But, in 1997, total consumption declined by 1.1% due to a fall of about 5% in the heating market caused by the warmer climatic conditions. In 1998, consumption increased again despite a relative stability of weather conditions. Resource availability, government energy and environmental policy and infrastructure development all favour increased use of natural gas;

• Due to the weather effect, oil consumption increased by only 0.2% in 1997 but grew by 3.8% in 1998. Since 1990, all the increase in oil product consumption, about 50 Mtoe, was concentrated on transportation fuel, including kerosene, and feedstock. Consequently the European oil market became increasingly captive to specific markets (transport and petrochemicals), together reaching 63% of total oil demand in 1997;

• Solid fuels steadily lost market share in all markets - even in the power sector, where consumption slowed down by 7% in 1997. Total solid fuel consumption is now 26% lower than in 1990;

• Electricity consumption continued to grow more rapidly than final demand, at about 1.8% per year on average since 1990. Electricity's share reached 28% in industry and 26% in the tertiary-

domestic sector although the development of new applications was compensated for by the introduction of more energy-efficient equipment when renewing obsolete appliances;

• Short-term trends demonstrated that nuclear accounted for most (about 50%) of the incremental power production followed by thermal (about 30%) and hydro (about 20%). But, in the near future, as the prospects for new nuclear and hydro capacity are strongly limited, incremental generation requirements will necessarily be met by thermal units with all the energy and environmental implications that this implies;

• The United Kingdom, followed by Sweden and Finland, initiated liberalisation of the electricity market in anticipation of the EU Directive of February 1999. The increasing liberalisation of gas and electricity markets will favour the use of gas in power generation, especially in combined cycle units (which accounted for about 50% of new investment since 1990) and in combined heat and power units.

INDIGENOUS PRODUCTION DECLINED SLOWLY IN 1997

• Domestic production of primary energy declined by 0.3% in 1997 after the peak registered in 1996;

• Oil production showed an average annual increase of 6.4% between 1990 and 1995, driven by the application of more efficient and economical methods for offshore exploitation, and reached a new peak in 1995. Since then the production has remained stable. The oil import dependency declined from 85% in 1990 to 80% in 1997;

• The recent increase in natural gas production was really impressive, with growth of 4.4% in 1995 and 13.2% in 1996. In 1997, confronted with declining European demand due to warmer weather conditions, the Netherlands played the role of swing producer by reducing gas production by about 12%. At the European level, gas production declined by 3.4%. Gas import dependency remained almost stable at 41%, despite the rapid increase of consumption since 1990;

• Solid fuels, which were declining faster and faster until 1995, with a reduction of about 34% between 1990 and 1995, experienced a reduced decline in the last two years. Solid fuel import dependency increased from 29% in 1990 to 44% in 1997;

• Thanks to an improving capacity utilisation rate - one of the best performances in the world - nuclear production grew faster than gross inland consumption, adding to energy self-sufficiency since 1990;

• In 1997, considering the spectacular jump by 12% that must still be statistically confirmed, the contribution of renewable energy sources represented 10.8% of total primary energy production and 5.8% of gross inland energy consumption;

• Total energy import dependency has remained unchanged at around 48% since 1990. The net import of energy represented 691 Mtoe in 1997, and increased by 1.0% per year on average since 1990.

ENERGY CONSUMER PRICES CONTINUED THE 1996 TRENDS

• Exceptionally cold weather conditions boosted oil prices on international markets in 1996 (+21% for crude oil), but prices stabilised at the 1996 level in 1997. Influenced by the effects of the Asian financial crisis, prices fell in 1998 (-34% for crude oil);

• Oil product prices on the EU market continued to increase slowly (4.1% for gasoline, 0.5% for diesel and 3.5% for heating gas oil) due to the effect of excises and taxes in price mechanisms, whilst industrial fuel oil prices remained stable;

• Though natural gas prices declined by 1.1% in industrial markets, they increased by 3.5% in the heating market slowing down its competitiveness. Electricity prices, as a result of increasing competition between producers, declined by 3.2% in both industrial and domestic markets;

• Compared to the prices of the main competitors inside OECD, European energy prices for industry cannot compete with those of the United States, with price differences of between 28% to 36%. This price comparison was, and remains, even more unfavourable compared to non-OECD regions.

ENERGY INTENSITY IMPROVED BY 0.6% PER YEAR SINCE 1990

• Overall energy intensity improved by 0.6% per year on average between 1990 and 1997, being favourably influenced by the 2.9% improvement in 1997. The comparison between 1990 and 1997 is particularly pertinent as these two years were characterised by similar weather conditions;

• Indeed, intensity improvements in industry since 1990 (-1.7% per year on average) and power generation (-0.6% per year on average) were the main drivers in reducing the overall energy intensity. Technological improvements are increasingly becoming the driving force for energy saving in both industry and the power sector;

• On the other hand, the energy intensity of the tertiary-domestic sector has remained stable since 1990. The increasing commercial and services floor area and the growing number of households, combined with the reduction in market incentives to use energy efficiently, together offset all the gains provided by technological improvements;

• Although energy intensity of the transport sector still increased by 0.3% per year on average in the period 1990-97, the first signs of stabilisation appeared in 1993. This resulted in a reduction in intensity of 0.8% per year on average over the period 1993-1997.

Initial analysis suggests this improvement can be associated with the improved efficiency of new vehicles, in particular passenger cars, and better management of traffic flows for goods transportation.

CO_2 EMISSIONS IN 1997 WERE 1% BELOW THE 1990 LEVEL

- With weather conditions returning in 1997 to their 1990 level, CO_2 emissions declined substantially (-2.6%) to reach a level below that of 1990. In the period 1990-97, CO_2 emissions decreased by 0.1% per year on average. This resulted from three main factors: the continuous improvement of technologies reducing specific energy consumption; the increasing contribution of non-fossil fuels, mainly nuclear together with some wind energy and biomass; and greater penetration of natural gas both for power generation and in final markets in substitution of solid fuels and oil products;
- Within the final demand sectors, transport was the only one with steadily increasing emissions since 1990 (+1.9% per year on average). The contribution of this sector to total CO_2 emissions grew from 24% in 1990 to 28% in 1997. The tertiary-domestic sector stabilised its emissions whilst industry experienced the greatest fall in CO_2 emissions since 1990 (-1.6% per year on average). Power generation remained the largest sector in term of emissions, although they fell by as much as 1% per year on average since 1990;
- Since 1990 per capita CO_2 emissions have shown a reduction of 0.5% per year on average. The CO_2 emitted per unit of GDP demonstrated a more sustained reduction as it declined by about 1.7% per year on average. These trends were favoured by the fact that the carbon intensity also declined by 1.1% per year on average, thanks to the conversion from oil and solid fuels to natural gas and increasing consumption of CO_2-free energies.

SHORT-TERM ENERGY OUTLOOK FOR THE EUROPEAN UNION

- By combining the forecast growth of the European economy and the return to long-term average temperatures, the result is a projected total primary energy demand growth of 1.3% on average between 1999 and 2001;
- Gross inland energy consumption will increase by about 55 Mtoe until 2001. Although oil's contribution will slowly increase, by 12.5 Mtoe, solid consumption will show a 25 Mtoe reduction while natural gas consumption will increase by 56 Mtoe, with nuclear and renewable energies covering the difference;
- Improvement of energy efficiencies, mainly in the power sector, associated with an increasing consumption of natural gas, diminishing the carbon intensity, will stabilise CO_2 emissions in the year 2001 at just above their 1990 level;
- The climatic conditions considered in the forecast are clearly one of the most sensitive variables. If the weather conditions replicate in 2000 the warmer years experienced since 1990, CO_2 emissions will be 2% lower than in 1990. On the other hand, a repeat of the colder climatic conditions observed since 1990 will result in an increase by 2% of CO_2 emissions in 2000 compared to their 1990 level. Finally, compared with short-term (10 years) average degree-days, CO_2 emissions will be 0.6% lower in 2000 than in 1990.

The World is divided into the following regions:

EUROPEAN UNION

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom;

EFTA

Iceland, Norway and Switzerland;

NAFTA

Canada, Mexico and the United States of America;

OECD PACIFIC

Australia, Japan and New Zealand;

OTHER OECD COUNTRIES

Include EFTA, NAFTA, OECD Pacific regions and Turkey;

Rem : The new members (Czech Republic, Hungary, Poland and South Korea) are still considered in their original region to respect the coherence of the analysis;

CENTRAL AND EASTERN EUROPE

Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and former Yugoslavia;

BALTIC STATES

Estonia, Latvia and Lithuania;

CIS

Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan;

AFRICA

North Africa (Algeria, Egypt, Libya, Morocco and Tunisia) and Sub-Saharian Africa including all other African countries;

MIDDLE EAST

Bahrain, Israel, Iran, Iraq, Lebanon, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen;

ASIA

China, Newly Industrialising Economies (Hong Kong, Singapore, South Korea and Taiwan) and all other Asian countries not included elsewhere and the Pacific islands;

LATIN AMERICA

Brazil, Venezuela and all other Central and South American countries.

Data cover the period from 1980 to 1996 for the OECD Countries and up to 1995 for all non-OECD Countries.
Data for 1996 in non-OECD Countries are shown wherever provisional figures were available.
The STEO covers the period from the first Quarter 1998 to the fourth Quarter of 2000.

FOLLOWING SOURCES ARE USED:

ENERGY DATA

- Statistical Office of the European Communities (SOEC) for EU statistics;
- International Energy Agency (IEA) for OECD statistics (non-EU countries), non-OECD statistics.
- PlanEcon for additional energy statistics on CEI and CEEC.
- Olade for additional energy statistics on Latin America.
- United Nations for biomass and generating capacities statistics.
- ESAP (Belgium) for generating capacities.
- Energy Information Administration, US Department of energy for provisional data for 1997 in non-OECD countries
- BP Statistical Review of World Energy for provisional data for 1997 in non-OECD countries;

PRICE DATA

- IEA for all average price fuels in the European Union's countries
- European Commission Directorate General for Energy for oil price statistics;

MACROECONOMIC AND POPULATION DATA

- Eurostat for European Union
- United Nations, World Bank, IMF and Planecon for the rest of the world.

Data for non-OECD Countries should be used with caution. Comparisons between series of absolute values are only indicative.

We call the reader's attention to the fact that data for the STEO are based on monthly statistics while all other data are based on annual balance sheets; The difference between monthly and annual series may sometimes be significant;

The editor is pleased to acknowledge the support and contribution of the International Energy Agency. The IEA, an autonomous body within the framework of the Organisation for Economic Cooperation and Development, provides a large share of the statistics presented here – for OECD Member countries other than the European Union and for non-Members throughout the world.

A FEW WORDS ON METHODOLOGY AND DEFINITIONS ARE NECESSARY.

GENERAL

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

• **Biomass** data for OECD Countries (excluding European Union 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 and UN data under the designation of "Vegetal Fuels". These data have been deeply revised for the present edition. In the case of the European Union see below.

• **Primary heat** (geothermal energy) 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 case of the European Union see below.

• In the **World Summary Energy Balance, gross energy consumption** corresponds to the total primary energy consumed including quantities delivered to marine bunkers. **Total final energy consumption** (TFEC) does not include any quantities used for non-energy purposes.

• **Energy intensity** is defined as the ratio of energy consumption to an economic activity indicator. In the case of total energy intensity, the ratio is between the Gross Inland Consumption and GDP.

• **CO_2 emissions** are given only on an indicative basis and were calculated using common emission factors across all countries. At world level, CO_2 emissions resulting from bunker fuels were included in the tables similarly to those resulting from fuels sold to airline transport.

EUROPEAN UNION

• The SOEC energy balance now available includes additional information on **renewable energy sources** (biomass, solar, wind and geothermal). The data related to renewable energy sources are available since 1985. This limits the analysis for Member States to the period 1985-1995 to ensure consistency in the times series.

• Data for **Germany** include both the former West Germany and the former German Democratic Republic.

More detailed definitions are shown in SOEC and IEA publications.

ADDITIONAL INFORMATION ABOUT THE PRINCIPAL SOURCES

The mission of the Energy Unit of Eurostat is to provide the European Union with a high-quality statistical service in the field of energy. In particular, the actions implemented by the Unit aim to:

1. Provide the European Commission with the harmonised, reliable and relevant statistical information needed to define, implement, follow and evaluate the Commission policies in the energy sector.

2. Provide the EU institutions, national administrations, enterprises, professional associations and EU citizens with high quality statistical services and products in the field of energy.

3. Improve the national statistical systems of the Member States in the field of energy.

4. Assist Candidate Countries in developing and harmonising their national statistical systems in accordance with EU standards in the field of energy statistics.

Eurostat collects statistics on energy from the Member States and the Candidate Countries. Statistics of the flows of energy commodities are collected on an annual and monthly basis. Price statistics are also collected. These statistics are available in both paper and electronic formats from the Eurostat Data Shops.

The results of specific projects implemented within the Member States (renewables, co-generation, energy efficiency, energy consumption in households/services) and the Candidate Countries are also available from the Eurostat Data Shops.

For further information contact the Eurostat Data Shop network or visit us on the Internet (http://europa.eu.int/eurostat.html).

The IEA's Energy Statistics Division gathers basic energy data from national administrations, from international and regional organisations and from an extensive network of industry officials, experts and consultants. Data from more than 140 countries and regions are published in Energy Statistics of OECD Countries and Energy Statistics of non-OECD Countries, and in Energy Balances for both OECD and non-OECD countries. The IEA also publishes yearly compendia of statistics on coal, natural gas, oil and electricity, and a book on worldwide CO2 emissions.

Most IEA data are available on diskettes or CD-ROM or over the Internet. For more information, call the IEA's Energy Statistics Division at (33) 1 40 57 66 25 or fax to (33) 1 40 57 66 49. The IEA's World Wide Web site is at http://www.iea.org

PART I WORLD

WORLD: Major trends (1980-1997)

- Total gross energy consumption growth fell to 1.1% in 1997 after the rebound registered in 1995 and 1996
- Final energy consumption, driven by transport and domestic sectors, has increased by 1.3% annually since 1980
- World primary energy production marked by a 28% reduction in CIS since 1990
- World energy production still dominated by oil, representing 37% of energy production in 1997
- NAFTA region contributed 24% of world primary energy production
- Market share of OPEC increased from 1990 to meet 41% of world oil production in 1997
- Stabilisation of oil prices resulting from sustained demand in developing countries
- Gas production, marked by the fall in CIS production in the early 90s, increased by only 0.2% in 1997
- Lack of infrastructure is the major barrier to increased gas consumption
- Solid production, driven by the United States and China, accounted for 24% of world energy supply
- Prospects for an increasing nuclear contribution, which fell for the first time in 1997, are dimming
- Asia accounted for 55% of world biomass production
- Electricity's share in final energy consumption increased by one third since 1980
- World power market characterised by privatisation, integration and foreign investment
- Power production remained largely dominated by thermal production even though its share declined slowly
- Inputs for electricity generation increasingly dominated by solid fuels
- Refinery capacities have increased only in non-OECD region since 1985
- World GDP growth accelerated since 1994, driven by the developing regions
- World energy consumption per capita stable but Asia grew by 52% since 1980
- World energy intensity improved on average by 0.9% per year since 1980
- World CO_2 emissions grew by 8% since 1990
- The contribution of CO_2 emissions from power generation increased from 28% in 1980 to 34% in 1996
- The OECD absorbed about 80% of world interregional exchanges of energy

ENERGY OUTLOOK

Total gross energy consumption growth fell to 1.1% in 1997 after the rebound registered in 1995 and 1996…

Total **gross energy consumption** in the world as a whole increased by about 1.6% per year from 1980 to 1997, but by only 1.4% annually since 1990. The developments in the period are characterised by a faster growth in the non-OECD area during the 1980's (2.9% per year against 0.9% per year in the OECD) driven by the Middle East (+5.9% per year on average), Asia (+4.2%) and Africa (3.4%). However, while the OECD area continued to increase its energy needs by 1.5% per year on average since 1990, the non-OECD world had a slower growth in demand limited to 1.3% annually. This drop in the non-OECD demand resulted from the significant decreases in Central and Eastern Europe (-2% per year on average) and the former USSR (-5.4% per year on average) which was just about compensated by the buoyant demand in the Middle East (+4.8% per year on average), Asia (+4.5%) and Latin America (+3.6%). As a consequence of the stabilisation of consumption since 1994 in CEEC and CIS considered as a whole, world energy consumption rebounded in 1995 and 1996 to reach a growth of about 2.7% per year, contrasting with a limited increase by only 0.7% between 1990 and 1994. In 1997 the increase was limited to only 1.2% despite growth of the world economy by 3.3%. This resulted from the favourable climatic conditions in the western hemisphere and from the impacts of the financial crisis that affected South East Asia, major countries in Latin America and CIS but with a rebound effect on Central and Eastern countries.

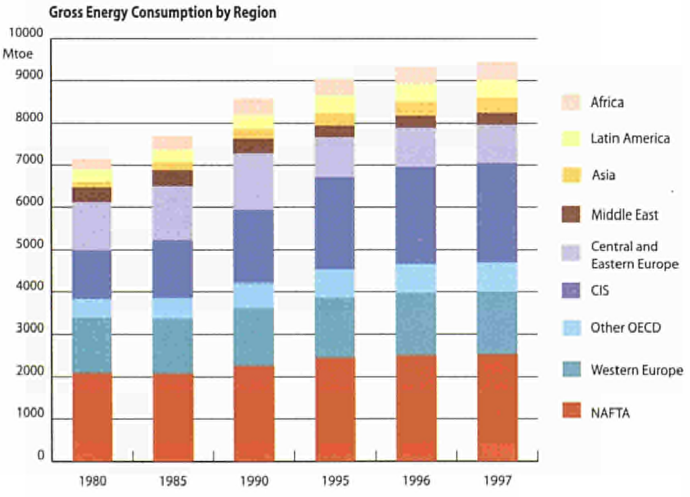
Structurally, the weight of Asia has increased substantially since 1980 to represent 24.5% of world consumption in 1997 against only 15.8% in 1980. On the other hand, the share of CIS declined from 15.6% to 9.5%, and of Central and Eastern Europe from 4.9% to 3.0%; while the contribution of OECD as a whole to world energy consumption decreased from 52.9% in 1980 to 49.1% in 1997.

The future evolution of gross energy consumption will be heavily influenced by the restructuring of eastern economies that will lead to the resumption of industrial growth and of these economies as a whole with, as a consequence, increasing consumption of energy. On the other hand, the economic crisis in East Asia which began in the summer of 1997 and continued to deepen into the winter of 1998 with some extensions to Latin America and CIS, will certainly, in the short term, affect GDP and energy consumption growth in Asia, the most buoyant region over the last fifteen years. The preliminary estimate for 1998 indicated that world gross energy consumption will remain constant overall, but with a marked reduction in Central and Eastern Countries, Asia and OECD Pacific region. These recent economic events highlight the uncertainties attached to economic growth both in the short and long term.

TOTAL GROSS ENERGY CONSUMPTION : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	7273.2	7795.1	8534.1	8686.1	9178.2	9470.3	9579.4	1.4%	2.2%	1.1%	3.2%	1.2%
Bunkers	109.0	94.7	104.1	117.6	127.1	129.3	131.9	-2.8%	4.4%	1.6%	1.7%	2.1%
Western Europe	1282.0	1285.9	1338.2	1362.7	1413.5	1462.6	1459.7	0.1%	1.2%	0.7%	3.5%	-0.2%
European Union	1240.8	1240.8	1291.9	1314.2	1362.6	1411.1	1406.9	0.0%	1.2%	0.7%	3.6%	-0.3%
EFTA	41.2	45.1	46.3	48.6	50.9	51.5	52.8	1.9%	1.5%	0.9%	1.3%	2.4%
Rest of OECD	2565.2	2577.8	2800.3	2852.2	3123.6	3207.4	3246.2	0.1%	2.0%	1.8%	2.7%	1.2%
NAFTA	2103.6	2086.5	2259.8	2259.6	2454.4	2511.9	2541.7	-0.2%	1.6%	1.7%	2.3%	1.2%
OECD Pacific	430.4	452.4	493.8	540.1	607.0	627.8	633.2	1.0%	3.6%	2.4%	3.4%	0.9%
Central and Eastern Europe	354.2	370.5	381.3	333.4	279.7	293.9	289.5	0.9%	-2.1%	-3.5%	5.1%	-1.5%
CIS (1)	1131.9	1272.4	1389.1	1347.8	955.7	932.9	911.1	2.4%	1.2%	-6.6%	-2.4%	-2.3%
Africa	260.2	321.6	356.7	363.8	407.6	412.7	425.2	4.3%	2.5%	2.3%	1.2%	3.0%
Middle East	133.5	191.3	228.6	237.2	295.6	315.8	329.3	7.5%	4.4%	4.5%	6.8%	4.3%
Asia	1148.4	1378.3	1601.0	1732.2	2174.5	2291.8	2350.7	3.7%	4.7%	4.7%	5.4%	2.6%
Latin America	288.8	302.4	334.9	339.1	400.9	423.9	435.8	0.9%	2.3%	3.4%	5.7%	2.8%
of which (%)												
European Union	17.1	15.9	15.1	15.1	14.8	14.9	14.7	-1.4%	-1.0%	-0.4%	0.4%	-1.4%
OECD	52.9	49.6	48.5	48.5	49.4	49.3	49.1	-1.3%	-0.4%	0.4%	-0.2%	-0.4%

(1) Including Baltic countries for statistical reasons



Final energy consumption, driven by transport and domestic sectors, increased by 1.3% annually since 1980…

The **final energy consumption** by sector was very varied. Energy consumption for transport, still the minor contributor, has increased regularly since 1980 by about 2% per annum in the OECD region and 2.3% in the non-OECD region as a whole, the share of OECD still achieving about 69% in 1996. Since 1990 major developments occurred in Asia (+7.6% per year on average), the Middle East (+6.7%) and Latin America (+5.1%). The near future will be marked by two majors elements: the increasing contribution of transport in final energy demand (from 22.2% in 1980 to 25.1% in 1996); and the very sustained growth in emerging regions where the potential for development remained enormous with an average energy consumption per inhabitant ranging from 58 kgoe in Africa to 71 kgoe in Asia and 242 kgoe in Latin America, compared to 1076 kgoe for the OECD as a whole and a maximum of 1650 kgoe in the NAFTA region. Energy consumption by the tertiary and domestic sector depends heavily on climatic conditions. It increased on average by 1.8% since 1980 with a contrasted evolution between the OECD region (+1.1% per year on average) and the non-OECD region (+2.2% per year) due to increasing living standards and growing urbanisation in emerging regions. As a consequence, the share of the OECD region declined from 44% in 1980 to 40% in 1996. Nevertheless this evolution was not uniform. Between 1990 and 1996, substantially warmer in the Western Hemisphere, energy consumption by the tertiary-domestic sector increased faster in the OECD region (2.3% per year on average) than in the rest of the world (+1.8%). Energy consumption by industry was only 2.6% higher in 1996 than in 1980 and still 3.3% below the peak reached in 1988. Even if this is the consequence of the sharp decline in Eastern Countries, the long-term evolution reflects all the efforts made by industrialists to reduce specific energy consumption per unit produced. Although consumption declined in the OECD region by 0.9% on average per year since 1980, it grew by 0.9% in non-OECD regions. The latter increased its share from 52% in 1980 to 60% in 1996. The growth was spectacular in Asia, driven by China and South East Asia, reaching 4.4% per year on average since 1980. In 1996, Asia, excluding Japan and New Zealand, absorbed 33% of world energy consumption by industry. As a result of this, it is clear that the evolution in non-OECD regions will be the leading force for the future.

TOTAL ENERGY CONSUMPTION BY INDUSTRY : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	1919.4	1907.6	2036.9	1983.2	1937.3	1969.3	na	-0.1%	0.8%	-0.5%	1.7%	na
Western Europe	321.4	275.4	278.7	274.7	268.7	271.3	272.9	-3.0%	-0.1%	-0.4%	0.9%	0.6%
European Union	310.7	264.1	268.5	264.9	258.4	261.1	262.6	-3.2%	0.1%	-0.5%	1.0%	0.6%
EFTA	10.7	11.3	10.2	9.9	10.3	10.2	10.3	1.0%	-2.7%	0.9%	-1.3%	1.8%
Rest of OECD	583.6	541.1	566.1	509.6	519.4	526.3	531.0	-1.5%	-1.2%	0.4%	1.3%	0.9%
NAFTA	465.3	423.1	442.8	378.6	383.0	385.7	388.3	-1.9%	-2.2%	0.2%	0.7%	0.7%
OECD Pacific	111.8	110.4	113.9	120.2	124.2	125.9	126.8	-0.2%	1.7%	0.7%	1.3%	0.7%
Central and Eastern Europe	123.9	119.8	111.1	98.2	68.8	70.5	na	-0.7%	-3.9%	-6.9%	2.4%	na
CIS (1)	399.7	386.1	413.5	413.5	233.7	226.5	na	-0.7%	1.4%	-10.8%	-3.1%	na
Africa	49.4	52.3	56.2	56.9	54.1	55.4	na	1.2%	1.7%	-1.0%	2.3%	na
Middle East	35.4	39.0	38.3	26.0	44.8	49.1	na	2.0%	-7.8%	11.5%	9.6%	na
Asia	328.2	410.6	482.1	514.1	638.7	658.9	na	4.6%	4.6%	4.4%	3.2%	na
Latin America	77.8	83.3	90.7	90.1	108.9	111.5	na	1.4%	1.6%	3.9%	2.3%	na
of which (%)												
European Union	16.2	13.8	13.2	13.4	13.3	13.3	na	-3.1%	-0.7%	0.0%	-0.6%	na
OECD	47.2	42.8	41.5	39.6	40.7	40.5	na	-1.9%	-1.6%	0.6%	-0.5%	na

TOTAL ENERGY CONSUMPTION BY TRANSPORT : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	1132.2	1211.4	1358.9	1408.3	1526.6	1572.9	na	1.4%	3.1%	1.6%	3.0%	na
Western Europe	197.1	211.7	244.8	264.6	286.8	294.7	300.4	1.4%	4.6%	1.6%	2.8%	1.9%
European Union	189.2	202.8	234.7	253.8	275.7	283.3	288.6	1.4%	4.6%	1.7%	2.8%	1.9%
EFTA	7.8	8.9	10.1	10.8	11.1	11.5	11.7	2.5%	4.0%	0.6%	2.8%	2.4%
Rest of OECD	583.5	602.2	669.4	687.8	757.8	776.2	792.4	0.6%	2.7%	2.0%	2.4%	2.1%
NAFTA	502.2	515.5	570.2	577.8	629.3	642.7	656.9	0.5%	2.3%	1.7%	2.1%	2.2%
OECD Pacific	75.7	80.1	90.4	100.5	116.3	120.5	123.3	1.1%	4.7%	3.0%	3.6%	2.3%
Central and Eastern Europe	25.4	23.9	26.9	28.0	23.2	26.8	na	-1.2%	3.2%	-3.7%	15.2%	na
CIS (1)	123.8	134.1	144.6	139.9	67.6	62.0	na	1.6%	0.9%	-13.5%	-8.2%	na
Africa	30.6	35.4	37.0	37.1	40.7	41.8	na	3.0%	0.9%	1.9%	2.7%	na
Middle East	30.1	42.1	44.8	41.1	59.4	60.8	na	7.0%	-0.5%	7.6%	2.4%	na
Asia	77.8	99.5	122.7	139.7	200.4	216.2	na	5.0%	7.0%	7.5%	7.9%	na
Latin America	63.8	62.5	68.5	70.0	90.7	94.3	na	-0.4%	2.3%	5.3%	4.0%	na
of which (%)												
European Union	16.7	16.7	17.3	18.0	18.1	18.0	na	0.0%	1.5%	0.0%	-0.3%	na
OECD	68.9	67.2	67.3	67.6	68.4	68.1	na	-0.5%	0.1%	0.2%	-0.5%	na

TOTAL ENERGY CONSUMPTION BY TERTIARY-DOMESTIC SECTOR : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	2045.3	2236.8	2394.1	2406.1	2609.9	2709.5	na	1.8%	1.5%	1.6%	3.8%	na
Western Europe	359.3	370.6	365.2	358.8	381.8	410.8	396.1	0.6%	-0.6%	1.2%	7.6%	-3.6%
European Union	344.9	355.0	349.2	342.6	364.7	392.9	379.0	0.6%	-0.7%	1.3%	7.7%	-3.5%
EFTA	14.4	15.5	16.0	16.2	17.1	17.9	17.0	1.5%	0.9%	1.1%	4.7%	-4.8%
Rest of OECD	549.1	564.8	607.4	593.9	653.0	679.5	670.9	0.6%	1.0%	1.9%	4.0%	-1.3%
NAFTA	464.7	467.0	496.0	476.7	516.6	539.7	530.6	0.1%	0.4%	1.6%	4.5%	-1.7%
OECD Pacific	70.9	82.6	94.2	100.3	117.0	119.7	119.2	3.1%	3.9%	3.1%	2.3%	-0.4%
Central and Eastern Europe	98.7	101.5	105.6	88.7	77.2	81.4	na	0.6%	-2.7%	-2.7%	5.4%	na
CIS (1)	266.2	318.9	339.7	338.6	363.4	358.6	na	3.7%	1.2%	1.4%	-1.3%	na
Africa	122.6	140.8	153.3	161.7	188.1	191.1	na	2.8%	2.8%	3.1%	1.6%	na
Middle East	22.4	37.4	58.8	76.8	83.9	89.0	na	10.8%	15.5%	1.8%	6.1%	na
Asia	554.7	628.4	684.9	706.6	770.9	804.9	na	2.5%	2.4%	1.8%	4.4%	na
Latin America	72.4	74.6	79.2	81.0	91.5	94.3	na	0.6%	1.7%	2.5%	3.0%	na
of which (%)												
European Union	16.9	15.9	14.6	14.2	14.0	14.5	na	-1.2%	-2.1%	-0.4%	3.8%	na
OECD	44.4	41.8	40.6	39.6	39.7	40.2	na	-1.2%	-1.1%	0.0%	1.5%	na

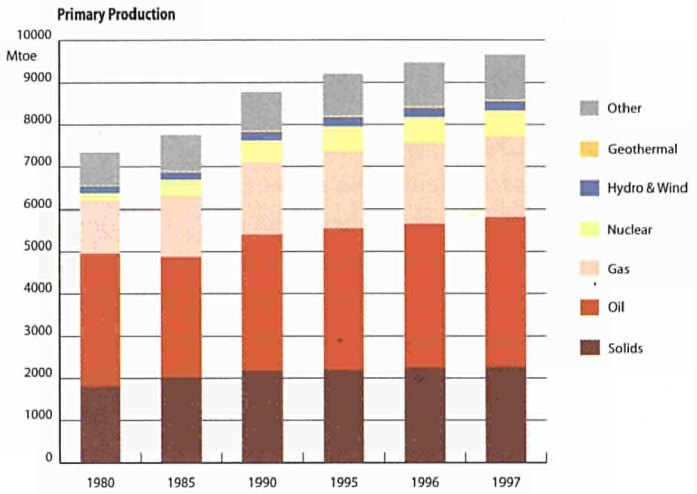
(1) Including Baltic countries for statistical reasons

Main items

In recent years, the vision of many citizens, analysts and policy makers has shifted increasingly to the global level. This change in focus has reflected much improved global communication and transportation; greater economic interdependence via trade and overseas direct investment; and, perhaps above all, the growing recognition of the many man-made impacts which are influencing the natural environment. Huge inequalities remain. For many millions of people the vision is much more limited: for them survival remains the dominant imperative given inadequate access to basic essentials such as food, water and shelter. One-third of the global population still has no access to the commercial energy supplies seen as a fundamental necessity by the more fortunate. Despite recent financial crises in some regions, continued economic growth is leading to a steady rise in global energy consumption - particularly in the developing countries. Energy use in central and eastern Europe has fallen as these regions adjust their economies through a difficult process of market reforms and structural change. Particularly rapid growth in electricity demand and transport is a feature of most regions, reflecting rising standards of living and higher consumer aspirations. World energy use remains heavily dependent (some 82%) upon the major fossil fuels, with the carbon-free sources - renewables and nuclear power - satisfying the balance. Whilst there is growing recognition of the need to reduce global reliance upon fossil fuels, the shift away from this heavy dependence will take very many decades. Nevertheless, as the Kyoto Protocol and other similar international agreements reveal, there is now clear evidence that concern with sustainability is achieving greater prominence in both public attitudes and policy responses.

World primary energy production marked by a 27% reduction in CIS since 1990…

World **primary energy production** (equivalent to gross energy consumption aside from some stock variations and statistical errors) increased from 1980 to 1997 by about 1.6% per year, with a contrasted evolution in the 1990's. Growth was limited to 0.6% per annum for the first four years but jumped by 2.3% per year on average since then. The most recent evolution is marked by the impressive reduction of energy production in CIS (-456 Mtoe or a reduction by 28% between 1990 and 1997) and CEEC (-26 Mtoe or a reduction by 11%) compensated by increases in all other regions of the world, mainly in Asia (+420 Mtoe or +25%), the Middle East (+246 Mtoe or +26%), Latin America (+173 Mtoe or +43%), NAFTA (+153 Mtoe or +7%), Africa (+132 Mtoe or +20%) and EFTA (+94 Mtoe or +72%).



World energy production still dominated by oil, representing 37% of total energy production in 1997…

In 1997, oil was still the most important fuel with 37% of world primary energy production (43% in 1980). Its production and consumption, however, grew three times slower than total energy since 1980 even though they have accelerated significantly since 1995. The second most important fuel remained solid fuels which kept a share of about one-quarter, slowly declining since 1985 and losing about 1% market share every five years. Natural gas ranks third in meeting world needs with 20% in 1997 (17% in 1980). Gas experienced accelerating growth since 1980, excluding a relative slowdown between 1990 and 1995 due to the particular economic situation in the CIS where gas production was reduced by 18% since 1990. Renewable energy sources (hydro, geothermal, biomass and wind) come fourth in satisfying world energy consumption with almost 13% in 1997, as in 1980, growing globally at the same rate as total primary energy. Finally, nuclear energy grew the fastest in the period, mainly up to 1988 (13% per year). Its rate of growth has slowed down progressively since then and, for the first time since 1980, nuclear production diminished in 1997.

Between 1980 and 1997, OECD and non-OECD areas had approximately the same growth in total energy production (about 1.6% per year), but the evolution was slightly different over time and by regions. While between 1986 and 1990 the non-OECD world increased its production about three times faster than the OECD, on the contrary, between 1990 and 1995, primary energy production increased twice as fast in the OECD region as in the non-OECD area.

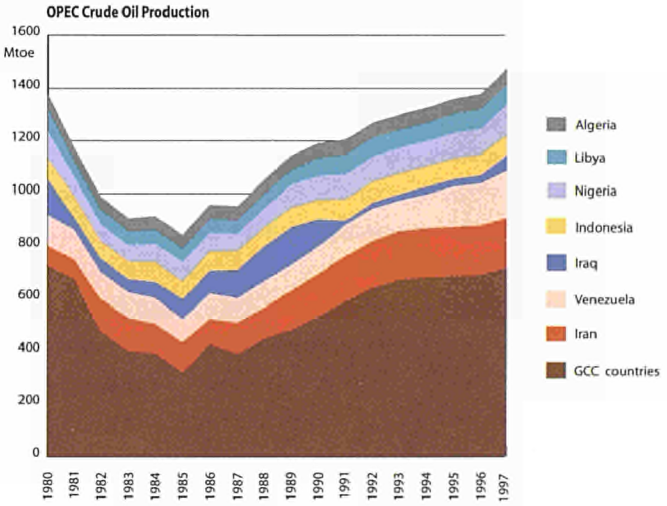
TOTAL PRIMARY ENERGY PRODUCTION : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	7353.7	7767.8	8520.1	8775.6	9213.2	9466.7	9646.1	1.1%	2.5%	1.0%	2.8%	1.9%
Western Europe	671.9	818.7	845.9	834.5	932.9	984.1	986.6	4.0%	0.4%	2.3%	5.5%	0.3%
European Union	608.3	735.2	740.5	703.3	738.2	763.6	761.5	3.9%	-0.9%	1.0%	3.4%	-0.3%
EFTA	63.6	83.4	105.4	131.2	194.7	220.5	225.1	5.6%	9.5%	8.2%	13.2%	2.1%
Rest of OECD	2066.3	2229.1	2325.1	2388.1	2539.3	2590.1	2617.5	1.5%	1.4%	1.2%	2.0%	1.1%
NAFTA	1910.0	2005.5	2081.5	2117.5	2215.0	2257.7	2269.6	1.0%	1.1%	0.9%	1.9%	0.5%
OECD Pacific	139.1	201.9	219.1	244.9	298.2	305.7	320.3	7.7%	3.9%	4.0%	2.5%	4.8%
Central and Eastern Europe	268.2	287.1	288.8	237.5	212.4	215.9	210.9	1.4%	-3.7%	-2.2%	1.7%	-2.3%
CIS (1)	1357.8	1512.9	1677.0	1624.6	1194.8	1198.0	1167.9	2.2%	1.4%	-6.0%	0.3%	-2.5%
Africa	532.2	566.2	606.6	661.6	722.7	748.9	793.9	1.2%	3.2%	1.8%	3.6%	6.0%
Middle East	999.8	599.0	835.7	949.7	1107.7	1127.3	1196.3	-9.7%	9.7%	3.1%	1.8%	6.1%
Asia	1137.5	1404.0	1556.6	1675.8	1989.9	2063.1	2096.0	4.3%	3.6%	3.5%	3.7%	1.6%
Latin America	319.9	350.8	384.4	403.8	513.5	539.4	577.0	1.9%	2.9%	4.9%	5.0%	7.0%
of which (%)												
European Union	8.3	9.5	8.7	8.0	8.0	8.1	7.9	2.7%	-3.3%	0.0%	0.7%	-2.1%
OECD	37.2	39.2	37.2	36.7	37.7	37.8	37.4	1.1%	-1.3%	0.5%	0.2%	-1.0%

(1) Including Baltic countries for statistical reasons

NAFTA region contributed 24% of world primary energy production...

In 1997, to cover the requirements, energy production increased by 1.9%. The production continued to decline in CIS and CEEC to be close to 14% of world production in 1997 against 22% in 1980. On the other hand, sustained growth was observed in Latin America, the Middle East, Africa and OECD Pacific. In 1997 the European Union's production slowed down by 0.3% following the trend of gross inland consumption marked by warm weather conditions. The main contributor to energy production in 1997 remained the NAFTA region with about 24% of total world primary energy production (26% in 1980), followed by Asia with 22% (15% in 1980), the Middle East with 12% (14% in 1980), the CIS with 12% (18% in 1980) and Western Europe with 10% (9% in 1980).



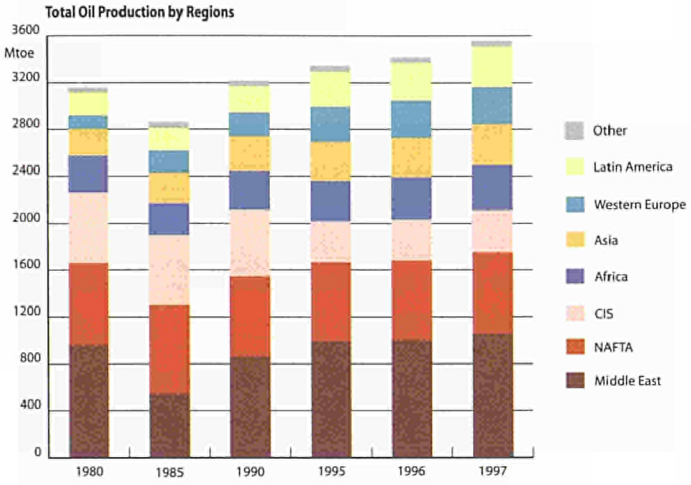
Market share of OPEC increased from 1990 to meet 41% of world oil production in 1997...

Oil remains the dominant fuel in world production and consumption although, as stated above, it has lost share in total energy production despite a sustained growth in 1996 (+2.2%) and 1997 (+4.1%). OPEC as a whole remains the major oil producer, but its weight in total world oil production fell from 44% in 1980 (54% in 1973) to 41% in 1997, with a minimum share of 29% in 1985. Since 1990, the share of Western Europe has sharply increased (from 6% in 1990 to 9% in 1997) driven by rising North Sea production. Since 1990 production losses in CIS and Eastern countries, (about 214 Mtoe), have been compensated mainly by the Middle East (+199 Mtoe), Latin America (+121 Mtoe) and Western Europe (+118 Mtoe), although the NAFTA region, the second world producer, remained stable.

Some key supply developments in 1997 included[1] :

- While the economies of developing Asian countries are currently experiencing a downturn, it is not expected to last long. The mid- to long-term trend appears to be for continued economic growth with resultant increases in oil demand. Oil consumption in developing countries of Asia is projected to grow by 3.8% per year to about 730 Mtoe in 2000;

[1] International Energy Outlook 1998, Energy Information Administration, US Department of Energy, 1998.



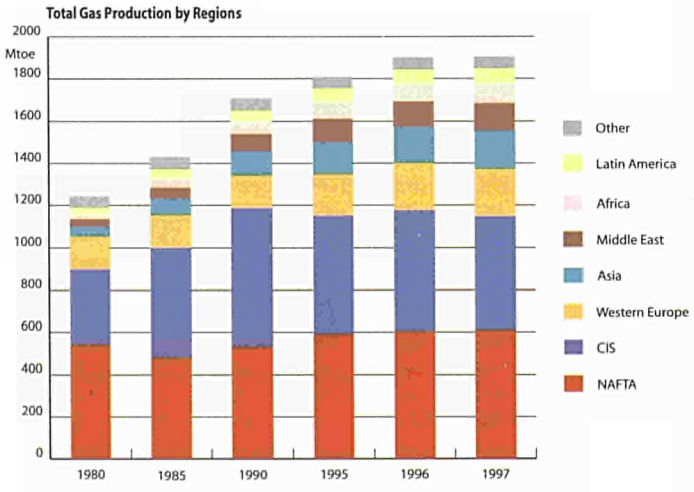
- Enhanced sub-sea technologies continue to contribute to significant optimism about the long-term potential for offshore oil production. The focus on offshore activity by major oil companies has led to record levels of demand for equipment capable of operating in water depths up to 10,000 feet. Vast areas of offshore West Africa are now considered to be promising sites for future development;
- There is enormous potential for oil production from the Caspian Basin. Estimates mention over 200 billion barrels in the Caspian Basin. Only the United States and Saudi Arabia are thought to have larger ultimately recoverable conventional oil resources. Currently, Caspian oil is only able to flow though pipelines into Russia in relatively small quantities. By the end of this decade, several pipeline routes to the Black Sea are expected to become operational;
- OPEC has increased its output quota from 25 to 27.5 million barrels per day. The new quota more closely tracks production levels already achieved in 1997;
- OPEC members outside the Persian Gulf region are expected to improve their market share over the next decade. There is significant potential for offshore oil production in Nigeria, as well as aggressive plans to expand the oil production capacity of Venezuela;
- European oil production progressively reached a peak. Led by increased production in Norway, overall production in North Sea areas rose by only 0.3% in 1997;
- Prospects for increased production both in North Africa (Libya, Egypt and Algeria) and equatorial Africa (Nigeria and Angola) brightened;
- In South America notable gains in production have been achieved by Argentina, Venezuela, Colombia and Brazil through agreements with foreign investors to revitalise production from existing oil fields;
- In North America major progress in the deep offshore Gulf of Mexico and offshore Eastern Canada continued.

Stabilisation of oil prices resulting from sustained demand in developing countries…

Perhaps the most surprising development in world oil markets was the stability of prices compared to the high level reached in 1996. Early in 1996 most analysts were expecting that the resumption of Iraqi oil exports would lead to price weakness throughout the year. However, the resumption was delayed until the end of the year, inducing an increase of more than 500,000 barrels per day in aggregate OPEC supply, largely due to the exceptionally cold weather in Europe and the North America. Consequently, oil prices at the end of 1996 were nearly 40% higher than a year earlier. On the other hand, 1997 was characterised by warm weather in the Western Hemisphere. This weakened demand in Western Europe and OECD Pacific. But it remained globally strong in all developing countries, including CIS. Consequently, world oil demand increased by 2.5% in 1997, a little lower than in 1996, but somewhat higher than during 1990-1995.

Gas production, marked in the early 90's by the fall in CIS production, increased by only 0.2% in 1997…

Amongst the fossil fuels, natural gas production showed the major increase between 1980 and 1990 with a total gain of 35%. But since 1990, production increased by only 13% following the 19% reduction observed between 1990 and 1995 in the CIS production, the second world producer. The share of natural gas in world energy production grew from 17% in 1980 to 20% in 1990, remaining at this level since then. The two major contributors



during this period were the CIS (360 Mtoe in 1980 and 541 Mtoe in 1997, with a peak of 656 Mtoe in 1990) and the NAFTA region (540 Mtoe in 1980, compared to 608 Mtoe in 1997). Their global share in total gas production slowed down from 72% in 1980 to 60% in 1997. Production is increasing fastest in Asia with an annual growth of almost 9% per year on average since 1980. All the other developing regions are also increasing their production at sustained rates. In 1997, production declined in the European Union, a reaction of the Netherlands playing the role of swing producer on the European market, faced with a slight slowdown of internal consumption. Since 1990, the bulk of the consumption increase occurred in power generation.

Lack of infrastructure is the major barrier to increased gas consumption...

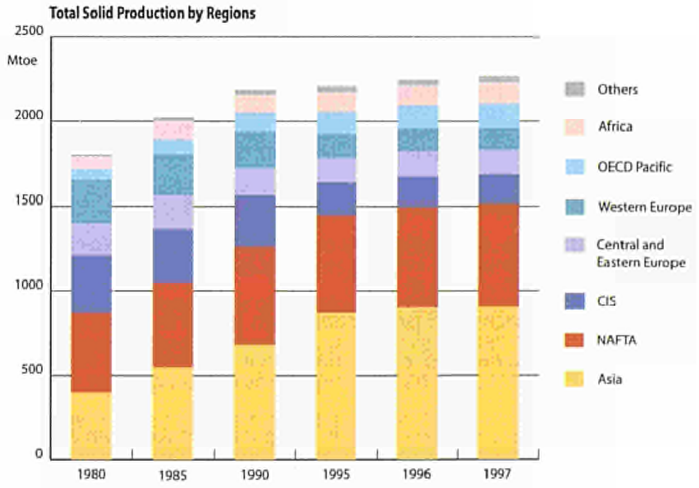
Throughout the world, major efforts to reduce production, transmission and distribution constraints are proceeding. Worldwide there is a great deal of construction activity to develop gas distribution and transmission systems. According to the International Pipeline and Offshore Contractors Association, 34,000 miles of natural gas pipelines are expected to be installed between 1998 and 2000. The survey included only firm projects that have secured financing and did not include projects in the former Soviet Union and China.

Some key developments supporting the world's natural gas markets in 1997 include[2]:

- Installation of Norfra, the world's longest sub-sea pipeline, was completed in August 1997. The pipeline extends more than 520 miles from Daupner, offshore Norway, to Dunkirk, France. Gas delivery to France was scheduled to begin in October 1998;
- Vibrant growth in Central and South America was demonstrated by the completion of the Gas-Andes pipeline. Completed in August 1997, it provided the first natural gas supplies to Santiago, Chile. Progress was also made in 1997 on other major pipeline projects, including the Bolivia-Brazil pipeline and the Atacama pipeline;
- Development of Iran's South Par natural gas field moved closer to reality as Total, Gazprom and Petrogas signed a $2 billion contract to develop 2 billion cubic feet per day from the field;
- Substantial planned increases in pipeline capacity between the United States and Canada are underway. Most of the capacity expansion needed to support the consumption increase between now and 2000 is either already under construction or in the final planning stages.
- Planning proceeded for the development of a trans-Asian gas pipeline system to connect Indonesia with Malaysia, Myanmar, Thailand, Singapore and the Philippines. This pipeline is likely to become operational as early as 2002;
- Several major projects to expand liquefied natural gas trade went to contract. New LNG facilities will soon be under construction in Oman, Qatar, Nigeria and Trinidad. Japan, South Korea, Taiwan and Thailand are the largest customers committed to purchase the output from these new facilities.

Solid production driven by the United States and China accounted for 24% of world energy supply...

Coal's role in energy use worldwide has shifted substantially over the decades, from a fuel used extensively in all sectors of the economy to one that is now used primarily for electricity generation and in a few key industrial sectors, such as steel, cement and chemicals. Although coal has lost market share to petroleum products and natural gas, it continues to be a key source of energy because of the dominant role it has maintained in its core markets and its success in penetrating markets in emerging economies. In 1997, coal accounted for 23.5% of the world's primary energy production, a slow decline already started in 1985. The largest producer in 1997 remained Asia (40% of the total compared to 22% in 1980), followed by NAFTA (27% in 1997, almost the same contribution as in 1980). Increased production in these two regions compensated for a slowdown in CIS and Eastern countries due to economic and political reforms and mine closures in the European Union as a consequence of the restructuring of the coal sector. In 1997, the two biggest producers were China (705 Mtoe) and the United States (562 Mtoe), followed by India (139 Mtoe), Australia (130 Mtoe) and Russia (100 Mtoe). The two major producers accounted for 56% of total world production.



[2] International Energy Outlook 1998, Energy Information Administration, US Department of Energy, 1998.

TOTAL SOLID PRODUCTION : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	1806.3	2023.7	2165.6	2189.8	2210.4	2249.5	2271.2	2.3%	1.6%	0.2%	1.8%	1.0%
Western Europe	257.8	239.8	230.8	210.1	138.2	131.5	126.5	-1.4%	-2.6%	-8.0%	-4.9%	-3.8%
European Union	257.6	239.4	230.6	209.9	138.0	131.3	126.3	-1.5%	-2.6%	-8.0%	-4.9%	-3.8%
EFTA	0.2	0.4	0.2	0.2	0.2	0.2	0.3	11.9%	-10.6%	-0.7%	-21.4%	68.2%
Rest of OECD	541.0	605.2	647.7	704.8	722.1	741.5	766.3	2.3%	3.1%	0.5%	2.7%	3.3%
NAFTA	470.2	502.5	537.1	580.2	576.7	593.6	609.9	1.3%	2.9%	-0.1%	2.9%	2.8%
OECD Pacific	64.6	92.1	99.2	112.3	133.4	135.7	143.3	7.3%	4.0%	3.5%	1.7%	5.6%
Central and Eastern Europe	189.6	200.4	202.1	164.8	146.3	150.0	145.2	1.1%	-3.8%	-2.4%	2.6%	-3.2%
CIS (1)	338.7	312.5	331.8	300.5	190.5	180.4	174.1	-1.6%	-0.8%	-8.7%	-5.3%	-3.5%
Africa	69.8	103.8	109.3	105.7	115.8	115.8	123.1	8.3%	0.4%	1.8%	0.0%	6.3%
Middle East	0.6	0.8	0.8	0.8	0.7	0.6	0.6	6.8%	1.5%	-3.7%	-11.4%	5.2%
Asia	402.6	550.7	627.5	684.8	874.2	905.3	907.6	6.5%	4.5%	5.0%	3.6%	0.3%
Latin America	6.2	10.5	15.5	18.3	22.6	24.4	27.7	11.2%	11.6%	4.3%	8.3%	13.3%
of which (%)												
European Union	14.3	11.8	10.6	9.6	6.2	5.8	5.6	-3.7%	-4.1%	-8.2%	-6.5%	-4.8%
OECD	43.9	41.2	40.0	41.2	38.4	38.3	38.7	-1.2%	0.0%	-1.4%	-0.3%	1.2%

TOTAL OIL PRODUCTION : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	3160.7	2862.2	3134.1	3218.7	3343.7	3416.4	3556.3	-2.0%	2.4%	0.8%	2.2%	4.1%
Western Europe	119.4	190.4	201.5	201.3	302.0	320.3	319.1	9.8%	1.1%	8.4%	6.1%	-0.4%
European Union	94.4	150.9	143.5	117.0	159.7	159.2	158.3	9.8%	-5.0%	6.4%	-0.3%	-0.6%
EFTA	25.0	39.5	57.9	84.4	142.3	161.1	160.8	9.6%	16.4%	11.0%	13.2%	-0.2%
Rest of OECD	721.8	789.0	758.1	715.0	703.7	711.2	724.3	1.8%	-1.9%	-0.3%	1.1%	1.8%
NAFTA	697.2	757.1	724.9	680.1	669.4	676.9	688.9	1.7%	-2.1%	-0.3%	1.1%	1.8%
OECD Pacific	22.2	29.7	30.6	31.2	30.6	30.7	31.8	6.0%	1.0%	-0.3%	0.3%	3.5%
Central and Eastern Europe	20.7	18.9	16.8	14.6	13.2	12.6	12.8	-1.9%	-5.0%	-1.9%	-4.6%	1.6%
CIS (1)	606.2	598.2	627.4	573.5	353.7	353.0	361.6	-0.3%	-0.8%	-9.2%	-0.2%	2.5%
Africa	310.5	270.0	282.4	323.8	340.7	357.6	381.4	-2.8%	3.7%	1.0%	5.0%	6.7%
Middle East	961.4	542.4	753.0	862.7	994.7	1003.5	1061.9	-10.8%	9.7%	2.9%	0.9%	5.8%
Asia	226.8	261.4	283.1	304.9	335.9	341.4	351.2	2.9%	3.1%	2.0%	1.6%	2.9%
Latin America	194.0	192.0	211.7	222.9	299.9	316.8	344.0	-0.2%	3.0%	6.1%	5.6%	8.6%
of which (%)												
European Union	3.0	5.3	4.6	3.6	4.8	4.7	4.5	12.0%	-7.2%	5.6%	-2.4%	-4.5%
OECD	26.5	34.1	30.5	28.4	30.0	30.1	29.2	5.2%	-3.6%	1.1%	0.4%	-2.8%

TOTAL GAS PRODUCTION : TOTAL BY REGION

Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	1243.4	1432.1	1613.3	1707.4	1808.5	1899.2	1902.9	2.9%	3.6%	1.2%	5.0%	0.2%
Western Europe	156.1	155.3	150.6	157.0	194.8	226.0	223.2	-0.1%	0.2%	4.4%	16.0%	-1.2%
European Union	133.3	131.9	124.7	132.9	166.6	188.6	182.2	-0.2%	0.2%	4.6%	13.2%	-3.4%
EFTA	22.8	23.4	25.9	24.1	28.3	37.4	41.0	0.6%	0.6%	3.2%	32.2%	9.8%
Rest of OECD	549.9	496.2	522.4	553.1	620.9	634.8	640.2	-2.0%	2.2%	2.3%	2.2%	0.9%
NAFTA	539.7	480.0	503.6	530.1	590.0	602.6	607.8	-2.3%	2.0%	2.2%	2.1%	0.9%
OECD Pacific	10.2	16.2	18.8	22.8	30.8	32.0	32.3	9.7%	7.1%	6.2%	4.0%	0.8%
Central and Eastern Europe	43.6	44.2	41.8	32.0	24.3	23.1	20.9	0.3%	-6.2%	-5.4%	-4.8%	-9.5%
CIS (1)	359.6	520.1	622.7	656.3	562.9	572.7	540.7	7.7%	4.8%	-3.0%	1.7%	-5.6%
Africa	20.4	42.5	52.1	61.5	74.8	79.6	88.7	15.8%	7.7%	4.0%	6.5%	11.4%
Middle East	36.2	53.9	79.4	83.7	109.6	120.3	131.0	8.3%	9.2%	5.5%	9.8%	8.8%
Asia	44.8	76.8	96.6	111.7	153.9	170.5	181.5	11.4%	7.8%	6.6%	10.8%	6.4%
Latin America	32.8	43.1	47.6	52.0	67.3	72.2	76.7	5.6%	3.9%	5.3%	7.4%	6.2%
of which (%)												
European Union	10.7	9.2	7.7	7.8	9.2	9.9	9.6	-3.0%	-3.3%	3.4%	7.8%	-3.6%
OECD	56.8	45.5	41.7	41.6	45.1	45.3	45.4	-4.3%	-1.8%	1.6%	0.5%	0.1%

(1) Including Baltic countries for statistical reasons

Prospects for an increasing nuclear contribution, which fell for the first time in 1997, are dimming...

Even as the performance of nuclear reactors improves worldwide, the prospects for increased reliance on nuclear power for electricity generation are dimming. Public concern about the safety of nuclear reactor operations and the disposal of nuclear waste makes the siting of new nuclear facilities difficult. In 1996 Japan joined the ranks of countries in which local voting initiatives recorded strong public opposition to the construction of nuclear facilities. In 1997, reflecting some plant closures in the United States and Canada, nuclear production fell for the first time since 1980. An equally important barrier to additions of nuclear power capacity in the industrialised countries is market competition, primarily from natural gas, which can be used to supply highly efficient low-cost combined cycle gas turbine power plants. In addition, the trend towards utility deregulation and privatisation has been a parallel force undermining the competitive potential of nuclear power. In developing countries, meanwhile, reliance on nuclear power was increasing, especially in Asia. China, India, South Korea and Taiwan all have sizeable construction projects planned or underway.

Asia accounted for 55% of world biomass production...

The contribution of renewable energy sources (hydro, biomass, geothermal, wind...) must be analysed from two perspectives: commercial and non-commercial energy sources. The bulk of biomass production and consumption concerned non-commercial uses mainly located in Asia (55% of total biomass production), Africa (18%), NAFTA (8%) and Latin America. Since 1980, the contribution of biomass to world energy production has remained stable at about 11%. With the exception of Africa where biomass production increased faster, the average growth rate since 1980 was relatively similar amongst the major contributors.

Low fossil fuel prices continue to constrain development of the world's renewable energy sources dedicated to commercial uses. While the costs of installing and generating electricity with renewable resources continue to decline, and technological advances improve generating efficiencies, they have not been able to keep pace with the declining costs of energy from fossil fuels. Nevertheless, in Western Europe, for environmental reasons, and in rural areas of developing countries where populations live far from institutional electricity grids, there is sustained interest in increasing the use of renewable energy sources. In particular, wind energy is experiencing some of the strongest growth among the renewable energy sources, the five top markets being located in Germany (2,000 MWe installed at end 1997), the United States (1646 MWe), Denmark (1135 MWe) India (870 MWe) and Spain (449 MWe)[3]. The share of hydro in world energy production remained stable at around 2.3% with major developments in non-OECD countries where the main potential for growth is located for geographic reasons.

Electricity's share in final energy consumption increased by one third since 1980...

Throughout the world, electricity is - and will continue to be - the fastest growing component of final energy demand. In the OECD region, electricity showed strong growth between 1980 and 1997, at 2.7% per year on average, in contrast to 0.8% annual growth in total final energy demand. In the industrialised world, where electrification has been fully achieved throughout all economic sectors, increased demand was driven by economic growth and growing electrical applications in industry as well as for computers, communications, and other electronic applications for home and business uses. This demand growth is tempered by increases in energy efficiency encouraged by both regulation and technological innovation. Electricity consumption in the rest of the world grew by 3.9% per year on average since 1980 although total final energy demand increased by only 1.8% in the same period. In the developing world, there are many opportunities for the expansion of electrical applications. The marginal benefit of introducing electricity into a rural village is considerable. High value-added applications such as refrigeration and communication are the reasons that providing electricity to the wider population is a priority for most political leaders in the developing world.

World power market characterised by privatisation, integration and foreign investment...

Highlights of recent developments in electricity markets around the world are:

- Privatisation and electricity reform measures continued apace in 1997. Central and South America has led the developing world in the privatisation of electricity and the implementation of electricity reform. In 1997, Brazil followed the path, commenced first by Chile and later by Argentina, in aggressively selling off state-owned electricity assets to the public;
- Financial crises in Southeast Asia slowed down the development of the power industry. In mid-1997, several Southeast Asia nations experienced financial difficulties characterised by steep currency depreciation and sharp drops in domestic asset values. The crisis was in part precipitated by the accumulation of excessive levels of foreign debt, trade imbalances and speculative

[3] Wind Energy: The Facts, European Commission, 1999.

financial investments. Consequently, the near-term power prospects for Malaysia, Thailand, Indonesia, South Korea and the Philippines have been affected;

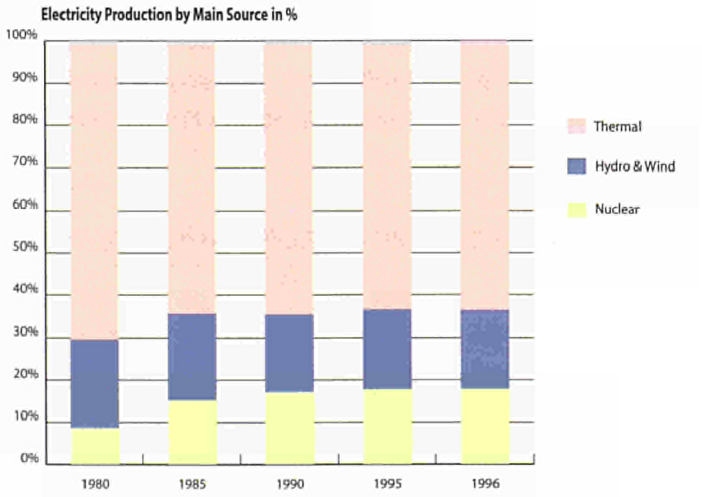
- European electricity markets are becoming increasingly integrated. From the perspective of the future liberalisation of electricity markets, the European Parliament adopted a directive whose intent was to provide independent producers with greater access to other countries' power networks. At the same time, the United Kingdom has become the largest target of foreign direct investment in electricity and, consequently, a substantial portion of the United Kingdom electricity industry is owned by US companies. Integration of national electricity industries has progressed furthest in the Scandinavian countries. Sweden and Norway operated a joint electricity pool and Finland is scheduled to join the pool in early 1998;
- The pace of foreign investment in developing nations' electricity sectors hinged strongly on the implementation of electricity reform and the application of transparent and consistent regulatory and investment policies. Economic growth in several developing countries was restrained by a shortage of electricity capacity. Facilitating the contract negotiation phase of electric power developments will be crucial to the successful realisation of their full economic growth potential.

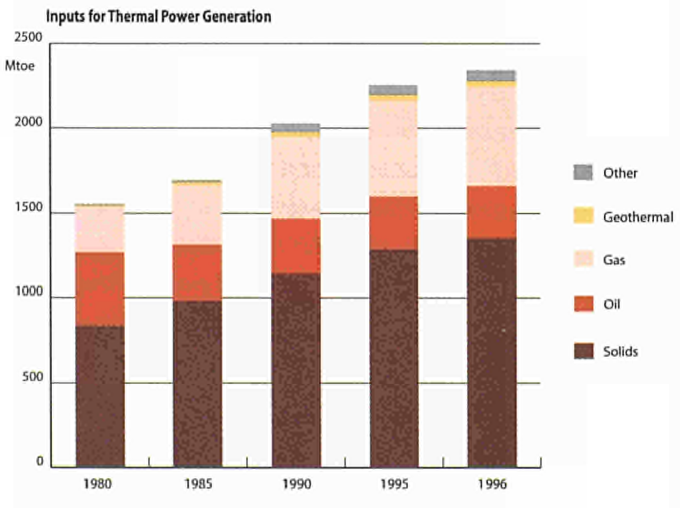
Power production remained largely dominated by thermal production even though its share declined slowly…

Thermal production continued largely to dominate total electricity generation, although its share decreased from 70% in 1980 to 64% in 1996. Nuclear's share doubled from 9% in 1980 to 18% in 1996. This growth occurred principally during the 1980's. After 1990, the increase in nuclear production has slowed down considerably due to lack of investment mainly in Western Europe and North America, increases being mainly located in Asia (+50%) and in Japan (+58%). Hydro power, depending on hydraulic conditions, grew regularly on average by 2.3% per year since 1980. The installed capacity reached 3134 GWe in 1996, compared with 1973 GWe in 1980, or an average increase of about 2.9% per year since 1980. Thermal units, which represented 59% of additional capacity since 1980 (70% since 1990), grew by about 2.6% per year over this period. Since 1990 the expansion of nuclear capacity slowed down, and hydro capacity expanded a little slower than thermal capacity.

Inputs for electricity generation increasingly dominated by solid fuels…

Solid fuels increasingly dominated inputs for electricity generation. While these represented 54% of total input in 1980, they reached 58% in 1996. The consumption was mainly located in NAFTA (increasing by 58% since 1980), Asia growing more than fourfold, and the European Union almost stable since 1980. However, since 1990, coal consumption in the Union was declining due to the restructuring of coal industries and growing environmental concerns. It was the only part of the world, except for the CIS for other reasons, in which this trend was observed. Despite the growing consumption of developing regions, the OECD region still represents 54% of solid fuels consumption for power generation. Oil use has declined slowly since 1985. Consequently its market share was only 13% in 1996 against 19% in 1985 and 27% in 1980. The utilisation of gas has more than doubled since 1980 as power generation technologies have evolved to favour natural gas use. The main gas consumers are respectively: CIS (221 Mtoe or 38% of world gas consumption for power generation), NAFTA (130 Mtoe) and the European Union (64 Mtoe). Almost all regions of the world were showing increases in the use of natural gas to generate electricity.





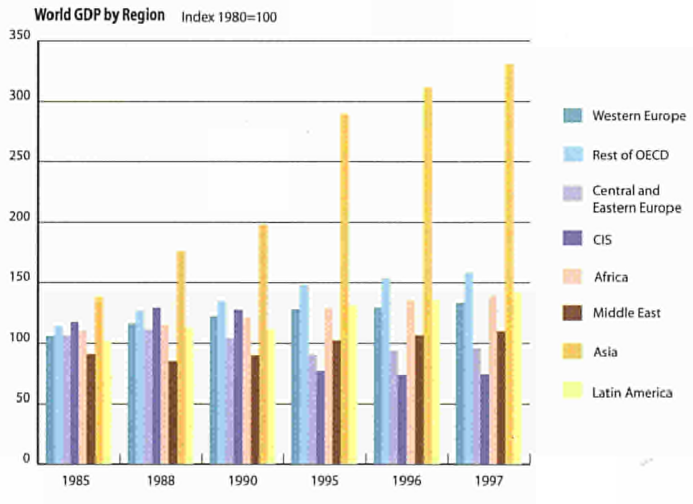
Refinery capacities have increased only in non-OECD region since 1985…

The refinery capacities increased slowly by 0.7% per year on average since 1985 but in fact they remained relatively stable between 1985 and 1992, and increased by 1.4% per year on average since then. In the OECD region, in-depth restructuring led to a stabilisation of installed capacity since 1985 but the capacity utilisation rate increased regularly from 72% in 1985 to 94% in 1997. This has increased profitability of the refinery sector and enabled further costly investment in conversion units to adapt production to changing oil product demand and to provide cleaner fuels. In the non-OECD region refinery capacity grew by about 20% since 1985, the main investment being located in the Middle East (+52%) to increase the value-added of crude production, China (+100%) driven by buoyant internal demand, and Southeast Asia. At the same time, the utilisation rate in the non-OECD region fell from 80% in 1985 to only 74% in 1997 with very contrasted experience by region. Although capacities were quite saturated in the Middle East and Asia, on the other hand utilisation rates remained too low in Latin America to ensure profitability and an urgent restructuring was needed in the CIS where utilisation rates fell below 45%.

COMPETITIVENESS

World GDP growth accelerated since 1994 driven by the developing regions…

Economic growth is the main factor driving growth in energy demand, excluding variations associated with climatic conditions in industrialised regions. While the world population grew regularly by 1.6% per annum since 1980, world GDP increased by 2.5% per year on average. Economic activity was more sustained during the second part of the 1980's followed by a relative slow down, between 1990 and 1993, mainly in the OECD countries. Since 1994, world GDP accelerated to reach an average growth of 3.0% per year driven by the developing countries. Asia is indisputably the main driver with an average growth rate of 7.3% per year since 1980. As a consequence, Asia doubled its share in world GDP to pass beyond 10% in 1996. During the 1980's economic activity expanded at the same rate in OECD and non-OECD regions; but since 1990 developing regions, driven by Asia, Latin America and Middle East have been developing more rapidly.



The two main energy indicators are energy consumption per capita and energy intensity. The stage of economic development and the standards of living in each region strongly condition the link between economic growth and energy demand. Advanced economies with high living standards tend to have relatively high energy use per capita, but they also tend to be economies where per capita energy uses is relatively stable or changes very slowly. In this context, rising energy demand tends to track employment and population growth. In industrialised countries, use of modern appliances and personal transport equipment is widespread. As a result, increments to personal income tend to result in spending on goods and services that are not very energy intensive. To the extent that spending is directed at energy-using goods, it essentially involves purchases of new equipment to replace old capital stock. The new stock is often more efficient than the equipment it is replacing, so that the relation between income and energy demand is weaker.

In developing countries, standards of living, while rising, tend to be low compared to those in more advanced economies. As a result, many energy-using devices are being widely adopted for the first time, causing energy use to track rising income levels more closely. Many areas in these countries are now gaining access to electricity for the first time. Those that have electricity are expanding the variety of appliances they use. At the same time, personal car ownership is becoming an important component of consumer demand in newly industrialising areas. Double-digit growth rates in car ownership are evident in many countries, mainly in Asia.

World energy consumption per capita stable but Asia grew by 52% since 1980…

Comparing energy consumption per capita in 1997 across regions, it is clear that NAFTA shows by far the highest levels, although the inclusion of Mexico lowers this to some extent. At the other extreme, Africa and Asia have the lowest levels, significantly below the world average. At a world level, energy consumption per capita remained stable. The growth in both

GROSS DOMESTIC PRODUCT PER CAPITA : TOTAL BY REGION

Thousand 1990 MEUR / inhabitant	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	2.94	3.01	3.17	3.24	3.29	3.35	3.41	0.5%	1.5%	-0.2%	1.8%	1.9%
Western Europe	12.25	12.98	14.17	14.87	15.57	15.79	16.16	1.2%	2.8%	-1.0%	1.4%	2.3%
European Union	11.99	12.69	13.89	14.58	15.27	15.48	15.85	1.1%	2.8%	-1.1%	1.4%	2.4%
EFTA	20.73	22.39	23.25	24.36	24.99	25.42	25.97	1.6%	1.7%	0.0%	1.7%	2.2%
Rest of OECD	11.51	12.42	13.30	13.80	14.35	14.72	15.06	1.5%	2.1%	0.8%	2.6%	2.3%
NAFTA	12.18	12.94	13.67	13.93	14.47	14.80	15.27	1.2%	1.5%	1.2%	2.3%	3.2%
OECD Pacific	13.18	14.97	16.65	18.05	19.10	19.77	19.90	2.6%	3.8%	0.3%	3.5%	0.7%
Central and Eastern Europe	1.85	1.92	1.98	1.84	1.61	1.67	1.72	0.7%	-0.7%	-5.5%	3.6%	2.9%
CIS (1)	2.12	2.38	2.56	2.49	1.48	1.42	1.43	2.4%	0.9%	-10.5%	-4.4%	1.0%
Africa	0.71	0.68	0.65	0.65	0.61	0.62	0.62	-0.9%	-0.9%	-1.8%	1.8%	0.5%
Middle East	4.08	3.09	2.62	2.60	2.54	2.58	2.59	-5.4%	-3.4%	0.5%	1.7%	0.3%
Asia	0.27	0.34	0.41	0.45	0.61	0.64	0.67	4.7%	5.5%	6.2%	6.0%	4.7%
Latin America	2.16	1.97	2.07	1.97	2.14	2.17	2.23	-1.8%	-0.1%	2.7%	1.5%	2.9%

(1) Including Baltic countries for statistical reasons

GROSS INLAND ENERGY CONSUMPTION PER CAPITA : TOTAL BY REGION

toe/inhabitant	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	1.63	1.60	1.67	1.64	1.60	1.63	1.63	-0.3%	0.4%	-0.5%	1.8%	-0.3%
Western Europe	3.51	3.48	3.59	3.63	3.68	3.80	3.78	-0.2%	0.8%	-0.4%	3.2%	-0.5%
European Union	3.50	3.46	3.57	3.61	3.66	3.78	3.76	-0.2%	0.8%	-0.5%	3.3%	-0.6%
EFTA	3.85	4.13	4.16	4.30	4.34	4.38	4.48	1.4%	0.8%	1.2%	0.9%	2.2%
Rest of OECD	5.15	4.87	5.11	5.09	5.27	5.36	5.38	-1.1%	0.9%	1.1%	1.7%	0.4%
NAFTA	6.59	6.15	6.43	6.27	6.40	6.48	6.51	-1.4%	0.4%	1.0%	1.2%	0.4%
OECD Pacific	3.20	3.24	3.47	3.75	4.12	4.25	4.27	0.2%	3.0%	1.2%	3.0%	0.5%
Central and Eastern Europe	3.01	3.07	3.12	2.72	2.30	2.42	2.39	0.4%	-2.4%	-0.9%	5.2%	-0.9%
CIS (1)	4.26	4.58	4.87	4.66	3.27	3.20	3.12	1.5%	0.4%	-8.5%	-2.3%	-2.3%
Africa	0.56	0.60	0.61	0.59	0.58	0.57	0.57	1.4%	-0.3%	-2.2%	-1.4%	0.4%
Middle East	1.45	1.74	1.88	1.83	1.95	2.03	2.07	3.7%	1.0%	3.6%	4.2%	1.5%
Asia	0.50	0.54	0.60	0.62	0.72	0.75	0.76	1.8%	2.7%	3.8%	3.9%	1.1%
Latin America	1.00	0.94	0.99	0.96	1.04	1.09	1.10	-1.1%	0.4%	0.3%	4.1%	1.1%

(1) Including Baltic countries for statistical reasons

developing regions (mainly located in Asia and the Middle East) and the OECD region (mainly the OECD Pacific region) was compensated since 1988 by the slowdown in CIS (-36%) and CEEC (-23%). To appreciate future trends it must be stressed that Asia, which represented more than 50% of the world population in 1997, has seen its consumption per capita grow by 52% since 1980.

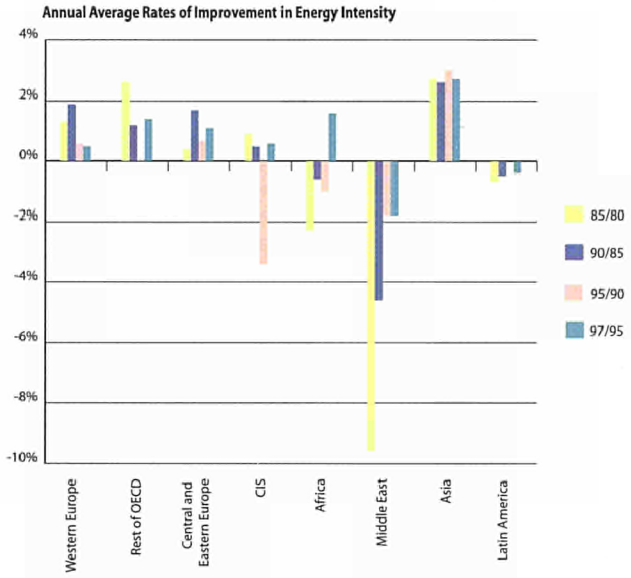
World energy intensity improved on average by 0.9% per year since 1980...

Total world **energy intensity** showed a slight but continuous downward trend by 0.9% a year since 1980; but the improvement was limited to 0.8% annually since 1990, and stabilised between 1994 and 1996. In 1997, world energy intensity improved by 2.1% with significant contributions from major parts of the world. The OECD regions, which had by far the lowest energy intensity, improved their performance by 1.8% per year on average during the 1980s. But the gains have remained marginal since the beginning of the 1990's, reaching only 0.4% per year on average. Inside the OECD the best performances were achieved by NAFTA and the European Union whilst energy intensity increased in the OECD Pacific region since 1990. It must be stressed that in the industrialised countries, major improvements of energy intensity were in all cases associated with sustained economic growth. On the other hand, the non-OECD part of the world was characterised by a stabilisation of its energy intensity during the 1980s, followed by a sustained reduction since then (-1.8% per annum on average since 1990). This is despite the marked increase in the CIS (+2.2% per year) and the Middle East (+1.8% per year). It must be stressed that Asia demonstrated the best improvement since 1980, at about 2.8% per year and intensity was falling regularly. In the case

ENERGY INTENSITY : TOTAL BY REGION

toe/1990 MEUR	1980	1985	1988	1990	1994	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
									Annual % Change				
World	553	532	525	505	489	488	488	477	-0.8%	-1.0%	-0.3%	0.0%	-2.1%
Western Europe	286	268	253	244	237	237	241	234	-1.3%	-1.9%	0.6%	1.8%	-2.8%
European Union	291	272	257	247	240	240	244	237	-1.3%	-1.9%	0.6%	1.9%	-2.9%
EFTA	186	184	179	177	178	174	172	172	-0.1%	-0.9%	1.2%	-0.8%	0.0%
Rest of OECD	447	392	385	369	369	368	364	357	-2.6%	-1.2%	0.3%	-0.9%	-1.8%
NAFTA	541	476	471	450	447	443	438	426	-2.6%	-1.1%	-0.2%	-1.1%	-2.7%
OECD Pacific	242	216	208	208	214	216	215	214	-2.3%	-0.8%	0.9%	-0.4%	-0.2%
Mediterranean	440	430	433	444	439	449	456	447	-0.4%	0.6%	-2.2%	1.6%	-2.0%
Central and Eastern Europe	1630	1600	1573	1472	1444	1424	1446	1392	-0.4%	-1.7%	4.9%	1.6%	-3.7%
CIS (1)	2010	1921	1903	1869	2157	2205	2254	2180	-0.9%	-0.5%	2.2%	2.3%	-3.3%
Africa	790	883	936	909	960	957	927	926	2.3%	0.6%	-0.4%	-3.2%	-0.1%
Middle East	356	563	719	704	764	769	788	797	9.6%	4.6%	3.1%	2.5%	1.2%
Asia	1813	1578	1441	1382	1221	1188	1164	1124	-2.7%	-2.6%	-2.3%	-2.0%	-3.5%
Latin America	462	478	476	490	477	489	502	493	0.7%	0.5%	-2.3%	2.5%	-1.8%

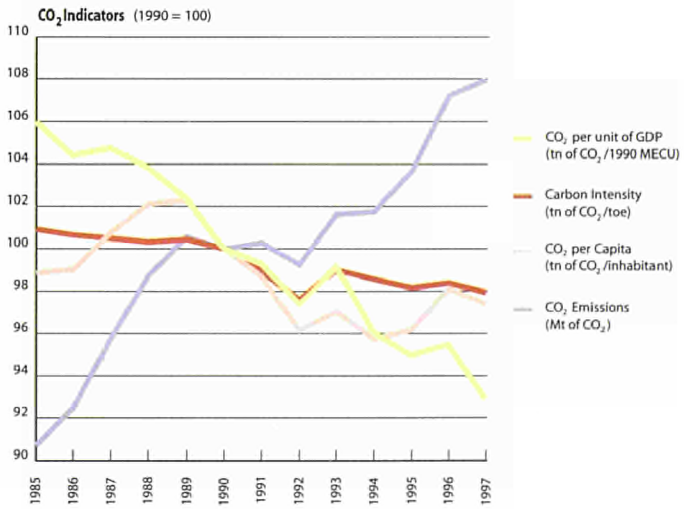
(1) Including Baltic countries for statistical reasons



with a reduction of one third since 1980. The transport sector slowly but regularly reduced its energy intensity by 0.2% since 1985, demonstrating that the development of improved vehicles is partly able to offset rapid motorization in developing regions. Finally the energy intensity of the tertiary-domestic sector, which improved about 1% per year on average during the 1980s, has remained stable since then. This is the result of a contrasted evolution: a relative stability in the OECD, slow decline - less than 10% - in CEEC and Middle East, slow increase - less than 10% - in Latin America and Africa, a marked fall in Asia (-28%) and an incredible increase in CIS where energy consumption in the tertiary-domestic sector grew slowly to cover basic needs while GDP declined by 42% since 1990.

of the Middle East, gross domestic product is directly dependent on oil market revenues. Fluctuations in export volumes and oil prices induced a GDP growth of only 10% since 1980. As a result, observed increases in energy intensity resulted in fact from this particular evolution of GDP, which does not reflect less efficient use of energy by final consumers. In 1997, energy intensity was three times higher in the non-OECD region than in the OECD region, excluding the CIS and CEEC where energy intensity reached five times the OECD level.

Looking at energy intensity by sector at the world level, it must be stressed that improvements occurred in all final sectors but at different rates. The major improvement was observed in industry



CO_2 EMISSIONS (1) : TOTAL BY REGION

Mt of CO2	1980	1985	1988	1990	1995	1996	1997(3)	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
World	18099	18699	20350	20656	21432	22161	22312	0.7%	2.0%	0.7%	3.4%	0.7%
Western Europe	3504	3156	3207	3262	3236	3331	3261	-2.1%	0.7%	-0.2%	2.9%	-2.1%
European Union	3431	3081	3131	3184	3153	3244	3174	-2.1%	0.7%	-0.2%	2.9%	-2.1%
EFTA	73	75	76	77	83	87	87	0.5%	0.6%	1.5%	4.9%	-0.2%
Rest of OECD	6598	6536	7025	7138	7630	7872	7973	-0.2%	1.8%	1.3%	3.2%	1.3%
NAFTA	5455	5359	5745	5746	6093	6280	6375	-0.4%	1.4%	1.2%	3.1%	1.5%
OECD Pacific	1074	1086	1175	1268	1387	1426	1423	0.2%	3.2%	1.8%	2.8%	-0.2%
Mediterranean	69	91	105	123	151	166	175	5.7%	6.3%	4.1%	10.3%	5.6%
Central and Eastern Europe	1060	1095	1094	957	776	805	787	0.7%	-2.7%	-4.1%	3.7%	-2.2%
CIS (2)	3267	3395	3641	3553	2318	2255	2213	0.8%	0.9%	-8.2%	-2.7%	-1.9%
Africa	431	504	547	566	624	634	653	3.2%	2.3%	2.0%	1.6%	3.0%
Middle East	387	546	639	658	860	909	947	7.1%	3.8%	5.5%	5.8%	4.1%
Asia	2288	2913	3579	3906	5237	5569	5672	5.0%	6.0%	6.0%	6.3%	1.8%
Latin America	565	554	619	616	750	786	806	-0.4%	2.2%	4.0%	4.8%	2.6%
of which (%)												
European Union	19.0	16.5	15.4	15.4	14.7	14.6	14.2	-2.8%	-1.3%	-0.9%	-0.5%	-2.8%
OECD	55.4	51.3	49.8	49.7	50.0	49.8	49.6	-1.5%	-0.6%	0.1%	-0.4%	-0.5%

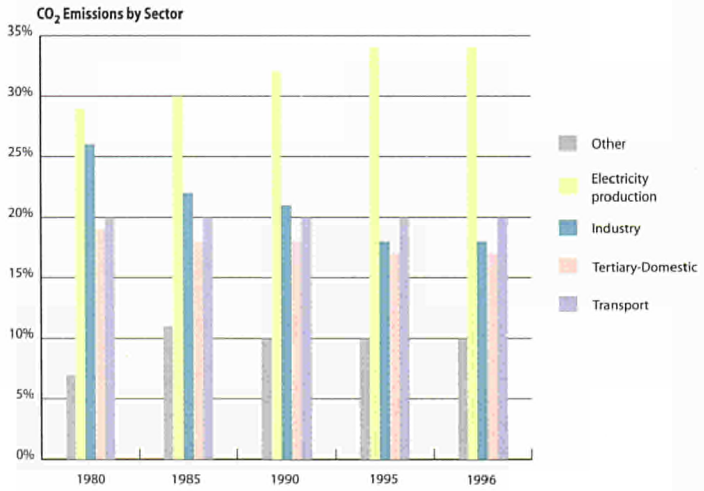
(1) in this table emissions from each region include those resulting from bunker fuels
(2) Including Baltic countries for statistical reasons
(3) estimated values for non-OECD regions

ENVIRONMENT

World emissions grew by 8% since 1990…

CO_2 emission indicators are of prime importance in the post-Kyoto debate as the Kyoto Protocol adopted on 11 December 1997 may signal a significant change in the level of effort among industrialised countries to reduce greenhouse gas emissions. The agreed objectives, if realised, will markedly reduce or change energy use among the signatory participants. Substantial shifts in the composition of energy supply away from high-carbon fuels, substantial reductions in energy intensity, or some combination of both, will have to be achieved in developed countries.

CO_2 emissions are given on an indicative basis, being calculated using common emission factors by energy aggregates across all countries in the world. Worldwide **emissions of CO_2** increased steadily by 1.3% per year during the 1980's and by 1.1% per year since then, leading to a global increase by 8% in 1997 compared to the 1990 level. Since 1990, CO_2 emissions have been increasing in almost all regions in the world, in some cases by more than 5% per year (Asia and the Middle East), with the exception of former Centrally Planned Economies due to the drastic reduction of energy consumption observed, mainly in the CIS, since 1990. The European Union stabilised its emissions, benefiting from energy efficiency improvements as the climatic conditions of 1990 and 1997 were similar. Inside the OECD region the European Union was by far the best performer as CO_2 emissions increased by 11% in the NAFTA region, 12% in the OECD Pacific region and 13% in EFTA since 1990. At the same time, CO_2 emissions per capita showed a reduction of 0.4% a year on average since 1990 (3.8 tons of CO_2 per capita in 1997 compared to 4.0 in 1980). Carbon intensity (tn of CO_2 emitted per toe of energy consumed) declined regularly over the whole period, the main improvements being observed in industry (-18% since 1990) and the tertiary-domestic sector (-15%). Both were benefiting from the increasing contribution of electricity and the substitution of high CO_2 content energy fuels by natural gas.



WORLD : CO_2 Emissions by sector

Mt of CO2	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	95/94	96/95	96/90
								Annual % Change				
Total	**18075**	**18676**	**20603**	**21361**	**22126**	**22158**	**0,7%**	**2,0%**	**0,7%**	**1,9%**	**3,6%**	**1,2%**
Bunkers	314	270	312	322	366	na	-3,0%	2,9%	0,7%	2,3%	13,4%	2,7%
Transformation	6307	7473	8475	9250	9694	na	3,5%	2,5%	1,8%	1,2%	4,8%	2,3%
Power Generation	5075	5527	6451	7149	7472	na	1,7%	3,1%	2,1%	2,0%	4,5%	2,5%
Energy sector	1232	1947	2024	2101	2222	na	9,6%	0,8%	0,8%	-1,4%	5,8%	1,6%
Final Demand sectors	11454	10932	11817	11788	12067	na	-0,9%	1,6%	0,0%	2,4%	2,4%	0,3%
Industry	4665	3979	4171	3863	3911	na	-3,1%	0,9%	-1,5%	2,2%	1,2%	-1,1%
Transport	3472	3681	4070	4292	4408	na	1,2%	2,0%	1,1%	3,8%	2,7%	1,3%
Domestic and Tertiary	3317	3272	3576	3633	3748	na	-0,3%	1,8%	0,3%	1,1%	3,2%	0,8%

The contribution of CO_2 emissions from power generation increased from 28% in 1980 to 34% in 1997...

Looking at worldwide CO_2 emissions by sector, the first conclusion is that the power generation sector remained by far the largest sector in terms of emissions. CO_2 emissions from the power sector grew by 2.4% on average since 1980, with a relative slowdown since 1990, to represent about 34% of total world emissions in 1997. This is a consequence of rapid electrification in developing regions, a trend which will continue in the near future. The growing share of solid fuels for thermal power generation accentuated this trend. Within the final demand sectors, CO_2 emissions from transport have increased since 1980 at an average growth rate of 1.5% despite a relative stability between 1990 and 1994 resulting from the particular situation in CIS and CEEC. Their share at the level of final energy consumption increased from 30% in 1980 to 36% in 1996. The domestic and tertiary sectors showed a limited upward trend (+0.8% per year since 1980, excluding any correction for climatic conditions) due to the penetration of natural gas and distributed heat in heating markets in place of heating oil and solids. Industry presented the greatest fall in CO_2 emissions between 1980 and 1996 (-1.1% per year) but a marked reverse trend appeared since 1992 (+1.8% per year on average over the last four years) in parallel with the increasing energy consumption of this sector.

NET ENERGY IMPORT : TOTAL BY REGION

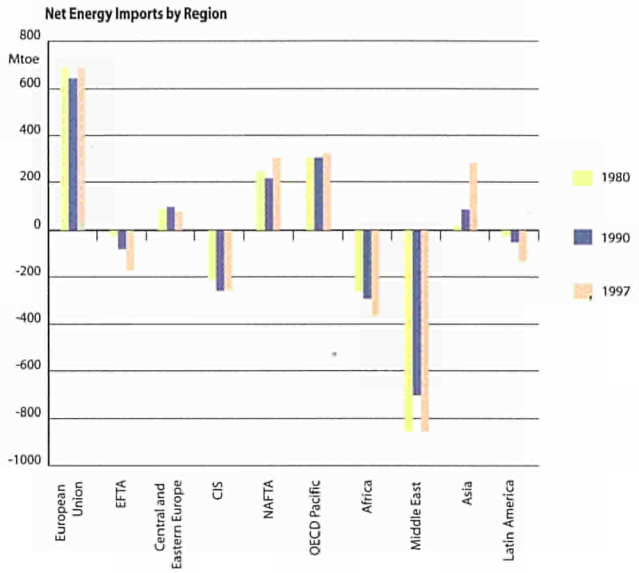
Mtoe	1980	1985	1988	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
Western Europe	671.9	487.9	519.4	563.4	508.3	512.3	519.1	-6.2%	2.9%	-2.0%	0.8%	1.3%
European Union	688.4	526.3	578.2	643.7	651.3	678.8	690.7	-5.2%	4.1%	0.2%	4.2%	1.8%
EFTA	-21.4	-38.5	-58.9	-80.4	-142.9	-166.6	-171.6	12.4%	15.9%	12.2%	16.5%	3.0%
Rest of OECD	565.9	343.2	481.6	550.0	605.6	645.7	675.0	-9.5%	9.9%	1.9%	6.6%	4.5%
NAFTA	246.0	68.9	185.1	215.4	249.4	274.3	307.4	-22.5%	25.6%	3.0%	10.0%	12.1%
OECD Pacific	305.7	257.1	272.8	306.8	318.9	330.0	324.3	-3.4%	3.6%	0.8%	3.5%	-1.7%
Central and Eastern Europe	71.5	66.9	76.5	77.6	57.8	68.5	65.0	-1.3%	3.0%	-5.7%	18.4%	-5.1%
CIS (1)	-212.2	-219.2	-272.9	-260.0	-244.5	-276.6	-256.6	0.6%	3.5%	-1.2%	13.1%	-7.2%
Africa	-260.6	-241.7	-245.8	-295.8	-310.8	-328.4	-366.1	-1.5%	4.1%	1.0%	5.7%	11.5%
Middle East	-854.8	-394.6	-593.6	-701.3	-796.7	-798.9	-853.9	-14.3%	12.2%	2.6%	0.3%	6.9%
Asia	19.5	0.9	54.8	85.4	213.5	252.7	283.6	-45.9%	148.2%	20.1%	18.4%	12.2%
Latin America	-22.6	-38.8	-42.7	-51.7	-103.7	-103.5	-132.8	11.4%	5.9%	14.9%	-0.2%	28.4%
of which (%)												
OECD	1237.8	831.1	1001.0	1113.3	1114.0	1158.0	1194.1	-7.7%	6.0%	0.0%	4.0%	3.1%

(1) Including Baltic countries for statistical reasons

GLOBAL MARKETS

The OECD absorbed about 80% of world interregional exchanges of energy…

The world **energy trade** between the main regions considered in this study (net energy imports) shows that the European Union is by far the largest net importer with a steady annual growth of 2.3% since 1985, achieving a 1997 level comparable to 1980. OECD Pacific is the second ranking with a relatively stable level since 1980, except for the drop observed in mid-1980's. NAFTA is also an important importer with a similar profile to that of the European Union, although with a faster growth rate between 1985 and 1997 (+13% per year). As a consequence of these trends, the OECD absorbed about 80% of world net energy exchanges in 1997. Amongst the non-OECD regions, although Central and Eastern Europe stabilised their level of imports at about 65 Mtoe, mainly oil and gas from CIS, Asia was continuously increasing its imports starting from a negligible level in 1980 to reach 284 Mtoe in 1997, a level comparable with NAFTA. The net exporters remained the Middle East (854 Mtoe in 1997), Africa (366 Mtoe), CIS (257 Mtoe) and EFTA (172 Mtoe), all four mainly exporters of hydrocarbons. Oil, both crude and oil products, accounted for 81% of interregional energy exchanges in 1997, natural gas for 11% and solids for 8%. Although OPEC continued to dominate the oil market, it must be stressed that Russia accounted for 40% of the trade in natural gas in 1997. Finally interregional exchanges of energy represented in 1997 only 19.5% of total world energy consumption, about the same level as in 1980.



WORLD : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(3)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	7352	7768	8776	9213	9467	9646	1.1%	2.5%	1.0%	2.8%	1.9%
Solids	1806	2024	2190	2210	2250	2271	2.3%	1.6%	0.2%	1.8%	1.0%
Oil	3161	2862	3219	3344	3416	3556	-2.0%	2.4%	0.8%	2.2%	4.1%
Natural gas	1243	1432	1707	1809	1899	1903	2.9%	3.6%	1.2%	5.0%	0.2%
Nuclear	187	387	519	598	618	613	15.6%	6.0%	2.9%	3.2%	-0.7%
Hydro & Wind	150	171	186	216	219	219	2.7%	1.7%	3.0%	1.6%	0.2%
Geothermal	12	20	32	34	36	36	11.1%	9.7%	1.4%	6.0%	-1.1%
Other renewable energy sources	793	871	923	1002	1028	1047	1.9%	1.2%	1.7%	2.6%	1.8%
Net Imports(1)	-11	20	-13	-62	-16	-53	-	-	35.8%	-74.2%	232.2%
Solids	2	3	-1	-12	-8	2	4.6%	-	60.3%	-29.7%	-
Oil	-11	22	-9	-44	-5	-47	-	-	38.0%	-88.9%	850.7%
Crude oil	22	71	51	25	59	na	26.4%	-6.4%	-13.6%	140.8%	na
Oil products	-33	-49	-60	-69	-64	na	7.9%	4.2%	2.7%	-6.6%	na
Natural gas	-2	-5	-4	-6	-3	-9	13.9%	-4.1%	8.9%	-48.1%	197.1%
Electricity	0	0	0	0	0	1	-	-	-	-	417.8%
Gross Inland Consumption	7164	7700	8568	9051	9341	9447	1.5%	2.2%	1.1%	3.2%	1.1%
Solids	1789	2027	2162	2203	2259	2270	2.5%	1.3%	0.4%	2.5%	0.5%
Oil	2995	2798	3072	3199	3289	3373	-1.4%	1.9%	0.8%	2.8%	2.5%
Natural gas	1239	1426	1675	1797	1891	1889	2.8%	3.3%	1.4%	5.2%	-0.1%
Other (2)	1141	1449	1660	1851	1901	1916	4.9%	2.7%	2.2%	2.7%	0.8%
Electricity Generation in Twh	8308	9815	11830	13244	13666	na	3.4%	3.8%	2.3%	3.2%	na
Nuclear	713	1492	2013	2332	2418	na	15.9%	6.2%	3.0%	3.7%	na
Hydro & wind	1747	2004	2177	2519	2559	na	2.8%	1.7%	3.0%	1.6%	na
Thermal	5847	6318	7640	8393	8689	na	1.6%	3.9%	1.9%	3.5%	na
Generation Capacity in GWe	1973	2426	2757	3069	3134	na	4.2%	2.6%	2.2%	2.1%	na
Nuclear	142	253	330	349	354	na	12.2%	5.5%	1.1%	1.5%	na
Hydro & wind	466	564	647	720	733	na	3.9%	2.8%	2.2%	1.8%	na
Thermal	1365	1610	1781	2000	2046	na	3.4%	2.0%	2.3%	2.3%	na
Average Load Factor in %	48.1	46.2	49.0	49.3	49.8	na	-0.8%	1.2%	0.1%	1.0%	na
Fuel Inputs for Thermal Power Generation	1557	1695	2030	2259	2345	na	1.7%	3.7%	2.2%	3.8%	na
Solids	838	984	1147	1291	1356	na	3.3%	3.1%	2.4%	5.1%	na
Oil	426	327	322	308	302	na	-5.2%	-0.3%	-0.9%	-1.9%	na
Gas	272	353	477	565	587	na	5.3%	6.2%	3.5%	3.9%	na
Geothermal	11	19	31	33	35	na	11.3%	9.7%	1.3%	6.1%	na
Biomass	9	12	54	62	65	na	5.7%	34.2%	2.8%	4.5%	na
Average Thermal Efficiency in %	32.3	32.1	32.4	32.0	31.9	na	-0.2%	0.2%	-0.3%	-0.3%	na
Non-Energy Uses	340	353	427	467	488	na	0.8%	3.9%	1.8%	4.5%	na
Total Final Energy Demand	5127	5394	5842	6131	6309	na	1.0%	1.6%	1.0%	2.9%	na
Solids	780	843	840	732	728	na	1.6%	-0.1%	-2.7%	-0.5%	na
Oil	2054	1993	2183	2286	2352	na	-0.6%	1.8%	0.9%	2.9%	na
Gas	804	846	938	967	1026	na	1.0%	2.1%	0.6%	6.1%	na
Electricity	586	693	830	934	967	na	3.4%	3.7%	2.4%	3.5%	na
Heat	120	161	178	270	273	na	6.1%	2.1%	8.7%	1.1%	na
Renewable energy sources	783	859	872	942	963	na	1.9%	0.3%	1.6%	2.2%	na
CO_2 Emissions in Mt of CO_2	17761	18406	20291	21038	21761	21907	0.7%	2.0%	0.7%	3.4%	0.7%
Indicators											
Population (Million)	4409	4801	5232	5640	5720	5801	1.7%	1.7%	1.5%	1.4%	1.4%
GDP (index 1985=100)	89.6	100.0	117.2	128.3	132.4	136.7	2.2%	3.2%	1.8%	3.2%	3.3%
Gross Inl Cons./GDP (toe/1985 MEUR)	552.8	532.1	505.3	487.6	487.5	477.4	-0.8%	-1.0%	-0.7%	0.0%	-2.1%
Gross Inl Cons./Capita (toe/inhabitant)	1.62	1.60	1.64	1.60	1.63	1.63	-0.3%	0.4%	-0.4%	1.8%	-0.3%
Electricity Generated/Capita (kWh/inhabitant)	1884	2044	2261	2348	2389	na	1.6%	2.0%	0.8%	1.8%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	4.03	3.83	3.88	3.73	3.80	3.78	-1.0%	0.2%	-0.8%	2.0%	-0.7%

(1) corresponds to statistical errors
(2) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(3) Estimates

WORLD : MAIN INDICATORS

	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Gross Inland Consumption (Mtoe)	7164.2	7700.3	8568.5	9051.1	9341.0	9447.4	1.5%	2.2%	1.1%	3.2%	1.1%
Power Generation	1534.4	1824.3	2182.6	2429.6	2524.8	na	3.5%	3.7%	2.2%	3.9%	na
Energy Branch	399.0	458.1	538.2	530.2	561.3	na	2.8%	3.3%	-0.3%	5.9%	na
Final Energy Consumption	5097.7	5355.9	5797.6	6073.7	6251.7	na	1.0%	1.6%	0.9%	2.9%	na
Industry	1919.4	1907.6	1983.2	1937.3	1969.3	na	-0.1%	0.8%	-0.5%	1.7%	na
Transport	1132.2	1211.4	1408.3	1526.6	1572.9	na	1.4%	3.1%	1.6%	3.0%	na
Tertiary-Domestic	2045.3	2236.8	2406.1	2609.9	2709.5	na	1.8%	1.5%	1.6%	3.8%	na
Energy Intensity (toe/1990 MEUR)	552.8	532.1	505.3	487.6	487.5	477.4	-0.8%	-1.0%	-0.7%	0.0%	-2.1%
Power Generation	118.4	126.1	128.7	130.9	131.8	na	1.3%	0.4%	0.3%	0.7%	na
Final Energy Consumption	393.3	370.1	341.9	327.2	326.3	na	-1.2%	-1.6%	-0.9%	-0.3%	na
Industry	148.1	131.8	117.0	104.4	102.8	na	-2.3%	-2.4%	-2.3%	-1.5%	na
Transport	87.4	83.7	83.0	82.2	82.1	na	-0.9%	-0.2%	-0.2%	-0.2%	na
Tertiary-Domestic	157.8	154.6	141.9	140.6	141.4	na	-0.4%	-1.7%	-0.2%	0.6%	na
Energy per capita (Kgoe/inhabitant)	1625	1604	1638	1605	1633	1629	-0.3%	0.4%	-0.4%	1.8%	-0.3%
Power Generation	348	380	417	431	441	na	1.8%	1.9%	0.6%	2.5%	na
Final Energy Consumption	1156	1115	1108	1077	1093	na	-0.7%	-0.1%	-0.6%	1.5%	na
Industry	435	397	379	343	344	na	-1.8%	-0.9%	-2.0%	0.2%	na
Transport	257	252	269	271	275	na	-0.4%	1.3%	0.1%	1.6%	na
Tertiary-Domestic	464	466	460	463	474	na	0.1%	-0.3%	0.1%	2.4%	na
Electricity Share (%)											
Final Energy Consumption	11.5%	12.9%	14.3%	15.4%	15.5%	na	2.4%	2.1%	1.4%	0.6%	na
Industry	15.5%	17.5%	19.4%	20.7%	21.0%	na	2.4%	2.1%	1.3%	1.1%	na
Transport	1.2%	1.3%	1.3%	1.2%	1.2%	na	1.1%	-0.5%	-0.7%	-2.0%	na
Tertiary-Domestic	13.4%	15.3%	17.8%	19.7%	19.8%	na	2.7%	3.0%	2.1%	0.4%	na
Total Renewable consumption (Mtoe)	954.1	1062.6	1140.5	1252.5	1283.3	na	2.2%	1.4%	1.9%	2.5%	na
Hydro	149.6	171.0	185.5	214.2	217.4	na	2.7%	1.6%	2.9%	1.5%	na
Biomass	792.6	871.1	922.1	1002.4	1027.7	na	1.9%	1.1%	1.7%	2.5%	na
Other renewable energy source	11.9	20.5	32.9	35.9	38.2	na	11.5%	9.9%	1.7%	6.5%	na
Renewable Intensity (toe/1990 MEUR)	73.6	73.4	67.3	67.5	67.0	na	-0.1%	-1.7%	0.1%	-0.7%	na
Renewable per capita (kgoe/inhabitant)	216.4	221.3	218.0	222.0	224.4	na	0.4%	-0.3%	0.4%	1.0%	na
CO_2 Emissions (Mt of CO_2)	17761	18406	20291	21038	21761	21907	0.7%	2.0%	0.7%	3.4%	0.7%
Power Generation	5075	5527	6451	7149	7472	na	1.7%	3.1%	2.1%	4.5%	na
Energy Branch	897	900	1051	1031	1105	na	0.1%	3.1%	-0.4%	7.2%	na
Final Energy Consumption	11454	10932	11817	11788	12067	na	-0.9%	1.6%	0.0%	2.4%	na
Industry	4665	3979	4171	3863	3911	na	-3.1%	0.9%	-1.5%	1.2%	na
Transport	3472	3681	4070	4292	4408	na	1.2%	2.0%	1.1%	2.7%	na
Tertiary-Domestic	3317	3272	3576	3633	3748	na	-0.3%	1.8%	0.3%	3.2%	na
Carbon (tn of CO_2/toe)	2.5	2.4	2.4	2.3	2.3	2.3	-0.7%	-0.2%	-0.4%	0.2%	-0.5%
Power Generation	3.3	3.0	3.0	2.9	3.0	na	-1.7%	-0.5%	-0.1%	0.6%	na
Energy Branch	2.2	2.0	2.0	1.9	2.0	na	-2.6%	-0.1%	-0.1%	1.3%	na
Final Energy Consumption	2.2	2.0	2.0	1.9	1.9	na	-1.9%	0.0%	-1.0%	-0.6%	na
Industry	2.4	2.1	2.1	2.0	2.0	na	-3.0%	0.2%	-1.1%	-0.4%	na
Transport	3.1	3.0	2.9	2.8	2.8	na	-0.2%	-1.0%	-0.6%	-0.3%	na
Tertiary-Domestic	1.6	1.5	1.5	1.4	1.4	na	-2.0%	0.3%	-1.3%	-0.6%	na
CO_2 per capita (kg of CO_2/inhabitant)	4028	3833	3878	3730	3804	3777	-1.0%	0.2%	-0.8%	2.0%	-0.7%
Final Energy Consumption	2598	2277	2258	2090	2110	na	-2.6%	-0.2%	-1.5%	0.9%	na
Industry	1058	829	797	685	684	na	-4.8%	-0.8%	-3.0%	-0.2%	na
Transport	787	767	778	761	771	na	-0.5%	0.3%	-0.4%	1.3%	na
Tertiary-Domestic	752	682	683	644	655	na	-2.0%	0.1%	-1.2%	1.7%	na
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	1370	1272	1197	1133	1136	1107	-1.5%	-1.2%	-1.1%	0.2%	-2.5%
Power Generation	392	382	380	385	390	na	-0.5%	-0.1%	0.2%	1.3%	na
Public Thermal Power Generation	370	359	357	353	358	na	-0.6%	-0.1%	-0.2%	1.4%	na
Autoprod. Thermal Power Generation	22	23	23	32	32	na	0.9%	0.4%	6.3%	-0.6%	na
Energy Branch	69	62	62	56	58	na	-2.1%	-0.1%	-2.2%	3.8%	na
Final Energy Consumption	884	755	697	635	630	na	-3.1%	-1.6%	-1.8%	-0.8%	na
Industry	360	275	246	208	204	na	-5.2%	-2.2%	-3.3%	-1.9%	na
Transport	268	254	240	231	230	na	-1.0%	-1.2%	-0.7%	-0.5%	na
Tertiary-Domestic	256	226	211	196	196	na	-2.4%	-1.4%	-1.5%	0.0%	na

PART II EUROPEAN UNION

ENERGY OUTLOOK – Energy Demand : Recent evolution (1985-1997)

- Sustained GDP growth in 1997 pushed energy demand…
- …But warmer weather conditions compensated, finally stabilising final energy demand
- With about 46% of final energy demand, oil remained the largest energy source

INDUSTRY

- Industrial energy consumption rebounded since 1994 but industrial energy intensity continued to improve
- The contribution of gas and electricity together reached 61% of total industrial consumption in 1997
- Energy developments showed large variations amongst Member States
- Throughout the European Union, energy price discrepancies remained considerable

TRANSPORT

- Transport sector accounted for 80% of final energy demand increase since 1985 but only 50% since 1990
- Passenger traffic has grown more rapidly than economic growth driven by leisure-time travel
- Goods transport accelerated since 1990 as a consequence of just-in-time industrial organisation
- Increasing energy and environmental implications of road transport
- Diesel oil share reached 47% of total road fuel consumption in 1997
- Surging demand for air transport, still stimulated by the liberalisation of air markets
- Transport energy intensity peaked in 1993 and declined by 0.8% per year since then
- Prices for transport fuel increased by about 1% per year since 1990 under the pressure of tax increases

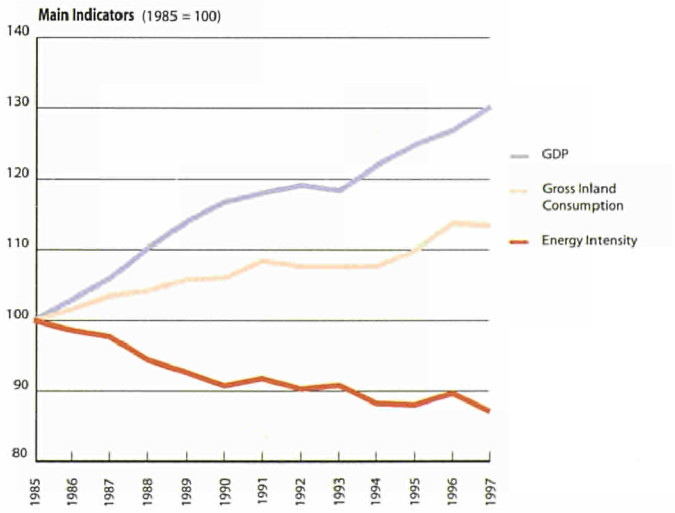
TERTIARY-DOMESTIC

- Between 1990 and 1997, despite similar climatic conditions, energy consumption increased by 10.6%
- Faced with moderate energy prices, energy consumption for heating seems less efficient
- Technological improvements balanced by the emergence of new appliances
- Energy intensity, corrected for climatic effects, seems to be quite stable since 1985
- Energy prices for domestic consumers showed an overall decrease despite large national variations

The European Union is one of the largest energy consuming regions in the world. In 1997 it consumed 1407 Mtoe, about 30% of total OECD primary energy consumption and about 15% of world consumption. Although examined as a whole region, the European Union is in fact marked by contrasts, ranging from countries with cold climates such as those in Scandinavia to those with milder climates in the Mediterranean. Similarly, there are substantial differences in national gross production and in income levels. All of these factors result in widely differing patterns of living standards and energy consumption.

Sustained GDP growth in 1997 pushed energy demand….

The volume of energy consumed is largely a function, among other variables, of economic activity and climate. These two main factors have had contradictory influences in 1997. During the 80's, GDP grew on average by 2.2% per annum with a marked acceleration in the period 1986-1990 (3% per year). Since then, GDP growth has been marked by a slowdown to 0.5% between 1991 and 1992, followed by sustained recovery in 1994-95 (+2.7% per year on average). In 1996, economic growth showed a relative slowdown with an increase limited to 1.7%. But the economy rebounded in 1997 with GDP growth of 2.6%, rising to 2.9% in 1998. Over the period 1990-1997, a very differentiated evolution characterised economic growth amongst Member States with Sweden and Finland showing an average growth of less than 1.0% per year whilst, on the other hand, Ireland achieved 7.1% growth. The major political events during this period have been the reunification of Germany in 1990 and the entry of three new member states in 1995: Austria, Finland and Sweden. Together these contributed a little less than 10% of total EU GDP in 1997.



1 To avoid a break in the time series, the analysis of the European Union includes all data regarding the former German Democratic Republic.

GROSS DOMESTIC PRODUCT (BILLIONS 1990 EUR)

	1980	1985	1990	1994	1995	1996	1997	80/85	90/85	95/90	96/95	97/96	97/90
								Annual % Change					
Austria	100.0	107.3	125.6	135.7	138.5	140.7	144.2	1.4%	3.2%	2.0%	1.6%	2.5%	2.0%
Belgium	128.4	133.1	154.5	161.0	164.8	166.9	171.9	0.7%	3.0%	1.3%	1.3%	3.0%	1.5%
Denmark	80.5	91.7	101.6	111.2	114.8	118.5	122.4	2.6%	2.1%	2.5%	3.2%	3.3%	2.7%
Finland	78.1	89.9	106.2	98.3	103.3	107.0	113.4	2.8%	3.4%	-0.5%	3.6%	6.0%	0.9%
France	758.3	811.0	940.0	967.1	987.1	1000.7	1022.7	1.4%	3.0%	1.0%	1.4%	2.2%	1.2%
Germany	1045.1	1124.0	1297.4	1388.5	1405.4	1423.4	1454.7	1.5%	2.9%	1.6%	1.3%	2.2%	1.6%
Greece	55.6	59.5	65.3	68.0	69.4	71.1	73.3	1.3%	1.9%	1.2%	2.4%	3.2%	1.7%
Ireland	24.2	27.4	35.9	43.2	48.3	52.2	57.8	2.5%	5.5%	6.1%	8.3%	10.6%	7.1%
Italy	690.6	744.0	861.2	884.6	910.6	916.6	930.4	1.5%	3.0%	1.1%	0.7%	1.5%	1.1%
Luxembourg	6.0	7.0	8.5	9.9	10.2	10.5	10.9	3.3%	3.9%	3.9%	2.6%	4.1%	3.7%
Netherlands	180.3	192.0	222.5	241.5	247.0	254.7	264.0	1.3%	3.0%	2.1%	3.1%	3.6%	2.5%
Portugal	39.8	41.6	54.3	57.6	59.1	60.8	63.1	0.9%	5.5%	1.7%	3.0%	3.7%	2.2%
Spain	290.5	313.3	398.2	414.3	425.7	435.3	450.1	1.5%	4.9%	1.3%	2.3%	3.4%	1.8%
Sweden	148.2	161.5	180.8	178.1	185.1	187.5	190.8	1.7%	2.3%	0.5%	1.3%	1.8%	0.8%
United Kingdom	590.7	650.6	763.1	792.5	814.1	831.9	861.1	1.9%	3.2%	1.3%	2.2%	3.5%	1.7%
EUROPEAN UNION	**4216.2**	**4553.7**	**5315.0**	**5551.6**	**5683.2**	**5777.8**	**5930.8**	**1.6%**	**3.1%**	**1.3%**	**1.7%**	**2.6%**	**1.6%**

FINAL ENERGY CONSUMPTION

...But warmer weather conditions compensated, finally stabilising final energy demand...

1997 is of particular interest as it presents similar climatic conditions to 1990. In that way a lot of comparisons, mainly regarding energy and environment indicators, can be made without having to correct for climatic variations. In 1997, **final energy demand** in the European Union (930 Mtoe) declined by 0.8% mainly due to warmer weather conditions which led to a 12% decline in degree-days compared to 1996. This compensated for the increasing consumption induced in industry and transport by the sustained economic growth. The major evolution therefore involved heating fuels, with natural gas leading the way with a 5.2% decline in consumption, followed by heating gas oil with a reduction by 4.5%, solid fuels by 1.7% and distributed heat by 1.3%. Since 1990, final energy demand has increased on average by 1.1% per year while GDP increased by 1.6% implying an elasticity of about 0.69.

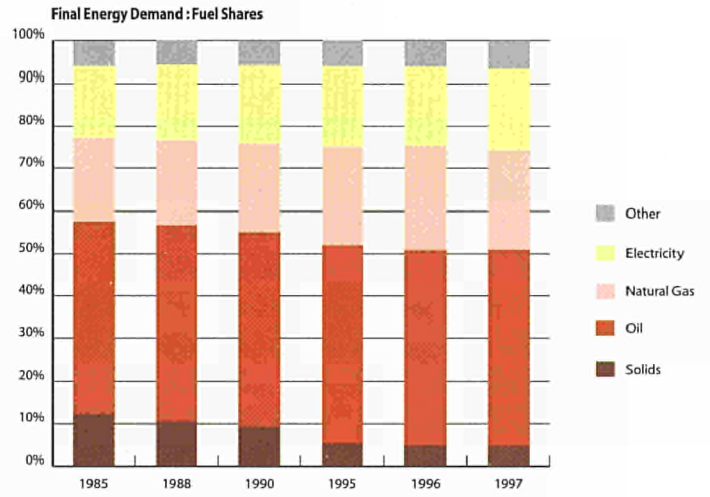
With about 46% of final energy demand, oil remained the largest energy source...

Oil remained the largest energy source with around 46% of total demand since 1990. But this apparent stability hides big structural changes in oil product consumption. Although oil products increased as a whole by 1.2% on average since 1990, consumption of kerosene grew by 4.0% per year on average, diesel oil by 3.3%, heating gas oil by 0.7%, while gasoline consumption remained stable and residual fuel oil consumption declined by 4.6% per year on average. Gas (23% share in 1997 against 21.6% in 1990 and 19.6% in 1985) grew by 2.8% per year on average since 1990, gaining market share in both industry (from 25.0% to 32.9%) and tertiary-domestic sectors (from 29.4% to 34.1%). Electricity demand (19% share in 1997 against 18.1% in 1990 and 16.6% in 1985) increased by 1.8% a year since 1990, corresponding to an

Main items

In 1997 the European Union had a combined population of some 375 m people, just over 6% of the world total. The Union is now the largest economic and political bloc in the world and the prospects are for continued expansion pending further discussion and political agreement with a number of Accession States. The European Union includes many of the earliest industrialising countries which have since evolved into mature industrialised economies. However, in recent years, the most significant developments have included the rapid growth of a wide range of service industries and a continuing shift to less energy-intensive manufacturing. Rising personal incomes have underpinned high standards of living, associated with widespread ownership of domestic appliances and private cars. Space heating requirements, influenced by the varied climatic conditions in the European Union, are generally high and temperature dependent. These trends have shaped the broad evolution of energy demand and will continue to do so in future. In particular, they explain a shift towards gas and electricity in final markets other than transport – the latter continuing to experience rapid growth and now accounting for a high proportion of total oil demand. Structural change, combined with saturation in some final markets, is leading to slower growth in energy use; but the European Union still accounts for some 15% of total world demand.

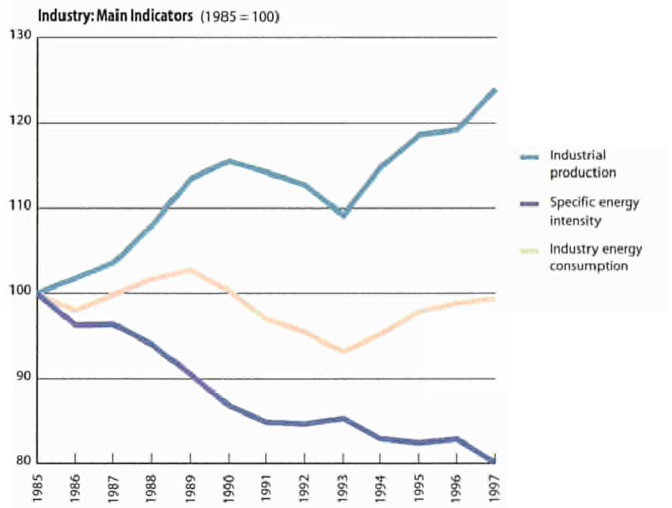
elasticity against GDP higher than 1. At the same time, the distributed heat demand, pushed by the development of combined production of heat and power in both industry and tertiary sectors, increased annually by 3.0% on average, with a major development since the 90's. As a consequence, the contribution of distributed energy networks (electricity, natural gas and distributed heat) reached 44% of total final energy demand in 1997 (40.7% in 1990) and 64.4% excluding transport energy consumption (57.7% in 1990). Since 1990 the consumption of solid fuels has been reduced by 43%, their share dropping from 9.3% to 4.9%. By fuels, lignite consumption fell by 82%, coke consumption declined by 29% and steam coal by 23%. The declining contribution of solid fuels must be linked to the conversion of the iron and steel sectors to electrical furnaces and the continuing closing of mines limiting deliveries to their local mineworkers. This evolution was completed by the increasing standard of living in the new German Länder where historically the consumption of lignite by final consumers used to be significant but it had become marginal by 1997. The contribution of renewable energy forms (biomass, wind, photovoltaics...) increased substantially with a major jump of 12% in 1997; and their share became comparable with that of solid fuel.



INDUSTRY

Industrial energy consumption rebounded since 1994 but industrial energy intensity continued to improve…

Energy consumption in industry has shown a contrasted evolution within three specific periods. During the second part of the 80's energy consumption increased slowly, the 15% increase of industrial production being compensated for by the energy savings generated by rational use of energy measures dictated by high energy prices prevailing in 1985 and continued industrial restructuring. Between 1990 and 1994 energy consumption declined by 1.6% per year on average, pushed by saving measures and depressed industrial production. Since 1994, energy consumption has grown at 1.6% per year on average while industrial production has increased by 2.0% on average. Consequently the specific energy intensity, (or energy consumption per unit of industrial production), has improved by about 20% since 1985. The recent evolution shows that sustained industrial production favours additional intensity gains. This can be a consequence of higher capacity utilisation rates combined with the continued development of small to medium-sized enterprises dedicated to high value-added products (electronics, telecoms, bioengineering…). The analysis of the specific energy intensity ratio is complex: technological improvements happened, but at the same time as structural changes. The accelerated restructuring of European industry, which commenced after the second petroleum shock, was continued, inducing a further reduction of activity in energy-intensive branches, such as iron and steel, chemicals and non-metallic minerals. In addition the last few years have been marked by the decline of manufacturing industries, including textiles, penalised by high labour costs. But this evolution seems to indicate that an economic potential for further energy savings still exists in traditional industrial sectors, in particular when energy prices are rising as in 1997.



The indices of industrial production reflect the 1993 recession with a slow-down of 3.2% in the European Union as a whole, followed by sustained recovery since then, particularly marked in 1994 (+5.1%), 1995 (+3.3%) and 1997 (+4%). The period 1990-97 demonstrated a limited increase by about 1.0% per year on average but the trends vary significantly across the Member States: the highest growth was obtained by Ireland, (+10.2% per year on

INDICES OF INDUSTRIAL PRODUCTION (1990=100) (1)

	1980	1985	1988	1990	1995	1996	1997	80/85	90/85	95/90	96/95	97/96	97/90
								Annual % Change					
Austria	75.9	82.3	87.7	100.0	112.3	112.9	119.8	1.6%	4.0%	2.3%	0.6%	6.1%	2.6%
Belgium	81.5	84.9	92.5	100.0	101.0	101.9	106.6	0.8%	3.3%	0.2%	0.8%	4.7%	0.9%
Denmark	76.4	92.5	97.1	100.0	115.8	117.7	123.9	3.9%	1.6%	3.0%	1.6%	5.3%	3.1%
Finland	73.6	88.1	97.3	100.0	114.5	118.8	129.5	3.7%	2.6%	2.7%	3.8%	9.0%	3.8%
France	89.3	87.1	94.9	100.0	99.7	99.6	103.6	-0.5%	2.8%	-0.1%	-0.1%	4.0%	0.5%
Germany	82.5	85.5	90.4	100.0	95.9	96.5	99.9	0.7%	3.2%	-0.8%	0.6%	3.6%	0.0%
Greece	90.9	97.2	100.8	100.0	97.4	98.4	100.1	1.4%	0.6%	-0.5%	1.0%	1.8%	0.0%
Ireland	54.2	69.6	85.6	100.0	158.5	171.1	197.3	5.1%	7.5%	9.7%	8.0%	15.3%	10.2%
Italy	87.5	84.8	96.9	100.0	107.9	105.8	109.9	-0.6%	3.3%	1.5%	-1.9%	3.8%	1.4%
Luxembourg	69.9	84.9	93.4	100.0	101.3	100.8	107.7	4.0%	3.3%	0.3%	-0.4%	6.8%	1.1%
Netherlands	85.3	90.8	94.1	100.0	108.3	112.4	115.5	1.3%	1.9%	1.6%	3.8%	2.7%	2.1%
Portugal	62.5	73.9	85.9	100.0	99.7	105.0	107.9	3.4%	6.2%	-0.1%	5.3%	2.8%	1.1%
Spain	82.9	86.0	95.6	100.0	103.3	102.2	109.3	0.7%	3.1%	0.6%	-1.0%	7.0%	1.3%
Sweden	78.1	86.6	90.3	100.0	112.8	114.7	122.8	2.1%	2.9%	2.4%	1.7%	7.1%	3.0%
United Kingdom	85.8	88.9	97.6	100.0	107.3	108.0	109.7	0.7%	2.4%	1.4%	0.6%	1.6%	1.3%
EUROPEAN UNION	**80.4**	**86.6**	**93.6**	**100.0**	**102.7**	**103.3**	**107.4**	**1.5%**	**2.9%**	**0.5%**	**0.5%**	**4.0%**	**1.0%**

(1) Excluding construction

average) followed by the Nordic countries (between 3 and 4%). Germany, globally stable since 1990, experienced the weakest growth due to the reunification.

The contribution of gas and electricity together reached 61% of total consumption in 1997…

In terms of **fuel mix**, significant changes have occurred since 1985 with the declining contribution of solids in the coke and steam coal markets. Consumption is increasingly concentrated in the iron and steel sector despite the recent growth of electric arc furnaces. Coke consumption is decreasing slowly although hard coal and lignite consumption has been more than halved, even in the building material sector where they compete with petroleum coke and industrial wastes. Oil consumption declined continuously, except during the recession period, falling by 20% since 1985. The reduction of residual fuel oil, about 15 Mtoe since 1985, exceeded the total reduction in industrial energy demand. This was partly compensated by an increase of petroleum coke consumption. Globally, other products, in particular LPG and gas oil, remained constant. Consequently, the share of heavy products (residual fuel oil and petroleum coke) has declined from 62% in 1990 to 50% in 1997. Gas and electricity, which showed an average growth rate of about 2.2% and 1.5% respectively per annum since 1985, largely dominated the industrial energy market. Since 1990, they have both increased their market shares to reach 33% for natural gas and 28% for electricity. Their progression must be partly related to the reduced share of energy-intensive industries (iron & steel, chemicals, building materials…); this share declined from 56% in 1985 to 49% in 1997. In addition, excluding the climatic effect, gas consumption benefited from the significant improvements that occurred in all gas technologies (gas turbines, gas engines…) over the last five years, resulting in higher efficiencies and reduced environmental impacts. This evolution will be reinforced in the near future, as in electricity, by the progressive liberalisation of these two energy markets. Overall, the resulting share of each fuel changed over the period 1985-1997 as follows: solids from 24% to 14%, oil from 21% to 17%, gas from 25% to 33% and electricity from 23% to 28%.

Energy developments showed large variations amongst Member States…

Energy developments in industry on a Member State basis show large variations, with Ireland's industrial energy intensity dropping by about 53% in the 1990-97 period at the same time as it saw the fastest growth in industrial production as a result of diversification towards high added-value industries. Sweden, Finland, Denmark and Austria, who experienced the most sustained increase in industrial production after Ireland with a progress since 1990 of between 20% and 30%, are also amongst the best performers in terms of energy efficiency with improvements of between 7.5% and 13.9% over this period. This confirms that improvements in energy intensity require sustained industrial production growth. The experience of the five major Member States (France, Germany, Italy, Spain and the United Kingdom) was not so good. Between 1985 and 1990, all of them registered a growth of industrial production of about 11%-15% accompanied by a reduction in energy intensity ranging from 1% in Italy to 23% in Germany. Since 1990, the evolution has been even more contrasted. The changes in industrial production ranged from a stabilisation in Germany, deeply influenced by the industrial restructuring in the new

Länder, to an increase of about 10% in Italy, Spain and the United Kingdom. At the same time, the range for energy intensity went from –17.6% in Germany to +1.1% in Spain. If we exclude Germany, where energy intensity gains are mainly due to the restructuring and the closing of old industries in the new Länder, intensity improvements (of about 5%) occurred only in Italy and the United Kingdom which both showed progress in industrial production. The share of total industrial energy demand of these five Member States remained stable overall, representing about three-quarters of the European Union's consumption. The most spectacular improvement occurred in Luxembourg in '94 and '95, largely the result of the conversion of the steel industry to electric arc furnaces.

The improvement of energy intensity at the European level has been favoured by the gains observed in Germany, Austria, the Netherlands, Denmark and France. This corresponds to countries where specific attention, often through policy measures, has been given to the reduction of industrial energy consumption. This means that a co-ordinated policy at the European level could help the other Member States to continue to improve the energy performance of industry even if major progress has already been noted since the beginning of the 1980's.

Throughout the European Union, energy price discrepancies remained considerable...

The average prices of energy for industrial consumers (1990 EUR per toe) over the 1990-1997 period show an average yearly decrease of 7.1% for steam coal, largely influenced by the ending of the kohlpfennig in Germany in 1996, 0.1% for heavy oil, 1.1% for natural gas and 3.2% for electricity based on the weighted average at the European level. In 1997, the difference between average European prices per toe of heavy fuel (122 EUR) and natural gas (119 EUR) narrowed but without affecting the significant substitution in favour of gas. The more rapid decline of electricity prices also favoured electrici-

EUROPEAN UNION : INDUSTRY - FINAL ENERGY CONSUMPTION

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Total consumption	**264.1**	**268.5**	**264.9**	**258.4**	**261.1**	**262.6**	**0.1%**	**-0.5%**	**1.0%**	**0.6%**	**-0.1%**
Iron & Steel	61.0	58.0	55.7	54.2	52.4	53.7	-1.8%	-0.5%	-3.2%	2.4%	-0.6%
Chemicals	50.4	51.8	50.3	44.4	43.5	43.4	0.0%	-2.5%	-2.1%	-0.3%	-2.4%
Building Materials	35.0	35.5	35.8	32.3	32.5	31.7	0.4%	-2.1%	0.8%	-2.6%	-2.0%
Other	117.7	123.2	123.1	127.6	132.7	133.9	0.9%	0.7%	4.0%	0.9%	1.4%
Solids	**63.5**	**57.6**	**53.5**	**39.2**	**36.7**	**37.2**	**-3.4%**	**-6.0%**	**-6.4%**	**1.2%**	**-5.9%**
Iron & Steel	29.1	26.2	25.6	24.7	23.2	24.4	-2.5%	-0.7%	-6.3%	5.2%	-0.8%
Chemicals	7.8	7.7	6.3	2.7	2.6	2.6	-4.4%	-15.4%	-6.2%	0.3%	-13.9%
Building Materials	12.9	10.9	10.3	6.9	6.4	5.7	-4.4%	-7.7%	-6.9%	-10.7%	-9.3%
Other	13.6	12.8	11.2	4.9	4.6	4.5	-3.7%	-15.4%	-6.4%	-1.4%	-14.1%
Oil	**56.7**	**55.5**	**48.9**	**48.7**	**46.2**	**45.6**	**-2.9%**	**-0.1%**	**-5.1%**	**-1.2%**	**-1.1%**
Iron & Steel	4.0	4.2	3.7	3.8	3.3	3.4	-1.4%	0.3%	-11.7%	1.2%	-1.6%
Chemicals	12.1	11.9	10.3	9.3	7.4	7.5	-3.1%	-2.1%	-20.6%	1.6%	-5.2%
Building Materials	8.8	9.4	9.6	8.4	8.3	8.5	1.7%	-2.6%	-1.5%	2.8%	-2.0%
Other	31.7	29.9	25.2	27.2	27.2	26.3	-4.5%	1.5%	0.0%	-3.4%	0.7%
Gas	**66.7**	**72.2**	**77.2**	**82.0**	**88.2**	**86.4**	**3.0%**	**1.2%**	**7.6%**	**-2.0%**	**1.9%**
Iron & Steel	19.2	19.0	18.0	17.1	17.5	17.1	-1.3%	-1.1%	2.3%	-1.9%	-0.8%
Chemicals	15.0	15.7	16.8	17.6	18.7	18.1	2.3%	1.0%	6.0%	-3.3%	1.2%
Building Materials	8.7	10.0	10.8	11.6	12.3	11.9	4.3%	1.4%	6.5%	-3.1%	1.7%
Other	23.8	27.5	31.6	35.7	39.8	39.3	5.8%	2.5%	11.3%	-1.2%	3.7%
Electricity	**61.9**	**67.3**	**69.3**	**71.4**	**71.7**	**74.0**	**2.3%**	**0.6%**	**0.5%**	**3.1%**	**1.1%**
Iron & Steel	8.5	8.5	8.2	8.6	8.5	8.8	-0.8%	0.9%	-1.5%	3.7%	1.1%
Chemicals	14.6	15.6	16.1	14.2	14.2	14.6	1.9%	-2.5%	0.1%	3.0%	-1.6%
Building Materials	4.3	4.9	5.0	5.3	5.4	5.4	3.0%	1.2%	2.0%	-0.2%	1.3%
Other	34.4	38.3	40.0	43.3	43.7	45.2	3.0%	1.6%	0.9%	3.4%	2.0%
Heat	**3.3**	**3.7**	**3.8**	**3.1**	**4.1**	**4.2**	**2.7%**	**-3.8%**	**31.9%**	**2.8%**	**1.9%**
Industrial Production Index (1990=100)	86.6	93.6	100.0	102.7	103.3	107.4	2.9%	0.5%	0.5%	4.0%	1.2%
Industrial Energy Intensity (1990=100)	115.1	108.3	100.0	95.0	95.5	92.3	-2.8%	-1.0%	0.5%	-3.3%	-1.3%

INDUSTRIAL ENERGY CONSUMPTION

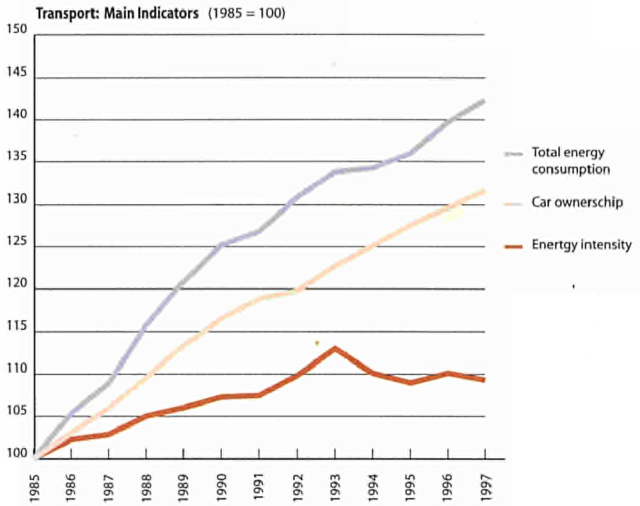
	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Austria											
Total Consumption (Mtoe)	5.8	5.7	5.7	5.9	6.1	6.1	-0.3%	0.4%	4.1%	0.6%	1.0%
Share in European Union (%)	2.2%	2.1%	2.2%	2.3%	2.3%	2.3%	-0.4%	0.9%	3.0%	0.0%	1.1%
Specific Industrial Energy Intensity (1990=100)	123.4	113.3	100.0	91.1	94.2	89.3	-4.1%	-1.9%	3.5%	-5.2%	-1.6%
Belgium											
Total Consumption (Mtoe)	10.6	11.1	11.5	11.8	11.5	12.5	1.5%	0.5%	-1.8%	8.2%	1.2%
Share in European Union (%)	4.0%	4.1%	4.3%	4.6%	4.4%	4.8%	1.4%	1.0%	-2.9%	7.6%	1.4%
Specific Industrial Energy Intensity (1990=100)	109.4	105.0	100.0	101.6	98.9	102.3	-1.8%	0.3%	-2.7%	3.4%	0.3%
Denmark											
Total Consumption (Mtoe)	2.7	2.7	2.8	3.0	3.0	3.0	0.6%	1.1%	2.5%	-0.2%	1.1%
Share in European Union (%)	1.0%	1.0%	1.1%	1.1%	1.2%	1.2%	0.5%	1.6%	1.4%	-0.7%	1.3%
Specific Industrial Energy Intensity (1990=100)	105.1	100.7	100.0	91.3	92.1	87.3	-1.0%	-1.8%	0.9%	-5.2%	-1.9%
Finland											
Total Consumption (Mtoe)	8.0	8.4	8.8	9.9	10.2	10.6	1.9%	2.4%	2.8%	3.5%	2.6%
Share in European Union (%)	3.0%	3.1%	3.3%	3.8%	3.9%	4.0%	1.8%	2.9%	1.8%	2.9%	2.7%
Specific Industrial Energy Intensity (1990=100)	103.4	97.6	100.0	98.3	97.4	92.5	-0.7%	-0.3%	-0.9%	-5.0%	-1.1%
France											
Total Consumption (Mtoe)	37.8	36.8	36.8	37.5	37.5	37.7	-0.5%	0.4%	0.1%	0.6%	0.4%
Share in European Union (%)	14.3%	13.7%	13.9%	14.5%	14.4%	14.4%	-0.6%	0.8%	-0.9%	0.1%	0.5%
Specific Industrial Energy Intensity (1990=100)	118.0	105.4	100.0	102.1	102.3	98.9	-3.3%	0.4%	0.2%	-3.3%	-0.2%
Germany											
Total Consumption (Mtoe)	79.8	77.6	71.5	62.0	61.0	58.9	-2.2%	-2.8%	-1.7%	-3.4%	-2.7%
Share in European Union (%)	30.2%	28.9%	27.0%	24.0%	23.4%	22.4%	-2.2%	-2.3%	-2.7%	-3.9%	-2.6%
Specific Industrial Energy Intensity (1990=100)	130.4	120.0	100.0	90.4	88.4	82.4	na	-2.0%	-2.2%	-6.8%	-2.7%
Greece											
Total Consumption (Mtoe)	3.7	4.1	3.9	4.1	4.3	4.3	1.0%	0.8%	5.0%	1.0%	1.4%
Share in European Union (%)	1.4%	1.5%	1.5%	1.6%	1.6%	1.7%	1.0%	1.3%	3.9%	0.4%	1.5%
Specific Industrial Energy Intensity (1990=100)	97.6	102.6	100.0	106.8	111.0	110.2	0.5%	1.3%	4.0%	-0.7%	1.4%
Ireland											
Total Consumption (Mtoe)	1.8	1.8	2.0	1.8	1.8	1.9	2.2%	-2.2%	1.4%	3.3%	-0.9%
Share in European Union (%)	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	2.1%	-1.7%	0.3%	2.7%	-0.8%
Specific Industrial Energy Intensity (1990=100)	129.0	107.8	100.0	56.4	53.0	47.4	-5.0%	-10.8%	-6.1%	-10.4%	-10.1%
Italy											
Total Consumption (Mtoe)	31.5	35.1	36.9	37.1	36.5	37.5	3.2%	0.1%	-1.7%	2.6%	0.2%
Share in European Union (%)	11.9%	13.1%	13.9%	14.4%	14.0%	14.3%	3.1%	0.6%	-2.7%	2.0%	0.3%
Specific Industrial Energy Intensity (1990=100)	100.6	98.2	100.0	93.3	93.5	92.4	-0.1%	-1.4%	0.3%	-1.2%	-1.1%
Luxembourg											
Total Consumption (Mtoe)	1.8	1.6	1.7	1.2	1.1	1.0	-0.6%	-7.2%	-2.7%	-10.3%	-7.1%
Share in European Union (%)	0.7%	0.6%	0.6%	0.5%	0.4%	0.4%	-0.7%	-6.8%	-3.7%	-10.8%	-6.9%
Specific Industrial Energy Intensity (1990=100)	121.5	101.7	100.0	67.8	66.3	55.7	-3.8%	-7.5%	-2.3%	-16.0%	-8.0%
Netherlands											
Total Consumption (Mtoe)	13.7	13.1	13.2	12.7	13.2	13.2	-0.7%	-0.9%	4.1%	0.1%	0.0%
Share in European Union (%)	5.2%	4.9%	5.0%	4.9%	5.0%	5.0%	-0.8%	-0.4%	3.0%	-0.4%	0.1%
Specific Industrial Energy Intensity (1990=100)	114.2	105.5	100.0	88.3	88.6	86.4	-2.6%	-2.5%	0.3%	-2.5%	-2.1%
Portugal											
Total Consumption (Mtoe)	3.7	3.8	4.1	4.3	4.7	5.3	2.3%	0.8%	9.6%	12.4%	3.6%
Share in European Union (%)	1.4%	1.4%	1.6%	1.7%	1.8%	2.0%	2.3%	1.3%	8.5%	11.8%	3.8%
Specific Industrial Energy Intensity (1990=100)	120.5	107.6	100.0	104.5	108.8	118.9	-3.7%	0.9%	4.1%	9.3%	2.5%
Spain											
Total Consumption (Mtoe)	18.8	19.4	19.8	20.7	20.5	21.8	1.0%	1.0%	-1.2%	6.5%	1.4%
Share in European Union (%)	7.1%	7.2%	7.5%	8.0%	7.8%	8.3%	0.9%	1.5%	-2.2%	5.9%	1.6%
Specific Industrial Energy Intensity (1990=100)	110.9	102.9	100.0	101.7	101.5	101.1	-2.0%	0.3%	-0.2%	-0.4%	0.2%
Sweden											
Total Consumption (Mtoe)	11.9	11.8	11.8	12.6	12.4	12.5	-0.1%	1.3%	-1.7%	0.7%	0.8%
Share in European Union (%)	4.5%	4.4%	4.5%	4.9%	4.8%	4.8%	-0.1%	1.8%	-2.7%	0.2%	0.9%
Specific Industrial Energy Intensity (1990=100)	115.9	110.9	100.0	94.7	91.5	86.1	-2.9%	-1.1%	-3.4%	-5.9%	-2.1%
United Kingdom											
Total Consumption (Mtoe)	32.4	35.3	34.2	33.9	37.1	36.1	1.1%	-0.2%	9.6%	-2.6%	0.8%
Share in European Union (%)	12.3%	13.1%	12.9%	13.1%	14.2%	13.8%	1.1%	0.3%	8.5%	-3.2%	0.9%
Specific Industrial Energy Intensity (1990=100)	106.4	105.5	100.0	92.1	100.3	96.2	-1.2%	-1.6%	8.9%	-4.1%	-0.6%
European Union											
Total Consumption (Mtoe)	264.14	268.54	264.91	258.43	261.10	262.56	0.1%	-0.5%	1.0%	0.6%	-0.1%
Specific Industrial Energy Intensity (1990=100)	115.1	108.3	100.0	95.0	95.5	92.3	-2.8%	-1.0%	0.5%	-3.3%	-1.1%

ENERGY PRICES TO INDUSTRIAL CONSUMERS IN CONSTANT 1990 EUR PER TOE (1)(2)

		1985	1988	1990	1994	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
									Annual % Change				
Austria	Steam Coal	154.6	97.0	91.7	71.8	72.4	67.4	66.9	-9.9%	-4.6%	-7.0%	-0.7%	-4.4%
	Heavy fuel oil 3.5 % S	310.5	109.2	98.7	72.5	84.1	83.4	79.0	-20.5%	-3.1%	-0.9%	-5.3%	-3.1%
	Natural gas	304.7	150.8	138.9	118.6	115.8	119.5	129.9	-14.5%	-3.6%	3.1%	8.7%	-1.0%
	Electricity	726.2	699.4	598.2	579.1	561.2	579.5	656.3	-3.8%	-1.3%	3.3%	13.2%	1.3%
Belgium	Steam Coal	120.6	72.8	62.4	na	na	na	na	-12.3%	-	-	-	-
	Heavy fuel oil 3.5 % S	270.5	85.1	102.6	98.8	98.7	105.4	106.3	-17.6%	-0.8%	6.8%	0.9%	0.5%
	Natural gas	273.6	106.0	113.7	88.2	87.2	84.1	94.6	-16.1%	-5.2%	-3.6%	12.5%	-2.6%
	Electricity	775.2	582.4	584.7	487.8	487.2	482.1	461.6	-5.5%	-3.6%	-1.0%	-4.3%	-3.3%
Denmark	Steam Coal	191.4	127.3	134.9	79.5	78.5	na	na	-6.7%	-10.3%	-	-	-
	Heavy fuel oil 3.5 % S	286.2	111.1	na	na	na	na	na	-	-	-	-	-
	Electricity	875.7	533.2	569.8	548.7	521.1	556.2	545.1	-8.2%	-1.8%	6.8%	-2.0%	-0.6%
Finland	Steam Coal	128.7	75.5	78.7	87.7	107.5	103.4	128.0	-9.4%	6.4%	-3.8%	23.8%	7.2%
	Heavy fuel oil 3.5 % S	345.5	132.1	144.9	na	na	na	na	-15.9%	-	-	-	-
	Natural gas	270.8	97.9	97.3	104.3	117.2	124.9	134.6	-18.5%	3.8%	6.6%	7.8%	4.7%
	Electricity	765.6	621.7	578.4	559.2	561.9	584.0	564.9	-5.5%	-0.6%	3.9%	-3.3%	-0.3%
France	Steam Coal	144.6	111.2	106.1	99.5	97.8	95.9	95.0	-6.0%	-1.6%	-2.0%	-0.8%	-1.6%
	Heavy fuel oil 3.5 % S	288.2	98.7	110.2	91.5	96.3	100.1	98.4	-17.5%	-2.7%	4.0%	-1.7%	-1.6%
	Natural gas	271.1	123.2	122.2	103.8	104.2	105.2	111.9	-14.7%	-3.1%	1.0%	6.4%	-1.2%
	Electricity	599.3	517.2	516.5	452.0	452.5	428.1	415.3	-2.9%	-2.6%	-5.4%	-3.0%	-3.1%
Germany	Steam Coal (3)	209.0	211.2	202.8	190.3	189.7	68.0	67.5	-0.6%	-1.3%	-64.1%	-0.8%	-14.5%
	Heavy fuel oil 3.5 % S	284.5	96.1	115.0	na	na	na	na	-16.6%	-	-	-	-
	Natural gas	284.0	127.8	147.7	126.6	123.8	124.7	133.0	-12.3%	-3.5%	0.7%	6.6%	-1.5%
	Electricity	833.2	880.0	835.3	710.6	694.2	619.1	584.7	0.0%	-3.6%	-10.8%	-5.5%	-5.0%
Greece	Heavy fuel oil 3.5 % S	284.9	169.2	129.3	118.7	na	na	na	-14.6%	-	-	-	-
	Electricity	775.4	657.6	593.3	440.7	431.0	396.0	382.6	-5.2%	-6.2%	-8.1%	-3.4%	-6.1%
Ireland	Heavy fuel oil 3.5 % S	328.2	130.9	129.9	122.9	129.7	226.2	148.7	-16.9%	0.0%	74.4%	-34.3%	1.9%
	Natural gas	389.0	280.4	260.8	234.4	228.5	224.8	221.5	-7.7%	-2.6%	-1.6%	-1.4%	-2.3%
	Electricity	965.7	700.3	619.5	561.4	547.3	543.5	542.1	-8.5%	-2.4%	-0.7%	-0.3%	-1.9%
Italy	Steam Coal	131.9	74.6	65.8	63.6	68.5	60.7	63.0	-13.0%	0.8%	-11.4%	3.8%	-0.6%
	Heavy fuel oil 3.5 % S	303.0	88.3	150.9	138.7	149.0	149.4	143.3	-13.0%	-0.3%	0.2%	-4.1%	-0.7%
	Natural gas	271.7	86.9	123.7	137.5	145.6	151.1	158.4	-14.6%	3.3%	3.8%	4.8%	3.6%
	Electricity	1183.0	863.3	893.9	928.3	903.5	900.6	903.6	-5.4%	0.2%	-0.3%	0.3%	0.2%
Luxembourg	Heavy fuel oil 3.5 % S	287.6	93.4	106.7	93.0	na	na	na	-18.0%	-	-	-	-
	Electricity	739.6	708.0	649.0	541.4	540.7	535.1	512.4	-2.6%	-3.6%	-1.0%	-4.3%	-3.3%
Netherlands	Steam Coal	129.1	65.0	70.6	na	na	na	na	-11.4%	-	-	-	-
	Heavy fuel oil 3.5 % S	275.3	119.8	147.5	117.3	119.1	120.0	na	-11.7%	-4.2%	0.8%	-	-
	Natural gas	234.9	97.9	98.6	82.6	89.6	87.9	93.1	-15.9%	-1.9%	-1.9%	5.9%	-0.8%
	Electricity	690.4	451.0	479.3	522.3	522.5	515.2	513.3	-7.0%	1.7%	-1.4%	-0.4%	1.0%
Portugal	Heavy fuel oil 3.5 % S	294.9	163.2	147.8	110.7	105.5	110.3	114.4	-12.9%	-6.5%	4.5%	3.7%	-3.6%
	Electricity	1050.7	1115.4	1059.7	913.7	830.9	762.9	740.8	0.2%	-4.7%	-8.2%	-2.9%	-5.0%
Spain	Heavy fuel oil 3.5 % S	365.8	130.8	119.9	122.0	139.4	152.2	151.9	-20.0%	3.1%	9.2%	-0.2%	3.4%
	Natural gas	359.5	155.7	129.0	114.3	119.2	124.1	129.8	-18.5%	-1.6%	4.1%	4.6%	0.1%
	Electricity	969.3	1015.6	892.7	768.6	705.6	681.0	622.7	-1.6%	-4.6%	-3.5%	-8.6%	-5.0%
Sweden	Steam Coal	145.6	107.6	98.2	na	na	na	na	-7.6%	-	-	-	-
	Electricity	503.6	465.5	456.2	360.7	354.3	377.8	325.8	-2.0%	-4.9%	6.6%	-13.8%	-4.7%
United Kingdom	Steam Coal	151.3	113.2	99.5	78.3	70.2	65.1	61.4	-8.1%	-6.7%	-7.3%	-5.8%	-6.7%
	Heavy fuel oil 3.5 % S	293.4	109.6	108.1	94.6	107.2	114.9	106.3	-18.1%	-0.2%	7.2%	-7.5%	-0.2%
	Natural gas	212.3	152.2	124.9	113.3	95.5	68.2	68.2	-10.1%	-5.2%	-28.6%	0.0%	-8.3%
	Electricity	777.3	711.0	648.1	624.1	597.9	563.5	515.0	-3.6%	-1.6%	-5.8%	-8.6%	-3.2%
European Union	Steam Coal (3)	155.8	131.5	122.9	117.1	115.4	73.7	73.2	-4.6%	-1.2%	-36.1%	-0.8%	-7.1%
	Heavy fuel oil 3.5 % S	305.2	108.9	123.5	110.5	120.4	127.2	122.4	-16.6%	-0.5%	5.7%	-3.8%	-0.1%
	Natural gas	263.0	121.4	128.6	117.0	116.4	112.8	118.9	-13.3%	-2.0%	-3.1%	5.4%	-1.1%
	Electricity	734.0	658.9	635.7	584.3	567.8	537.5	506.9	-2.8%	-2.2%	-5.3%	-5.7%	-3.2%

(1) Excluding Refundable VAT
(2) Estimates marked in bold
(3) marked by the suppression of te kohlpfennig in Germany in 1996

ty uses, increasing the competitiveness of many electro-technologies. Between Member States, the prices for the different energy sources show important discrepancies in both value and trends depending on supply conditions, market mechanisms and taxation. The ranges between the extreme prices remained considerable: from 79 EUR/toe (Austria) to 152 EUR/toe (Spain) for heavy fuel oil, from 68 EUR/toe (the United Kingdom) to 221 ECU/toe (Ireland) for natural gas and from 326 EUR/toe (Sweden) to 904 EUR/toe (Italy) for electricity. It must be stressed that the liberalisation of the electricity and gas markets in the United Kingdom resulted in impressive price reductions both for gas and electricity; 28% for gas in only two years and 14% for electricity.



TRANSPORT

Transport sector responsible for 80% of final energy demand increase since 1985 but only 50% since 1990…

Energy consumption in Transport grew between 1985 and 1997 at an average annual rate of 3.0% but, in the period 1990-97, the growth remained limited to 1.9% per year despite a jump of 2.8% in 1996. This must be compared to the 4.6% average growth registered during the second part of the 1980's. In 1997, total energy demand in the transport sector (excluding marine bunkers) reached 289 Mtoe or 31% of total final energy demand compared with only 24.6% in 1985. This underlines the predominant contribution of the transport sector in the growth of final energy demand. Between 1985 and 1997 the increase of energy consumption for transport, about 86 Mtoe, represented 80% of the total increase in final energy demand. But, between 1990 and 1997, transport contributed only 50% of the total increase of final energy demand, the rest being absorbed by the tertiary-domestic sector. It is particularly difficult to interpret the recent trends in the transport sector. Since 1993 energy demand grew more slowly than before and the energy intensity, measured against the GDP, diminished.

Passenger traffic has grown more rapidly than economic growth driven by leisure-time travel…

The volume of passenger traffic in the European Union has grown more rapidly than economic growth since the beginning of the 80's. During the 1980's passenger traffic increased on average by 3.2% per year against 2.3% GDP growth. Since 1990 this growth has been reduced to 2.0% per year on average compared with economic growth of 1.6%. This evolution

EUROPEAN UNION : TRANSPORT - FINAL ENERGY CONSUMPTION

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Total consumption	202.80	234.74	253.85	275.69	283.29	288.63	4.6%	1.7%	2.8%	1.9%	1.9%
Solids	0.18	0.04	0.03	0.01	0.01	0.01	-28.8%	-15.0%	2.4%	-1.3%	-10.8%
Oil	199.00	230.85	249.60	270.72	278.15	283.44	4.6%	1.6%	2.7%	1.9%	1.8%
of which:											
Road	170.18	197.26	212.26	228.75	234.20	238.17	4.5%	1.5%	2.4%	1.7%	1.7%
Motor Gasoline	*105.38*	*116.75*	*121.79*	*120.48*	*122.75*	*122.34*	*2.9%*	*-0.2%*	*1.9%*	*-0.3%*	*0.1%*
Diesel Oil	*62.48*	*77.96*	*87.78*	*105.50*	*108.64*	*112.94*	*7.0%*	*3.7%*	*3.0%*	*4.0%*	*3.7%*
Air	21.09	25.43	27.81	32.54	34.37	36.04	5.7%	3.2%	5.6%	4.9%	3.8%
Jet Fuel	*20.98*	*25.29*	*27.69*	*32.41*	*34.25*	*35.95*	*5.7%*	*3.2%*	*5.7%*	*4.9%*	*3.8%*
Gas	0.24	0.22	0.21	0.27	0.29	0.30	-2.9%	5.1%	8.2%	4.9%	5.6%
Electricity	3.39	3.63	4.00	4.69	4.83	4.87	3.4%	3.2%	3.0%	0.9%	2.8%
Transport Energy Intensity (toe/1990 MEUR)	44.54	46.76	47.76	48.51	49.03	48.67	1.4%	0.3%	1.1%	-0.7%	0.3%
Transport Energy Intensity (1990=100)	93.25	97.90	100.00	101.57	102.66	101.90	1.4%	0.3%	1.1%	-0.7%	0.3%
Nb. of Vehicles (millions)	135.23	146.55	157.32	180.60	184.07	187.37	3.1%	2.8%	1.9%	1.8%	2.5%
Specific Consumption in Road Traffic (toe/vehicle)	1.26	1.35	1.35	1.27	1.27	1.27	1.4%	-1.3%	0.4%	-0.1%	-0.8%

has been relatively uniform across most of the European countries; southern countries (respectively Portugal, Greece, Italy and Spain) showed above-average growth in passenger traffic volume; while in Sweden growth was below average. Rises in overall European passenger traffic volume can be seen in absolute figures for all transportation modes. But the relative proportion of rail (5.8% in 1997) and bus traffic (8.7%) has declined continuously in favour of passenger cars (78.7%) and air traffic (6.7%). The volume of work-related traffic (journeys between home and workplace, university or school as well as business trips) has remained very constant. By contrast, leisure-time travel (attending leisure-time events, weekend excursions, holiday trips...) has risen significantly in just a few years. Globally passenger transport reached 4,700 billion passenger-kilometres in 1996, or 12,500 passenger-kilometres per person equivalent to 35 passenger-kilometres per person per day.

Goods transport accelerated since 1990 as a consequence of just-in-time industrial organisation...

Goods transport evolved differently from passenger traffic. During the 1980's, goods traffic increased on average by 1.9% per year with a major expansion of road traffic that reached 4.0% per year on average. Since 1990, as a consequence of just-in-time industrial organisation to reduce stocks and working capital, goods transport has increased by 2.8% per year on average. Road transport grew by 29% over the last seven years, followed by sea (intra) with a 22% increase and inland waterways with a 10% increase. At the same time the contribution of rail declined by 7%. In 1997, the respective shares per mode were: 43.5% for road transport (40.7% in 1990), 40.5% for sea (40.1%), 8.6% for rail (11.1%) and 4.3% for inland waterways (4.7%). In 1996, goods transport demand was 2,640 billion ton-kilometres or 7,100 ton-kilometres per person corresponding to 20 ton-kilometres per person per day.

Increasing energy and environmental implications of road transport...

Within the transport sector, road transport is by far the largest energy contributor, accounting for about 83% of total energy demand since 1985. The energy and environmental implications of road transport are increasing because the expected growth in traffic volumes is likely to more than offset the expected energy efficiency improvements in vehicle performance. Also, the rate of car ownership is steadily increasing with the number of cars in the European Union having increased by about 3% per year on average since 1985, but only by 2.1% since 1990. In addition, larger cars (over 1500cc) have increased their share of new registrations at the expense of smaller cars. In 1997, marked differences in car ownership rates still existed between countries: Greece had the lowest ownership with 229 passenger cars per 1000 inhabitants and Italy the highest with 577. The European average reached 450 cars per 1000 inhabitants, a 12.5% increase since 1990. Variations in income levels and fuel prices, and different tax regimes for the purchase, ownership and use of cars are part of the explanation for these differences.

Diesel oil share reached 47% of the total road consumption in 1997...

The share of diesel in total road fuel consumption has increased continuously since 1980, growing from 36.7% to reach 47.4% in 1997. This evolution is the result of two main phenomena: the increasing volume of goods transported by road and the progressive dieselisation of the car fleet. The number of goods vehicles, consuming diesel for the major part with the exception of some light vehicles, increased by 47% during the 1980's and by an additional 17% since 1990. In addition, although the utilisation rate (ton-kilometres per vehicle) of the goods vehicle fleet remained stable during the 1980's, it increased by 11% since 1990. On the other hand, the share of diesel cars increased regularly to reach 15% in the European Union as a whole in 1995. Depending largely upon fiscal regimes, the share of diesel cars varied from 31% in Belgium to only 1% in the United Kingdom.

Surging demand for air transport, still stimulated by the liberalisation of air markets...

The demand for aviation fuel grew on average by 4.6% per annum since 1985, as a result of rising real incomes implying increasing leisure air travel combined with the recent liberalisation of air markets that induced spectacular reductions in fares. The movement was initiated by low-cost companies and followed by the major companies. Kerosene consumption increased respectively by 5.7% in 1996 and 4.9% in 1997.

Transport energy intensity peaked in 1993 and declined by 0.8% per year since then...

Transport energy intensity grew continuously by 1.5% between 1985 and 1993 but has declined since then by 0.8% per year on average. But without statistical disaggregation between private and freight transport it is not currently possible to analyse in detail the determinants of this new trend. Many factors already described above have contributed to this evolution: the slowdown of the growth of passenger traffic associated with a stabilisation of the road contribution, technological improvements in the car fleet, accelerated contribution of road for good transportation compensated by a better utilisation of the goods vehicles and also technological improvement to increase efficiencies

TRANSPORT ENERGY CONSUMPTION

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Austria	**4.52**	**5.06**	**5.40**	**6.23**	**6.29**	**6.26**	**3.6%**	**2.9%**	**1.0%**	**-0.5%**	**2.1%**
Transport Energy Intensity (toe/1990 MEUR)	42.09	43.86	42.98	44.99	44.70	43.39	0.4%	0.9%	-0.6%	-2.9%	0.7%
Road Consumption	4.02	4.47	4.75	5.39	5.39	5.39	3.4%	2.6%	0.0%	0.0%	1.8%
Specific consumption in (toe/vehicle)	1.28	1.31	1.31	1.25	1.25	1.22	0.4%	-0.8%	-0.3%	-2.6%	-0.6%
Belgium	**6.13**	**7.39**	**7.70**	**8.48**	**8.89**	**9.19**	**4.7%**	**1.9%**	**4.9%**	**3.3%**	**1.4%**
Transport Energy Intensity (toe/1990 MEUR)	46.08	51.03	49.87	51.45	53.28	53.45	1.6%	0.6%	3.5%	0.3%	0.4%
Road Consumption	5.12	6.39	6.44	7.08	7.21	7.28	4.7%	1.9%	1.8%	1.0%	1.4%
Specific consumption in (toe/vehicle)	1.41	1.63	1.54	1.51	1.51	1.49	1.7%	-0.4%	0.2%	-1.7%	-0.3%
Denmark	**3.63**	**3.96**	**4.50**	**4.64**	**4.74**	**4.75**	**4.4%**	**0.6%**	**2.1%**	**0.3%**	**0.4%**
Transport Energy Intensity (toe/1990 MEUR)	39.63	39.56	44.30	40.40	39.99	38.83	2.3%	-1.8%	-1.0%	-2.9%	-1.3%
Road Consumption	2.80	2.81	3.20	3.54	3.58	3.65	2.7%	2.0%	1.2%	1.9%	1.5%
Specific consumption in (toe/vehicle)	1.58	1.48	1.68	1.70	1.66	1.61	1.3%	0.2%	-2.3%	-3.3%	0.2%
Finland	**3.35**	**3.92**	**4.27**	**4.11**	**4.03**	**4.24**	**5.0%**	**-0.8%**	**-1.8%**	**5.2%**	**-0.5%**
Transport Energy Intensity (toe/1990 MEUR)	37.24	38.99	40.17	39.75	37.69	37.40	1.5%	-0.2%	-5.2%	-0.8%	-0.2%
Road Consumption	2.90	3.36	3.63	3.50	3.42	3.60	4.6%	-0.7%	-2.5%	5.4%	-0.5%
Specific consumption in (toe/vehicle)	1.35	1.56	1.64	1.63	1.55	1.64	4.0%	-0.1%	-4.7%	5.5%	-0.1%
France	**33.50**	**38.65**	**41.91**	**43.97**	**45.87**	**46.85**	**4.6%**	**1.0%**	**4.3%**	**2.1%**	**0.7%**
Transport Energy Intensity (toe/1990 MEUR)	41.31	43.68	44.58	44.55	45.83	45.81	1.5%	0.0%	2.9%	-0.1%	0.0%
Road Consumption	29.39	33.75	36.17	37.30	38.85	39.60	4.2%	0.6%	4.2%	1.9%	0.4%
Specific consumption in (toe/vehicle)	1.21	1.29	1.32	1.28	1.33	1.35	1.8%	-0.7%	3.7%	1.6%	-0.5%
Germany	**48.21**	**54.49**	**58.82**	**62.86**	**62.56**	**63.69**	**4.1%**	**1.3%**	**-0.5%**	**1.8%**	**1.0%**
Transport Energy Intensity (toe/1990 MEUR)	42.90	44.87	45.33	44.73	43.95	43.78	1.1%	-0.3%	-1.7%	-0.4%	-0.2%
Road Consumption	40.88	46.59	50.42	54.19	53.77	54.73	4.3%	1.5%	-0.8%	1.8%	1.0%
Specific consumption in (toe/vehicle)	1.49	1.52	1.55	1.26	1.23	1.24	0.8%	-4.1%	-2.2%	0.6%	-2.9%
Greece	**4.68**	**5.18**	**5.82**	**6.43**	**6.56**	**6.73**	**4.5%**	**2.0%**	**2.0%**	**2.5%**	**1.4%**
Transport Energy Intensity (toe/1990 MEUR)	78.62	82.38	89.13	92.64	92.31	91.72	2.5%	0.8%	-0.3%	-0.6%	0.6%
Road Consumption	3.06	3.56	3.90	4.58	4.81	4.92	5.0%	3.3%	4.8%	2.3%	2.3%
Specific consumption in (toe/vehicle)	1.64	1.63	1.56	1.61	1.67	1.64	-1.0%	0.6%	3.5%	-1.7%	0.4%
Ireland	**1.69**	**1.81**	**1.97**	**2.18**	**2.70**	**2.92**	**3.1%**	**2.1%**	**23.5%**	**8.3%**	**1.5%**
Transport Energy Intensity (toe/1990 MEUR)	61.76	57.92	54.93	45.26	51.64	50.56	-2.3%	-3.8%	14.1%	-2.1%	-2.7%
Road Consumption	1.43	1.40	1.56	1.73	2.17	2.36	1.7%	2.1%	25.5%	8.9%	1.5%
Specific consumption in (toe/vehicle)	1.71	1.59	1.65	1.57	1.90	1.90	-0.7%	-1.0%	20.7%	0.3%	-0.7%
Italy	**27.75**	**31.11**	**33.40**	**37.64**	**38.00**	**38.67**	**3.8%**	**2.4%**	**1.0%**	**1.8%**	**1.7%**
Transport Energy Intensity (toe/1990 MEUR)	37.30	37.97	38.79	41.33	41.46	41.56	0.8%	1.3%	0.3%	0.3%	0.9%
Road Consumption	24.99	28.44	30.39	33.94	34.10	34.64	4.0%	2.2%	0.4%	1.6%	1.6%
Specific consumption in (toe/vehicle)	0.99	1.02	1.01	1.00	0.98	0.99	0.3%	-0.2%	-1.5%	0.2%	-0.1%
Luxembourg	**0.60**	**0.74**	**1.01**	**1.30**	**1.36**	**1.47**	**10.9%**	**5.3%**	**3.9%**	**8.2%**	**3.8%**
Transport Energy Intensity (toe/1990 MEUR)	85.61	92.95	118.98	127.48	129.13	134.15	6.8%	1.4%	1.3%	3.9%	1.0%
Road Consumption	0.51	0.62	0.87	1.11	1.14	1.20	11.2%	4.9%	2.9%	5.6%	3.5%
Specific consumption in (toe/vehicle)	3.08	3.23	4.13	4.10	3.97	4.17	6.0%	-0.1%	-3.2%	4.9%	-0.1%
Netherlands	**8.80**	**9.69**	**10.32**	**12.37**	**13.09**	**13.49**	**3.2%**	**3.7%**	**5.8%**	**3.1%**	**2.6%**
Transport Energy Intensity (toe/1990 MEUR)	45.85	47.47	46.36	50.08	51.38	51.10	0.2%	1.6%	2.6%	-0.5%	1.1%
Road Consumption	7.47	7.52	8.04	8.95	9.52	9.66	1.5%	2.2%	6.4%	1.5%	1.5%
Specific consumption in (toe/vehicle)	0.14	1.32	1.33	1.36	1.40	1.40	56.3%	0.5%	3.3%	-0.2%	0.3%
Portugal	**2.66**	**3.32**	**3.73**	**4.85**	**5.11**	**5.26**	**7.0%**	**5.4%**	**5.3%**	**2.8%**	**3.8%**
Transport Energy Intensity (toe/1990 MEUR)	63.97	66.97	68.74	82.17	84.02	83.32	1.4%	3.6%	2.3%	-0.8%	2.6%
Road Consumption	2.06	2.65	3.03	4.10	4.36	4.53	8.0%	6.3%	6.3%	3.7%	4.4%
Specific consumption in (toe/vehicle)	0.92	1.02	0.96	0.93	0.94	0.90	0.8%	-0.7%	0.3%	-3.5%	-0.5%
Spain	**15.06**	**20.24**	**22.33**	**26.07**	**27.75**	**28.00**	**8.2%**	**3.1%**	**6.4%**	**0.9%**	**2.2%**
Transport Energy Intensity (toe/1990 MEUR)	48.08	55.16	56.06	61.24	63.75	62.20	3.1%	1.8%	4.1%	-2.4%	1.3%
Road Consumption	11.81	15.81	17.68	20.47	21.71	21.94	8.4%	3.0%	6.1%	1.1%	2.1%
Specific consumption in (toe/vehicle)	1.08	1.23	1.22	1.20	1.22	1.19	2.4%	-0.3%	1.5%	-2.4%	-0.2%
Sweden	**6.43**	**7.47**	**7.23**	**7.66**	**7.62**	**7.69**	**2.4%**	**1.2%**	**-0.6%**	**0.9%**	**0.8%**
Transport Energy Intensity (toe/1990 MEUR)	39.83	42.89	40.00	41.40	40.64	40.29	0.1%	0.7%	-1.8%	-0.9%	0.5%
Road Consumption	5.37	6.21	6.07	6.43	6.39	6.42	2.5%	1.2%	-0.7%	0.6%	0.8%
Specific consumption in (toe/vehicle)	1.40	1.61	1.55	1.63	1.61	1.62	2.1%	1.0%	-1.4%	0.6%	0.7%
United Kingdom	**35.80**	**41.72**	**45.45**	**46.89**	**48.74**	**49.45**	**4.9%**	**0.6%**	**3.9%**	**1.5%**	**0.4%**
Transport Energy Intensity (toe/1990 MEUR)	60.60	68.04	69.86	61.45	65.14	66.44	2.9%	-2.5%	6.0%	2.0%	-1.8%
Road Consumption	28.62	33.90	36.31	36.69	38.06	38.52	4.9%	0.2%	3.8%	1.2%	0.1%
Specific consumption in (toe/vehicle)	1.44	1.52	1.51	1.47	1.49	1.48	0.9%	-0.5%	1.7%	-0.8%	-0.4%
European Union	**202.80**	**234.74**	**253.85**	**275.69**	**283.29**	**288.63**	**4.6%**	**1.7%**	**2.8%**	**1.9%**	**1.2%**
Transport Energy Intensity (toe/1990 MEUR)	44.5	46.8	47.8	48.5	49.0	48.7	1.4%	0.3%	1.1%	-0.7%	0.2%
Road Consumption	170.2	197.3	212.3	228.8	234.2	238.2	4.5%	1.5%	2.4%	1.7%	1.1%
Specific consumption in (toe/vehicle)	1.26	1.35	1.35	1.27	1.27	1.27	1.4%	-1.3%	0.4%	-0.1%	-0.9%

ENERGY PRICES OF TRANSPORT FUELS IN CONSTANT 1990 EUR PER TOE (1)

	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Austria											
Premium leaded gasoline	1258.7	900.6	978.6	na	na	na	-4.9%	na	na	na	na
Premium Unleaded gasoline (95)	na	870.4	940.6	915.5	909.8	929.9	na	-0.5%	-0.6%	2.2%	-0.2%
Diesel	831.1	584.8	600.9	509.5	533.4	543.3	-6.3%	-3.2%	4.7%	1.8%	-1.4%
Belgium											
Premium leaded gasoline	1278.8	899.2	1038.4	1025.3	1102.9	1168.0	-4.1%	-0.3%	7.6%	5.9%	1.7%
Premium Unleaded gasoline (95)	na	na	975.1	923.4	1016.5	1079.3	na	-1.1%	10.1%	6.2%	1.5%
Diesel	637.6	387.0	499.1	502.5	531.2	532.7	-4.8%	0.1%	5.7%	0.3%	0.9%
Denmark											
Premium leaded gasoline	1298.8	1226.0	1096.9	964.7	na	na	-3.3%	-2.5%	na	na	na
Premium Unleaded gasoline (98)	na	na	1022.0	959.8	1023.9	1032.4	na	-1.2%	6.7%	0.8%	0.1%
Diesel	522.6	277.6	289.4	450.9	476.6	518.1	-11.2%	9.3%	5.7%	8.7%	8.7%
Finland											
Premium leaded gasoline	1390.2	1070.6	1179.1	na	na	na	-3.2%	na	na	na	na
Premium Unleaded gasoline (95)	na	na	1087.8	1225.9	1374.0	1365.6	na	2.4%	12.1%	-0.6%	3.3%
Diesel	881.8	793.4	921.4	637.4	675.5	677.3	0.9%	-7.1%	6.0%	0.3%	-4.3%
France											
Premium leaded gasoline	1291.6	1023.7	1059.7	1042.8	1080.1	1106.8	-3.9%	-0.3%	3.6%	2.5%	0.6%
Premium Unleaded gasoline (95)	na	na	1035.3	999.7	1038.6	1063.4	na	-0.7%	3.9%	2.4%	0.4%
Diesel	802.7	540.1	521.0	502.0	542.9	555.2	-8.3%	-0.7%	8.1%	2.3%	0.9%
Germany											
Premium leaded gasoline	1066.5	746.9	885.9	1001.2	1026.8	na	-3.6%	2.5%	2.6%	na	na
Premium Unleaded gasoline (95)	na	713.3	817.5	917.7	943.4	957.8	na	2.3%	2.8%	1.5%	2.3%
Diesel	739.4	478.0	512.6	489.0	523.5	524.0	-7.1%	-0.9%	7.0%	0.1%	0.3%
Greece											
Premium leaded gasoline	1038.6	718.0	783.2	724.7	717.9	708.4	-5.5%	-1.5%	-0.9%	-1.3%	-1.4%
Premium Unleaded gasoline (95)	na	774.0	738.9	675.4	669.2	662.7	na	-1.8%	-0.9%	-1.0%	-1.5%
Diesel	472.2	289.4	290.7	368.9	381.3	371.1	-9.2%	4.9%	3.4%	-2.7%	3.5%
Ireland											
Premium leaded gasoline	1395.7	1116.4	1125.7	957.0	997.6	1021.5	-4.2%	-3.2%	4.2%	2.4%	-1.4%
Premium Unleaded gasoline (95)	na	na	1086.4	888.2	899.9	921.3	na	na	1.3%	2.4%	-2.3%
Diesel	833.5	686.1	680.4	612.1	792.7	744.0	-4.0%	-2.1%	29.5%	-6.1%	1.3%
Electricity											
Italy											
Premium leaded gasoline	1653.8	1461.4	1400.5	1362.4	1348.9	1345.2	-3.3%	-0.5%	-1.0%	-0.3%	-0.6%
Premium Unleaded gasoline (95)	na	na	1382.4	1281.3	1280.2	1282.1	na	-1.5%	-0.1%	0.2%	-1.1%
Diesel	656.5	558.8	670.3	723.8	741.8	730.1	0.4%	1.5%	2.5%	-1.6%	1.2%
Luxembourg											
Premium leaded gasoline	961.4	735.4	740.1	789.6	809.8	835.4	-5.1%	1.3%	2.6%	3.2%	1.7%
Premium Unleaded gasoline (95)	na	na	705.0	698.8	720.6	744.1	na	-0.2%	3.1%	3.3%	0.8%
Diesel	585.4	355.1	374.6	430.2	458.5	466.5	-8.5%	2.8%	6.6%	1.7%	3.2%
Netherlands											
Premium leaded gasoline	1259.4	1063.4	1126.4	1118.6	1137.8	na	-2.2%	-0.1%	1.7%	na	na
Premium Unleaded gasoline (95)	1219.6	1025.9	1077.6	1026.4	1057.6	1106.7	-2.4%	-1.0%	3.0%	4.6%	0.4%
Diesel	593.7	392.7	500.5	616.5	659.4	573.8	-3.4%	4.3%	7.0%	-13.0%	2.0%
Portugal											
Premium leaded gasoline	1467.5	1196.6	1077.2	869.8	875.8	894.0	-6.0%	-4.2%	0.7%	2.1%	-2.6%
Premium Unleaded gasoline (95)	na	1196.6	1032.0	858.7	856.6	867.0	na	-3.6%	-0.2%	1.2%	-2.5%
Diesel	762.9	615.2	586.2	477.7	478.4	449.1	-5.1%	-4.0%	0.2%	-6.1%	-3.7%
Spain											
Premium leaded gasoline	1349.6	918.9	877.6	930.8	935.3	940.0	-8.2%	1.2%	0.5%	0.5%	1.0%
Premium Unleaded gasoline (95)	na	na	na	881.0	884.2	907.6	na	na	0.4%	2.6%	na
Diesel	789.3	535.1	517.8	511.5	544.5	550.3	-8.1%	-0.2%	6.4%	1.1%	0.9%
Sweden											
Premium leaded gasoline	1149.5	958.8	1179.5	1173.4	1212.6	1263.4	0.5%	-0.1%	3.3%	4.2%	1.0%
Premium Unleaded gasoline (95)	na	na	na	1116.3	1162.1	1209.8	na	na	4.1%	4.1%	na
Diesel	664.6	498.7	634.2	662.6	690.6	689.9	-0.9%	0.9%	4.2%	-0.1%	1.2%
United Kingdom											
Premium leaded gasoline	1166.8	896.2	911.6	1025.6	1033.0	1092.5	-4.8%	2.4%	0.7%	5.8%	2.6%
Premium Unleaded gasoline (95)	na	na	852.8	924.2	947.5	1004.7	na	1.6%	2.5%	6.0%	2.4%
Diesel	834.8	599.2	603.8	670.5	695.6	730.7	-6.3%	2.1%	3.7%	5.0%	2.8%
European Union											
Premium leaded gasoline	1249.3	961.6	1012.7	1061.9	1078.8	1123.5	-4.1%	1.0%	1.6%	4.1%	1.5%
Premium Unleaded gasoline (95)	1219.6	774.0	966.7	989.7	1012.2	1037.5	-4.5%	0.5%	2.3%	2.5%	1.0%
Diesel	735.4	514.4	555.5	558.2	590.8	593.9	-5.5%	0.1%	5.8%	0.5%	1.0%

(1) Excluding refundable VAT only for Diesel

and reduce emissions. This short-term evolution was confined to nine Member States with reductions ranging from 2% in Italy to 13% in Finland since 1993. Only the Netherlands, Portugal, Spain and the United Kingdom still showed increases in transport energy intensity.

Prices for transport fuel increased by about 1% per year since 1990 under the pressure of tax increases....

Transport fuel prices have increased regularly since 1990 by a yearly average of about 1%. This growth accelerated in 1996 and 1997 as a consequence of higher crude oil prices, even though the share of raw materials in final prices declined continuously under the pressure of tax increases. Between 1990 and 1997 the share of tax for diesel increased from 52% to 60% for the European Union as a whole. In April 1999 taxes represented between 61% and 82% of final diesel prices depending on the country. For unleaded gasoline, taxes rose from 65% of the final price in 1990 to 72% in 1997. In April 1999, extremes in tax levels ranged between 64% and 81%. Large price variations existed between Member State and fuel types. Furthermore, the relative prices of gasoline versus diesel differed very sharply between countries, largely explaining the differences in the dieselisation rate of the car fleet. In 1997, leaded gasoline prices ranged between 708 and 1345 EUR/toe, unleaded gasoline between 663 and 1366 EUR/toe and diesel prices ranged between 371 and 744 EUR/toe. The differences between leaded and unleaded gasoline in the same country ranged, in 1997, between 100 (Ireland) and 27 (Portugal) EUR/toe, with an average difference of 86 EUR/toe. This differential has increased year by year to favour the use of unleaded gasoline. Comparing unleaded gasoline and diesel, the difference in price ranged between 689 (Finland) and 177 (Ireland) EUR/toe, with an average value of 443 EUR/toe across all the Member States.

DOMESTIC AND TERTIARY

Between 1990 and 1997, with similar climatic conditions, energy consumption increased by 10.6%...

In 1997, the domestic and tertiary sectors represented around 41% of final energy demand, almost the same proportion as in 1985 with warmer climatic conditions. **Energy consumption in the domestic and tertiary sectors** increased by 0.5% annually on average since 1985 under the pressure of the continual increase of specific uses (electrical appliances and cooking) and living standards (central heating and house size). In fact, energy consumption in this sector, although a function of population, number of households, private income and evolution of the services sector, is also highly dependent on weather conditions (space heating) and thus experiences marked fluctuations reflecting the prevailing weather conditions. From this point of view it is very interesting to compare 1997 with 1990, as they had similar climatic conditions. It must be stressed that between these two years energy consumption increased by 10.6%, the tertiary-domestic sector contributing to 50% of the total increase of final energy demand. Available statistics indicate that the energy consumption of the domestic sector increased by 8.9% since 1990 while tertiary consumption grew by 14.4%.

EUROPEAN UNION : DOMESTIC AND TERTIARY - FINAL ENERGY CONSUMPTION

Mtoe	1985	1988	1990	1994	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
								Annual % Change				
Total consumption	355.03	349.22	342.62	356.27	364.70	392.90	379.03	-0.7%	1.3%	7.7%	-3.5%	1.5%
Solids	37.78	31.53	26.61	11.75	9.83	9.96	8.71	-6.8%	-18.1%	1.3%	-12.5%	-14.7%
Oil	117.90	108.38	98.32	100.19	100.20	107.17	100.99	-3.6%	0.4%	7.0%	-5.8%	0.4%
of which:												
Gas Oil	95.36	88.56	79.54	81.06	81.40	86.98	83.18	-3.6%	0.5%	6.9%	-4.4%	0.6%
Gas	94.44	97.19	100.87	117.07	123.47	139.19	129.13	1.3%	4.1%	12.7%	-7.2%	3.6%
Electricity	71.06	78.07	82.67	91.04	93.32	97.32	97.81	3.1%	2.5%	4.3%	0.5%	2.4%
of which :												
Residential	40.50	42.61	44.61	49.56	50.05	52.69	52.08	2.0%	2.3%	5.3%	-1.2%	2.2%
Commercial & Public Services	28.09	32.92	35.37	38.63	40.31	41.62	42.73	4.7%	2.7%	3.2%	2.7%	2.7%
Heat	12.64	12.77	12.85	15.42	16.00	16.61	16.26	0.3%	4.5%	3.8%	-2.2%	3.4%
Renewable (1)	21.22	21.29	21.31	20.80	21.88	22.66	26.13	0.1%	0.5%	3.5%	15.3%	3.0%
Total consumption per Capita (toe/inhabitant)	0.99	0.97	0.95	0.97	0.99	1.06	1.02	-0.9%	0.8%	7.2%	-3.9%	1.0%
Absolute Degree Days (Eur12)	2836	2268	2141	2126	2202	2486	2184	-5.5%	0.6%	12.9%	-12.1%	0.3%
Difference to Average in %	6.7%	-7.6%	-12.8%	-13.4%	-10.4%	1.2%	-11.1%	-	-	-	-	-

(1) Geothermal heat. solar heat. biomass

Faced with moderate energy prices energy consumption for heating seems less efficient...

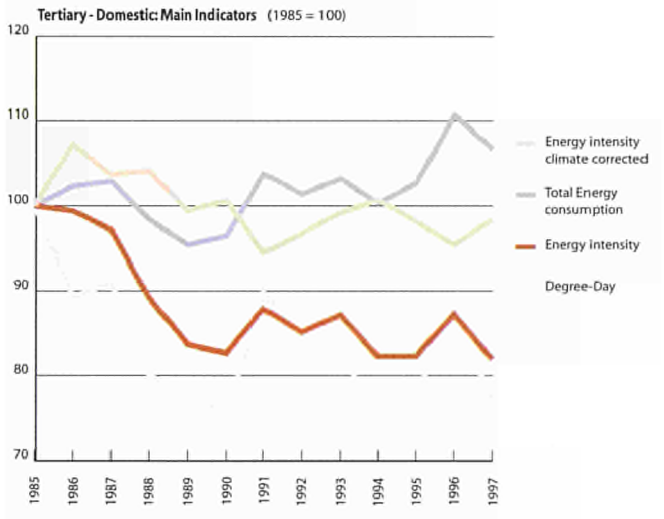
In terms of **fuel mix**, solid fuel consumption dropped by 77% since 1985, and now represents only 2% of the total energy demand in these sectors. Oil demand dropped throughout the 1980's but since 1990 has experienced wide fluctuations related to weather conditions, and still represents 27% of the total demand in 1997 against 34% in 1985. The comparison between 1990 and 1997 even shows a moderate increase by 2.7%. Gas and electricity slowly increased their market share to reach 34% and 26% of total energy demand respectively in 1997 (27% and 20% respectively in 1985). Since 1990, gas consumption increased by 3.6% per year on average, gaining substantial market share in the heating market to the detriment of heating gas oil and solid fuels. The growth in the domestic market reached 3.3% per year on average since 1990 and 6.0% in the tertiary market. Although this corresponds to increasing market shares combined with growing square metres, in particular in services, consumer behaviour faced with moderate energy prices must also be a factor. Electricity demand grew during the second part of the 80's at the same rate as GDP; since 1990 it has grown 50% faster than GDP. Between 1985 and 1997, electricity demand from services increased 70% more rapidly than in the domestic sector, though growth rates have been more similar in these two sub-sectors since 1990. Electricity demand growth in the domestic sector has remained quite stable, around 2.1% per year on average. Distributed heat progressively increased its market share, now representing more than 4% of total energy demand. The renewable energy contribution remained almost stable over the decade but with some increase in the last three years. The jump registered in 1997, mainly located in Italy and Germany, still requires statistical confirmation. The share of renewable energy has remained stable, at around 6%, since 1985.

Technological improvements balanced by the emergence of new appliances...

Over the past ten years, a number of factors have been important in determining energy demand in the tertiary and domestic sectors. Higher energy efficiency in new buildings has had a dampening effect, whereas rising private incomes have resulted in a larger area of living space per household and in higher appliance penetration. Technological change has both improved appliance efficiency and led to the development of new appliances. Thus, while the major existing appliance stocks - such as refrigerators - are renewed with more efficient units, the emergence of new appliances, e.g. video recorders, home computers or air conditioning, partly offsets this improvement.

Energy intensity, corrected for climatic effects, appears quite stable since 1985...

Measuring **energy intensity** evolution in the domestic and tertiary sectors is a very difficult task as the classical intensity indicator, reported to GDP, aggregates GDP-sensitive commercial activities (tertiary sector) and non commercial activities (domestic sector). Additionally the impact of climatic conditions may largely swamp the evolution of economic conditions. The classical ratio of energy consumption to GDP has demonstrated a global improvement of about 18% since 1985. But, at the same time, more favourable climatic conditions in 1997 versus 1985 reduced heating requirements by an estimated 17%. Correcting total energy demand to take into account standard climatic conditions[2], it appears that the revised calculated energy intensity has been quite stable since 1985. Its relative stability over this period suggests that increased standards of living and the growth of the services sector have offset all the technological and other efficiency improvements introduced, mainly during the 1980's. The total consumption per capita, which has increased by 1.0% per year on average since 1990, seems to confirm this impression.



Energy prices for domestic consumers showed an overall decrease despite large national variations...

Average **energy prices for the tertiary-domestic sector** showed a general decrease since 1990 in the European Union as a whole but at contrasting rates depending on the fuels. The decrease

[2] Estimation made considering that for the European Union as a whole about 70% of tertiary domestic energy consumption is directly related to weather. SOEC is analysing the possibilities of weather corrections for energy statistics. Our estimates stick only to qualitative statements.

ENERGY PRICES TO DOMESTIC CONSUMERS IN CONSTANT 1990 EUR PER TOE (1) (2)

		1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
								Annual % Change				
Austria	Steam Coal	572.0	448.9	417.6	353.5	359.2	361.5	-6.1%	-3.3%	1.6%	0.6%	-2.0%
	Heating Oil	660.3	357.0	413.9	310.8	342.0	309.5	-8.9%	-5.6%	10.0%	-9.5%	-4.1%
	Natural gas	597.5	333.1	308.5	273.7	287.3	300.9	-12.4%	-2.4%	5.0%	4.7%	-0.4%
	Electricity	1569.0	1526.7	1425.4	1326.8	1383.7	1373.8	-1.9%	-1.4%	4.3%	-0.7%	-0.5%
Belgium	Steam Coal	395.2	383.7	338.6	318.1	311.1	305.8	-3.0%	-1.2%	-2.2%	-1.7%	-1.4%
	Heating Oil	522.2	203.9	244.6	176.8	217.5	223.5	-14.1%	-6.3%	23.0%	2.7%	-1.3%
	Natural gas	516.2	326.4	327.4	300.2	286.4	297.7	-8.7%	-1.7%	-4.6%	3.9%	-1.4%
	Electricity	1832.2	1594.8	1560.2	1454.7	1407.4	1403.7	-3.2%	-1.4%	-3.3%	-0.3%	-1.5%
Denmark	Steam Coal	385.1	412.5	439.2	432.5	447.3	469.8	2.7%	-0.3%	3.4%	5.0%	1.0%
	Heating Oil	686.4	647.3	657.5	563.8	594.7	601.9	-0.9%	-3.0%	5.5%	1.2%	-1.3%
	Natural gas	609.6	576.2	529.9	447.5	484.7	495.2	-2.8%	-3.3%	8.3%	2.2%	-1.0%
	Electricity	1635.3	1502.9	1506.0	1569.9	1642.1	1659.4	-1.6%	0.8%	4.6%	1.1%	1.4%
Finland	Heating Oil	531.1	258.3	336.9	316.7	358.2	392.2	-8.7%	-1.2%	13.1%	9.5%	2.2%
	Natural gas	270.8	116.6	117.3	142.9	152.3	159.6	-15.4%	4.0%	6.6%	4.8%	4.5%
	Electricity	988.3	973.3	941.7	1016.2	1080.9	1094.3	-1.0%	1.5%	6.4%	1.2%	2.2%
France	Steam Coal	654.1	640.3	467.0	441.5	437.4	436.3	-6.5%	-1.1%	-0.9%	-0.2%	-1.0%
	Heating Oil	608.7	339.2	380.1	311.7	335.1	347.5	-9.0%	-3.9%	7.5%	3.7%	-1.3%
	Natural gas	565.5	398.9	373.7	323.8	305.7	312.5	-8.0%	-2.8%	-5.6%	2.2%	-2.5%
	Electricity	1527.9	1401.4	1374.3	1253.5	1238.8	1141.6	-2.1%	-1.8%	-1.2%	-7.8%	-2.6%
Germany	Steam Coal	583.2	571.3	543.6	na	na	na	-1.4%	na	na	na	na
	Heating Oil	496.6	198.2	281.4	203.0	239.1	239.0	-10.7%	-6.3%	17.8%	0.0%	-2.3%
	Natural gas	460.6	287.8	312.3	285.1	271.6	291.8	-7.5%	-1.8%	-4.7%	7.4%	-1.0%
	Electricity	1460.2	1557.2	1500.0	1411.7	1296.9	1309.0	0.5%	-1.2%	-8.1%	0.9%	-1.9%
Greece	Heating Oil	489.3	317.9	324.2	356.8	410.9	399.0	-7.9%	1.9%	15.2%	-2.9%	3.0%
	Electricity	1103.5	1087.8	1081.6	792.5	763.8	733.5	-0.4%	-6.0%	-3.6%	-4.0%	-5.4%
Ireland	Steam Coal	300.8	259.9	274.3	na	na	na	-1.8%	na	na	na	na
	Heating Oil	543.6	393.9	395.9	332.0	361.6	353.0	-6.1%	-3.5%	8.9%	-2.4%	-1.6%
	Natural gas	620.2	407.9	379.3	340.0	334.4	329.6	-9.4%	-2.2%	-1.6%	-1.4%	-2.0%
	Electricity	1493.0	1312.7	1202.6	1102.6	1109.4	1118.0	-4.2%	-1.7%	0.6%	0.8%	-1.0%
Italy	Heating Oil	714.7	589.4	745.2	820.2	838.1	837.7	0.8%	1.9%	2.2%	0.0%	1.7%
	Natural gas (2)	529.5	426.3	505.6	559.3	559.9	562.7	-0.9%	2.0%	0.1%	0.5%	1.5%
	Electricity	1692.4	1430.1	1435.7	1649.7	1577.9	1530.2	-3.2%	2.8%	-4.4%	-3.0%	0.9%
Luxembourg	Steam Coal	409.4	419.7	392.2	366.3	361.2	355.8	-0.9%	-1.4%	-1.4%	-1.5%	-1.4%
	Heating Oil	471.8	231.8	254.7	191.1	219.3	228.4	-11.6%	-5.6%	14.8%	4.2%	-1.5%
	Natural gas	355.3	186.1	194.5	180.6	200.4	212.0	-11.3%	-1.5%	11.0%	5.8%	1.2%
	Electricity	1189.1	1163.6	1134.8	1029.4	1036.2	1029.2	-0.9%	-1.9%	0.7%	-0.7%	-1.4%
Netherlands	Heating Oil	523.2	296.4	353.4	236.6	280.2	339.4	-7.5%	-7.7%	18.4%	21.1%	-0.6%
	Natural gas	366.7	248.9	264.2	217.4	225.3	252.5	-6.3%	-3.8%	3.6%	12.1%	-0.6%
	Electricity	1522.3	1093.7	1072.8	945.4	1066.8	1057.2	-6.8%	-2.5%	12.8%	-0.9%	-0.2%
Portugal	Heating Oil	762.9	638.9	608.7	501.5	502.3	na	-4.4%	-3.8%	0.2%	na	na
	Electricity	1431.7	1455.7	1346.8	1233.1	1195.6	1186.5	-1.2%	-1.7%	-3.0%	-0.8%	-1.8%
Spain	Heating Oil	576.3	352.1	364.1	291.9	319.5	334.2	-8.8%	-4.3%	9.5%	4.6%	-1.2%
	Natural gas	745.3	496.1	482.4	456.8	451.1	456.6	-8.3%	-1.1%	-1.3%	1.2%	-0.8%
	Electricity	1794.7	1739.1	1739.9	1700.0	1626.9	1580.4	-0.6%	-0.5%	-4.3%	-2.9%	-1.4%
Sweden	Heating Oil	587.7	382.5	559.3	501.9	556.6	576.5	-1.0%	-2.1%	10.9%	3.6%	0.4%
	Electricity	708.4	689.1	804.1	849.9	922.6	962.4	2.6%	1.1%	8.6%	4.3%	2.6%
United Kingdom	Steam Coal	313.7	289.4	264.7	262.5	258.9	253.2	-3.3%	-0.2%	-1.4%	-2.2%	-0.6%
	Heating Oil	492.7	219.9	250.7	201.0	233.8	211.9	-12.6%	-4.3%	16.3%	-9.4%	-2.4%
	Natural gas	305.6	274.8	259.5	247.0	241.5	231.7	-3.2%	-1.0%	-2.2%	-4.0%	-1.6%
	Electricity	1165.9	1105.0	1086.1	1110.5	1081.3	996.2	-1.4%	0.4%	-2.6%	-7.9%	-1.2%
European Union	Steam Coal	394.0	366.2	331.3	304.5	309.8	302.2	-3.4%	-1.7%	1.7%	-2.4%	-1.3%
	Heating Oil	559.5	309.5	380.9	311.7	339.2	341.6	-7.4%	-3.9%	8.8%	0.7%	-1.5%
	Natural gas	425.4	317.2	330.5	315.6	306.4	317.2	-4.9%	-0.9%	-2.9%	3.5%	-0.6%
	Electricity	1279.2	1216.8	1199.3	1180.6	1140.9	1104.0	-1.3%	-0.3%	-3.4%	-3.2%	-1.2%

(1) Includind all taxes
(2) 1997 estimates

remains limited for electricity: -1.2% per year for European Union as a whole with extremes ranging from +2.6% in Sweden to –5.4% in Greece. The most important price decrease concerns heating oil: -1.5% per year on average across the European Union with extremes between –4.1% in Austria and +3.0% in Greece. The average yearly decrease of natural gas prices is less significant: -0.6% at the European level with extremes of between –2.5% in France and +4.5% in Finland.

The 1997 heating oil price showed large variations amongst Member States: 212 EUR/toe in the United Kingdom compared to 838 EUR/toe in Italy, with a European average price of 342 EUR/toe. Natural gas prices ranged between 160 EUR/toe in Finland and 563 EUR/toe in Italy, with a European average price of 317 EUR/toe. The minimum price for electricity was 733 EUR/toe in Greece and the maximum price was 1659 EUR/toe in Denmark, with a European average of 1104 EUR/toe.

ENERGY OUTLOOK – Energy supply: Recent evolution (1985-1997)

POWER GENERATION

- Long-term elasticity of electricity demand versus GDP is close to 1
- Electricity significantly increased its market shares both in industrial and tertiary-domestic markets
- Nuclear accounted for most of the incremental production since 1990
- Since 1990 combined cycle units accounted for about 50% of new investment
- Increasing contribution of combined heat and power mainly in Northern Europe
- Since 1990 gas consumption grew by 9.7% per year on average, substituting about 33 Mtoe of solid fuels
- The United Kingdom, followed by Sweden and Finland, initiated liberalisation of electricity markets

REFINERY

- Closure of crude oil distillation capacity increased utilisation rate to 92%
- Desulphurisation capacity increased with improved quality of fuels
- The Auto Oil programme, a common framework to reflect on EU energy policies in the oil sector

GROSS INLAND CONSUMPTION

- Share of natural gas in gross inland consumption reached 21.5% in 1997 against only 16.9% in 1990
- Since 1990 differences in gross inland consumption growth rates by Member States can only be explained by an in-depth analysis of individual energy situation
- Transport fuels and petrochemical feedstock accounted for 63% of total oil consumption in 1997
- Natural gas, the fuel of the 90's, showed a continuous acceleration of its growth rate since 1990
- In-depth restructuring in producing countries reduced solid consumption since 1990 by 26%
- Renewable energy sources, supported by the Altener EU programme, increased by 5.1% per year since 1990

INDIGENOUS PRODUCTION

- Indigenous production peaked in 1996 at 763 Mtoe and declined slowly in 1997
- Increasing contribution of renewable energy reached about 6% of gross inland consumption
- Real economic potential exists now for renewable energy sources…

ELECTRICITY SECTOR

Long-term elasticity of electricity demand versus GDP is close to 1…

Electricity consumption since 1985 has shown an average increase of 2.2% per year, but the long-term trend of this growth clearly indicated a progressive slowdown. During the second part of the 1980's, electricity growth still reached 2.7% per year on average but this evolution must be related to an average GDP growth of about 3.1% per year. In the beginning of the 90's, a slower growth (1.3%) was registered due to the economic slowdown of 1992-93. In 1995 and 1996, sustained by economic activity and colder weather conditions, electricity demand growth reached 2.6% per year on average. In 1997, higher economic activity combined with warmer weather conditions limited the growth to 1.6%. Consequently the average growth of electricity demand since 1990 reached 1.8% per year, compared to a GDP growth of 1.6% per year. This means that the long-term elasticity of electricity demand versus GDP is now close to 1. The electricity growth was largely driven by the tertiary sector. In the period 85-90, electricity demand from the services sector grew by 4.7% per year on average followed by industry with 2.3% and the domestic sector with 2.0%. The pattern evolved perceptibly during the 1990's. Demand growth rates from tertiary and domestic sectors were closer at 2.7% and 2.4% respectively, whereas industrial consumption grew by only 0.9% per year on average.

Additionally, large variations exist between Members States even though electricity demand growth was slowing down in all of them with the exception of Greece and Ireland. Over the period 1990-1997, electricity demand growth rates ranged from 0.5% per year on average in Germany and Sweden to 4.4% in Portugal and 5.0% in Ireland. Globally, ten Member States are well above the Europe average growth of 1.8% per year on average. Per country, the short-term elasticity (1990-1997) versus GDP presented extremes ranging from 0.3 in Germany to 2.9 in Finland. Seven countries were below the European average: Germany (0.3), Denmark (0.4), Sweden (0.6), Ireland (0.7), Austria and Luxembourg (0.9) and the United Kingdom (1.0). Although the Netherlands was still close to the European average, other countries were well above Spain (1.6), Italy and France (1.9), Portugal (2.0), Belgium (2.1), Greece (2.2) and Finland (2.9). Electricity consumption varied from 3,721 kWh per inhabitant in Portugal to 16,540 kWh per inhabitant in Sweden. The lowest per capita consumption occurred in southern countries (Portugal, Greece, Spain and Italy), all below 5,000 kWh per inhabitant. The other Member States ranged between 5,500 kWh and 8,000 kWh. The highest

Main items

Energy production in the European Union was equivalent to 53% of total requirements in 1997. Indigenous coal production has declined steadily given high costs, cuts in state aids and increased competition from lower-cost imports. Conversely, oil and gas production has increased rapidly over the past 20 years. Whilst North Sea oil output is reaching a peak, with much smaller fields now being discovered, the competitiveness of this offshore production has been maintained - despite weaker international oil prices - as a result of considerable technological change. Gas production has proved much more buoyant and has partly satisfied the rapid increase in gas demand, particularly in power generation. In recent years, additions to nuclear capacity have slowed because of public opposition and completion of reactor construction programmes. Despite this, nuclear output has risen given the substantial improvements in nuclear plant operating performance. Of the renewable sources, the scope for further large-scale hydro production is constrained by geographical factors; biomass use is already significant in some countries; and other sources, such as wind, are now growing rapidly – although from a low base. As for the future, it is expected that coal output will continue to fall, and - on the basis of present trends - that oil, gas and nuclear output will decline progressively over the next 5-15 years, leading to a steady increase in import dependence. Should new nuclear investment prove financially or politically unattractive, the only significant indigenous resource in the longer term will be renewable sources. This explains the rise in R&D support for these technologies, matched by growing market and policy interest in their more rapid deployment.

consumption per capita was in the two northern countries, Sweden and Finland, where electrical heating based on low-cost electricity generated by hydro plays a major role. The exception was Luxembourg, where the recent development of electric arc furnaces boosted consumption.

Electricity significantly increased its market shares both in industrial and tertiary-domestic markets…

The share of electricity in final demand increased significantly. In industry it grew at the European level from 23.4% in 1985 to 26.2% in 1990 and 28.2% in 1997. In fact electricity gained substantial market share during the 1980's as a result of the restructuring and modernisation of industrial processes and progressed more slowly during the 1990's. The highest shares occurred in the Nordic countries, Sweden and Finland, where electricity prices are relatively low thanks to the major contribution of hydro. These are

ELECTRICITY : FINAL DEMAND GROWTH RATE

Annual Average Growth Rate	1985-1990	1990-1997
Austria	3.1%	1.8%
Belgium	3.7%	3.1%
Denmark	2.9%	1.2%
Finland	4.0%	2.6%
France	3.6%	2.3%
Germany	1.0%	0.5%
Greece	3.6%	3.7%
Ireland	4.0%	5.0%
Italy	4.3%	2.1%
Luxembourg	1.7%	3.2%
Netherland	3.7%	2.9%
Portugal	6.2%	4.4%
Spain	4.1%	2.9%
Sweden	1.2%	0.5%
United Kingdom	2.5%	1.7%
European Union	**2.7%**	**1.8%**

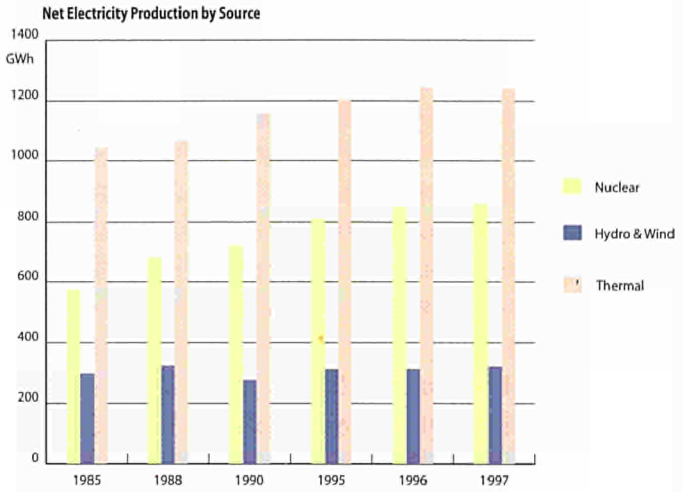
followed by Germany, France and Ireland. Countries with higher prices such as Austria, Portugal and Spain are well below the European average. Surprisingly the electricity share diminished in the United Kingdom despite the significant reduction of prices resulting from electricity market liberalisation. In the tertiary-domestic sector the share of electricity increased on average from 20.0% in 1985 to 24.1% in 1990 and 25.8% in 1997. The gap between the minimum share (18.8% in Netherlands) and the maximum (43.7% in Sweden) is more important for a number of specific reasons. In the south of Europe, as energy demand for heating is limited, the weight of electrical appliances increased proportionally more rapidly and explain penetration rates of between 34% and 41%. In the middle of Europe, the increasing energy demand for heating induced a share between 18.8% and 27.3%, depending on the contribution of electricity to heating requirements. On the other hand, the major contribution of electric heating in France, Finland and Sweden was responsible for the 30% to 43.7% share observed in 1997.

ELECTRICITY : CONSUMPTION PER INHABITANT

Kwh/inhabitant	1985	1990	1997	90/85	97/90
				Annual Average Growth Rate	
Austria	5555	6328	6774	2.6%	1.0%
Belgium	5697	6665	7967	3.2%	2.6%
Denmark	5769	6377	7009	2.0%	1.4%
Finland	11090	13028	14930	3.3%	2.0%
France	5769	6529	7384	2.5%	1.8%
Germany	6607	6777	6631	0.5%	-0.3%
Greece	2864	3489	4332	4.0%	3.1%
Ireland	3313	4055	5410	4.1%	4.2%
Italy	3635	4370	4964	3.8%	1.8%
Luxembourg	11046	11871	13407	1.5%	1.8%
Netherland	4693	5418	6352	2.9%	2.3%
Portugal	2122	2866	3721	6.2%	3.8%
Spain	3238	3872	4631	3.6%	2.6%
Sweden	16157	16835	16540	0.8%	-0.3%
United Kingdom	5204	5708	6107	1.9%	1.0%
European Union	**5317**	**5914**	**6436**	**2.2%**	**1.2%**

ELECTRICITY SHARE IN FINAL CONSUMPTION

	Industry			Tertiary-Domestic		
	1985	1990	1997	1985	1990	1997
Austria	22.5%	27.2%	25.9%	19.1%	21.9%	24.8%
Belgium	20.8%	22.9%	25.1%	14.9%	19.3%	19.9%
Denmark	23.7%	26.8%	28.1%	18.7%	24.1%	25.2%
Finland	29.2%	31.7%	32.1%	25.2%	28.6%	32.1%
France	22.9%	26.8%	29.1%	21.3%	27.3%	30.0%
Germany	21.8%	25.0%	30.1%	16.9%	19.9%	20.3%
Greece	25.3%	26.5%	24.4%	26.8%	29.2%	33.6%
Ireland	17.4%	19.4%	30.6%	19.3%	20.4%	22.3%
Italy	25.3%	25.8%	28.4%	17.5%	20.8%	22.2%
Luxembourg	12.2%	13.1%	26.4%	17.8%	21.1%	22.1%
Netherland	17.7%	21.6%	25.2%	13.8%	17.2%	18.8%
Portugal	21.1%	25.4%	23.1%	21.8%	28.3%	34.1%
Spain	25.9%	27.5%	25.7%	27.4%	35.0%	40.8%
Sweden	35.5%	39.3%	36.6%	41.5%	48.3%	43.7%
United Kingdom	23.4%	25.3%	24.9%	22.0%	25.6%	27.3%
European Union	**23.4%**	**26.2%**	**28.2%**	**20.0%**	**24.1%**	**25.8%**



Nuclear accounted for most of the incremental production since 1990…

In 1997, electricity generation in the European Union reached 2422 TWh showing an average growth of 1.7% per year since 1990. The 1996 net export of about 1.6 TWh was replaced by a net import of 7.8 TWh in 1997, explaining the limited growth of production (0.5%) for that year. Despite a limited increase in generating capacity since 1990, coming partly from capacity extension in existing units when replacing steam generators, nuclear production showed the fastest growth (2.6% per year on average since 1990). Its contribution reached a little more than 35% of the total electricity production in 1997 compared to only 30% in 1985 and 33% in 1990. The utilisation factor of nuclear units has been increasing continuously over the past ten years to reach about 80% on average at the European level. Hydro and wind power together increased their production by 2.2% per year on average since 1990 to generate 13% of the total in 1997. Since 1990, wind production has been multiplied by 10 but its contribution only represented 0.3% of total production even though some European countries are amongst the largest world contributors: Germany and Denmark, for example. Thermal electricity production showed a slower annual growth of 1.0% on average since 1990 with even a reduction by 0.4% in 1997, but still represented about 51% of total electricity generation (54% in 1990). The short-term evolution demonstrated that nuclear accounted for most (about 50%) of the incremental production followed by thermal (about 30%) and hydro (about 20%). In the near future, as the prospects both for new nuclear capacity and for hydro are strongly limited, incremental generation requirements will necessarily be mainly covered by thermal units with all the energy and environmental implications that this implies.

Since 1990 combined cycle units accounted for about 50% of new investment…

In 1997, the installed capacity for electricity generation was about 556 GWe, of which 56% was thermal capacity, the remainder comprising almost equally nuclear power stations, and hydro and wind power stations. Since 1990, after allowing for closure of older plants, installed capacity has increased by 33 GWe, 50% of this being added in the last two years. New capacity, excluding repowering and conversion of existing units, represents about 57 GWe, of which: 9.4 GWe of nuclear units, 4.7 GWe for hydro power, 4 GWe for wind power, about 25 GWe of combined cycle units, 6.8 GWe of gas turbines and 3.2 GWe of internal combustion engines. About 50% of combined cycle capacity was still located in the United Kingdom but this technology is expanding in many other Member States: the Netherlands (5.4 GWe installed in 1997), Italy (2.5 GWe), Belgium (2.0 GWe), Spain (1.3 GWe) and Austria (1 GWe). In addition, the increasing deregulation of electricity markets will favour the use of gas in power generation, especially in combined cycle units, as smaller companies entering the markets are looking for shorter lead times, lower capital costs and higher efficiency inducing lower fuel costs.

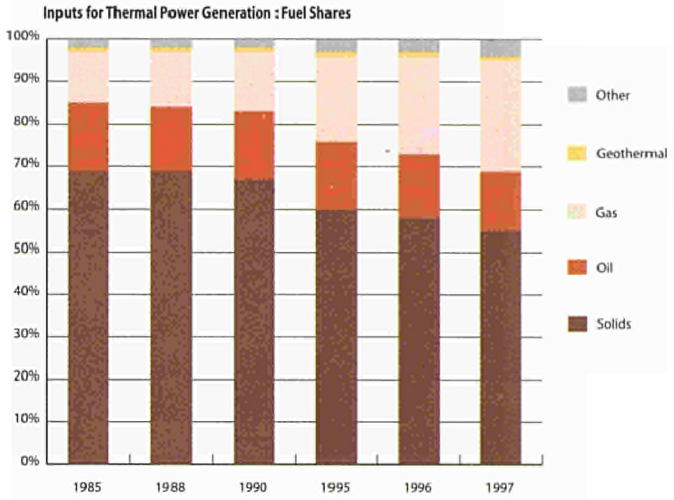
Increasing contribution of combined heat and power mainly in Northern Europe…

The last decade was also marked by the development of combined heat and power generation. In 1997, 11% of total electricity production was generated in combined heat and power units. The major absolute contributors in the European Union, from Eurelectric[3] statistics, were Germany (59 TWh cogenerated), Netherlands (41 TWh), Italy (40 TWh), the Finland (25 TWh) and the United Kingdom (19 TWh). If compared with the total electricity

production, the European leaders are Denmark (60% of electricity cogenerated) followed by the Netherlands (50%), Finland (38%) and Austria (26%). Cogeneration was sustained by district heating networks, industrial on-site combined heat and power production, and more recently by the rapid expansion of cogeneration in buildings. The installed capacity in 1997 can be estimated at about 60 GWe or 19% of total thermal capacity in the European Union. The expected growth by 2000, about 15 GWe, will be helpful in improving the overall efficiency of the electricity sector and limiting CO2 emissions. The Commission had taken an important initiative in the field of cogeneration in its Communication on the promotion of CHP, issued on 15 October 1997. Cogeneration has been identified as a high priority measure to reduce CO2 emissions and the Commission has proposed a doubling of its contribution to electricity production in 2010. It has a key role in ensuring the development of the internal market for energy, European Union competitiveness and sustainable development through the most efficient use of fossil fuels.

Since 1990 gas consumption grew by 9.7% per year on average, substituting about 33 Mtoe of solid fuels…

Concerning the fuel mix in thermal power stations, solid fuels remain the major contributor (55% of total energy consumed in 1997 from 67% in 1990) even though their share decreased slightly by 2.8% a year on average since 1990, with a maximum reduction by 7.1% in 1997. Both steam coal and lignite were declining at the same rate. Oil consumption, slowly increasing over the period 1990-95, declined by 4.5% in 1996 and by 7.7% in 1997. Oil's contribution declined from 15.8% in 1990 to 14.2% in 1997. Italy accounted for more than 60% of oil consumption in 1997 (50% in 1990). The progression of gas consumption has been very spectacular since 1990. Its share in fuel inputs almost doubled in seven years, growing from 13.5% in 1990 to 25.8% in 1997. Gas consumption grew by 4.0% per year on average between 1985 and 1990 and by 9.7% since 1990. This evolution has even accelerated with a global growth of 26% in the last two years. As the overall fuel input has remained quite stable since 1990, this means that about 33 Mtoe of solid fuels have been substituted by gas since 1990. Although the share of other sources (mainly urban and industrial waste) remained small (about 4% of total input in 1996), their consumption, constant over the period 1985-1990, increased sharply after 1992 due to the development of incinerators in some Member States. Replacement of old-fashioned units and the development of new technologies such as combined cycles, supercritical units and gas turbines, induced a continuous improvement of thermal efficiency of the power sector. This average efficiency, 39.4% in 1997, has been increasing by 0.9% per



year on average since 1990. This improving rate accelerated in the last two years reaching 1.2% in 1996 and 2.3% in 1997 as a consequence of the impressive commissioning of combined cycle plants in this period.

The United Kingdom, followed by Sweden and Finland, initiated liberalisation of the electricity market…

The opening of the European electricity markets through the EU Directive in February 1999 except for Belgium, Greece and Ireland, which due to technical problems, were allowed a delay, was the first stage of a three-part process to liberalisation, with competition being extended to at least 28% of the market in 2000 and 33% by 2003. The first stage corresponds to an average consumption threshold of 40 GWh, falling to 20 GWh by the second stage and 9 GWh by 2003. Led by the United Kingdom, several European countries have opened their markets more quickly than required, introducing important electricity reforms. To varying degrees these reforms have reduced government oversight and increased the role of market forces in balancing electricity supply and demand. The United Kingdom first began to privatise its electricity industry in 1990 and completed the final phase of privatisation in 1996. Behind the United Kingdom's effort at electricity reform was the belief that the industry could be made more competitive through deregulation and privatisation. Sweden and Norway also operate a joint electricity pool and Finland was scheduled to join the pool in early 1998.

The Directive introduces full competition in generation, with any producer able to build new plants and generate anywhere in the European Union from February 1999. There are two options for

3 Eurprog 1999, Programmes and Prospects for the European Electricity Sector, Unipede, June 1999.

constructing new generation capacity: an authorisation system or a tendering system. Under the authorisation approach, any company may build a generation facility providing that it complies with the host state's planning and energy supply criteria. This system has been more popular and is more transparent than the tendering system, whereby an independent organisation compiles an inventory and the capacity is allocated by a tendering process. The Directive allows three alternative methods of access to transmission and distribution lines: regulated third party access; negotiated third party access; or the single buyer model. Most countries have opted for regulated or negotiated third party access. With regulated third party access, published tariffs are fixed and applied to all network users. This is the most transparent system and the one that will be most effective in stimulating competition.

REFINERY SECTOR

Closure of crude oil distillation capacity increased utilisation rate to 92%...

Total crude oil distillation capacity as reported by Member States for 1997 was 639 million ton/year. The closure during 1997 of three refineries in Denmark (2.9 million ton/year), Germany (5 million ton/year) and the United Kingdom (5.6 million ton/year) caused a fall of total European capacity for atmospheric distillation. This loss was, to a certain extent, compensated by the commissioning of the new capacity: the Leuna refinery in Germany (8.7 millions ton/year) and in Ireland (+0.2 million ton/year). This limited the total fall to about 5 million ton/year. In 1997, the utilisation rate continued to increase to reach 92% (91% in 1996) and followed the more or less steady rise in utilisation observed since 1985 when utilisation was only 63%. This increase reflects the programme of crude distillation capacity reductions undertaken by many refiners over the period, but also better economic conditions, notably increasing margins and moderate crude prices. Conversion capacity amounted to 207 million ton per year, expressed in terms of catalytic cracking equivalent, up 42% compared to 1985. Since 1995, in the European Union as a whole, visbreaking and thermal cracking units were diminishing respectively by 8% and 11%. On the other hand, hydrocracking capacity increased by 25% in the last three years. Total conversion capacity accounted for about 32% of distillation capacity. This strong growth in conversion capacity since 1985 reflected the industry's expectations at the time concerning future gasoline demand growth and increasingly heavy crude supply slate. These expectations were justified up until the early 1990s when gasoline growth flattened and the crude slate started to lighten.

Desulphurisation capacity increased with improved quality of fuels...

The Community obligation to market, as from 1 October 1996, diesel fuel at 0.05% sulphur, led European refiners to increase the capacity of middle distillate desulphurisation by improving existing, or installing new, capacity. Thus in 1997 the Community capacity for gasoil desulphurisation reached 178 million ton/year, accounting for approximately 78% of the production both of diesel and heating gasoil by EU refineries. Desulphurisation units for other products accounted for 111 million ton/year in 1997. In the near future new investment will be required to permit a further reduction of sulphur content of gasoline and diesel at the horizon 2000 and 2005, and, on the other hand, the expected reduction of sulphur content of fuel oil and heating gasoil over the next decade.

Following the new European regulation on gasoline specifications, notably the limitation of benzene and other aromatics at the horizon 2000 and 2005, capacities to improve the octane index are increasing. This particularly affects isomerisation, alkylation and oxygenate compounds (MTBE, ETBE) units. The capacity of these units increased by 77% in 1997.

The Auto Oil programme, a common framework to reflect on EU energy policies in the oil sector....

The Auto Oil Programme was established in 1993 to elaborate a set of Air Quality Standards, derived from the World Health Organisation, and examine a range of possible methods to find the most cost effective way of achieving the required improvements in air quality. The parties in this research were the Commission, the Refining Industry via their trade organisation Europia, and the Car Industry, via their trade organisation ACEA. When the first phase of the programme was completed the Commission then reviewed the findings and proposed, in June 1996, two Directives, one on car emissions and one on fuel quality. The estimated cost to the Refining Industry of the changes required to produce the new specifications was estimated at some 765 million EUR per year, or discounted at 7%, some 8 billion EUR. The scope of the second phase was widened to explicitly include stationary emission sources, alternative fuels such as the electric car and other non technical measures such as road traffic policies, road pricing, traffic management... It also involves more actors: Member States are now actively involved as are Non-Governmental Organisations (NGOs).

GROSS INLAND CONSUMPTION

Share of natural gas in gross inland consumption reached 21.5% in 1997 against only 16.9% in 1990…

The gross inland energy consumption of the European Union (1406 Mtoe in 1997) increased slightly by 1.0% over the period 1990-97, notwithstanding a relative stabilisation between 1990-94 as a consequence of the 92-93 economic recession and a limited decline by 0.3% in 1997 due to weather conditions. As already explained, the comparison between 1990 and 1997 was of particular interest as these two reference years presented similar weather conditions for Europe as a whole. Over this period gross inland consumption increased rather slower than GDP, presenting an implicit elasticity of about 0.62. The pattern of energy consumption, which changed slowly over the period 1985-1990, has been significantly modified since then. Since 1990 solid fuels showed a continuous decrease by about 4.3% per year on average, resulting from a 34 Mtoe consumption reduction by final users, a 33 Mtoe reduction by power generation and a 13 Mtoe reduction by the energy branch. Their share in gross inland consumption was therefore reduced from 25.6% in 1985 to 22.9% in 1990 and only 15.8% in 1997. Oil products, driven by increasing consumption for transportation, showed an average yearly increase of 1.1% since 1990, signifying a stabilisation of their share at about 41.5%. The growth of natural gas consumption has been accelerating continuously to reach 8% in 1995 and an even larger increase in 1996 at about 11%. But weather conditions induced a reduction of 1.1% in 1997. Its share grew to 21.5% in 1997 against only 16.9% in 1990. The other sources of energy, including nuclear, hydro, wind, net imports of electricity and other energy sources, increased steadily from 17.3% of total gross inland consumption in 1985 to 18.7% in 1990 and 21% in 1996. The major increases from these non-fossil sources were in nuclear energy and, more recently, wind power and biomass use.

Since 1990 differences in gross inland consumption growth rates by Member States can only be explained by an in-depth analysis of individual energy situation…

When looking at their energy consumption over the period 1990-97, a large majority of Member States presented a yearly average growth of between 1% and 2.2%. The fast growers in primary energy demand with annual rates above 2.2% over the period are Portugal, Ireland, Spain, Denmark and Greece. But this observation must be correlated with the fact that GDP growth was higher in these countries than the European average, especially in the case of Ireland. Those with very modest growth, below 1%, are limited to the United Kingdom, Luxembourg and Germany; these last two even reducing their consumption for specific reasons. The German situation is relatively atypical with a continuous slow decrease by about 0.2% of gross inland consumption since 1985 as a result of the restructuring of the economy with the reunification of the new Länder and a continuous effort to promote the rational use of energy. The case of Luxembourg was more typical as it benefited from the conversion of its main industry, iron and steel, to a less energy consuming process; the electric arc furnace, combined with the fact that the major part of electricity was until now imported. Since 1990 the gross inland energy intensity versus GDP varied widely between Member States, from a minimum of -0.25 in Germany to a maximum of 2.44 in Finland. The bulk of Member States fell between 0.38 and 1.25 with only four countries overshooting this upper limit: Spain (1.39), Belgium (1.47), Portugal (1.55) and Finland (2.44). Only an in-depth analysis of the energy situation by Member State can explain these major differences.

GROSS INLAND CONSUMPTION GROWTH IN 1998

	Solid Fuels	Oil	Natural Gas	Total
Austria	7.0%	6.8%	-1.9%	4.4%
Belgium	20.1%	4.7%	10.7%	6.4%
Denmark	-16.7%	-0.4%	4.2%	-3.7%
Finland	-55.4%	20.3%	0.0%	0.6%
France	-2.8%	5.1%	6.4%	1.5%
Germany	-0.8%	1.3%	-0.3%	-0.3%
Greece	3.6%	-2.5%	182.8%	0.6%
Ireland	-1.1%	13.6%	-0.2%	6.8%
Italy	0.4%	-1.5%	0.4%	-0.6%
Luxembourg	-65.4%	3.4%	0.7%	-3.0%
Netherlands	-2.0%	5.3%	-0.3%	1.8%
Portugal	-17.7%	12.1%	704.5%	7.5%
Spain	-5.5%	6.8%	2.7%	4.4%
Sweden	16.8%	-1.5%	3.5%	2.2%
United Kingdom	-1.1%	8.7%	4.0%	4.3%
European Union	**-2.1%**	**3.8%**	**2.5%**	**1.8%**

Transport fuels and petrochemical feedstock accounted for 63% of total oil consumption in 1997…

Total oil demand has steadily increased by 1.1% yearly since 1990. The consumption growth reached 34 Mtoe in the transport sector of a total of about 50 Mtoe, excluding statistical differences, and 16 Mtoe for non-energy uses. Other changes were more marginal with the energy branch compensating for the reduction which occurred in the power generation sector. Consequently, consumption of heating gas oil remained quite stable over the period 1990-1997. This means also that the European oil market is becoming increasingly captive with specific markets (transport and petrochemistry) reaching 63% of total oil demand in 1997. Oil is also losing market share to natural gas and electricity in many industrial energy uses and also on the heating market in the tertiary-domestic sector.

GROSS INLAND CONSUMPTION

Mtoe	1985	1990	1995	1997	90/85	95/90	97/95	97/90	1985	1990	1995	1997
					Annual % change				Share in %			
Austria	23.7	25.6	26.3	28.4	1.6%	0.5%	3.9%	1.4%	1.9%	2.0%	1.9%	2.0%
of which Solids	4.0	4.2	3.2	3.6	1.0%	-5.0%	5.3%	-2.2%	1.3%	1.4%	1.4%	1.6%
Oil	9.6	10.5	10.9	11.7	1.8%	0.6%	3.8%	1.5%	1.9%	1.9%	1.9%	2.0%
Natural Gas	4.6	5.2	6.3	6.5	2.6%	3.9%	1.6%	3.2%	2.3%	2.4%	2.3%	2.2%
Belgium	43.8	47.3	50.5	55.1	1.5%	1.3%	4.5%	2.2%	3.5%	3.6%	3.7%	3.9%
of which Solids	9.9	10.2	8.6	8.4	0.7%	-3.5%	-1.1%	-2.9%	3.1%	3.4%	3.6%	3.8%
Oil	17.3	17.7	19.8	22.5	0.4%	2.2%	6.5%	3.4%	3.4%	3.3%	3.4%	3.8%
Natural Gas	7.3	8.2	10.6	11.3	2.2%	5.4%	3.0%	4.7%	3.7%	3.7%	3.9%	3.7%
Denmark	19.6	18.2	20.6	21.6	-1.5%	2.5%	2.4%	2.5%	1.6%	1.4%	1.5%	1.5%
of which Solids	7.4	6.1	6.4	6.7	-3.7%	1.1%	1.6%	1.2%	2.3%	2.0%	2.7%	3.0%
Oil	10.7	8.6	9.6	10.0	-4.3%	2.3%	2.1%	2.2%	2.1%	1.6%	1.7%	1.7%
Natural Gas	0.6	1.8	3.1	3.9	25.8%	11.8%	11.2%	11.7%	0.3%	0.8%	1.1%	1.3%
Finland	26.8	28.5	28.9	33.2	1.2%	0.3%	7.1%	2.2%	2.2%	2.2%	2.1%	2.4%
of which Solids	5.0	5.1	6.0	7.3	0.4%	3.4%	10.2%	5.3%	1.6%	1.7%	2.5%	3.3%
Oil	10.2	9.9	8.3	10.0	-0.6%	-3.5%	9.5%	0.1%	2.0%	1.8%	1.4%	1.7%
Natural Gas	0.8	2.3	2.8	2.9	23.1%	4.7%	1.2%	3.7%	0.4%	1.0%	1.0%	1.0%
France	202.4	219.2	234.5	242.5	1.6%	1.4%	1.7%	1.5%	16.3%	16.7%	17.2%	17.2%
of which Solids	24.4	20.0	15.3	14.6	-3.9%	-5.2%	-2.4%	-4.4%	7.7%	6.6%	6.4%	6.6%
Oil	83.9	87.7	85.2	87.4	0.9%	-0.6%	1.3%	0.0%	16.4%	16.1%	14.8%	14.9%
Natural Gas	24.2	24.6	29.0	31.3	0.3%	3.3%	4.0%	3.5%	12.2%	11.1%	10.6%	10.4%
Germany	359.6	354.0	336.2	343.5	-0.3%	-1.0%	1.1%	-0.4%	29.0%	26.9%	24.7%	24.4%
of which Solids	148.0	131.5	92.2	86.7	-2.3%	-6.9%	-3.0%	-5.8%	46.8%	43.7%	38.8%	39.1%
Oil	121.3	124.0	133.6	137.1	0.4%	1.5%	1.3%	1.4%	23.7%	22.8%	23.2%	23.3%
Natural Gas	49.6	55.0	66.4	71.1	2.1%	3.8%	3.5%	3.7%	25.0%	24.8%	24.3%	23.6%
Greece	18.3	22.2	24.1	25.6	3.9%	1.6%	3.0%	2.0%	1.5%	1.7%	1.8%	1.8%
of which Solids	6.1	8.1	8.8	8.8	5.9%	1.7%	0.2%	1.2%	1.9%	2.7%	3.7%	4.0%
Oil	11.0	12.8	14.0	15.1	3.1%	1.7%	3.9%	2.3%	2.2%	2.4%	2.4%	2.6%
Natural Gas	0.1	0.1	0.0	0.2	14.0%	-20.4%	97.4%	3.1%	0.0%	0.1%	0.0%	0.1%
Ireland	8.8	10.2	11.1	12.3	2.9%	1.7%	5.4%	2.7%	0.7%	0.8%	0.8%	0.9%
of which Solids	2.6	3.5	2.9	2.9	6.5%	-3.9%	-0.6%	-2.9%	0.8%	1.2%	1.2%	1.3%
Oil	4.1	4.6	5.6	6.4	2.1%	4.1%	7.2%	4.9%	0.8%	0.8%	1.0%	1.1%
Natural Gas	1.9	1.9	2.3	2.8	-0.5%	4.3%	9.0%	5.6%	1.0%	0.9%	0.9%	0.9%
Italy	136.1	154.8	162.7	168.1	2.6%	1.0%	1.6%	1.2%	11.0%	11.8%	11.9%	11.9%
of which Solids	15.2	14.6	12.3	11.2	-0.7%	-3.4%	-4.6%	-3.7%	4.8%	4.9%	5.2%	5.1%
Oil	81.0	89.8	93.4	92.7	2.1%	0.8%	-0.4%	0.4%	15.8%	16.5%	16.2%	15.8%
Natural Gas	27.2	39.0	44.7	47.5	7.5%	2.7%	3.1%	2.8%	13.7%	17.6%	16.3%	15.7%
Luxembourg	3.1	3.6	3.3	3.4	2.5%	-1.2%	0.2%	-0.8%	0.3%	0.3%	0.2%	0.2%
of which Solids	1.4	1.1	0.5	0.3	-4.5%	-14.6%	-22.1%	-16.8%	0.4%	0.4%	0.2%	0.1%
Oil	1.1	1.6	1.8	1.9	8.8%	2.1%	3.7%	2.6%	0.2%	0.3%	0.3%	0.3%
Natural Gas	0.3	0.4	0.6	0.6	7.2%	5.3%	6.0%	5.5%	0.2%	0.2%	0.2%	0.2%
Netherlands	61.5	66.9	73.4	74.9	1.7%	1.9%	1.0%	1.6%	5.0%	5.1%	5.4%	5.3%
of which Solids	6.6	9.1	9.1	9.1	6.7%	-0.1%	0.2%	0.0%	2.1%	3.0%	3.8%	4.1%
Oil	20.4	24.4	27.2	27.3	3.7%	2.2%	0.2%	1.6%	4.0%	4.5%	4.7%	4.6%
Natural Gas	32.3	30.8	34.1	35.3	-1.0%	2.0%	1.8%	2.0%	16.3%	13.9%	12.5%	11.7%
Portugal	12.4	16.9	19.8	21.3	6.4%	3.2%	3.8%	3.4%	1.0%	1.3%	1.5%	1.5%
of which Solids	0.7	2.6	3.5	3.5	31.2%	6.3%	0.0%	4.4%	0.2%	0.9%	1.5%	1.6%
Oil	8.4	11.6	13.4	13.9	6.7%	3.0%	1.6%	2.6%	1.6%	2.1%	2.3%	2.4%
Natural Gas	0.0	0.0	0.0	0.1	-	-	-	-	0.0%	0.0%	0.0%	0.0%
Spain	73.9	89.1	102.3	105.9	3.8%	2.8%	1.8%	2.5%	6.0%	6.8%	7.5%	7.5%
of which Solids	19.5	18.9	19.5	18.5	-0.6%	0.6%	-2.7%	-0.4%	6.2%	6.3%	8.2%	8.3%
Oil	38.3	45.5	54.6	56.1	3.5%	3.7%	1.4%	3.0%	7.5%	8.4%	9.5%	9.5%
Natural Gas	2.4	5.0	7.7	11.3	16.1%	9.2%	21.0%	12.5%	1.2%	2.2%	2.8%	3.7%
Sweden	46.9	46.9	49.9	50.2	0.0%	1.2%	0.3%	1.0%	3.8%	3.6%	3.7%	3.6%
of which Solids	2.8	2.7	2.9	2.5	-0.5%	1.2%	-7.7%	-1.4%	0.9%	0.9%	1.2%	1.1%
Oil	17.6	14.5	15.7	15.8	-3.8%	1.6%	0.3%	1.2%	3.4%	2.7%	2.7%	2.7%
Natural Gas	0.1	0.5	0.7	0.7	47.8%	5.0%	3.2%	4.5%	0.0%	0.2%	0.2%	0.2%
United Kingdom	203.7	210.9	219.2	221.0	0.7%	0.8%	0.4%	0.7%	16.4%	16.0%	16.1%	15.7%
of which Solids	62.8	63.3	46.6	37.9	0.2%	-5.9%	-9.8%	-7.1%	19.9%	21.0%	19.6%	17.1%
Oil	77.4	81.7	83.0	80.0	1.1%	0.3%	-1.8%	-0.3%	15.1%	15.0%	14.4%	13.6%
Natural Gas	46.6	47.2	65.0	76.4	0.2%	6.6%	8.4%	7.1%	23.6%	21.3%	23.8%	25.3%
European Union	1240.8	1314.2	1362.6	1406.9	1.2%	0.7%	1.6%	1.0%	100.0%	100.0%	100.0%	100.0%
of which Solids	316.2	301.2	237.8	221.8	-1.0%	-4.6%	-3.4%	-4.3%	100.0%	100.0%	100.0%	100.0%
Oil	512.3	545.1	576.0	587.8	1.2%	1.1%	1.0%	1.1%	100.0%	100.0%	100.0%	100.0%
Natural Gas	198.0	222.1	273.4	301.9	2.3%	4.2%	5.1%	4.5%	100.0%	100.0%	100.0%	100.0%

Natural gas, the fuel of the 90's, showed a continuous acceleration of its growth rate since 1990…

Primary consumption of natural gas increased by about 4.5% per year since 1990, demonstrating continuous growth. Increases were spectacular in the three main markets: the power sector (+91% or +33 Mtoe), tertiary-domestic market (+31% or +30 Mtoe) and industry (+17% or +11 Mtoe). In the last three years natural gas demand grew the fastest among the primary fossil fuels and in almost all Member States - even in the Netherlands where the gas market was already saturated for a long time. Some mature markets, Denmark, Austria, Ireland and the United Kingdom, also demonstrated very high growth rates, largely above 8% per annum.

Resource availability, government energy policy and infrastructure development all favour increased use of natural gas. Environmental policy also encourages gas use. Natural gas prices have been competitive at the same time as requirements for fitting coal-fired or oil-fired generators with pollution control equipment have increased the costs associated with continued coal use. Privatisation of the electricity sector and the ensuing, widespread development of independent power plants are further examples of how policy can encourage expanded gas use. Growth in natural gas demand is being accompanied by considerable activity in gas infrastructure, which will enable customers to diversify suppliers and gas supply contracts. This will be especially in the context of gas market liberalisation which will increase gas to gas competition.

In-depth restructuring in producing countries reduced solid consumption since 1990 by 26%…

The **use of solid fuels** decreased in most of the Member States and sectors over the period 1990-97. The slow-down was particularly noticeable in France, Germany and the United Kingdom. All three are historically identified as mining countries and absorbed about 75% of total European consumption in 1985 and still 71.3% in 1990. The in-depth restructuring of the mining industry has suppressed protected markets in these countries and opened the door for competition with gas and oil products. As a consequence, the reduction of consumption has reached 35% in these three countries since 1990 and, in 1997, their share was limited to 62.7% of total European consumption. On the contrary, since 1990, coal consumption slightly increased in Denmark, Finland, Greece and Portugal with growth mainly located in the power sector. All over the European Union, the consumption of solid fuels is increasingly concentrated in power generation whose share increased from 54% in 1985 to 60% in 1990 and to about 67% in 1997.

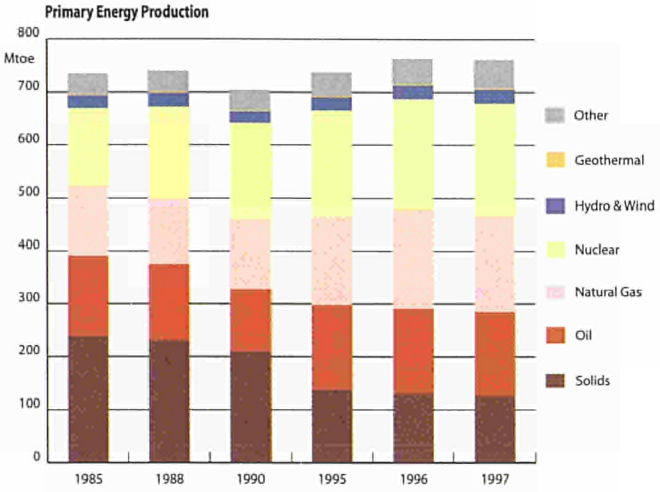
Renewable energy sources, supported by the Altener EU programme, increased by 5.1% per year since 1990…

Other fuels increased regularly by 2.8% per year since 1985. Before 1990, the major growth was provided by nuclear supported by a rapid extension of its capacity. Since 1990, limited nuclear investments have been compensated by increasing capacity utilisation rates of existing units. Although the contribution of hydro fluctuated marginally over this period depending on rainfall, other renewable energy sources have increased substantially since 1990. This can be considered a result of the Altener programme, sustained by the Commission to promote all forms of renewable energy. The major growth, 5.1% per year on average over the period 1990-1997, concerned biomass of which the two main markets, power generation and direct use in tertiary-domestic sector, are increasing.

INDIGENOUS PRODUCTION

Indigenous production peaked at 763 Mtoe in 1996 and declined slowly in 1997…

Domestic production of primary energy in the European Union as a whole declined by 0.3% in 1997 after the peak registered in 1996. After a continuous decrease between 1986 and 1992, production rebounded sharply demonstrating an accelerating growth rate: 2.1% in 1994, 2.5% in 1995 and 3.7% in 1996. Solid fuels, which were declining faster and faster until 1995 with a reduction of about 34% since 1990, progressively reduced their slowdown in the last two years. The production both of steam coal and lignite fell at similar rates since 1985, by 45% and 50% respectively. Oil production, marked by a significant decline between 1985 and 1990, showed an annual increase of 6.4% between 1990 and 1995, driven by the application of more efficient and economical methods for offshore exploitation and reached a new peak in 1995. Since then, the production has remained stable. Despite a period of low oil prices, reduced costs have made small field development profitable. The use of floating platforms instead of fixed steel ones is an example of this cost reduction exercise. Consequently, satellite developments from existing fields have been a significant contributor to enlarged European production in the North Sea. At the same time, a declining size of reserves necessary for fields to be developed has been observed. Whereas fields once required at least 100 million barrels of reserves in order to be developed, now fields with reserves of as little as 10 million barrels are being exploited. Natural gas and nuclear energy became the main energy sources in Europe (23.9% and 27.9% of total primary production respectively), with a continuous increase of 4.6% and 2.3% per year respectively over



the period 1990-1997. The recent increase in natural gas production was really impressive with a progress of 4.4% in 1995 and 13.2% in 1996. This trend was mainly sustained by the United Kingdom, the largest European gas producer in 1996, which doubled its production since 1990; and by the Netherlands, which played the role of swing producer with their major Groningen gas field, characterised by very low production costs. In 1997, confronted with declining European demand due to warmer weather conditions, the Netherlands played perfectly this role by reducing gas production by about 12%. Although they reduced their inland deliveries by 5.7% they mainly diminished their export deliveries to other European countries by 18.2%. For its part, nuclear was also performing well, with production increasing in the last two years by 2.3% on average even though capacity growth reached only 0.9% on average. This implied increasing reactor utilisation rates, which now exceed 80% for the European Union as a whole, one of the best performances in the world.

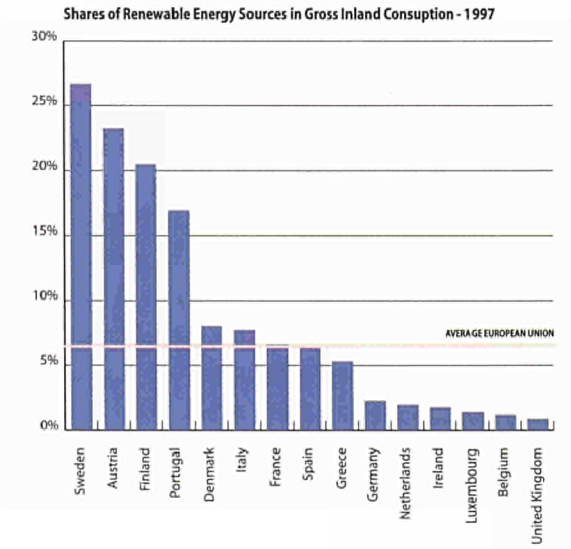
Increasing contribution of renewable energy reached about 6% of gross inland consumption…

In 1997, considering the spectacular jump by 12% that must still be statistically confirmed, the contribution of **renewable energy** sources represented 10.8% of the total primary energy production and 5.8% of gross inland consumption respectively. Hydroelectricity and wind energy output has remained quite stable since 1995, representing only 2.8% of primary production. Increasing production from wind power compensated for a relative slowdown of hydro production linked to the poor hydraulic conditions in the last few years. Geothermal energy remained globally marginal but the prospects for the near future were favourable with the Italian production expected to almost double. Finally, biomass - whose use grew both for power generation mainly in the northern countries and for direct use mainly in the domestic sector - showed an accelerating progression since 1990 to reach 7% of total primary production in 1997. The situation varies widely from Member State to Member State. Renewable energy sources are mainly used in Sweden, Austria, Finland and Portugal with a national share of gross inland consumption ranging between 16% to 27%. They are also used significantly in Denmark, Italy, France, Spain, and Greece, with a share of between 5% and 8%. Its use remained almost negligible in the other Member States.

Real economic potential now exists for renewables energy sources…

Current trends show that considerable technological progress related to renewable energy technologies has been achieved over recent years. Costs are rapidly falling and many renewables, under the right conditions, have reached or are approaching economic viability. The first signs of large-scale implementation are also appearing in wind energy and solar thermal collectors. Some technologies, in particular biomass, small hydro and wind, are currently competitive and economically viable in particular compared to other decentralised applications. Although comparative costs for many renewables are becoming less disadvantageous, in certain cases quite markedly, their use is still hampered in many situations by higher initial investment costs compared with conventional fuel cycles.

As a first step towards a strategy for renewable energy, the Commission adopted a White Paper for a Community Strategy and Action Plan (Com(97) 599 final). This strategy and action plan are directed towards the goal of achieving a 12% penetration of



RENEWABLE ENERGY SOURCES IN 1997

Ktoe	Hydro	Wind	Solar	Geoth	Biomass	Other	Total	Contribution of Renewable
Production = Gross Inland Consumption								
Austria	3094	0	0	0	3508	0	6602	23,3%
Belgium	26	1	1	2	623	105	758	1,4%
Denmark	2	166	7	1	1541	0	1717	8,0%
Finland	1053	1	0	0	5698	172	6924	20,9%
France	5399	0	16	131	10473	0	16020	6,6%
Germany	1492	261	68	10	5903	0	7734	2,3%
Greece	334	3	114	2	911	0	1364	5,3%
Ireland	58	4	0	0	162	0	225	1,8%
Italy	3577	10	7	2611	6722	428	13355	7,9%
Luxembourg	7	0	0	0	40	0	47	1,4%
Netherlands	8	41	5	0	1438	0	1492	2,0%
Portugal	1127	3	16	45	2406	0	3597	16,9%
Spain	2975	31	25	7	3788	0	6827	6,4%
Sweden	5935	18	4	0	7458	0	13416	26,7%
United Kingdom	355	57	6	1	1638	0	2057	0,9%
European Union	**25442**	**598**	**271**	**2810**	**52309**	**705**	**82134**	**5,8%**
Inputs to Power Generation Production								
Austria	3094	0	0	0	772	0	3866	48,9%
Belgium	26	1	0	0	367	105	499	2,7%
Denmark	2	166	0	0	991	0	1159	11,5%
Finland	1053	1	0	0	1350	172	2577	17,6%
France	5399	0	0	0	1159	0	6558	6,1%
Germany	1492	261	0	0	1767	0	3520	2,9%
Greece	334	3	0	0	0	0	337	3,5%
Ireland	58	4	0	0	22	0	84	1,9%
Italy	3577	10	0	2398	328	428	6741	14,3%
Luxembourg	7	0	0	0	23	0	30	29,1%
Netherlands	8	41	0	0	1047	0	1096	6,0%
Portugal	1127	3	0	45	153	0	1328	23,3%
Spain	2975	31	0	0	562	0	3568	9,4%
Sweden	5935	18	0	0	2272	0	8225	30,4%
United Kingdom	355	57	0	0	847	0	1259	1,7%
European Union	25442	598	0	2443	11661	705	40849	9,7%
Final Energy Consumption								
Austria	0	0	0	0	2736	0	2736	12,5%
Belgium	0	0	1	2	255	0	258	0,7%
Denmark	0	0	7	1	550	0	558	3,7%
Finland	0	0	0	0	4348	0	4348	18,9%
France	0	0	16	131	9314	0	9462	6,4%
Germany	0	0	68	10	4136	0	4214	1,9%
Greece	0	0	114	2	911	0	1027	6,0%
Ireland	0	0	0	0	141	0	141	1,6%
Italy	0	0	7	213	6394	0	6614	5,4%
Luxembourg	0	0	0	0	17	0	17	0,5%
Netherlands	0	0	5	0	390	0	396	0,8%
Portugal	0	0	16	0	2252	0	2269	15,2%
Spain	0	0	25	7	3226	0	3258	4,8%
Sweden	0	0	4	0	5186	0	5191	15,5%
United Kingdom	0	0	6	1	791	0	798	0,5%
European Union	0	0	271	367	40648	0	41285	4,4%

renewables in the European Union by 2010, an ambitious but realistic approach. This overall target of doubling the share of renewables could be an important instrument for attaining CO_2 emissions reduction, decreasing energy dependence, developing national industries and creating jobs.

COMPETITIVENESS: Recent evolution (1985-1997)

- Energy intensity improved by 0.6% per year between 1990 and 1997, with similar weather conditions
- Energy intensity associated with individual activities (heating, transport…) do not participate in the overall improvement
- Geographical variations between Member States
- Gas consumption per capita increased by 33% at European level since 1990
- European energy prices are not competitive compared to United States and non-OECD region

COMPETITIVENESS

Main items

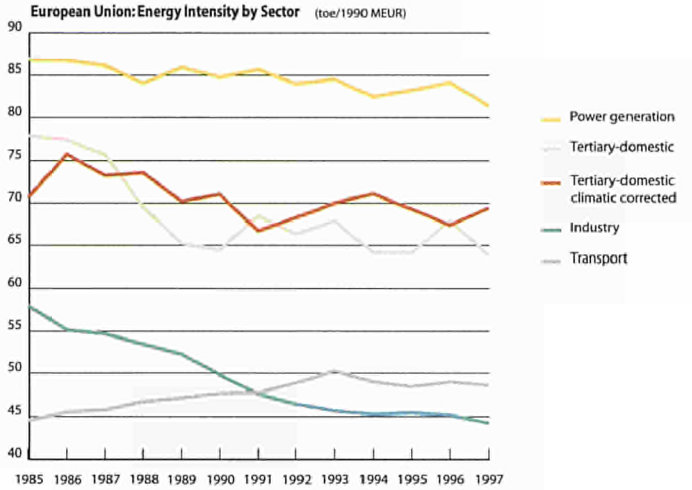
Energy costs within the European Union remain high compared with those faced by most international trading competitors. Liberalisation of electricity and gas markets is intended to exert downward pressure on prices, as is increasing use of imported coal. A rising share of oil is consumed in the transport sector in which duties and taxes account for a growing proportion of final product prices, especially for road transport fuels. Energy intensity continues to decline, though at a somewhat lower rate over recent years given reduced market incentives and lower levels of investment. The scope for energy efficiency improvements remains large, driven by technological change and the replacement of existing, less-efficient, energy-using equipment.

Energy intensity improved by 0.6% per year between 1990 and 1997, with similar weather conditions…

The European Union continuously improved its overall energy intensity (as measured by energy use per unit of GDP) over the period 1985-1997 (-1.8% per year between 1985 and 1990 and -0.6% annually between 1990 and 1997). As already mentioned, the comparison between 1990 and 1997 is of particular interest as these two years were characterised by similar weather conditions. On the contrary, the degree-days were 32% higher in 1985 than in 1990, meaning that the energy intensity improvement over that period was heavily influenced by the significant reduction of heating requirements in 1990 compared to 1985. This energy intensity indicator is the result of different developments in the main consuming sectors, including power generation. Indeed, intensity improvements in industry since 1990 (-1.7% per year on average) and power generation (-0.6% per year on average) were the main drivers in reducing the overall energy intensity. The performance of industry is particularly surprising as it had already made major contributions during the 1980's as a result of the restructuring from energy-intensive industry to small and medium companies characterised by higher added-value and less energy content. This phenomenon has continued in the present decade but to a lesser extent. But faced with a competitive global economy, industrialists were optimising these processes and consequently reducing their specific energy consumption, even in the context of lower energy prices. Technological improvements are increasingly becoming the driving force for energy savings in industry. This observation applies just as well to the power sector which, despite a continuous increase in its output, succeeded in improving its energy intensity since 1990, thanks to spectacular efficiency gains. These must be linked to the technological improvement of conventional units (supercritical units…), the emergence of combined cycle and continuous development of combined heat and power production. It must be underlined that the major improvements occurred in relatively centralised sectors where competitiveness was playing a major role.

Energy intensity associated with individual activities (heating, transport…) do not participate in the overall improvement…

On the other hand, the energy intensity of the tertiary-domestic sector remained stable between 1990 and 1997. This means that the increasing commercial and services floor area and the growing number of households (as the average family size was declining), combined with the reduction of incentives to use energy rationally, together absorbed all the gains provided by technological improvements (computer optimised building services, high efficiency boilers, improved characteristics of new buildings, reduction in the specific consumption of all electrical appliances…). In many cases, returns on energy savings investment became too low to incentivise decisions by a large number of individual consumers. The conclusion is a little different for the transport sector. Although energy intensity still increased by 0.3% per year on average in the period 1990-97, the first signs of stabilisa-



tion appeared in 1993. This resulted in a reduction in intensity of 0.8% per year on average over the period 1993-1997. This occurred despite an increase in goods transport (about 3% per year on average) which coincided with a stabilisation of the road contribution and, on the other hand, a growth of passenger traffic (about 2.1% per year on average). The number of passenger cars also stabilised. In the absence of statistical information by use (goods transport vs. passenger transport), the improvement can be associated in a first approximation to the improved efficiency of new vehicles, in particular passenger cars, and better management of traffic flows. This apparent structural modification will require more in-depth analysis to fully understand the future contribution of transport to final energy consumption and, in particular, its possible impact on CO_2 emissions.

Geographical variations between Member States…

Between 1990 and 1997, which have the advantage of offering comparable climatic conditions at the European level, (very warm weather), seven Members located at the extreme north (Denmark, Finland and Sweden) and the extreme south of Europe (Greece, Portugal, Spain and Italy) showed increasing or stable energy intensity. As already mentioned, this evolution is the result for the southern countries of higher economic growth mainly based on a strong industrialisation and improved living standards. For the northern part of Europe it can be attributed to colder weather, the variation of weather conditions not being uniform throughout the whole European Union. At the same time, Member States located in the middle of Europe, with the exception of Belgium, improved their energy intensity. Luxembourg, helped by the conversion of its steel industry to electric arc furnaces, Ireland sustained by a strong industrial growth oriented to high added value industries, and Germany assisted by the restructuring of the new Länder, are the best performers in both the short and long term.

Gas consumption per capita increased by 33% at European level since 1990…

Considering the differences in living standards and space heating requirements (where geography is the key element), Portugal had the lowest **energy consumption per-capita** in 1997 with 2.14 toe/inhabitant; while Finland had the highest with 6.45 toe/inhabitant, or three times as much. This was excluding Luxembourg whose value is not representative due to the weight of the iron and steel industry in this small country and the importance of motor fuel purchases by drivers from neighbouring Member States. Over the period 1990-97, the energy consumption per capita was increasing in all Member States, with the exception of Germany and Luxembourg. The European average growth reached 0.6% per year. Portugal has been increasing its per capita consumption twice as fast as Finland. This illustrates the differences between an economy growing from a low level of development and an already stable economic system.

Oil consumption per capita is characterised by a convergence between all the Member States to the European average (1.6 toe per capita) since 1985. This resulted from the progressive concentration of oil consumption on its captive markets: motor fuels and petrochemistry. With the exception of the Netherlands and France, per capita gas consumption has been increasing significantly in all countries where distribution networks are well developed, driven by demand from power generation, industry and the tertiary-domestic sectors. Between 1990 and 1997 this per capita consumption increased by 33% at the European level!

European energy prices are not competitive compared to the United States and non-OECD regions…

Although energy efficiency played a major role in competitiveness, energy prices are also of primary importance if we limit the analysis to the energy point of view, to the exclusion of any considerations of labour costs, fiscal systems and regulation. As already mentioned, the average prices of energy for industrial consumers since 1985 show an average yearly decrease of 6.1% for steam coal, 7.3% for heavy oil, 6.4% for natural gas and 3.0% for electricity using a weighted average at the European level. In addition very large variations exist between Member States as a result of differences in taxation regimes, excise duties and VAT. Compared with the prices of the main competitors inside the OECD, the United States and Japan, it is clear that the US prices are well below Europe's. Japanese prices are comparable for heavy fuel oil but twice for gas and electricity. If the European average for heavy fuel oil equalled 100 in 1997, the US value was 64 (an accentuation of the difference since 1996), and the Japanese 94, closer to the European average. For natural gas, the respective

MAIN INDICATORS

	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Austria											
Gross inl. Cons./GDP (toe/1990 MEUR)	220.5	209.7	204.1	189.7	197.5	196.5	-1.5%	-2.2%	4.1%	-0.5%	-0.5%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	3122.8	3174.2	3317.1	3265.1	3448.4	3508.8	1.2%	-1.4%	5.6%	1.8%	0.8%
Electricity Generated/Capita (kWh/inhabitant)	5913.9	6478.8	6576.6	7031.2	6802.6	7034.9	2.1%	1.5%	-3.3%	3.4%	1.0%
Belgium											
Gross inl. Cons./GDP (toe/1990 MEUR)	329.5	315.2	305.9	306.2	323.4	320.4	-1.5%	-0.7%	5.6%	-0.9%	0.7%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	4447.3	4607.5	4741.9	4977.5	5314.2	5410.3	1.3%	0.2%	6.8%	1.8%	1.9%
Electricity Generated/Capita (kWh/inhabitant)	5813.5	6598.6	7106.5	7341.1	7496.1	7747.0	4.1%	0.5%	2.1%	3.3%	1.2%
Denmark											
Gross inl. Cons./GDP (toe/1990 MEUR)	213.8	188.1	179.2	179.2	196.1	176.4	-3.5%	-1.8%	9.4%	-10.0%	-0.2%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	3833.8	3670.8	3541.7	3936.2	4415.8	4090.3	-1.6%	0.5%	12.2%	-7.4%	2.1%
Electricity Generated/Capita (kWh/inhabitant)	5679.6	5450.8	5010.4	7035.5	10176.1	8387.3	-2.5%	0.0%	44.6%	-17.6%	7.6%
Finland											
Gross inl. Cons./GDP (toe/1990 MEUR)	298.2	282.2	268.1	279.7	289.2	292.4	-2.1%	-1.2%	3.4%	1.1%	1.2%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	5465.4	5730.7	5708.2	5655.8	6036.3	6448.6	0.9%	-0.5%	6.7%	6.8%	1.8%
Electricity Generated/Capita (kWh/inhabitant)	10139.7	10893.9	10903.0	12505.1	13534.7	13451.9	1.5%	2.0%	8.2%	-0.6%	3.0%
France											
Gross inl. Cons./GDP (toe/1990 MEUR)	249.6	236.2	233.2	237.6	248.0	237.1	-1.3%	-1.0%	4.4%	-4.4%	0.2%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	3661.5	3725.3	3863.9	4033.6	4252.1	4138.2	1.1%	-0.4%	5.4%	-2.7%	1.0%
Electricity Generated/Capita (kWh/inhabitant)	6226.7	6982.7	7404.2	8507.5	8776.1	8593.2	3.5%	1.6%	3.2%	-2.1%	2.2%
Germany											
Gross inl. Cons./GDP (toe/1990 MEUR)	320.0	299.0	272.9	239.2	244.3	236.2	-3.1%	-2.0%	2.1%	-3.3%	-2.0%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	4630.4	4648.0	4460.6	4116.5	4246.5	4178.4	-0.7%	-1.3%	3.2%	-1.6%	-0.9%
Electricity Generated/Capita (kWh/inhabitant)	6706.5	7014.7	6912.6	6565.5	6779.7	6707.1	0.6%	-0.7%	3.3%	-1.1%	-0.4%
Greece											
Gross inl. Cons./GDP (toe/1990 MEUR)	308.4	321.0	340.9	347.7	357.5	349.2	2.0%	1.1%	2.8%	-2.3%	0.3%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	1845.9	2009.0	2189.3	2309.1	2425.8	2435.8	3.5%	1.4%	5.1%	0.4%	1.5%
Electricity Generated/Capita (kWh/inhabitant)	2791.8	3327.6	3444.2	3973.9	4061.6	4137.6	4.3%	3.3%	2.2%	1.9%	2.7%
Ireland											
Gross inl. Cons./GDP (toe/1990 MEUR)	322.4	304.9	284.2	229.2	223.8	212.8	-2.5%	-4.8%	-2.4%	-4.9%	-4.1%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	2494.6	2697.6	2906.7	3071.4	3223.7	3383.5	3.1%	1.4%	5.0%	5.0%	2.2%
Electricity Generated/Capita (kWh/inhabitant)	3414.1	3745.9	4139.5	4958.2	5288.8	5490.4	3.9%	3.7%	6.7%	3.8%	4.1%
Italy											
Gross inl. Cons./GDP (toe/1990 MEUR)	182.9	179.5	179.7	178.7	177.2	180.6	-0.3%	-0.2%	-0.8%	1.9%	0.1%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	2404.0	2596.4	2729.1	2838.9	2830.2	2926.2	2.6%	0.7%	-0.3%	3.4%	1.0%
Electricity Generated/Capita (kWh/inhabitant)	3281.4	3594.0	3823.3	4213.5	4257.7	4377.7	3.1%	1.9%	1.0%	2.8%	2.0%
Luxembourg											
Gross inl. Cons./GDP (toe/1990 MEUR)	448.1	395.8	419.7	325.8	323.8	306.5	-1.3%	-6.5%	-0.6%	-5.3%	-4.4%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	8548.5	8466.8	9300.5	8140.5	8184.2	7950.8	1.7%	-4.4%	0.5%	-2.9%	-2.2%
Electricity Generated/Capita (kWh/inhabitant)	2560.2	3572.9	3610.7	3028.5	3144.7	2988.8	7.1%	-4.1%	3.8%	-5.0%	-2.7%
Netherlands											
Gross inl. Cons./GDP (toe/1990 MEUR)	320.6	317.6	300.5	297.1	299.2	283.7	-1.3%	-0.9%	0.7%	-5.2%	-0.8%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	4246.8	4393.9	4473.3	4746.3	4906.9	4795.3	1.0%	0.5%	3.4%	-2.3%	1.0%
Electricity Generated/Capita (kWh/inhabitant)	4342.1	4715.3	4805.7	5243.3	5493.0	5547.9	2.0%	1.6%	4.8%	1.0%	2.1%
Portugal											
Gross inl. Cons./GDP (toe/1990 MEUR)	297.2	298.5	310.3	334.6	328.5	337.6	0.9%	2.0%	-1.8%	2.8%	1.2%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	1234.2	1482.5	1703.2	1992.9	2012.8	2142.2	6.7%	3.4%	1.0%	6.4%	3.3%
Electricity Generated/Capita (kWh/inhabitant)	1908.3	2255.7	2879.5	3353.9	3476.6	3438.5	8.6%	2.6%	3.7%	-1.1%	2.6%
Spain											
Gross inl. Cons./GDP (toe/1990 MEUR)	235.9	226.9	223.7	240.3	230.3	235.4	-1.1%	1.0%	-4.1%	2.2%	0.7%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	1923.8	2150.9	2292.9	2608.6	2553.4	2693.1	3.6%	1.9%	-2.1%	5.5%	2.3%
Electricity Generated/Capita (kWh/inhabitant)	3314.4	3605.1	3905.0	4260.1	4424.1	4743.0	3.3%	1.6%	3.8%	7.2%	2.8%
Sweden											
Gross inl. Cons./GDP (toe/1990 MEUR)	290.6	281.8	259.6	269.7	276.0	263.0	-2.2%	-0.2%	2.3%	-4.7%	0.2%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	5621.6	5821.5	5484.8	5655.4	5851.3	5661.8	-0.5%	0.1%	3.5%	-3.2%	0.5%
Electricity Generated/Capita (kWh/inhabitant)	16421.4	17331.0	17114.7	16803.3	15904.0	16859.7	0.8%	-0.4%	-5.4%	6.0%	-0.2%
United Kingdom											
Gross inl. Cons./GDP (toe/1990 MEUR)	344.8	344.0	324.1	287.2	304.8	297.0	-1.2%	-2.5%	6.1%	-2.6%	-1.2%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	3593.5	3689.4	3663.2	3740.2	3877.7	3748.0	0.4%	0.1%	3.7%	-3.3%	0.3%
Electricity Generated/Capita (kWh/inhabitant)	5257.7	5389.9	5540.5	5698.9	5906.7	5855.2	1.1%	0.5%	3.6%	-0.9%	0.8%
European Union											
Gross inl. Cons./GDP (toe/1990 MEUR)	272.5	257.3	247.3	239.8	244.2	237.2	-1.9%	-1.1%	1.9%	-2.9%	-0.6%
Gross Inl. Cons./Capita (Kgoe/inhabitant)	3458.1	3574.3	3605.4	3661.9	3781.4	3759.3	0.8%	-0.1%	3.3%	-0.6%	0.6%
Electricity Generated/Capita (kWh/inhabitant)	5342.8	5737.6	5913.9	6256.7	6459.2	6473.1	2.1%	0.8%	3.2%	0.2%	1.3%

ratios are 72 for the United States, stable compare to 1996, and 235 for Japan, or a substantial increase. Finally, for electricity the ratios are 64 for the United States, stable from 1996 as a result of the progressive liberation in these two regions, and 202 for Japan - a substantial increase compared to 1996. As a first approximation, it can be considered that the US figures reflect low prices observed in liberalised and competitive markets, especially for gas and electricity. Additionally, tax levels are also considerably lower in the US.

Energy prices in the non-OECD regions are generally very low compared to the international markets for a number of specific reasons: abundant indigenous production, low incomes, absence of national structured markets, etc.... These differences explain the relocation of some energy-intensive industries, especially petrochemicals, which also consume energy as a raw material, and iron and steel and building materials.

INDUSTRIAL CONSUMERS - ENERGY PRICES COMPARISON (1)

	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
EUR90/toe							Annual % Change				
Heavy fuel oil											
France	288.2	98.7	110.2	96.3	100.1	98.4	-17.5%	-2.7%	4.0%	-1.7%	-1.6%
Germany	284.5	96.1	115.0	na	na	na	-16.6%	na	na	na	na
Italy	303.0	88.3	150.9	149.0	149.4	143.3	-13.0%	-0.3%	0.2%	-4.1%	-0.7%
United Kingdom	293.4	109.6	108.1	107.2	114.9	106.3	-18.1%	-0.2%	7.2%	-7.5%	-0.2%
European Union average	305.2	108.9	123.5	120.4	127.2	122.4	-16.6%	-0.5%	5.7%	-3.8%	-0.1%
United States	157.9	74.0	89.3	76.7	85.7	78.6	-10.8%	-3.0%	11.7%	-8.3%	-1.8%
Japan	337.2	149.5	155.8	91.4	100.5	115.1	-14.3%	-10.1%	10.0%	14.5%	-4.2%
Natural gas											
France	271.1	123.2	122.2	104.2	105.2	111.9	-14.7%	-3.1%	1.0%	6.4%	-1.2%
Germany	284.0	127.8	147.7	123.8	124.7	133.0	-12.3%	-3.5%	0.7%	6.6%	-1.5%
Italy	271.7	86.9	123.7	145.6	151.1	158.4	-14.6%	3.3%	3.8%	4.8%	3.6%
United Kingdom	212.3	152.2	124.9	95.5	68.2	68.2	-10.1%	-5.2%	-28.6%	0.0%	-8.3%
European Union average	263.0	121.4	128.6	116.4	112.8	118.9	-13.3%	-2.0%	-3.1%	5.4%	-1.1%
United States	145.2	99.0	87.5	67.9	84.5	85.9	-9.6%	-4.9%	24.4%	1.7%	-0.3%
Japan	580.9	351.9	325.1	234.7	233.9	279.8	-11.0%	-6.3%	-0.3%	19.6%	-2.1%
Electricity											
France	599.3	517.2	516.5	452.5	428.1	415.3	-2.9%	-2.6%	-5.4%	-3.0%	-3.1%
Germany	833.2	880.0	835.3	694.2	619.1	584.7	0.0%	-3.6%	-10.8%	-5.5%	-5.0%
Italy	1183.0	863.3	893.9	903.5	900.6	903.6	-5.4%	0.2%	-0.3%	0.3%	0.2%
United Kingdom	777.3	711.0	648.1	597.9	563.5	515.0	-3.6%	-1.6%	-5.8%	-8.6%	-3.2%
European Union average	734.0	658.9	635.7	567.8	537.5	506.9	-2.8%	-2.2%	-5.3%	-5.7%	-3.2%
United States	577.1	464.2	438.4	368.1	350.0	327.1	-5.3%	-3.4%	-4.9%	-6.5%	-4.1%
Japan	1536.2	1248.0	1120.1	1028.8	1010.1	1023.2	-6.1%	-1.7%	-1.8%	1.3%	-1.3%

(1) Excluding Refundable VAT

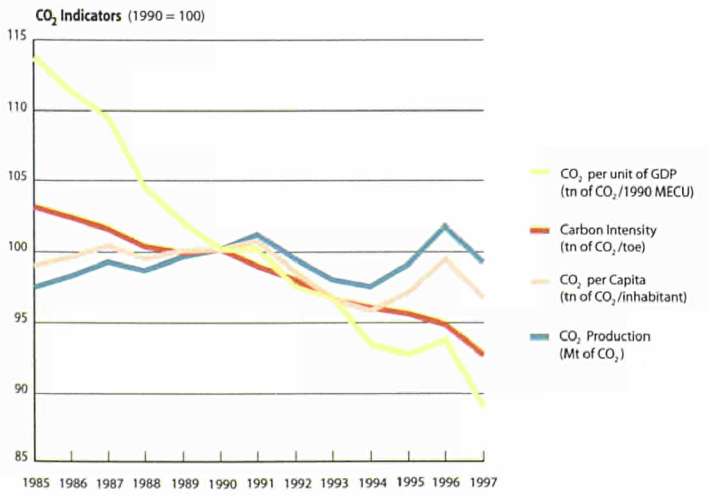
ENVIRONMENT: Recent evolution (1985-1997)

- In 1997 CO_2 emissions in the European Union were 1% below the 1990 level
- Climatic conditions need to be examined in detail country by country
- The contribution of CO_2 emissions from transport increased from 19% in 1985 to 28% in 1997
- SO_2 and NO_x emissions are declining

ENVIRONMENT

Gas consumption per capita increased by 33% at European level since 1990…

CO_2 emissions indicators are of foremost importance in the current political debate. To facilitate international comparisons, the calculation of total emissions was done on an indicative basis, using common emissions factors by energy aggregate. This could explain some limited differences, below 0.1%, with the latest figures from European Statistical Office (Eurostat). In general terms, the CO_2 emissions in the European Union declined substantially in 1997 (-2.6%) to reach a level 1% below the 1990 level. In the period 1990-97, excluding weather variations, CO_2 emissions decreased by 0.1% per year on average. Since 1990 the per capita CO_2 emissions showed a reduction of 0.5% per year on average at about 8.1 tons compared to 8.4 tons in 1990. The CO_2 emitted per unit of GDP demonstrated a more sustained reduction as it declined by about 1.7% per year on average since 1990. These trends were favoured by the fact that the carbon intensity (ton of CO_2/toe) also declined by about 1.1% per year on average since 1990 thanks to conversion from oil and solid fuels to natural gas and increasing consumption of CO_2 -free energies (nuclear, wind, biomass…).



Main items

Environmental impacts arising from energy production, transportation and use include land use, noise, visual impacts, radioactivity, water pollution and a range of gaseous emissions. Over the past decade, the European Union has made very substantial progress in reducing particulates, lead use in petrol, and precursors of acid rain, such as sulphur dioxide. Especially since the Kyoto Protocol of late 1997, greater focus has been placed on the basket of greenhouse gases – particularly CO_2. The main routes to reduce CO_2 emissions are: energy efficiency; switching to less carbon-intensive fossil fuels, especially natural gas; and increasing use of carbon-free energy, such as nuclear and renewables. Considerable effort is now being directed to identify, and progressively implement, a range of least-cost measures to reduce such emissions further.

Per country, Germany ranks first in spite of an average yearly decline of 1.9% between 1990 and 1997. Its share of total European CO_2 emissions reached 27% in 1996 (34% in 1985 and 31% in 1990). The second Member State by far remained the United Kingdom with a yearly reduction of 1.0% per year on average and its share declined slowly to reach 17% in 1997. Italy comes third with a share of about 13% but a yearly increase of 0.4% on average since 1970; and France fourth with a share of 12% and a yearly growth of 0.2%. These four Member States together account for 69% of total European CO_2 emissions in 1997 against 75% in 1985.

Climatic conditions needs to be examined in detail country by country…

The short-term evolution of CO_2 emissions clearly illustrates the sensitivity of CO_2 emissions to climatic conditions. 1994 was the warmest of the last ten years with weather conditions 13.4% warmer than the 25 year average. In 1997, degree-days, (indicators of heating requirements), were close to the values registered in 1990 and 1994. It is worth repeating that weather variations

CO_2 EMISSIONS (1) (TRADITIONAL CALCULATION)

	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
	Million tonnes of CO_2						Annual % Change				
Austria	51.0	50.7	55.0	56.7	59.5	59.5	1.5%	0.6%	5.0%	-0.1%	1.1%
Belgium	98.8	101.7	104.5	111.0	116.5	115.7	1.1%	1.2%	5.0%	-0.7%	1.5%
Denmark	60.9	56.3	52.7	59.9	73.9	64.0	-2.8%	2.6%	23.5%	-13.4%	2.8%
Finland	46.8	50.1	51.6	56.2	60.0	58.7	2.0%	1.7%	6.8%	-2.2%	1.9%
France	360.0	338.5	352.4	345.4	363.0	358.1	-0.4%	-0.4%	5.1%	-1.3%	0.2%
Germany	997.1	982.0	947.4	864.3	871.6	830.2	-1.0%	-1.8%	0.9%	-4.8%	-1.9%
Greece	56.7	65.5	70.9	77.9	81.7	78.8	4.6%	1.9%	5.0%	-3.6%	1.5%
Ireland	26.1	29.2	29.8	33.3	34.9	36.2	2.7%	2.3%	4.9%	3.7%	2.9%
Italy	337.6	367.4	388.6	403.2	399.1	400.2	2.9%	0.7%	-1.0%	0.3%	0.4%
Luxembourg	10.0	9.6	10.6	8.7	8.9	8.5	1.2%	-3.9%	2.0%	-4.8%	-3.2%
Netherlands	141.2	148.6	153.0	166.8	177.7	168.9	1.6%	1.7%	6.5%	-4.9%	1.4%
Portugal	25.1	29.9	39.1	47.9	45.6	47.8	9.2%	4.2%	-4.8%	4.8%	2.9%
Spain	177.4	181.4	202.0	226.7	224.7	240.1	2.6%	2.3%	-0.9%	6.9%	2.5%
Sweden	58.0	55.3	50.6	53.6	58.3	51.5	-2.7%	1.2%	8.7%	-11.6%	0.3%
United Kingdom	544.2	563.0	566.9	531.3	551.2	528.5	0.8%	-1.3%	3.7%	-4.1%	-1.0%
EUROPEAN UNION	**2992.1**	**3030.3**	**3076.0**	**3043.0**	**3126.8**	**3046.7**	**0.6%**	**-0.2%**	**2.8%**	**-2.6%**	**-0.1%**

CO_2 EMISSIONS (1) (TOTAL INCLUDING BUNKER)

	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
	Million tonnes of CO_2						Annual % Change				
Austria	51.0	50.7	55.0	56.7	59.5	59.5	1.5%	0.6%	5.0%	-0.1%	1.1%
Belgium	106.2	113.4	117.5	123.4	130.8	131.9	2.1%	1.0%	6.0%	0.8%	1.7%
Denmark	62.1	59.0	55.7	64.9	78.6	68.7	-2.2%	3.1%	21.2%	-12.7%	3.0%
Finland	48.2	51.6	53.4	57.2	61.1	59.9	2.0%	1.4%	6.9%	-2.0%	1.7%
France	367.5	345.5	360.5	353.3	371.6	367.4	-0.4%	-0.4%	5.2%	-1.1%	0.3%
Germany	1008.0	991.1	955.2	870.8	878.0	837.0	-1.1%	-1.8%	0.8%	-4.7%	-1.9%
Greece	60.2	72.0	78.9	89.1	91.6	88.7	5.6%	2.4%	2.8%	-3.2%	1.7%
Ireland	26.2	29.3	29.8	33.6	35.4	36.7	2.6%	2.5%	5.2%	3.6%	3.0%
Italy	348.4	377.1	397.0	410.9	406.4	407.7	2.6%	0.7%	-1.1%	0.3%	0.4%
Luxembourg	10.0	9.6	10.6	8.7	8.9	8.5	1.2%	-3.9%	2.0%	-4.8%	-3.2%
Netherlands	168.7	182.0	187.4	202.4	213.9	207.4	2.1%	1.6%	5.7%	-3.1%	1.5%
Portugal	26.6	31.4	41.0	49.4	47.2	49.4	9.0%	3.8%	-4.5%	4.6%	2.7%
Spain	185.7	191.5	214.0	236.7	239.2	258.1	2.9%	2.0%	1.1%	7.9%	2.7%
Sweden	59.7	57.4	52.7	56.9	61.8	55.7	-2.5%	1.5%	8.6%	-9.9%	0.8%
United Kingdom	550.8	568.6	574.7	538.9	559.4	537.6	0.9%	-1.3%	3.8%	-3.9%	-0.9%
EUROPEAN UNION	**3080.7**	**3131.4**	**3184.4**	**3153.1**	**3243.7**	**3174.0**	**0.7%**	**-0.2%**	**2.9%**	**-2.1%**	**0.0%**

CO_2 EMISSIONS (1) (EXCLUDING BUNKERS AND AIR TRANSPORT)

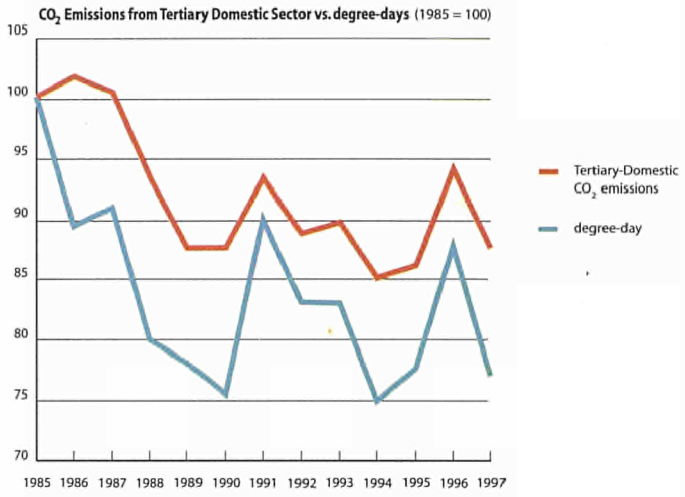
	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
	Million tonnes of CO_2						Annual % Change				
Austria	50.4	49.8	54.0	55.3	58.0	58.0	1.4%	0.5%	4.9%	-0.1%	1.0%
Belgium	97.2	99.7	101.7	108.2	113.3	111.7	0.9%	1.2%	4.7%	-1.4%	1.4%
Denmark	59.2	54.2	50.6	57.6	71.4	61.6	-3.1%	2.6%	24.0%	-13.8%	2.8%
Finland	46.0	49.0	50.2	54.9	58.7	57.3	1.8%	1.8%	6.8%	-2.4%	1.9%
France	352.0	328.2	341.0	331.4	348.1	342.9	-0.6%	-0.6%	5.1%	-1.5%	0.1%
Germany	984.7	966.9	930.7	846.5	853.5	811.2	-1.1%	-1.9%	0.8%	-5.0%	-1.9%
Greece	53.2	62.2	67.1	74.2	78.1	75.3	4.8%	2.0%	5.3%	-3.6%	1.6%
Ireland	25.4	28.1	28.7	32.2	33.7	34.9	2.4%	2.3%	4.7%	3.7%	2.8%
Italy	332.3	362.5	383.0	396.0	391.3	392.1	2.9%	0.7%	-1.2%	0.2%	0.3%
Luxembourg	9.8	9.3	10.2	8.1	8.3	7.7	0.9%	-4.5%	1.6%	-6.8%	-4.0%
Netherlands	137.5	144.1	148.2	159.1	169.5	160.0	1.5%	1.4%	6.5%	-5.6%	1.1%
Portugal	23.7	28.4	37.3	46.1	43.8	46.0	9.5%	4.3%	-5.0%	5.1%	3.0%
Spain	171.6	174.2	194.7	217.5	214.6	229.3	2.6%	2.2%	-1.3%	6.9%	2.4%
Sweden	56.3	53.0	48.4	51.1	55.8	49.0	-3.0%	1.1%	9.2%	-12.2%	0.2%
United Kingdom	528.9	544.0	546.8	508.1	526.8	503.0	0.7%	-1.5%	3.7%	-4.5%	-1.2%
EUROPEAN UNION	**2929.6**	**2954.9**	**2993.6**	**2946.5**	**3025.0**	**2939.9**	**0.4%**	**-0.3%**	**2.7%**	**-2.8%**	**-0.3%**

(1) CO_2 emissions given on an indicative basis, calculated using common emissions factors by energy aggregate

were not uniform throughout the European Union. For example, 1990 and 1997 – whilst apparently similar at the European level - presented large variations amongst Europe with northern countries characterised by weather 10% colder in 1997 than in 1990 and, conversely, southern countries having warmer weather conditions.

In fact, between 1990 and 1997, total CO_2 emissions, including bunkers have been stabilised. The reductions in industry (-10.5% in seven years) and the power sector (-7.0%) compensated for the increase from the transport sector (+14.0% including air transport) and bunkers (+30.0%); while emissions from the tertiary-domestic sector and from the energy branch remained stable. CO_2 emissions from all the sectors, with the exception of the tertiary-domestic sector, are almost independent of climatic conditions. On the contrary, in the tertiary-domestic sector where energy consumption for heating dominates, CO_2 emissions were correlated with degree-days. It appears that the impact of temperature variations on CO_2 emissions in the tertiary-domestic sector can be estimated at +/-6% following colder or warmer temperature extremes. As tertiary-domestic CO_2 emissions accounted in 1996 for 22% of total emissions, this means that the weather effect on total CO_2 emissions can be estimated to be +/-1.2% compared to an average climate. This is important in the context of the EU's political objective of stabilisation of CO_2 emissions in 2000 compared to the 1990 level.

The stabilisation of CO_2 emissions between 1990 and 1997 is the result of three main factors: the continuous improvement of technologies reducing specific energy consumption; the increasing contribution of non-fossil fuels, mainly nuclear together with some wind energy and biomass; and greater penetration of natural gas both for power generation and in final markets in substitution of solid fuels and oil products. It is important to underline that the contribution of these last two factors could be modified



in the near future. The potential for new nuclear power is very limited and the load factor of existing units is already so high that it will be difficult to increase nuclear's contribution. The contribution of renewable energy sources is increasing very slowly even though the European Union proposes a goal of a 12% share of renewables by the year 2010. The substitution limits for natural gas in final markets will be progressively reached. This means that, to reduce CO_2 emissions in the near future, it will be necessary to substantially increase the contribution of renewable energy and to promote rational use of energy to reduce energy intensity in the Union.

The contribution of CO_2 emissions from the transport increased from 19% in 1985 to 28% in 1997…

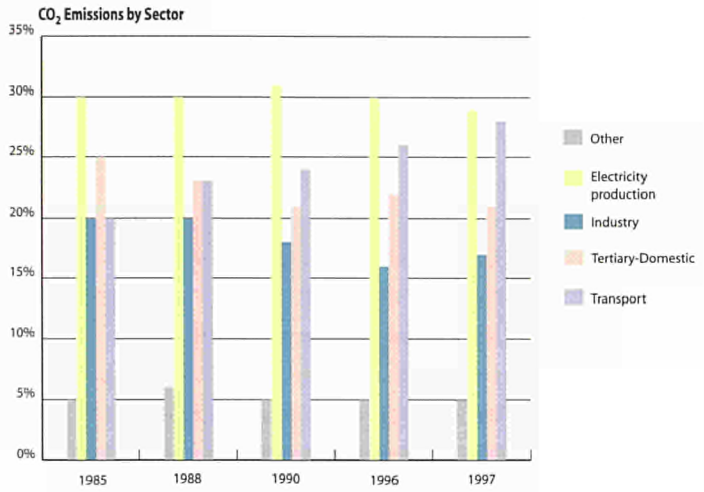
Looking at CO_2 emissions by sector at a European Union level, it is clear that the largest sector in terms of emissions remained power generation. Despite thermal production increases by 0.8% per year since 1990, CO_2 emissions from the power sector declined by as much as 1.0% per year on average. This is due to both the effi-

EUROPEAN UNION : CO_2 EMISSIONS BY SECTORS

European Union	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
	Millions tonnes of CO_2						Annual % Change				
Total (including bunker)	**3080.7**	**3131.4**	**3184.4**	**3153.1**	**3243.7**	**3174.0**	**0.7%**	**-0.2%**	**2.9%**	**-2.1%**	**0.0%**
Bunkers	88.6	101.1	108.4	110.1	116.9	127.3	4.1%	0.3%	6.1%	8.9%	2.3%
Air Transport	62.5	75.4	82.4	96.5	101.9	106.8	5.7%	3.2%	5.6%	4.9%	3.8%
Transformation	1056.9	1066.6	1126.7	1091.2	1098.9	1054.2	1.3%	-0.6%	0.7%	-4.1%	-0.9%
Power Generation	893.9	897.8	962.0	926.5	935.5	894.2	1.5%	-0.7%	1.0%	-4.4%	-1.0%
Energy sector	163.0	168.9	164.7	164.7	163.4	160.0	0.2%	0.0%	-0.8%	-2.0%	-0.4%
Final Demand sectors	1872.7	1888.3	1866.9	1855.4	1926.1	1885.6	-0.1%	-0.1%	3.8%	-2.1%	0.1%
Industry	613.3	596.0	568.0	516.9	512.7	508.5	-1.5%	-1.9%	-0.8%	-0.8%	-1.6%
Transport	525.5	607.0	656.1	706.7	723.5	734.7	4.5%	1.5%	2.4%	1.5%	1.6%
Domestic and Tertiary	733.9	685.3	642.7	631.8	689.9	642.4	-2.6%	-0.3%	9.2%	-6.9%	0.0%

CO_2 EMISSIONS

	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
	Millions tons of CO_2						Annual % Change				
Austria											
Total CO_2 emissions	51.04	50.69	54.96	56.70	59.53	59.48	1.5%	0.6%	5.0%	-0.1%	1.1%
of which power generation	7.00	8.16	12.13	11.26	13.12	12.62	11.6%	-1.5%	16.5%	-3.8%	0.6%
of which final markets	40.38	38.93	39.49	41.58	42.15	42.21	-0.4%	1.0%	-4.5%	1.6%	0.0%
Belgium											
Total CO_2 emissions	98.85	101.69	104.51	111.00	116.50	115.73	1.1%	1.2%	5.0%	-0.7%	1.5%
of which power generation	17.90	17.21	21.83	22.88	22.41	20.94	4.1%	0.9%	-2.0%	-6.6%	-0.6%
of which final markets	76.03	78.85	77.40	83.02	88.27	88.92	0.4%	1.4%	1.5%	-3.3%	0.0%
Denmark											
Total CO_2 emissions	60.86	56.27	52.67	59.86	73.95	64.01	-2.8%	2.6%	23.5%	-13.4%	2.8%
of which power generation	26.87	25.51	22.99	29.08	42.07	33.42	-3.1%	4.8%	44.7%	-20.6%	5.5%
of which final markets	33.02	27.64	27.38	27.97	28.94	27.96	-3.7%	0.4%	-3.1%	1.0%	0.0%
Finland											
Total CO_2 emissions	46.76	50.05	51.58	56.16	59.98	58.65	2.0%	1.7%	6.8%	-2.2%	1.9%
of which power generation	12.81	14.83	15.65	20.63	26.67	24.74	4.1%	5.7%	29.3%	-7.2%	6.8%
of which final markets	29.22	31.76	33.14	32.40	30.75	30.63	2.5%	-0.4%	6.0%	-0.4%	0.0%
France											
Total CO_2 emissions	359.96	338.51	352.43	345.36	363.03	358.13	-0.4%	-0.4%	5.1%	-1.3%	0.2%
of which power generation	47.29	31.50	40.02	27.52	28.91	29.57	-3.3%	-7.2%	5.0%	2.3%	-4.2%
of which final markets	297.53	292.19	296.45	299.59	314.93	309.41	-0.1%	0.2%	0.5%	0.4%	0.0%
Germany											
Total CO_2 emissions	997.06	981.96	947.39	864.26	871.61	830.20	-1.0%	-1.8%	0.9%	-4.8%	-1.9%
of which power generation	344.07	342.90	342.48	318.07	316.76	294.68	-0.1%	-1.5%	-0.4%	-7.0%	-2.1%
of which final markets	592.18	579.12	548.29	500.20	516.87	498.08	-1.5%	-1.8%	-4.2%	0.6%	0.0%
Greece											
Total CO_2 emissions	56.69	65.45	70.92	77.89	81.75	78.78	4.6%	1.9%	5.0%	-3.6%	1.5%
of which power generation	25.15	30.55	34.34	38.92	39.53	35.94	6.4%	2.5%	1.6%	-9.1%	0.7%
of which final markets	30.19	32.85	34.56	36.74	39.52	40.14	2.7%	1.2%	-0.2%	1.8%	0.0%
Ireland											
Total CO_2 emissions	26.06	29.21	29.75	33.28	34.92	36.22	2.7%	2.3%	4.9%	3.7%	2.9%
of which power generation	8.26	10.06	10.28	13.44	13.87	14.23	4.5%	5.5%	3.3%	2.6%	4.8%
of which final markets	17.71	18.99	19.28	19.64	20.84	21.74	1.7%	0.4%	0.1%	-0.9%	0.0%
Italy											
Total CO_2 emissions	337.57	367.37	388.56	403.22	399.12	400.18	2.9%	0.7%	-1.0%	0.3%	0.4%
of which power generation	90.16	105.93	118.64	125.86	122.22	122.65	5.6%	1.2%	-2.9%	0.3%	0.5%
of which final markets	229.42	243.85	252.61	259.96	259.87	260.96	1.9%	0.6%	-0.3%	-0.5%	0.0%
Luxembourg											
Total CO_2 emissions	10.02	9.64	10.62	8.70	8.88	8.45	1.2%	-3.9%	2.0%	-4.8%	-3.2%
of which power generation	0.53	0.61	0.72	0.38	0.34	0.24	6.4%	-11.8%	-11.5%	-29.7%	-14.6%
of which final markets	9.49	9.03	9.90	8.32	8.54	8.21	0.8%	-3.4%	-2.0%	1.6%	0.0%
Netherlands											
Total CO_2 emissions	141.17	148.56	153.01	166.83	177.67	168.89	1.6%	1.7%	6.5%	-4.9%	1.4%
of which power generation	35.38	41.33	43.30	48.90	51.05	48.90	4.1%	2.5%	4.4%	-4.2%	1.8%
of which final markets	96.89	94.82	96.07	102.18	110.59	104.97	-0.2%	1.2%	-1.2%	4.2%	0.0%
Portugal											
Total CO_2 emissions	25.13	29.92	39.06	47.92	45.64	47.82	9.2%	4.2%	-4.8%	4.8%	2.9%
of which power generation	5.76	7.87	14.81	19.14	15.16	16.06	20.8%	5.3%	-20.8%	6.0%	1.2%
of which final markets	18.44	20.77	22.74	26.55	28.64	29.87	4.3%	3.1%	4.1%	0.9%	0.0%
Spain											
Total CO_2 emissions	177.42	181.42	202.00	226.67	224.65	240.15	2.6%	2.3%	-0.9%	6.9%	2.5%
of which power generation	60.08	48.93	63.23	69.45	63.61	76.23	1.0%	1.9%	-8.4%	19.8%	2.7%
of which final markets	108.70	121.44	127.25	144.26	147.70	150.65	3.2%	2.5%	-0.3%	-2.1%	0.0%
Sweden											
Total CO_2 emissions	57.96	55.29	50.62	53.62	58.30	51.55	-2.7%	1.2%	8.7%	-11.6%	0.3%
of which power generation	7.71	5.79	4.07	6.09	9.55	5.62	-12.0%	8.4%	56.9%	-41.2%	4.7%
of which final markets	45.57	45.84	42.59	44.04	44.59	42.81	-1.3%	0.7%	1.4%	-0.9%	0.0%
United Kingdom											
Total CO_2 emissions	544.18	562.99	566.92	531.34	551.22	528.53	0.8%	-1.3%	3.7%	-4.1%	-1.0%
of which power generation	203.85	205.57	216.43	174.20	169.60	157.83	1.2%	-4.2%	-2.6%	-6.9%	-4.4%
of which final markets	310.17	327.39	322.24	325.72	346.14	336.37	0.8%	0.2%	0.2%	-0.9%	0.0%
European Union											
Total CO_2 emissions	2992.14	3030.30	3076.00	3043.00	3126.82	3046.73	0.6%	-0.2%	2.8%	-2.6%	-0.1%
of which power generation	893.87	897.77	961.96	926.46	935.48	894.21	1.5%	-0.7%	1.0%	-4.4%	-1.0%
of which final markets	1935.25	1963.66	1949.31	1951.81	2027.97	1992.48	0.1%	0.0%	-1.1%	0.0%	0.0%



ciency gains in the classical conventional power stations and the development of combined cycle plants which have high conversion efficiency and use the fossil fuel with the lowest CO_2 content per unit of energy. Consequently, the average thermal efficiency of thermal power stations increased by 6.5% since 1990 and the carbon intensity (CO_2/toe) has been reduced by 13.2%. The share of emissions from the power sector declined regularly from 31.2% in 1990 to 29.3% in 1997. Within the final demand sectors, transport was the only one with steadily increasing emissions since 1990 (1.9% per year on average). The contribution of this sector grew from 24% in 1990 (19% in 1985) to 28% in 1997. The domestic and tertiary sectors stabilised their emissions despite the penetration of natural gas and distributed heat in the heating market in place of heating gas oil and solids. In fact the development of low CO_2 content fuels (natural gas, electricity and renewables) compensated for the increasing floor area and the change in consumers' behaviour. Industry presented the greatest fall in CO_2 emissions since 1990 (-1.6% per year) even though the reduction was limited to 0.8% in the last two years. All these recent developments raise questions for the future.

SO_2 and NO_x emissions are declining...

In the absence of complete statistical data, the European situation concerning other polluting emissions, SO_2 and NO_x in particular, can be considered to be generally improving. SO_2 emissions are declining significantly as a result of different actions: improvement of fuel quality to reduce sulphur content in oil products, regulation in large industrial combustion installations, substitution of solid fuels and oil products by natural gas. NO_x emissions are also decreasing, but to a lesser extent than SO_2 emissions under the pressure of both regulation in large industrial combustion installations and regulations concerning catalytic converter for new cars.

The profile of emissions for these two components was quite different. With regard to SO_2 in 1990, the main sources are respectively public power, cogeneration and district heating with 50.4% of the total emissions, followed by industrial combustion and production processes with 32%, commercial, institutional and residential combustion with 7.4% and road transport with 3.1%. Concerning NO_x, 50% of emissions were issued from road transport, 18.3% from public power, cogeneration and district heating, 13.8% from industrial combustion including production processes, 12.3% from other mobile sources and machinery and 3.7% from commercial, institutional and residential combustion. In 1990, the five major Member States together accounted for 86.8% of SO_2 emissions and 78.3% of NO_x emissions.

SO_2 AND NO_x EMISSIONS

Kton/year	SO_2 Emissions					NO_x Emissions				
	1990	1992	1994	1996	94/90	1990	1992	1994	1996	94/90
Austria	91	63	56	52	-38%	194	188	184	163	-5%
Belgium	322	310	251	240	-22%	343	354	346	334	1%
Denmark	182	190	155	186	-15%	282	276	272	288	-4%
Finland	260	141	112	105	-57%	300	283	282	267	-6%
France	1298	1238	1013	1031	-22%	1585	1597	1682	1641	6%
Germany	5313	3299	2466	1543	-54%	2693	2308	2020	1887	-25%
Greece	509	554	538	543	6%	343	352	358	374	4%
Ireland	178	161	177	147	-1%	115	125	117	121	2%
Italy	1651	1394	1271	na	-23%	1938	2010	1789	na	-8%
Luxembourg	15	14	13	8	-13%	23	23	23	22	0%
Netherlands	202	172	146	135	-28%	580	556	510	501	-12%
Portugal	362	420	336	na	-7%	348	391	391	na	12%
Spain	2266	2195	2061	na	-9%	1177	1251	1223	na	4%
Sweden	119	88	82	83	-31%	338	329	331	302	-2%
United Kingdom	3731	3456	2679	2017	-28%	2686	2510	2252	2029	-16%
EUROPEAN UNION	**16499**	**13695**	**11356**	**na**	**-31%**	**12945**	**12553**	**11780**	**na**	**-9%**

Source : EMEP/Corinair

GLOBAL MARKETS: Recent evolution (1985-1997)

- Energy self-sufficiency stable since 1990
- Diversified and stable sources for solid fuels
- Thanks to technological improvements and cost reduction, North Sea crude oil regularly increased its market share in the European oil market
- Reinforcement of the European gas transport network
- Less concern about security of supply

SELF-SUFFICIENCY

Energy self-sufficiency stable since 1990...

The degree of self-sufficiency of the European Union as a whole has fluctuated since 1985 in parallel with indigenous production. From 58.5% in 1985, it declined to 50.2% in 1992 to reach a level of 52.6% in 1997 similar to 1990. Denmark, the Netherlands and the United Kingdom have the highest degrees of self-sufficiency, due to the exploitation of their large gas and oil reserves. In the cases of Belgium, France and Spain the levels of self-sufficiency are mainly achieved by use of nuclear energy and, for the last two, by hydro power. The contributions of each Member State to European Union domestic production were quite varied, depending on reserves, implementation of nuclear programmes, and acceptance and promotion of renewable energy sources, especially biomass. Since 1990, although self-sufficiency remained stable at the overall European level, the trends in the Member States were more varied. Major increases, above 2% per year on average, occurred in Denmark, Finland, Italy, Luxembourg, Portugal and the United Kingdom. Major losers, by more than 2% per year on average, were Germany, Ireland and Spain, due especially to coal mine closures in Germany and Spain.

EXTERNAL SUPPLIES

Closing the gap between domestic production and gross consumption, the European Union obtained about 47% of its total energy needs from third countries in 1997 (from 42% in 1985 with a peak of 50% in 1992). The **net import of energy** in the Union represented globally 691 Mtoe in 1997 and increased, in absolute terms, by 1.0% per year on average since 1990.

Diversified and stable sources for solid fuels...

For solid fuels some 44% of total needs came from external suppliers in 1997 (24% in 1985 and 29% in 1990). Of this 44%, 23% came from United States (24% in 1996), 22% from South Africa as in 1996, 13% from Colombia (11% in 1996), 12% from Australia (10% in 1996) and 11% from Poland as in 1996. In 1997 Australian supplies increased about 20%, compensating for some reduction from South Africa. Although the shares varied a little from year to year between these main sources, depending on market conditions and long term contracts, they have the advantages of being well diversified and politically stable.

DEGREE OF SELF-SUFFICIENCY IN ENERGY SUPPLY (Total Domestic Production / Gross Consumption)

%	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Austria	34.69	37.61	32.61	33.86	31.78	33.48	-1.2%	0.8%	-6.1%	5.3%	0.4%
Belgium	30.73	27.80	24.34	19.63	19.68	21.75	-4.6%	-4.2%	0.2%	10.5%	-1.6%
Denmark	22.40	43.31	52.62	64.27	75.60	81.78	18.6%	4.1%	17.6%	8.2%	6.5%
Finland	40.93	44.88	37.88	47.25	44.96	45.22	-1.5%	4.5%	-4.9%	0.6%	2.6%
France	45.44	47.87	45.99	51.35	50.45	50.26	0.2%	2.2%	-1.7%	-0.4%	1.3%
Germany	58.00	55.24	53.64	42.30	40.60	39.70	-1.6%	-4.6%	-4.0%	-2.2%	-4.2%
Greece	39.26	38.67	37.94	34.22	33.98	33.18	-0.7%	-2.0%	-0.7%	-2.3%	-1.9%
Ireland	39.93	34.43	30.62	31.69	29.59	23.59	-5.2%	0.7%	-6.6%	-20.3%	-3.7%
Italy	17.96	19.88	16.19	18.42	18.38	21.24	-2.1%	2.6%	-0.2%	15.6%	4.0%
Luxembourg	1.02	2.25	1.00	2.34	0.70	1.63	-0.5%	18.6%	-70.2%	134.2%	7.3%
Netherlands	94.28	73.05	77.67	80.70	84.00	73.92	-3.8%	0.8%	4.1%	-12.0%	-0.7%
Portugal	24.84	23.54	13.17	11.69	18.65	15.38	-11.9%	-2.4%	59.6%	-17.5%	2.2%
Spain	39.42	38.24	35.57	28.47	29.50	28.12	-2.0%	-4.4%	3.6%	-4.7%	-3.3%
Sweden	57.82	63.05	62.57	62.49	60.07	61.20	1.6%	0.0%	-3.9%	1.9%	-0.3%
United Kingdom	115.38	109.59	96.56	116.29	114.39	116.02	-3.5%	3.8%	-1.6%	1.4%	2.7%
EUROPEAN UNION	**58.51**	**56.32**	**52.26**	**53.39**	**53.12**	**52.26**	**-2.2%**	**0.4%**	**-0.5%**	**-1.6%**	**0.0%**

Thanks to technological improvements and cost reduction, North Sea crude oil regularly increased its market share in the European oil market...

In terms of crude oil, the European Union depended on external supplies for as much as 80% in 1997 (75% in 1985 and 85% in 1990), including requirements for marine bunkers. It mainly concerned crude oil, as net imports of oil products were marginal in 1997. Of these external supplies, 57% came from OPEC (56% in 1996), 25% from Norway (24% in 1996), 20% from CIS (16% in 1996) and 20% from Africa (23% in 1996). In 1997, the CIS increased their deliveries by about 25%, compensating for the reduction (-12.5%) from Africa. Since the mid-80's OPEC has regained some of the share lost to new non-OPEC producers following the oil price shocks of the 80s. However, in recent years, technology and cost reduction advances in oil exploration and production, notably in the North Sea, have resulted in OPEC taking a lower than expected share of the growing demand for oil.

Reinforcement of the European gas transport network...

The external dependency of the European Union in terms of natural gas was 41% in 1997 (35% in 1985 and 42% in 1990). The shares of the three major suppliers were 41% for CIS (45% in 1996), 30% for Algeria (26% in 1996) and 27% for Norway (26% in 1996) with only 2% from diverse sources (Libya, UAE and Australia). Norway benefited from the sales agreements for the gas from its Troll fields and increased deliveries to the European Union in 1996 by about 4 Mtoe. Algeria, after the upgrading of its liquefaction units, also increased by about 5.6 Mtoe. On the other hand, deliveries from CIS declined slowly.

In addition, major investments were under way to reinforce the transport network throughout Europe. The main developments concern:

- The interconnector linking Bacton, England and Zeebrugge, Belgium to be commissioned in 1998;
- The NorFra pipeline linking directly Norway and France to be commissioned in 1998;
- The deliveries from the Norway Froy field through the Frigg pipeline to St Georgius in Scotland and from there to Ireland;
- The new agreement between Norway and the Czech Republic for deliveries that began in May 1997;
- ÖMV, the largest oil company in Austria, began construction of a number of pipeline projects designed to move gas into the European market, such as the Trans-Austria-Gasline running across Austria from the Slovak border and supplying 90% of its gas to Italy's Snam. Another line will supply Russian gas to Germany and France;

Main items

The European Union remains the largest net energy importer in the world and, in 1997, imports met 47% of total requirements. Import dependency varies markedly between individual Member States. Considerable effort has been made to diversify the sources of oil, gas and coal imports. Over the next 20 years, import dependence will increase as indigenous production declines. Greater emphasis is being placed on overseas direct investment in energy exporting regions; as well as on diplomatic efforts to encourage free international trade in energy and to engage in dialogue with major exporting nations.

- In Germany, several pipeline projects are currently underway, the most important being the Trans Europa Naturgas Pipeline (a Ruhrgas/Snam joint venture), the Wedel line (From Bielefeld to Aachen) and a pipeline from Schnaitsee to the Austrian border;
- Many other countries of Western Europe, including Italy, Spain, Portugal and Greece, have extensive plans to reinforce their transport infrastructure.

Less concern about security of supply...

Presently, there is generally little concern about **security of supply**. But more than three-quarters of world oil and gas reserves are located in potentially unstable areas from political and/or economic points of view. Furthermore, these areas will remain the dominant source of European Union supplies in the future. For this reason, it is crucial for the European Union to reinforce good producer-consumer relations, fostered by a process of dialogue and alignment of interests via investment and operational arrangements. Upstream investment possibilities for European companies in producer countries are now opening up; and the developments that producer country companies have been pursuing in the European Union's downstream sector in recent years are continuing. Such moves consolidate the mutual interest that both parties have in the successful operation of the oil and gas markets as a whole.

EUROPEAN UNION : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	735.21	740.49	703.31	738.22	763.56	761.45	-0.9%	1.0%	3.4%	-0.3%	1.1%
Solids	239.43	230.64	209.87	138.02	131.30	126.25	-2.6%	-8.0%	-4.9%	-3.8%	-7.0%
Oil	150.87	143.54	116.96	159.65	159.18	158.28	-5.0%	6.4%	-0.3%	-0.6%	4.4%
Natural gas	131.87	124.72	132.87	166.60	188.63	182.17	0.2%	4.6%	13.2%	-3.4%	4.6%
Nuclear	147.38	173.33	181.44	201.24	208.86	212.61	4.2%	2.1%	3.8%	1.8%	2.3%
Hydro & Wind	24.41	26.80	22.33	25.30	25.26	26.04	-1.8%	2.5%	-0.1%	3.1%	2.2%
Geothermal	1.79	1.97	2.22	2.51	2.74	2.81	4.4%	2.6%	9.1%	2.5%	3.5%
Other renewable energy sources	39.46	39.48	37.62	44.90	47.59	53.28	-1.0%	3.6%	6.0%	12.0%	5.1%
Net Imports	526.35	578.25	643.73	651.26	678.81	690.72	4.1%	0.2%	4.2%	1.8%	1.0%
Solids	74.45	73.14	88.25	94.41	95.22	96.51	3.5%	1.4%	0.9%	1.4%	1.3%
Oil	381.96	420.65	460.86	446.73	465.27	469.29	3.8%	-0.6%	4.1%	0.9%	0.3%
Crude oil	343.38	398.08	436.75	434.71	454.66	465.07	4.9%	-0.1%	4.6%	2.3%	0.9%
Oil products	38.58	22.58	24.11	12.02	10.61	4.22	-9.0%	-13.0%	-11.7%	-60.3%	-22.1%
Natural gas	68.61	82.37	92.30	108.63	118.46	124.25	6.1%	3.3%	9.1%	4.9%	4.3%
Electricity	1.33	2.09	2.33	1.50	-0.14	0.67	12.0%	-8.5%	-	-	-16.3%
Gross Inland Consumption	1240.79	1291.90	1314.20	1362.61	1411.07	1406.88	1.2%	0.7%	3.6%	-0.3%	1.0%
Solids	316.18	305.36	301.15	237.77	234.79	221.82	-1.0%	-4.6%	-1.3%	-5.5%	-4.3%
Oil	512.27	536.34	545.05	576.04	586.82	587.77	1.2%	1.1%	1.9%	0.2%	1.1%
Natural gas	197.97	206.53	222.06	273.35	305.14	301.87	2.3%	4.2%	11.6%	-1.1%	4.5%
Other (1)	214.37	243.67	245.94	275.45	284.32	295.42	2.8%	2.3%	3.2%	3.9%	2.7%
Electricity Generation in TWh	1917.01	2073.86	2155.63	2328.15	2410.31	2422.49	2.4%	1.6%	3.5%	0.5%	1.7%
Nuclear	574.92	681.90	720.06	810.12	851.05	859.74	4.6%	2.4%	5.1%	1.0%	2.6%
Hydro & wind (including pumping)	299.19	325.78	276.37	314.04	314.81	322.91	-1.6%	2.6%	0.2%	2.6%	2.2%
Thermal	1042.90	1066.19	1159.21	1204.00	1244.45	1239.84	2.1%	0.8%	3.4%	-0.4%	1.0%
Generation Capacity in GWe	480.95	510.56	522.98	538.82	549.11	555.83	1.7%	0.6%	1.9%	1.2%	0.9%
Nuclear	87.04	110.03	116.65	119.56	121.45	124.15	6.0%	0.5%	1.6%	2.2%	0.9%
Hydro & wind	103.48	108.69	111.73	117.69	118.92	120.21	1.5%	1.0%	1.0%	1.1%	1.1%
Thermal	290.43	291.84	294.59	301.57	308.74	311.46	0.3%	0.5%	2.4%	0.9%	0.8%
Average Load Factor in %	45.5	46.4	47.1	49.3	50.1	49.8	0.7%	0.9%	1.6%	-0.7%	0.8%
Fuel Inputs for Thermal Power Generation	248.46	249.40	269.55	271.98	277.69	270.39	1.6%	0.2%	2.1%	-2.6%	0.0%
Solids	170.39	173.65	182.24	161.93	160.81	149.43	1.4%	-2.3%	-0.7%	-7.1%	-2.8%
Oil	40.39	36.52	42.48	43.59	41.63	38.40	1.0%	0.5%	-4.5%	-7.7%	-1.4%
Gas	30.15	31.57	36.60	55.17	63.86	69.76	4.0%	8.6%	15.8%	9.2%	9.7%
Geothermal	1.70	1.84	1.88	2.15	2.35	2.44	2.0%	2.7%	9.6%	3.8%	3.9%
Biomass	5.83	5.82	6.35	9.15	9.04	10.35	1.7%	7.6%	-1.2%	14.5%	7.2%
Average Thermal Efficiency in %	36.1	36.8	37.0	38.1	38.5	39.4	0.5%	0.6%	1.2%	2.3%	0.9%
Non-Energy Uses	75.89	85.42	85.20	94.30	92.05	97.71	2.3%	2.0%	-2.4%	6.1%	2.0%
Total Final Energy Demand	822.07	852.63	861.72	899.18	937.68	930.59	0.9%	0.9%	4.3%	-0.8%	1.1%
Solids	101.44	89.19	80.10	49.07	46.69	45.90	-4.6%	-9.3%	-4.9%	-1.7%	-7.6%
Oil	373.58	394.75	396.81	419.59	431.51	430.07	1.2%	1.1%	2.8%	-0.3%	1.2%
Gas	161.39	169.64	178.23	205.74	227.71	215.87	2.0%	2.9%	10.7%	-5.2%	2.8%
Electricity	136.31	148.99	155.97	169.37	173.88	176.64	2.7%	1.7%	2.7%	1.6%	1.8%
Heat	16.01	16.65	16.94	19.45	21.08	20.81	1.1%	2.8%	8.4%	-1.3%	3.0%
Renewable energy sources	33.34	33.41	33.67	35.95	36.80	41.30	0.2%	1.3%	2.4%	12.2%	3.0%
CO_2 Emissions in Mt of CO_2 (2)	2992.1	3030.3	3076.0	3043.0	3126.8	3046.7	0.6%	-0.2%	2.8%	-2.6%	-0.1%
Indicators											
Population (Million)	358.80	361.44	364.51	372.10	373.16	374.24	0.3%	0.4%	0.3%	0.3%	0.4%
GDP (bil. EUR 1990)	4553.7	5020.2	5315.0	5683.2	5777.8	5930.8	3.1%	1.3%	1.7%	2.6%	1.6%
Gross Inl Cons./GDP (toe/1990 MEUR)	272.5	257.3	247.3	239.8	244.2	237.2	-1.9%	-0.6%	1.9%	-2.9%	-0.6%
Gross Inl Cons./Capita (Kgoe/inhabitant)	3458.1	3574.3	3605.4	3661.9	3781.4	3759.3	0.8%	0.3%	3.3%	-0.6%	0.6%
Electricity Generated/Capita (kWh/inhabitant)	5342.8	5737.6	5913.9	6256.7	6459.2	6473.1	2.1%	1.1%	3.2%	0.2%	1.3%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	8339.3	8384.0	8438.7	8177.8	8379.4	8141.2	0.2%	-0.6%	2.5%	-2.8%	-0.5%
Import Dependency (%)	41.5	43.7	47.7	46.6	46.9	47.7	2.8%	-0.5%	0.6%	1.8%	0.0%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

EUROPEAN UNION : MAIN INDICATORS

	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Gross Inland Consumption (Mtoe)	1240.8	1291.9	1314.2	1362.6	1411.1	1406.9	1.2%	0.7%	3.6%	-0.3%	1.0%
Public Thermal Power Generation	356.5	384.6	412.4	435.5	450.4	444.7	3.0%	1.1%	3.4%	-1.3%	1.1%
Autoprod. Thermal Power Generation	39.0	37.8	38.5	37.7	36.1	38.3	-0.3%	-0.4%	-4.1%	6.0%	-0.1%
Energy Branch	60.4	63.3	63.3	68.0	70.7	69.2	0.9%	1.5%	3.9%	-2.1%	1.3%
Final Energy Consumption	822.0	852.5	861.4	898.8	937.3	930.2	0.9%	0.9%	4.3%	-0.8%	1.1%
Industry	264.1	268.5	264.9	258.4	261.1	262.6	0.1%	-0.5%	1.0%	0.6%	-0.1%
Transport	202.8	234.7	253.8	275.7	283.3	288.6	4.6%	1.7%	2.8%	1.9%	1.9%
Tertiary-Domestic	355.0	349.2	342.6	364.7	392.9	379.0	-0.7%	1.3%	7.7%	-3.5%	1.5%
Energy Intensity (toe/1990 MEUR)	272.5	257.3	247.3	239.8	244.2	237.2	-1.9%	-0.6%	1.9%	-2.9%	-0.6%
Public Thermal Power Generation	78.3	76.6	77.6	76.6	78.0	75.0	-0.2%	-0.2%	1.7%	-3.8%	-0.5%
Autoprod. Thermal Power Generation	8.6	7.5	7.2	6.6	6.3	6.5	-3.3%	-1.7%	-5.7%	3.2%	-1.6%
Industry	58.0	53.5	49.8	45.5	45.2	44.3	-3.0%	-1.8%	-0.6%	-2.0%	-1.7%
Transport	44.5	46.8	47.8	48.5	49.0	48.7	1.4%	0.3%	1.1%	-0.7%	0.3%
Tertiary-Domestic	78.0	69.6	64.5	64.2	68.0	63.9	-3.7%	-0.1%	6.0%	-6.0%	-0.1%
Energy per Capita (Kgoe/inhabitant)	3458	3574	3605	3662	3781	3759	0.8%	0.3%	3.3%	-0.6%	0.6%
Industry	736	743	727	694	700	702	-0.3%	-0.9%	0.8%	0.3%	-0.5%
Transport	565	649	696	741	759	771	4.3%	1.2%	2.5%	1.6%	1.5%
Tertiary-Domestic	989	966	940	980	1053	1013	-1.0%	0.8%	7.4%	-3.8%	1.1%
Electricity Share (%)											
Final Energy Consumption	16.6%	17.5%	18.1%	18.8%	18.6%	19.0%	1.8%	0.8%	-1.5%	2.4%	0.7%
Industry	23.4%	25.1%	26.2%	27.6%	27.5%	28.2%	2.2%	1.1%	-0.5%	2.5%	1.1%
Transport	1.7%	1.5%	1.6%	1.7%	1.7%	1.7%	-1.1%	1.5%	0.2%	-1.0%	1.0%
Tertiary-Domestic	20.0%	22.4%	24.1%	25.6%	24.8%	25.8%	3.8%	1.2%	-3.1%	0.8%	0.6%
Total Renewable Consumption (Mtoe)	65.5	68.1	61.9	72.5	75.4	81.4	-1.1%	3.2%	5.3%	12.3%	1.1%
Hydro	24.4	26.8	22.3	24.9	24.8	25.4	-1.8%	2.3%	-2.8%	2.0%	0.4%
Biomass	39.2	39.2	37.2	44.4	47.1	52.3	-1.0%	3.6%	9.5%	17.7%	1.5%
Other renawable energy sources	1.9	2.1	2.4	3.1	3.4	3.7	5.2%	5.0%	14.2%	19.0%	1.0%
Renewable Intensity (toe/1990MEUR)	14.4	13.6	11.6	12.8	13.0	13.7	-4.1%	1.8%	1.2%	7.7%	0.7%
Renewable per capita (Kgoe/inhabitant)	182.4	188.3	169.8	194.8	202.0	217.6	-1.4%	2.8%	4.7%	11.7%	1.1%
CO_2 Emissions (Mt of CO_2)	2992.1	3030.3	3076.0	3043.0	3126.8	3046.7	0.6%	-0.2%	2.8%	-2.6%	-0.1%
Public Thermal Power Generation	762.5	772.9	837.4	817.7	833.6	789.1	1.9%	-0.5%	1.9%	-5.3%	-0.8%
Autoprod. Thermal Power Generation	131.4	124.9	124.6	108.8	101.9	105.1	-1.1%	-2.7%	-6.3%	3.1%	-2.4%
Energy Branch	123.2	128.2	127.4	141.1	147.3	143.5	0.7%	2.1%	4.4%	-2.6%	1.7%
Industry	613.3	596.0	568.0	516.9	512.7	508.5	-1.5%	-1.9%	-0.8%	-0.8%	-1.6%
Transport	588.0	682.4	738.5	803.2	825.4	841.5	4.7%	1.7%	2.8%	2.0%	1.9%
Tertiary-Domestic	733.9	685.3	642.7	631.8	689.9	642.4	-2.6%	-0.3%	9.2%	-6.9%	0.0%
Carbon Intensity (tn of CO_2/toe)	2.4	2.3	2.3	2.2	2.2	2.2	-0.6%	-0.9%	-0.8%	-2.3%	-1.1%
Public Thermal Power Generation	3.6	3.7	3.6	3.5	3.5	3.4	-0.1%	-0.8%	-1.1%	-1.5%	-0.9%
Autoprod. Thermal Power Generation	3.4	3.3	3.2	2.9	2.8	2.7	-0.8%	-2.3%	-2.3%	-2.7%	-2.3%
Energy Branch	2.0	2.0	2.0	2.1	2.1	2.1	-0.3%	0.6%	0.5%	-0.5%	0.4%
Industry	2.3	2.2	2.1	2.0	2.0	1.9	-1.6%	-1.4%	-1.8%	-1.4%	-1.4%
Transport	2.9	2.9	2.9	2.9	2.9	2.9	0.1%	0.0%	0.0%	0.1%	0.0%
Tertiary-Domestic	2.1	2.0	1.9	1.7	1.8	1.7	-1.9%	-1.6%	1.4%	-3.5%	-1.4%
CO_2 per Capita (kg of CO_2/inhabitant)	8339	8384	8439	8178	8379	8141	0.2%	-0.6%	2.5%	-2.8%	-0.5%
Industry	1709	1649	1558	1389	1374	1359	-1.8%	-2.3%	-1.1%	-1.1%	-1.9%
Transport	1639	1888	2026	2158	2212	2249	4.3%	1.3%	2.5%	1.7%	1.5%
Tertiary-Domestic	2046	1896	1763	1698	1849	1717	-2.9%	-0.8%	8.9%	-7.2%	-0.4%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	657	604	579	535	541	514	-2.5%	-1.5%	1.1%	-5.1%	-1.7%
Public Thermal Power Generation	167	154	158	144	144	133	-1.2%	-1.8%	0.3%	-7.8%	-2.4%
Autoprod. Thermal Power Generation	29	25	23	19	18	18	-4.1%	-4.0%	-7.8%	0.4%	-3.9%
Energy Branch	27	26	24	25	25	24	-2.4%	0.7%	2.6%	-5.1%	0.1%
Industry	135	119	107	91	89	86	-4.5%	-3.2%	-2.4%	-3.4%	-3.1%
Transport	129	136	139	141	143	142	1.5%	0.3%	1.1%	-0.7%	0.3%
Tertiary-Domestic	161	137	121	111	119	108	-5.6%	-1.7%	7.4%	-9.3%	-1.6%

AUSTRIA : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	8.43	8.92	8.69	8.70	8.99	9.06	0.6%	0.0%	3.4%	0.8%	0.3%
Solids	0.63	0.56	0.64	0.30	0.26	0.26	0.6%	-13.9%	-14.6%	2.0%	-9.3%
Oil	1.15	1.21	1.19	1.06	0.97	0.98	0.5%	-2.2%	-8.5%	0.9%	-3.5%
Natural gas	1.01	1.09	1.11	1.26	1.27	1.22	1.9%	2.6%	0.7%	-4.3%	1.9%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & Wind	2.66	3.08	2.71	3.19	2.94	3.09	0.4%	3.3%	-7.7%	5.2%	2.8%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Other renewable energy sources	2.99	2.99	3.05	2.89	3.55	3.51	0.4%	-1.1%	23.0%	-1.3%	0.1%
Net Imports	15.46	15.08	17.28	17.38	18.96	18.86	2.3%	0.1%	9.1%	-0.5%	-0.4%
Solids	3.57	3.35	3.12	2.52	3.03	3.10	-2.7%	-4.2%	20.3%	2.5%	-4.4%
Oil	8.39	8.73	9.71	9.65	10.26	10.69	3.0%	-0.1%	6.2%	4.3%	-0.8%
Crude oil	6.68	6.51	7.80	8.01	8.16	8.98	3.1%	0.5%	1.8%	10.1%	-0.2%
Oil products	1.71	2.22	1.91	1.64	2.09	1.71	2.2%	-3.0%	27.7%	-18.3%	-3.1%
Natural gas	3.64	3.24	4.49	5.42	5.59	5.13	4.3%	3.8%	3.3%	-8.3%	3.7%
Electricity	-0.15	-0.23	-0.04	-0.21	0.08	-0.07	-23.2%	40.0%	-	-	-
Gross Inland Consumption	23.67	24.17	25.64	26.27	27.79	28.35	1.6%	0.5%	5.8%	2.0%	-0.4%
Solids	3.96	3.72	4.16	3.22	3.33	3.57	1.0%	-5.0%	3.4%	7.2%	-4.6%
Oil	9.61	10.19	10.52	10.86	11.10	11.71	1.8%	0.6%	2.2%	5.4%	-1.1%
Natural gas	4.60	4.43	5.24	6.33	6.79	6.54	2.6%	3.9%	7.2%	-3.6%	2.6%
Other (1)	5.50	5.83	5.72	5.86	6.58	6.54	0.8%	0.5%	12.2%	-0.6%	0.7%
Electricity Generation in TWh	44.82	49.34	50.83	56.58	54.83	56.84	2.6%	2.2%	-3.1%	3.7%	1.5%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind (including pumping)	31.89	36.86	32.91	38.47	35.57	37.29	0.6%	3.2%	-7.5%	4.8%	2.6%
Thermal	12.93	12.48	17.92	18.11	19.25	19.55	6.7%	0.2%	6.3%	1.6%	-0.6%
Generation Capacity in GWe	15.25	16.74	16.69	17.44	17.52	17.86	1.8%	0.9%	0.5%	1.9%	0.6%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind	10.17	10.76	10.95	11.31	11.38	11.55	1.5%	0.6%	0.7%	1.5%	0.4%
Thermal	5.08	5.98	5.74	6.13	6.14	6.31	2.5%	1.3%	0.1%	2.7%	1.1%
Average Load Factor in %	33.5	33.6	34.8	37.0	35.7	36.3	0.7%	1.3%	-3.5%	1.7%	0.8%
Fuel Inputs for Thermal Power Generation	2.57	2.92	4.17	4.07	4.97	4.82	10.2%	-0.5%	22.1%	-3.0%	-0.7%
Solids	0.66	0.84	1.46	1.04	1.13	1.22	17.2%	-6.6%	9.0%	7.4%	-6.8%
Oil	0.33	0.41	0.45	0.58	0.58	0.58	6.1%	5.5%	0.0%	0.0%	5.4%
Gas	1.31	1.41	1.97	2.11	2.75	2.38	8.5%	1.4%	30.4%	-13.7%	1.4%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.26	0.26	0.29	0.33	0.50	0.64	1.8%	2.9%	49.8%	29.0%	1.8%
Average Thermal Efficiency in %	43.3	36.8	37.0	38.3	33.3	34.9	-3.1%	0.7%	-12.9%	4.7%	0.2%
Non-Energy Uses	1.52	1.48	1.57	1.23	1.66	1.66	0.5%	-4.8%	35.6%	0.0%	-3.5%
Total Final Energy Demand	19.15	19.19	19.91	21.18	22.02	21.91	0.8%	1.2%	4.0%	-0.5%	0.2%
Solids	2.43	1.92	1.75	1.39	1.43	1.44	-6.4%	-4.4%	2.4%	1.0%	-3.8%
Oil	7.43	7.83	8.12	8.82	8.87	8.87	1.8%	1.7%	0.6%	0.0%	-0.1%
Gas	2.98	2.81	3.03	3.65	3.83	3.83	0.3%	3.8%	5.1%	0.0%	1.8%
Electricity	3.18	3.45	3.71	4.01	4.12	4.20	3.1%	1.6%	2.8%	1.8%	0.7%
Heat	0.44	0.48	0.57	0.79	0.83	0.83	5.3%	6.8%	5.0%	0.0%	3.1%
Renewable energy sources	2.70	2.70	2.74	2.52	2.94	2.74	0.3%	-1.7%	16.7%	-6.8%	-0.2%
CO_2 Emissions in Mt of CO_2 (2)	51.0	50.7	55.0	56.7	59.5	59.5	1.5%	0.6%	5.0%	-0.1%	-0.5%
Indicators											
Population (Million)	7.58	7.62	7.73	8.05	8.06	8.08	0.4%	0.8%	0.2%	0.3%	0.5%
GDP (bil. EUR 1990)	107.3	115.2	125.6	138.5	140.7	144.2	3.2%	2.0%	1.6%	2.5%	1.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	220.5	209.7	204.1	189.7	197.5	196.5	-1.5%	-1.5%	4.1%	-0.5%	-1.5%
Gross Inl Cons./Capita (Kgoe/inhabitant)	3122.8	3174.2	3317.1	3265.1	3448.4	3508.8	1.2%	-0.3%	5.6%	1.8%	-0.9%
Electricity Generated/Capita (kWh/inhabitant)	5913.9	6478.8	6576.6	7031.2	6802.6	7034.9	2.1%	1.3%	-3.3%	3.4%	1.0%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	6734.6	6656.2	7110.2	7046.0	7386.0	7361.5	1.1%	-0.2%	4.8%	-0.3%	-1.0%
Import Dependency (%)	65.3	62.4	67.4	66.1	68.2	66.5	0.6%	-0.4%	3.1%	-2.5%	0.0%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

BELGIUM : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	13.69	13.23	12.54	11.42	11.72	12.90	-1.7%	-1.8%	2.7%	10.0%	0.4%
Solids	4.38	1.85	1.08	0.27	0.24	0.18	-24.4%	-24.3%	-12.1%	-23.8%	-22.6%
Oil	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Natural gas	0.03	0.01	0.01	0.00	0.00	0.00	-22.3%	-53.3%	700.2%	-92.5%	-46.0%
Nuclear	8.70	10.80	10.71	10.34	10.69	11.96	4.2%	-0.7%	3.4%	11.8%	1.6%
Hydro & Wind	0.02	0.03	0.02	0.03	0.02	0.03	-0.7%	4.8%	-28.5%	26.2%	1.9%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	24.6%	8.2%	20.3%	-1.3%	8.4%
Other renewable energy sources	0.55	0.53	0.71	0.78	0.77	0.73	5.4%	1.9%	-1.2%	-5.4%	0.4%
Net Imports	31.97	35.59	38.86	43.69	46.97	47.07	4.0%	2.4%	7.5%	0.2%	2.8%
Solids	5.57	6.75	9.49	9.34	7.96	8.09	11.3%	-0.3%	-14.8%	1.7%	-2.2%
Oil	19.12	21.88	21.47	23.58	26.77	27.41	2.3%	1.9%	13.5%	2.4%	3.6%
Crude oil	20.35	24.97	26.12	25.67	30.79	31.86	5.1%	-0.3%	19.9%	3.5%	2.9%
Oil products	-1.23	-3.08	-4.65	-2.10	-4.02	-4.45	30.5%	-14.7%	91.8%	10.7%	-0.6%
Natural gas	7.29	7.15	8.22	10.42	11.88	11.28	2.4%	4.9%	14.0%	-5.0%	4.6%
Electricity	0.00	-0.18	-0.32	0.35	0.36	0.28	140.8%	-	2.9%	-22.0%	-
Gross Inland Consumption	43.84	45.62	47.26	50.46	53.97	55.09	1.5%	1.3%	7.0%	2.1%	2.2%
Solids	9.90	8.77	10.24	8.55	8.17	8.36	0.7%	-3.5%	-4.4%	2.3%	-2.9%
Oil	17.34	18.46	17.73	19.79	22.14	22.46	0.4%	2.2%	11.9%	1.5%	3.4%
Natural gas	7.33	7.21	8.17	10.61	11.82	11.26	2.2%	5.4%	11.4%	-4.7%	4.7%
Other (1)	9.27	11.18	11.12	11.50	11.85	13.00	3.7%	0.7%	3.0%	9.7%	2.3%
Electricity Generation in TWh	57.31	65.34	70.83	74.42	76.14	78.88	4.3%	1.0%	2.3%	3.6%	1.5%
Nuclear	34.59	43.09	42.71	41.35	43.33	47.40	4.3%	-0.6%	4.8%	9.4%	1.5%
Hydro & wind (including pumping)	1.35	1.17	0.90	1.24	1.21	1.28	-7.7%	6.5%	-2.4%	6.3%	5.1%
Thermal	21.37	21.07	27.21	31.83	31.60	30.19	5.0%	3.2%	-0.7%	-4.4%	1.5%
Generation Capacity in GWe	14.17	14.03	14.14	14.92	14.85	14.69	0.0%	1.1%	-0.4%	-1.1%	0.5%
Nuclear	5.48	5.50	5.50	5.63	5.69	5.71	0.1%	0.5%	1.1%	0.4%	0.5%
Hydro & wind	1.33	1.34	1.41	1.41	1.41	1.41	1.2%	0.0%	0.0%	0.1%	0.0%
Thermal	7.36	7.19	7.24	7.88	7.75	7.57	-0.3%	1.7%	-1.6%	-2.3%	0.7%
Average Load Factor in %	46.2	53.2	57.2	57.0	58.5	61.3	4.4%	-0.1%	2.8%	4.7%	1.0%
Fuel Inputs for Thermal Power Generation	5.26	4.97	6.58	7.17	7.12	6.76	4.6%	1.7%	-0.7%	-5.0%	0.4%
Solids	2.83	3.02	3.87	3.76	3.53	3.12	6.5%	-0.6%	-6.1%	-11.7%	-3.0%
Oil	0.96	0.31	0.32	0.18	0.19	0.20	-19.9%	-10.9%	6.2%	6.3%	-6.3%
Gas	1.24	1.42	1.98	2.72	2.93	2.97	9.9%	6.5%	7.5%	1.5%	5.9%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.23	0.22	0.40	0.50	0.47	0.47	11.5%	4.6%	-6.5%	0.1%	2.3%
Average Thermal Efficiency in %	34.9	36.4	35.6	38.2	38.2	38.4	0.4%	1.4%	-0.1%	0.6%	1.1%
Non-Energy Uses	2.90	3.21	3.16	3.63	4.74	5.07	1.7%	2.8%	30.4%	7.0%	7.0%
Total Final Energy Demand	29.21	30.89	30.84	34.16	36.35	36.46	1.1%	2.1%	6.4%	0.3%	2.4%
Solids	4.46	3.74	3.79	3.31	3.23	3.71	-3.2%	-2.7%	-2.2%	14.6%	-0.3%
Oil	13.09	15.15	14.29	15.96	17.20	17.33	1.8%	2.2%	7.8%	0.7%	2.8%
Gas	6.96	6.82	7.25	8.52	9.36	8.72	0.8%	3.3%	9.9%	-6.9%	2.7%
Electricity	4.16	4.66	4.99	5.88	6.01	6.18	3.7%	3.4%	2.1%	2.8%	3.1%
Heat	0.22	0.21	0.21	0.22	0.25	0.27	-0.6%	0.7%	12.1%	9.6%	3.5%
Renewable energy sources	0.31	0.31	0.31	0.28	0.30	0.26	-0.3%	-2.1%	8.6%	-14.2%	-2.5%
CO_2 Emissions in Mt of CO_2 (2)	98.8	101.7	104.5	111.0	116.5	115.7	1.1%	1.2%	5.0%	-0.7%	1.5%
Indicators											
Population (Million)	9.86	9.90	9.97	10.14	10.16	10.18	0.2%	0.3%	0.2%	0.2%	0.3%
GDP (bil. EUR 1990)	133.1	144.7	154.5	164.8	166.9	171.9	3.0%	1.3%	1.3%	3.0%	1.5%
Gross Inl Cons./GDP (toe/1990 MEUR)	329.5	315.2	305.9	306.2	323.4	320.4	-1.5%	0.0%	5.6%	-0.9%	0.7%
Gross Inl Cons./Capita (Kgoe/inhabitant)	4447.3	4607.5	4741.9	4977.5	5314.2	5410.3	1.3%	1.0%	6.8%	1.8%	1.9%
Electricity Generated/Capita (kWh/inhabitant)	5813.5	6598.6	7106.5	7341.1	7496.1	7747.0	4.1%	0.7%	2.1%	3.3%	1.2%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	10026.9	10270.3	10485.3	10950.2	11470.6	11366.2	0.9%	0.9%	4.8%	-0.9%	1.2%
Import Dependency (%)	69.3	72.2	75.7	80.4	80.3	78.2	1.8%	1.2%	-0.1%	-2.6%	0.5%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

DENMARK : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	4.85	7.88	9.94	15.46	17.52	20.26	15.4%	9.2%	13.3%	15.6%	10.7%
Solids	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Oil	2.92	4.78	6.06	9.31	10.30	11.59	15.7%	9.0%	10.6%	12.6%	9.7%
Natural gas	0.97	2.11	2.74	4.65	5.65	6.96	23.1%	11.2%	21.4%	23.2%	14.3%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & Wind	0.01	0.03	0.05	0.10	0.11	0.17	51.1%	13.6%	2.7%	57.9%	17.3%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.5%	-0.4%	-31.9%	56.2%	0.6%
Other renewable energy sources	0.96	0.96	1.09	1.40	1.47	1.55	2.7%	5.1%	5.2%	5.1%	5.1%
Net Imports	15.53	11.17	9.08	7.92	6.03	4.20	-10.2%	-2.7%	-23.8%	-30.3%	-10.4%
Solids	7.70	6.26	6.23	7.65	7.65	8.00	-4.1%	4.2%	-0.1%	4.7%	3.6%
Oil	8.19	5.28	3.16	1.83	1.41	-0.39	-17.3%	-10.4%	-22.9%	-	-
Crude oil	4.03	3.10	2.03	0.80	0.34	-2.74	-12.8%	-17.0%	-58.2%	-	-
Oil products	4.16	2.18	1.13	1.03	1.07	2.34	-23.0%	-1.9%	4.7%	117.9%	11.0%
Natural gas	-0.40	-0.74	-0.93	-1.49	-1.70	-2.78	18.5%	10.0%	13.8%	63.7%	17.0%
Electricity	0.04	0.36	0.61	-0.07	-1.32	-0.62	72.6%	-	1839.7%	-52.9%	-
Gross Inland Consumption	19.60	18.83	18.20	20.58	23.23	21.59	-1.5%	2.5%	12.9%	-7.1%	2.5%
Solids	7.38	6.87	6.11	6.44	8.87	6.66	-3.7%	1.1%	37.7%	-25.0%	1.2%
Oil	10.65	9.21	8.55	9.58	10.43	9.98	-4.3%	2.3%	8.9%	-4.3%	2.2%
Natural gas	0.57	1.39	1.79	3.12	3.67	3.86	25.8%	11.8%	17.7%	5.1%	11.7%
Other (1)	1.00	1.35	1.76	1.44	0.26	1.09	11.8%	-3.9%	-82.2%	326.8%	-6.5%
Electricity Generation in TWh	29.04	27.96	25.73	36.78	53.54	44.28	-2.4%	7.4%	45.6%	-17.3%	8.1%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind (including pumping)	0.08	0.33	0.64	1.20	1.24	1.95	51.1%	13.6%	2.7%	57.9%	17.3%
Thermal	28.96	27.63	25.10	35.58	52.31	42.33	-2.8%	7.2%	47.0%	-19.1%	7.8%
Generation Capacity in GWe	8.57	8.44	9.13	10.69	11.16	11.78	1.3%	3.2%	4.4%	5.5%	3.7%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind	0.06	0.21	0.35	0.63	0.85	1.12	43.5%	12.2%	35.9%	31.6%	17.9%
Thermal	8.52	8.24	8.78	10.06	10.31	10.66	0.6%	2.8%	2.4%	3.4%	2.8%
Average Load Factor in %	38.7	37.8	32.2	39.3	54.8	42.9	-3.6%	4.1%	39.5%	-21.6%	4.2%
Fuel Inputs for Thermal Power Generation	7.27	6.95	6.35	8.53	12.00	9.88	-2.7%	6.1%	40.6%	-17.7%	6.5%
Solids	6.49	6.13	5.55	6.05	8.55	6.29	-3.1%	1.8%	41.2%	-26.4%	1.8%
Oil	0.35	0.32	0.25	0.97	1.68	1.63	-6.1%	30.9%	73.4%	-2.9%	30.5%
Gas	0.08	0.14	0.14	0.91	1.29	1.45	12.5%	46.3%	41.1%	13.0%	40.3%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.36	0.36	0.41	0.60	0.49	0.50	3.0%	7.7%	-19.1%	3.1%	2.7%
Average Thermal Efficiency in %	34.3	34.2	34.0	35.9	37.5	36.8	-0.2%	1.1%	4.5%	-1.7%	1.2%
Non-Energy Uses	0.52	0.44	0.33	0.38	0.43	0.43	-8.7%	3.0%	13.8%	-0.4%	4.0%
Total Final Energy Demand	14.49	13.87	14.54	15.05	15.64	15.16	0.1%	0.7%	4.0%	-3.1%	0.6%
Solids	0.77	0.42	0.46	0.39	0.37	0.37	-9.6%	-3.2%	-6.4%	0.7%	-3.1%
Oil	9.46	7.87	7.59	7.48	7.68	7.38	-4.3%	-0.3%	2.8%	-3.9%	-0.4%
Gas	0.51	0.94	1.13	1.67	1.87	1.84	17.5%	8.2%	11.9%	-1.5%	7.3%
Electricity	2.18	2.41	2.52	2.69	2.77	2.74	2.9%	1.3%	3.0%	-1.0%	1.2%
Heat	1.09	1.75	2.31	2.23	2.42	2.27	16.2%	-0.7%	8.4%	-6.0%	-0.2%
Renewable energy sources	0.48	0.48	0.54	0.59	0.54	0.56	2.4%	1.8%	-8.9%	3.6%	0.4%
CO_2 Emissions in Mt of CO_2 (2)	60.9	56.3	52.7	59.9	73.9	64.0	-2.8%	2.6%	23.5%	-13.4%	2.8%
Indicators											
Population (Million)	5.11	5.13	5.14	5.23	5.26	5.28	0.1%	0.3%	0.6%	0.3%	0.4%
GDP (bil. EUR 1990)	91.7	100.1	101.6	114.8	118.5	122.4	2.1%	2.5%	3.2%	3.3%	2.7%
Gross Inl Cons./GDP (toe/1990 MEUR)	213.8	188.1	179.2	179.2	196.1	176.4	-3.5%	0.0%	9.4%	-10.0%	-0.2%
Gross Inl Cons./Capita (Kgoe/inhabitant)	3833.8	3670.8	3541.7	3936.2	4415.8	4090.3	-1.6%	2.1%	12.2%	-7.4%	2.1%
Electricity Generated/Capita (kWh/inhabitant)	5679.6	5450.8	5010.4	7035.5	10176.1	8387.3	-2.5%	7.0%	44.6%	-17.6%	7.6%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	11900.7	10969.0	10247.9	11450.5	14054.4	12123.8	-2.9%	2.2%	22.7%	-13.7%	2.4%
Import Dependency (%)	77.6	56.7	47.4	35.7	24.4	18.2	-9.4%	-5.5%	-31.7%	-25.4%	-12.8%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

FINLAND : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	11.16	11.62	11.74	13.19	13.38	14.98	1.0%	2.4%	1.5%	11.9%	3.5%
Solids	0.76	1.01	1.46	2.06	2.25	2.66	13.8%	7.2%	9.0%	18.5%	9.0%
Oil	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Nuclear	4.97	5.09	5.01	4.96	5.02	5.39	0.2%	-0.2%	1.4%	7.3%	1.1%
Hydro & Wind	1.06	1.15	0.93	1.11	1.02	1.05	-2.5%	3.5%	-8.2%	3.3%	1.7%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Other renewable energy sources	4.37	4.37	4.34	5.06	5.09	5.87	-0.2%	3.1%	0.6%	15.3%	4.4%
Net Imports	16.10	15.89	18.03	15.41	17.23	18.38	2.3%	-3.1%	11.8%	6.7%	0.3%
Solids	4.02	3.53	4.38	3.77	4.37	4.65	1.7%	-3.0%	16.1%	6.3%	0.9%
Oil	10.87	10.33	10.48	8.21	9.58	10.17	-0.7%	-4.8%	16.7%	6.2%	-0.4%
Crude oil	9.99	9.11	8.89	8.55	9.79	10.28	-2.3%	-0.8%	14.6%	5.0%	2.1%
Oil products	0.88	1.21	1.59	-0.34	-0.22	-0.11	12.6%	-	-36.5%	-47.9%	-
Natural gas	0.80	1.40	2.26	2.84	2.97	2.91	23.1%	4.7%	4.5%	-2.0%	3.7%
Electricity	0.40	0.63	0.92	0.60	0.31	0.66	17.8%	-8.1%	-47.5%	109.0%	-4.6%
Gross Inland Consumption	26.79	28.35	28.46	28.89	30.93	33.16	1.2%	0.3%	7.1%	7.2%	2.2%
Solids	4.98	5.06	5.07	5.99	7.31	7.28	0.4%	3.4%	22.0%	-0.4%	5.3%
Oil	10.22	10.64	9.94	8.33	9.20	10.00	-0.6%	-3.5%	10.5%	8.6%	0.1%
Natural gas	0.80	1.40	2.26	2.84	2.97	2.91	23.1%	4.7%	4.5%	-2.0%	3.7%
Other (1)	10.80	11.25	11.19	11.73	11.45	12.97	0.7%	0.9%	-2.4%	13.3%	2.1%
Electricity Generation in TWh	49.71	53.89	54.37	63.87	69.36	69.16	1.8%	3.3%	8.6%	-0.3%	3.5%
Nuclear	19.06	19.55	19.21	19.21	19.47	20.89	0.2%	0.0%	1.4%	7.3%	1.2%
Hydro & wind (including pumping)	12.33	13.36	10.86	12.92	11.87	12.26	-2.5%	3.5%	-8.2%	3.3%	1.7%
Thermal	18.32	20.98	24.30	31.74	38.02	36.02	5.8%	5.5%	19.8%	-5.3%	5.8%
Generation Capacity in GWe	11.32	11.90	13.22	14.43	14.57	15.70	3.2%	1.8%	0.9%	7.7%	2.5%
Nuclear	2.30	2.35	2.36	2.31	2.31	2.55	0.5%	-0.4%	0.0%	10.4%	1.1%
Hydro & wind	2.51	2.60	2.62	2.78	2.79	2.87	0.9%	1.2%	0.3%	2.9%	1.3%
Thermal	6.51	6.95	8.24	9.34	9.47	10.27	4.8%	2.5%	1.4%	8.5%	3.2%
Average Load Factor in %	50.1	51.7	46.9	50.5	54.3	50.3	-1.3%	1.5%	7.6%	-7.4%	1.0%
Fuel Inputs for Thermal Power Generation	4.41	5.06	5.41	6.91	8.19	8.20	4.1%	5.0%	18.6%	0.1%	6.1%
Solids	2.76	3.01	3.01	3.88	5.19	4.80	1.8%	5.2%	33.7%	-7.5%	6.9%
Oil	0.17	0.34	0.29	0.26	0.41	0.28	11.6%	-2.7%	58.0%	-29.9%	-0.5%
Gas	0.41	0.63	1.02	1.58	1.71	1.71	19.9%	9.3%	8.3%	0.2%	7.8%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	1.07	1.07	1.09	1.19	0.89	1.40	0.3%	1.8%	-25.4%	58.1%	3.7%
Average Thermal Efficiency in %	35.7	35.7	38.6	39.5	39.9	37.8	1.6%	0.4%	1.0%	-5.4%	-0.3%
Non-Energy Uses	1.32	1.93	1.80	0.91	0.97	1.24	6.4%	-12.8%	7.0%	27.4%	-5.2%
Total Final Energy Demand	18.50	20.06	20.90	21.99	22.37	22.97	2.5%	1.0%	1.7%	2.6%	1.4%
Solids	1.27	1.16	1.17	1.22	1.01	1.04	-1.7%	0.9%	-17.7%	3.7%	-1.6%
Oil	7.33	8.01	8.06	7.73	7.33	7.27	1.9%	-0.8%	-5.2%	-0.9%	-1.5%
Gas	0.61	1.00	1.51	1.51	1.60	1.56	19.6%	0.1%	6.1%	-2.6%	0.5%
Electricity	4.17	4.74	5.07	5.62	5.72	6.05	4.0%	2.1%	1.9%	5.8%	2.6%
Heat	1.87	1.91	1.91	2.13	2.75	2.70	0.5%	2.1%	29.3%	-1.8%	5.0%
Renewable energy sources	3.25	3.25	3.18	3.79	3.96	4.35	-0.4%	3.5%	4.7%	9.7%	4.6%
CO_2 Emissions in Mt of CO_2 (2)	46.8	50.1	51.6	56.2	60.0	58.7	2.0%	1.7%	6.8%	-2.2%	1.9%
Indicators											
Population (Million)	4.90	4.95	4.99	5.11	5.12	5.14	0.3%	0.5%	0.3%	0.3%	0.4%
GDP (bil. EUR 1990)	89.9	100.5	106.2	103.3	107.0	113.4	3.4%	-0.5%	3.6%	6.0%	0.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	298.2	282.2	268.1	279.7	289.2	292.4	-2.1%	0.8%	3.4%	1.1%	1.2%
Gross Inl Cons./Capita (Kgoe/inhabitant)	5465.4	5730.7	5708.2	5655.8	6036.3	6448.6	0.9%	-0.2%	6.7%	6.8%	1.8%
Electricity Generated/Capita (kWh/inhabitant)	10139.7	10893.9	10903.0	12505.1	13534.7	13451.9	1.5%	2.8%	8.2%	-0.6%	3.0%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	9538.4	10118.4	10343.6	10995.7	11704.2	11407.5	1.6%	1.2%	6.4%	-2.5%	1.4%
Import Dependency (%)	59.1	55.1	62.1	52.7	55.0	54.8	1.0%	-3.2%	4.3%	-0.5%	-1.8%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

FRANCE : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	90.29	100.60	104.42	122.20	124.90	123.49	3.0%	3.2%	2.2%	-1.1%	2.4%
Solids	10.45	8.40	7.63	5.36	4.89	4.09	-6.1%	-6.8%	-8.8%	-16.3%	-8.5%
Oil	3.36	3.44	3.49	3.02	2.63	2.48	0.8%	-2.8%	-13.1%	-5.5%	-4.7%
Natural gas	4.54	2.61	2.42	2.79	2.41	2.13	-11.8%	2.9%	-13.8%	-11.6%	-1.8%
Nuclear	57.27	70.18	79.13	93.99	97.85	98.77	6.7%	3.5%	4.1%	0.9%	3.2%
Hydro & Wind	5.38	6.64	4.64	6.32	5.65	5.40	-2.9%	6.4%	-10.5%	-4.4%	2.2%
Geothermal	0.08	0.12	0.12	0.13	0.15	0.13	9.2%	1.1%	17.0%	-14.8%	0.8%
Other renewable energy sources	9.21	9.21	6.99	10.59	11.32	10.49	-5.4%	8.6%	6.9%	-7.3%	6.0%
Net Imports	111.73	110.13	119.75	115.31	124.31	122.07	1.4%	-0.8%	7.8%	-1.8%	0.3%
Solids	12.55	7.81	13.00	9.01	10.72	9.68	0.7%	-7.1%	19.0%	-9.7%	-4.1%
Oil	81.08	84.52	86.55	85.43	89.89	88.66	1.3%	-0.3%	5.2%	-1.4%	0.3%
Crude oil	75.98	74.73	76.00	78.83	84.14	87.95	0.0%	0.7%	6.7%	4.5%	2.1%
Oil products	5.10	9.79	10.55	6.60	5.76	0.72	15.7%	-9.0%	-12.8%	-87.6%	-31.9%
Natural gas	20.11	20.98	24.10	26.88	29.62	29.35	3.7%	2.2%	10.2%	-0.9%	2.9%
Electricity	-2.01	-3.18	-3.91	-6.01	-5.92	-5.62	14.2%	9.0%	-1.5%	-5.0%	5.3%
Gross Inland Consumption	202.43	209.06	219.22	234.51	248.21	242.52	1.6%	1.4%	5.8%	-2.3%	1.5%
Solids	24.40	18.27	19.96	15.29	16.25	14.58	-3.9%	-5.2%	6.3%	-10.3%	-4.4%
Oil	83.90	84.47	87.67	85.24	90.22	87.44	0.9%	-0.6%	5.8%	-3.1%	0.0%
Natural gas	24.19	23.34	24.61	28.96	32.69	31.34	0.3%	3.3%	12.9%	-4.1%	3.5%
Other (1)	69.93	82.98	86.98	105.02	109.06	109.16	4.5%	3.8%	3.8%	0.1%	3.3%
Electricity Generation in TWh	344.24	391.86	420.08	494.62	512.30	503.61	4.1%	3.3%	3.6%	-1.7%	2.6%
Nuclear	224.06	275.47	314.02	377.16	397.27	395.41	7.0%	3.7%	5.3%	-0.5%	3.3%
Hydro & wind (including pumping)	64.25	78.77	57.91	78.01	70.76	67.99	-2.1%	6.1%	-9.3%	-3.9%	2.3%
Thermal	55.92	37.62	48.14	39.45	44.27	40.21	-3.0%	-3.9%	12.2%	-9.2%	-2.5%
Generation Capacity in GWe	86.56	100.62	103.41	107.61	109.69	112.70	3.6%	0.8%	1.9%	2.7%	1.2%
Nuclear	37.49	52.43	55.75	58.52	59.97	62.88	8.3%	1.0%	2.5%	4.8%	1.7%
Hydro & wind	21.83	24.65	24.99	25.23	25.32	25.34	2.7%	0.2%	0.3%	0.1%	0.2%
Thermal	27.24	23.54	22.67	23.87	24.41	24.48	-3.6%	1.0%	2.2%	0.3%	1.1%
Average Load Factor in %	45.4	44.5	46.4	52.5	53.3	51.0	0.4%	2.5%	1.6%	-4.3%	1.4%
Fuel Inputs for Thermal Power Generation	13.17	9.01	11.45	8.26	8.77	9.09	-2.8%	-6.3%	6.1%	3.7%	-3.2%
Solids	9.32	5.85	7.37	5.43	5.76	5.28	-4.6%	-5.9%	5.9%	-8.2%	-4.6%
Oil	1.61	1.03	1.84	0.61	0.59	1.17	2.8%	-20.0%	-2.4%	97.4%	-6.3%
Gas	1.53	1.41	1.42	1.22	1.28	1.50	-1.5%	-3.1%	5.5%	17.1%	0.8%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.72	0.72	0.81	1.01	1.14	1.14	2.6%	4.4%	12.9%	0.3%	4.9%
Average Thermal Efficiency in %	36.5	35.9	36.2	41.1	43.4	38.0	-0.2%	2.6%	5.8%	-12.4%	0.7%
Non-Energy Uses	11.91	12.63	13.08	16.21	16.67	17.91	1.9%	4.4%	2.9%	7.4%	4.6%
Total Final Energy Demand	129.79	131.33	135.09	142.06	149.56	146.70	0.8%	1.0%	5.3%	-1.9%	1.2%
Solids	10.89	9.36	9.05	6.90	6.94	7.04	-3.6%	-5.3%	0.5%	1.4%	-3.5%
Oil	65.80	66.63	67.57	68.78	71.66	70.11	0.5%	0.4%	4.2%	-2.2%	0.5%
Gas	22.70	22.51	23.69	27.10	29.92	29.43	0.9%	2.7%	10.4%	-1.6%	3.1%
Electricity	21.75	24.09	25.96	29.46	30.57	30.54	3.6%	2.6%	3.8%	-0.1%	2.3%
Heat	0.08	0.12	0.12	0.13	0.15	0.13	9.2%	1.1%	17.0%	-14.8%	0.8%
Renewable energy sources	8.57	8.62	8.69	9.69	10.31	9.46	0.3%	2.2%	6.4%	-8.3%	1.2%
CO_2 Emissions in Mt of CO_2 (2)	360.0	338.5	352.4	345.4	363.0	358.1	-0.4%	-0.4%	5.1%	-1.3%	0.2%
Indicators											
Population (Million)	55.28	56.12	56.74	58.14	58.37	58.61	0.5%	0.5%	0.4%	0.4%	0.5%
GDP (bil. EUR 1990)	811.0	885.0	940.0	987.1	1000.7	1022.7	3.0%	1.0%	1.4%	2.2%	1.2%
Gross Inl Cons./GDP (toe/1990 MEUR)	249.6	236.2	233.2	237.6	248.0	237.1	-1.3%	0.4%	4.4%	-4.4%	0.2%
Gross Inl Cons./Capita (Kgoe/inhabitant)	3661.5	3725.3	3863.9	4033.6	4252.1	4138.2	1.1%	0.9%	5.4%	-2.7%	1.0%
Electricity Generated/Capita (kWh/inhabitant)	6226.7	6982.7	7404.2	8507.5	8776.1	8593.2	3.5%	2.8%	3.2%	-2.1%	2.2%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	6511.1	6032.0	6211.9	5940.2	6219.0	6110.9	-0.9%	-0.9%	4.7%	-1.7%	-0.2%
Import Dependency (%)	54.6	52.1	54.0	48.7	49.5	49.7	-0.2%	-2.1%	1.8%	0.4%	-1.2%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

GERMANY : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	209.40	202.89	185.90	140.41	138.45	138.46	-2.4%	-5.5%	-1.4%	0.0%	-4.1%
Solids	148.32	138.73	125.04	78.80	73.79	70.64	-3.4%	-8.8%	-6.4%	-4.3%	-7.8%
Oil	4.25	3.98	3.75	3.21	3.16	3.04	-2.4%	-3.1%	-1.7%	-3.9%	-3.0%
Natural gas	16.30	15.39	13.73	14.81	16.12	15.94	-3.4%	1.5%	8.8%	-1.1%	2.2%
Nuclear	34.87	38.89	37.67	37.32	38.92	41.11	1.6%	-0.2%	4.3%	5.6%	1.3%
Hydro & Wind	1.35	1.59	1.39	1.85	1.93	1.75	0.5%	5.9%	4.4%	-9.0%	3.4%
Geothermal	0.01	0.01	0.01	0.01	0.01	0.01	0.2%	4.3%	11.1%	1.8%	4.9%
Other renewable energy sources	4.30	4.31	4.31	4.41	4.52	5.97	0.0%	0.5%	2.6%	32.1%	4.8%
Net Imports	152.52	163.81	165.28	195.15	207.78	208.44	1.6%	3.4%	6.5%	0.3%	3.4%
Solids	-0.07	2.27	3.27	10.99	12.41	14.86	-	27.5%	12.9%	19.7%	24.2%
Oil	117.91	123.61	120.13	130.81	135.77	135.53	0.4%	1.7%	3.8%	-0.2%	1.7%
Crude oil	83.77	91.15	88.51	101.17	103.04	98.06	1.1%	2.7%	1.8%	-4.8%	1.5%
Oil products	34.15	32.46	31.62	29.64	32.73	37.48	-1.5%	-1.3%	10.4%	14.5%	2.5%
Natural gas	34.44	37.75	41.82	52.93	60.06	58.25	4.0%	4.8%	13.5%	-3.0%	4.8%
Electricity	0.23	0.18	0.07	0.41	-0.45	-0.20	-21.6%	43.6%	-	-55.4%	-
Gross Inland Consumption	359.65	363.09	354.01	336.16	347.77	343.53	-0.3%	-1.0%	3.5%	-1.2%	-0.4%
Solids	148.01	140.86	131.52	92.17	90.92	86.72	-2.3%	-6.9%	-1.4%	-4.6%	-5.8%
Oil	121.30	124.54	124.05	133.57	136.85	137.07	0.4%	1.5%	2.5%	0.2%	1.4%
Natural gas	49.58	52.72	55.00	66.42	75.08	71.09	2.1%	3.8%	13.0%	-5.3%	3.7%
Other (1)	40.76	44.97	43.44	44.00	44.93	48.65	1.3%	0.3%	2.1%	8.3%	1.6%
Electricity Generation in TWh	520.89	547.96	548.62	536.15	555.24	551.47	1.0%	-0.5%	3.6%	-0.7%	0.1%
Nuclear	138.62	156.79	152.44	154.06	161.58	170.30	1.9%	0.2%	4.9%	5.4%	1.6%
Hydro & wind (including pumping)	17.82	21.02	18.56	25.92	27.08	23.93	0.8%	6.9%	4.5%	-11.6%	3.7%
Thermal	364.46	370.15	377.62	356.16	366.58	357.24	0.7%	-1.2%	2.9%	-2.5%	-0.8%
Generation Capacity in GWe	114.67	119.41	121.17	115.28	114.90	113.96	1.1%	-1.0%	-0.3%	-0.8%	-0.9%
Nuclear	17.92	23.32	24.24	22.71	22.91	22.31	6.2%	-1.3%	0.9%	-2.6%	-1.2%
Hydro & wind	8.54	8.70	8.76	9.95	10.49	10.79	0.5%	2.6%	5.4%	2.9%	3.0%
Thermal	88.21	87.39	88.18	82.62	81.50	80.86	0.0%	-1.3%	-1.4%	-0.8%	-1.2%
Average Load Factor in %	51.9	52.4	51.7	53.1	55.2	55.2	-0.1%	0.5%	3.9%	0.1%	1.0%
Fuel Inputs for Thermal Power Generation	88.87	89.24	89.81	85.20	85.57	78.85	0.2%	-1.0%	0.4%	-7.9%	-1.8%
Solids	77.50	76.03	75.54	69.22	67.75	64.10	-0.5%	-1.7%	-2.1%	-5.4%	-2.3%
Oil	2.56	3.18	2.86	2.07	1.68	1.32	2.3%	-6.2%	-19.2%	-21.4%	-10.5%
Gas	7.62	8.84	10.16	12.19	14.84	12.11	5.9%	3.7%	21.7%	-18.4%	2.5%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	1.19	1.19	1.24	1.71	1.30	1.32	0.8%	6.6%	-24.2%	1.5%	0.8%
Average Thermal Efficiency in %	35.3	35.7	36.2	36.0	36.8	39.0	0.5%	-0.1%	2.5%	5.8%	1.1%
Non-Energy Uses	21.05	22.73	22.78	22.81	23.10	23.75	1.6%	0.0%	1.3%	2.8%	0.6%
Total Final Energy Demand	234.71	234.99	227.30	221.42	229.03	223.86	-0.6%	-0.5%	3.4%	-2.3%	-0.2%
Solids	48.62	43.06	37.15	14.98	14.14	13.40	-5.2%	-16.6%	-5.7%	-5.2%	-13.6%
Oil	95.44	98.46	96.81	104.23	106.69	105.32	0.3%	1.5%	2.4%	-1.3%	1.2%
Gas	41.52	42.54	42.72	51.85	57.32	52.48	0.6%	3.9%	10.5%	-8.4%	3.0%
Electricity	36.51	38.40	38.39	38.91	39.41	39.70	1.0%	0.3%	1.3%	0.7%	0.5%
Heat	9.51	9.41	9.16	8.75	8.75	8.75	-0.7%	-0.9%	0.0%	0.0%	-0.7%
Renewable energy sources	3.12	3.12	3.07	2.70	2.73	4.21	-0.3%	-2.5%	1.1%	54.1%	4.6%
CO_2 Emissions in Mt of CO_2 (2)	997.1	982.0	947.4	864.3	871.6	830.2	-1.0%	-1.8%	0.9%	-4.8%	-1.9%
Indicators											
Population (Million)	77.67	78.12	79.36	81.66	81.90	82.22	0.4%	0.6%	0.3%	0.4%	0.5%
GDP (bil. EUR 1990)	1124.0	1214.5	1297.4	1405.4	1423.4	1454.7	2.9%	1.6%	1.3%	2.2%	1.6%
Gross Inl Cons./GDP (toe/1990 MEUR)	320.0	299.0	272.9	239.2	244.3	236.2	-3.1%	-2.6%	2.1%	-3.3%	-2.0%
Gross Inl Cons./Capita (Kgoe/inhabitant)	4630.4	4648.0	4460.6	4116.5	4246.5	4178.4	-0.7%	-1.6%	3.2%	-1.6%	-0.9%
Electricity Generated/Capita (kWh/inhabitant)	6706.5	7014.7	6912.6	6565.5	6779.7	6707.1	0.6%	-1.0%	3.3%	-1.1%	-0.4%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	12837.0	12570.5	11937.1	10583.5	10642.9	10097.7	-1.4%	-2.4%	0.6%	-5.1%	-2.4%
Import Dependency (%)	42.0	44.8	46.4	57.7	59.4	60.3	2.0%	4.5%	2.9%	1.5%	3.8%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

GREECE : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	7.34	8.63	9.15	9.71	10.14	9.95	4.5%	1.2%	4.5%	-1.9%	1.2%
Solids	4.84	6.29	7.08	7.91	8.20	8.07	7.9%	2.3%	3.7%	-1.6%	1.9%
Oil	1.32	1.12	0.83	0.46	0.51	0.47	-8.8%	-11.2%	12.2%	-9.4%	-7.9%
Natural gas	0.07	0.13	0.14	0.04	0.05	0.04	14.0%	-20.4%	5.5%	-3.1%	-14.8%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & Wind	0.24	0.20	0.15	0.31	0.38	0.34	-8.8%	15.0%	23.1%	-10.7%	12.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	14.9%	1.3%	0.0%	-14.8%	-1.4%
Other renewable energy sources	0.86	0.88	0.95	0.98	1.00	1.02	1.9%	0.7%	1.9%	2.2%	1.1%
Net Imports	11.81	13.62	15.37	18.21	18.83	19.19	5.4%	3.4%	3.4%	1.9%	3.2%
Solids	1.23	0.86	0.99	0.92	1.17	0.76	-4.3%	-1.3%	26.2%	-34.5%	-3.6%
Oil	10.52	12.74	14.32	17.21	17.54	18.10	6.4%	3.7%	1.9%	3.2%	3.4%
Crude oil	10.54	14.39	14.71	16.95	18.32	18.40	6.9%	2.9%	8.1%	0.4%	3.2%
Oil products	-0.02	-1.65	-0.39	0.26	-0.78	-0.29	83.4%	-	-	-62.7%	-3.9%
Natural gas	0.00	0.00	0.00	0.00	0.01	0.13	-	-	-	1585.4%	-
Electricity	0.06	0.03	0.06	0.07	0.12	0.20	-0.7%	2.3%	69.4%	69.9%	18.2%
Gross Inland Consumption	18.34	20.16	22.24	24.14	25.41	25.61	3.9%	1.6%	5.3%	0.8%	2.0%
Solids	6.08	7.42	8.09	8.78	8.95	8.82	5.9%	1.7%	1.9%	-1.5%	1.2%
Oil	11.01	11.50	12.85	13.95	14.91	15.06	3.1%	1.7%	6.9%	1.0%	2.3%
Natural gas	0.07	0.13	0.14	0.04	0.05	0.17	14.0%	-20.4%	12.3%	246.9%	3.1%
Other (1)	1.17	1.11	1.17	1.36	1.50	1.56	-0.1%	3.1%	10.1%	4.2%	4.3%
Electricity Generation in TWh	27.74	33.40	34.99	41.54	42.55	43.50	4.8%	3.5%	2.4%	2.2%	3.2%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind (including pumping)	2.80	2.60	2.00	3.82	4.54	4.13	-6.6%	13.8%	19.0%	-9.0%	10.9%
Thermal	24.93	30.79	33.00	37.73	38.01	39.37	5.8%	2.7%	0.7%	3.6%	2.6%
Generation Capacity in GWe	7.13	8.12	8.51	8.94	9.12	9.57	3.6%	1.0%	2.0%	5.0%	1.7%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind	2.03	2.15	2.41	2.55	2.55	2.75	3.5%	1.1%	0.0%	8.0%	1.9%
Thermal	5.10	5.97	6.10	6.39	6.57	6.82	3.7%	0.9%	2.8%	3.8%	1.6%
Average Load Factor in %	44.4	46.9	46.9	53.0	53.2	51.9	1.1%	2.5%	0.4%	-2.6%	1.4%
Fuel Inputs for Thermal Power Generation	6.44	7.72	8.72	9.88	10.01	9.16	6.2%	2.5%	1.3%	-8.5%	0.7%
Solids	4.81	6.23	6.89	7.79	7.97	7.11	7.5%	2.5%	2.4%	-10.8%	0.5%
Oil	1.63	1.47	1.80	2.08	2.02	1.96	1.9%	2.9%	-2.6%	-2.8%	1.3%
Gas	0.00	0.02	0.03	0.01	0.02	0.09	-	-14.9%	17.9%	426.9%	15.7%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Average Thermal Efficiency in %	33.3	34.3	32.5	32.8	32.7	36.9	-0.4%	0.2%	-0.6%	13.2%	1.8%
Non-Energy Uses	0.54	0.52	0.64	0.44	0.45	0.43	3.2%	-7.1%	2.5%	-4.7%	-5.4%
Total Final Energy Demand	12.52	13.72	14.54	15.82	16.88	17.25	3.0%	1.7%	6.7%	2.2%	2.5%
Solids	1.28	1.20	1.07	1.08	1.08	0.96	-3.5%	0.3%	-0.6%	-10.6%	-1.5%
Oil	8.29	9.29	10.05	10.80	11.72	12.06	3.9%	1.5%	8.5%	2.9%	2.6%
Gas	0.01	0.01	0.01	0.01	0.02	0.04	11.2%	-0.6%	24.0%	150.4%	17.1%
Electricity	2.05	2.31	2.45	2.93	3.06	3.15	3.6%	3.7%	4.3%	3.1%	3.7%
Heat	0.00	0.00	0.00	0.00	0.00	0.00	14.9%	1.3%	0.0%	-14.8%	-1.4%
Renewable energy sources	0.89	0.91	0.95	0.99	1.01	1.03	1.4%	0.7%	2.0%	2.2%	1.1%
CO_2 Emissions in Mt of CO_2 (2)	56.7	65.5	70.9	77.9	81.7	78.8	4.6%	1.9%	5.0%	-3.6%	1.5%
Indicators											
Population (Million)	9.93	10.04	10.16	10.45	10.48	10.51	0.5%	0.6%	0.2%	0.4%	0.5%
GDP (bil. EUR 1990)	59.5	62.8	65.3	69.4	71.1	73.3	1.9%	1.2%	2.4%	3.2%	1.7%
Gross Inl Cons./GDP (toe/1990 MEUR)	308.4	321.0	340.9	347.7	357.5	349.2	2.0%	0.4%	2.8%	-2.3%	0.3%
Gross Inl Cons./Capita (Kgoe/inhabitant)	1845.9	2009.0	2189.3	2309.1	2425.8	2435.8	3.5%	1.1%	5.1%	0.4%	1.5%
Electricity Generated/Capita (kWh/inhabitant)	2791.8	3327.6	3444.2	3973.9	4061.6	4137.6	4.3%	2.9%	2.2%	1.9%	2.7%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	5706.6	6521.0	6979.6	7450.6	7803.6	7493.6	4.1%	1.3%	4.7%	-4.0%	1.0%
Import Dependency (%)	60.7	61.3	62.1	65.8	66.0	66.8	0.4%	1.2%	0.4%	1.2%	1.1%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

IRELAND : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	2.86	3.31	3.50	4.26	3.61	2.87	4.1%	4.0%	-15.1%	-20.6%	-2.8%
Solids	0.76	1.53	1.43	1.78	1.26	0.74	13.4%	4.5%	-29.3%	-41.3%	-9.0%
Oil	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Natural gas	1.94	1.63	1.89	2.25	2.17	1.91	-0.5%	3.5%	-3.6%	-12.1%	0.1%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & Wind	0.07	0.07	0.06	0.06	0.06	0.06	-3.4%	0.9%	1.0%	-1.1%	0.6%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.0%	0.0%	-
Other renewable energy sources	0.08	0.08	0.11	0.16	0.12	0.16	5.2%	8.4%	-23.7%	32.2%	6.0%
Net Imports	5.32	6.26	7.08	7.63	8.34	9.51	5.9%	1.5%	9.3%	14.0%	4.3%
Solids	1.26	2.29	2.08	1.83	1.78	1.95	10.5%	-2.5%	-2.7%	9.9%	-0.9%
Oil	4.06	3.97	5.00	5.72	6.09	6.69	4.3%	2.7%	6.4%	9.9%	4.2%
Crude oil	1.25	1.38	2.02	2.27	2.18	2.92	10.0%	2.4%	-4.2%	34.1%	5.4%
Oil products	2.81	2.59	2.99	3.45	3.91	3.77	1.2%	2.9%	13.4%	-3.6%	3.4%
Natural gas	0.00	0.00	0.00	0.08	0.48	0.87	-	-	469.9%	79.0%	-
Electricity	0.00	0.00	0.00	0.00	-0.01	0.00	-	-	760.0%	-90.7%	-
Gross Inland Consumption	8.83	9.52	10.19	11.06	11.69	12.30	2.9%	1.7%	5.7%	5.2%	2.7%
Solids	2.58	3.69	3.53	2.90	3.00	2.87	6.5%	-3.9%	3.7%	-4.6%	-2.9%
Oil	4.15	4.05	4.59	5.61	5.86	6.44	2.1%	4.1%	4.5%	9.9%	4.9%
Natural gas	1.95	1.63	1.89	2.33	2.65	2.77	-0.5%	4.3%	13.6%	4.5%	5.6%
Other (1)	0.15	0.16	0.17	0.22	0.18	0.22	1.6%	5.8%	-21.3%	27.9%	4.2%
Electricity Generation in TWh	12.09	13.23	14.51	17.86	19.18	19.96	3.7%	4.2%	7.4%	4.1%	4.7%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind (including pumping)	1.18	1.20	0.98	0.98	1.00	0.99	-3.6%	0.0%	1.2%	-0.4%	0.1%
Thermal	10.91	12.02	13.53	16.87	18.18	18.97	4.4%	4.5%	7.8%	4.3%	4.9%
Generation Capacity in GWe	3.19	3.81	3.82	4.39	4.41	4.30	3.7%	2.8%	0.3%	-2.5%	1.7%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind	0.51	0.51	0.52	0.52	0.53	0.58	0.4%	0.1%	1.9%	8.3%	1.5%
Thermal	2.68	3.30	3.30	3.87	3.87	3.72	4.2%	3.2%	0.1%	-3.9%	1.7%
Average Load Factor in %	43.2	39.6	43.4	46.4	49.7	53.0	0.1%	1.4%	7.1%	6.7%	2.9%
Fuel Inputs for Thermal Power Generation	2.63	2.82	2.95	3.92	4.11	4.27	2.4%	5.8%	4.9%	3.9%	5.4%
Solids	0.82	1.83	1.78	2.15	2.15	2.07	16.8%	3.9%	0.0%	-3.7%	2.2%
Oil	0.54	0.25	0.34	0.61	0.62	0.79	-8.8%	12.6%	1.0%	27.9%	12.9%
Gas	1.27	0.75	0.84	1.15	1.33	1.39	-7.9%	6.5%	15.4%	4.2%	7.4%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.00	0.00	0.00	0.00	0.01	0.02	-	-	-	115.3%	-
Average Thermal Efficiency in %	35.7	36.6	39.4	37.0	38.0	38.2	2.0%	-1.2%	2.7%	0.4%	-0.4%
Non-Energy Uses	0.53	0.58	0.66	0.61	0.60	0.80	4.5%	-1.5%	-0.9%	32.4%	2.8%
Total Final Energy Demand	6.22	6.71	7.06	7.75	8.23	8.65	2.6%	1.9%	6.2%	5.1%	2.9%
Solids	1.77	1.87	1.56	0.88	0.93	0.86	-2.4%	-10.8%	5.3%	-6.9%	-8.1%
Oil	3.24	3.43	3.79	4.70	4.96	5.34	3.2%	4.4%	5.4%	7.7%	5.0%
Gas	0.29	0.41	0.57	0.73	0.87	0.87	14.9%	4.9%	19.2%	0.1%	6.1%
Electricity	0.84	0.92	1.02	1.28	1.36	1.44	4.0%	4.6%	6.8%	5.3%	5.0%
Heat	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.0%	0.0%	-
Renewable energy sources	0.08	0.08	0.11	0.16	0.11	0.14	5.2%	8.3%	-29.7%	23.5%	3.8%
CO_2 Emissions in Mt of CO_2 (2)	26.1	29.2	29.8	33.3	34.9	36.2	2.7%	2.3%	4.9%	3.7%	2.9%
Indicators											
Population (Million)	3.54	3.53	3.51	3.60	3.63	3.63	-0.2%	0.5%	0.7%	0.2%	0.5%
GDP (bil. EUR 1990)	27.4	31.2	35.9	48.3	52.2	57.8	5.5%	6.1%	8.3%	10.6%	7.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	322.4	304.9	284.2	229.2	223.8	212.8	-2.5%	-4.2%	-2.4%	-4.9%	-4.1%
Gross Inl Cons./Capita (Kgoe/inhabitant)	2494.6	2697.6	2906.7	3071.4	3223.7	3383.5	3.1%	1.1%	5.0%	5.0%	2.2%
Electricity Generated/Capita (kWh/inhabitant)	3414.1	3745.9	4139.5	4958.2	5288.8	5490.4	3.9%	3.7%	6.7%	3.8%	4.1%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	7362.8	8273.3	8486.0	9242.2	9629.8	9963.8	2.9%	1.7%	4.2%	3.5%	2.3%
Import Dependency (%)	60.1	65.6	69.4	68.3	70.4	76.4	2.9%	-0.3%	3.1%	8.5%	1.4%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

ITALY : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	24.94	27.43	27.41	30.78	31.63	35.16	1.9%	2.3%	2.8%	11.2%	3.6%
Solids	0.33	0.29	0.34	0.10	0.07	0.03	0.3%	-22.2%	-22.1%	-65.5%	-30.7%
Oil	2.41	4.86	4.70	5.29	5.52	6.00	14.3%	2.4%	4.3%	8.8%	3.5%
Natural gas	11.54	13.50	14.03	16.35	16.36	15.78	4.0%	3.1%	0.1%	-3.6%	1.7%
Nuclear	1.98	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & Wind	3.53	3.50	2.72	3.25	3.62	3.59	-5.1%	3.6%	11.3%	-0.8%	4.0%
Geothermal	1.70	1.84	2.07	2.32	2.52	2.61	4.1%	2.3%	8.6%	3.5%	3.4%
Other renewable energy sources	3.44	3.44	3.55	3.48	3.54	7.16	0.6%	-0.4%	1.8%	102.2%	10.5%
Net Imports	114.41	120.25	131.96	134.69	134.45	134.23	2.9%	0.4%	-0.2%	-0.2%	0.2%
Solids	14.77	13.24	13.79	12.99	11.45	10.64	-1.4%	-1.2%	-11.9%	-7.1%	-3.6%
Oil	81.57	84.81	89.88	89.95	89.36	88.28	2.0%	0.0%	-0.7%	-1.2%	-0.3%
Crude oil	75.20	78.25	84.28	82.83	82.43	88.08	2.3%	-0.3%	-0.5%	6.9%	0.6%
Oil products	6.36	6.56	5.60	7.13	6.93	0.20	-2.5%	4.9%	-2.8%	-97.1%	-37.9%
Natural gas	16.04	19.51	25.31	28.53	30.43	31.98	9.6%	2.4%	6.7%	5.1%	3.4%
Electricity	2.04	2.69	2.98	3.22	3.21	3.34	7.9%	1.6%	-0.1%	3.9%	1.6%
Gross Inland Consumption	136.05	147.03	154.79	162.67	162.44	168.05	2.6%	1.0%	-0.1%	3.5%	1.2%
Solids	15.16	13.92	14.64	12.33	11.28	11.22	-0.7%	-3.4%	-8.5%	-0.6%	-3.7%
Oil	81.01	88.08	89.81	93.43	92.20	92.66	2.1%	0.8%	-1.3%	0.5%	0.4%
Natural gas	27.20	33.57	39.02	44.65	46.07	47.49	7.5%	2.7%	3.2%	3.1%	2.8%
Other (1)	12.69	11.47	11.32	12.27	12.90	16.69	-2.3%	1.6%	5.1%	29.5%	5.7%
Electricity Generation in TWh	185.71	203.52	216.85	241.44	244.38	251.42	3.1%	2.2%	1.2%	2.9%	2.1%
Nuclear	7.02	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind (including pumping)	44.59	43.54	35.07	41.91	47.10	46.66	-4.7%	3.6%	12.4%	-0.9%	4.2%
Thermal	134.10	159.99	181.78	199.53	197.28	204.76	6.3%	1.9%	-1.1%	3.8%	1.7%
Generation Capacity in GWe	55.51	55.62	56.56	65.91	68.14	70.25	0.4%	3.1%	3.4%	3.1%	3.1%
Nuclear	1.15	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind	17.82	17.94	18.77	19.87	19.91	20.06	1.0%	1.1%	0.2%	0.8%	1.0%
Thermal	36.54	37.68	37.79	46.04	48.23	50.19	0.7%	4.0%	4.8%	4.1%	4.1%
Average Load Factor in %	38.2	41.8	43.8	41.8	40.9	40.9	2.8%	-0.9%	-2.1%	-0.2%	-1.0%
Fuel Inputs for Thermal Power Generation	30.07	35.38	39.77	42.89	42.28	43.44	5.8%	1.5%	-1.4%	2.7%	1.3%
Solids	5.94	6.68	7.07	5.34	4.89	4.51	3.6%	-5.5%	-8.5%	-7.6%	-6.2%
Oil	16.20	19.14	21.53	25.01	24.15	23.26	5.8%	3.0%	-3.4%	-3.7%	1.1%
Gas	5.92	7.41	8.90	10.16	10.60	12.52	8.5%	2.7%	4.4%	18.0%	5.0%
Geothermal	1.70	1.84	1.87	2.11	2.31	2.40	2.0%	2.4%	9.5%	3.8%	3.6%
Biomass	0.31	0.31	0.40	0.27	0.33	0.75	5.2%	-7.2%	20.5%	127.2%	9.5%
Average Thermal Efficiency in %	38.4	38.9	39.3	40.0	40.1	40.5	0.5%	0.4%	0.3%	1.0%	0.4%
Non-Energy Uses	8.41	10.14	9.84	13.88	13.51	14.18	3.2%	7.1%	-2.7%	5.0%	5.4%
Total Final Energy Demand	96.51	104.99	110.62	116.84	117.50	121.46	2.8%	1.1%	0.6%	3.4%	1.3%
Solids	5.12	3.86	4.28	4.14	3.72	3.87	-3.6%	-0.7%	-10.0%	3.9%	-1.4%
Oil	52.58	55.37	54.69	54.12	53.92	54.42	0.8%	-0.2%	-0.4%	0.9%	-0.1%
Gas	20.74	25.59	29.68	34.51	35.57	35.03	7.4%	3.1%	3.1%	-1.5%	2.4%
Electricity	14.93	17.03	18.41	20.44	20.66	21.31	4.3%	2.1%	1.0%	3.2%	2.1%
Heat	0.00	0.00	0.20	0.21	0.21	0.21	-	1.2%	0.0%	0.0%	0.9%
Renewable energy sources	3.13	3.13	3.35	3.41	3.42	6.61	1.4%	0.3%	0.1%	93.6%	10.2%
CO_2 Emissions in Mt of CO_2 (2)	337.6	367.4	388.6	403.2	399.1	400.2	2.9%	0.7%	-1.0%	0.3%	0.4%
Indicators											
Population (Million)	56.59	56.63	56.72	57.30	57.40	57.43	0.0%	0.2%	0.2%	0.1%	0.2%
GDP (bil. EUR 1990)	744.0	819.3	861.2	910.6	916.6	930.4	3.0%	1.1%	0.7%	1.5%	1.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	182.9	179.5	179.7	178.7	177.2	180.6	-0.3%	-0.1%	-0.8%	1.9%	0.1%
Gross Inl Cons./Capita (Kgoe/inhabitant)	2404.0	2596.4	2729.1	2838.9	2830.2	2926.2	2.6%	0.8%	-0.3%	3.4%	1.0%
Electricity Generated/Capita (kWh/inhabitant)	3281.4	3594.0	3823.3	4213.5	4257.7	4377.7	3.1%	2.0%	1.0%	2.8%	2.0%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	5964.8	6487.3	6850.6	7036.9	6953.7	6967.9	2.8%	0.5%	-1.2%	0.2%	0.2%
Import Dependency (%)	82.0	80.1	83.8	81.6	81.6	78.8	0.4%	-0.5%	0.0%	-3.5%	-0.9%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

LUXEMBOURG : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	0.05	0.05	0.05	0.05	0.04	0.05	-1.2%	0.0%	-14.3%	17.3%	0.1%
Solids	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Oil	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & Wind	0.01	0.01	0.01	0.01	0.01	0.01	-2.2%	4.3%	-28.6%	38.3%	2.9%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Other renewable energy sources	0.04	0.04	0.04	0.04	0.03	0.04	-1.0%	-0.7%	-11.7%	14.1%	-0.4%
Net Imports	3.10	3.09	3.52	3.26	3.38	3.30	2.5%	-1.5%	3.7%	-2.4%	-0.9%
Solids	1.42	1.10	1.13	0.51	0.49	0.31	-4.5%	-14.6%	-5.5%	-35.8%	-16.8%
Oil	1.07	1.32	1.62	1.76	1.86	1.91	8.6%	1.6%	5.9%	2.9%	2.4%
Crude oil	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Oil products	1.07	1.32	1.62	1.76	1.86	1.91	8.6%	1.6%	5.9%	2.9%	2.4%
Natural gas	0.30	0.35	0.43	0.56	0.61	0.63	7.2%	5.3%	9.7%	2.5%	5.5%
Electricity	0.30	0.32	0.34	0.43	0.42	0.45	2.0%	5.1%	-1.9%	5.7%	4.1%
Gross Inland Consumption	3.13	3.16	3.55	3.34	3.40	3.35	2.5%	-1.2%	2.0%	-1.5%	-0.8%
Solids	1.42	1.10	1.13	0.51	0.49	0.31	-4.5%	-14.6%	-5.5%	-35.8%	-16.8%
Oil	1.06	1.34	1.61	1.79	1.84	1.92	8.8%	2.1%	3.1%	4.2%	2.6%
Natural gas	0.30	0.35	0.43	0.56	0.61	0.63	7.2%	5.3%	9.7%	2.5%	5.5%
Other (1)	0.35	0.37	0.38	0.48	0.46	0.49	1.6%	4.5%	-3.1%	6.7%	3.7%
Electricity Generation in TWh	0.94	1.33	1.38	1.24	1.31	1.26	8.0%	-2.1%	5.3%	-3.6%	-1.3%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind (including pumping)	0.50	0.81	0.82	0.83	0.88	0.94	10.4%	0.2%	5.9%	7.0%	1.9%
Thermal	0.44	0.52	0.56	0.41	0.43	0.32	5.0%	-5.8%	4.1%	-25.1%	-7.5%
Generation Capacity in GWe	1.24	1.24	1.24	1.26	1.26	1.28	0.0%	0.3%	0.6%	0.9%	0.4%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind	1.13	1.13	1.13	1.14	1.16	1.14	0.0%	0.2%	2.0%	-2.0%	0.1%
Thermal	0.11	0.11	0.11	0.12	0.10	0.14	0.0%	1.2%	-13.7%	33.7%	3.0%
Average Load Factor in %	8.6	12.3	12.7	11.3	11.8	11.3	8.0%	-2.4%	4.7%	-4.4%	-1.7%
Fuel Inputs for Thermal Power Generation	0.15	0.17	0.20	0.13	0.12	0.10	5.4%	-7.8%	-11.1%	-16.5%	-9.5%
Solids	0.01	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Oil	0.00	0.02	0.01	0.00	0.00	0.00	7.0%	-	-	-	-
Gas	0.10	0.13	0.16	0.11	0.10	0.07	9.3%	-8.2%	-7.8%	-24.8%	-10.7%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.03	0.03	0.03	0.02	0.02	0.02	-1.5%	-1.2%	-25.5%	29.4%	-1.3%
Average Thermal Efficiency in %	25.2	25.9	24.6	27.3	32.0	28.7	-0.4%	2.1%	17.0%	-10.3%	2.2%
Non-Energy Uses	0.02	0.02	0.02	0.02	0.02	0.01	2.9%	0.4%	-3.9%	-34.8%	-6.2%
Total Final Energy Demand	2.97	2.99	3.32	3.15	3.24	3.23	2.2%	-1.1%	2.9%	-0.2%	-0.4%
Solids	0.99	0.74	0.75	0.37	0.36	0.24	-5.4%	-13.4%	-3.0%	-33.4%	-15.2%
Oil	1.02	1.30	1.58	1.75	1.82	1.91	9.0%	2.1%	4.0%	4.8%	2.8%
Gas	0.61	0.60	0.62	0.58	0.62	0.62	0.2%	-1.2%	6.7%	-1.1%	-0.1%
Electricity	0.33	0.34	0.35	0.43	0.42	0.44	1.7%	3.9%	-1.6%	4.4%	3.2%
Heat	0.00	0.00	0.00	0.00	0.00	0.01	-	-	-	-	-
Renewable energy sources	0.02	0.02	0.02	0.02	0.02	0.02	-0.2%	0.0%	0.0%	0.0%	0.0%
CO_2 Emissions in Mt of CO_2 (2)	10.0	9.6	10.6	8.7	8.9	8.5	1.2%	-3.9%	2.0%	-4.8%	-3.2%
Indicators											
Population (Million)	0.37	0.37	0.38	0.41	0.42	0.42	0.8%	1.4%	1.4%	1.4%	1.4%
GDP (bil. EUR 1990)	7.0	8.0	8.5	10.2	10.5	10.9	3.9%	3.9%	2.6%	4.1%	3.7%
Gross Inl Cons./GDP (toe/1990 MEUR)	448.1	395.8	419.7	325.8	323.8	306.5	-1.3%	-4.9%	-0.6%	-5.3%	-4.4%
Gross Inl Cons./Capita (Kgoe/inhabitant)	8548.5	8466.8	9300.5	8140.5	8184.2	7950.8	1.7%	-2.6%	0.5%	-2.9%	-2.2%
Electricity Generated/Capita (kWh/inhabitant)	2560.2	3572.9	3610.7	3028.5	3144.7	2988.8	7.1%	-3.5%	3.8%	-5.0%	-2.7%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	27328.4	25825.4	27814.0	21241.9	21369.8	20049.4	0.4%	-5.2%	0.6%	-6.2%	-4.6%
Import Dependency (%)	99.0	97.8	99.0	97.7	99.3	98.4	0.0%	-0.3%	1.7%	-0.9%	-0.1%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

NETHERLANDS : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	65.47	55.58	60.39	66.02	73.83	65.63	-1.6%	1.8%	11.8%	-11.1%	1.2%
Solids	0.07	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Oil	4.09	4.25	4.03	3.52	3.14	2.96	-0.3%	-2.7%	-10.6%	-5.8%	-4.3%
Natural gas	59.52	49.59	54.61	60.46	68.34	60.59	-1.7%	2.1%	13.0%	-11.3%	1.5%
Nuclear	0.98	0.92	0.88	1.04	1.04	0.59	-2.1%	3.3%	0.1%	-43.1%	-5.5%
Hydro & Wind	0.00	0.00	0.01	0.03	0.04	0.05	114.7%	24.3%	27.5%	9.2%	22.5%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Other renewable energy sources	0.81	0.81	0.86	0.97	1.26	1.44	1.1%	2.6%	29.3%	14.6%	7.7%
Net Imports	4.02	20.31	17.35	16.33	14.02	22.69	34.0%	-1.2%	-14.1%	61.8%	3.9%
Solids	6.60	8.21	9.48	8.89	8.88	10.38	7.5%	-1.3%	-0.1%	17.0%	1.3%
Oil	24.19	30.72	30.88	32.83	35.12	36.46	5.0%	1.2%	7.0%	3.8%	2.4%
Crude oil	38.30	50.79	47.96	59.27	61.55	60.74	4.6%	4.3%	3.8%	-1.3%	3.4%
Oil products	-14.12	-20.07	-17.08	-26.44	-26.43	-24.28	3.9%	9.1%	-0.1%	-8.1%	5.2%
Natural gas	-27.21	-19.12	-23.80	-26.37	-30.89	-25.25	-2.6%	2.1%	17.1%	-18.3%	0.8%
Electricity	0.44	0.50	0.79	0.98	0.91	1.09	12.4%	4.4%	-7.1%	19.3%	4.6%
Gross Inland Consumption	61.54	64.85	66.88	73.37	76.21	74.89	1.7%	1.9%	3.9%	-1.7%	1.6%
Solids	6.59	8.18	9.12	9.06	9.11	9.10	6.7%	-0.1%	0.5%	-0.1%	0.0%
Oil	20.40	23.98	24.41	27.20	26.38	27.28	3.7%	2.2%	-3.0%	3.4%	1.6%
Natural gas	32.32	30.45	30.81	34.09	37.46	35.33	-1.0%	2.0%	9.9%	-5.7%	2.0%
Other (1)	2.23	2.24	2.54	3.02	3.25	3.17	2.6%	3.5%	7.5%	-2.6%	3.2%
Electricity Generation in TWh	62.92	69.60	71.82	81.06	85.31	86.64	2.7%	2.4%	5.2%	1.6%	2.7%
Nuclear	3.90	3.67	3.50	4.02	4.16	2.41	-2.1%	2.8%	3.5%	-42.1%	-5.2%
Hydro & wind (including pumping)	0.00	0.02	0.14	0.41	0.52	0.57	114.7%	24.3%	27.5%	9.2%	22.5%
Thermal	59.02	65.91	68.18	76.63	80.63	83.67	2.9%	2.4%	5.2%	3.8%	3.0%
Generation Capacity in GWe	17.05	17.49	17.56	18.99	20.40	20.09	0.6%	1.6%	7.4%	-1.5%	1.9%
Nuclear	0.51	0.51	0.51	0.51	0.51	0.45	0.0%	-0.2%	0.0%	-11.1%	-1.8%
Hydro & wind	0.00	0.02	0.09	0.29	0.34	0.37	-	26.7%	14.3%	10.1%	22.4%
Thermal	16.54	16.96	16.96	18.20	19.55	19.27	0.5%	1.4%	7.5%	-1.4%	1.8%
Average Load Factor in %	42.1	45.4	46.7	48.7	47.7	49.2	2.1%	0.8%	-2.0%	3.1%	0.8%
Fuel Inputs for Thermal Power Generation	12.85	14.08	14.53	16.78	17.96	17.76	2.5%	2.9%	7.0%	-1.1%	2.9%
Solids	3.17	4.98	5.70	5.90	5.94	5.16	12.5%	0.7%	0.8%	-13.2%	-1.4%
Oil	0.69	0.78	0.70	0.82	0.82	0.68	0.4%	3.2%	-0.4%	-16.8%	-0.4%
Gas	8.56	7.89	7.65	9.47	10.32	10.88	-2.2%	4.3%	9.1%	5.4%	5.2%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.43	0.43	0.48	0.60	0.88	1.05	2.3%	4.3%	47.1%	19.5%	11.7%
Average Thermal Efficiency in %	39.5	40.3	40.3	39.3	38.6	40.5	0.4%	-0.5%	-1.7%	4.9%	0.1%
Non-Energy Uses	7.65	8.76	9.26	9.29	7.68	8.74	3.9%	0.1%	-17.3%	13.8%	-0.8%
Total Final Energy Demand	42.58	42.15	43.08	47.46	51.46	49.19	0.2%	2.0%	8.4%	-4.4%	1.9%
Solids	2.03	1.71	1.68	1.40	1.39	1.56	-3.7%	-3.6%	-0.7%	11.9%	-1.1%
Oil	12.07	13.16	13.19	14.65	15.52	15.86	1.8%	2.1%	6.0%	2.2%	2.7%
Gas	22.57	20.74	21.24	22.52	25.06	21.93	-1.2%	1.2%	11.3%	-12.5%	0.5%
Electricity	5.28	5.88	6.32	7.14	7.41	7.70	3.7%	2.5%	3.7%	3.9%	2.9%
Heat	0.25	0.27	0.27	1.38	1.70	1.76	1.3%	38.6%	23.1%	3.7%	30.7%
Renewable energy sources	0.38	0.38	0.37	0.38	0.38	0.40	-0.4%	0.2%	1.3%	3.3%	0.8%
CO_2 Emissions in Mt of CO_2 (2)	141.2	148.6	153.0	166.8	177.7	168.9	1.6%	1.7%	6.5%	-4.9%	1.4%
Indicators											
Population (Million)	14.49	14.76	14.95	15.46	15.53	15.62	0.6%	0.7%	0.5%	0.6%	0.6%
GDP (bil. EUR 1990)	192.0	204.2	222.5	247.0	254.7	264.0	3.0%	2.1%	3.1%	3.6%	2.5%
Gross Inl Cons./GDP (toe/1990 MEUR)	320.6	317.6	300.5	297.1	299.2	283.7	-1.3%	-0.2%	0.7%	-5.2%	-0.8%
Gross Inl Cons./Capita (Kgoe/inhabitant)	4246.8	4393.9	4473.3	4746.3	4906.9	4795.3	1.0%	1.2%	3.4%	-2.3%	1.0%
Electricity Generated/Capita (kWh/inhabitant)	4342.1	4715.3	4805.7	5243.3	5493.0	5547.9	2.0%	1.8%	4.8%	1.0%	2.1%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	9741.5	10065.2	10233.6	10792.1	11440.1	10814.3	1.0%	1.1%	6.0%	-5.5%	0.8%
Import Dependency (%)	5.7	26.9	22.3	19.3	16.0	26.1	31.3%	-2.9%	-17.1%	63.0%	2.2%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

PORTUGAL : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	3.20	3.32	2.77	2.75	3.58	3.60	-2.8%	-0.1%	30.0%	0.5%	3.8%
Solids	0.10	0.09	0.12	0.00	0.00	0.00	3.4%	-	-	-	-
Oil	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & Wind	0.93	1.05	0.79	0.72	1.27	1.13	-3.2%	-1.8%	76.8%	-11.1%	5.3%
Geothermal	0.00	0.00	0.00	0.04	0.04	0.04	-	63.5%	12.6%	6.6%	45.8%
Other renewable energy sources	2.17	2.18	1.87	2.00	2.27	2.42	-3.0%	1.4%	13.4%	6.9%	3.8%
Net Imports	9.64	11.65	15.16	17.88	16.66	18.44	9.5%	3.4%	-6.8%	10.7%	2.8%
Solids	0.94	1.80	2.79	3.80	3.39	3.62	24.4%	6.4%	-10.8%	6.9%	3.8%
Oil	8.51	9.65	12.37	14.00	13.17	14.46	7.8%	2.5%	-5.9%	9.8%	2.3%
Crude oil	7.19	8.60	11.36	13.55	12.12	13.51	9.6%	3.6%	-10.6%	11.5%	2.5%
Oil products	1.31	1.05	1.01	0.45	1.06	0.96	-5.2%	-14.7%	133.2%	-9.5%	-0.7%
Natural gas	0.00	0.00	0.00	0.00	0.00	0.10	-	-	-	-	-
Electricity	0.19	0.21	0.00	0.08	0.10	0.25	-56.0%	89.9%	21.6%	160.9%	86.5%
Gross Inland Consumption	12.36	14.78	16.86	19.76	19.98	21.29	6.4%	3.2%	1.1%	6.6%	3.4%
Solids	0.66	1.97	2.58	3.49	3.46	3.49	31.2%	6.3%	-0.9%	0.8%	4.4%
Oil	8.40	9.38	11.61	13.44	12.84	13.87	6.7%	3.0%	-4.4%	8.0%	2.6%
Natural gas	0.00	0.00	0.00	0.00	0.00	0.09	-	-	-	-	-
Other (1)	3.29	3.43	2.66	2.83	3.67	3.85	-4.2%	1.3%	29.7%	4.7%	5.4%
Electricity Generation in TWh	19.10	22.47	28.50	33.26	34.51	34.18	8.3%	3.1%	3.8%	-1.0%	2.6%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind (including pumping)	10.85	12.29	9.30	8.47	14.88	13.21	-3.0%	-1.9%	75.7%	-11.2%	5.1%
Thermal	8.26	10.19	19.19	24.79	19.64	20.97	18.4%	5.3%	-20.8%	6.8%	1.3%
Generation Capacity in GWe	6.01	6.92	7.39	9.30	9.38	9.46	4.2%	4.7%	0.9%	0.9%	3.6%
Nuclear	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Hydro & wind	3.06	3.29	3.34	4.42	4.45	4.47	1.8%	5.7%	0.7%	0.5%	4.2%
Thermal	2.95	3.63	4.05	4.88	4.94	4.99	6.5%	3.8%	1.1%	1.2%	3.0%
Average Load Factor in %	36.3	37.1	44.0	40.8	42.0	41.2	3.9%	-1.5%	2.8%	-1.8%	-0.9%
Fuel Inputs for Thermal Power Generation	1.86	2.26	4.27	5.48	4.29	4.56	18.1%	5.1%	-21.8%	6.4%	1.0%
Solids	0.22	1.32	2.03	2.92	2.74	2.84	56.0%	7.6%	-6.1%	3.8%	5.0%
Oil	1.51	0.81	2.10	2.36	1.33	1.44	6.9%	2.3%	-43.8%	8.9%	-5.2%
Gas	0.02	0.02	0.02	0.02	0.03	0.08	4.3%	-1.5%	78.4%	137.8%	21.6%
Geothermal	0.00	0.00	0.00	0.04	0.04	0.04	-	63.5%	12.6%	6.6%	45.8%
Biomass	0.11	0.11	0.11	0.15	0.15	0.15	0.0%	5.2%	0.2%	3.5%	4.2%
Average Thermal Efficiency in %	38.2	38.7	38.7	38.9	39.4	39.5	0.2%	0.1%	1.3%	0.4%	0.3%
Non-Energy Uses	1.01	1.92	2.10	1.94	1.88	2.07	15.8%	-1.5%	-3.2%	10.2%	-0.2%
Total Final Energy Demand	9.54	10.60	11.21	13.50	14.19	14.93	3.3%	3.8%	5.1%	5.2%	4.2%
Solids	0.43	0.64	0.62	0.55	0.60	0.49	7.5%	-2.4%	9.9%	-19.0%	-3.3%
Oil	5.42	5.99	6.69	8.10	8.73	9.23	4.3%	3.9%	7.8%	5.8%	4.7%
Gas	0.09	0.10	0.10	0.10	0.09	0.13	1.7%	-1.1%	-7.1%	46.9%	3.7%
Electricity	1.50	1.79	2.02	2.48	2.60	2.74	6.2%	4.1%	4.9%	5.5%	4.4%
Heat	0.03	0.03	0.03	0.04	0.05	0.07	-2.8%	5.1%	40.5%	31.6%	13.1%
Renewable energy sources	2.06	2.06	1.75	2.25	2.12	2.27	-3.2%	5.1%	-5.7%	7.1%	3.8%
CO_2 Emissions in Mt of CO_2 (2)	25.1	29.9	39.1	47.9	45.6	47.8	9.2%	4.2%	-4.8%	4.8%	2.9%
Indicators											
Population (Million)	10.01	9.97	9.90	9.92	9.93	9.94	-0.2%	0.0%	0.1%	0.1%	0.1%
GDP (bil. EUR 1990)	41.6	49.5	54.3	59.1	60.8	63.1	5.5%	1.7%	3.0%	3.7%	2.2%
Gross Inl Cons./GDP (toe/1990 MEUR)	297.2	298.5	310.3	334.6	328.5	337.6	0.9%	1.5%	-1.8%	2.8%	1.2%
Gross Inl Cons./Capita (Kgoe/inhabitant)	1234.2	1482.5	1703.2	1992.9	2012.8	2142.2	6.7%	3.2%	1.0%	6.4%	3.3%
Electricity Generated/Capita (kWh/inhabitant)	1908.3	2255.7	2879.5	3353.9	3476.6	3438.5	8.6%	3.1%	3.7%	-1.1%	2.6%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	2509.7	3001.8	3946.5	4832.5	4596.9	4811.0	9.5%	4.1%	-4.9%	4.7%	2.9%
Import Dependency (%)	75.2	76.5	86.8	88.3	81.3	84.6	2.9%	0.3%	-7.9%	4.0%	-0.4%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

SPAIN : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	30.24	33.39	33.41	31.44	32.20	30.76	2.0%	-1.2%	2.4%	-4.5%	-1.2%
Solids	13.94	11.20	11.68	10.17	10.00	9.89	-3.5%	-2.7%	-1.7%	-1.1%	-2.3%
Oil	2.17	1.47	0.79	0.78	0.51	0.37	-18.2%	-0.4%	-34.4%	-27.7%	-10.4%
Natural gas	0.23	0.81	1.27	0.38	0.43	0.16	40.9%	-21.5%	12.2%	-61.8%	-25.5%
Nuclear	7.38	13.02	13.70	14.30	13.99	13.51	13.2%	0.9%	-2.2%	-3.5%	-0.2%
Hydro & Wind	2.69	3.04	2.19	2.01	3.42	3.01	-4.1%	-1.7%	70.2%	-12.1%	4.7%
Geothermal	0.00	0.00	0.00	0.01	0.01	0.01	22.9%	22.1%	0.0%	0.0%	15.3%
Other renewable energy sources	3.84	3.84	3.77	3.79	3.84	3.81	-0.4%	0.1%	1.4%	-0.6%	0.2%
Net Imports	46.37	53.40	59.85	75.41	73.93	80.23	5.2%	4.7%	-2.0%	8.5%	4.3%
Solids	5.23	5.30	7.04	9.15	7.78	7.04	6.1%	5.4%	-14.9%	-9.5%	0.0%
Oil	39.10	45.63	49.16	58.36	57.75	61.91	4.7%	3.5%	-1.0%	7.2%	3.3%
Crude oil	43.95	49.88	53.25	55.36	54.78	56.37	3.9%	0.8%	-1.0%	2.9%	0.8%
Oil products	-4.85	-4.25	-4.09	3.00	2.97	5.54	-3.4%	-	-1.2%	86.7%	-
Natural gas	2.14	2.59	3.69	7.52	8.31	11.54	11.5%	15.3%	10.6%	38.8%	17.7%
Electricity	-0.09	-0.11	-0.04	0.39	0.09	-0.26	-17.1%	-	-76.4%	-	32.9%
Gross Inland Consumption	73.91	83.28	89.08	102.28	100.27	105.94	3.8%	2.8%	-2.0%	5.7%	2.5%
Solids	19.48	15.72	18.94	19.52	16.37	18.46	-0.6%	0.6%	-16.1%	12.8%	-0.4%
Oil	38.27	44.41	45.54	54.55	53.91	56.10	3.5%	3.7%	-1.2%	4.1%	3.0%
Natural gas	2.35	3.35	4.97	7.72	8.64	11.31	16.1%	9.2%	11.9%	30.8%	12.5%
Other (1)	13.81	19.79	19.63	20.49	21.35	20.07	7.3%	0.9%	4.2%	-6.0%	0.3%
Electricity Generation in TWh	127.34	139.68	151.71	167.04	173.73	186.59	3.6%	1.9%	4.0%	7.4%	3.0%
Nuclear	28.04	50.46	54.26	55.45	56.32	55.29	14.1%	0.4%	1.6%	-1.8%	0.3%
Hydro & wind (including pumping)	33.03	36.36	26.18	24.83	40.87	36.19	-4.5%	-1.0%	64.6%	-11.5%	4.7%
Thermal	66.27	52.86	71.28	86.76	76.55	95.11	1.5%	4.0%	-11.8%	24.3%	4.2%
Generation Capacity in GWe	39.61	42.79	43.42	45.85	46.92	48.41	1.9%	1.1%	2.3%	3.2%	1.6%
Nuclear	5.55	7.47	6.97	7.07	7.09	7.25	4.7%	0.3%	0.3%	2.2%	0.6%
Hydro & wind	14.53	15.32	16.24	16.90	17.10	17.20	2.2%	0.8%	1.2%	0.6%	0.8%
Thermal	19.53	20.00	20.21	21.88	22.73	23.97	0.7%	1.6%	3.9%	5.4%	2.5%
Average Load Factor in %	36.7	37.2	39.9	41.6	42.3	44.0	1.7%	0.8%	1.6%	4.1%	1.4%
Fuel Inputs for Thermal Power Generation	15.65	12.79	16.51	19.28	17.53	21.49	1.1%	3.1%	-9.1%	22.6%	3.8%
Solids	12.86	10.44	13.76	13.59	13.11	15.21	1.4%	-0.3%	-3.5%	16.0%	1.4%
Oil	1.97	1.87	2.17	3.65	2.72	2.72	1.9%	11.0%	-25.6%	0.0%	3.3%
Gas	0.76	0.43	0.49	1.51	1.13	3.00	-8.5%	25.5%	-25.1%	165.4%	29.7%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.06	0.06	0.09	0.53	0.56	0.56	9.5%	41.5%	5.4%	0.0%	29.1%
Average Thermal Efficiency in %	36.4	35.5	37.1	38.7	37.6	38.1	0.4%	0.8%	-2.9%	1.3%	0.4%
Non-Energy Uses	4.87	5.94	5.85	7.14	5.90	7.00	3.7%	4.1%	-17.4%	18.7%	2.6%
Total Final Energy Demand	47.52	53.47	56.53	63.81	65.99	67.65	3.5%	2.5%	3.4%	2.5%	2.6%
Solids	4.25	3.45	3.52	2.23	1.97	1.85	-3.7%	-8.7%	-11.7%	-6.2%	-8.8%
Oil	28.10	32.67	33.60	39.84	40.72	41.34	3.6%	3.5%	2.2%	1.5%	3.0%
Gas	2.55	3.75	4.90	6.32	7.29	7.92	13.9%	5.2%	15.3%	8.7%	7.1%
Electricity	8.84	9.82	10.82	12.12	12.66	13.18	4.1%	2.3%	4.5%	4.2%	2.9%
Heat	0.00	0.00	0.00	0.05	0.07	0.08	22.9%	79.7%	61.4%	3.7%	63.6%
Renewable energy sources	3.78	3.78	3.68	3.26	3.28	3.28	-0.5%	-2.4%	0.6%	0.0%	-1.6%
CO_2 Emissions in Mt of CO_2 (2)	177.4	181.4	202.0	226.7	224.7	240.1	2.6%	2.3%	-0.9%	6.9%	2.5%
Indicators											
Population (Million)	38.42	38.72	38.85	39.21	39.27	39.34	0.2%	0.2%	0.2%	0.2%	0.2%
GDP (bil. EUR 1990)	313.3	366.9	398.2	425.7	435.3	450.1	4.9%	1.3%	2.3%	3.4%	1.8%
Gross Inl Cons./GDP (toe/1990 MEUR)	235.9	226.9	223.7	240.3	230.3	235.4	-1.1%	1.4%	-4.1%	2.2%	0.7%
Gross Inl Cons./Capita (Kgoe/inhabitant)	1923.8	2150.9	2292.9	2608.6	2553.4	2693.1	3.6%	2.6%	-2.1%	5.5%	2.3%
Electricity Generated/Capita (kWh/inhabitant)	3314.4	3605.1	3905.0	4260.1	4424.1	4743.0	3.3%	1.8%	3.8%	7.2%	2.8%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	4617.9	4685.9	5199.4	5781.0	5720.6	6104.6	2.4%	2.1%	-1.0%	6.7%	2.3%
Import Dependency (%)	60.6	61.8	64.4	71.5	70.5	71.9	1.2%	2.1%	-1.4%	2.0%	1.6%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

SWEDEN : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	26.73	29.51	29.61	31.14	31.26	31.71	2.1%	1.0%	0.4%	1.5%	1.0%
Solids	0.10	0.15	0.27	0.31	0.36	0.26	21.8%	3.2%	15.5%	-28.3%	-0.4%
Oil	0.01	0.00	0.00	0.00	0.00	0.00	-17.8%	6.0%	-	-	-
Natural gas	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Nuclear	15.26	18.09	17.76	18.04	19.16	18.04	3.1%	0.3%	6.2%	-5.9%	0.2%
Hydro & Wind	6.11	6.01	6.23	5.86	4.46	5.95	0.4%	-1.2%	-23.9%	33.4%	-0.7%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Other renewable energy sources	5.26	5.26	5.33	6.91	7.27	7.46	0.3%	5.3%	5.2%	2.6%	4.9%
Net Imports	20.03	18.39	17.82	19.11	21.09	19.98	-2.3%	1.4%	10.4%	-5.3%	1.6%
Solids	3.08	2.48	2.33	2.66	2.38	2.48	-5.4%	2.7%	-10.6%	4.2%	0.9%
Oil	17.01	15.81	15.11	15.93	17.46	17.01	-2.3%	1.1%	9.6%	-2.6%	1.7%
Crude oil	14.06	14.65	16.93	17.81	18.99	20.10	3.8%	1.0%	6.6%	5.9%	2.5%
Oil products	2.95	1.16	-1.82	-1.89	-1.53	-3.09	-	0.7%	-19.2%	102.3%	7.8%
Natural gas	0.07	0.32	0.53	0.68	0.73	0.72	47.8%	5.0%	7.8%	-1.3%	4.5%
Electricity	-0.13	-0.22	-0.15	-0.14	0.53	-0.23	3.2%	-1.0%	-	-	6.3%
Gross Inland Consumption	46.94	49.11	46.94	49.92	51.73	50.18	0.0%	1.2%	3.6%	-3.0%	1.0%
Solids	2.80	2.88	2.73	2.90	3.14	2.47	-0.5%	1.2%	8.1%	-21.2%	-1.4%
Oil	17.58	16.79	14.50	15.67	16.44	15.77	-3.8%	1.6%	5.0%	-4.1%	1.2%
Natural gas	0.07	0.32	0.53	0.68	0.73	0.72	47.8%	5.0%	7.8%	-1.3%	4.5%
Other (1)	26.49	29.13	29.18	30.67	31.42	31.22	2.0%	1.0%	2.4%	-0.6%	1.0%
Electricity Generation in TWh	137.13	146.21	146.48	148.32	140.61	149.43	1.3%	0.3%	-5.2%	6.3%	0.3%
Nuclear	58.55	69.41	68.17	69.92	74.26	69.92	3.1%	0.5%	6.2%	-5.9%	0.4%
Hydro & wind (including pumping)	71.59	70.47	73.03	68.25	51.91	69.25	0.4%	-1.3%	-23.9%	33.4%	-0.8%
Thermal	6.98	6.33	5.28	10.15	14.44	10.26	-5.4%	14.0%	42.2%	-28.9%	9.9%
Generation Capacity in GWe	33.18	33.17	34.19	33.62	34.16	34.04	0.6%	-0.3%	1.6%	-0.3%	-0.1%
Nuclear	9.46	9.70	9.97	10.06	10.06	10.06	1.1%	0.2%	0.0%	0.0%	0.1%
Hydro & wind	15.70	16.12	16.34	16.22	16.31	16.37	0.8%	-0.1%	0.5%	0.4%	0.0%
Thermal	8.02	7.35	7.88	7.35	7.80	7.62	-0.4%	-1.4%	6.1%	-2.2%	-0.5%
Average Load Factor in %	47.2	50.3	48.9	50.4	47.0	50.1	0.7%	0.6%	-6.7%	6.6%	0.3%
Fuel Inputs for Thermal Power Generation	2.93	2.31	1.78	3.31	4.36	3.10	-9.5%	13.2%	31.4%	-28.7%	8.3%
Solids	0.89	0.91	0.63	0.69	0.96	0.60	-6.6%	2.0%	38.6%	-37.8%	-0.7%
Oil	1.15	0.48	0.23	0.67	1.38	0.61	-27.8%	24.1%	107.5%	-56.0%	15.2%
Gas	0.13	0.16	0.25	0.39	0.42	0.43	14.9%	9.2%	8.6%	0.8%	7.8%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.76	0.76	0.67	1.56	1.59	1.47	-2.5%	18.4%	1.5%	-7.3%	11.8%
Average Thermal Efficiency in %	20.5	23.5	25.5	26.3	28.5	28.4	4.5%	0.6%	8.2%	-0.3%	1.5%
Non-Energy Uses	1.51	1.90	1.87	1.96	2.06	2.35	4.4%	1.0%	5.1%	13.8%	3.3%
Total Final Energy Demand	31.16	31.42	30.43	33.64	34.12	33.57	-0.5%	2.0%	1.4%	-1.6%	1.4%
Solids	1.14	1.18	1.22	1.32	1.16	1.04	1.4%	1.5%	-11.7%	-10.4%	-2.2%
Oil	13.13	13.15	12.00	12.35	12.68	12.26	-1.8%	0.6%	2.7%	-3.3%	0.3%
Gas	0.33	0.47	0.59	0.58	0.65	0.65	11.9%	-0.2%	11.6%	0.9%	1.6%
Electricity	9.77	10.32	10.35	10.71	10.83	10.69	1.2%	0.7%	1.2%	-1.4%	0.5%
Heat	2.51	2.02	1.71	3.54	3.90	3.74	-7.4%	15.7%	10.3%	-4.3%	11.9%
Renewable energy sources	4.28	4.28	4.57	5.15	4.89	5.19	1.3%	2.4%	-5.0%	6.2%	1.8%
CO_2 Emissions in Mt of CO_2 (2)	58.0	55.3	50.6	53.6	58.3	51.5	-2.7%	1.2%	8.7%	-11.6%	0.3%
Indicators											
Population (Million)	8.35	8.44	8.56	8.83	8.84	8.86	0.5%	0.6%	0.2%	0.2%	0.5%
GDP (bil. EUR 1990)	161.5	174.3	180.8	185.1	187.5	190.8	2.3%	0.5%	1.3%	1.8%	0.8%
Gross Inl Cons./GDP (toe/1990 MEUR)	290.6	281.8	259.6	269.7	276.0	263.0	-2.2%	0.8%	2.3%	-4.7%	0.2%
Gross Inl Cons./Capita (Kgoe/inhabitant)	5621.6	5821.5	5484.8	5655.4	5851.3	5661.8	-0.5%	0.6%	3.5%	-3.2%	0.5%
Electricity Generated/Capita (kWh/inhabitant)	16421.4	17331.0	17114.7	16803.3	15904.0	16859.7	0.8%	-0.4%	-5.4%	6.0%	-0.2%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	6941.4	6553.2	5913.9	6074.9	6593.9	5816.4	-3.2%	0.5%	8.5%	-11.8%	-0.2%
Import Dependency (%)	42.2	36.9	37.4	37.5	39.9	38.8	-2.4%	0.0%	6.4%	-2.8%	0.5%

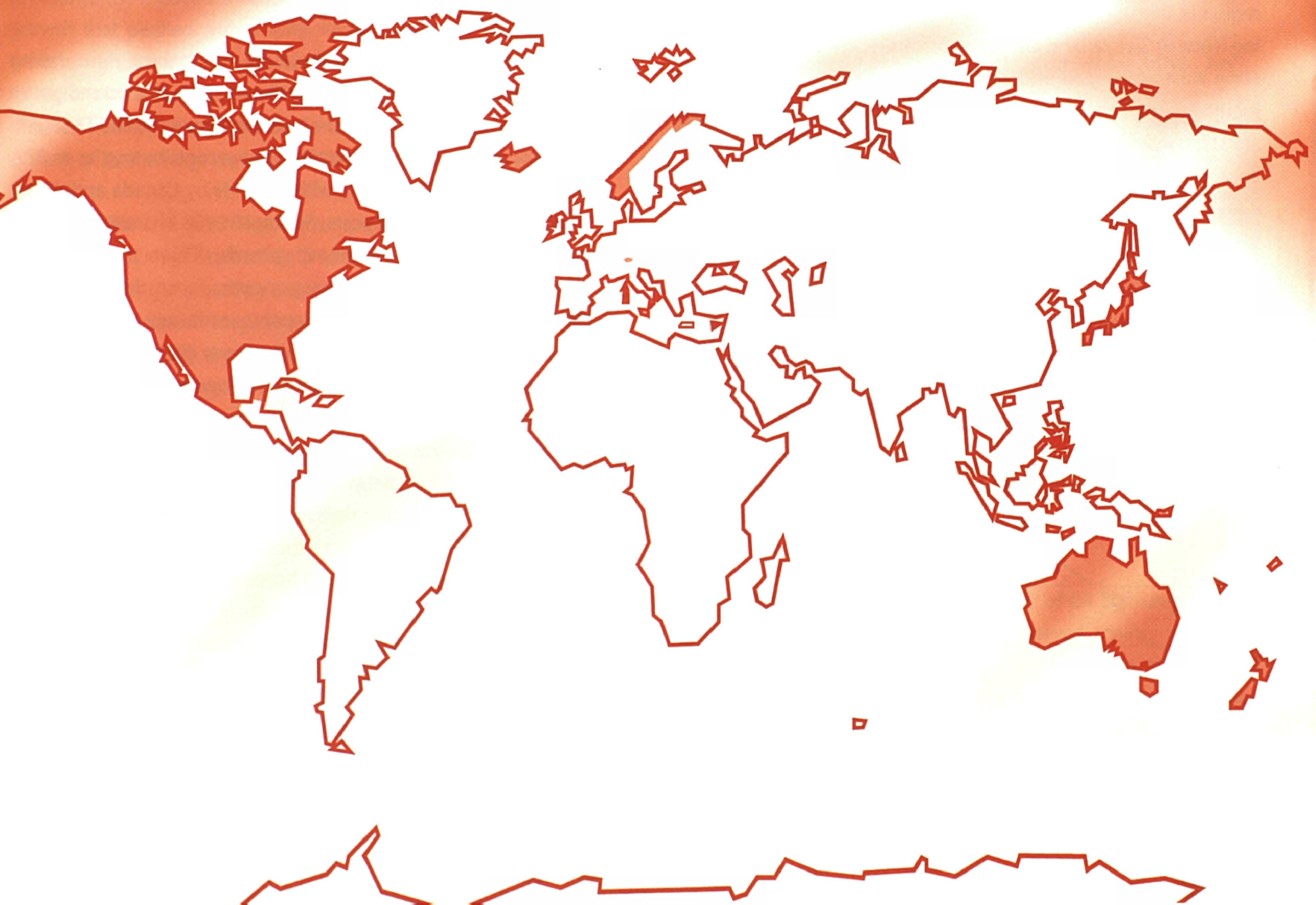
(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

UNITED KINGDOM : SUMMARY ENERGY BALANCE

Mtoe	1985	1988	1990	1995	1996	1997	90/85	95/90	96/95	97/96	97/90
							Annual % Change				
Primary Production	236.57	234.12	203.80	250.71	262.30	262.57	-2.9%	4.2%	4.6%	0.1%	3.7%
Solids	54.74	60.51	53.11	30.96	29.97	29.43	-0.6%	-10.2%	-3.2%	-1.8%	-8.1%
Oil	129.20	118.44	92.12	133.00	132.44	130.40	-6.5%	7.6%	-0.4%	-1.5%	5.1%
Natural gas	35.72	37.85	40.92	63.60	75.84	77.44	2.8%	9.2%	19.2%	2.1%	9.5%
Nuclear	15.98	16.34	16.57	21.25	22.18	23.25	0.7%	5.1%	4.4%	4.8%	5.0%
Hydro & Wind	0.35	0.40	0.44	0.45	0.33	0.41	4.4%	0.6%	-26.4%	24.6%	-0.8%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.0%	13.6%	0.0%	0.0%	9.5%
Other renewable energy sources	0.58	0.58	0.64	1.45	1.53	1.64	2.2%	17.5%	5.6%	7.7%	14.3%
Net Imports	-31.65	-20.39	7.34	-36.11	-33.18	-35.86	-	-	-8.1%	8.1%	-
Solids	6.59	7.90	9.12	10.38	11.78	10.93	6.7%	2.6%	13.5%	-7.2%	2.6%
Oil	-49.62	-38.33	-8.99	-48.53	-46.76	-47.63	-28.9%	40.1%	-3.7%	1.9%	26.9%
Crude oil	-47.91	-29.43	-3.11	-36.36	-31.96	-29.44	-42.1%	63.5%	-12.1%	-7.9%	37.9%
Oil products	-1.71	-8.90	-5.88	-12.17	-14.79	-18.19	28.0%	15.7%	21.6%	22.9%	17.5%
Natural gas	11.39	8.93	6.18	0.64	0.36	-0.59	-11.5%	-36.5%	-44.1%	-	-
Electricity	0.00	1.10	1.03	1.40	1.43	1.43	-	6.4%	2.2%	-0.6%	4.8%
Gross Inland Consumption	203.70	210.88	210.86	219.20	228.01	221.02	0.7%	0.8%	4.0%	-3.1%	0.7%
Solids	62.77	66.93	63.31	46.61	44.14	37.91	0.2%	-5.9%	-5.3%	-14.1%	-7.1%
Oil	77.38	79.32	81.66	83.04	82.49	80.01	1.1%	0.3%	-0.7%	-3.0%	-0.3%
Natural gas	46.64	46.21	47.20	65.00	75.92	76.36	0.2%	6.6%	16.8%	0.6%	7.1%
Other (1)	16.91	18.42	18.68	24.55	25.47	26.73	2.0%	5.6%	3.8%	4.9%	5.3%
Electricity Generation in TWh	298.04	308.08	318.92	333.99	347.32	345.28	1.4%	0.9%	4.0%	-0.6%	1.1%
Nuclear	61.08	63.44	65.74	88.95	94.65	98.13	1.5%	6.2%	6.4%	3.7%	5.9%
Hydro & wind (including pumping)	6.93	6.97	7.06	6.78	5.40	6.28	0.4%	-0.8%	-20.3%	16.2%	-1.7%
Thermal	230.03	237.67	246.12	238.26	247.27	240.87	1.4%	-0.6%	3.8%	-2.6%	-0.3%
Generation Capacity in GWe	67.43	69.63	73.02	70.11	73.35	72.70	1.6%	-0.8%	4.6%	-0.9%	-0.1%
Nuclear	7.07	7.69	11.35	12.76	12.92	12.95	9.9%	2.4%	1.2%	0.2%	1.9%
Hydro & wind	4.19	4.16	4.18	4.40	4.46	4.62	0.0%	1.0%	1.3%	3.5%	1.4%
Thermal	56.17	57.78	57.49	52.95	55.97	55.14	0.5%	-1.6%	5.7%	-1.5%	-0.6%
Average Load Factor in %	50.5	50.5	49.9	54.4	54.1	54.2	-0.2%	1.8%	-0.6%	0.3%	1.2%
Fuel Inputs for Thermal Power Generation	54.33	53.72	57.05	50.16	50.43	48.90	1.0%	-2.5%	0.5%	-3.0%	-2.2%
Solids	42.13	46.40	47.58	34.15	31.13	27.11	2.5%	-6.4%	-8.8%	-12.9%	-7.7%
Oil	10.72	6.11	7.59	3.73	3.46	1.75	-6.7%	-13.3%	-7.1%	-49.4%	-18.9%
Gas	1.20	0.92	1.57	11.62	15.10	19.19	5.5%	49.3%	30.0%	27.1%	43.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
Biomass	0.29	0.29	0.31	0.66	0.73	0.85	1.5%	16.5%	10.2%	15.8%	15.5%
Average Thermal Efficiency in %	36.4	38.0	37.1	40.8	42.2	42.4	0.4%	1.9%	3.2%	0.5%	1.9%
Non-Energy Uses	12.14	13.22	12.26	13.85	12.36	12.06	0.2%	2.5%	-10.7%	-2.5%	-0.2%
Total Final Energy Demand	127.20	136.25	136.37	141.34	151.10	147.61	1.4%	0.7%	6.9%	-2.3%	1.1%
Solids	15.99	14.89	12.04	8.90	8.37	8.03	-5.5%	-5.9%	-6.0%	-4.0%	-5.6%
Oil	51.17	56.46	58.78	60.28	62.00	61.38	2.8%	0.5%	2.9%	-1.0%	0.6%
Gas	38.92	41.35	41.17	46.10	53.65	50.81	1.1%	2.3%	16.4%	-5.3%	3.0%
Electricity	20.81	22.82	23.60	25.27	26.28	26.59	2.5%	1.4%	4.0%	1.2%	1.7%
Heat	0.01	0.44	0.45	0.00	0.00	0.00	104.0%	-71.7%	0.0%	0.0%	-59.4%
Renewable energy sources	0.29	0.29	0.34	0.78	0.80	0.80	2.8%	18.5%	1.7%	0.3%	13.2%
CO2 Emissions in Mt of CO2 (2)	544.2	563.0	566.9	531.3	551.2	528.5	0.8%	-1.3%	3.7%	-4.1%	-1.0%
Indicators											
Population (Million)	56.69	57.16	57.56	58.61	58.80	58.97	0.3%	0.4%	0.3%	0.3%	0.3%
GDP (bil. EUR 1990)	590.7	613.1	650.6	763.1	748.1	744.2	1.9%	3.2%	-2.0%	-0.5%	1.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	344.8	344.0	324.1	287.2	304.8	297.0	-1.2%	-2.4%	6.1%	-2.6%	-1.2%
Gross Inl Cons./Capita (Kgoe/inhabitant)	3593.5	3689.4	3663.2	3740.2	3877.7	3748.0	0.4%	0.4%	3.7%	-3.3%	0.3%
Electricity Generated/Capita (kWh/inhabitant)	5257.7	5389.9	5540.5	5698.9	5906.7	5855.2	1.1%	0.6%	3.6%	-0.9%	0.8%
CO_2 Emissions/Capita (kg of CO_2/inhabitant)	9600.1	9849.7	9849.1	9066.4	9374.2	8962.8	0.5%	-1.6%	3.4%	-4.4%	-1.3%
Import Dependency (%)	-15.4	-9.6	3.4	-16.3	-14.4	-16.0	-	-	-11.7%	11.3%	-

(1) Includes nuclear. hydro and wind. net imports of electricity. and other energy sources.
(2) Given on an indicative basis; calculated using common emission factors accross all countries in the world

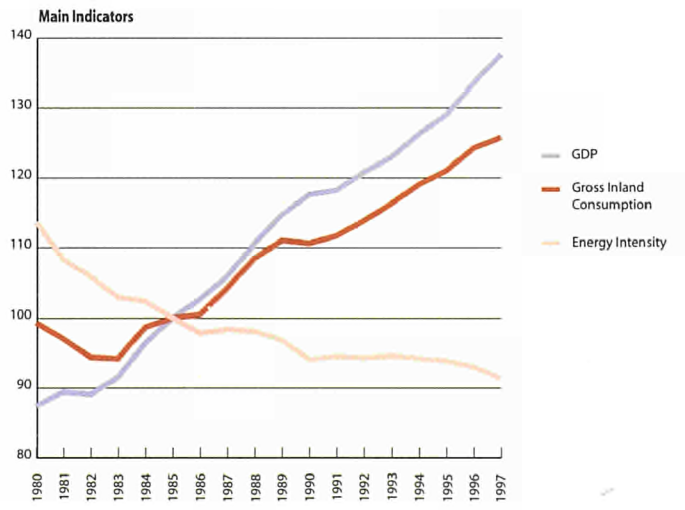
PART III OTHER OECD COUNTRIES



Other OECD countries: Major trends (1985-1997)

- Strong economic growth in 1996 and 1997 driven by the United States but Japan slowed down in 1997
- Final energy demand showed an accelerating growth rate since 1994 but slowed down in 1997
- Since 1980, oil and gas contributions to final energy demand slowly declined
- Transport contributed to 40% of final energy demand under the pressure of NAFTA region
- Electricity's contribution has continued to increase slowly, with wide regional differences
- Gross inland energy consumption dominated by the United States
- Oil and gas covered about 60% of incremental gross inland consumption since 1985
- Indigenous energy production increased almost as fast as gross inland consumption
- Gas infrastructure in the NAFTA region continued to increase rapidly to meet the demand
- Increasing coal production will be challenged by environmental regulations
- Nuclear production slowed down both in the United States and Canada but Japan continued to increase
- The whole region represented 25% of the world's fossil fuel reserves, principally solid fuels
- Since 1995, thermal units covered all the incremental electricity demand
- Solid fuels still increased their share in thermal power stations
- Deregulation of electricity markets generalised in North America and Japan
- NAFTA refinery capacity is well adapted to the regional markets, unlike the Japanese
- Energy intensity improved again since 1994 at about –1.0% per year on average
- Energy consumption per capita peaked in the United States, at twice the Japanese level
- The United States presented the lowest energy prices in OECD by far
- CO2 emissions increased by 12% since 1990
- Transport and power generation sectors were responsible for about 65% of CO2 emissions
- The region remained a net importer of hydrocarbons but a net exporter of solid fuels

"Other OECD countries" is a global heading embracing: the NAFTA region of the USA, Canada and Mexico; the EFTA region comprising Norway, Switzerland and Iceland; the OECD Pacific region covering Australia, Japan and New Zealand; and Turkey. The new members (the Czech Republic, Hungary, Poland and South Korea) are still considered in their original region to improve the coherence of the analysis. Each of these groups is rather heterogeneous from a sociological, political and macro-economic point of view.



Strong economic growth in 1996 and 1997 driven by the United States but Japan slowed down in 1997…

The global GDP increased by about 3% during the eighties, falling under 2% on average between 1990 and 1995, to rebound above 3% in 1996 and 1997. The economic activity of the NAFTA region is largely dominated by the United States contributing up to 87% of the region's GDP in 1997, with only 9% by Canada and 4% by Mexico. In the last two years, the region was characterised by a remarkable sustained economic growth. Given the size of its economy, population and energy needs, Japan dominated the OECD Pacific region. In 1997, Japan contributed to 89% of the region's GDP. Japanese GDP growth, above 4% per year on average during the 80's, was hit by a severe slowdown since 1991. The recent Asian financial crisis cut Japanese economic growth to just 0.8% in 1997. The economic links with the developing Asian countries and China have strong impacts on Japan's economy and energy sector. The economic environment of the EFTA region was marked by a GDP growing on average by 2.2% in the last two years, under the leadership of Norway and influenced by the increasing production of hydrocarbons in the North Sea. Turkey, which had remarkable annual GDP growth above 7% since 1995, rebounded successfully after the 1994 recession caused by internal political problems.

REGIONAL GDP EVOLUTION

Billions 1990 EUR	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
EFTA	221.8	244.7	275.0	292.6	298.8	306.1	2.0%	2.4%	1.2%	2.1%	2.4%
NAFTA	3887.3	4387.8	5019.2	5545.1	5735.4	5966.9	2.5%	2.7%	2.0%	3.4%	4.0%
OECD Pacific	1774.8	2092.7	2599.2	2814.0	2923.3	2954.0	3.3%	4.4%	1.6%	3.9%	1.0%
Turkey	71.2	90.3	118.4	138.6	148.3	159.5	4.9%	5.6%	3.2%	7.0%	7.5%
Total	5955.1	6815.5	8011.8	8790.3	9105.8	9386.4	2.7%	3.3%	1.9%	3.6%	3.1%

ENERGY OUTLOOK

Final energy demand demonstrated an accelerating growth rate since 1994 but slowed down in 1997...

The **final energy demand**, mainly characterised by the NAFTA region absorbing 77% of consumption in 1997 (82% in 1980), demonstrated an accelerating growth rate since 1980. The exception is the OECD Pacific region where the increase peaked during the second part of the 80's but slowed down during the 90's due to the performance of the Japanese economy. Between 1990 and 1993, a general slowdown was observed in all regions as a result of the weakness of the economy in the OECD. The 1994 economic resurgence induced a rebound of final energy consumption growth that peaked with a 2.7% increase boosted by the cold weather conditions in the Western Hemisphere in 1996. In 1997, all regions benefited from warmer climatic conditions resulting in reduced heating requirements of more than 2% that limited the growth of final energy demand to 0.6% for the region as a whole.

Between 1980 and 1993 final consumption remained apparently stable in the United States. This is only due to the fact that until 1988 electricity generated by autoproducers was accounted for at the final consumption stage in terms of fuel inputs, rather than as generated electricity and heat. Between 1989 and 1993 these inputs have been progressively better identified statistically and allocated to electricity production. This means that final energy demand in the United States was over-estimated (by up to 60-90 Mtoe) before 1993 and, as a consequence, the growth rate of final energy demand was under-estimated mainly during the 80's.

Since 1980, oil and gas contributions to final energy demand slowly declined...

Final energy demand is largely dominated by hydrocarbons. Since 1980, the oil products and gas contributions have decreased slowly: from 52% to 50% for oil and 23% to 21% for gas. The share of oil products in total final demand remained stable in the United States which absorbed more than 65% of oil consumption. But some significant reductions were observed mainly in Canada (from 50% in 1980 to 38% in 1997), Norway (from 46% to 37%) and Japan (from 63% to 58%). The gas market share declined slowly in NAFTA, from 26.7% to 25.2% despite the 1992 liberalisation of the gas market in the United States. At present, about half

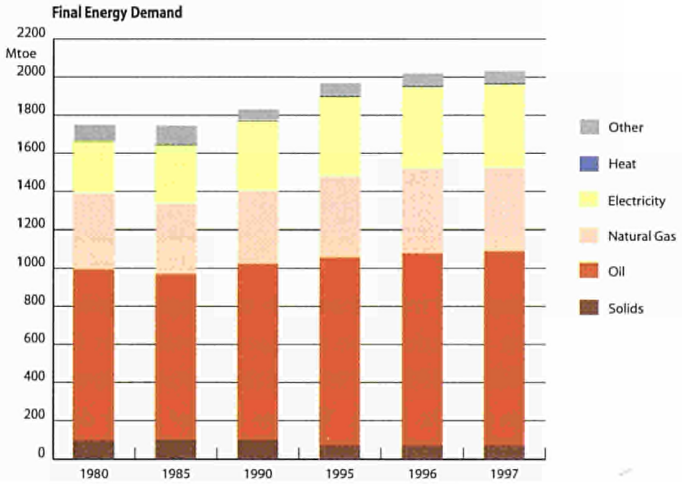
Main items

The 'Other OECD' countries, as defined in this report, comprise nearly 615 millions people, or some 11% of the world's total population; and include virtually all the most advanced industrialised economies, outside the European Union. With the highest average incomes and amongst the largest per capita levels of energy consumption, these OECD countries now account for 34% of total world energy consumption and 35% of global CO_2 emissions. They also undertake a very high share of total research and development; and dominate overseas direct investment and the world's financial markets. As a result they are vulnerable to any major global financial or trade disruptions although, with the exception of Japan, this region has been largely unaffected by the recent crises. Key current policy issues include liberalisation and structural reform of their energy sectors, especially gas and electricity; formulating an effective response to a range of environmental issues, particularly greenhouse gas emissions; tackling sustained growth in transportation and its associated impacts; and - in future, as overall regional import dependency increases - ensuring adequate energy supply security. Growth rates for most of these countries will remain relatively modest and stable given their economic maturity. As a consequence, the 'Other OECD' countries' share of world economic activity, energy use and environmental emissions will continue to decline steadily as the African, east European, Latin American and, especially, Asian regions develop in the longer term at a faster overall rate.

FINAL ENERGY DEMAND BY REGION

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
EFTA	33.0	35.7	36.9	38.6	39.6	39.2	1.6%	0.7%	- 0.9%	2.5%	-1.0%
NAFTA	1432.2	1405.6	1433.5	1530.3	1569.7	1577.5	-0.4%	0.4%	1.3%	2.6%	0.5%
OECD Pacific	258.3	273.0	321.0	357.6	366.2	369.3	1.1%	3.3%	2.2%	2.4%	0.8%
Turkey	25.7	29.5	37.3	43.9	47.7	49.3	2.8%	4.8%	3.3%	8.8%	3.3%
Total	93.7	98.7	97.7	68.0	66.6	68.0	1.0%	-0.2%	-7.0%	-2.1%	2.1%

of all final gas sales in the United States are made by suppliers other than the local distribution company. More importantly, large industrial customers can already switch suppliers in some 75% of cases. But this liberalisation has only favoured gas to gas competition, as the gas market share has remained stable since 1992. This contrasts with the evolution in the OECD Pacific region where the gas market is still under development. The gas share in this region reached only 9% of total final demand in 1997 (6% in 1980). But, in the main markets, Japan and Australia, gas competition was affected by the additional costs related to LNG infrastructures. Electricity consumption grew by about 2.9% per year on average since 1980, the growth rate being more sustained in the OECD Pacific region (+3.5% on average) than in NAFTA (+2.7%) or EFTA (+2.0%). Thus about 60% of the incremental demand for energy was covered by electricity alone. Solid fuels and biomass covered the rest of the consumption but their contributions remained quite marginal, declining from 10% in 1980 to only 6% in 1997. As they are mainly consumed in the United States by industrial electricity autoproducers, the modification of statistical allocations pushed their apparent consumption to below the 1993 levels.



Transport contributed to 40% of final energy demand under the pressure of the NAFTA region...

Industry, including US electricity autoproducers before 1992, made the major contribution to final energy demand in 1980 with a 34% share. Its contribution has dropped progressively to 27% in 1997. But industrial shares varied significantly from region to region: 24.6% in NAFTA with a minimum of 22.8% in the United States, 26.3% in EFTA and 34.3% in OECD Pacific. Despite sustained economic activity, industrial energy consumption grew by only 1.3% in 1996 and 0.9% in 1997. The increasing predominance of less energy-intensive industries contributed to this evolution as well as the declining trend of energy intensities in many heavy industrial sectors. Over the same period, transport climbed from 33% of final energy consumption in 1980 up to 40% in 1997, easily becoming the major energy consuming sector. This was mainly under the pressure of NAFTA, where transport represented 42% of total final demand in 1997 against 33% in OECD Pacific and only 30% in EFTA. This is due to the very high level of motorization reached in the NAFTA region, reinforced by longer distance travel than in the other regions. In the OECD Pacific region, in particular Japan, a recent switch to larger cars has been observed. The share of Japanese passenger cars with an engine capacity greater than 2000cc increased from 4.1% in 1980 to 21.1% in 1996. As a consequence, the contribution of transport to oil consumption by final consumers reached 76% in the OECD region as a whole in 1997 with a maximum of 82% in NAFTA compared to only 58% in both OECD Pacific and EFTA. The share of the tertiary and domestic sector was essentially unchanged, at between 32% and 34 % of the total over the whole period. The highest contribution occurred in EFTA for climatic reasons (43% of final consumption in 1997) and the lowest in the OECD Pacific region (32% of final consumption) due to the limited size of households.

Electricity's contribution has continued to increase slowly, with wide regional differences

Electricity's share in final consumption reached 20% in 1990 from 15% in 1980 and continued to increase slowly to reach a little lower than 22% in 1997. EFTA, benefiting from much low-cost hydro power, had the largest contribution of electricity with about 34%, followed by the OECD Pacific region with 26% and finally NAFTA with only 21% as a result of the larger contribution of the transport sector. The highest contributions occurred in the EFTA region with 55% in industry and 44% in the tertiary-domestic sector respectively as a result of low electricity prices. The two other regions were relatively homogeneous: about 32% for industry and 40% for tertiary-domestic. The increasing contribution of electricity in industry resulted from improved automation and control, development of electro-technologies and an industrial production more oriented to high-added-value products. In the tertiary-domestic sector, driven by high living standards, electricity's contribution continued to grow because - even though the market for classical appliances was close to saturation - other markets such as air conditioning and microcomputers were developing rapidly.

Gross inland energy consumption dominated by the United States...

Gross inland energy consumption showed a steady annual increase of about 1.9% since 1985 after the stagnation observed during the first part of the 80's; this evolution was dictated by the United States, the largest economy in the world with about 23% of world energy consumption. Furthermore, this growth was not equally spread over all primary fuels and regions. The lowest growth occurred in the EFTA region, at only 1.3% per year over the period 1985-1997, despite an acceleration in 1997. The NAFTA region followed with growth of 1.7% per year on average. Even Mexico, which can still be associated with developing countries, limited its growth to an average of 2.0% per year. In the OECD Pacific, where industrial development continued to increase sharply during the 1980's, accompanied by improving living standards, the increase reached 2.8% per year over the same period. Finally Turkey, a country still under major development, increased its consumption by about 83% since 1985.

Oil and gas covered about 60% of incremental gross inland consumption since 1985...

Solid fuel demand, which increased by about 3.0% in the first part of the 80's, continued to grow by 1.4% per year on average since then; but jumped by 4.8% in 1996 and 3.5% in 1997 due to increasing demand from the US power sector. This represented about 21% of total gross inland consumption, a constant share since 1990. Coal consumption is concentrated in the United States, which accounted for about three-quarters of the regional total since 1980. With its substantial reserves, the United States has come to rely heavily on coal for electricity generation and will continue to do so in the near future. Although there was a drop in demand for oil and gas between 1980 and 1985, the use of both these energy sources has increased regularly since then. Oil grew on average by 1.6% per year since 1985 to contribute 42% of total consumption in 1976 (49% in 1980) under the pressure of OECD Pacific region (+2.4% per year on average) and Turkey (+4.7%). Since 1985, the annual growth of gas consumption reached an average of 2.2% with a peak of 3.8% in the OECD Pacific where gas use increased both for final energy uses and power generation. In the United States, which absorbed about 73% of the whole region's consumption and 27% of total world consumption in 1997, gas use grew by 1.8% per year on average since 1985 but has remained stable since 1995. Non-fossil fuels grew continuously to reach 16% of total consumption in 1996 against 10% in 1980 but slowed down to grow by 2.9% in 1997, due to a general decline registered in the United States: -6.8% for nuclear, -and 5.8% for hydro and biomass. Since 1985, incremental gross inland consumption has been covered as follows: 35% by oil, 24% by gas, 19% by solid fuels, 17% by nuclear and 5% by other renewable sources. This evolution differs notably from the European Union where solid fuels have lost 30% of their market since 1985 and gas covered 63% of the incremental gross inland consumption.

GROSS INLAND CONSUMPTION BY REGION

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
EFTA	41.2	45.1	48.6	50.9	51.5	52.8	1.9%	1.5%	0.9%	1.3%	2.4%
NAFTA	2103.6	2086.5	2259.6	2454.4	2511.9	2541.7	-0.2%	1.6%	1.7%	2.3%	1.2%
OECD Pacific	430.4	452.4	540.1	607.0	627.8	633.2	1.0%	3.6%	2.4%	3.4%	0.9%
Turkey	31.3	38.9	52.5	62.2	67.7	71.3	4.4%	6.2%	3.4%	8.8%	5.4%
Total	2606.6	2623.1	2900.9	3174.6	3259.1	3299.2	0.1%	2.0%	1.8%	2.7%	1.2%

Indigenous energy production increased almost as fast as gross inland consumption...

Indigenous **energy production**, showing significant improvement in the three main regions, increased almost as fast as gross inland consumption. **Oil** contributed 885 Mtoe or 31% of all energy produced in the whole region. In absolute terms, the production of oil declined in the NAFTA region between 1985 and 1995 but increased again by 1.1% in 1996 and 1.8% in 1997. In fact, the United States' production has been reduced by 16% between 1985 and 1990 due to the closure of numerous small independent producers whose profitability was threatened by low oil prices. After 1990 the reduction of US production (-35 Mtoe) was largely compensated by Canada (+25 Mtoe, or a 27% increase since 1990), and Mexico (+18 Mtoe) which significantly increased its production in these last two years. In EFTA, the major evolution occurred in Norway where oil production has quadrupled since 1985, making it the eighth world producer. The production in the OECD Pacific region, mainly located in Australia, remained marginal.

Gas infrastructure in the NAFTA region continued to increase rapidly to meet the demand...

Natural gas production was reduced between 1980 and 1985 by 1.9% per year on average and since then increased continuously to reach a peak of 681 Mtoe in 1997. Gas production was mainly located in the United States (442 Mtoe) and Canada (137 Mtoe), the first and third world producers respectively. 79% of the incremental production since 1985 came from NAFTA, almost equally distributed between the United States and Canada, which has doubled its production since 1985. Infrastructure expansion is underway and expected to continue throughout North America to facilitate trans-national exchanges to meet the increasing demand. More than 40 pipeline construction projects, including 10 new ones, were completed in the United States in 1997. Two new gas export lines from the United States to Mexico, totalling 237 million cubic feet per day of new capacity, were also put in service in 1997 to help meet Mexico's anticipated growth in consumption. Australian and Norwegian gas production also continued to grow: Australian production steadily increased since 1985 to finally double in 1997. Norwegian production only grew since 1990 with spectacular jumps by 32% in 1996 and 10% in 1997. The Norwegian export market is totally oriented towards the European Union.

Increasing coal production will be challenged by environmental regulations...

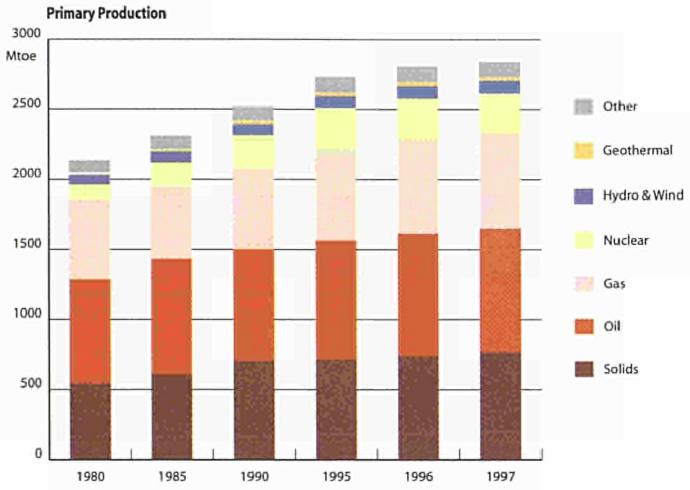
Solid fuel production grew on average by 2% per year since 1985. Additional contribution came mainly from the United States (+107 Mtoe since 1985) and Australia (+58 Mtoe), the second and the fourth world producers respectively. The United States, after relative stagnation between 1990 and 1995, again increased its production by 2.9% in 1996 and 2.7% in 1997. Australian production increased on average by 4.6% per year since 1985. These two countries were both net exporters of solids fuels. Exports represented 8.2% of US production and 68% of Australian production. In the future, environmental regulation, in particular the application of the Kyoto Protocol in industrialised countries, will represent a major challenge for coal markets in many areas of the world, particularly in the OECD countries that have agreed to reduce their greenhouse gas emissions to below 1990 levels. Between 2008 and 2012, the United States must reduce its emissions by 8% from 1990 levels, and Japan by 6%.

Nuclear production slowed down both in United States and Canada but Japan continued to increase...

Nuclear energy accounted for 10% of total production in 1997 against 5% in 1980. Nuclear was mainly expanded in the United States and Japan during the 80's showing a 8.5% annual increase of its contribution. Since 1990 its use has continued to increase at about 7% per year in Japan but by only 2.7% per year in the NAFTA region caused by a continuous decline in Canada, -22% since 1994, and a first decrease of 7% in the United States in 1997. Japan has ambitious plans for further nuclear expansion, mainly as a means of reducing its dependence on imported fossil fuels. However, the uncertainties surrounding financial markets in Asia, as well as increased public opposition to nuclear power, will affect

PRIMARY ENERGY PRODUCTION BY REGION

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
EFTA	63.6	83.4	131.2	194.7	220.5	225.1	5.6%	9.5%	8.2%	13.2%	2.1%
NAFTA	1910.0	2005.5	2117.5	2215.0	2257.7	2269.6	1.0%	1.1%	0.9%	1.9%	0.5%
OECD Pacific	139.1	201.9	244.9	298.2	305.7	320.3	7.7%	3.9%	4.0%	2.5%	4.8%
Turkey	17.2	21.7	25.7	26.1	26.8	27.6	4.7%	3.5%	0.4%	2.4%	2.9%
Total	2129.9	2312.6	2519.3	2734.0	2810.6	2842.6	1.7%	1.7%	1.6%	2.8%	1.1%



new construction decisions. The deregulation of the electricity industry in the United States is affecting the nuclear industry in different ways: some units have been shut down prematurely; others have been sold; and still others are expected to continue operating beyond current retirement dates. In 1997 two reactors were shut down permanently. In Canada, Ontario Hydro, the operating utility for the majority of the nuclear units, has begun an extensive programme to improve the performance of its nuclear plants. Seven of the oldest units have been shut down, five of them in 1997 and two in 1998. The units may be refurbished and brought back on line eventually.

Renewable energy, 7.5% of the primary energy production in 1980, did not significantly improve its share, reaching only 8.0% in 1997. Hydro and wind grew very slowly since 1985, despite the impressive development of wind energy in the United States, especially in California. The contribution of geothermal energy was multiplied by three during the 80's but has remained rather stable since then. Other sources, mainly biomass, made a constant contribution of about 100 Mtoe since 1985. Biomass production was mainly located in the United States and used to supply electricity producers.

The whole region represented 25% of the world's fossil fuel reserves, principally solid fuels...

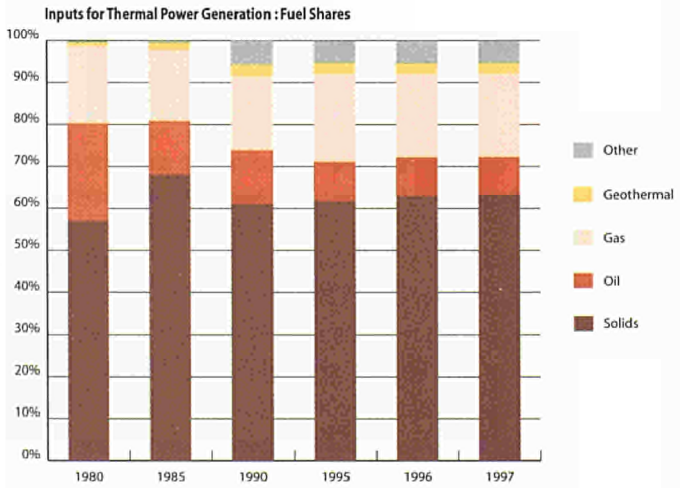
In late 1997, Asian oil reserves amounted to about 8.2% of world reserves, mostly (2.3%) located in the NAFTA region but the oil reserves/production ratio was only 16 years, significantly below the world average. The situation for gas reserves was quite similar, with about 7.2% of world reserves. Finally, coal reserves, mainly located in the United States (23.3%), and Australia (8.8%), accounted for 33.1% of world reserves. As a result of this, the region represented 25.4% of total world fossil fuel reserves.

Since 1995, thermal units covered all the incremental electricity demand...

Electricity generation grew at an annual average rate of 3.0% since 1985. But the growth declined from 3.9% per year on average during the second part of the 1980's to 2.3% during the 1990's and reached only 1.5% in 1997. Thermal power stations covered 64% of the production in 1997 (68% in 1980) with nuclear and hydro accounting for 19% and 17% of total production respectively. These shares have remained stable since 1990, with nuclear becoming more important than hydro in the late 80's. Since 1985, thermal units have covered 66% of the incremental production, nuclear 26% and hydro only 8%. But since 1995, all the production growth was covered by thermal, the fall in nuclear production being barely compensated by growth in hydro and wind. The installed capacity reached 1300 GWe in 1997 compared to 917 GWe in 1980 and 1164 GWe in 1990. Since 1980 nuclear capacity has doubled. Hydro capacity expanded by 2% per year on average between 1985 and 1995 but has remained stable since then. In particular the development of wind power in the United States, the largest world market, has slowed since 1996; new investment being compensated by the closure of old or inefficient units. On the other hand, thermal power increased by 1.3% per year on average since 1985. But this growth was accelerating during the 90's due to the limited investment in nuclear and hydro. The growth of power capacity is not uniform across the whole region. The fastest increase occurred in Turkey with about 7.5% per year on average since 1985. OECD Pacific, dominated by Japan, grew at 2.7% per year and NAFTA at only 1.1% with two extremes: Mexico at 4.0% since 1985 and the United States at only 0.9%.

Solid fuels still increased their share in thermal power stations...

Solid fuels remain the main energy source for thermal power stations (64% of thermal input in 1997 versus 57% in 1980) as a result



of the fuel preferences of US electricity producers. The contribution of oil (9% in 1997) which declined during the oil crisis in the early 1980's, to the benefit of biomass and geothermal energy, dropped again in 1995 after some signs of recovery in the beginning of the 90's, due this time to environmental pressures. The development of gas use has indeed been very important since 1985. Gas consumption increased by 75% since 1985 to reach 182 Mtoe despite a relative stability since 1995. Growth in gas consumption occurred mainly in the NAFTA region where it represented about 18% of all fuel inputs thanks to the large indigenous production and the liberalisation of the gas market in the United States at the beginning of the 1990's. Since 1990 it increased by only 17% in the OECD Pacific region due to non-competitive prices of LNG imported gas for the Japanese electricity market. For this reason, in Japan, the contribution of oil products was still higher than gas. For the OECD as a whole, the share of gas in thermal power stations reached about 20% in 1997, against 17% in 1990, making it the second energy source but far behind solid fuels.

Deregulation of electricity markets generalised in North America and Japan…

Electric utility regulatory reform is underway throughout North America. In the United States and Canada the driving force for reform is the expectation that increased competition will lower costs of electricity supply. In the United States, reforms are being carried out at both the federal and state levels. The latest regulations concern open access, additional guidelines for the recovery of stranded costs and the establishment of electronic systems on the availability of transmission capacity. The reforms should also serve to integrate more closely the US and Canadian electricity markets. In May 1997, the Japanese Cabinet approved an Action Plan for Economic Structure Reform, in which deregulation measures were proposed as a means of promoting market mechanisms. The Action Plan aimed to ensure, through competition, that the electricity, gas and petroleum industries provide services at an international standard of performance, including costs, by 2001.

NAFTA refinery capacity is well adapted to the regional markets, unlike the Japanese...

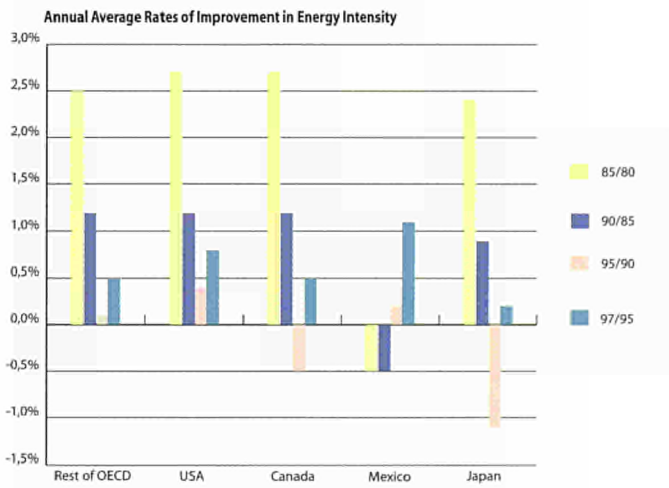
The **refinery capacity** remained globally stable in the whole region since 1985. About 24% of world capacity was located in the NAFTA region, principally in the United States, but this capacity was just sufficient to cover the needs of the region. Regional utilisation rates increased regularly from 78% in 1985 to 86% in 1990 and 93% in 1997. This guaranteed sufficient profitability for the regional refineries to finance the additional investment required to adapt the production to a demand increasingly oriented towards light (transportation fuels and petrochemical feedstock) and environmentally cleaner products. On the other hand, Japanese refinery capacity, increased by 1.8% per year on average during the 1990's and accounted for about 6% of world capacity in 1997, but it has not yet adapted fully to the changes in product markets even though its utilisation rate increased from 63% in 1985 to 87% in 1997. This inadequate production means the region remained a net importer of oil products for about 16% of its total consumption.

COMPETITIVENESS

Energy intensity improved again since 1994 at about -1.0% per year on average...

The **energy intensity** of the region as a whole improved significantly (-1.9% per year on average) during the 80's, remained stable between 1990 and 1993 due to the economic slow-down, and improved again after this. But the gain was limited to -0.9% per year on average even if this was accelerating by 1997 to reach -1.8%. Since 1990, however, this is the result of very contrasting regional trends. In fact the 6% decrease observed in the United States since 1990 was largely offset by the stability registered in Canada and the 4% growth observed in Japan. The depressed economic climate in the early 90's led to lower utilisation rates of industrial capacities and limited gross fixed capital formation. This induced increasing specific energy consumption per unit of production and less investment in rational uses of energy. This trend has continued in Japan since then due to the weak economic climate, except in 1996.

Compared to other OECD countries, the United States and Canada have high energy intensity. This is due to many factors. Amongst the most important are low energy prices, high income per capi-

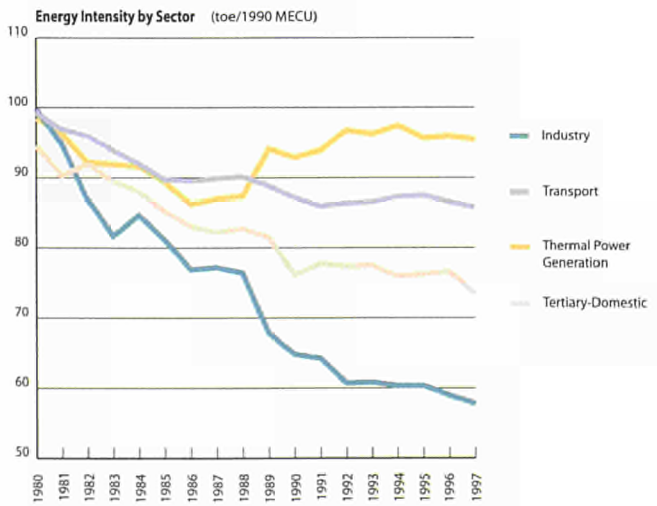


ENERGY INTENSITY BY REGION

toe/1990 MEUR	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
EFTA	185.6	184.4	176.5	173.8	172.4	172.4	-0.1%	-0.9%	-0.3%	-0.8%	0.0%
NAFTA	541.1	475.5	450.2	442.6	438.0	426.0	-2.6%	-1.1%	-0.3%	-1.1%	-2.7%
OECD Pacific	242.5	216.2	207.8	215.7	214.8	214.4	-2.3%	-0.8%	0.8%	-0.4%	-0.2%
Turkey	439.6	430.4	443.6	448.7	456.1	446.8	-0.4%	0.6%	0.2%	1.6%	-2.0%
Total	437.7	384.8	362.1	361.1	357.9	351.5	-2.5%	-1.2%	-0.1%	-0.9%	-1.8%

ta, large distances between centres of population and extreme climatic conditions in both winter and summer. In contrast, Japan has a low energy intensity, some 30% lower than that of the OECD partly due to the higher contribution of energy-efficient industry in final energy consumption, the country's limited energy resources and traditionally high energy prices.

By sector, the energy intensity of industry has been continuously improving since 1980, falling about 42% for the region as a whole. The best performance occurred in the United States where the intensity that had continued to improve at a sustained rate during the 1990's has halved since 1980. The improvement of the Japanese industrial energy intensity, limited to 34% since 1980, reflected the slower trend observed since 1990. In Canada, the gain was limited to 25% due to the stabilisation of energy intensity since 1990. It is only in Turkey, characterised by rapid industrialisation, that energy intensity in industry increased since 1980. The tertiary-domestic sector also improved its energy intensity by about 20% during the 1980's despite the improvement of living standards and the development of new appliances such as air conditioning. Between 1990 and 1996, it has fluctuated around the 1990 level, continuing improvement in the United States being compensated by poorer performance in Canada (+3%) and Japan (+8%). Finally, in 1997, characterised by favourable climatic conditions, it improved by 7.1% in the EFTA region, 5.5% in the NAFTA region and 1.5% in the OECD Pacific region but this is not representative of a long-term evolution. Even the transport sector improved about 12% during the 80's but it flattened between 1990 and 1995 and showed further improvement since then, driven by the US performance. In contrast, the energy intensity of power generation, driven by the increasing contribution of electricity to final energy demand, has grown by about 7% since 1985 even though it stabilised since 1995.



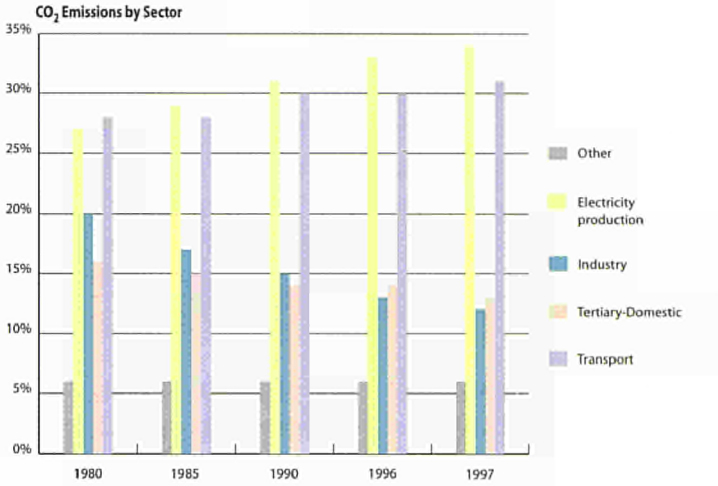
Energy consumption per capita peaked in the United States, at twice the Japanese level...

The **gross inland consumption per capita** increased slowly by 0.8% since 1985 to reach an average value of 5.4 toe/inhabitant in 1996. But it reflected large variations between regions and countries. In fact, absolute values varied from 1.1 toe/inhabitant in Turkey, to 4.3 in the OECD Pacific, 4.5 in EFTA, and 6.5 toe/inhabitant in NAFTA, with a peak of 8.1 toe/inhabitant in the United States, the highest per capita consumption in the world. The energy consumption per inhabitant was twice as high in the United States as in Japan, the first and the second industrialised countries in the world respectively. Although per capita consumption remained stable in NAFTA since 1980, it increased in all the others since 1980: by 38% in Turkey, 25% in the OECD Pacific region and 16% in EFTA. This was a consequence of increasing living standards and also industrial development in the particular case of Turkey.

The United States presented, by far, the lowest energy prices in OECD...

If energy efficiency is a major factor influencing competitiveness, energy prices are even more important, to the exclusion of any consideration of labour costs, fiscal systems and regulation. Comparing energy prices within the main competitors inside the OECD, the United States, Japan and the European Union, it is clear that the US prices are the lowest, followed by the European and the Japanese. In 1997, prices of industrial heavy fuel oil ranged

from 79 EUR90/toe in the United States, to 115 EUR90/toe in Japan and 122 EUR90/toe for the European average. For natural gas deliveries to industry the respective prices are 86 EUR90/toe in US, 119 EUR90/toe in the European Union and 280 EUR90/toe in Japan. Finally, for electricity the prices are 28 EUR90/MWh in the United States, 44 EUR90/MWh in European Union and 90 EUR90/MWh in Japan. As a first approximation, it can be considered that US prices reflect low prices observed in liberalised and competitive markets, especially for gas and electricity. Additionally, tax levels are also considerably lower in the USA.



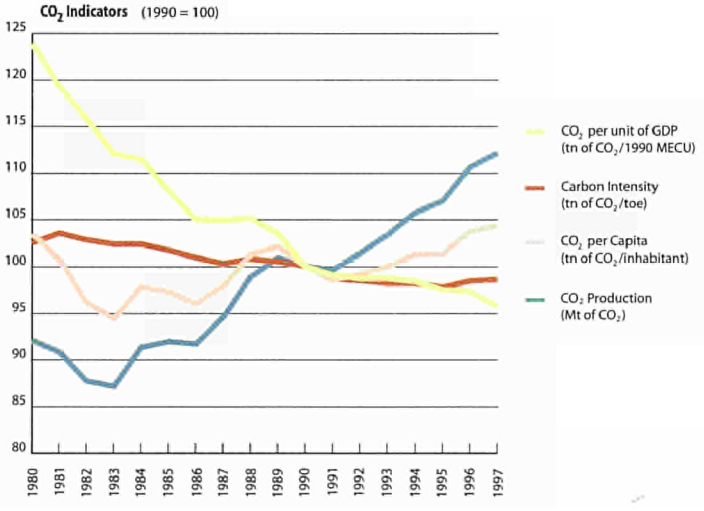
ENVIRONMENT

CO2 emissions increased by 12% since 1990...

In general terms CO2 emissions have increased continuously since 1985 driven by the OECD Pacific (+32% since 1985) and the NAFTA region (+19% since 1985). Since 1990 CO2 emissions for the region as a whole have grown by 12% despite a continuous decline until 1995 of the carbon intensity of the fuel mix due to the increasing contribution of non-fossil fuels and switching from solids fuels and oil products to natural gas. Over the last two years this indicator has been negatively influenced by the reduced contribution of non-fossil fuels, mainly compensated by coal in the United States. It must be stressed that CO2 emissions by unit of GDP, generally slowing down in other parts of the world, were only declining by 0.6% per year in this region since 1990. The level of CO2 emissions per capita reflects living standards and the industrialisation levels as well as the efforts to reduce energy intensity. The range was very large inside the region with 2744 kg of CO2/capita in Turkey, 3637 in Mexico, 8492 in Japan, 16350 in Canada and 20481 in the United States.

Transport and power generation were responsible for about 65% of CO2 emissions...

Since 1990, the main contributor to CO2 emissions has been power generation. Its share in total emissions grew from 27% in 1980 to 34% in 1997. In the last two years, the large increase of solid fuel consumption by US electricity producers induced a jump by about 9% of sectoral CO2 emissions. The second contributor by far was still the transport sector with a share of about 31% in 1997 against 27% in 1980. The emissions from the tertiary and domestic sectors (13% of total emissions in 1997 against 16% in 1980) remained almost constant after 1980, fluctuating in accordance with climatic conditions. Finally, CO2 emissions from industry, even though they increased slowly in 1995 and 1996, have been reduced by about 23% since 1980, their share in total CO2 emissions being reduced from 20% in 1980 to only 12% in 1997.



GLOBAL MARKETS

The region remained a net importer of hydrocarbons but a net exporter of solid fuels...

The region is a net importer of energy. Although its import dependency index dropped to 11% in 1985, it has increased since then to reach 16% in 1990, and subsequently fluctuated between 14% and 16%. The region imported mainly crude oil and oil products, covering almost all of its total fuel imports. Although the NAFTA region diversified its suppliers between Latin America (140 Mtoe), the Middle East (93 Mtoe), Africa (88 Mtoe) and the North Sea (52 Mtoe), the OECD Pacific region relied almost entirely on the

Middle East (228 Mtoe). Japan also imported some LNG. On the other hand, the region remained a net coal exporter, the main volumes being exported outside the region by Australia (95 Mtoe), the United States (47 Mtoe) and Canada (16 Mtoe).

The situation differs between regions and countries. Inside NAFTA, the United States was the only net importer of oil (487 Mtoe in 1997), the two others being net exporters (Mexico with 91 Mtoe and Canada with 37 Mtoe). NAFTA countries are self-sufficient in natural gas even though significant trade took place between Canada and the United States. The import dependency of NAFTA remained limited to about 12%, the same level as in 1980. Conversely, the OECD Pacific region depended for 51% on energy imports in 1997 (70% in 1980) and Japan peaked at 80% as it is totally dependant on imports for all fossil fuels consumed in the country. At the same time, Australia, one of the world's largest solid fuel producers, exported about 48% of its total primary energy production. Finally the EFTA region, led by Norway, became a larger net exporter of energy. In 1997, about 85% of both crude oil and natural gas in the region were exported, mainly to the European Union.

OTHER OECD COUNTRIES: SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	2129.9	2312.6	2519.3	2734.0	2810.6	2842.6	1.7%	1.7%	1.6%	2.8%	1.1%
Solids	541.2	605.6	705.0	722.3	741.7	766.6	2.3%	3.1%	0.5%	2.7%	3.4%
Oil	746.8	828.5	799.4	846.0	872.3	885.1	2.1%	-0.7%	1.1%	3.1%	1.5%
Natural gas	572.7	519.7	577.2	649.1	672.1	681.2	-1.9%	2.1%	2.4%	3.5%	1.4%
Nuclear	105.0	169.8	238.4	296.2	298.0	287.7	10.1%	7.0%	4.4%	0.6%	-3.5%
Hydro & Wind	68.6	75.8	77.6	86.4	89.8	88.8	2.0%	0.5%	2.2%	3.9%	-1.1%
Geothermal	7.8	13.0	22.9	23.4	24.8	23.9	10.9%	11.9%	0.5%	5.6%	-3.6%
Other	87.8	100.3	98.7	110.5	111.9	109.3	2.7%	-0.3%	2.3%	1.2%	-2.3%
Net Imports	544.4	304.7	469.6	462.7	479.2	503.4	-11.0%	9.0%	-0.3%	3.6%	5.1%
Solids	-35.2	-53.5	-70.0	-70.1	-68.4	-64.9	8.7%	5.5%	0.0%	-2.5%	-5.1%
Oil	580.9	347.8	518.7	509.8	525.5	549.7	-9.8%	8.3%	-0.3%	3.1%	4.6%
Crude oil	501.0	271.7	430.6	462.7	457.6	485.6	-11.5%	9.6%	1.5%	-1.1%	6.1%
Oil products	79.9	76.1	88.1	47.1	67.9	64.1	-1.0%	3.0%	-11.8%	44.1%	-5.6%
Natural gas	-0.6	11.0	22.5	24.2	21.3	18.3	-	15.4%	1.4%	-11.9%	-14.2%
Electricity	-0.6	-0.6	-1.6	-1.2	0.7	0.3	-1.8%	23.1%	-5.7%	-	-58.1%
Gross Inland Consumption	2606.4	2622.9	2900.7	3174.4	3258.9	3298.9	0.1%	2.0%	1.8%	2.7%	1.2%
Solids	496.2	572.5	612.6	645.3	676.5	699.9	2.9%	1.4%	1.0%	4.8%	3.5%
Oil	1268.7	1154.9	1266.9	1328.6	1364.6	1390.4	-1.9%	1.9%	1.0%	2.7%	1.9%
Natural gas	572.9	537.2	585.2	685.0	692.6	698.7	-1.3%	1.7%	3.2%	1.1%	0.9%
Other (1)	268.6	358.3	436.1	515.5	525.2	510.0	5.9%	4.0%	3.4%	1.9%	-2.9%
Electricity Generation in TWh	3724.8	4184.7	5061.9	5738.2	5865.3	5950.5	2.4%	3.9%	2.5%	2.2%	1.5%
Nuclear	401.2	649.4	913.3	1136.2	1143.2	1103.8	10.1%	7.1%	4.5%	0.6%	-3.4%
Hydro & wind	797.8	880.3	901.5	1003.2	1042.2	1030.8	2.0%	0.5%	2.2%	3.9%	-1.1%
Thermal	2525.9	2655.0	3247.0	3598.7	3679.9	3815.9	1.0%	4.1%	2.1%	2.3%	3.7%
Generation Capacity in GWe	916.8	1083.2	1163.9	1263.9	1279.1	1299.7	3.4%	1.4%	1.7%	1.2%	1.6%
Nuclear	80.0	120.3	148.5	160.4	163.1	165.0	8.5%	4.3%	1.6%	1.7%	1.2%
Hydro & wind	204.3	232.7	255.4	280.8	281.0	282.1	2.6%	1.9%	1.9%	0.1%	0.4%
Thermal	632.6	730.2	760.0	822.6	835.0	852.6	2.9%	0.8%	1.6%	1.5%	2.1%
Average Load Factor in %	46.4	44.1	49.6	51.8	52.3	52.3	-1.0%	2.4%	0.9%	1.0%	-0.2%
Fuel Inputs for Thermal Power Generation	593.6	620.9	766.1	862.3	896.6	918.0	0.9%	4.3%	2.4%	4.0%	2.4%
Solids	339.8	422.6	468.9	533.9	565.7	583.3	4.5%	2.1%	2.6%	5.9%	3.1%
Oil	136.6	78.6	97.1	78.9	81.3	81.2	-10.5%	4.3%	-4.1%	3.0%	-0.1%
Gas	107.7	103.9	133.8	180.2	176.7	181.6	-0.7%	5.2%	6.1%	-2.0%	2.8%
Geothermal	7.3	12.4	22.0	22.3	23.6	22.6	11.3%	12.2%	0.3%	5.7%	-3.9%
Other	2.2	3.4	44.3	46.9	49.4	49.3	9.3%	67.2%	1.1%	5.4%	-0.3%
Average Thermal Efficiency in %	36.6	36.8	36.4	35.9	35.3	35.7	0.1%	-0.2%	-0.3%	-1.7%	1.3%
Non-Energy Uses	147.8	141.1	177.3	191.8	201.7	209.7	-0.9%	4.7%	1.6%	5.2%	4.0%
Total Final Energy Demand	1749.2	1743.8	1828.8	1970.4	2023.2	2035.2	-0.1%	1.0%	1.5%	2.7%	0.6%
Solids	93.7	98.7	97.7	68.0	66.6	68.0	1.0%	-0.2%	-7.0%	-2.1%	2.1%
Oil	900.6	869.8	925.9	986.5	1010.2	1020.0	-0.7%	1.3%	1.3%	2.4%	1.0%
Gas	398.1	367.7	380.5	422.4	440.6	436.0	-1.6%	0.7%	2.1%	4.3%	-1.0%
Electricity	269.2	307.5	366.0	419.2	432.1	439.7	2.7%	3.5%	2.7%	3.1%	1.8%
Heat	1.8	3.2	3.6	9.8	10.2	10.6	12.3%	2.6%	22.0%	4.0%	3.4%
Other	85.7	96.9	55.0	64.6	63.4	61.0	2.5%	-10.7%	3.3%	-1.8%	-3.9%
CO_2 Emissions in Mt of CO_2	6539.4	6529.3	7102.7	7596.9	7853.3	7962.0	0.0%	1.7%	1.4%	3.4%	1.4%
Indicators											
Population (Million)	508.88	540.17	571.75	603.92	609.87	614.63	1.2%	1.1%	1.1%	1.0%	0.8%
GDP (index 1985=100)	87.4	100.0	117.6	129.0	133.6	137.7	2.7%	3.3%	1.9%	3.6%	3.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	437.7	384.8	362.1	361.1	357.9	351.5	-2.5%	-1.2%	-0.1%	-0.9%	-1.8%
Gross Inl Cons./Capita (toe/inhabitant)	5.12	4.86	5.07	5.26	5.34	5.37	-1.1%	0.9%	0.7%	1.7%	0.4%
Electricity Generated/Capita (kWh/inhabitant)	7320	7747	8853	9501	9617	9681	1.1%	2.7%	1.4%	1.2%	0.7%
CO_2 Emissions/Capita (t of CO_2/inhabitant)	12.9	12.1	12.4	12.6	12.9	13.0	-1.2%	0.5%	0.3%	2.4%	0.6%
Import Dependency (%)	20.5	11.5	16.0	14.4	14.6	15.1	-11.0%	6.8%	-2.1%	1.0%	3.9%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

OTHER OECD COUNTRIES : MAIN INDICATORS

	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	9796
							Annual % Change				
Gross Inland Consumption (Mtoe)	2606.4	2622.9	2900.7	3174.4	3258.9	3298.9	0.1%	2.0%	1.8%	2.7%	1.2%
Public Thermal Power Generation	568.6	594.5	659.8	696.9	720.3	743.0	0.9%	2.1%	1.1%	3.4%	3.1%
Autoprod. Thermal Power Generation	17.7	14.0	84.6	143.4	153.1	152.7	-4.6%	43.4%	11.1%	6.7%	-0.3%
Energy Branch	154.8	159.2	187.4	195.8	204.9	205.7	0.6%	3.3%	0.9%	4.7%	0.4%
Final Energy Consumption	1749.2	1743.8	1828.2	1968.8	2021.5	2033.4	-0.1%	1.0%	1.5%	2.7%	0.6%
Industry	594.3	552.4	519.5	529.7	536.5	541.4	-1.5%	-1.2%	0.4%	1.3%	0.9%
Transport	591.4	611.1	698.6	768.9	787.6	804.1	0.7%	2.7%	1.9%	2.4%	2.1%
Tertiary-Domestic	563.4	580.3	610.1	670.1	697.4	688.0	0.6%	1.0%	1.9%	4.1%	-1.4%
Energy Intensity (toe/1990 MEUR)	437.7	384.8	362.1	361.1	357.9	351.5	-2.5%	-1.2%	-0.1%	-0.9%	-1.8%
Public Thermal Power Generation	95.5	87.2	82.3	79.3	79.1	79.2	-1.8%	-1.1%	-0.8%	-0.2%	0.1%
Autoprod. Thermal Power Generation	3.0	2.0	10.6	16.3	16.8	16.3	-7.2%	38.8%	9.1%	3.0%	-3.2%
Industry	99.8	81.1	64.8	60.3	58.9	57.7	-4.1%	-4.4%	-1.5%	-2.2%	-2.1%
Transport	99.3	89.7	87.2	87.5	86.5	85.7	-2.0%	-0.6%	0.1%	-1.1%	-1.0%
Tertiary-Domestic	94.6	85.1	76.1	76.2	76.6	73.3	-2.1%	-2.2%	0.0%	0.5%	-4.3%
Energy per Capita (Kgoe/inhabitant)	5122	4856	5073	5256	5344	5367	-1.1%	0.9%	0.7%	1.7%	0.4%
Industry	1168	1023	909	877	880	881	-2.6%	-2.3%	-0.7%	0.3%	0.1%
Transport	1162	1131	1222	1273	1291	1308	-0.5%	1.6%	0.8%	1.4%	1.3%
Tertiary-Domestic	1107	1074	1067	1110	1144	1119	-0.6%	-0.1%	0.8%	3.1%	-2.1%
Electricity Share (%)											
Final Energy Consumption	15.4%	17.6%	20.0%	21.3%	21.4%	21.6%	2.8%	2.6%	1.2%	0.4%	1.2%
Industry	19.5%	22.0%	26.9%	30.3%	30.9%	31.4%	2.5%	4.1%	2.4%	1.7%	1.7%
Transport	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	1.7%	1.1%	-0.2%	-1.8%	-0.2%
Tertiary-Domestic	26.9%	31.6%	36.6%	38.1%	37.8%	38.8%	3.3%	3.0%	0.8%	-0.8%	2.6%
Total Renewable Consumption (Mtoe)	164.2	189.1	199.2	220.5	226.5	222.0	2.9%	1.1%	2.0%	2.7%	-2.0%
Hydro	68.6	75.7	77.3	85.9	89.2	88.3	2.0%	0.4%	2.1%	3.9%	-1.1%
Biomass	87.8	100.3	98.7	110.6	111.9	109.3	2.7%	-0.3%	2.3%	1.2%	-2.4%
Other	7.8	13.1	23.3	23.9	25.3	24.4	11.0%	12.2%	0.6%	5.7%	-3.4%
Renewable intensity (toe/1990MEUR)	27.6	27.7	24.9	25.1	24.9	23.6	0.1%	-2.2%	0.2%	-0.8%	-4.9%
Renewable per capita (Kgoe/inhabitant)	322.7	350.0	348.5	365.1	371.4	361.2	1.6%	-0.1%	0.9%	1.7%	-2.7%
CO_2 Emissions (Mt of CO_2)	6539.4	6529.3	7102.7	7596.9	7853.3	7962.0	0.0%	1.7%	1.4%	3.4%	1.4%
Public Thermal Power Generation	1708.2	1870.1	2091.6	2187.6	2313.2	2379.1	1.8%	2.3%	0.9%	5.7%	2.8%
Autoprod. Thermal Power Generation	51.1	37.7	117.5	295.6	316.0	316.6	-5.9%	25.5%	20.3%	6.9%	0.2%
Energy Branch	378.2	381.6	440.2	443.7	463.7	467.1	0.2%	2.9%	0.2%	4.5%	0.7%
Industry	1295.0	1134.5	1077.5	987.9	991.4	990.7	-2.6%	-1.0%	-1.7%	0.4%	-0.1%
Transport	1799.4	1860.4	2124.9	2332.0	2391.9	2440.3	0.7%	2.7%	1.9%	2.6%	2.0%
Tertiary-Domestic	1038.6	986.6	979.3	1036.0	1085.8	1062.1	-1.0%	-0.1%	1.1%	4.8%	-2.2%
Carbon Intensity (tn of CO2/toe)	2.5	2.5	2.4	2.4	2.4	2.4	-0.2%	-0.3%	-0.5%	0.7%	0.2%
Public Power Generation	2.3	2.2	2.1	2.0	2.1	2.1	-0.8%	-0.8%	-1.0%	2.9%	1.8%
Public Thermal Power Generation	3.0	3.1	3.2	3.1	3.2	3.2	0.9%	0.2%	-0.2%	2.3%	-0.3%
Autoprod. Power Generation	2.3	2.0	1.2	1.9	1.9	1.9	-2.6%	-9.4%	8.8%	0.7%	0.9%
Autoprod. Thermal Power Generation	2.9	2.7	1.4	2.1	2.1	2.1	-1.3%	-12.5%	8.2%	0.2%	0.4%
Energy Branch	0.0	2.5	2.1	3.0	3.0	3.0	-	-3.9%	7.8%	0.5%	0.2%
Industry	2.4	2.4	2.3	2.3	2.3	2.3	-0.4%	-0.4%	-0.7%	-0.1%	0.3%
Transport	2.2	2.1	2.1	1.9	1.8	1.8	-1.2%	0.2%	-2.1%	-0.9%	-1.0%
Tertiary-Domestic	3.0	3.0	3.0	3.0	3.0	3.0	0.0%	0.0%	-0.1%	0.1%	-0.1%
CO_2 per Capita (kg of CO_2/inhabitant)	12851	12087	12423	12579	12877	12954	-1.2%	0.5%	0.3%	2.4%	0.6%
Industry	2545	2100	1885	1636	1626	1612	-3.8%	-2.1%	-2.8%	-0.6%	-0.8%
Transport	3536	3444	3716	3861	3922	3970	-0.5%	1.5%	0.8%	1.6%	1.2%
Tertiary-Domestic	2041	1826	1713	1716	1780	1728	-2.2%	-1.3%	0.0%	3.8%	-2.9%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	1098	958	887	864	862	848	-2.7%	-1.5%	-0.5%	-0.2%	-1.6%
Public Thermal Power Generation	287	274	261	249	254	253	-0.9%	-1.0%	-1.0%	2.1%	-0.2%
Autoprod. Thermal Power Generation	9	6	15	34	35	34	-8.4%	21.5%	18.1%	3.2%	-2.8%
Energy Branch	0	0	0	1	1	1	-	2.4%	67.4%	18.3%	9.8%
Industry	64	56	55	50	51	50	-2.5%	-0.4%	-1.7%	0.9%	-2.3%
Transport	217	166	134	112	109	106	-5.2%	-4.2%	-3.5%	-3.1%	-3.1%
Tertiary-Domestic	302	273	265	265	263	260	-2.0%	-0.6%	0.0%	-1.0%	-1.0%

NAFTA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	1910.0	2005.5	2117.5	2215.0	2257.7	2269.6	1.0%	1.1%	0.9%	1.9%	0.5%
Solids	470.2	502.5	580.2	576.7	593.6	609.9	1.3%	2.9%	-0.1%	2.9%	2.8%
Oil	697.2	757.1	680.1	669.4	676.9	688.9	1.7%	-2.1%	-0.3%	1.1%	1.8%
Natural gas	539.7	480.0	530.1	590.0	602.6	607.8	-2.3%	2.0%	2.2%	2.1%	0.9%
Nuclear	79.8	122.3	179.5	213.8	212.7	197.9	8.9%	8.0%	3.6%	-0.5%	-6.9%
Hydro & Wind	47.0	52.8	51.3	58.6	63.9	61.2	2.3%	-0.6%	2.7%	9.0%	-4.1%
Geothermal	5.4	9.9	18.2	17.7	18.5	17.5	13.0%	12.9%	-0.5%	4.2%	-5.1%
Other	70.7	80.9	78.2	88.8	89.6	86.3	2.8%	-0.7%	2.6%	0.9%	-3.6%
Net Imports	246.0	68.9	215.4	249.4	274.3	307.4	-22.5%	25.6%	3.0%	10.0%	12.1%
Solids	-56.0	-64.9	-76.3	-65.3	-65.9	-60.9	3.0%	3.3%	-3.1%	1.0%	-7.7%
Oil	301.1	134.8	290.7	315.3	339.7	367.4	-14.8%	16.6%	1.6%	7.8%	8.1%
Crude oil	265.3	108.3	269.8	317.6	329.4	354.5	-16.4%	20.0%	3.3%	3.7%	7.6%
Oil products	35.9	26.5	20.9	-2.3	10.4	12.9	-5.9%	-4.6%	-	-	24.6%
Natural gas	0.9	-1.0	1.0	-0.7	0.4	0.5	-	-	-	-	22.4%
Electricity	0.0	0.0	0.0	0.1	0.0	0.4	41.3%	-19.7%	35.7%	-43.5%	833.3%
Gross Inland Consumption	2103.6	2086.5	2259.6	2454.4	2511.9	2541.7	-0.2%	1.6%	1.7%	2.3%	1.2%
Solids	399.9	454.5	484.3	506.1	529.8	547.3	2.6%	1.3%	0.9%	4.7%	3.3%
Oil	959.3	880.5	931.3	968.3	995.1	1023.5	-1.7%	1.1%	0.8%	2.8%	2.9%
Natural gas	541.5	485.5	516.8	600.9	602.4	607.5	-2.2%	1.3%	3.1%	0.2%	0.9%
Other (1)	202.9	266.0	327.2	379.0	384.6	363.3	5.6%	4.2%	3.0%	1.5%	-5.5%
Electricity Generation in TWh	2867.6	3173.8	3786.2	4273.3	4390.8	4420.7	2.1%	3.6%	2.4%	2.8%	0.7%
Nuclear	304.2	467.2	687.4	820.1	815.9	759.3	9.0%	8.0%	3.6%	-0.5%	-6.9%
Hydro & wind	546.8	613.9	596.4	681.2	742.8	712.1	2.3%	-0.6%	2.7%	9.0%	-4.1%
Thermal	2016.5	2092.7	2502.3	2772.0	2832.2	2949.2	0.7%	3.6%	2.1%	2.2%	4.1%
Generation Capacity in GWe	701.6	823.3	866.0	923.5	932.4	944.0	3.3%	1.0%	1.3%	1.0%	1.3%
Nuclear	62.4	92.7	113.9	116.8	118.1	119.3	8.3%	4.2%	0.5%	1.1%	1.0%
Hydro & wind	130.5	147.3	159.6	173.9	174.6	175.4	2.5%	1.6%	1.7%	0.4%	0.5%
Thermal	508.7	583.3	592.5	632.8	639.7	649.4	2.8%	0.3%	1.3%	1.1%	1.5%
Average Load Factor in %	46.7	44.0	49.9	52.8	53.8	53.5	-1.2%	2.6%	1.1%	1.8%	-0.6%
Fuel Inputs for Thermal Power Generation	476.5	498.3	608.7	689.5	714.2	737.1	0.9%	4.1%	2.5%	3.6%	3.2%
Solids	307.1	374.1	408.9	460.4	485.8	499.7	4.0%	1.8%	2.4%	5.5%	2.9%
Oil	73.5	39.3	46.6	33.9	36.1	41.3	-11.8%	3.5%	-6.2%	6.5%	14.5%
Gas	90.2	74.3	95.0	136.1	130.1	135.1	-3.8%	5.0%	7.4%	-4.4%	3.9%
Geothermal	5.4	9.9	18.2	17.7	18.5	17.5	13.0%	12.9%	-0.5%	4.2%	-5.1%
Other	0.3	0.7	40.0	41.4	43.8	43.4	15.5%	124.7%	0.7%	5.9%	-0.9%
Average Thermal Efficiency in %	36.4	36.1	35.3	34.6	34.1	34.4	-0.2%	-0.4%	-0.4%	-1.4%	0.9%
Non-Energy Uses	112.6	105.3	130.5	136.8	146.0	151.9	-1.3%	4.4%	0.9%	6.8%	4.0%
Total Final Energy Demand	1432.2	1405.6	1433.5	1530.3	1569.7	1577.5	-0.4%	0.4%	1.3%	2.6%	0.5%
Solids	62.0	63.2	61.1	33.0	30.9	31.1	0.4%	-0.7%	-11.6%	-6.5%	0.6%
Oil	711.5	680.7	706.0	742.7	759.4	770.8	-0.9%	0.7%	1.0%	2.2%	1.5%
Gas	382.2	347.2	354.6	388.4	404.4	398.7	-1.9%	0.4%	1.8%	4.1%	-1.4%
Electricity	205.2	232.0	270.9	310.2	320.4	324.9	2.5%	3.2%	2.7%	3.3%	1.4%
Heat	1.0	2.2	2.2	7.8	8.1	8.4	16.3%	-0.2%	29.1%	3.6%	3.1%
Other	70.3	80.2	38.7	48.2	46.5	43.6	2.7%	-13.6%	4.5%	-3.5%	-6.2%
CO_2 Emissions in Mt of CO_2	5364.0	5303.5	5654.1	6001.2	6193.1	6298.8	-0.2%	1.3%	1.2%	3.2%	1.7%
Indicators											
Population (Million)	319.10	339.13	360.29	383.27	387.53	390.64	1.2%	1.2%	1.2%	1.1%	0.8%
GDP (index 1985=100)	88.6	100.0	114.4	126.4	130.7	136.0	2.5%	2.7%	2.0%	3.4%	4.0%
Gross Inl Cons./GDP (toe/1990 MEUR)	541.1	475.5	450.2	442.6	438.0	426.0	-2.6%	-1.1%	-0.3%	-1.1%	-2.7%
Gross Inl Cons./Capita (toe/inhabitant)	6.59	6.15	6.27	6.40	6.48	6.51	-1.4%	0.4%	0.4%	1.2%	0.4%
Electricity Generated/Capita (kWh/inhabitant)	8986	9359	10509	11149	11330	11317	0.8%	2.3%	1.2%	1.6%	-0.1%
CO_2 Emissions/Capita (t of CO_2/inhabitant)	16.8	15.6	15.7	15.7	16.0	16.1	-1.4%	0.1%	0.0%	2.1%	0.9%
Import Dependency (%)	11.5	3.3	9.4	10.0	10.8	12.0	-22.3%	23.5%	1.3%	7.5%	10.9%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

NAFTA : MAIN INDICATORS

	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	9796
							Annual % Change				
Gross Inland Consumption (Mtoe)	2103.6	2086.5	2259.6	2454.4	2511.9	2541.7	-0.2%	1.6%	1.7%	2.3%	1.2%
Public Thermal Power Generation	470.1	487.1	525.8	552.7	568.2	594.3	0.7%	1.5%	1.0%	2.8%	4.6%
Autoprod. Thermal Power Generation	1.0	1.3	65.0	119.4	127.9	125.7	5.7%	118.1%	12.9%	7.2%	-1.7%
Energy Branch	130.6	132.1	155.9	159.1	167.1	166.7	0.2%	3.4%	0.4%	5.0%	-0.3%
Final Energy Consumption	1432.2	1405.5	1433.0	1528.9	1568.1	1575.8	-0.4%	0.4%	1.3%	2.6%	0.5%
Industry	465.3	423.1	378.6	383.0	385.7	388.3	-1.9%	-2.2%	0.2%	0.7%	0.7%
Transport	502.2	515.5	577.8	629.3	642.7	656.9	0.5%	2.3%	1.7%	2.1%	2.2%
Tertiary-Domestic	464.7	467.0	476.7	516.6	539.7	530.6	0.1%	0.4%	1.6%	4.5%	-1.7%
Energy Intensity (toe/1990 MEUR)	541.1	475.5	450.2	442.6	438.0	426.0	-2.6%	-1.1%	-0.3%	-1.1%	-2.7%
Public Thermal Power Generation	120.9	111.0	104.7	99.7	99.1	99.6	-1.7%	-1.2%	-1.0%	-0.6%	0.5%
Autoprod. Thermal Power Generation	0.3	0.3	12.9	21.5	22.3	21.1	3.2%	112.3%	10.7%	3.6%	-5.5%
Industry	119.7	96.4	75.4	69.1	67.3	65.1	-4.2%	-4.8%	-1.7%	-2.6%	-3.2%
Transport	129.2	117.5	115.1	113.5	112.1	110.1	-1.9%	-0.4%	-0.3%	-1.2%	-1.8%
Tertiary-Domestic	119.5	106.4	95.0	93.2	94.1	88.9	-2.3%	-2.2%	-0.4%	1.0%	-5.5%
Energy per Capita (Kgoe/inhabitant)	6592	6153	6272	6404	6482	6506	-1.4%	0.4%	0.4%	1.2%	0.4%
Industry	1458	1248	1051	999	995	994	-3.1%	-3.4%	-1.0%	-0.4%	-0.1%
Transport	1574	1520	1604	1642	1659	1682	-0.7%	1.1%	0.5%	1.0%	1.4%
Tertiary-Domestic	1456	1377	1323	1348	1393	1358	-1.1%	-0.8%	0.4%	3.3%	-2.5%
Electricity Share (%)											
Final Energy Consumption	14.3%	16.5%	18.9%	20.3%	20.4%	20.6%	2.9%	2.8%	1.4%	0.7%	0.9%
Industry	16.9%	19.7%	24.7%	29.0%	29.8%	30.4%	3.2%	4.6%	3.3%	2.8%	1.8%
Transport	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	4.3%	-0.1%	-0.6%	-1.4%	2.8%
Tertiary-Domestic	27.2%	31.7%	37.1%	38.4%	37.9%	38.8%	3.1%	3.2%	0.7%	-1.2%	2.5%
Total Renewable Consumption (Mtoe)	123.1	143.6	147.7	165.2	171.9	165.1	3.1%	0.6%	2.3%	4.1%	-4.0%
Hydro	47.0	52.8	51.0	58.2	63.5	60.9	2.3%	-0.7%	2.7%	9.1%	-4.1%
Biomass	70.7	80.9	78.2	88.9	89.6	86.3	2.8%	-0.7%	2.6%	0.8%	-3.7%
Other	5.4	9.9	18.4	18.1	18.8	17.9	13.0%	13.2%	-0.4%	4.3%	-5.0%
Renewable intensity (toe/1990MEUR)	31.7	32.7	29.4	29.8	30.0	27.7	0.7%	-2.1%	0.3%	0.6%	-7.7%
Renewable per capita (Kgoe/inhabitant)	385.7	423.6	409.8	431.0	443.6	422.5	1.9%	-0.7%	1.0%	2.9%	-4.8%
CO_2 Emissions (Mt of CO_2)	5364.0	5303.5	5654.1	6001.2	6193.1	6298.8	-0.2%	1.3%	1.2%	3.2%	1.7%
Public Thermal Power Generation	1433.2	1592.0	1751.7	1822.0	1925.2	1995.2	2.1%	1.9%	0.8%	5.7%	3.6%
Autoprod. Thermal Power Generation	2.1	2.6	63.8	229.8	246.5	242.4	4.7%	89.1%	29.2%	7.3%	-1.7%
Energy Branch	315.8	313.9	365.1	358.6	376.0	376.4	-0.1%	3.1%	-0.4%	4.9%	0.1%
Industry	1006.6	849.9	782.3	688.7	684.0	681.3	-3.3%	-1.6%	-2.5%	-0.7%	-0.4%
Transport	1530.7	1572.4	1760.7	1910.8	1954.8	1996.1	0.5%	2.3%	1.7%	2.3%	2.1%
Tertiary-Domestic	850.2	787.8	755.0	785.3	829.1	812.1	-1.5%	-0.8%	0.8%	5.6%	-2.1%
Carbon Intensity (tn of CO_2/toe)	2.5	2.5	2.5	2.4	2.5	2.5	-0.1%	-0.3%	-0.5%	0.8%	0.5%
Public Power Generation	2.4	2.4	2.3	2.2	2.3	2.3	-0.1%	-0.8%	-0.8%	3.2%	2.6%
Public Thermal Power Generation	3.0	3.3	3.3	3.3	3.4	3.4	1.4%	0.4%	-0.2%	2.8%	-0.9%
Autoprod. Power Generation	0.6	0.7	0.9	1.7	1.7	1.8	3.3%	4.9%	15.2%	0.4%	0.5%
Autoprod. Thermal Power Generation	2.1	2.0	1.0	1.9	1.9	1.9	-1.0%	-13.3%	14.4%	0.1%	0.1%
Energy Branch	0.0	0.0	0.0	3.1	3.1	3.1	-	-	-	0.0%	0.0%
Industry	2.4	2.4	2.3	2.3	2.2	2.3	-0.4%	-0.3%	-0.8%	-0.2%	0.4%
Transport	2.2	2.0	2.1	1.8	1.8	1.8	-1.5%	0.6%	-2.7%	-1.4%	-1.1%
Tertiary-Domestic	3.0	3.1	3.0	3.0	3.0	3.0	0.0%	0.0%	-0.1%	0.2%	-0.1%
CO_2 per Capita (kg of CO_2/inhabitant)	16810	15639	15693	15658	15981	16124	-1.4%	0.1%	0.0%	2.1%	0.9%
Industry	3155	2506	2171	1797	1765	1744	-4.5%	-2.8%	-3.7%	-1.8%	-1.2%
Transport	4797	4637	4887	4986	5044	5110	-0.7%	1.1%	0.4%	1.2%	1.3%
Tertiary-Domestic	2664	2323	2096	2049	2139	2079	-2.7%	-2.0%	-0.4%	4.4%	-2.8%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	1380	1209	1126	1082	1080	1056	-2.6%	-1.4%	-0.8%	-0.2%	-2.2%
Public Thermal Power Generation	369	363	349	329	336	334	-0.3%	-0.8%	-1.2%	2.2%	-0.4%
Autoprod. Thermal Power Generation	1	1	13	41	43	41	2.2%	84.1%	26.7%	3.7%	-5.5%
Energy Branch	0	0	0	1	2	2	-	-	-	19.3%	10.6%
Industry	81	72	73	65	66	63	-2.5%	0.3%	-2.3%	1.4%	-3.8%
Transport	259	194	156	124	119	114	-5.6%	-4.3%	-4.4%	-4.0%	-4.3%
Tertiary-Domestic	394	358	351	345	341	335	-1.9%	-0.4%	-0.4%	-1.1%	-1.8%

UNITED STATES : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	1553.3	1570.2	1648.8	1663.6	1688.5	1683.8	0.2%	1.0%	0.2%	1.5%	-0.3%
Solids	447.9	465.9	539.1	531.5	547.1	561.9	0.8%	3.0%	-0.3%	2.9%	2.7%
Oil	498.3	514.3	431.2	399.6	398.7	396.6	0.6%	-3.5%	-1.5%	-0.2%	-0.5%
Natural gas	454.6	385.9	419.2	435.7	440.2	442.1	-3.2%	1.7%	0.8%	1.0%	0.4%
Nuclear	69.4	106.0	159.4	186.0	186.4	173.7	8.8%	8.5%	3.1%	0.2%	-6.8%
Hydro & Wind	24.0	24.4	23.7	27.4	30.6	28.8	0.4%	-0.6%	2.9%	11.7%	-5.8%
Geothermal	4.6	8.5	13.8	12.8	13.5	12.8	13.1%	10.1%	-1.4%	5.4%	-5.3%
Other	54.5	65.1	62.3	70.5	72.0	67.9	3.6%	-0.9%	2.5%	2.2%	-5.8%
Net Imports	307.3	201.8	344.7	438.6	470.4	509.5	-8.1%	11.3%	4.9%	7.3%	8.3%
Solids	-57.0	-57.3	-64.8	-49.4	-51.3	-46.6	0.1%	2.5%	-5.3%	3.7%	-9.2%
Oil	340.3	235.3	376.2	422.5	453.8	486.9	-7.1%	9.8%	2.4%	7.4%	7.3%
Crude oil	299.0	202.9	350.2	419.3	440.0	475.4	-7.5%	11.5%	3.7%	4.9%	8.0%
Oil products	41.3	32.4	26.0	3.2	13.8	11.5	-4.7%	-4.3%	-34.2%	332.6%	-16.8%
Natural gas	21.7	20.3	33.2	62.2	64.6	65.9	-1.3%	10.3%	13.4%	3.7%	2.0%
Electricity	2.3	3.5	0.2	3.2	3.3	3.3	8.9%	-45.4%	80.0%	1.1%	1.3%
Gross Inland Consumption	1811.7	1781.7	1925.7	2089.7	2140.1	2162.2	-0.3%	1.6%	1.6%	2.4%	1.0%
Solids	376.2	425.7	456.7	475.3	497.5	513.3	2.5%	1.4%	0.8%	4.7%	3.2%
Oil	803.9	736.8	770.3	805.8	832.5	854.5	-1.7%	0.9%	0.9%	3.3%	2.6%
Natural gas	476.8	411.7	439.4	508.5	504.3	508.0	-2.9%	1.3%	3.0%	-0.8%	0.7%
Other (1)	154.7	207.5	259.3	300.1	305.8	286.4	6.0%	4.6%	3.0%	1.9%	-6.3%
Electricity Generation in TWh	2427.3	2621.9	3181.5	3558.4	3651.2	3670.6	1.6%	3.9%	2.3%	2.6%	0.5%
Nuclear	266.2	406.7	611.6	713.8	715.2	666.4	8.8%	8.5%	3.1%	0.2%	-6.8%
Hydro & wind	278.8	284.0	273.2	314.1	350.9	330.2	0.4%	-0.8%	2.8%	11.7%	-5.9%
Thermal	1882.4	1931.3	2296.8	2530.5	2585.1	2674.1	0.5%	3.5%	2.0%	2.2%	3.4%
Generation Capacity in GWe	603.1	701.9	733.3	771.4	778.3	788.3	3.1%	0.9%	1.0%	0.9%	1.3%
Nuclear	56.5	81.6	99.6	99.1	100.4	101.6	7.6%	4.1%	-0.1%	1.3%	1.1%
Hydro & wind	76.7	85.0	92.4	100.2	100.3	99.9	2.1%	1.7%	1.6%	0.1%	-0.4%
Thermal	470.0	535.3	541.3	572.0	577.6	586.9	2.6%	0.2%	1.1%	1.0%	1.6%
Average Load Factor in %	45.9	42.6	49.5	52.7	53.6	53.2	-1.5%	3.0%	1.2%	1.7%	-0.8%
Fuel Inputs for Thermal Power Generation	442.9	458.8	558.1	632.1	655.9	672.7	0.7%	4.0%	2.5%	3.8%	2.6%
Solids	292.0	353.7	387.6	435.8	460.2	472.7	3.9%	1.9%	2.4%	5.6%	2.7%
Oil	60.6	25.1	27.3	15.2	16.9	18.9	-16.2%	1.7%	-11.1%	11.8%	11.5%
Gas	85.6	71.2	89.7	127.2	121.8	125.2	-3.6%	4.7%	7.2%	-4.3%	2.8%
Geothermal	4.6	8.5	13.8	12.8	13.5	12.8	13.1%	10.1%	-1.4%	5.4%	-5.3%
Other	0.1	0.4	39.7	41.1	43.5	43.1	26.6%	157.0%	0.7%	5.9%	-1.0%
Average Thermal Efficiency in %	36.6	36.2	35.4	34.4	33.9	34.2	-0.2%	-0.5%	-0.6%	-1.6%	0.9%
Non-Energy Uses	96.2	82.4	107.2	112.3	120.4	126.4	-3.0%	5.4%	0.9%	7.2%	5.1%
Total Final Energy Demand	1223.7	1196.3	1207.2	1281.7	1317.1	1320.5	-0.5%	0.2%	1.2%	2.8%	0.3%
Solids	56.2	57.4	56.6	28.0	25.8	25.8	0.4%	-0.3%	-13.1%	-7.7%	-0.2%
Oil	601.5	582.4	596.3	628.0	644.6	652.9	-0.6%	0.5%	1.0%	2.6%	1.3%
Gas	337.4	296.6	303.0	326.4	340.8	336.5	-2.5%	0.4%	1.5%	4.4%	-1.3%
Electricity	174.2	193.8	226.5	261.6	269.0	272.2	2.2%	3.2%	2.9%	2.8%	1.2%
Heat	0.0	1.4	1.7	7.5	7.6	7.6	-	3.9%	34.8%	1.6%	0.3%
Other	54.4	64.7	23.1	30.2	29.3	25.5	3.6%	-18.6%	5.5%	-3.1%	-12.9%
CO_2 Emissions in Mt of CO_2	4720.6	4650.8	4930.3	5214.2	5388.0	5464.2	-0.3%	1.2%	1.1%	3.3%	1.4%
Indicators											
Population (Million)	227.73	238.47	249.91	263.17	265.56	266.79	0.9%	0.9%	1.0%	0.9%	0.5%
GDP (index 1985=100)	88.6	100.0	114.6	127.1	131.6	136.8	2.4%	2.8%	2.1%	3.6%	3.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	537.0	468.0	441.4	431.9	427.1	415.2	-2.7%	-1.2%	-0.4%	-1.1%	-2.8%
Gross Inl Cons./Capita (toe/inhabitant)	7.96	7.47	7.71	7.94	8.06	8.10	-1.2%	0.6%	0.6%	1.5%	0.6%
Electricity Generated/Capita (kWh/inhabitant)	10659	10995	12731	13521	13749	13758	0.6%	3.0%	1.2%	1.7%	0.1%
CO_2 Emissions/Capita (t of CO_2/inhabitant)	20.7	19.5	19.7	19.8	20.3	20.5	-1.2%	0.2%	0.1%	2.4%	0.9%
Import Dependency (%)	16.7	11.2	17.6	20.7	21.7	23.3	-7.7%	9.5%	3.3%	4.8%	7.4%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

OECD PACIFIC : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	139.1	201.9	244.9	298.2	305.7	320.3	7.7%	3.9%	4.0%	2.5%	4.8%
Solids	64.6	92.1	112.3	133.4	135.7	143.3	7.3%	4.0%	3.5%	1.7%	5.6%
Oil	22.2	29.7	31.2	30.6	30.7	31.8	6.0%	1.0%	-0.3%	0.3%	3.5%
Natural gas	10.2	16.2	22.8	30.8	32.0	32.3	9.7%	7.1%	6.2%	4.0%	0.8%
Nuclear	21.5	41.6	52.7	75.9	78.8	83.1	14.1%	4.9%	7.6%	3.8%	5.6%
Hydro & Wind	10.4	10.0	11.0	10.9	10.6	11.3	-0.6%	1.8%	-0.2%	-2.5%	6.2%
Geothermal	1.8	2.3	3.7	4.6	5.1	5.1	4.8%	10.1%	4.6%	11.6%	0.0%
Other	8.4	10.0	11.3	12.1	12.8	13.4	3.6%	2.5%	1.3%	5.6%	4.8%
Net Imports	305.7	257.1	306.8	318.9	330.0	324.3	-3.4%	3.6%	0.8%	3.5%	-1.7%
Solids	19.0	8.5	1.1	-10.4	-9.6	-12.4	-14.9%	-33.8%	-	-7.1%	29.3%
Oil	267.2	215.7	266.4	287.5	294.2	292.4	-4.2%	4.3%	1.5%	2.3%	-0.6%
Crude oil	236.4	174.5	205.5	242.8	242.5	247.8	-5.9%	3.3%	3.4%	-0.1%	2.2%
Oil products	30.8	41.2	60.9	44.7	51.7	44.6	6.0%	8.2%	-6.0%	15.5%	-13.8%
Natural gas	19.5	33.0	39.3	41.8	45.4	44.4	11.0%	3.6%	1.2%	8.8%	-2.3%
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Gross Inland Consumption	430.4	452.4	540.1	607.0	627.8	633.2	1.0%	3.6%	2.4%	3.4%	0.9%
Solids	87.9	104.2	110.1	121.3	126.6	130.2	3.5%	1.1%	2.0%	4.4%	2.9%
Oil	270.8	235.1	289.4	309.6	316.7	313.5	-2.8%	4.2%	1.4%	2.3%	-1.0%
Natural gas	29.7	49.2	61.9	72.6	77.3	76.6	10.7%	4.7%	3.2%	6.4%	-0.9%
Other (1)	42.1	63.9	78.7	103.4	107.2	112.9	8.7%	4.2%	5.6%	3.7%	5.3%
Electricity Generation in TWh	698.9	814.5	1037.4	1189.3	1214.5	1248.8	3.1%	5.0%	2.8%	2.1%	2.8%
Nuclear	82.6	159.6	202.3	291.3	302.2	319.1	14.1%	4.9%	7.6%	3.8%	5.6%
Hydro & wind	120.2	116.2	126.8	125.3	122.2	129.8	-0.7%	1.8%	-0.2%	-2.5%	6.3%
Thermal	496.1	538.7	708.3	772.7	790.1	799.9	1.7%	5.6%	1.8%	2.2%	1.2%
Generation Capacity in GWe	175.3	211.0	237.9	273.9	280.6	289.3	3.8%	2.4%	2.9%	2.5%	3.1%
Nuclear	15.7	24.7	31.6	40.5	41.9	42.7	9.5%	5.1%	5.1%	3.3%	2.0%
Hydro & wind	39.9	45.9	49.7	56.3	56.3	56.5	2.9%	1.6%	2.5%	0.1%	0.3%
Thermal	119.7	140.5	156.6	177.1	182.4	190.1	3.2%	2.2%	2.5%	3.0%	4.2%
Average Load Factor in %	45.5	44.1	49.8	49.6	49.4	49.3	-0.6%	2.5%	-0.1%	-0.3%	-0.2%
Fuel Inputs for Thermal Power Generation	113.2	115.7	147.2	158.5	166.6	163.5	0.4%	4.9%	1.5%	5.1%	-1.9%
Solids	30.8	44.3	54.2	65.7	71.3	74.1	7.5%	4.1%	3.9%	8.5%	3.9%
Oil	61.5	37.3	49.2	43.2	43.2	37.9	-9.5%	5.7%	-2.6%	0.1%	-12.4%
Gas	17.4	29.4	36.5	41.0	42.9	42.0	11.0%	4.4%	2.3%	4.4%	-1.9%
Geothermal	1.8	2.3	3.4	4.1	4.6	4.6	4.8%	8.5%	3.8%	12.0%	-0.3%
Other	1.7	2.3	3.9	4.4	4.6	4.9	6.8%	10.6%	2.8%	3.9%	6.4%
Average Thermal Efficiency in %	37.7	40.0	41.4	41.9	40.8	42.1	1.2%	0.7%	0.3%	-2.7%	3.2%
Non-Energy Uses	32.1	31.9	41.5	48.6	49.2	51.2	-0.1%	5.4%	3.2%	1.2%	4.0%
Total Final Energy Demand	258.3	273.0	321.0	357.6	366.2	369.3	1.1%	3.3%	2.2%	2.4%	0.8%
Solids	26.4	28.0	27.8	27.3	26.6	26.8	1.2%	-0.1%	-0.3%	-2.6%	0.6%
Oil	157.3	156.6	182.7	202.0	207.0	206.6	-0.1%	3.1%	2.0%	2.5%	-0.2%
Gas	15.1	19.3	23.9	29.7	31.2	31.8	4.9%	4.4%	4.5%	5.0%	1.7%
Electricity	52.6	61.3	78.6	89.9	92.1	94.5	3.1%	5.1%	2.7%	2.5%	2.6%
Heat	0.1	0.1	0.5	0.9	1.0	1.0	6.2%	28.0%	13.3%	7.7%	6.0%
Other	6.7	7.7	7.5	7.7	8.3	8.6	2.7%	-0.5%	0.5%	6.6%	3.9%
CO_2 Emissions in Mt of CO_2	1034.3	1061.2	1249.7	1364.7	1409.6	1404.2	0.5%	3.3%	1.8%	3.3%	-0.4%
Indicators											
Population (Million)	134.64	139.81	143.97	147.30	147.89	148.46	0.8%	0.6%	0.5%	0.4%	0.4%
GDP (index 1985=100)	84.8	100.0	124.2	134.5	139.7	141.2	3.3%	4.4%	1.6%	3.9%	1.0%
Gross Inl Cons./GDP (toe/1990 MEUR)	242.5	216.2	207.8	215.7	214.8	214.4	-2.3%	-0.8%	0.8%	-0.4%	-0.2%
Gross Inl Cons./Capita (toe/inhabitant)	3.20	3.24	3.75	4.12	4.25	4.27	0.2%	3.0%	1.9%	3.0%	0.5%
Electricity Generated/Capita (kWh/inhabitant)	5191	5826	7206	8074	8212	8412	2.3%	4.3%	2.3%	1.7%	2.4%
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.7	7.6	8.7	9.3	9.5	9.5	-0.2%	2.7%	1.3%	2.9%	-0.8%
Import Dependency (%)	68.9	55.8	56.2	51.9	52.1	50.7	-4.1%	0.1%	-1.6%	0.4%	-2.7%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

OECD PACIFIC : MAIN INDICATORS

	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	9796
							Annual % Change				
Gross Inland Consumption (Mtoe)	430.4	452.4	540.1	607.0	627.8	633.2	1.0%	3.6%	2.4%	3.4%	0.9%
Public Thermal Power Generation	95.5	101.9	125.6	132.4	139.1	134.4	1.3%	4.3%	1.1%	5.0%	-3.3%
Autoprod. Thermal Power Generation	15.9	11.5	18.2	22.0	23.0	24.4	-6.3%	9.6%	3.8%	4.4%	6.5%
Energy Branch	21.2	23.3	26.2	29.3	30.2	30.9	2.0%	2.3%	2.3%	2.9%	2.2%
Final Energy Consumption	258.3	273.0	321.0	357.5	366.1	369.3	1.1%	3.3%	2.2%	2.4%	0.8%
Industry	111.8	110.4	120.2	124.2	125.9	126.8	-0.2%	1.7%	0.7%	1.3%	0.7%
Transport	75.7	80.1	100.5	116.3	120.5	123.3	1.1%	4.7%	3.0%	3.6%	2.3%
Tertiary-Domestic	70.9	82.6	100.3	117.0	119.7	119.2	3.1%	3.9%	3.1%	2.3%	-0.4%
Energy Intensity (toe/1990 MEUR)	242.5	216.2	207.8	215.7	214.8	214.4	-2.3%	-0.8%	0.8%	-0.4%	-0.2%
Public Thermal Power Generation	53.8	48.7	48.3	47.0	47.6	45.5	-2.0%	-0.1%	-0.5%	1.1%	-4.3%
Autoprod. Thermal Power Generation	9.0	5.5	7.0	7.8	7.9	8.3	-9.3%	4.9%	2.2%	0.5%	5.4%
Industry	63.0	52.7	46.2	44.2	43.1	42.9	-3.5%	-2.6%	-0.9%	-2.5%	-0.3%
Transport	42.6	38.3	38.7	41.3	41.2	41.7	-2.1%	0.2%	1.3%	-0.3%	1.2%
Tertiary-Domestic	39.9	39.5	38.6	41.6	40.9	40.3	-0.2%	-0.5%	1.5%	-1.5%	-1.5%
Energy per Capita (Kgoe/inhabitant)	3197	3236	3752	4121	4245	4265	0.2%	3.0%	1.9%	3.0%	0.5%
Industry	830	789	835	844	851	854	-1.0%	1.1%	0.2%	0.9%	0.3%
Transport	562	573	698	790	815	830	0.4%	4.0%	2.5%	3.2%	1.9%
Tertiary-Domestic	527	591	696	794	809	803	2.3%	3.3%	2.7%	1.9%	-0.8%
Electricity Share (%)											
Final Energy Consumption	20.4%	22.5%	24.5%	25.1%	25.2%	25.6%	2.0%	1.7%	0.5%	0.1%	1.7%
Industry	28.3%	28.2%	32.0%	32.8%	33.1%	33.6%	-0.1%	2.6%	0.5%	0.9%	1.5%
Transport	1.8%	1.9%	1.9%	1.7%	1.7%	1.7%	0.5%	-0.2%	-1.3%	-3.5%	-0.8%
Tertiary-Domestic	27.6%	34.8%	38.1%	40.3%	40.5%	41.8%	4.7%	1.8%	1.1%	0.4%	3.3%
Total Renewable Consumption (Mtoe)	20.6	22.3	26.0	27.5	28.5	29.8	1.7%	3.1%	1.2%	3.4%	4.5%
Hydro	10.3	10.0	10.9	10.8	10.5	11.2	-0.7%	1.8%	-0.2%	-2.5%	6.3%
Biomass	8.4	10.0	11.3	12.1	12.8	13.4	3.6%	2.5%	1.3%	5.6%	4.8%
Other	1.8	2.3	3.8	4.7	5.2	5.2	5.0%	10.1%	4.5%	11.5%	0.1%
Renewable intensity (toe/1990MEUR)	11.6	10.7	10.0	9.8	9.7	10.1	-1.6%	-1.3%	-0.4%	-0.4%	3.4%
Renewable per capita (Kgoe/inhabitant)	152.7	159.7	180.5	187.0	192.6	200.5	0.9%	2.5%	0.7%	3.0%	4.1%
CO_2 Emissions (Mt of CO_2)	1034.3	1061.2	1249.7	1364.7	1409.6	1404.2	0.5%	3.3%	1.8%	3.3%	-0.4%
Public Thermal Power Generation	265.0	258.8	317.7	333.2	352.8	344.6	-0.5%	4.2%	1.0%	5.9%	-2.3%
Autoprod. Thermal Power Generation	46.4	31.4	49.2	60.4	63.4	67.2	-7.5%	9.4%	4.2%	4.9%	6.0%
Energy Branch	54.8	58.5	62.1	67.3	69.1	70.6	1.3%	1.2%	1.6%	2.6%	2.1%
Industry	251.2	246.5	253.9	256.5	256.0	255.0	-0.4%	0.6%	0.2%	-0.2%	-0.4%
Transport	228.0	241.1	302.7	350.7	363.6	372.0	1.1%	4.7%	3.0%	3.7%	2.3%
Tertiary-Domestic	145.5	151.5	173.5	194.8	198.8	192.4	0.8%	2.8%	2.3%	2.1%	-3.2%
Carbon Intensity (tn of CO_2/toe)	2.4	2.3	2.3	2.2	2.2	2.2	-0.5%	-0.3%	-0.6%	-0.1%	-1.2%
Public Power Generation	2.1	1.7	1.7	1.5	1.5	1.5	-4.1%	-0.2%	-2.0%	1.4%	-2.5%
Public Thermal Power Generation	2.8	2.5	2.5	2.5	2.5	2.6	-1.7%	-0.1%	-0.1%	0.8%	1.0%
Autoprod. Power Generation	2.8	2.5	2.6	2.6	2.6	2.6	-2.0%	0.3%	0.4%	1.2%	0.2%
Autoprod. Thermal Power Generation	2.9	2.7	2.7	2.7	2.8	2.7	-1.3%	-0.2%	0.3%	0.5%	-0.5%
Energy Branch	0.0	2.9	2.8	2.7	2.6	2.6	-	-0.6%	-1.0%	-0.7%	-0.2%
Industry	2.6	2.5	2.4	2.3	2.3	2.3	-0.6%	-1.1%	-0.6%	-0.3%	-0.1%
Transport	2.2	2.2	2.1	2.1	2.0	2.0	-0.1%	-1.1%	-0.4%	-1.5%	-1.1%
Tertiary-Domestic	3.0	3.0	3.0	3.0	3.0	3.0	0.0%	0.0%	0.0%	0.1%	0.0%
CO_2 per Capita (kg of CO_2/inhabitant)	7682	7590	8680	9265	9531	9459	-0.2%	2.7%	1.3%	2.9%	-0.8%
Industry	1866	1763	1763	1742	1731	1718	-1.1%	0.0%	-0.2%	-0.6%	-0.7%
Transport	1693	1724	2102	2381	2459	2506	0.4%	4.0%	2.5%	3.3%	1.9%
Tertiary-Domestic	1081	1083	1205	1322	1344	1296	0.0%	2.2%	1.9%	1.7%	-3.6%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	583	507	481	485	482	475	-2.7%	-1.1%	0.2%	-0.6%	-1.4%
Public Thermal Power Generation	149	124	122	118	121	117	-3.7%	-0.2%	-0.6%	1.9%	-3.3%
Autoprod. Thermal Power Generation	26	15	19	21	22	23	-10.5%	4.8%	2.5%	1.0%	4.9%
Energy Branch	0	0	0	0	0	0	-	1.0%	5.8%	-1.3%	-0.3%
Industry	31	28	24	24	24	24	-2.0%	-3.1%	0.0%	-1.2%	1.1%
Transport	142	118	98	91	88	86	-3.6%	-3.7%	-1.4%	-4.0%	-1.4%
Tertiary-Domestic	128	115	116	125	124	126	-2.2%	0.2%	1.4%	-0.2%	1.2%

JAPAN : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	47.5	67.7	75.6	99.1	102.5	107.0	7.3%	2.2%	5.6%	3.4%	4.4%
Solids	10.9	9.6	4.6	3.5	3.6	2.4	-2.5%	-13.8%	-5.5%	3.5%	-34.0%
Oil	0.5	0.6	0.6	0.8	0.8	0.8	2.5%	0.8%	5.9%	-2.2%	0.5%
Natural gas	1.9	2.0	1.8	1.9	2.0	2.0	0.3%	-1.7%	1.6%	1.0%	2.2%
Nuclear	21.5	41.6	52.7	75.9	78.8	83.1	14.1%	4.9%	7.6%	3.8%	5.6%
Hydro & Wind	7.6	7.1	7.7	7.1	6.9	7.7	-1.3%	1.5%	-1.7%	-1.9%	11.5%
Geothermal	0.8	1.3	1.5	2.9	3.4	3.5	10.7%	3.1%	14.3%	16.5%	2.6%
Other	4.3	5.5	6.7	7.0	7.0	7.5	5.2%	4.1%	0.7%	1.1%	5.9%
Net Imports	318.8	308.4	369.3	404.6	415.6	416.5	-0.7%	3.7%	1.8%	2.7%	0.2%
Solids	47.5	63.4	69.0	79.0	81.5	83.2	5.9%	1.7%	2.7%	3.2%	2.1%
Oil	251.7	212.1	258.7	275.6	279.9	280.3	-3.4%	4.1%	1.3%	1.6%	0.1%
Crude oil	223.0	172.2	198.5	232.1	229.1	236.2	-5.0%	2.9%	3.2%	-1.3%	3.1%
Oil products	28.7	39.9	60.2	43.5	50.8	44.1	6.8%	8.6%	-6.3%	17.0%	-13.2%
Natural gas	19.5	33.0	41.7	50.0	54.3	53.0	11.0%	4.8%	3.7%	8.5%	-2.3%
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Gross Inland Consumption	350.8	367.0	438.8	497.0	510.4	514.9	0.9%	3.6%	2.5%	2.7%	0.9%
Solids	59.6	73.0	74.0	82.6	84.6	86.5	4.1%	0.3%	2.2%	2.5%	2.2%
Oil	235.6	203.6	252.9	269.6	273.5	271.6	-2.9%	4.4%	1.3%	1.5%	-0.7%
Natural gas	21.4	35.0	43.3	52.0	56.1	54.9	10.3%	4.3%	3.8%	7.8%	-2.0%
Other (1)	34.2	55.5	68.6	92.9	96.1	101.8	10.2%	4.3%	6.2%	3.5%	5.9%
Electricity Generation in TWh	581.0	666.9	850.8	980.8	1000.4	1029.5	2.8%	5.0%	2.9%	2.0%	2.9%
Nuclear	82.6	159.6	202.3	291.3	302.2	319.1	14.1%	4.9%	7.6%	3.8%	5.6%
Hydro & wind	88.3	82.9	89.3	82.1	80.5	89.8	-1.3%	1.5%	-1.7%	-1.9%	11.5%
Thermal	410.2	424.5	559.2	607.4	617.7	620.6	0.7%	5.7%	1.7%	1.7%	0.5%
Generation Capacity in GWe	143.7	169.4	194.7	226.5	231.2	236.5	3.3%	2.8%	3.1%	2.0%	2.3%
Nuclear	15.7	24.7	31.6	40.5	41.9	42.7	9.5%	5.1%	5.1%	3.3%	2.0%
Hydro & wind	29.8	34.3	37.8	43.8	43.8	43.8	2.9%	2.0%	3.0%	0.0%	0.2%
Thermal	98.3	110.3	125.3	142.3	145.5	149.9	2.3%	2.6%	2.6%	2.3%	3.0%
Average Load Factor in %	46.1	45.0	49.9	49.4	49.4	49.7	-0.5%	2.1%	-0.2%	0.0%	0.6%
Fuel Inputs for Thermal Power Generation	88.7	85.9	110.0	119.7	124.4	119.6	-0.6%	5.1%	1.7%	3.9%	-3.8%
Solids	10.5	20.5	25.3	34.6	36.9	38.1	14.3%	4.3%	6.5%	6.6%	3.4%
Oil	60.3	36.4	48.4	42.4	42.5	37.3	-9.6%	5.9%	-2.6%	0.1%	-12.2%
Gas	15.6	25.7	31.8	36.4	38.2	37.1	10.5%	4.4%	2.7%	5.0%	-3.0%
Geothermal	0.8	1.3	1.5	2.7	3.2	3.2	10.7%	3.1%	12.8%	15.8%	2.2%
Other	1.5	2.1	3.0	3.5	3.6	3.9	6.8%	7.9%	3.1%	3.1%	7.6%
Average Thermal Efficiency in %	39.8	42.5	43.7	43.7	42.7	44.6	1.3%	0.6%	0.0%	-2.2%	4.5%
Non-Energy Uses	29.1	28.0	36.8	43.0	43.1	45.2	-0.7%	5.6%	3.1%	0.4%	4.7%
Total Final Energy Demand	206.7	218.3	257.7	287.3	293.8	295.3	1.1%	3.4%	2.2%	2.3%	0.5%
Solids	21.4	22.8	22.5	22.0	21.5	21.7	1.3%	-0.3%	-0.5%	-2.4%	1.0%
Oil	128.6	129.3	151.5	167.4	171.2	170.0	0.1%	3.2%	2.0%	2.3%	-0.7%
Gas	9.7	11.8	14.7	19.1	20.5	20.8	3.9%	4.6%	5.3%	7.4%	1.5%
Electricity	44.1	50.8	65.1	74.8	76.6	78.5	2.9%	5.1%	2.8%	2.4%	2.5%
Heat	0.1	0.1	0.2	0.6	0.6	0.7	6.2%	7.9%	22.8%	13.6%	8.4%
Other	2.8	3.4	3.7	3.5	3.4	3.6	4.3%	1.5%	-1.4%	-0.9%	3.9%
CO_2 Emissions in Mt of CO_2	812.2	821.2	966.9	1058.6	1085.7	1071.3	0.2%	3.3%	1.8%	2.6%	-1.3%
Indicators											
Population (Million)	116.80	120.75	123.54	125.57	125.86	126.17	0.7%	0.5%	0.3%	0.2%	0.2%
GDP (index 1985=100)	84.7	100.0	125.4	134.7	140.0	141.2	3.4%	4.6%	1.4%	3.9%	0.8%
Gross Inl Cons./GDP (toe/1990 MEUR)	222.5	197.2	188.1	198.3	195.9	196.0	-2.4%	-0.9%	1.1%	-1.2%	0.0%
Gross Inl Cons./Capita (toe/inhabitant)	3.00	3.04	3.55	3.96	4.05	4.08	0.2%	3.2%	2.2%	2.4%	0.6%
Electricity Generated/Capita (kWh/inhabitant)	4975	5523	6886	7811	7949	8160	2.1%	4.5%	2.6%	1.8%	2.7%
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.0	6.8	7.8	8.4	8.6	8.5	-0.4%	2.9%	1.5%	2.3%	-1.6%
Import Dependency (%)	88.0	82.4	83.2	80.4	80.8	80.1	-1.3%	0.2%	-0.7%	0.4%	-0.8%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

EFTA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	63.6	83.4	131.2	194.7	220.5	225.1	5.6%	9.5%	8.2%	13.2%	2.1%
Solids	0.2	0.4	0.2	0.2	0.2	0.3	11.9%	-10.6%	-0.7%	-21.4%	68.2%
Oil	25.0	39.5	84.4	142.3	161.1	160.8	9.6%	16.4%	11.0%	13.2%	-0.2%
Natural gas	22.8	23.4	24.1	28.3	37.4	41.0	0.6%	0.6%	3.2%	32.2%	9.8%
Nuclear	3.7	5.9	6.2	6.5	6.6	6.6	9.5%	1.0%	1.0%	1.0%	1.1%
Hydro & Wind	10.3	11.9	13.3	13.9	11.8	12.8	2.9%	2.3%	0.8%	-15.1%	8.9%
Geothermal	0.6	0.8	1.0	1.0	1.0	1.0	8.0%	2.8%	0.2%	1.6%	4.0%
Other	1.1	1.6	2.0	2.6	2.5	2.6	7.7%	4.8%	5.5%	-1.9%	0.8%
Net Imports	-21.4	-38.5	-80.4	-142.9	-166.6	-171.6	12.4%	15.9%	12.2%	16.5%	3.0%
Solids	1.3	1.3	1.1	1.1	1.0	0.9	0.2%	-4.2%	0.1%	-4.5%	-9.9%
Oil	-1.0	-18.0	-59.4	-120.2	-136.9	-137.5	79.6%	26.9%	15.2%	13.9%	0.5%
Crude oil	-11.4	-26.9	-65.2	-122.9	-139.0	-140.5	18.8%	19.4%	13.5%	13.1%	1.1%
Oil products	10.4	8.9	5.8	2.7	2.1	3.0	-3.2%	-8.0%	-14.2%	-23.1%	44.0%
Natural gas	-21.0	-21.0	-20.5	-22.6	-31.4	-34.8	-0.1%	-0.4%	1.9%	38.9%	10.8%
Electricity	-0.7	-0.8	-1.5	-1.2	0.7	-0.3	1.4%	14.3%	-5.0%	-	-
Gross Inland Consumption	41.2	45.1	48.6	50.9	51.5	52.8	1.9%	1.5%	0.9%	1.3%	2.4%
Solids	1.4	1.7	1.3	1.3	1.2	1.2	5.2%	-5.9%	-0.2%	-4.6%	-1.5%
Oil	23.1	21.5	22.7	21.2	21.8	22.5	-1.4%	1.1%	-1.4%	2.8%	3.6%
Natural gas	1.7	2.4	3.6	5.7	6.0	6.2	7.1%	8.1%	9.4%	5.4%	4.2%
Other (1)	14.9	19.4	20.9	22.8	22.6	22.8	5.4%	1.5%	1.7%	-0.8%	1.1%
Electricity Generation in TWh	135.1	162.2	180.7	189.3	165.2	177.7	3.7%	2.2%	0.9%	-12.8%	7.6%
Nuclear	14.3	22.6	23.6	24.9	25.1	25.4	9.5%	0.9%	1.0%	1.0%	1.1%
Hydro & wind	119.5	138.1	155.1	161.2	136.8	149.0	2.9%	2.3%	0.8%	-15.2%	9.0%
Thermal	1.3	1.5	2.0	3.2	3.3	3.2	3.2%	5.9%	10.5%	1.1%	-0.7%
Generation Capacity in GWe	34.8	39.8	43.7	45.4	44.8	44.8	2.7%	1.9%	0.8%	-1.4%	0.1%
Nuclear	1.9	2.9	3.0	3.1	3.1	3.1	8.5%	0.2%	0.7%	1.0%	0.0%
Hydro & wind	31.8	35.6	39.3	40.9	40.2	40.2	2.3%	2.0%	0.8%	-1.7%	0.1%
Thermal	1.1	1.2	1.5	1.5	1.5	1.5	2.0%	4.2%	0.7%	0.0%	-0.1%
Average Load Factor in %	44.3	46.6	47.2	47.6	42.1	45.3	1.0%	0.3%	0.2%	-11.5%	7.5%
Fuel Inputs for Thermal Power Generation	0.5	0.9	1.1	1.5	1.6	1.5	11.6%	3.9%	6.4%	6.9%	-2.0%
Solids	0.0	0.1	0.1	0.0	0.0	0.0	15.8%	0.0%	-4.4%	2.5%	-12.2%
Oil	0.2	0.2	0.1	0.1	0.1	0.0	2.8%	-10.7%	-10.9%	32.8%	-48.1%
Gas	0.1	0.1	0.1	0.2	0.2	0.2	-1.4%	1.0%	8.2%	31.1%	5.6%
Geothermal	0.1	0.2	0.4	0.4	0.5	0.5	23.3%	10.6%	3.2%	8.6%	8.3%
Other	0.2	0.3	0.5	0.8	0.8	0.8	17.7%	6.0%	11.6%	-0.2%	-4.8%
Average Thermal Efficiency in %	21.0	14.2	15.6	18.9	17.9	18.1	-7.5%	1.9%	3.8%	-5.4%	1.3%
Non-Energy Uses	2.2	2.5	2.5	2.5	2.4	2.4	2.1%	0.0%	0.4%	-5.6%	-1.1%
Total Final Energy Demand	33.0	35.7	36.9	38.6	39.6	39.2	1.6%	0.7%	0.9%	2.5%	-1.0%
Solids	1.2	1.5	1.2	1.2	1.2	1.1	4.9%	-4.8%	0.3%	-3.7%	-3.8%
Oil	19.7	19.3	19.0	19.0	20.0	19.6	-0.5%	-0.2%	0.0%	4.8%	-2.0%
Gas	0.7	1.1	1.5	2.1	2.2	2.1	9.4%	5.9%	6.3%	6.7%	-4.4%
Electricity	9.7	11.7	12.7	13.5	13.5	13.5	3.8%	1.6%	1.2%	-0.2%	0.4%
Heat	0.7	0.9	1.0	1.1	1.1	1.1	5.6%	2.3%	1.7%	1.0%	1.5%
Other	0.9	1.2	1.5	1.8	1.8	1.8	5.7%	4.5%	3.5%	-2.5%	3.5%
CO_2 Emissions in Mt of CO_2	72.2	74.0	75.7	80.9	84.8	84.1	0.5%	0.5%	1.3%	4.8%	-0.9%
Indicators											
Population (Million)	10.70	10.93	11.29	11.71	11.76	11.79	0.4%	0.7%	0.7%	0.4%	0.3%
GDP (index 1985=100)	90.6	100.0	112.4	119.6	122.1	125.1	2.0%	2.4%	1.2%	2.1%	2.4%
Gross Inl Cons./GDP (toe/1990 MEUR)	185.6	184.4	176.5	173.8	172.4	172.4	-0.1%	-0.9%	-0.3%	-0.8%	0.0%
Gross Inl Cons./Capita (toe/inhabitant)	3.85	4.13	4.30	4.34	4.38	4.48	1.4%	0.8%	0.2%	0.9%	2.2%
Electricity Generated/Capita (kWh/inhabitant)	12628	14839	16006	16172	14053	15074	3.3%	1.5%	0.2%	-13.1%	7.3%
CO_2 Emissions/Capita (t of CO_2/inhabitant)	6.7	6.8	6.7	6.9	7.2	7.1	0.1%	-0.2%	0.6%	4.4%	-1.2%
Import Dependency (%)	-51.7	-84.6	-163.9	-276.8	-318.2	-319.0	10.4%	14.1%	11.1%	15.0%	0.3%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

EFTA : MAIN INDICATORS

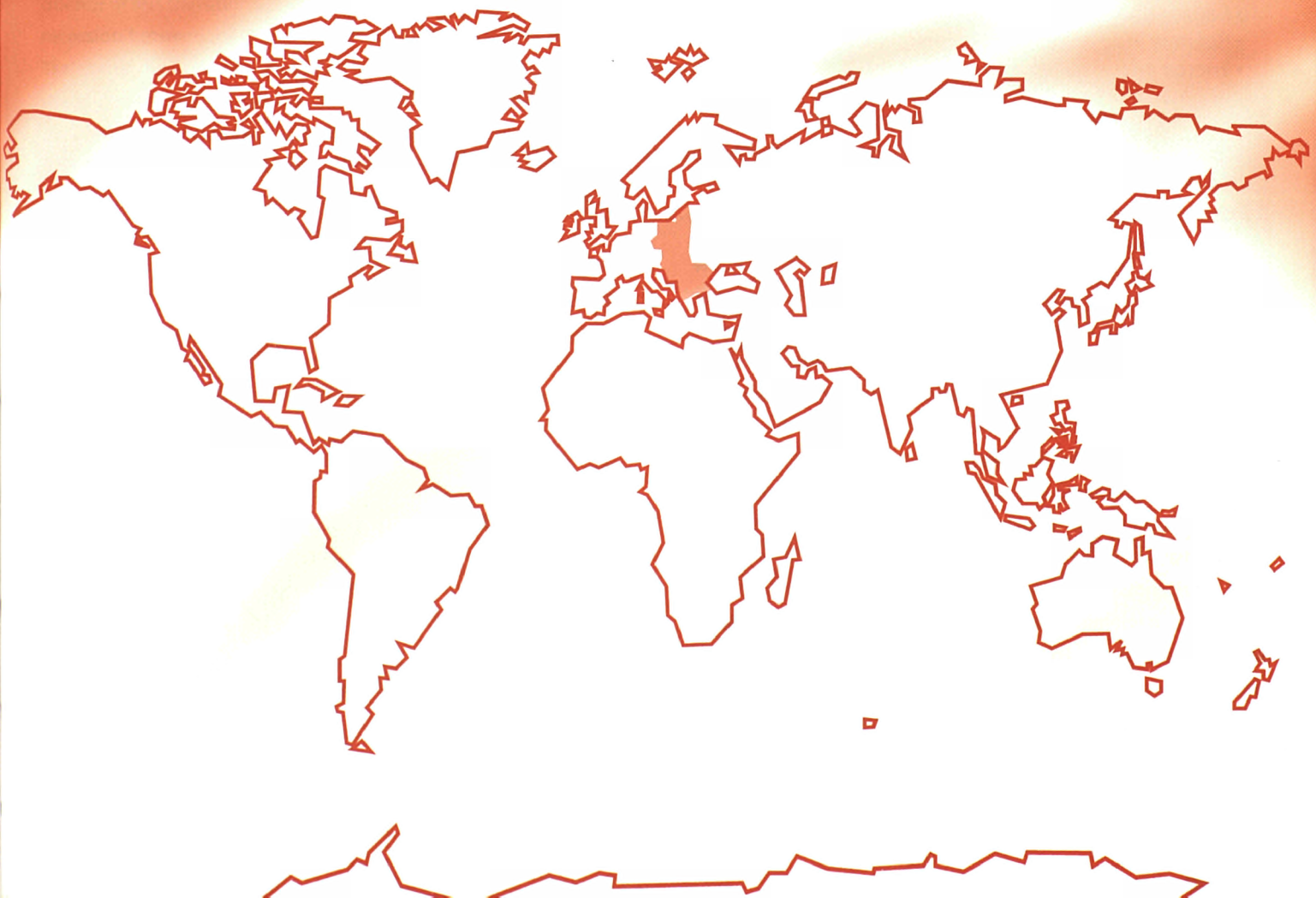
	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	9796
							Annual % Change				
Gross Inland Consumption (Mtoe)	41.2	45.1	48.6	50.9	51.5	52.8	1.9%	1.5%	0.9%	1.3%	2.4%
Public Thermal Power Generation	0.3	0.5	0.6	0.8	0.9	0.8	10.1%	1.5%	8.2%	1.9%	-3.6%
Autoprod. Thermal Power Generation	0.1	0.1	0.1	0.2	0.3	0.2	5.3%	0.4%	6.7%	23.8%	-14.9%
Energy Branch	1.8	2.2	3.4	4.9	5.1	5.6	4.4%	8.8%	7.9%	3.7%	9.2%
Final Energy Consumption	33.0	35.7	36.9	38.5	39.5	39.1	1.6%	0.6%	0.9%	2.6%	-1.1%
Industry	10.7	11.3	9.9	10.3	10.2	10.3	1.0%	-2.7%	0.9%	-1.3%	1.8%
Transport	7.8	8.9	10.8	11.1	11.5	11.7	2.5%	4.0%	0.6%	2.8%	2.4%
Tertiary-Domestic	14.4	15.5	16.2	17.1	17.9	17.0	1.5%	0.9%	1.1%	4.7%	-4.8%
Energy Intensity (toe/1990 MEUR)	185.6	184.4	176.5	173.8	172.4	172.4	-0.1%	-0.9%	-0.3%	-0.8%	0.0%
Public Thermal Power Generation	1.5	2.2	2.1	2.9	2.9	2.7	8.0%	-0.8%	6.9%	-0.2%	-5.9%
Autoprod. Thermal Power Generation	0.5	0.6	0.5	0.7	0.9	0.7	3.2%	-1.9%	5.4%	21.2%	-16.9%
Industry	48.5	46.2	35.8	35.2	34.0	33.8	-0.9%	-5.0%	-0.3%	-3.3%	-0.7%
Transport	35.4	36.2	39.3	38.1	38.3	38.3	0.5%	1.6%	-0.6%	0.6%	-0.1%
Tertiary-Domestic	64.9	63.4	58.9	58.4	59.9	55.7	-0.4%	-1.5%	-0.2%	2.6%	-7.1%
Energy per Capita (Kgoe/inhabitant)	3846	4129	4300	4345	4382	4477	1.4%	0.8%	0.2%	0.9%	2.2%
Industry	1004	1035	872	880	865	878	0.6%	-3.4%	0.2%	-1.7%	1.5%
Transport	733	811	956	952	974	995	2.0%	3.4%	-0.1%	2.3%	2.1%
Tertiary-Domestic	1345	1420	1435	1460	1523	1445	1.1%	0.2%	0.3%	4.3%	-5.1%
Electricity Share (%)											
Final Energy Consumption	29.5%	32.8%	34.5%	35.0%	34.0%	34.5%	2.2%	1.0%	0.3%	-2.7%	1.5%
Industry	43.1%	48.7%	57.3%	55.6%	53.9%	55.0%	2.5%	3.3%	-0.6%	-3.2%	2.2%
Transport	3.0%	2.8%	2.7%	3.2%	3.2%	3.1%	-1.5%	-0.8%	3.4%	-1.0%	-2.3%
Tertiary-Domestic	33.7%	38.3%	41.7%	43.3%	42.5%	43.7%	2.6%	1.7%	0.7%	-1.7%	2.8%
Total Renewable Consumption (Mtoe)	11.9	14.3	16.3	17.5	15.3	16.4	3.7%	2.7%	1.4%	-12.2%	7.3%
Hydro	10.3	11.9	13.3	13.9	11.8	12.8	2.9%	2.3%	0.8%	-15.2%	9.0%
Biomass	1.1	1.6	2.0	2.6	2.6	2.6	7.7%	4.8%	5.5%	-1.9%	0.9%
Other	0.6	0.8	1.0	1.0	1.0	1.1	8.0%	2.8%	0.6%	1.8%	4.1%
Renewable intensity (toe/1990MEUR)	53.8	58.4	59.3	59.7	51.3	53.7	1.7%	0.3%	0.1%	-14.0%	4.7%
Renewable per capita (Kgoe/inhabitant)	1115.5	1307.9	1443.3	1491.2	1303.7	1394.9	3.2%	2.0%	0.7%	-12.6%	7.0%
CO_2 Emissions (Mt of CO_2)	72.2	74.0	75.7	80.9	84.8	84.1	0.5%	0.5%	1.3%	4.8%	-0.9%
Public Thermal Power Generation	0.4	0.5	0.4	0.2	0.2	0.1	3.3%	-6.8%	-11.7%	-11.6%	-34.4%
Autoprod. Thermal Power Generation	0.3	0.4	0.3	0.4	0.5	0.5	4.8%	-3.3%	1.9%	49.4%	-15.0%
Energy Branch	4.2	5.1	8.2	11.9	12.6	13.6	3.8%	9.8%	7.8%	6.1%	7.9%
Industry	18.3	16.9	11.6	11.8	12.3	11.9	-1.5%	-7.3%	0.4%	4.1%	-3.4%
Transport	23.3	26.4	32.2	33.1	34.0	34.9	2.5%	4.1%	0.5%	2.8%	2.4%
Tertiary-Domestic	25.5	24.5	23.0	23.4	25.0	22.9	-0.8%	-1.3%	0.3%	6.8%	-8.2%
Carbon Intensity (tn of CO_2/toe)	1.8	1.6	1.6	1.6	1.6	1.6	-1.3%	-1.0%	0.4%	3.5%	-3.3%
Public Power Generation	0.0	0.0	0.0	0.0	0.0	0.0	-2.1%	-8.8%	-12.7%	-3.2%	-38.0%
Public Thermal Power Generation	1.4	1.0	0.7	0.2	0.2	0.1	-6.2%	-8.2%	-18.4%	-13.2%	-32.0%
Autoprod. Power Generation	0.2	0.3	0.2	0.2	0.4	0.3	3.5%	-3.3%	0.1%	67.6%	-16.7%
Autoprod. Thermal Power Generation	2.8	2.7	2.2	1.8	2.1	2.1	-0.4%	-3.6%	-4.5%	20.7%	-0.2%
Energy Branch	0.0	0.1	0.1	0.4	1.1	0.8	-	-0.1%	26.7%	160.6%	-33.2%
Industry	2.4	2.3	2.4	2.4	2.5	2.5	-0.5%	1.0%	0.0%	2.3%	-1.3%
Transport	1.7	1.5	1.2	1.1	1.2	1.1	-2.6%	-4.7%	-0.5%	5.5%	-5.1%
Tertiary-Domestic	3.0	3.0	3.0	3.0	3.0	3.0	0.0%	0.0%	-0.1%	0.0%	0.1%
CO_2 per Capita (kg of CO_2/inhabitant)	6747	6773	6708	6912	7216	7132	0.1%	-0.2%	0.6%	4.4%	-1.2%
Industry	1712	1551	1025	1007	1045	1007	-2.0%	-8.0%	-0.3%	3.7%	-3.7%
Transport	2181	2419	2856	2828	2896	2958	2.1%	3.4%	-0.2%	2.4%	2.2%
Tertiary-Domestic	2381	2245	2037	1999	2126	1946	-1.2%	-1.9%	-0.4%	6.4%	-8.5%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	326	302	275	277	284	275	-1.5%	-1.9%	0.1%	2.7%	-3.2%
Public Thermal Power Generation	2	2	1	1	1	0	1.3%	-8.9%	-12.8%	-13.4%	-36.0%
Autoprod. Thermal Power Generation	1	2	1	1	2	2	2.8%	-5.5%	0.6%	46.3%	-17.1%
Energy Branch	0	0	0	0	0	0	-	23.9%	27.7%	270.7%	-39.1%
Industry	19	21	30	41	42	44	1.8%	7.3%	6.5%	3.9%	5.3%
Transport	83	69	42	40	41	39	-3.5%	-9.5%	-0.9%	2.0%	-5.7%
Tertiary-Domestic	105	108	117	113	114	114	0.5%	1.7%	-0.7%	0.7%	0.0%

NORWAY : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	55.7	72.9	120.1	182.4	208.6	212.7	5.5%	10.5%	8.7%	14.4%	1.9%
Solids	0.2	0.4	0.2	0.2	0.2	0.3	11.9%	-10.6%	-0.7%	-21.4%	68.2%
Oil	25.0	39.5	84.4	142.3	161.1	160.8	9.6%	16.4%	11.0%	13.2%	-0.2%
Natural gas	22.8	23.4	24.1	28.3	37.4	41.0	0.5%	0.6%	3.2%	32.2%	9.8%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & Wind	7.2	8.8	10.4	10.4	8.9	9.4	4.1%	3.4%	0.0%	-14.6%	5.9%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.6	0.8	1.0	1.2	1.1	1.2	5.9%	4.2%	3.2%	-6.9%	5.8%
Net Imports	-36.2	-52.4	-96.3	-157.6	-182.6	-187.5	7.7%	12.9%	10.3%	15.8%	2.7%
Solids	0.8	0.9	0.7	0.9	0.9	0.8	2.0%	-5.2%	5.2%	-0.7%	-6.9%
Oil	-15.1	-31.1	-73.5	-133.1	-150.5	-151.6	15.5%	18.8%	12.6%	13.0%	0.7%
Crude oil	-16.1	-31.2	-68.4	-127.7	-144.5	-145.7	14.1%	17.0%	13.3%	13.1%	0.8%
Oil products	1.0	0.2	-5.1	-5.4	-6.0	-5.9	-29.4%	-	1.4%	10.7%	-1.3%
Natural gas	-21.9	-22.2	-22.2	-24.8	-33.8	-37.1	0.3%	0.0%	2.3%	36.2%	9.8%
Electricity	0.0	0.0	-1.4	-0.6	0.8	0.3	3.3%	96.2%	-16.0%	-	-57.4%
Gross Inland Consumption	18.8	20.3	21.5	23.5	23.6	24.2	1.6%	1.1%	1.9%	0.4%	2.6%
Solids	1.0	1.2	0.9	1.0	1.0	1.0	3.0%	-5.9%	3.5%	-2.0%	2.5%
Oil	9.2	8.4	8.6	8.0	8.3	8.3	-1.7%	0.4%	-1.3%	3.1%	1.2%
Natural gas	0.9	1.2	2.0	3.5	3.6	3.9	6.3%	10.9%	11.9%	3.6%	9.3%
Other (1)	7.8	9.6	10.1	11.0	10.8	10.9	4.3%	1.0%	1.9%	-2.4%	1.4%
Electricity Generation in TWh	83.8	102.7	121.6	122.1	104.4	110.5	4.2%	3.4%	0.1%	-14.4%	5.8%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & wind	83.6	102.4	121.1	121.3	103.6	109.8	4.1%	3.4%	0.0%	-14.6%	6.0%
Thermal	0.1	0.3	0.5	0.7	0.8	0.7	20.4%	6.1%	8.8%	17.4%	-14.5%
Generation Capacity in GWe	20.0	23.7	27.1	27.6	27.7	27.7	3.4%	2.8%	0.3%	0.3%	0.2%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & wind	19.8	23.4	26.9	27.3	27.4	27.4	3.4%	2.8%	0.3%	0.3%	0.2%
Thermal	0.2	0.3	0.3	0.3	0.3	0.3	1.5%	-0.3%	3.2%	0.0%	0.0%
Average Load Factor in %	47.8	49.6	51.2	50.5	43.1	45.5	0.7%	0.6%	-0.3%	-14.7%	5.6%
Fuel Inputs for Thermal Power Generation	0.0	0.1	0.1	0.2	0.2	0.1	22.9%	1.3%	7.2%	3.3%	-12.0%
Solids	0.0	0.0	0.0	0.0	0.0	0.0	20.1%	12.5%	1.6%	5.1%	-12.2%
Oil	0.0	0.1	0.0	0.0	0.0	0.0	19.8%	-50.7%	-100.0%	-	-
Gas	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	29.2%	-16.1%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.0	0.0	0.1	0.1	0.1	0.1	-	42.3%	5.2%	-4.4%	-10.5%
Average Thermal Efficiency in %	32.7	29.5	37.1	39.8	45.2	43.9	-2.1%	4.7%	1.4%	13.7%	-2.9%
Non-Energy Uses	1.6	1.9	1.8	1.9	1.8	1.8	4.1%	-1.0%	0.9%	-6.0%	-1.8%
Total Final Energy Demand	14.8	15.9	16.2	17.3	17.7	17.6	1.4%	0.4%	1.3%	2.5%	-0.3%
Solids	0.9	1.0	0.8	1.0	1.0	0.9	2.5%	-4.5%	4.2%	-0.6%	-0.1%
Oil	6.9	6.2	6.1	6.2	6.8	6.6	-2.1%	-0.2%	0.3%	9.0%	-2.3%
Gas	0.0	0.0	0.0	0.0	0.0	0.0	-100.0%	-	-	-	-
Electricity	6.4	7.9	8.3	8.9	8.9	8.9	4.1%	1.2%	1.4%	-0.6%	0.3%
Heat	0.0	0.0	0.1	0.1	0.1	0.1	-	14.3%	7.5%	8.5%	-0.9%
Other	0.6	0.8	0.9	1.1	1.0	1.1	5.5%	3.0%	3.2%	-7.1%	7.2%
CO_2 Emissions in Mt of CO_2	28.1	27.7	29.7	34.1	36.5	37.0	-0.3%	1.4%	2.8%	7.0%	1.4%
Indicators											
Population (Million)	4.09	4.15	4.24	4.36	4.38	4.41	0.3%	0.4%	0.6%	0.5%	0.5%
GDP (index 1985=100)	85.7	100.0	108.6	130.2	137.3	142.0	3.1%	1.7%	3.7%	5.5%	3.4%
Gross Inl Cons./GDP (toe/1990 MEUR)	263.0	243.5	236.6	216.5	206.0	204.3	-1.5%	-0.6%	-1.8%	-4.8%	-0.8%
Gross Inl Cons./Capita (toe/inhabitant)	4.61	4.89	5.06	5.40	5.39	5.50	1.2%	0.7%	1.3%	-0.1%	2.0%
Electricity Generated/Capita (kWh/inhabitant)	20497	24736	28675	28001	23836	25080	3.8%	3.0%	-0.5%	-14.9%	5.2%
CO_2 Emissions/Capita (t of CO_2/inhabitant)	6.9	6.7	7.0	7.8	8.3	8.4	-0.7%	1.0%	2.3%	6.4%	0.8%
Import Dependency (%)	-189.8	-253.9	-439.9	-650.4	-748.7	-744.6	6.0%	11.6%	8.1%	15.1%	-0.5%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

PART IV CENTRAL AND EASTERN EUROPE



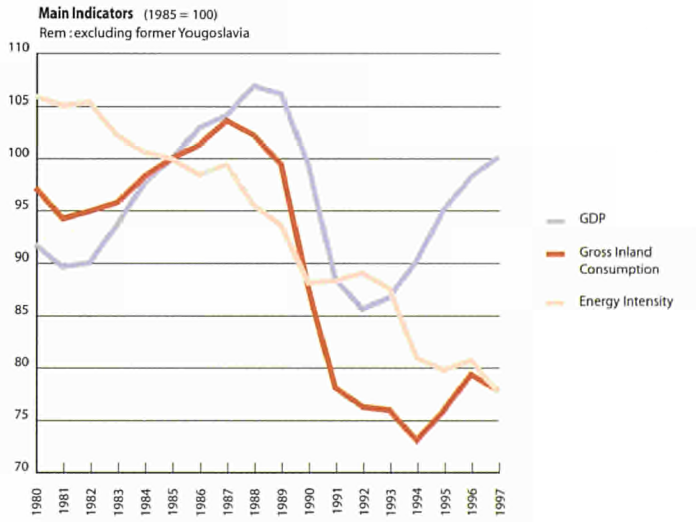
The partition of Central and Eastern Countries into two groups does not accurately reflect the geographical and political situation and it originates purely from statistical conventions and practices. The geographical grouping of the Baltic States is introduced to complete the energy presentation to cover all regions of the world. Given the complexities and differences between national, OECD and SOEC statistical conventions, attempts to integrate Estonian, Latvian and Lithuanian energy statistics prior to 1991 into the CEEC summary sheet gave unsatisfactory results, thus necessitating the current ad hoc solution.

A major characteristic of these countries is the fact that all 10 of them are candidates for eventual entry into the European Union: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The Commission's "Agenda 2000" provides a careful assessment of the readiness for membership of all these applicants and recommends that accession negotiations start initially with Hungary, Poland, Estonia, the Czech Republic and Slovenia. These are judged closest to fulfilling the criteria established by the European Council at its summit in Copenhagen in June 1993. Negotiations with them started early in 1998, as well as with Cyprus whose application had already received a favourable opinion from the Commission. Meanwhile, the door remains open to Bulgaria, Romania, Latvia, Lithuania and Slovakia and they will be invited into partnerships with the EU to help speed up their preparations for eventual EU membership.

Central and Eastern Europe: Major trends (1980-1997)

- Economic reform induced a deep recession but GDP rebounded after 1993 with varied evolution by country
- Common downward trend (-24% to -27% since 1988) in both gross inland energy consumption and energy production
- Economic growth already associated with shifting patterns of energy use
- Restructuring of economies caused a new pattern of sectoral energy consumption
- Increased share of electricity in final energy consumption, focused on tertiary-domestic sector
- Contribution of solid fuels in gross inland energy declined but still dominated
- Energy production marked by ongoing substantial restructuring
- Eastern countries represented only 3% of world fossil fuel reserves
- Large predominance of solid fuels in electricity production
- Reform and privatisation of the power industry are continuing
- Refinery industry in need of restructuring and upgrading
- Energy intensity has improved by about 2.3% per year on average since 1988
- Improvement in energy intensity driven by industry and the tertiary-domestic sector
- CO_2 emissions reduced by 16% since 1990
- Energy import dependency is increasing with some attempts to diversify suppliers

This region includes the following countries: Albania, Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic and the Republics of the former Yugoslavia which together represent a stable population of around 121 million inhabitants. Given the improvement of available statistical data, the Czech and Slovak Republics will be shown individually, while the "former Yugoslavia" still includes, for statistical reasons related to the political situation prevailing in this region since 1992, all the republics emerging from the partition of that country. For the most recent years (covering 1992-1997), when available, data for the newly formed independent states, especially for Slovenia, have been presented to complement the existing aggregate data. This reflects, as realistically as possible, the new geopolitical configuration of the region.



[1] Analysis excludes the former Yugoslavia for obvious statistical reasons.

CEEC : GDP (1985=100)

	1985	1990	1993	1994	1995	1996	1997
CEEC	100.00	99.50	86.82	90.27	95.21	98.33	100.23
Poland	100.00	98.45	97.56	102.63	109.81	116.18	124.19
Hungary	100.00	104.12	88.41	91.01	92.36	93.56	97.68
Czech Republic	100.00	108.18	93.13	95.65	101.34	105.47	106.52
Slovakia	100.00	107.23	81.79	85.31	91.41	97.56	103.90
Bulgaria	100.00	107.92	84.61	86.68	88.26	80.33	74.79
Romania	100.00	86.11	70.63	73.50	78.72	81.95	76.54

Economic reform induced a deep recession but GDP rebounded after 1993 with contrasted evolution by country

Eastern European countries are undergoing major reforms of their political and economic structures. Previously under strong central government control, they have now begun to decentralise their economies through various programmes, especially industrial restructuring and privatisation. Former state-owned firms were internally restructured, shifting progressively from public ownership with state control to various types of private ownership. To address the needs of potential investors for clearly defined property rights, each country has attempted to develop viable legal structures, contract laws, regulatory systems, capital markets, trade policies, and domestic bond and stock markets. As a consequence of this transition period, structural reforms induced a deep recession between 1990 and 1993 in all countries except Poland. Thereafter these eastern countries have begun to rebound from the region's economic setback. Since 1993 they have experienced positive levels of economic growth, ranging from 1.1% in 1993 to 5.5% in 1995, 3.4% in 1996 and 2.3% in 1997 even though different countries experienced contrasting patterns. Poland, the dominant economy in the region, accounting for about 37% of its total GDP, experienced an average growth of 3.4% per year since 1990 and an even more impressive average growth of 6.6% per year since 1994. But Poland remained the exception of the region. All the other countries have not yet returned to their 1990 GDP level even though all countries showed positive economic growth between 1993 and 1996, with the exception of Bulgaria in 1996. Economic growth in 1997 was more varied: Poland (+6.9%), Slovakia (+6.5%) and Hungary (+4.4%) pursued their economic development, the Czech Republic (+1.0%) showed the first signs of breathlessness, but Bulgaria and Romania underwent a deep recession. Until now it was not expected that the deterioration of the Russian economy in 1998 would affect the economies of the eastern countries. On the other hand, the Kosovo war at the beginning of 1999 is likely to slow down economic activity in all the surrounding countries.

Main items

Formerly within the Soviet sphere of influence, and members of the Council for Mutual Economic Assistance (CMEA), the Central and East European countries have undergone profound economic and political transitions over the past decade. Not surprisingly, these created significant dislocations and reorientations. These were most acute in 1990-93. Central to this process was the adoption of western-style market reforms, accompanied by gradual economic liberalisation and privatisation of former state-owned enterprises. Both the enthusiasm for such reforms and the specific transition processes adopted have differed across the region. Most economies have at last stabilised and some are now growing consistently. Since 1995, the Czech Republic, Hungary and Poland have joined the OECD. These and some other countries in the region are also in the midst of accession negotiations with the European Union which - to be successful - will necessitate further convergence of financial, legal, market, and regulatory frameworks. Regional indigenous energy production has been dominated by solid fuel, mainly produced by high-cost, subsidised, deep mines – capacity from which is now being severely rationalised as state aids are reduced. The small oil and gas production sectors have been starved of adequate investment, which will require joint ventures and inward investment to rectify. Regional dependence upon the FSU for crude oil and products has progressively diminished, as sourcing has been diversified towards the Middle East and Western Europe. Energy intensities and environmental emissions have fallen sharply, reflecting output falls (especially in energy-intensive industries), structural shifts within the regional economies, and the adoption of much more cost-reflective energy pricing policies. Whilst continued economic adjustment should maintain momentum in lowering energy and carbon intensities, higher incomes will boost fuel demand for private transport.

ENERGY OUTLOOK

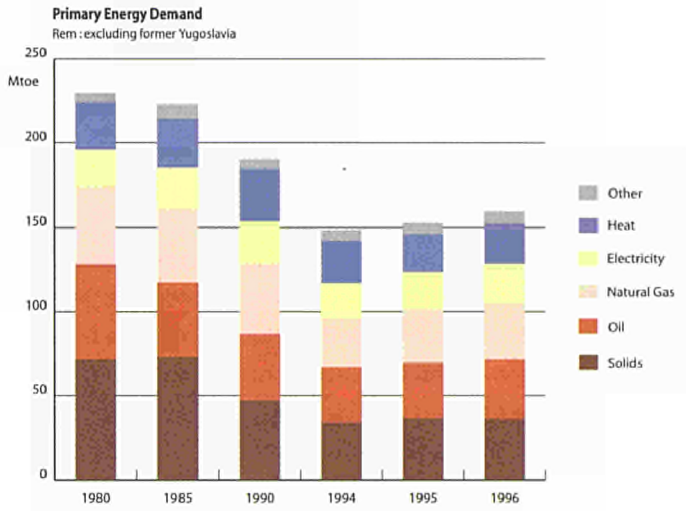
Common downward trend (-24% to -27% since 1988) in both gross inland energy consumption and energy production

Eastern Countries, like the CIS, have demonstrated large variations in energy consumption since the beginning of the economic and structural reforms. In addition, these countries were characterised, before 1990, by the world's highest energy intensity after the

Former Soviet Union. This situation resulted from an industrial structure based on energy- intensive industries (steel, cement, chemicals...) using energy inefficiently; and very low energy prices as demand was largely supplied from Former Soviet Union at prices that were usually well below world market prices. Given the economic crisis faced by the Central and Eastern European Countries since 1988, a common downward trend has been observed in both energy production (-27% between 1988 and 1997), and gross inland consumption (-24% between 1988 and 1997). This evolution is of importance in the context of the Kyoto Protocol because the energy circumstances of both Central and Eastern Countries and the CIS have slowed down the growth of global energy consumption and hence the growth of greenhouse gases emissions. Given the very large potential for energy saving, which will stabilise energy consumption despite further economic growth, Eastern countries are projected to generate net carbon credits in relation to Kyoto Protocol goals. This is reinforced by the fact that the Kyoto targets for Bulgaria, Hungary, Poland and Romania, which together currently account for some 66% of all emissions from Eastern Countries, use base years other than 1990. Bulgaria and Romania are using 1989 as a base year, Poland is using 1988, and Hungary is using the average emissions for the years 1985 to 1987.

Economic growth already associated with shifting patterns of energy uses...

Final energy demand peaked in 1987 (231.2 Mtoe) and has declined since then by 36% to reach a minimum of 148.4 Mtoe in 1994. In 1995 and 1996 energy demand rebounded by 3% and 4.5% respectively at the regional level but provisional data suggest a stabilisation in 1997 at the 1995 level. The reduction of energy demand affected energy forms in different ways: solid fuel (-52% between 1987 and 1996), gas (-27%), oil products (-22%), distributed heat (-21%) and electricity (-11%). The reduction of solid fuel consumption resulted from the drastic reduction of direct uses for steam and heat production in all sectors (-29% in industry and -62% in tertiary-domestic) and from the marked slowdown of steel production. The evolution of gas consumption has been influenced by new supply arrangements imposed by Russia which started to invoice its supplies at world market prices instead of the special conditions prevailing before 1989. Consequently, between 1989 and 1992, gas consumption fell by 42%. Since the regularisation of supplies gas use has increased on average at 6.5% per year. Oil, sustained by stable demand from the transport sector given a growing number of private cars, limited its overall decline to 27% but experienced a 50% reduction in both industry and the tertiary-domestic sector. Distributed heat, largely used for space heating, declined by 17% as a result of tariff



increases despite the continued absence of systematic metering of consumption. Electricity demand, benefiting from the modernisation of industry and improvements in standards of living, has increased by about 6% per year since 1994. Natural gas and electricity have mainly supplied the rebound of energy consumption observed in 1995 and 1996. This illustrates the fact that economic growth and modernisation will lead to changing patterns of energy use.

Restructuring of the economies induced a new pattern of sectoral energy consumption...

The share of the transport sector in final energy consumption increased from 9% in 1985 to 14% in 1995, to the detriment of industry (41% in 1996 vs. 49% in 1985) while the share of tertiary-domestic increased slowly. Growth in transport fuel demand resulted from increasing motorization (starting from a very low level and still representing only 25% of the European per capita average). On the other hand, energy statistics must be treated with great caution as, until recently, energy consumption for transportation in industry was partly aggregated with industrial energy consumption. Recent statistical improvements, which give better accounting of transport consumption, explain the unexpected growth in transport fuel use in Poland and the Czech Republic in 1996. The high contribution of industry reflects the predominance of heavy industries based on old technologies inherited from the socialist regime. Recent shifts resulted from the modernisation of industrial processes and the diversification to industries with higher added values. This evolution was sustained by privatisation of state companies and impressive foreign investment. The evolution of the tertiary-domestic sector resulted from two main factors. At the domestic level, consumption per capita decreased significantly over the last ten years, mainly as a result of

increasing tariffs, to reflect the real price of energy even though effective metering of energy consumption, mainly for heating uses, is still not yet widespread. This provides much scope for further improvements. On the other hand, services and commercial activities are still at an early stage of development and will increase energy demand in the future even if efficient technologies are utilised.

Increasing share of electricity in final energy demand, focused in the tertiary-domestic sector...

The share of electricity in final consumption reached 14.5% in 1996 from 10.9% in 1985. It must be stressed that the contribution of the transport sector is higher than in the OECD region for two reasons: a larger role for railways in long distance transport and the electrification of public transport (trams and trolley buses) in a number of large and medium sized cities. A major evolution was observed in the tertiary-domestic sector where electricity's share increased from 9.0% in 1985 to 16.1% in 1996. This corresponds to a stagnation of demand during the transition period followed by a 6% increase in 1995 and 1996 reflecting the improvement of living standards. In industry the share of electricity increased more slowly as consumption declined by some 5% per year during the transition period as a result of restructuring and closure of obsolescent factories. But electricity consumption increased by more than 5% each year in these two years with the rebound of industrial production and the diversification to higher added value industries where electricity use is favoured.

Contribution of solid fuels in gross inland energy declined but still dominated...

Solid fuels (47% in 1997 from 54% in 1980), followed by oil (22% in 1997 from 25% in 1980) and gas (20% in 1996 from 18% in 1980) dominated **Gross inland energy consumption**. Since the peak of 1987, the total reduction of consumption of about 85 Mtoe has been split between solid fuels (57 Mtoe), oil (16 Mtoe) and natural gas (15 Mtoe) respectively, while the contribution of nuclear increased by 4 Mtoe. The evolution of fossil fuel consumption by the electricity sector witnessed reduction of consumption especially of solid fuels and oil products, accentuating the trend observed for these fossil fuels in final consumption. At the same time, non-fossil fuel consumption increased, in 1997 exceeding the peak observed in 1988 thanks to limited gains in the three components: hydro, nuclear and biomass.

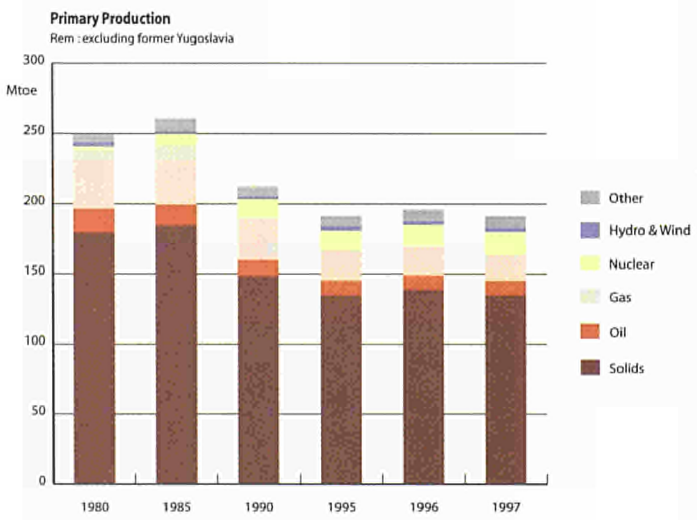
Poland, the key coal consumer in Eastern countries with a consumption of about 77 Mtoe in 1997, accounted for about 64% of the region's total consumption. In other countries, coal consumption is dominated by use of low-Btu sub-bituminous coal and lignite, produced from local reserves. In Poland, the contribution of solid fuels in 1997 reached 70% of gross inland consumption. The second largest consumer was the Czech Republic where solid fuels based on indigenous production contributed about 51% of gross inland consumption. At the opposite end, in Romania, a producer of both oil and gas, solid fuels represented only 19% and in Hungary, historically oriented to gas consumption (38% of gross inland consumption in 1997 with indigenous gas production supplemented by imports), solid fuels accounted for only 17%.

Although 1996 saw a reversal of the downward trend in natural gas use in many of the eastern countries, n 1997 gas markets again moved into decline. All but Poland and Slovakia showed decreases in consumption. This is explained by the facts that natural gas production dropped some 10% compared with 1996 and that imports declined by some 11%. Consumption dropped most dramatically in Romania, falling nearly 20%. Gas consumption fell almost 5% in Hungary and by 8% in Poland.

Energy production marked by ongoing substantial restructuring

Indigenous energy production has reflected these shifts in gross inland energy consumption. The energy sector has also been seriously affected by restructuring, investment to improve obsolete equipment and closure of unprofitable facilities. Since 1985 the reduction of fossil fuel production (50 Mtoe for solid fuels, 23 Mtoe for gas and 4 Mtoe for oil) has only been partly compensated by a small increase in nuclear output (8 Mtoe). The main reduction in indigenous production occurred in Poland and the Czech Republic (for solid fuels) and in Romania (for oil and gas).

At present, Poland's hard coal industry is operating at a loss. Over the past few years, a number of coal industry restructuring plans



have been proposed with the aim of transforming Poland's hard coal industry into a position of positive earnings, thus eliminating the need for government subsidies. The most recent plan was announced by Poland's Ministry of the Economy in April 1998. It calls for the closure of 24 of the country's 50 unprofitable mines, from 65 in 1998 to 41 by 2002. In addition, the restructuring plan aims to reduce the number of miners by nearly one-half, from 245,000 in 1998 to 138,000 by 2002. The World Bank has indicated its willingness to lend the Polish government up to $1 billion over a 3-year period to cover the costs of this radical restructuring programme, including economic assistance for miners leaving the industry. The programme assumes full liberalisation of coal pricing and complete liberalisation of trade in coal by the year 2000.

Foreign investment will be critical in the development of the natural gas industry in many of the eastern countries. In addition to augmenting existing infrastructure, most countries also need to refurbish or replace ageing pipes and to upgrade existing storage and production facilities. Shell is exploring a possible joint venture with Romgas, the Romanian state gas company, to rejuvenate gas fields where production has declined, to expand the gas distribution network and to increase gas storage facilities. As a result, Romania should be able to increase revenues for the transport of Russian gas to markets in the Balkans and Eastern Europe, and to reduce dependence on Gazprom for its own internal consumption needs.

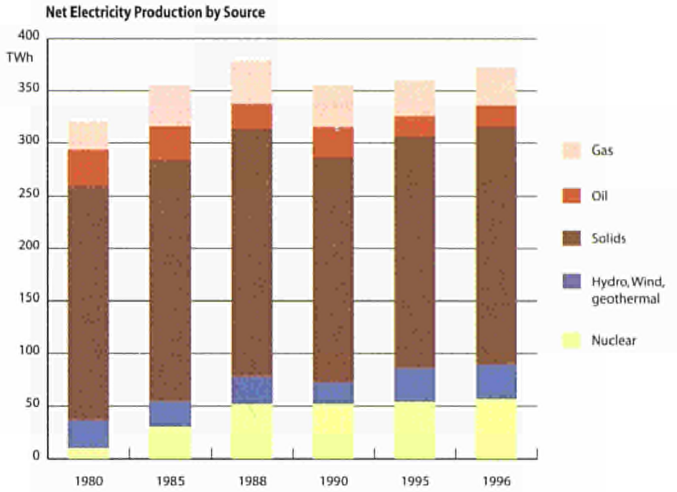
Regional production of crude oil plays a relatively minor role in overall consumption. Oil from Russia, delivered by pipeline and tanker, satisfies much of the overall demand in these Eastern Countries. The volume of trade in refined products in Eastern Countries has contracted over the past seven years, mainly due to a dramatic decline in product exports from Romania and Bulgaria. As a result, the region's trade in refined products is nearly balanced.

Eastern countries represented only 3% of world fossil fuel reserves...

Eastern countries oil reserves at end 1997 amounted to only 0.2% of world reserves, with the major part concentrated in Romania. The situation was comparable for gas reserves which represented only 0.5% of world gas reserves, of which 50% were also located in Romania. Finally, coal reserves, mainly located in Poland, accounted for 5% of world reserves. As a result, Eastern countries represented only 3% of total world fossil fuel reserves.

Large predominance of solid fuels in electricity production...

Electricity is mainly produced by thermal power stations (76% in 1996 declining from 85% in 1985); followed by nuclear (15% in



1996 increasing from 9% in 1985) and hydro (8% in 1996 thanks to a major jump of 23% in 1995 following quite stable production since 1985). Thermal power stations are mainly fired by solid fuels (about 80% in 1996); oil and gas, with 7% and 13%, respectively supplied the rest.

Electricity generation peaked at 385 TWh in 1989, yet only reached 374 TWh in 1996. So it has not been necessary to expand capacity since 1987. But as the power industry's generating capacity was old, inefficient and highly polluting, huge investment has been required to refurbish existing plants with the aim of improving their performance, cutting production costs and reducing their environmental impacts. In Romania, a Canadian-built reactor at Cernavoda was opened in April 1996. The plant, which was expected to begin operation commercially at the year end, is the first western-designed nuclear power plant to be ordered in Eastern Europe.

The use of low-quality coal, combined with an absence of adequate environmental control equipment, has led to acute environmental pollution problems in Central & Eastern European countries, particularly acid rain. Some efforts have been undertaken by countries in the region to improve the environmental performance of coal-fired plants. Low NOx burners are being installed in Poland and there are also plans to use them in Bulgaria and Romania. Circulating fluidised bed combustion boilers are being installed or planned in Poland and Romania. Electrostatic precipitators are widely used, although they are often inefficient; several flue gas desulphurisation systems have been installed or are planned in Poland.

The development of renewable energy sources has been limited to improvements of existing hydroelectric facilities and small pilot projects for other renewables, such as geothermal and wind. Hydroelectricity represents a substantial source of power in only a few countries, such as Romania (23% of all electricity generated) and Slovakia (13%). Most of the potential for hydro expansion lies in Albania, Bulgaria and Romania, as well as in the former Yugoslav republics. However, as yet, these countries have found it difficult to secure financing for such expansion projects.

Reform and privatisation of the power industry are continuing...

The traditional electricity industries in this region were vertically integrated monopolies controlled by central governments. But reforms of the structure, ownership, and regulation have started. Several of the countries have attempted to reform their electricity industries, motivated in part by the desire to ensure availability of the foreign funds needed for upgrades and expansion. The Czech Republic has been actively pursuing the upgrading and modernisation of its electric power sector to meet rising internal demand and EU environmental standards, mainly by encouraging foreign investment. Construction of the Temelin nuclear plant has lagged far behind the original construction schedule and completion costs are mounting steeply. Environmental activists and others have opposed the project mainly due to its Soviet-era design, judged to be well below current western nuclear safety standards. Croatia plans to improve efficiency and capacity in its electricity power sector by attracting foreign investors and spinning-off non-core businesses. Hungary has also sought foreign investment to modernise its electricity sector. In December 1997, the state privatisation agency sold 61% ownership stakes in two power companies to two consortia, one foreign and one domestic.

Refinery industry in need of restructuring and upgrading...

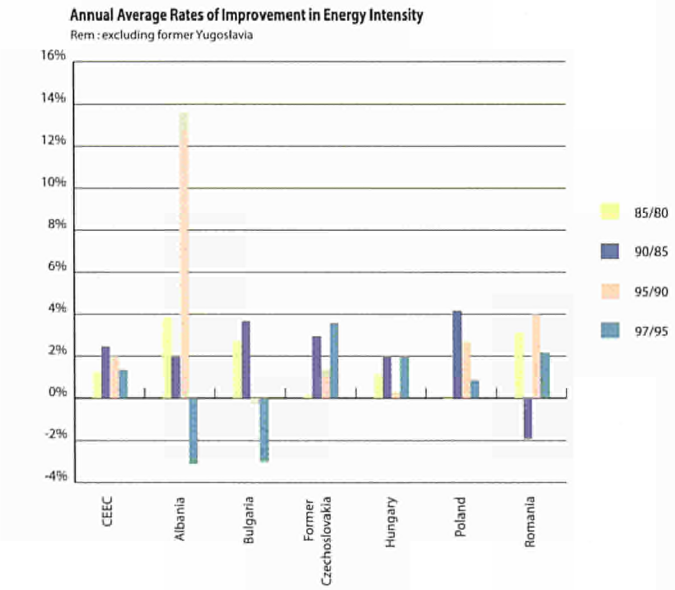
As regards the **refining industry**, the Communist regimes left Eastern European countries with bloated and inefficient hydrocarbon industries that suffered from decades of neglect, outdated technology, heavy debt and which imposed severe environmental impacts. In 1997, refinery capacity, including that of the former Yugoslav Republic, reached 2292 millions barrels day, or about 3% of world installed capacity. The output of refined petroleum products reached only 1349 million barrels day in 1996, corresponding to a utilisation rate of refining capacity of only 58%. Most oil companies in the region remain state-owned and government-run. However, reflecting the progressive economic reforms under way in the region, private ownership is beginning to emerge in the oil sector.

COMPETITIVENESS

Energy intensity has improved by about 2.3% per year on average since 1988...

Energy and macroeconomic data for Eastern Countries are sometimes of dubious quality, as was the case in all centrally- planned economies before the transition period. In particular, the statistical systems of these countries are not yet well equipped to identify activity in the private sector. This has two effects: firstly, to underestimate GDP as a whole and, secondly, to understate the share of activity taken up by the service sector. Since the service sector is generally less energy intensive than industry, a failure to register correctly activity levels in this sector has resulted in aggregate energy intensity being seriously overestimated. In addition, the industrial structure was mainly based on energy-intensive industries (steel, cement, chemicals...) to supply the former Soviet Union. These industries used energy very inefficiently as domestic energy prices were kept well below world market prices. Consequently, before the transition period, Eastern Countries had one of the highest energy intensities in the world.

Energy intensity declined slowly between 1980 and 1988 resulting from underlying technological improvement. But, from then, the reforms undertaken to restructure the economy, and in particular the industrial sector, stimulated a much dramatic improvement. The political changes which occurred in most countries between 1988 and 1993 led to decreases in both GDP (-19% between 1988 and 1993, excluding former Yugoslavia), and gross inland energy consumption (-26%). This led to an average energy

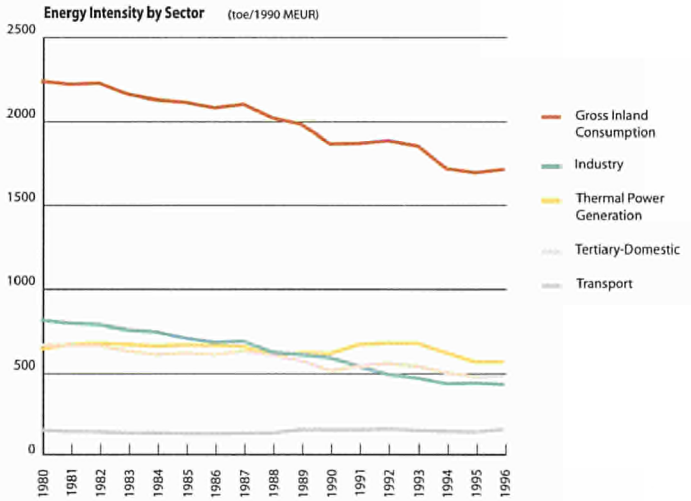


intensity improvement of 1.6% per year. After 1993, with the help of foreign investment, industrial restructuring accelerated, leading to a more rapid decrease in energy intensity (-3.0% on average between 1994 and 1997), while GDP exhibited clear signs of recovering (+3.6% per year on average). This impressive decline was obtained despite a rebound of 1.2% in intensity in 1996, partly due to the cold weather conditions which boosted energy demand for space heating.

CEEC : ENERGY INTENSITY (TOE/1990 MEUR)

	1980	1985	1990	1995	1996	1997
CEEC	2222.6	2097.7	1848.6	1674.3	1694.2	1629.3
Poland	2711.0	2728.6	2202.1	1922.1	1983.1	1888.2
Hungary	1187.5	1125.1	1017.5	1000.4	1008.6	961.3
Czech Republic	2506.3	2527.6	2101.1	1929.7	1925.6	1897.5
Slovakia	1982.3	1908.9	1756.3	1672.9	1576.7	1365.8
Romania	2163.2	1852.7	2034.4	1659.5	1602.8	1588.9
Bulgaria	2348.0	2052.4	1699.2	1720.0	1865.2	1825.8

Major improvements in energy intensity of about 25% in the period 1988-1997 have been seen in Poland and Slovakia and a little less (about 20%) in the Czech Republic and Romania. The first three countries benefited from a sustained economic rebound after 1994, accompanied by diversification of economic activities towards high added values ones. This was not the case of Romania, still waiting its economic rebound, or Bulgaria, where energy intensity has increased over the past ten years. The case of Hungary is distinctive: it has improved its energy intensity by only 8% since 1988 but its energy intensity was already 40% lower than the regional level.



Improvement in energy intensity driven by industry and the tertiary-domestic sector...

The continuing improvement of energy intensity has been sustained mainly by the industrial sector's widespread reconstruction and modernisation (-32% since 1988) and by the tertiary-domestic sector (-21%), despite the improvement of living standards. The energy intensity of transport was declining by the beginning of the 1980's but increased with the outset of the economic reforms to peak in 1992 about 4% above the 1980 value. Since 1992, if we exclude the 1996 jump which must be confirmed by further statistical analysis, transport energy intensity has declined (the impact of increasing car numbers being offset by declining consumption per capita). Finally, the weight of power generation was also declining as the electricity intensity of GDP has diminished since 1988.

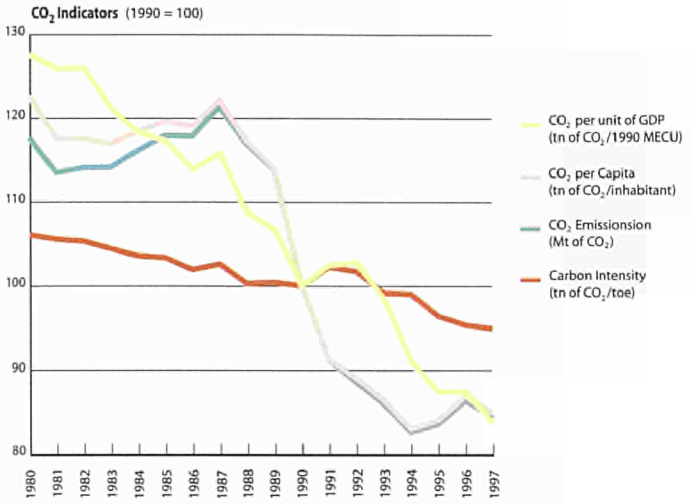
In terms of gross inland **energy consumption per capita**, a marked reduction has been observed since the peak of 1987 (from 3.46 toe per capita in 1987 to 2.60 toe in 1997). Despite higher energy intensity, average consumption per capita in 1997 remained some 35% below the European Union average - reflecting the current lower standards of living in this region.

ENVIRONMENT

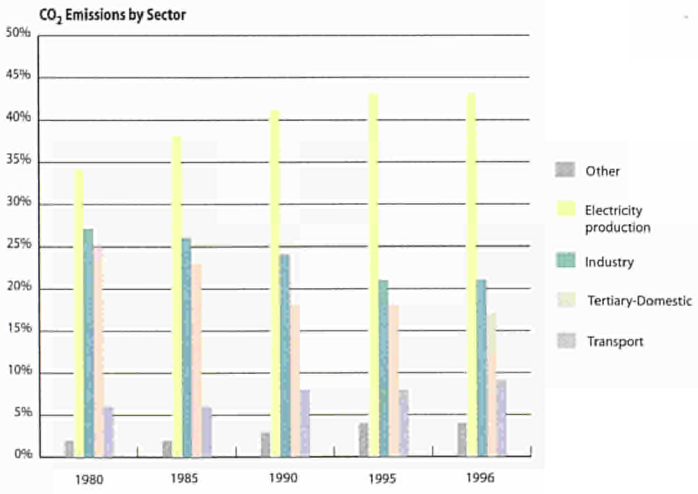
CO_2 emissions reduced by 16% since 1990...

The evolution of CO_2 emissions was profoundly influenced by the profile of energy consumption: increasing continuously between 1980 and 1987 to peak at 1008 million tonnes; but declining since then to reach 831 million tonnes in 1990 and 714 million tonnes in 1993. Since 1993, in line with the evolution of gross inland energy consumption, CO_2 emissions have remained quite stable, the annual fluctuations being largely explained by climatic conditions. Per capita CO_2 emissions, which were 20% above the average EU level in 1985, fell to only 83% of the EU level in 1997. CO_2 emissions per unit of GDP have declined regularly since the beginning of the 1980's by about 2.2% per year on average, though they stabilised in 1997. Finally, the increasing share of natural gas and the expansion of nuclear output during the second half of the 1980's enabled the carbon intensity to be reduced steadily.

In the period 1980-1996, emissions from the tertiary-domestic sector were reduced by 49%, those from industry by 45%, while those from the transport sector increased by 10%. The sector with the largest emissions remained power generation (about 43% of



total emissions in 1996, from 37% in 1988 and 34% in 1980). This included emissions related to heat produced in cogeneration units and explains the relatively low contribution of the tertiary-domestic sector (17% of total emissions in 1995 from 25% in 1980). Industrial emissions declined in volume until 1993 to represent only 17% of total emissions but were rebounding with the recent progress of industrial production (+19% in only three years).



GLOBAL MARKETS

Energy import dependency is increasing with some attempts to diversify suppliers...

The overall energy dependence of this region on **external supplies** was 25% in 1997, a little less than the peak level of 1990. The Eastern Countries together have been net importers of crude oil and natural gas, mainly from the former USSR. Oil imports represented 82% of total oil requirements in 1997, declining slightly since 1990 (84%) as oil consumption fell more rapidly than crude oil production. On the other hand, gas import dependency increased from 54% in 1990 to 62% in 1997 following a significant reduction in indigenous gas production. As regional resources of hydrocarbons remain quite limited, any increase of oil or gas consumption in future will need to be met by additional imports.

Imports of Russian natural gas dominate Eastern Countries' total supply, comprising 60% of consumption, though some countries have made attempts to diversify their supplies. Hungary receives a small amount of gas from Western suppliers (Ruhrgas). Poland and the Czech Republic have also actively explored alternative suppliers but have yet to diversify away from Russian gas. On the other hand, Gazprom has been negotiating to increase its participation in Eastern European gas companies. This is already the case in Bulgaria, where a joint venture Topenergy (50% Gazprom) is responsible for importing Russian gas; and the Slovak Gas Company (SPP) has formed a joint venture with Gazprom to increase the level of co-operation between the two countries on gas deliveries and transit.

CENTRAL AND EASTERN COUNTRIES (FORMER YUGOSLAVIA EXCLUDED) : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	249.4	261.1	212.2	191.4	195.8	191.3	0.9%	-4.1%	-2.0%	2.3%	-2.3%
Solids	179.9	184.8	148.6	134.8	138.9	134.8	0.5%	-4.3%	-1.9%	3.1%	-3.0%
Oil	16.4	14.6	11.4	10.3	10.0	10.3	-2.3%	-4.9%	-1.9%	-3.3%	3.0%
Natural gas	41.8	42.2	29.8	21.9	21.1	18.9	0.2%	-6.7%	-6.0%	-3.8%	-10.4%
Nuclear	2.8	8.2	13.8	14.3	15.1	16.4	24.0%	11.1%	0.7%	5.1%	8.6%
Hydro & Wind	2.3	2.0	1.8	2.7	2.7	2.6	-2.2%	-2.7%	8.6%	2.3%	-6.2%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	6.2	9.3	6.7	7.4	8.0	8.3	8.4%	-6.2%	1.8%	8.5%	4.3%
Net Imports	71.5	66.9	77.6	57.8	68.5	65.0	-1.3%	3.0%	-5.7%	18.4%	-5.1%
Solids	-12.6	-13.2	-11.7	-18.5	-14.5	-13.4	1.0%	-2.4%	9.6%	-21.8%	-7.9%
Oil	65.3	56.8	53.2	44.5	46.1	46.7	-2.8%	-1.3%	-3.5%	3.5%	1.2%
Crude oil	71.7	63.6	56.5	47.5	46.9	na	-2.4%	-2.3%	-3.4%	-1.4%	na
Oil products	-6.3	-6.7	-3.2	-3.0	-0.8	na	1.2%	-13.6%	-1.6%	-73.5%	na
Natural gas	17.7	21.6	33.7	31.7	36.6	31.5	4.1%	9.2%	-1.2%	15.5%	-13.9%
Electricity	1.1	1.6	2.4	0.1	0.3	0.1	8.5%	8.0%	-44.6%	114.3%	-53.3%
Gross Inland Consumption	320.1	329.1	288.5	250.1	261.4	256.2	0.6%	-2.6%	-2.8%	4.5%	-2.0%
Solids	167.5	173.4	137.5	117.8	122.8	121.4	0.7%	-4.5%	-3.1%	4.3%	-1.1%
Oil	81.2	71.5	63.4	54.1	55.7	56.9	-2.5%	-2.4%	-3.1%	3.0%	2.2%
Natural gas	59.0	63.1	62.9	53.6	56.8	50.4	1.3%	-0.1%	-3.1%	5.9%	-11.2%
Other (1)	12.3	21.2	24.7	24.6	26.0	27.4	11.4%	3.2%	-0.1%	5.9%	5.2%
Electricity Generation in TWh	321.9	358.1	358.1	362.1	373.9	na	2.2%	0.0%	0.2%	3.3%	na
Nuclear	10.7	31.4	53.0	55.0	57.8	na	24.0%	11.1%	0.7%	5.1%	na
Hydro & wind	26.4	23.7	20.6	31.2	31.6	na	-2.2%	-2.7%	8.6%	1.3%	na
Thermal	284.8	303.1	284.5	276.0	284.6	na	1.2%	-1.3%	-0.6%	3.1%	na
Generation Capacity in GWe	56.0	68.3	94.6	93.7	95.3	na	4.1%	6.7%	-0.2%	1.7%	na
Nuclear	1.8	4.3	7.9	8.8	8.9	na	19.8%	12.8%	2.0%	1.5%	na
Hydro & wind	7.7	10.1	14.3	14.5	15.4	na	5.5%	7.2%	0.3%	5.9%	na
Thermal	46.5	53.9	72.4	70.4	71.0	na	3.0%	6.1%	-0.6%	0.9%	na
Average Load Factor in %	65.7	59.9	43.2	44.1	44.8	na	-1.8%	-6.3%	0.4%	1.5%	na
Fuel Inputs for Thermal Power Generation	90.0	102.2	93.4	81.8	84.4	na	2.6%	-1.8%	-2.6%	3.1%	na
Solids	70.2	77.2	69.9	65.2	67.1	na	1.9%	-2.0%	-1.4%	2.8%	na
Oil	11.4	10.9	9.7	6.1	6.2	na	-0.7%	-2.4%	-8.8%	1.4%	na
Gas	8.2	13.4	13.3	10.2	10.9	na	10.5%	-0.2%	-5.1%	6.0%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.3	0.6	0.5	0.3	0.3	na	13.0%	-4.5%	-10.2%	10.2%	na
Average Thermal Efficiency in %	27.2	25.5	26.2	29.0	29.0	na	-1.3%	0.5%	2.0%	0.0%	na
Non-Energy Uses	10.9	10.6	11.3	11.5	12.4	na	-0.5%	1.3%	0.5%	7.8%	na
Total Final Energy Demand	229.7	222.9	190.5	152.8	159.7	na	-0.6%	-3.1%	-4.3%	4.5%	na
Solids	71.7	73.0	46.9	36.7	36.4	na	0.3%	-8.5%	-4.8%	-0.7%	na
Oil	56.1	44.1	39.4	32.6	35.1	na	-4.7%	-2.2%	-3.7%	7.4%	na
Gas	46.0	43.6	42.0	32.2	33.4	na	-1.1%	-0.7%	-5.2%	3.5%	na
Electricity	21.7	24.3	25.1	21.9	23.1	na	2.2%	0.6%	-2.7%	5.7%	na
Heat	28.2	29.2	30.8	22.2	24.0	na	0.7%	1.0%	-6.3%	8.2%	na
Other	5.9	8.7	6.3	7.2	7.7	na	8.2%	-6.4%	2.8%	7.4%	na
CO_2 Emissions in Mt of CO_2	978.1	979.9	831.2	694.4	717.7	700.4	0.0%	-3.2%	-3.5%	3.4%	-2.4%
Indicators											
Population (Million)	95.29	97.90	99.34	98.81	98.72	98.62	0.5%	0.3%	-0.1%	-0.1%	-0.1%
GDP (index 1985=100)	91.8	100.0	99.5	95.2	98.3	100.2	1.7%	-0.1%	-0.9%	3.3%	1.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	2222.6	2097.7	1848.6	1674.3	1694.2	1629.3	-1.2%	-2.5%	-2.0%	1.2%	-3.8%
Gross Inl Cons./Capita (toe/inhabitant)	3.36	3.36	2.90	2.53	2.65	2.60	0.0%	-2.9%	-2.7%	4.6%	-1.9%
Electricity Generated/Capita (kWh/inhabitant)	3379	3658	3605	3664	3788	na	1.6%	-0.3%	0.3%	3.4%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	10.3	10.0	8.4	7.0	7.3	7.1	-0.5%	-3.5%	-3.4%	3.5%	-2.3%
Import Dependency (%)	22.3	20.3	26.8	23.1	26.1	25.3	-1.9%	5.7%	-3.0%	13.3%	-3.2%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

CENTRAL AND EASTERN COUNTRIES (FORMER YUGOSLAVIA EXCLUDED) : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	320.1	329.1	288.5	240.5	250.1	261.4	0.6%	-2.6%	-2.8%	4.5%
Public Thermal Power Generation	76.8	87.5	81.0	68.2	69.9	72.4	2.6%	-1.5%	-2.9%	3.6%
Autoprod. Thermal Power Generation	13.2	14.7	12.3	17.2	12.0	12.0	2.2%	-3.4%	-0.6%	0.6%
Energy Branch	14.1	14.7	15.3	17.5	17.8	17.7	0.8%	0.8%	3.1%	-0.7%
Final Energy Consumption	229.4	222.5	190.2	147.8	152.0	159.0	-0.6%	-3.1%	-4.4%	4.6%
Industry	115.2	109.0	89.8	59.8	63.5	64.5	-1.1%	-3.8%	-6.7%	1.6%
Transport	20.6	19.1	22.5	19.2	19.5	22.7	-1.5%	3.3%	-2.8%	16.4%
Tertiary-Domestic	93.6	94.4	77.9	68.8	68.9	71.7	0.2%	-3.8%	-2.4%	4.1%
Energy Intensity (toe/1990 MEUR)	2222.6	2097.7	1848.6	1698.3	1674.3	1694.2	-1.2%	-2.5%	-2.0%	1.2%
Public Thermal Power Generation	533.4	557.9	519.1	481.9	468.0	469.4	0.9%	-1.4%	-2.1%	0.3%
Autoprod. Thermal Power Generation	91.5	93.6	79.1	121.4	80.0	78.0	0.5%	-3.3%	0.2%	-2.6%
Industry	800.2	694.5	575.3	421.9	425.2	418.3	-2.8%	-3.7%	-5.9%	-1.6%
Transport	143.0	121.7	144.1	135.4	130.9	147.4	-3.2%	3.4%	-1.9%	12.7%
Tertiary-Domestic	650.2	601.9	498.8	486.1	461.3	465.0	-1.5%	-3.7%	-1.6%	0.8%
Energy per Capita (Kgoe/inhabitant)	3359	3361	2905	2433	2531	2647	0.0%	-2.9%	-2.7%	4.6%
Industry	1209	1113	904	604	643	654	-1.6%	-4.1%	-6.6%	1.7%
Transport	216	195	226	194	198	230	-2.0%	3.0%	-2.7%	16.5%
Tertiary-Domestic	983	964	784	696	697	727	-0.4%	-4.1%	-2.3%	4.2%
Electricity Share (%)										
Final Energy Consumption	9.5%	10.9%	13.2%	14.0%	14.4%	14.5%	2.9%	3.8%	1.8%	1.0%
Industry	12.0%	13.3%	15.0%	15.7%	15.5%	16.2%	2.1%	2.5%	0.6%	4.7%
Transport	5.3%	6.6%	5.8%	5.5%	5.5%	4.8%	4.4%	-2.4%	-1.3%	-11.9%
Tertiary-Domestic	7.3%	9.0%	13.2%	15.0%	15.9%	16.1%	4.4%	7.9%	3.8%	1.2%
Total Renewable Consumption (Mtoe)	8.5	11.3	8.5	9.5	10.1	10.7	6.0%	-5.6%	3.6%	5.6%
Hydro	2.3	2.0	1.8	2.2	2.7	2.7	-2.2%	-2.7%	8.6%	1.3%
Biomass	6.2	9.3	6.7	7.3	7.5	8.0	8.5%	-6.2%	2.1%	6.9%
Other	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	1761.0%
Renewable intensity (toe/1990MEUR)	58.7	72.2	54.5	66.9	67.9	69.5	4.2%	-5.5%	4.5%	2.3%
Renewable per capita (Kgoe/inhabitant)	88.8	115.7	85.6	95.9	102.7	108.6	5.4%	-5.8%	3.7%	5.7%
CO_2 Emissions (Mt of CO_2)	978.1	979.9	831.2	686.1	694.4	717.7	0.0%	-3.2%	-3.5%	3.4%
Public Thermal Power Generation	282.5	317.3	293.5	258.0	264.6	273.6	2.3%	-1.5%	-2.1%	3.4%
Autoprod. Thermal Power Generation	49.0	54.1	44.8	55.4	36.6	36.6	2.0%	-3.7%	-3.9%	-0.2%
Energy Branch	23.1	22.7	24.4	27.1	28.5	28.4	-0.3%	1.5%	3.1%	-0.3%
Industry	268.2	252.1	197.1	127.4	146.5	147.4	-1.2%	-4.8%	-5.8%	0.6%
Transport	60.5	55.3	65.4	55.6	56.6	66.4	-1.8%	3.4%	-2.8%	17.3%
Tertiary-Domestic	241.4	224.8	148.7	124.5	122.3	120.8	-1.4%	-7.9%	-3.8%	-1.2%
Carbon Intensity (tn of CO_2/toe)	3.1	3.0	2.9	2.9	2.8	2.7	-0.5%	-0.7%	-0.7%	-1.1%
Public Power Generation	3.5	3.2	3.0	3.0	3.0	3.0	-1.2%	-1.3%	0.0%	-0.3%
Public Thermal Power Generation	3.7	3.6	3.6	3.8	3.8	3.8	-0.3%	0.0%	0.9%	-0.2%
Autoprod. Power Generation	3.7	3.7	3.6	3.2	3.1	3.0	-0.2%	-0.3%	-3.3%	-0.7%
Autoprod. Thermal Power Generation	3.7	3.7	3.6	3.2	3.1	3.0	-0.2%	-0.3%	-3.3%	-0.8%
Energy Branch	3.6	3.6	3.5	3.3	3.3	3.3	-0.2%	-0.4%	-1.1%	-0.9%
Industry	1.6	1.5	1.6	1.5	1.6	1.6	-1.2%	0.7%	0.1%	0.5%
Transport	2.3	2.3	2.2	2.1	2.3	2.3	-0.1%	-1.1%	1.0%	-1.0%
Tertiary-Domestic	2.9	2.9	2.9	2.9	2.9	2.9	-0.3%	0.1%	-0.1%	0.8%
CO_2 per Capita (kg of CO_2/inhabitant)	10265	10008	8367	6940	7028	7270	-0.5%	-3.5%	-3.4%	3.5%
Industry	2814	2575	1984	1289	1483	1493	-1.8%	-5.1%	-5.7%	0.7%
Transport	635	565	658	563	573	673	-2.3%	3.1%	-2.7%	17.4%
Tertiary-Domestic	2534	2296	1497	1260	1237	1224	-2.0%	-8.2%	-3.7%	-1.1%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	6792	6246	5325	4845	4649	4653	-1.7%	-3.1%	-2.7%	0.1%
Public Thermal Power Generation	1962	2023	1880	1822	1771	1774	0.6%	-1.4%	-1.2%	0.1%
Autoprod. Thermal Power Generation	340	345	287	391	245	237	0.3%	-3.6%	-3.1%	-3.3%
Energy Branch	371	342	367	268	263	288	-1.6%	1.4%	-6.4%	9.6%
Industry	160	145	156	192	191	184	-2.0%	1.6%	4.0%	-3.5%
Transport	1862	1607	1263	900	981	956	-2.9%	-4.7%	-4.9%	-2.6%
Tertiary-Domestic	420	353	419	393	379	430	-3.5%	3.5%	-2.0%	13.6%

BULGARIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	7.7	9.5	9.8	10.0	10.3	9.5	4.3%	0.6%	0.5%	3.2%	-8.1%
Solids	5.2	5.3	5.4	5.1	5.2	4.7	0.4%	0.4%	-1.0%	1.1%	-9.8%
Oil	0.3	0.2	0.1	0.0	0.0	0.0	-6.2%	-21.4%	-6.5%	-25.6%	0.0%
Natural gas	0.1	0.0	0.0	0.0	0.0	0.0	-34.8%	-8.9%	29.6%	-16.7%	0.0%
Nuclear	1.6	3.4	3.8	4.5	4.7	4.3	16.3%	2.2%	3.3%	4.8%	-7.9%
Hydro & Wind	0.3	0.2	0.2	0.1	0.1	0.2	-9.6%	-3.4%	-7.9%	34.7%	4.2%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.2	0.4	0.4	0.2	0.2	0.3	16.0%	-2.8%	-9.4%	14.4%	12.1%
Net Imports	21.0	21.6	17.7	13.3	13.0	11.3	0.6%	-3.9%	-5.5%	-2.7%	-13.0%
Solids	4.3	5.2	3.4	2.2	2.4	2.0	4.0%	-8.3%	-8.1%	8.0%	-15.3%
Oil	13.4	11.5	8.6	6.6	5.9	5.6	-3.0%	-5.7%	-5.2%	-10.3%	-5.0%
Crude oil	13.2	12.6	8.3	8.1	7.1	na	-0.9%	-8.0%	-0.6%	-12.3%	na
Oil products	0.1	-1.1	0.3	-1.5	-1.2	na	-	-	-	-20.8%	na
Natural gas	3.0	4.6	5.4	4.6	4.7	3.7	8.6%	3.5%	-3.4%	3.7%	-22.1%
Electricity	0.3	0.4	0.3	0.0	0.0	0.0	2.4%	-2.5%	-	180.6%	-64.4%
Gross Inland Consumption	28.7	31.0	27.7	22.9	22.6	20.6	1.5%	-2.2%	-3.7%	-1.3%	-8.9%
Solids	9.4	10.5	8.8	7.2	7.3	6.7	2.2%	-3.4%	-3.8%	0.9%	-8.3%
Oil	13.7	11.5	8.8	6.3	5.6	5.4	-3.4%	-5.1%	-6.5%	-11.3%	-2.5%
Natural gas	3.2	4.6	5.4	4.6	4.7	3.7	7.7%	3.2%	-3.2%	2.0%	-20.5%
Other (1)	2.5	4.4	4.7	4.8	5.1	4.8	12.4%	1.2%	0.6%	5.3%	-5.9%
Electricity Generation in TWh	34.8	41.6	42.1	40.7	41.5	na	3.6%	0.2%	-0.7%	1.8%	na
Nuclear	6.2	13.1	14.7	17.3	18.1	na	16.3%	2.2%	3.3%	4.8%	na
Hydro & wind	3.7	2.2	1.9	1.2	1.7	na	-9.6%	-3.4%	-7.9%	34.6%	na
Thermal	25.0	26.3	25.6	22.2	21.7	na	1.0%	-0.5%	-2.8%	-2.2%	na
Generation Capacity in GWe	8.2	10.2	11.1	12.1	12.1	na	4.6%	1.7%	1.7%	0.0%	na
Nuclear	0.9	1.8	2.8	3.5	3.5	na	14.9%	9.4%	5.1%	0.0%	na
Hydro & wind	1.9	2.0	2.0	1.4	1.4	na	1.1%	0.0%	-6.6%	0.0%	na
Thermal	5.4	6.5	6.4	7.1	7.1	na	3.6%	-0.3%	2.2%	0.0%	na
Average Load Factor in %	48.5	46.4	43.2	38.5	39.2	na	-0.9%	-1.4%	-2.3%	1.8%	na
Fuel Inputs for Thermal Power Generation	9.5	9.8	8.0	8.1	8.0	na	0.7%	-4.0%	0.1%	-0.5%	na
Solids	5.4	5.5	5.4	5.8	5.9	na	0.5%	-0.2%	1.4%	1.0%	na
Oil	4.2	3.4	0.7	0.6	0.5	na	-3.7%	-27.7%	-1.9%	-10.6%	na
Gas	0.0	0.9	1.9	1.7	1.6	na	-	15.9%	-3.1%	-2.2%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	22.6	22.9	27.4	23.7	23.2	na	0.3%	3.6%	-2.9%	-1.7%	na
Non-Energy Uses	0.7	0.7	0.5	1.2	1.4	na	0.9%	-6.5%	19.9%	15.2%	na
Total Final Energy Demand	19.2	18.4	17.7	11.3	11.3	na	-0.9%	-0.7%	-8.5%	-0.7%	na
Solids	3.4	4.4	1.5	1.4	1.4	na	5.3%	-19.8%	-1.3%	0.4%	na
Oil	8.0	5.4	5.8	2.9	2.7	na	-7.6%	1.4%	-12.6%	-7.2%	na
Gas	3.2	3.7	2.5	1.6	1.5	na	3.0%	-7.2%	-9.4%	-4.3%	na
Electricity	2.6	3.0	3.0	2.5	2.6	na	3.4%	0.1%	-4.0%	4.2%	na
Heat	1.9	1.4	4.5	2.8	2.9	na	-5.5%	26.0%	-9.2%	2.3%	na
Other	0.2	0.4	0.4	0.2	0.2	na	16.0%	-2.9%	-9.9%	13.3%	na
CO_2 Emissions in Mt of CO_2	81.8	79.6	66.2	53.1	52.2	na	-0.5%	-3.6%	-4.3%	-1.8%	na
Indicators											
Population (Million)	8.86	8.94	8.72	8.40	8.36	8.31	0.2%	-0.5%	-0.7%	-0.5%	-0.6%
GDP (index 1985=100)	80.9	100.0	107.9	88.3	80.3	74.8	4.3%	1.5%	-3.9%	-9.0%	-6.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	2348.0	2052.4	1699.2	1720.0	1865.2	1825.8	-2.7%	-3.7%	0.2%	8.4%	-2.1%
Gross Inl Cons./Capita (toe/inhabitant)	3.24	3.46	3.17	2.73	2.71	2.48	1.4%	-1.7%	-3.0%	-0.8%	-8.3%
Electricity Generated/Capita (kWh/inhabitant)	3931	4656	4834	4848	4963	na	3.4%	0.8%	0.1%	2.4%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	9.2	8.9	7.6	6.3	6.2	na	-0.7%	-3.1%	-3.6%	-1.3%	na
Import Dependency (%)	73.3	69.3	63.2	57.4	56.7	54.0	-1.1%	-1.8%	-1.9%	-1.2%	-4.8%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

CZECH REPUBLIC : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	43.3	44.6	39.3	31.3	31.9	30.1	0.6%	-2.5%	-4.5%	2.2%	-5.8%
Solids	42.2	43.0	35.2	27.0	27.6	25.8	0.4%	-4.0%	-5.1%	2.0%	-6.6%
Oil	0.1	0.0	0.0	0.3	0.2	0.2	-0.8%	0.4%	38.7%	-17.4%	-25.0%
Natural gas	0.3	0.2	0.2	0.2	0.2	0.2	-5.2%	-3.6%	-0.3%	-8.1%	0.0%
Nuclear	0.0	0.6	3.3	3.2	3.3	3.4	-	39.3%	-0.6%	5.1%	2.5%
Hydro & Wind	0.2	0.1	0.1	0.2	0.2	0.1	-7.0%	-2.9%	6.8%	13.3%	-26.3%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.6	0.5	0.5	0.4	0.4	0.4	-3.9%	1.9%	-3.5%	0.0%	-3.5%
Net Imports	4.6	5.4	5.3	7.0	9.1	10.2	3.3%	-0.1%	5.6%	29.0%	12.5%
Solids	-8.7	-9.4	-7.9	-7.2	-6.5	-5.1	1.6%	-3.4%	-1.8%	-9.9%	-21.0%
Oil	11.0	11.3	8.5	7.8	8.0	7.9	0.6%	-5.5%	-1.9%	3.0%	-1.6%
Crude oil	9.1	8.7	7.2	6.9	7.4	na	-1.0%	-3.7%	-0.6%	6.4%	na
Oil products	1.8	2.7	1.4	0.8	0.6	na	7.6%	-12.4%	-9.6%	-25.4%	na
Natural gas	2.4	3.5	4.8	6.4	7.5	7.4	7.9%	6.3%	6.1%	17.5%	-1.9%
Electricity	-0.1	-0.1	-0.1	0.0	0.0	0.0	-14.9%	0.5%	-	-	-
Gross Inland Consumption	47.5	50.3	45.2	38.9	40.4	40.2	1.2%	-2.1%	-3.0%	3.9%	-0.5%
Solids	33.2	33.5	27.5	20.6	20.7	20.6	0.2%	-3.9%	-5.5%	0.2%	-0.3%
Oil	11.0	11.4	8.6	7.9	8.2	8.0	0.6%	-5.3%	-1.8%	4.1%	-2.7%
Natural gas	2.6	4.2	5.3	6.5	7.5	7.6	10.2%	4.4%	4.5%	15.1%	0.6%
Other (1)	0.6	1.2	3.9	3.8	4.0	4.0	12.9%	26.9%	-0.2%	3.9%	1.3%
Electricity Generation in TWh	52.7	58.1	62.6	60.6	63.8	na	2.0%	1.5%	-0.6%	5.4%	na
Nuclear	0.0	2.4	12.6	12.2	12.9	na	-	39.3%	-0.6%	5.1%	na
Hydro & wind	2.4	1.7	1.4	2.0	2.0	na	-7.0%	-2.9%	6.7%	-1.6%	na
Thermal	50.3	54.1	48.5	46.3	49.0	na	1.5%	-2.1%	-0.9%	5.7%	na
Generation Capacity in GWe	na	na	15.3	13.9	14.7	na	na	na	-1.9%	6.3%	na
Nuclear	0.0	0.2	1.8	1.8	1.8	na	-	54.5%	0.0%	0.0%	na
Hydro & wind	na	na	1.4	1.4	1.8	na	na	na	0.1%	26.5%	na
Thermal	na	na	12.1	10.7	11.2	na	na	na	-2.5%	4.7%	na
Average Load Factor in %	na	na	46.7	49.9	49.5	na	na	na	1.3%	-0.9%	na
Fuel Inputs for Thermal Power Generation	11.4	11.7	10.1	12.4	13.4	na	0.5%	-2.9%	4.2%	8.2%	na
Solids	10.0	10.6	9.2	11.7	12.5	na	1.2%	-2.8%	4.9%	7.1%	na
Oil	1.2	0.9	0.7	0.3	0.4	na	-5.6%	-4.4%	-15.9%	18.8%	na
Gas	0.2	0.2	0.2	0.3	0.5	na	0.0%	0.0%	15.8%	35.4%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	0.0%	na
Average Thermal Efficiency in %	37.9	39.7	41.3	32.2	31.4	na	0.9%	0.8%	-4.9%	-2.4%	na
Non-Energy Uses	0.8	0.8	0.7	1.9	2.0	na	2.1%	-3.6%	22.0%	4.1%	na
Total Final Energy Demand	38.4	39.3	33.6	25.9	25.8	na	0.5%	-3.1%	-5.1%	-0.6%	na
Solids	21.4	22.5	17.4	7.2	5.8	na	1.0%	-5.0%	-16.1%	-20.1%	na
Oil	9.4	7.6	6.0	5.5	5.6	na	-4.3%	-4.6%	-1.6%	2.3%	na
Gas	2.4	3.4	4.2	5.2	5.9	na	7.7%	4.0%	4.5%	12.1%	na
Electricity	3.3	3.7	4.1	4.1	4.3	na	2.7%	2.2%	0.0%	4.6%	na
Heat	1.4	1.7	1.5	3.5	3.7	na	3.9%	-2.6%	19.0%	8.3%	na
Other	0.6	0.5	0.5	0.4	0.4	na	-3.9%	1.9%	-5.4%	13.3%	na
CO_2 Emissions in Mt of CO_2	172.4	176.7	146.4	111.3	112.5	na	0.5%	-3.7%	-5.3%	1.0%	na
Indicators											
Population (Million)	10.28	10.31	10.36	10.33	10.32	10.31	0.0%	0.1%	-0.1%	-0.1%	-0.1%
GDP (index 1985=100)	95.2	100.0	108.2	101.3	105.5	106.5	1.0%	1.6%	-1.3%	4.1%	1.0%
Gross Inl Cons./GDP (toe/1990 MEUR)	2506.3	2527.6	2101.1	1929.7	1925.6	1897.5	0.2%	-3.6%	-1.7%	-0.2%	-1.5%
Gross Inl Cons./Capita (toe/inhabitant)	4.62	4.88	4.36	3.77	3.92	3.90	1.1%	-2.2%	-2.9%	4.0%	-0.4%
Electricity Generated/Capita (kWh/inhabitant)	5121	5640	6037	5863	6187	na	2.0%	1.4%	-0.6%	5.5%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	16.8	17.1	14.1	10.8	10.9	na	0.5%	-3.8%	-5.3%	1.2%	na
Import Dependency (%)	9.6	10.7	11.8	18.0	22.4	25.3	2.1%	2.0%	8.8%	24.2%	13.0%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

HUNGARY : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	14.9	16.9	14.2	13.0	12.8	13.1	2.6%	-3.4%	-1.7%	-1.5%	1.8%
Solids	6.4	5.8	4.2	3.1	3.2	3.3	-2.0%	-6.3%	-6.0%	4.1%	3.9%
Oil	2.5	2.5	2.3	2.3	2.1	2.5	0.0%	-2.1%	0.2%	-7.7%	19.0%
Natural gas	5.1	5.8	3.8	3.8	3.6	3.4	2.8%	-8.2%	-0.1%	-4.9%	-6.3%
Nuclear	0.0	1.7	3.6	3.7	3.7	3.6	-	16.2%	0.4%	1.1%	-1.5%
Hydro & Wind	0.0	0.0	0.0	0.0	0.0	0.0	6.7%	2.8%	-1.7%	27.0%	0.0%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.9	1.1	0.4	0.2	0.2	0.2	3.9%	-19.0%	-9.8%	-1.2%	-9.9%
Net Imports	14.3	13.8	14.2	12.1	13.3	12.2	-0.6%	0.5%	-3.1%	9.7%	-8.6%
Solids	2.2	2.6	1.6	1.1	1.1	1.1	3.6%	-9.0%	-8.0%	3.0%	-1.7%
Oil	8.3	7.1	6.5	5.3	4.7	4.5	-3.1%	-1.8%	-3.8%	-10.8%	-5.1%
Crude oil	7.4	6.4	6.3	5.7	5.1	na	-2.9%	-0.3%	-1.8%	-10.9%	na
Oil products	0.8	0.7	0.2	-0.4	-0.4	na	-4.8%	-23.9%	-	-13.0%	na
Natural gas	3.2	3.3	5.2	5.5	7.3	6.4	0.4%	9.7%	1.4%	31.3%	-12.4%
Electricity	0.6	0.9	1.0	0.2	0.2	0.2	7.9%	0.6%	-26.4%	-8.6%	9.5%
Gross Inland Consumption	28.9	30.4	28.6	24.9	25.5	25.3	1.0%	-1.2%	-2.7%	2.1%	-0.5%
Solids	8.5	8.0	6.2	4.2	4.3	4.4	-1.0%	-5.1%	-7.5%	2.3%	2.5%
Oil	11.0	9.8	8.6	7.5	6.8	7.2	-2.1%	-2.6%	-2.7%	-8.7%	4.7%
Natural gas	8.0	8.8	8.9	9.2	10.2	9.7	2.1%	0.2%	0.6%	11.6%	-4.9%
Other (1)	1.5	3.7	4.9	4.1	4.1	4.1	19.4%	5.9%	-3.6%	0.6%	-1.4%
Electricity Generation in TWh	23.9	26.8	28.4	34.0	35.1	na	2.3%	1.2%	3.6%	3.2%	na
Nuclear	0.0	6.5	13.7	14.0	14.2	na	-	16.2%	0.4%	1.1%	na
Hydro & wind	0.1	0.2	0.2	0.2	0.2	na	6.7%	2.8%	-1.7%	27.0%	na
Thermal	23.8	20.2	14.5	19.8	20.7	na	-3.2%	-6.3%	6.4%	4.4%	na
Generation Capacity in GWe	4.8	5.8	6.6	7.0	7.5	na	3.7%	2.6%	1.2%	7.5%	na
Nuclear	0.0	0.8	1.7	1.8	1.8	na	-	15.1%	2.2%	0.0%	na
Hydro & wind	0.0	0.0	0.0	0.0	0.0	na	0.0%	0.9%	0.0%	0.0%	na
Thermal	4.8	4.9	4.9	5.1	5.6	na	0.6%	-0.2%	0.9%	10.2%	na
Average Load Factor in %	56.3	52.7	49.2	55.4	53.2	na	-1.3%	-1.4%	2.4%	-4.0%	na
Fuel Inputs for Thermal Power Generation	8.2	7.0	5.3	5.9	6.0	na	-3.1%	-5.4%	2.2%	2.4%	na
Solids	4.2	3.7	3.3	2.8	2.9	na	-2.7%	-2.0%	-3.2%	3.7%	na
Oil	1.5	1.4	0.4	1.6	1.3	na	-0.7%	-23.4%	32.6%	-13.9%	na
Gas	2.5	1.9	1.6	1.5	1.8	na	-5.4%	-3.3%	-0.9%	17.0%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	25.1	24.8	23.7	28.9	29.5	na	-0.2%	-1.0%	4.1%	1.9%	na
Non-Energy Uses	2.7	2.2	1.9	1.8	1.6	na	-3.6%	-3.2%	-1.5%	-8.6%	na
Total Final Energy Demand	19.7	21.4	20.0	15.9	16.5	na	1.7%	-1.3%	-4.5%	3.4%	na
Solids	3.5	3.8	2.5	1.1	1.0	na	2.1%	-7.9%	-16.0%	-1.9%	na
Oil	7.2	6.4	6.5	4.0	3.8	na	-2.1%	0.3%	-9.2%	-4.7%	na
Gas	3.9	5.1	5.6	6.5	7.1	na	5.5%	1.9%	2.9%	10.4%	na
Electricity	2.2	2.6	2.7	2.4	2.5	na	3.4%	0.9%	-2.6%	3.4%	na
Heat	2.1	2.4	2.3	1.8	1.8	na	2.7%	-0.9%	-5.1%	0.3%	na
Other	0.9	1.1	0.4	0.2	0.2	na	3.9%	-19.2%	-9.6%	-1.2%	na
CO_2 Emissions in Mt of CO_2	79.1	78.0	68.6	56.9	58.6	na	-0.3%	-2.5%	-3.6%	2.9%	na
Indicators											
Population (Million)	10.71	10.58	10.37	10.23	10.19	10.16	-0.2%	-0.4%	-0.3%	-0.4%	-0.3%
GDP (index 1985=100)	90.1	100.0	104.1	92.4	93.6	97.7	2.1%	0.8%	-2.4%	1.3%	4.4%
Gross Inl Cons./GDP (toe/1990 MEUR)	1187.5	1125.1	1017.5	1000.4	1008.6	961.3	-1.1%	-2.0%	-0.3%	0.8%	-4.7%
Gross Inl Cons./Capita (toe/inhabitant)	2.70	2.87	2.76	2.44	2.50	2.49	1.2%	-0.8%	-2.4%	2.5%	-0.2%
Electricity Generated/Capita (kWh/inhabitant)	2230	2533	2743	3326	3442	na	2.6%	1.6%	3.9%	3.5%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	7.4	7.4	6.6	5.6	5.7	na	0.0%	-2.1%	-3.4%	3.2%	na
Import Dependency (%)	49.4	45.6	49.7	48.6	52.2	47.9	-1.6%	1.7%	-0.4%	7.4%	-8.2%

(1) Includes nuclea, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

POLAND : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	124.1	128.1	101.5	99.5	103.5	103.3	0.6%	-4.6%	-0.4%	4.0%	-0.1%
Solids	115.9	118.0	94.5	91.1	94.3	93.9	0.4%	-4.4%	-0.7%	3.6%	-0.5%
Oil	0.3	0.2	0.2	0.4	0.4	0.5	-10.5%	-2.2%	15.5%	8.0%	20.0%
Natural gas	4.5	4.1	2.4	3.2	3.2	3.2	-1.9%	-10.5%	5.9%	2.3%	0.0%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & Wind	0.2	0.2	0.1	0.2	0.2	0.2	-4.6%	-5.2%	6.1%	2.3%	-7.7%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	3.1	5.7	4.4	4.7	5.3	5.6	13.0%	-5.0%	1.6%	12.6%	4.7%
Net Imports	2.6	-1.8	2.1	-0.9	5.6	7.1	-	-	-	-	25.6%
Solids	-20.5	-23.2	-18.9	-21.2	-18.1	-16.6	2.5%	-4.0%	2.3%	-14.7%	-8.5%
Oil	18.8	16.7	14.3	14.7	17.7	18.3	-2.3%	-3.0%	0.5%	20.3%	3.6%
Crude oil	16.6	13.8	12.9	13.0	15.0	na	-3.7%	-1.2%	0.1%	15.5%	na
Oil products	2.1	2.9	1.4	1.7	2.7	na	6.6%	-14.0%	4.5%	56.4%	na
Natural gas	4.3	4.8	6.8	5.8	6.3	5.5	2.4%	6.9%	-3.0%	8.4%	-12.3%
Electricity	0.0	-0.2	-0.1	-0.2	-0.3	-0.2	55.1%	-13.2%	21.9%	11.5%	-10.3%
Gross Inland Consumption	126.5	128.4	102.0	99.3	108.4	110.3	0.3%	-4.5%	-0.5%	9.2%	1.8%
Solids	96.0	96.9	75.4	70.3	75.6	77.3	0.2%	-4.9%	-1.4%	7.5%	2.3%
Oil	18.5	16.9	13.3	15.2	18.0	18.8	-1.8%	-4.7%	2.8%	18.3%	4.1%
Natural gas	8.8	8.9	8.9	9.0	9.5	8.8	0.3%	0.0%	0.1%	6.2%	-8.2%
Other (1)	3.2	5.6	4.4	4.8	5.2	5.5	11.6%	-4.8%	1.6%	9.8%	5.1%
Electricity Generation in TWh	120.8	135.6	134.5	137.0	141.2	na	2.3%	-0.2%	0.4%	3.0%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	2.3	1.9	1.4	1.9	1.9	na	-4.6%	-5.2%	5.9%	2.3%	na
Thermal	118.4	133.7	133.1	135.2	139.3	na	2.5%	-0.1%	0.3%	3.0%	na
Generation Capacity in GWe	24.7	29.0	30.9	29.5	29.5	na	3.3%	1.3%	-1.0%	0.0%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	1.3	2.0	1.9	2.0	2.0	na	8.8%	-1.3%	2.0%	0.0%	na
Thermal	23.4	27.1	29.1	27.4	27.4	na	2.9%	1.4%	-1.2%	0.0%	na
Average Load Factor in %	55.8	53.3	49.7	53.1	54.7	na	-0.9%	-1.4%	1.3%	3.0%	na
Fuel Inputs for Thermal Power Generation	46.5	50.6	44.5	36.9	37.8	na	1.7%	-2.5%	-3.7%	2.4%	na
Solids	43.9	48.2	42.7	36.3	37.2	na	1.9%	-2.4%	-3.2%	2.3%	na
Oil	2.3	1.8	1.2	0.4	0.4	na	-4.7%	-7.0%	-20.0%	-2.9%	na
Gas	0.1	0.1	0.1	0.1	0.1	na	-7.9%	0.0%	-2.3%	33.4%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.3	0.6	0.4	0.1	0.1	na	13.0%	-5.0%	-23.8%	22.2%	na
Average Thermal Efficiency in %	21.9	22.7	25.7	31.5	31.7	na	0.8%	2.5%	4.1%	0.6%	na
Non-Energy Uses	4.5	4.7	4.6	4.0	4.2	na	1.2%	-0.6%	-2.9%	6.7%	na
Total Final Energy Demand	77.6	78.3	60.3	61.7	66.6	na	0.2%	-5.1%	0.5%	7.9%	na
Solids	31.8	29.8	17.2	22.5	23.9	na	-1.3%	-10.4%	5.5%	5.9%	na
Oil	12.1	11.4	9.3	12.0	13.8	na	-1.2%	-4.0%	5.1%	15.1%	na
Gas	6.1	6.0	6.0	6.0	6.5	na	-0.2%	-0.1%	-0.1%	8.9%	na
Electricity	7.2	7.8	8.3	7.7	8.0	na	1.7%	1.2%	-1.4%	4.2%	na
Heat	17.6	18.1	15.6	8.8	9.2	na	0.5%	-3.0%	-10.7%	4.9%	na
Other	2.8	5.1	3.9	4.7	5.2	na	13.0%	-5.0%	3.8%	9.9%	na
CO_2 Emissions in Mt of CO_2	409.7	413.3	331.8	322.3	340.2	na	0.2%	-4.3%	-0.6%	5.5%	na
Indicators											
Population (Million)	35.58	37.20	38.12	38.59	38.62	38.67	0.9%	0.5%	0.2%	0.1%	0.1%
GDP (index 1985=100)	99.1	100.0	98.5	109.8	116.2	124.2	0.2%	-0.3%	2.2%	5.8%	6.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	2711.0	2728.6	2202.1	1922.1	1983.1	1888.2	0.1%	-4.2%	-2.7%	3.2%	-4.8%
Gross Inl Cons./Capita (toe/inhabitant)	3.55	3.45	2.68	2.57	2.81	2.85	-0.6%	-5.0%	-0.8%	9.1%	1.7%
Electricity Generated/Capita (kWh/inhabitant)	3394	3644	3528	3551	3656	na	1.4%	-0.6%	0.1%	2.9%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	11.5	11.1	8.7	8.4	8.8	na	-0.7%	-4.8%	-0.8%	5.5%	na
Import Dependency (%)	2.0	-1.4	2.0	-0.9	5.2	6.4	-	-	-	-	23.7%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

ROMANIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	52.6	54.3	39.7	31.6	31.3	29.8	0.6%	-6.1%	-4.4%	-1.1%	-4.8%
Solids	8.1	10.3	7.6	7.4	7.5	6.1	4.9%	-6.0%	-0.6%	2.3%	-18.6%
Oil	11.2	10.4	7.7	6.8	6.7	6.6	-1.4%	-5.8%	-2.5%	-1.4%	-1.4%
Natural gas	31.3	31.3	22.9	14.4	13.8	11.8	0.0%	-6.1%	-8.8%	-4.7%	-14.3%
Nuclear	0.0	0.0	0.0	0.0	0.4	2.0	-	-	-	-	466.7%
Hydro & Wind	1.1	1.1	0.9	1.4	1.4	1.3	0.1%	-2.9%	8.7%	-5.6%	-2.6%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	1.0	1.2	0.6	1.6	1.6	1.9	4.5%	-12.8%	22.1%	-0.1%	18.0%
Net Imports	12.1	11.3	21.6	14.0	14.4	12.5	-1.4%	13.9%	-8.3%	3.0%	-13.5%
Solids	4.0	4.9	4.3	2.7	2.5	2.0	4.1%	-2.7%	-8.8%	-9.0%	-18.7%
Oil	6.9	4.6	10.6	6.5	6.2	6.7	-8.1%	18.4%	-9.4%	-3.8%	8.3%
Crude oil	15.5	14.2	15.6	8.4	6.9	na	-1.7%	1.9%	-11.6%	-17.3%	na
Oil products	-8.6	-9.6	-5.0	-1.9	-0.7	na	2.4%	-12.3%	-17.2%	-62.3%	na
Natural gas	1.1	1.5	5.9	4.8	5.7	3.7	6.6%	31.2%	-4.2%	17.9%	-34.8%
Electricity	0.0	0.3	0.8	0.0	0.1	0.0	50.4%	23.8%	-49.9%	169.9%	-63.0%
Gross Inland Consumption	64.7	64.6	61.1	45.6	45.8	42.4	0.0%	-1.1%	-5.7%	0.5%	-7.4%
Solids	12.1	15.2	11.7	10.1	9.9	8.1	4.6%	-5.1%	-2.9%	-1.7%	-18.0%
Oil	18.1	14.9	18.2	13.2	13.1	13.5	-3.8%	4.1%	-6.3%	-0.6%	3.1%
Natural gas	32.4	31.9	28.8	19.2	19.4	15.5	-0.3%	-2.0%	-7.8%	0.9%	-20.2%
Other (1)	2.1	2.6	2.4	3.1	3.4	5.3	4.4%	-1.7%	5.5%	10.4%	56.1%
Electricity Generation in TWh	66.1	70.9	63.9	59.3	61.4	na	1.4%	-2.1%	-1.5%	3.5%	na
Nuclear	0.0	0.0	0.0	0.0	1.4	na	-	-	-	-	na
Hydro & wind	12.6	12.7	11.0	16.7	15.8	na	0.1%	-2.9%	8.7%	-5.6%	na
Thermal	53.5	58.2	52.9	42.6	44.2	na	1.7%	-1.9%	-4.2%	3.8%	na
Generation Capacity in GWe	16.1	19.6	22.5	22.3	22.2	na	4.0%	2.8%	-0.2%	-0.6%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	3.5	4.4	5.7	6.0	6.0	na	5.1%	5.1%	1.1%	0.7%	na
Thermal	12.7	15.2	16.8	16.3	16.1	na	3.7%	2.1%	-0.6%	-1.0%	na
Average Load Factor in %	46.9	41.4	32.4	30.4	31.6	na	-2.5%	-4.7%	-1.3%	4.1%	na
Fuel Inputs for Thermal Power Generation	11.3	19.9	22.3	15.7	16.2	na	12.0%	2.3%	-6.8%	3.4%	na
Solids	4.7	7.0	7.1	6.7	6.7	na	8.4%	0.2%	-1.3%	0.5%	na
Oil	1.5	2.8	6.2	3.0	3.3	na	13.2%	17.6%	-13.6%	10.2%	na
Gas	5.1	10.1	9.0	6.0	6.2	na	14.5%	-2.3%	-7.8%	3.1%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	22.9%	16.4%	na
Average Thermal Efficiency in %	40.7	25.2	20.4	23.3	23.4	na	-9.2%	-4.1%	2.7%	0.5%	na
Non-Energy Uses	1.4	1.2	1.1	0.9	1.4	na	-3.6%	-1.8%	-2.2%	44.3%	na
Total Final Energy Demand	57.9	49.2	42.1	26.2	27.8	na	-3.2%	-3.1%	-9.1%	6.4%	na
Solids	6.9	7.0	2.8	1.5	1.5	na	0.4%	-17.0%	-11.6%	0.2%	na
Oil	13.4	8.9	8.0	5.8	6.7	na	-7.9%	-2.1%	-6.3%	16.0%	na
Gas	27.3	21.8	19.8	9.5	9.0	na	-4.3%	-1.9%	-13.7%	-5.1%	na
Electricity	4.6	5.1	4.7	3.1	3.4	na	1.9%	-1.8%	-7.7%	9.3%	na
Heat	4.7	5.1	6.2	4.7	5.6	na	1.6%	3.8%	-5.4%	20.0%	na
Other	0.9	1.2	0.6	1.6	1.6	na	4.8%	-13.2%	22.1%	-0.6%	na
CO_2 Emissions in Mt of CO_2	178.1	176.1	162.0	111.1	115.6	na	-0.2%	-1.7%	-7.3%	4.0%	na
Indicators											
Population (Million)	22.20	22.73	23.21	22.68	22.61	22.51	0.5%	0.4%	-0.5%	-0.3%	-0.4%
GDP (index 1985=100)	85.7	100.0	86.1	78.7	81.9	76.5	3.1%	-2.9%	-1.8%	4.1%	-6.6%
Gross Inl Cons./GDP (toe/1990 MEUR)	2163.2	1852.7	2034.4	1659.5	1602.8	1588.9	-3.1%	1.9%	-4.0%	-3.4%	-0.9%
Gross Inl Cons./Capita (toe/inhabitant)	2.91	2.84	2.63	2.01	2.03	1.88	-0.5%	-1.5%	-5.3%	0.9%	-7.0%
Electricity Generated/Capita (kWh/inhabitant)	2978	3121	2753	2613	2714	na	0.9%	-2.5%	-1.0%	3.9%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	8.0	7.7	7.0	4.9	5.1	na	-0.7%	-2.1%	-6.8%	4.4%	na
Import Dependency (%)	18.7	17.5	35.4	30.7	31.4	29.3	-1.4%	15.2%	-2.8%	2.4%	-6.6%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

SLOVAKIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	3.4	4.8	5.3	4.9	4.8	4.7	7.1%	1.9%	-1.4%	-2.2%	-3.4%
Solids	1.7	1.7	1.4	1.1	1.1	1.0	-0.2%	-3.7%	-4.6%	1.9%	-6.4%
Oil	0.0	0.1	0.1	0.1	0.1	0.1	9.5%	2.6%	0.3%	-5.4%	0.0%
Natural gas	0.1	0.3	0.3	0.3	0.2	0.2	17.8%	2.1%	-5.0%	-8.5%	0.0%
Nuclear	1.2	2.4	3.1	3.0	2.9	2.9	15.7%	5.1%	-1.0%	-1.5%	-0.9%
Hydro & Wind	0.2	0.2	0.2	0.4	0.4	0.3	-1.3%	-2.3%	21.4%	-13.3%	-14.8%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.2	0.1	0.2	0.1	0.1	0.1	-4.7%	5.2%	-14.4%	-0.4%	-11.7%
Net Imports	17.4	16.7	16.5	12.2	13.0	11.5	-0.8%	-0.2%	-5.8%	6.4%	-11.6%
Solids	6.0	6.5	5.7	3.9	4.1	3.0	1.7%	-2.6%	-7.3%	6.6%	-27.2%
Oil	7.4	5.9	4.7	3.6	3.5	3.5	-4.6%	-4.3%	-5.0%	-5.3%	0.7%
Crude oil	9.8	7.9	6.2	5.4	5.3	na	-4.1%	-4.9%	-2.7%	-0.9%	na
Oil products	-2.3	-2.0	-1.4	-1.7	-1.9	na	-2.5%	-6.8%	3.9%	8.4%	na
Natural gas	3.7	3.9	5.6	4.6	5.1	4.9	1.3%	7.4%	-4.0%	11.8%	-4.3%
Electricity	0.3	0.4	0.4	0.1	0.3	0.1	4.8%	4.4%	-23.3%	154.7%	-60.7%
Gross Inland Consumption	20.8	21.7	21.4	17.3	17.4	16.1	0.8%	-0.3%	-4.1%	0.6%	-7.7%
Solids	7.7	8.3	7.4	5.2	5.0	4.1	1.5%	-2.3%	-6.7%	-3.9%	-19.1%
Oil	7.5	6.0	4.7	3.4	3.4	3.5	-4.3%	-4.7%	-6.1%	-1.5%	3.0%
Natural gas	3.8	4.2	5.3	5.1	5.4	5.1	2.1%	4.8%	-1.0%	5.5%	-4.2%
Other (1)	1.8	3.1	3.9	3.6	3.7	3.4	11.3%	4.7%	-1.6%	2.2%	-7.4%
Electricity Generation in TWh	20.0	21.9	23.4	26.0	25.0	na	1.9%	1.3%	2.1%	-3.8%	na
Nuclear	4.5	9.4	12.0	11.4	11.3	na	15.7%	5.1%	-1.0%	-1.5%	na
Hydro & wind	2.3	2.1	1.9	5.0	4.3	na	-1.3%	-2.3%	21.4%	-13.3%	na
Thermal	13.2	10.4	9.5	9.6	9.5	na	-4.6%	-1.8%	0.3%	-1.6%	na
Generation Capacity in GWe	na	na	6.3	7.1	7.4	na	na	na	2.4%	4.5%	na
Nuclear	0.9	1.8	1.8	1.6	1.8	na	14.9%	0.0%	-1.5%	7.8%	na
Hydro & wind	na	na	1.7	1.9	2.4	na	na	na	3.3%	23.0%	na
Thermal	na	na	2.9	3.5	3.3	na	na	na	3.9%	-7.1%	na
Average Load Factor in %	na	na	42.2	41.8	38.4	na	na	na	-0.2%	-8.0%	na
Fuel Inputs for Thermal Power Generation	2.8	2.9	2.8	2.9	2.9	na	0.2%	-0.3%	0.2%	1.3%	na
Solids	2.0	2.2	2.0	1.9	1.9	na	1.5%	-1.5%	-0.6%	-2.3%	na
Oil	0.6	0.4	0.2	0.2	0.2	na	-6.3%	-9.3%	-8.0%	11.8%	na
Gas	0.3	0.3	0.6	0.7	0.7	na	2.1%	12.8%	2.9%	9.7%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.1	0.1	na	-	-	-	-5.7%	na
Average Thermal Efficiency in %	39.9	31.2	28.8	29.0	28.2	na	-4.8%	-1.6%	0.1%	-2.9%	na
Non-Energy Uses	0.6	0.8	2.3	1.7	1.8	na	5.4%	24.1%	-6.0%	6.3%	na
Total Final Energy Demand	14.3	14.1	14.6	11.0	11.0	na	-0.3%	0.7%	-5.6%	-0.1%	na
Solids	4.2	4.5	4.9	2.9	2.8	na	1.5%	1.6%	-9.7%	-3.3%	na
Oil	5.0	3.8	3.2	2.0	2.0	na	-5.1%	-3.6%	-9.0%	-1.9%	na
Gas	2.9	3.2	3.7	3.5	3.4	na	2.0%	2.7%	-1.0%	-4.4%	na
Electricity	1.6	1.8	2.0	1.9	2.0	na	2.4%	1.8%	-1.5%	9.4%	na
Heat	0.5	0.5	0.6	0.7	0.8	na	3.8%	3.6%	0.2%	15.5%	na
Other	0.2	0.1	0.2	0.0	0.0	na	-4.7%	5.2%	-53.2%	49.1%	na
CO_2 Emissions in Mt of CO_2	50.3	49.0	50.0	37.8	37.1	na	-0.5%	0.4%	-5.5%	-1.9%	na
Indicators											
Population (Million)	4.98	5.19	5.28	5.33	5.34	5.35	0.8%	0.3%	0.2%	0.2%	0.2%
GDP (index 1985=100)	92.5	100.0	107.2	91.4	97.6	103.9	1.6%	1.4%	-3.1%	6.7%	6.5%
Gross Inl Cons./GDP (toe/1990 MEUR)	1982.3	1908.9	1756.3	1672.9	1576.7	1365.8	-0.8%	-1.7%	-1.0%	-5.8%	-13.4%
Gross Inl Cons./Capita (toe/inhabitant)	4.18	4.17	4.04	3.25	3.27	3.01	0.0%	-0.6%	-4.3%	0.4%	-7.9%
Electricity Generated/Capita (kWh/inhabitant)	4006	4226	4435	4884	4688	na	1.1%	1.0%	1.9%	-4.0%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	10.1	9.4	9.5	7.1	6.9	na	-1.3%	0.1%	-5.6%	-2.1%	na
Import Dependency (%)	83.5	76.9	77.0	70.5	74.6	71.5	-1.6%	0.0%	-1.8%	5.8%	-4.2%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

SLOVENIA : SUMMARY ENERGY BALANCE

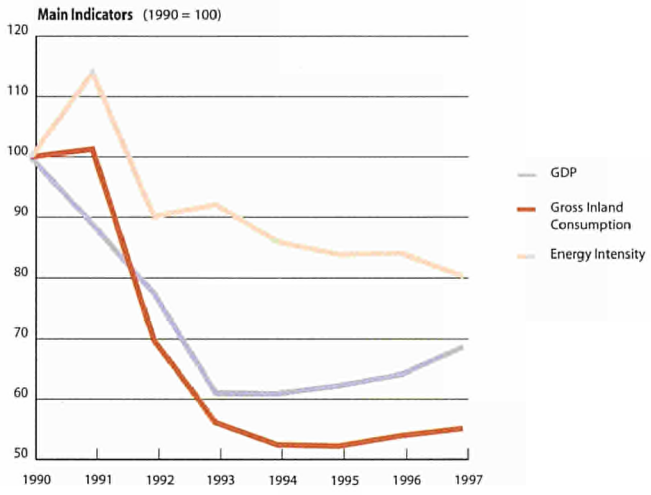
Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	1.6	2.8	2.7	2.8	2.8	2.9	11.5%	-0.9%	1.1%	-1.8%	4.3%
Solids	1.3	1.5	1.2	1.0	1.0	1.0	1.9%	-4.0%	-2.6%	-2.4%	-1.5%
Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	-7.8%	-50.0%	0.0%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	-3.0%	27.9%	-5.1%	-28.6%	0.0%
Nuclear	0.0	1.1	1.2	1.2	1.2	1.3	-	2.7%	0.7%	-4.5%	9.1%
Hydro & Wind	0.3	0.3	0.3	0.3	0.3	0.3	-1.2%	-1.5%	1.9%	13.3%	8.3%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.0	0.0	0.0	0.2	0.2	0.2	-	-	-	0.0%	-0.3%
Net Imports	2.7	2.4	2.5	3.0	3.4	3.3	-2.1%	0.6%	3.6%	14.1%	-3.4%
Solids	0.3	0.5	0.1	0.2	0.2	0.1	7.9%	-24.0%	8.1%	16.7%	-37.0%
Oil	1.9	1.5	1.8	2.3	2.7	2.9	-5.3%	4.7%	4.6%	18.5%	5.7%
Crude oil	0.5	0.5	0.6	0.6	0.5	na	-2.9%	5.2%	0.3%	-11.9%	na
Oil products	1.4	1.0	1.2	1.7	2.2	na	-6.3%	4.4%	6.5%	29.4%	na
Natural gas	0.4	0.6	0.7	0.7	0.6	0.5	11.0%	0.5%	0.7%	-4.4%	-29.3%
Electricity	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-	-10.5%	10.8%	0.5%	-0.5%
Gross Inland Consumption	4.3	5.2	5.2	5.9	6.2	6.2	3.8%	0.2%	2.3%	4.9%	0.7%
Solids	1.6	1.9	1.4	1.2	1.2	1.1	3.0%	-5.8%	-2.9%	-5.1%	-2.2%
Oil	1.9	1.5	1.8	2.3	2.7	2.9	-5.2%	3.9%	5.7%	16.5%	5.6%
Natural gas	0.4	0.6	0.7	0.7	0.7	0.5	10.9%	1.4%	-0.4%	-2.3%	-28.9%
Other (1)	0.4	1.2	1.4	1.6	1.6	1.7	25.7%	3.0%	3.7%	-1.2%	6.5%
Electricity Generation in TWh	8.0	12.2	12.4	12.6	12.8	na	8.9%	0.3%	0.3%	1.0%	na
Nuclear	0.0	4.1	4.6	4.8	4.6	na	-	2.7%	0.7%	-4.5%	na
Hydro & wind	3.4	3.2	3.0	3.2	3.7	na	-1.2%	-1.5%	1.9%	13.3%	na
Thermal	4.6	5.0	4.9	4.6	4.5	na	1.6%	-0.5%	-1.0%	-2.0%	na
Generation Capacity in GWe	na	na	2.5	2.5	2.5	na	na	na	-0.4%	0.0%	na
Nuclear	na	na	0.6	0.6	0.6	na	na	na	0.0%	0.0%	na
Hydro & wind	na	na	0.8	0.8	0.8	na	na	na	0.1%	0.0%	na
Thermal	na	na	1.1	1.1	1.1	na	na	na	-0.8%	0.0%	na
Average Load Factor in %	na	na	56.1	58.1	58.6	na	na	na	0.7%	1.0%	na
Fuel Inputs for Thermal Power Generation	1.2	1.5	1.3	1.2	1.2	na	4.6%	-3.1%	-1.7%	-3.0%	na
Solids	1.0	1.2	1.1	1.0	0.9	na	2.8%	-2.5%	-1.3%	-5.2%	na
Oil	0.1	0.2	0.2	0.1	0.1	na	3.2%	-1.2%	-5.0%	7.2%	na
Gas	0.0	0.1	0.1	0.1	0.1	na	49.2%	-11.2%	-0.5%	7.5%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	32.9	28.4	32.4	33.5	33.8	na	-2.9%	2.7%	0.7%	1.0%	na
Non-Energy Uses	0.0	0.0	0.0	0.0	0.1	na	-16.2%	13.0%	24.9%	126.0%	na
Total Final Energy Demand	3.4	3.2	3.4	4.0	4.4	na	-1.0%	1.0%	3.3%	10.4%	na
Solids	0.6	0.7	0.3	0.1	0.1	na	1.4%	-14.0%	-16.3%	-0.9%	na
Oil	1.7	1.3	1.5	2.1	2.5	na	-5.8%	4.2%	6.8%	15.9%	na
Gas	0.3	0.4	0.5	0.4	0.5	na	6.2%	5.6%	-3.1%	11.0%	na
Electricity	0.7	0.8	0.8	0.8	0.8	na	2.9%	1.7%	-0.8%	1.2%	na
Heat	0.1	0.1	0.2	0.2	0.2	na	3.0%	7.9%	1.6%	7.0%	na
Other	0.0	0.0	0.0	0.3	0.3	na	-	-	-	-0.1%	na
CO_2 Emissions in Mt of CO_2	13.0	13.1	12.3	12.8	13.9	na	0.2%	-1.4%	0.9%	7.9%	na
Indicators											
Population (Million)	1.90	1.97	2.00	1.99	1.99	1.99	0.7%	0.3%	-0.1%	0.1%	0.1%
GDP (index 1990=100)	na	na	100.0	94.8	97.7	101.3	na	na	-1.1%	3.0%	3.8%
Gross Inl Cons./GDP (toe/1990 MEUR)	na	na	385.7	455.8	464.0	450.2	na	na	3.4%	1.8%	-3.0%
Gross Inl Cons./Capita (toe/inhabitant)	2.27	2.63	2.63	2.95	3.10	3.12	3.0%	0.0%	2.4%	4.8%	0.6%
Electricity Generated/Capita (kWh/inhabitant)	4213	6204	6227	6356	6414	na	8.0%	0.1%	0.4%	0.9%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	6.9	6.7	6.1	6.5	7.0	na	-0.6%	-1.6%	1.0%	7.9%	na
Import Dependency (%)	62.8	47.0	48.0	51.7	56.1	53.9	-5.6%	0.4%	1.5%	8.6%	-4.0%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

The Baltic States: Major trends (1990-1997)

- Economies began to recover over the last three years, but slowly
- Both energy production and demand decreased strongly until 1993 but have since partly recovered
- Increasing share of the transport sector
- Primary energy production, concentrated on oil shale and nuclear, decreased substantially
- Difficulties in securing gas imports from Gazprom
- Energy intensity improved by 20% since 1990
- CO_2 emissions dropped by 51% since 1990
- Energy import dependency declined slowly to 54% in 1997

The Baltic countries comprise Estonia, Latvia and Lithuania, previously part of the former USSR. Reliable economic and energy indicators for these countries seems almost impossible to gather over a long-term period. This situation prevailed before independence, as generally observed elsewhere in the former USSR, due to aggregation of figures for several Republics and to nonstandardised methods of computing economic and energy data. As a consequence, the energy data and indicators described below must be interpreted very carefully, in particular data related to the year 1990 and to biomass.



Economies began to recover over the last three years, but slowly...

The separation from the former USSR provoked a severe economic crisis in the Baltic countries, as their main economic relations had been limited to the former Soviet Republics. GDP dropped by about 39% between 1990 and 1993 but has stabilised since then and has begun to recover slowly over the last three years. This evolution is due to several factors, including the disruption of trading links with other former Soviet Republics, the increase in relative energy prices, the transformation of these centrally-planned economies to market-based ones and the reorientation of trade towards the West.

ENERGY OUTLOOK

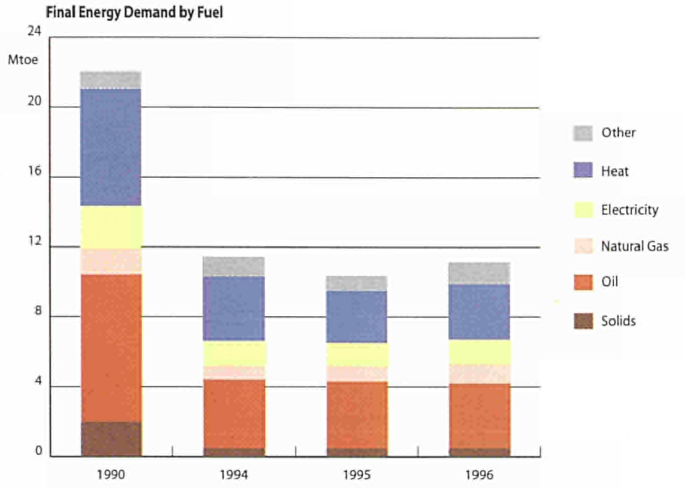
Both energy production and demand decreased strongly until 1993 but have since partly recovered...

As a direct consequence of economic restructuring, both **energy production and gross inland energy consumption** have decreased significantly since 1990. The production of energy declined from 11.3 Mtoe in 1990 to 7.2 Mtoe in 1994 and rebounded to 8.7 Mtoe in 1997, whereas the gross inland energy consumption decreased from 34.8 Mtoe in 1990 to 18.1 Mtoe in 1995 and then increased again to reach 19.2 Mtoe in 1997. Demand for all fossil fuels was severely reduced: between 1990 and 1997, consumption of oil products dropped by 59%, solid fuel by 47% and gas by 45%. Only non-fossil fuels (nuclear, biomass and hydro) maintained their level of consumption over this period.

This evolution resulted directly from the behaviour of **total final energy demand**, mainly constituted by oil and distributed heat which accounted for one third each. The demand for oil, gas and distributed heat fell in absolute terms between 1990 and 1996 by 56%, 27% and 52% respectively. At the same time, demand for electricity decreased by 42% and solid fuels by 75%. This evolution resulted both from the economic climate and effective increases of energy prices with energy markets adjusting abruptly to the reality of world or regional market prices.

Increasing share of the transport sector...

The evolution of the structure by sector of final energy demand demonstrated the effects of the severe economic crisis which resulted in a steep reduction in industrial production and a subsequent lowering of living standards. The first signs of real recovery occurred only in 1996. At the same time, energy demand for transport remained relatively stable as a result of the increasing importance of transport in the new market economies with the growing motorization rate of individuals. Consequently its share

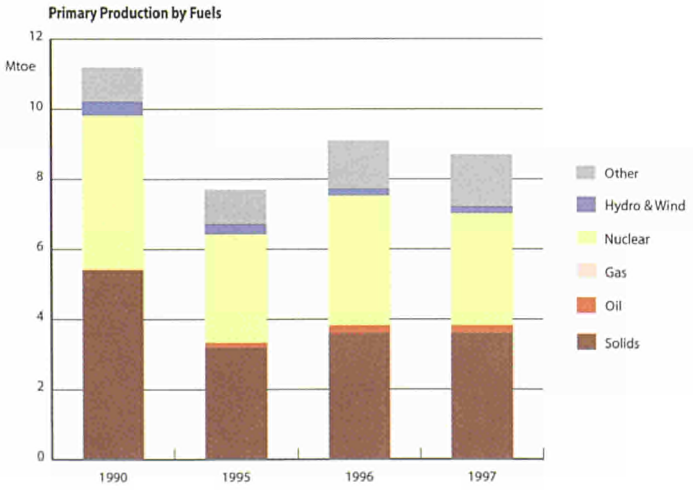


increased from 11% in 1990 to 19% in 1996 to the detriment of the tertiary-domestic sector (from 58% to 52%) and industry (from 31% to 30%).

Electricity's share in final energy demand has remained relatively unchanged since 1990, reaching 15% in industry but only 12% in the tertiary-domestic sector. These levels remained well below European averages and demonstrate the large potential for increases in electricity demand in future as living standards improve.

Primary energy production concentrated on oil shale and nuclear, decreased substantially...

The Baltic countries are energy producers of coal, mainly shale oil and nuclear electricity. Production has declined significantly between 1990 and 1994, by 35% for oil shale and by 52% for nuclear electricity as export markets to other Republics disappeared.



Main items

The three Baltic States - Estonia, Latvia and Lithuania - have a combined total population of some 7.5m inhabitants. They became legally independent from the former Soviet Union in September 1991. Since then these countries have sought economic and political integration with Europe. All have applied for EU membership with the hope of being accepted as accession states in due course. But, after years of close integration within the FSU, it is taking considerable time to adjust their economies. They all experienced steep falls in industrial production and living standards in the early 1990s. Economic reforms - including tight fiscal policies, liberalisation and privatisation, backed by international loans - have led to greater macroeconomic stability and GDP growth. Despite efforts to diversify economic and trade relations, Russia remains the largest single trading partner. Hence the recent Russian devaluation and currency crisis have much reduced trade, increased foreign debt and created greater uncertainty about their medium-term economic prospects. Other than peat and timber, indigenous energy resources are limited to small reserves of coal, shale oil and off-shore oil in the Baltic Sea; small hydro-electric capacity and the Ignalina nuclear plant in Lithuania. Progress continues to integrate their electricity grids, via the Baltic Ring system, with western Europe. The Baltic States rely heavily upon gas imports from Russia and, in future, will become more important transit centres for Russian oil and gas exports into eastern and western Europe.

Since 1994, oil shale production has stabilised. Nuclear, however, showed large fluctuations from one year to another. It recovered somewhat, but without reaching its historical peak level of 1990. A limited production of oil started in Lithuania. Coal production has risen slowly in recent years. On the other hand, biomass production seems to have increased substantially since 1990.

Difficulties in securing gas imports from Gazprom...

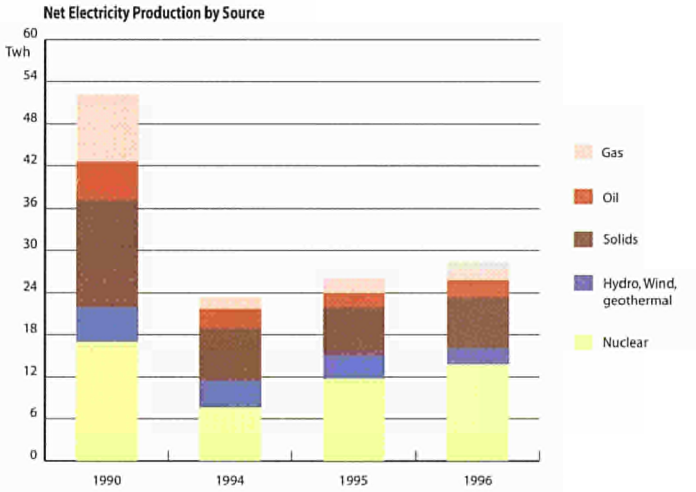
Electricity generation capacity has remained quite constant since 1990 at about 11 GWe, the only major modification being the commissioning of 600 MWe of pump storage units. Thermal power stations represented 58% of the capacity in 1995, the balance being covered by nuclear energy (22%) and hydro (20%). The load factor dropped dramatically from 55% to 29% over the period as, at the same time, electricity production fell by about 45%. The year 1996 was marked by a very low contribution from hydro due to the climatic conditions in Latvia. Solid fuels (59% in 1996), oil and natural gas (20% each) mainly covered demand

from thermal power stations, production from which was almost equivalent to that from nuclear units in 1996. Between 1990 and 1994, the contribution of natural gas fell drastically (-75%) due to supply reductions imposed by Gazprom as a means of securing payment for deliveries. Since 1994, deliveries have increased a little but still remained two-thirds lower than in 1990.

COMPETITIVENESS

Energy intensity improved by 20% since 1990...

In terms of **energy intensity**, as energy consumption declined more slowly than economic activities between 1990 and 1995, an increase of 16% was observed during this transition period. But as this region is relatively small, rapid shifts in energy intensity could result merely from closing or opening a single large industrial plant. Since 1994, despite the rebound of economic activity, energy intensity has continued to improve on average by 2.2% per year. Major gains were observed in Estonia and Lithuania; although energy intensity in Latvia fluctuated in both senses and was finally 6.5% higher in 1997 than in 1990. This result demonstrates the considerable uncertainty about the Latvian biomass data.



The evolution of sectoral energy intensity was marked by the continued improvement of power stations, apart from a 4.7% increase in 1996. Industry, confronted with restructuring and modernisation, improved its energy intensity between 1990 and 1994. But energy intensity has again increased since then with the renewal of industrial activity. The tertiary-domestic sector demonstrated a limited increase of about 6% between 1990 and 1993 resulting from lifestyle modifications induced by the capitalist economy such as higher penetration of electrical appliances, followed by a significant improvement associated with saturation phenomena. Finally the energy intensity of transport increased by 65% due to improving living standards and car use.

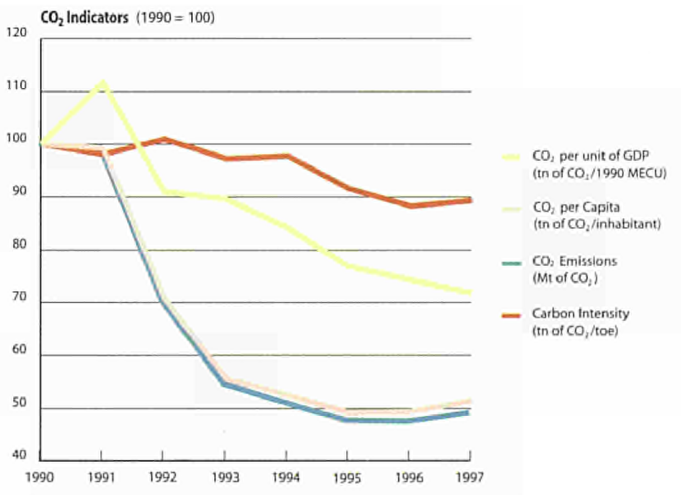
The **gross inland energy consumption** per capita dropped from 4.37 to 2.34 toe/inhabitant over the period 1990-1994, but rebounded to 2.52 toe/inhabitant in 1996.

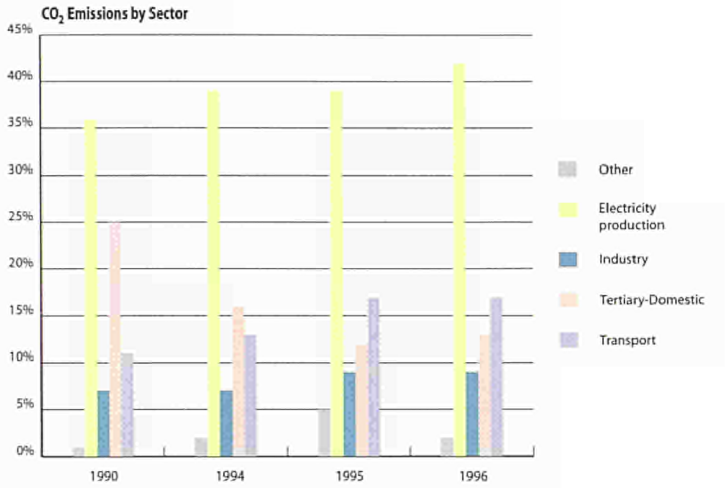
ENVIRONMENT

CO_2 emissions dropped by 51% since 1990...

As final energy consumption dropped significantly since 1990, CO_2 emissions followed the same trend: from 86 Mt. CO_2 in 1990 to 42 Mt. CO_2 in 1997 (a 51% drop over seven years). Since 1994, growing contributions from nuclear and natural gas have led to reduced consumption of solid fuels and oil products within overall gross inland energy consumption. This explains the continued reduction of CO_2 emissions over the last three years, even though an increase occurred in 1997 (+3.7%). As the population of the Baltic countries remained essentially stable over the period, the per capita CO_2 emissions followed the same trend, and dropped from 10.8 to 5.6 tonnes of CO_2/inhabitant over the period, compared to an European average value of 8.4 over the same period.

Turning to CO_2 emissions by sector at the regional level, it appears that the largest sector in terms of emissions is power generation with about 42% of total emissions in 1996 (37% in 1990). Transport, rapidly emerging as the second contributor, accounted for 17% in 1996 as against 11% in 1990. The tertiary-domestic sec-





tor declined to 13% in 1996 from 28% in 1990 whereas industry increased from 11% in 1990 to 17% in 1996.

GLOBAL MARKETS

Energy import dependency declined slowly to 54% in 1997...

The Baltic countries are importers of coal, but especially of oil and gas, from the CIS. These imports dropped by 52% between 1990 and 1994 but have been quite stable since then. The increasing gas imports were compensated by a reduction in oil imports. Historically, the Baltic countries have been net exporters of electricity with a large capacity based on nuclear power. But electricity exports disappeared as early as 1993. As at the same time the gross energy consumption dropped by 44%, the energy import dependency fell from 66% in 1990 to 54% in 1996.

BALTIC COUNTRIES : SUMMARY ENERGY BALANCE

Mtoe	1990	1994	1995	1996	1997(2)	94/90	95/94	96/95	97/96
						Annual % Change			
Primary Production	11.3	7.2	7.7	9.0	8.7	-10.8%	8.0%	16.5%	-3.6%
Solids	5.4	3.5	3.2	3.6	3.6	-10.1%	-9.9%	11.1%	0.0%
Oil	0.0	0.1	0.1	0.2	0.2	-	37.6%	21.1%	33.3%
Natural gas	0.0	0.0	0.0	0.0	0.0	-	-	-	-
Nuclear	4.4	2.1	3.1	3.7	3.2	-17.4%	51.9%	17.7%	-14.2%
Hydro & Wind	0.4	0.3	0.3	0.2	0.2	-6.5%	-11.9%	-33.9%	9.4%
Geothermal	0.0	0.0	0.0	0.0	0.0	-	-	-	-
Other	1.0	1.1	1.0	1.4	1.5	3.0%	-12.7%	44.1%	8.9%
Net Imports	22.9	11.0	10.8	10.3	10.5	-16.8%	-1.3%	-5.3%	1.9%
Solids	1.9	0.8	0.6	0.5	0.5	-20.0%	-27.4%	-15.9%	14.5%
Oil	14.1	7.0	6.8	6.3	5.6	-16.1%	-3.3%	-6.2%	-11.0%
Crude oil	9.6	4.0	3.6	4.0	na	-19.6%	-10.0%	12.4%	na
Oil products	4.5	3.0	3.2	2.3	na	-9.8%	5.6%	-27.3%	na
Natural gas	8.2	3.1	3.6	3.7	4.4	-21.9%	18.3%	1.9%	18.7%
Electricity	-1.3	0.2	-0.1	-0.2	-0.1	-	-	136.2%	-57.7%
Gross Inland Consumption	34.8	18.2	18.1	18.7	19.2	-14.9%	-0.4%	3.4%	2.2%
Solids	7.7	4.3	4.0	4.1	4.1	-13.4%	-6.9%	2.8%	-0.5%
Oil	14.5	7.2	6.3	6.0	5.9	-16.0%	-12.4%	-4.5%	-3.0%
Natural gas	8.1	3.1	3.6	3.7	4.4	-21.4%	18.0%	1.7%	18.6%
Other (1)	4.5	3.6	4.2	4.9	4.8	-5.6%	15.7%	17.4%	-1.3%
Electricity Generation in TWh	52.2	23.3	26.2	28.5	na	-18.2%	12.2%	8.7%	na
Nuclear	17.0	7.7	11.8	13.9	na	-18.0%	53.4%	17.9%	na
Hydro & wind	4.9	3.8	3.3	2.2	na	-6.5%	-11.9%	-33.9%	na
Thermal	30.3	11.9	11.1	12.3	na	-20.9%	-7.0%	11.6%	na
Generation Capacity in GWe	10.8	11.0	11.1	11.1	na	0.5%	0.3%	0.0%	na
Nuclear	2.5	2.4	2.4	2.4	na	-1.3%	0.0%	0.0%	na
Hydro & wind	1.6	2.2	2.2	2.2	na	8.5%	0.1%	0.0%	na
Thermal	6.7	6.4	6.5	6.5	na	-1.0%	0.4%	0.0%	na
Average Load Factor in %	55.2	24.2	27.0	29.4	na	-18.6%	11.9%	8.7%	na
Fuel Inputs for Thermal Power Generation	9.5	4.9	4.6	4.9	na	-15.1%	-6.9%	7.6%	na
Solids	4.8	3.1	2.8	2.9	na	-10.4%	-7.2%	3.5%	na
Oil	1.7	1.2	0.9	1.0	na	-9.0%	-25.8%	10.4%	na
Gas	3.0	0.7	0.9	1.0	na	-30.8%	26.9%	18.3%	na
Geothermal	0.0	0.0	0.0	0.0	na	-	-	-	na
Other	0.0	0.0	0.0	0.0	na	-	-	-	na
Average Thermal Efficiency in %	27.5	20.7	20.7	21.5	na	-6.8%	-0.1%	3.7%	na
Non-Energy Uses	2.0	0.6	0.8	0.8	na	-26.2%	29.5%	11.2%	na
Total Final Energy Demand	21.9	11.3	10.3	11.0	na	-15.3%	-8.4%	6.2%	na
Solids	2.0	0.5	0.5	0.5	na	-28.6%	-9.2%	-0.3%	na
Oil	8.4	3.9	3.8	3.7	na	-17.6%	-1.7%	-3.4%	na
Gas	1.5	0.8	0.9	1.1	na	-14.0%	7.5%	22.1%	na
Electricity	2.4	1.4	1.3	1.4	na	-13.0%	-3.1%	3.6%	na
Heat	6.7	3.7	3.0	3.2	na	-14.0%	-17.3%	4.4%	na
Other	1.0	1.1	0.8	1.2	na	1.2%	-20.4%	47.9%	na
CO_2 Emissions in Mt of CO_2	86.3	44.2	41.2	41.1	42.5	-15.4%	-6.7%	-0.4%	3.5%
Indicators									
Population (Million)	7.96	7.77	7.72	7.67	7.62	-0.6%	-0.7%	-0.6%	-0.6%
GDP (index 1985=100)	117.2	71.3	72.8	75.1	80.5	-11.7%	2.1%	3.1%	7.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	1383.0	1189.7	1160.1	1163.4	1110.3	-3.7%	-2.5%	0.3%	-4.6%
Gross Inl Cons./Capita (toe/inhabitant)	4.37	2.34	2.35	2.45	2.52	-14.4%	0.3%	4.1%	2.8%
Electricity Generated/Capita (kWh/inhabitant)	6559	3006	3394	3713	na	-17.7%	12.9%	9.4%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	10.8	5.7	5.3	5.4	5.6	-14.9%	-6.1%	0.3%	4.1%
Import Dependency (%)	65.8	59.5	58.8	53.7	54.1	-2.5%	-1.1%	-8.8%	0.7%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

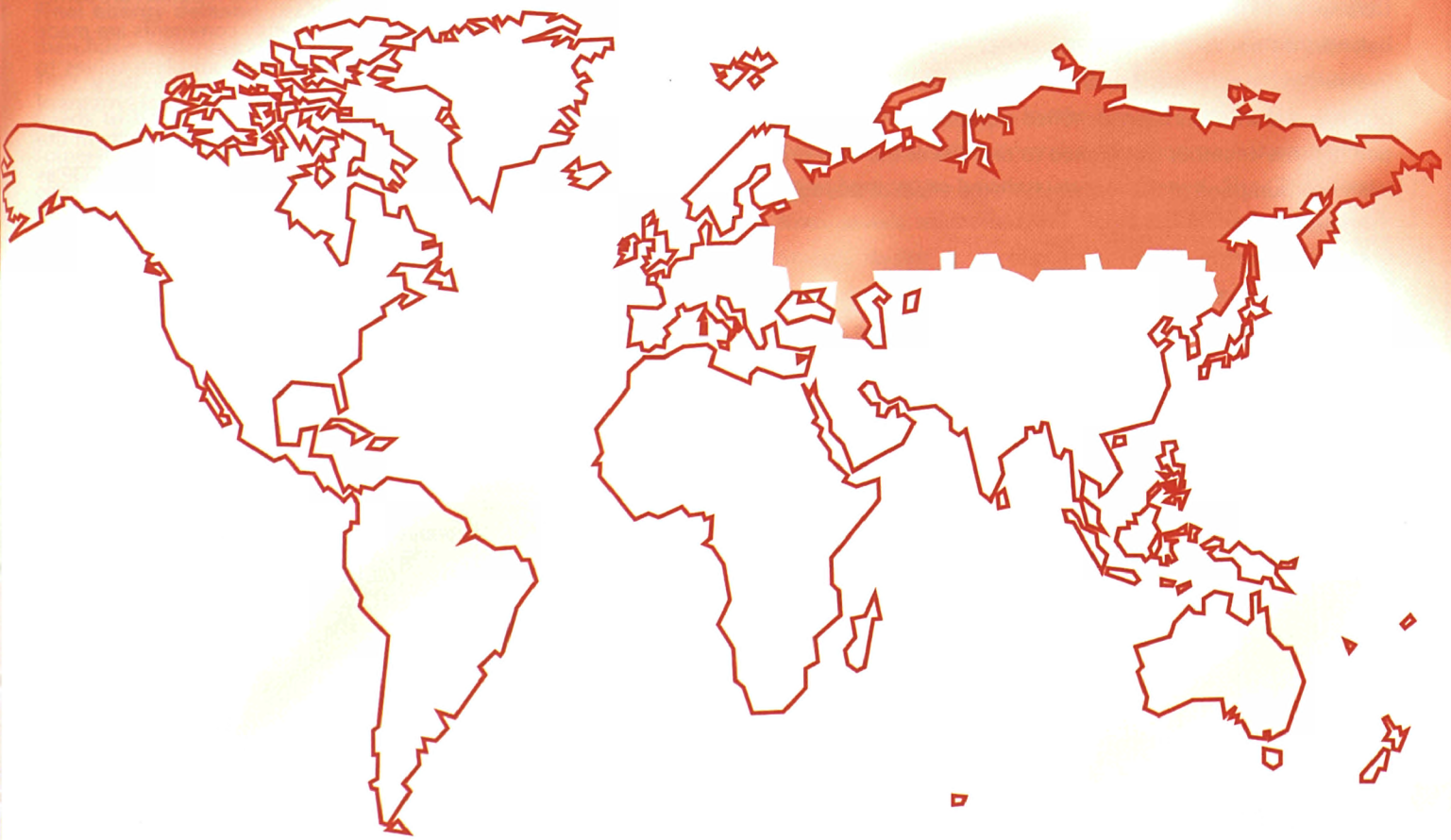
BALTIC COUNTRIES : MAIN INDICATORS

	1990	1994	1995	1996	94/90	95/94	96/95
					Annual % Change		
Gross Inland Consumption (Mtoe)	34.8	18.2	18.1	18.7	-14.9%	-0.4%	3.4%
Public Thermal Power Generation	9.2	4.7	4.3	4.7	-15.7%	-6.6%	7.9%
Autoprod. Thermal Power Generation	0.2	0.3	0.2	0.2	4.1%	-11.6%	2.3%
Energy Branch	1.0	1.0	1.2	0.8	-1.5%	18.8%	-31.2%
Final Energy Consumption	20.1	12.2	11.5	12.4	-11.7%	-5.9%	7.7%
Industry	6.2	3.1	3.2	3.7	-16.1%	4.1%	15.1%
Transport	2.2	1.9	2.3	2.3	-2.7%	19.3%	-0.4%
Tertiary-Domestic	11.7	7.2	6.0	6.4	-11.4%	-17.0%	7.0%
Energy Intensity (toe/1990 MEUR)	1383.0	1189.7	1160.1	1163.4	-3.7%	-2.5%	0.3%
Public Thermal Power Generation	367.1	304.2	278.1	291.2	-4.6%	-8.6%	4.7%
Autoprod. Thermal Power Generation	9.2	17.8	15.4	15.3	17.9%	-13.4%	-0.8%
Industry	247.2	200.9	204.7	228.5	-5.1%	1.9%	11.6%
Transport	85.9	126.5	147.8	142.7	10.2%	16.8%	-3.4%
Tertiary-Domestic	464.3	470.3	382.2	396.6	0.3%	-18.7%	3.8%
Energy per Capita (Kgoe/inhabitant)	4366.3	2343.9	2350.2	2445.5	-14.4%	0.3%	4.1%
Industry	780.6	395.8	414.8	480.4	-15.6%	4.8%	15.8%
Transport	271.1	249.2	299.3	300.0	-2.1%	20.1%	0.2%
Tertiary-Domestic	1465.9	926.5	774.2	833.7	-10.8%	-16.4%	7.7%
Electricity Share (%)							
Final Energy Consumption	12%	11%	11%	11%	-1.5%	3.0%	-3.9%
Industry	16%	17%	16%	15%	1.1%	-4.1%	-6.1%
Transport	3%	2%	2%	1%	-10.3%	-23.0%	-6.9%
Tertiary-Domestic	11%	11%	13%	12%	0.1%	14.8%	-5.5%
Total Renewable Consumption (Mtoe)	1.4	1.4	1.1	1.4	-0.9%	-18.4%	27.2%
Hydro	0.4	0.3	0.3	0.2	-6.5%	-11.9%	-33.9%
Biomass	1.0	1.1	0.8	1.2	1.2%	-20.4%	47.9%
Other	0.0	0.0	0.0	0.0	-	-	-
Renewable intensity (toe/1990MEUR)	56.9	90.3	72.1	88.9	12.2%	-20.1%	23.4%
Renewable per capita (Kgoe/inhabitant)	179.5	177.8	146.0	186.9	-0.2%	-17.9%	28.0%
CO_2 Emissions (Mt of CO_2)	86.3	44.2	41.2	41.1	-15.4%	-6.7%	-0.4%
Public Thermal Power Generation	30.8	16.6	15.3	16.4	-14.3%	-7.5%	6.9%
Autoprod. Thermal Power Generation	0.7	0.8	0.7	0.7	2.8%	-12.5%	2.9%
Energy Branch	1.0	1.1	2.0	0.7	1.5%	77.4%	-62.0%
Industry	6.0	3.0	3.7	3.6	-15.9%	23.9%	-3.6%
Transport	9.5	5.8	7.0	7.0	-11.6%	19.9%	-0.3%
Tertiary-Domestic	21.7	7.1	5.0	5.3	-24.3%	-29.5%	4.7%
Carbon Intensity (tn of CO_2/toe)	2.5	2.4	2.3	2.2	-0.6%	-6.3%	-3.6%
Public Power Generation	2.2	2.4	2.0	1.9	1.9%	-16.1%	-3.1%
Public Thermal Power Generation	3.3	3.6	3.5	3.5	1.7%	-0.9%	-1.0%
Autoprod. Power Generation	3.2	3.0	3.0	3.0	-1.3%	-0.9%	0.5%
Autoprod. Thermal Power Generation	3.2	3.0	3.0	3.0	-1.3%	-1.0%	0.6%
Energy Branch	1.0	1.1	1.7	0.9	3.0%	49.4%	-44.8%
Industry	1.0	1.0	1.2	1.0	0.2%	19.1%	-16.3%
Transport	4.4	3.0	3.0	3.0	-9.1%	0.5%	0.1%
Tertiary-Domestic	1.9	1.0	0.8	0.8	-14.5%	-15.0%	-2.2%
CO_2 per Capita (kg of CO_2/inhabitant)	10835	5685	5340	5356	-14.9%	-6.1%	0.3%
Industry	756	387	483	468	-15.4%	24.8%	-3.0%
Transport	1195	749	904	907	-11.0%	20.7%	0.3%
Tertiary-Domestic	2729	920	653	688	-23.8%	-29.0%	5.3%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	3432	2886	2636	2548	-4.2%	-8.6%	-3.4%
Public Thermal Power Generation	1223	1083	981	1017	-3.0%	-9.4%	3.7%
Autoprod. Thermal Power Generation	29	54	46	46	16.4%	-14.3%	-0.2%
Energy Branch	41	72	125	46	14.9%	73.7%	-63.2%
Industry	239	196	238	223	-4.8%	21.3%	-6.5%
Transport	378	380	446	432	0.1%	17.4%	-3.3%
Tertiary-Domestic	864	467	323	327	-14.3%	-30.9%	1.5%

SUMMARY ENERGY BALANCE	ESTONIA				LATVIA				LITHUANIA			
Mtoe	**1991**	**1995**	**1996**	**1997**	**1991**	**1995**	**1996**	**1997**	**1991**	**1995**	**1996**	**1997**
Primary Production	5.0	3.5	3.9	3.9	1.2	0.7	1.0	1.1	4.8	3.6	4.2	3.7
Solids	4.8	3.1	3.5	3.5	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2
Natural gas	0.0	0.0	0.0	0.0	0.0	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	0.0	4.4	3.1	3.7	3.2
Hydro & Wind	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.2	0.0	0.0	0.0	0.0
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.2	0.3	0.4	0.5	0.5	0.4	0.8	0.8	0.3	0.2	0.3	0.3
Net Imports	4.1	1.9	1.8	2.1	6.3	3.4	3.6	3.2	13.4	5.6	4.9	5.2
Solids	0.8	0.3	0.2	0.3	0.4	0.1	0.1	0.1	0.6	0.1	0.2	0.1
Oil	2.5	1.0	1.0	1.0	3.2	2.1	2.3	1.7	9.0	3.6	3.0	2.9
Crude oil	0.0	0.0	0.0	na	0.0	0.0	0.0	na	11.8	3.6	4.0	na
Oil products	2.5	1.0	1.0	na	3.2	2.1	2.3	na	-2.8	0.0	-1.1	na
Natural gas	1.2	0.6	0.6	0.8	2.4	1.0	0.9	1.1	4.8	2.0	2.2	2.4
Electricity	-0.4	-0.1	-0.1	-0.1	0.4	0.2	0.3	0.2	-1.1	-0.2	-0.4	-0.2
Gross Inland Consumption	9.5	5.4	5.6	5.9	7.5	4.0	4.2	4.3	18.2	8.8	9.0	9.0
Solids	5.9	3.6	3.7	3.8	0.8	0.2	0.2	0.2	0.7	0.2	0.2	0.2
Oil	2.6	0.9	0.9	1.0	3.2	2.0	2.1	1.8	9.0	3.4	3.0	3.1
Natural gas	1.2	0.6	0.6	0.8	2.4	1.0	0.9	1.1	4.8	2.0	2.2	2.4
Other (1)	-0.2	0.3	0.3	0.4	1.1	0.7	1.0	1.2	3.7	3.2	3.6	3.2
Electricity Generation in Twh	14.6	8.7	9.1	na	5.6	4.0	3.1	na	29.4	13.5	16.2	na
Nuclear	0.0	0.0	0.0	na	0.0	0.0	0.0	na	17.0	11.8	13.9	na
Hydro & wind	0.0	0.0	0.0	na	3.3	2.9	1.9	na	0.3	0.4	0.3	na
Thermal	14.6	8.7	9.1	na	2.4	1.0	1.3	na	12.0	1.3	2.0	na
Generation Capacity in GWe	3.4	3.3	3.3	3.3	2.1	2.1	2.1	na	5.3	5.7	5.7	na
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	na	2.5	2.4	2.4	na
Hydro & wind	0.0	0.0	0.0	0.0	1.5	1.5	1.5	na	0.1	0.7	0.7	na
Thermal	3.4	3.3	3.3	3.3	0.6	0.6	0.6	na	2.7	2.6	2.6	na
Average Load Factor in %	48.9	30.2	31.6	na	30.8	22.0	17.3	na	63.4	27.1	32.5	na
Fuel Inputs for Thermal Power Generation	5.1	3.0	2.9	na	1.1	0.6	0.0	na	3.2	1.0	0.0	na
Solids	4.3	2.8	0.1	na	0.0	0.1	0.0	na	0.0	0.0	0.0	na
Oil	0.5	0.1	0.1	na	0.3	0.3	0.3	na	1.2	0.6	0.6	na
Gas	0.3	0.1	0.1	na	0.7	0.3	0.2	na	2.0	0.5	0.7	na
Geothermal	0.0	0.0	0.0	na	0.0	0.0	0.0	na	0.0	0.0	0.0	na
Other	0.0	0.0	0.0	na	0.0	0.0	0.0	na	0.0	0.0	0.0	na
Average Thermal Efficiency in %	24.6	25.3	25.4	na	18.7	15.1	18.7	na	31.9	10.9	13.3	na
Non-Energy Uses	0.3	0.2	0.2	na	0.0	0.0	0.0	na	1.9	0.5	0.6	na
Total Final Energy Demand	5.0	2.5	2.7	na	6.2	3.3	3.8	na	9.9	4.5	4.5	na
Solids	0.4	0.2	0.2	na	0.6	0.1	0.1	na	0.6	0.2	0.1	na
Oil	1.4	0.9	0.9	na	2.1	1.3	1.1	na	4.1	1.7	1.7	na
Gas	0.2	0.2	0.2	na	0.6	0.3	0.5	na	0.7	0.4	0.4	na
Electricity	0.6	0.4	0.4	na	0.7	0.4	0.4	na	1.0	0.5	0.6	na
Heat	2.1	0.6	0.6	na	1.7	0.9	1.1	na	3.2	1.6	1.4	na
Other	0.2	0.3	0.4	na	0.5	0.3	0.6	na	0.3	0.2	0.3	na
CO_2 Emissions in Mt of CO_2	31.6	16.7	17.4	na	19.4	9.7	9.5	na	34.7	14.8	14.1	na
Indicators												
Population (Million)	1.6	1.5	1.5	1.5	2.7	2.5	2.5	2.5	3.7	3.7	3.7	3.7
GDP (index 1985=100)	92.7	67.6	70.0	77.6	105.6	60.7	61.9	66.0	110.5	89.2	92.4	97.7
Gross Inl Cons./GDP (toe/1985 MEUR)	1965.5	1521.9	1538.5	1463.3	856.3	785.1	806.6	778.3	2086.7	1248.8	1228.5	1162.0
Gross Inl Cons./Capita (toe/inhabitant)	6.1	3.6	3.8	4.1	2.8	1.6	1.7	1.7	4.9	2.4	2.4	2.4
Electricity Generated/Capita (Kwh/inhabitant)	9340.4	5853.8	6206.0	na	2113.4	1581.5	1254.6	na	7846.9	3639.3	4378.8	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	20.2	11.2	11.9	na	7.3	3.9	3.8	na	9.3	4.0	3.8	na
Import Dependency (%)	42.1	34.7	31.0	34.2	84.2	81.8	82.3	73.2	73.5	63.5	54.7	58.3

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

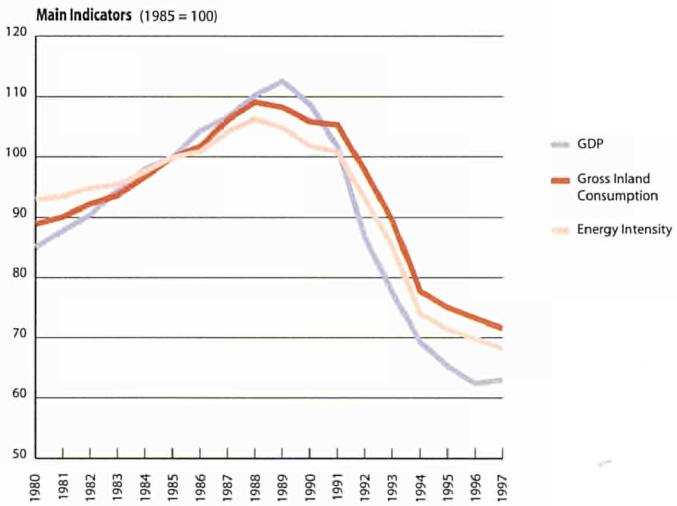
PART V CIS



CIS: Major trends (1980-1997)

- Substantial variations between different statistical energy and economic data sources
- Total decline of GDP by about 40% between 1990 and 1996 will continue until 2001 at least
- Considering statistical series disruptions, final energy consumption fell by about 25% between 1990 and 1996
- Since 1990 tertiary-domestic energy consumption increased by 6% while transport and industry decreased by about 50%
- Share of electricity was quite stable with a large potential from domestic appliances
- Gross inland energy consumption, met about 50% by natural gas, declined more slowly since 1995
- Russia remained the biggest energy producer in the world after the United States and China
- Efforts to rationalise the coal industry were hampered by the payment arrears of large consumers
- Crude oil production experienced an upturn in 1997
- Large potential of Caspian Basin still limited by the development of pipeline infrastructure
- CIS became the world's second largest gas producer in 1997, overtaken by the United States
- CIS represented about 23% of the world's fossil fuel reserves
- Electricity generation dominated by thermal power and more specifically by gas
- Power sector faces financial crisis while low tariffs and subsidies continue
- Refining industry in need of rationalisation and upgrading
- Energy intensity increased by 17% since 1990 and the near future appears unfavourable
- CO_2 emissions have fallen by 37% since 1990
- Energy exports peaked in 1996

The Community of Independent States (CIS) includes the following twelve republics: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. In addition, as consolidated energy balances do not exist for Baltic countries before 1992, they are included in the total energy balances; if available, the contribution of these countries has been identified explicitly. As the contribution of these countries was limited to only 2% of the total gross inland consumption of the former USSR, the effect of this aggregation is limited.



Substantial variations between different statistical energy and economic data sources…

Energy and macroeconomic data for all these republics are sometimes of dubious quality, and consequently comments are made on significant trends rather than relying on absolute values to draw analytical conclusions. In particular, the statistical systems of the republics are currently ill-equipped to identify activity in the private sector. This has two effects: firstly, to underestimate GDP as a whole and, secondly, to understate the share of activity of the service sector. Since the service sector is generally less energy intensive than industry, a failure correctly to register activities from this sector has resulted in aggregate energy intensity being seriously overestimated. In addition, some statistical series suffer from major time disruptions; and discrepancies still remain between the sum of all Republics and statistical data for the CIS as a whole, even for recent years.

Total decline of GDP by about 40% between 1990 and 1996 will continue until 2001 at least…

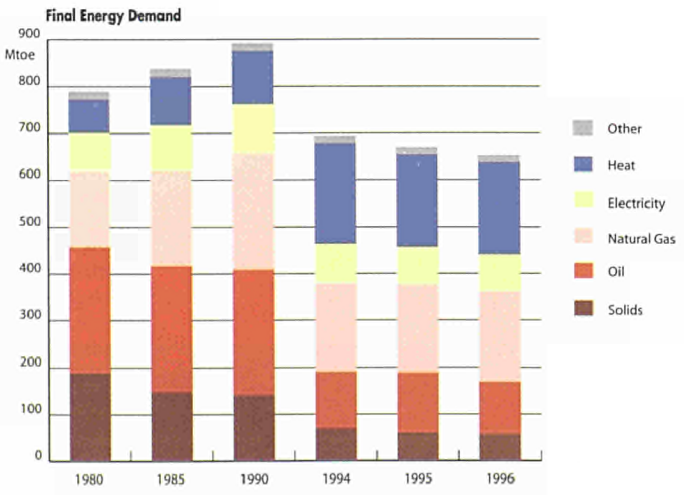
The Russian Federation and other independent states, apart from the Baltics, have been in trouble since the beginning of their transition period. As a whole, GDP declined by about 37% between 1990 and 1997 even though the first signs of stabilisation appeared in 1997. Russia, whose economy dominates the CIS, accounts for slightly more than 65% of total GDP. It demonstrated a first stabilisation in 1997, after a total decline of about 40% between 1990 and 1996. Ukraine, the second largest economy with just 15% of

total GDP, lags behind Russia, with a 3.2% decline in 1997 and a 51% decline since 1990. On the other hand, other republics demonstrated more sustained economic growth since 1980, with the exception of Turkmenistan. In 1997, the general perception of economic forecasts was in favour of a progressive recovery in the near future. But the deterioration of the Russian economy in mid 1998 has led to some substantial downward revisions of economic projections. The lower expectations are caused by the August 1998 devaluation of the Russian rouble, the defaults of public and private debts, the collapse of the Russian banking system, the worsening political situation for Boris Yeltsin and any potential successor and expected changes in monetary policy which raise the possibility of hyperinflation. In 1997, most forecasting sources were projecting positive growth in Russia's GDP in 1998, like other republics, and accelerating recovery in the years to follow. However, in October 1998, PlanEcon radically revised its GDP forecast for Russia for 1999 from +4.2% to -5%, with no positive GDP growth expected before 2001.

ENERGY OUTLOOK

Considering statistical series disruptions, final energy consumption fell by about 25% between 1990 and 1996…

Final energy demand peaked in 1989 at 908 Mtoe but, since then, has experienced an accelerated decline down to 652 Mtoe in 1996, a fall of more than 31% over 7 years. But this observation needs to be placed in context. In fact, statistical series were somewhat disrupted as the accounting of heat generation produced by local heating plants has improved since 1992. As a result of this, since 1992 heat consumption was accounted at the final stage instead of by the fuels used to produce it; and, as a consequence, production losses were reported in the transformation sector. The volume of additional heat averaged 130 Mtoe. That corresponds to about 30 Mtoe of losses reported in the transformation sector. Even allowing for this statistical adjustment, final energy demand still experienced a decline of about 24% between 1990 and 1996.

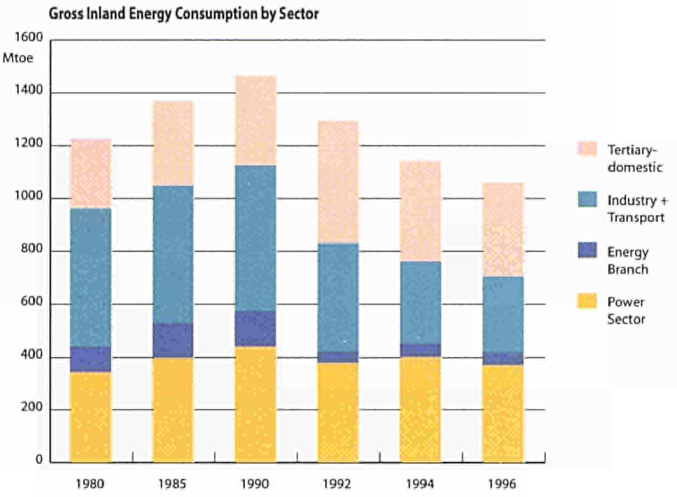


With this modification of heat accounting since 1992 it is difficult to evaluate precisely the evolution of consumption by fuel since 1990. On the period 1992-1996 for which consistent data were available, total final energy demand fell continuously. Those fuels delivered by a fixed infrastructure (gas, electricity and heat) decli-

Main items

The progressive dismemberment of the former Soviet Union since 1990 has led to grave, and sustained, economic collapse and continuing political uncertainty in the CIS. Real GDP, industrial production and living standards have seriously deteriorated – though poor economic data and a thriving informal and barter economy make precise performance measurement difficult. Economic transition in most of the CIS has been beset with huge problems. The merits of further western-style reforms, such as liberalisation and privatisation, remain in political dispute; efforts to stabilise currencies and control inflation have been undermined by recent economic events; creation of private banking, service and industrial enterprises has been set back; salaries and bills remain unpaid; debts have accumulated; and inward investment flows heavily curtailed. Yet the CIS is a crucial player on EU and world energy markets, with huge reserves of coal, oil and especially gas. Despite recent output declines, oil and gas exports account for some 40% of Russian export revenues and hard currency earnings. Lower real petroleum prices have had a serious impact. In future, gas exports are planned to rise considerably, especially to the EU and eastern and southern Europe. Despite the economic turmoil, greater foreign investment in gas production expansion has been secured; and several major pipeline projects are under construction. However, the coal industry is being painfully restructured; older nuclear reactors in the CIS give cause for safety concerns; and plant decommissioning and nuclear waste disposal have yet to be adequately addressed. The CIS suffers from severe environmental degradation and pollution. Steeply declining output, especially in energy-intensive industries, has led to lower emissions. Continued structural reform, and adjustment of energy prices to reflect costs, will further lower energy and carbon intensity in future. As a result, the CIS could benefit from substantial credits in any carbon trading schemes which might be developed following the 1997 Kyoto Protocol.

ned less rapidly than fuels that require physical deliveries (solid fuels and oil). In total the demand fell by 228 Mtoe over these five years; mainly oil products (92 Mtoe or 44% reduction), followed by distributed heat (49 Mtoe or 20%), solids (41 Mtoe or 42%), electricity (23 Mtoe or 22%) and gas (16 Mtoe or 7%). These trends were in line with the internal energy policies, which favoured reserving oil for export and concentrating internal consumption on gas.



Since 1990 tertiary-domestic energy consumption increased by 6% while transport and industry decreased by about 50%…

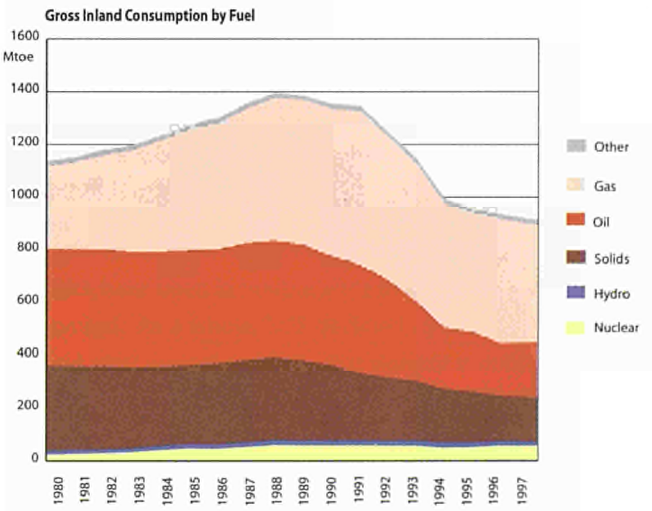
In 1990, the last year of the Soviet energy data system, industry represented about 48% of total final demand, buildings 24%, transport 15% and agriculture and other uses 13%. Since then, considering the lack of coherent data, it can be estimated that the industry and transport shares have been reduced by about 45% and 56% respectively whereas the residential share increased by about 6%. Demand in the residential sector tends to be unresponsive to price changes partly due to the absence of metering and control equipment, non-payment of bills and the lack of debt enforcement. Furthermore, residential energy demand appears to be quite unresponsive to falls in income. In addition, in several parts of the region, household consumption of gas and electricity is either unmetered or sold at very low prices, thus limiting price-related incentives to reduce consumption. As a consequence, since 1992, the tertiary-domestic sector largely dominated the final demand of energy with about 55% of total demand in 1996, compared to 35% for industry and only 10% for transport. In 1993, it was estimated that there were less than 18 million private cars in the CIS, or about 60 cars per 1000 inhabitants. There has been a rapid expansion of the car fleet over the past few years but passenger car ownership remained considerably lower than in the OECD countries. In addition, data on kilometres driven per vehicle in this region suggest that the average distance travelled per vehicle has fallen dramatically in recent years.

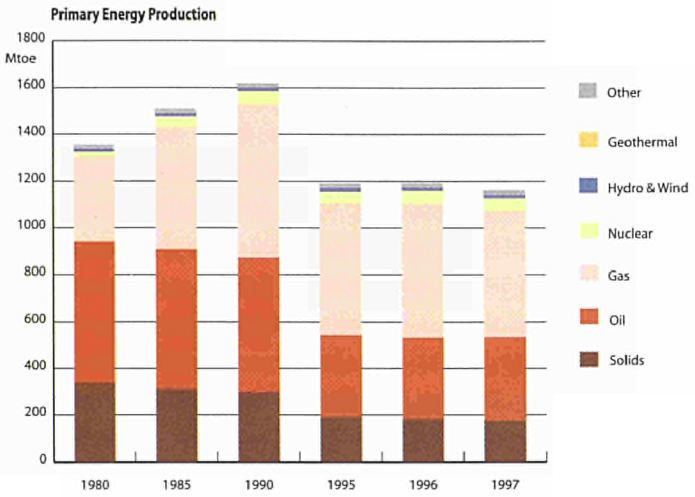
Share of electricity was quite stable with a large potential from domestic appliances….

The electricity share in final consumption has been quite stable since 1985; but the growth of residential demand remained limited. Household appliances such as televisions and refrigerators are already in widespread use. Other devices such as video recorders and freezers are rarer, while appliances such as fully automated washing machines, clothes dryers and dish washers are virtually unknown. There is great scope for the introduction of these products with any improvement of living standards, but their use is also subject to space constraints in household accommodation. The low level of maximum power demand currently available in some apartments also strictly limits the development of larger electricity using appliances. About 85% of electricity connections require modernisation to accommodate larger electricity consuming items such as washing machines. Much of the housing stock is limited to a maximum demand of 1.3 kW per apartment. Overcoming this constraint will take considerable investment and time.

Gross inland energy consumption, met about 50% by natural gas, declined more slowly since 1995…

Gross inland energy consumption, after a peak of 1394 Mtoe in 1988, fell to only 911.1 Mtoe in 1997 or a 35% total drop over 9 years. The decline was very rapid between 1991 and 1994, with a reduction by about 10% each year on average, but has slowed down over the last three years. The reduction, however, was not the same for all primary fuels as already illustrated by the evolution of final consumption. Solids and oil demand decreased systematically since 1980, and very rapidly after the reforms of 1990





(-7.4% on average per year for solid fuels and –9.3% for oil). For the first time since 1987, oil consumption increased again by 5.8% in 1997. On the other hand, natural gas consumption has steadily increased during the 1980's to become the largest source of energy since 1985. Since 1990 gas consumption dropped on average by 3.2% per year, slower than gross inland energy consumption. Consequently, gas consumption accounted for about half of gross inland consumption in 1997. Other forms of energy consumption were met mainly by nuclear energy, with limited contributions from both hydro and renewable energy. Nuclear energy saw a significant increase in consumption between 1980 and 1988, stagnated until 1993, fell by 15.5% in 1994 but recovered gradually to its 1993 level in 1997. The contribution of hydro has been stable since 1985 at about 20 Mtoe although there is a large potential for expansion.

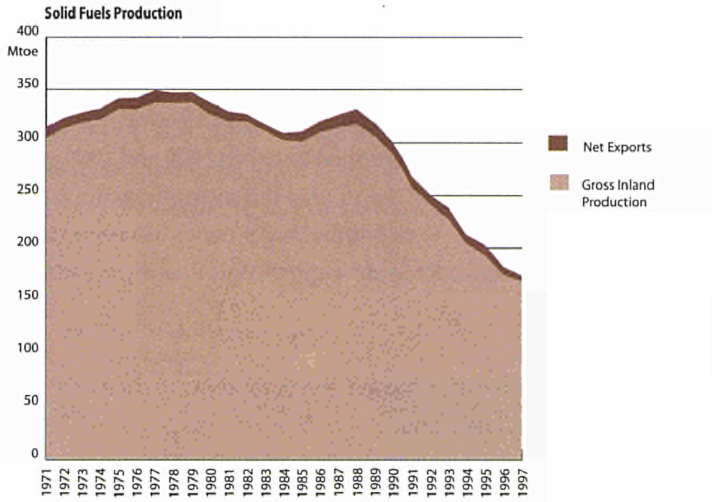
Russia remained the third biggest energy producer in the world after the United States and China…

The CIS as a whole remains the second biggest **energy producer** in the world after the United States and just ahead of China, and the world's leading producer and exporter of natural gas. CIS republics produce all types of primary fossil fuels, although they are not equally distributed. In 1997, Russia accounted for 79% of total energy production, but 58% of solid fuels production, 85% of oil production, 84% of gas production, 55 % of nuclear electricity

CIS(1) : TOTAL ENERGY

Mtoe	1980	1985	1990	1994	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
Total Production	1357.9	1513.0	1624.3	1228.6	1195.0	1198.0	1169.5	2.2%	1.4%	-6.0%	0.2%	-2.4%
Armenia	1.3	1.5	0.1	0.3	0.2	0.7	0.5	3.5%	-38.5%	13.0%	202.2%	-28.4%
Azerbaijan	26.1	24.7	20.4	14.9	14.7	14.4	13.6	-1.1%	-3.8%	-6.3%	-2.3%	-5.1%
Belarus	3.7	5.4	4.3	3.5	3.3	3.1	3.1	7.9%	-4.6%	-5.0%	-4.9%	-0.6%
Georgia	4.9	1.9	1.6	0.5	0.6	0.7	0.7	-17.4%	-3.4%	-18.7%	24.1%	-1.5%
Kazakhstan	79.7	82.9	86.1	69.7	61.9	62.0	65.7	0.8%	0.7%	-6.4%	0.1%	6.0%
Kyrgyzstan	2.3	2.2	2.3	1.6	1.4	1.4	1.5	-0.3%	0.4%	-9.6%	4.3%	7.4%
Moldova	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-7.1%	-5.7%	-1.0%	6.6%	-2.7%
Russia	976.5	1132.6	1252.4	965.5	942.9	945.6	920.0	3.0%	2.0%	-5.5%	0.3%	-2.7%
Tajikistan	2.2	2.0	1.8	1.5	1.3	1.3	1.3	-1.4%	-2.0%	-6.3%	1.2%	-6.5%
Turkmenistan	65.1	73.3	74.5	32.6	32.5	32.6	25.1	2.4%	0.3%	-15.3%	0.0%	-22.7%
Ukraine	154.6	143.5	130.3	85.1	80.0	78.3	79.8	-1.5%	-1.9%	-9.3%	-2.1%	1.8%
Uzbekistan	32.8	32.2	38.5	44.9	47.1	47.3	47.8	-0.4%	3.7%	4.1%	0.3%	1.1%
Baltics (2)	8.7	10.8	12.3	8.3	8.7	10.4	10.2	4.3%	2.7%	-6.6%	19.6%	-1.9%
Total Net Import	-212.21	-219.18	-259.97	-227.25	-244.49	-276.56	-256.63	0.6%	3.5%	-1.2%	13.1%	-7.2%
Total Gross Inland Consumption	1131.9	1272.4	1351.2	990.9	955.7	933.0	912.0	2.4%	1.2%	-6.7%	-2.4%	-2.3%
Armenia	5.7	4.5	7.7	1.4	1.7	1.8	1.3	-4.5%	11.2%	-26.3%	7.2%	-25.0%
Azerbaijan	20.0	20.8	23.0	16.8	13.5	12.4	13.4	0.8%	2.0%	-10.1%	-8.4%	8.3%
Belarus	18.3	33.2	41.4	26.1	23.5	24.2	23.7	12.7%	4.5%	-10.7%	2.9%	-1.8%
Georgia	10.4	7.6	10.7	3.2	2.1	1.6	1.7	-6.0%	7.1%	-28.0%	-22.0%	2.7%
Kazakhstan	76.9	77.1	73.8	59.2	52.6	42.7	42.0	0.1%	-0.9%	-6.5%	-18.9%	-1.6%
Kyrgyzstan	4.8	4.7	6.3	2.9	2.6	2.9	3.2	-0.4%	5.9%	-16.2%	13.0%	8.1%
Moldova	23.1	26.0	26.4	22.0	21.6	21.9	22.3	2.4%	0.3%	-3.9%	1.1%	2.0%
Russia	709.3	755.3	814.3	616.0	600.9	595.7	576.6	1.3%	1.5%	-5.9%	-0.9%	-3.2%
Tajikistan	4.0	4.2	6.5	3.3	3.3	3.5	3.4	0.6%	9.2%	-12.7%	7.2%	-4.2%
Turkmenistan	8.7	69.6	18.7	13.5	14.0	12.4	11.9	51.6%	-23.1%	-5.6%	-11.6%	-3.8%
Ukraine	198.7	196.7	243.1	163.8	159.8	152.4	151.2	-0.2%	4.3%	-8.0%	-4.6%	-0.8%
Uzbekistan	27.2	41.2	45.5	45.5	42.1	43.8	44.4	8.6%	2.0%	-1.6%	4.2%	1.4%
Baltics (1)	24.8	31.5	33.8	17.1	17.3	17.6	17.8	4.9%	1.4%	-12.5%	2.0%	0.9%

(1)Including Baltics only for statistical reasons
(2) Including oil shale



and 71% of hydro. Other major producers are Ukraine (solids, oil, natural gas and nuclear), Kazakhstan (solids, oil and gas); Uzbekistan (oil and gas) and Turkmenistan (gas).

Efforts to rationalise the coal industry were hampered by the payment arrears of large consumers...

For solid fuels the CIS (174 Mtoe in 1997) is now the third largest producer in the world after China (686 Mtoe) and the United States (546 Mtoe) even if Russia, the main contributor, was individually overtaken by Australia and South Africa. Solid fuel production has declined continuously since 1980 when the annual production reached 339 Mtoe, falling about 7.5% per year on average since 1990. The three main coal-producing countries - Russia (58% in 1997), Ukraine (23%) and Kazakhstan (18%) - were facing similar problems. The coal industries in Russia and Ukraine continue to be state-run operations, although efforts are underway to privatise the industries in both countries. These efforts are aimed primarily at shutting down inefficient mines and transferring support activities, such as housing, kindergartens, and health and recreation facilities, to local municipalities. Even efficient mines, however, are hampered by the payment arrears of their large customers, which have been making it nearly impossible to pay workers and purchase essential mining supplies and equipment.

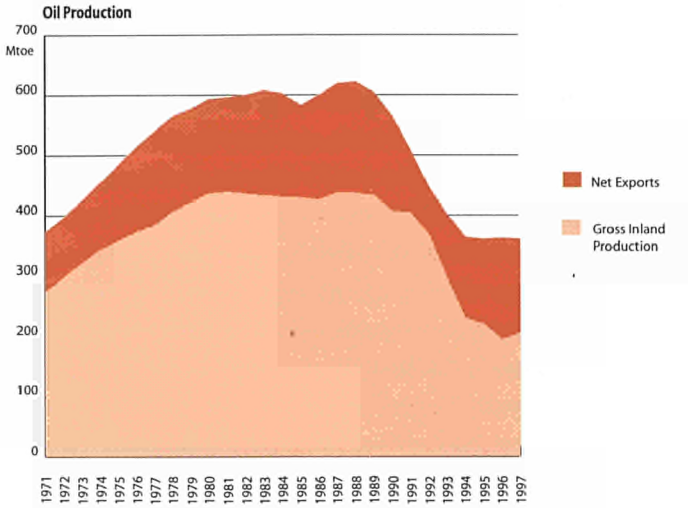
CIS(1) : SOLID FUELS

Mtoe	1980	1985	1990	1994	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
Total Production	338,7	312,5	300,5	208,2	190,5	180,4	174,7	-1,6%	-0,8%	-8,7%	-5,3%	-3,1%
Armenia	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-	-	-	-	-
Azerbaijan	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-	-	-	-	-
Belarus	0,0	2,4	1,3	0,7	0,6	0,5	0,5	-	-11,2%	-14,1%	-10,8%	0,0%
Georgia	0,9	0,7	0,4	0,0	0,0	0,0	0,0	-5,3%	-10,3%	-47,0%	-49,8%	0,0%
Kazakhstan	56,8	55,0	54,3	44,8	35,8	33,1	31,2	-0,6%	-0,2%	-8,0%	-7,6%	-5,7%
Kyrgyzstan	1,5	1,4	1,3	0,5	0,3	0,3	0,3	-1,3%	-2,3%	-25,3%	-13,3%	14,3%
Moldova	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-	-	-	-	-
Russia	172,2	155,5	154,3	109,8	107,1	104,4	98,7	-2,0%	-0,1%	-7,0%	-2,5%	-5,4%
Tajikistan	0,5	0,2	0,1	0,0	0,0	0,0	0,0	-19,6%	-2,3%	-39,2%	-44,0%	0,0%
Turkmenistan	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-	-	-	-	-
Ukraine	96,0	88,8	81,2	47,5	42,5	37,6	39,4	-1,5%	-1,8%	-12,2%	-11,5%	4,9%
Uzbekistan	2,8	1,8	2,1	1,3	1,1	1,0	1,0	-8,8%	3,6%	-13,0%	-6,7%	0,0%
Baltics (2)	8,0	6,8	5,4	3,5	3,2	3,6	3,6	-3,2%	-4,4%	-10,1%	11,1%	0,0%
Total Net Import	-11,05	-8,80	-11,72	-8,67	-9,21	-13,50	-5,63	-4,5%	5,9%	-4,7%	46,5%	-58,3%
Total Gross Inland Consumption	326,8	301,1	288,8	203,3	193,4	174,8	169,1	-1,6%	-0,8%	-7,7%	-9,6%	-3,3%
Armenia	0,0	0,2	0,2	0,0	0,0	0,0	0,0	-	2,4%	-64,5%	67,9%	0,0%
Azerbaijan	0,0	0,1	0,1	0,0	0,0	0,0	0,0	-	2,2%	-50,1%	0,6%	0,0%
Belarus	0,0	3,5	2,9	1,4	1,3	1,3	1,1	-	-3,5%	-15,3%	3,2%	-17,2%
Georgia	0,9	0,7	0,5	0,1	0,1	0,1	0,1	-5,2%	-6,2%	-26,4%	-7,5%	-15,0%
Kazakhstan	53,9	52,5	37,7	33,9	30,8	24,3	24,0	-0,5%	-6,4%	-4,0%	-21,2%	-0,9%
Kyrgyzstan	1,5	1,4	2,0	1,0	0,4	0,6	0,5	-1,2%	8,0%	-26,4%	32,5%	-15,6%
Moldova	0,0	2,2	1,9	0,9	0,6	0,5	0,5	-	-2,8%	-21,0%	-12,9%	-7,7%
Russia	176,9	148,3	155,5	110,6	105,0	100,0	94,2	-3,5%	1,0%	-7,6%	-4,8%	-5,8%
Tajikistan	0,5	0,2	1,4	0,0	0,0	0,0	0,0	-19,6%	54,6%	-61,3%	311,4%	-14,3%
Turkmenistan	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-	-	-	-	0,0%
Ukraine	81,5	82,8	76,0	49,4	50,2	42,7	43,6	0,3%	-1,7%	-8,0%	-14,9%	2,1%
Uzbekistan	2,7	1,7	3,0	1,6	1,0	1,2	1,0	-8,7%	12,0%	-19,1%	12,8%	-17,2%
Baltics (1)	9,0	7,7	7,7	4,3	4,0	4,1	4,1	-3,0%	-0,2%	-12,1%	2,8%	-0,5%

(1) Including Baltics only for statistical reasons
(2) Including oil shale

Crude oil production experienced an upturn in 1997…

Crude oil production has decreased since 1980 (606 Mtoe) to reach only 362 Mtoe in 1997, with an accelerating trend (more than -10% per year) between 1990 and 1994. Production as a whole increased by 2.5% in 1997 after the stabilisation registered in 1996. Russia represented more than 86% of the total production, remaining the third world producer after Saudi Arabia (457 Mtoe) and the United States (395 Mtoe). The dramatic production decline experienced since 1988 is a result of several factors, including natural reservoir depletion, insufficient investment, stalled implementation of tax reforms and poor technical management. Activity by foreign companies is currently restricted to a number of joint ventures which, however, will have some impact on total oil production. Negotiations are also under way for larger projects that will support the expected rebound of oil production in the near future. As a consequence of Russian energy policy promoting gas use, oil exports for the CIS as a whole have registered a 95% increase since 1992 but are still about 17% below the 1988 peak.



Large potential of the Caspian Basin still limited by the development of the pipeline infrastructure…

The Caspian Basin is an area of potentially vast resources. Only the United States and Saudi Arabia are thought to have more ultima-

CIS : OIL

Mtoe	1980	1985	1990	1994	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
Total Production	606.2	598.2	573.5	362.8	353.7	353.0	361.5	-0.3%	-0.8%	-9.2%	-0.2%	2.4%
Armenia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Azerbaijan	14.7	13.2	12.3	9.6	9.2	9.1	9.0	-2.1%	-1.5%	-5.6%	-0.7%	-1.1%
Belarus	2.6	2.0	2.1	2.0	1.9	1.9	1.9	-4.5%	0.2%	-1.2%	-3.7%	0.0%
Georgia	3.2	0.6	0.2	0.1	0.0	0.1	0.1	-29.5%	-18.4%	-25.2%	172.3%	0.0%
Kazakhstan	18.7	23.0	25.3	20.4	20.5	23.1	26.3	4.2%	1.9%	-4.1%	12.4%	14.0%
Kyrgyzstan	0.2	0.2	0.2	0.1	0.1	0.1	0.1	-2.7%	-3.4%	-11.1%	12.4%	0.0%
Moldova	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Russia	549.4	546.6	519.6	317.3	306.6	302.7	306.7	-0.1%	-1.0%	-10.0%	-1.3%	1.3%
Tajikistan	0.4	0.4	0.2	0.0	0.0	0.0	0.0	-0.1%	-12.4%	-34.0%	-16.0%	0.0%
Turkmenistan	8.0	6.1	5.6	3.4	3.5	4.1	5.6	-5.4%	-1.5%	-9.0%	17.1%	36.4%
Ukraine	7.5	4.1	5.3	4.2	4.1	4.1	4.3	-11.5%	5.2%	-5.1%	1.1%	3.7%
Uzbekistan	1.3	2.0	2.8	5.5	7.5	7.5	7.2	8.3%	7.2%	21.6%	0.5%	-4.8%
Baltics	0.0	0.0	0.0	0.1	0.1	0.2	0.2	-	-	-	21.1%	33.3%
Total Net Import	-156.93	-153.10	-158.37	-134.66	-139.56	-167.92	-164.08	-0.5%	0.7%	-2.5%	20.3%	-2.3%
Total Gross Inland Consumption	437.5	430.7	411.7	230.0	221.7	195.2	206.2	-0.3%	-0.9%	-11.6%	-11.9%	5.7%
Armenia	2.2	3.1	3.7	0.4	0.3	0.2	0.2	7.1%	3.4%	-40.2%	-44.6%	9.1%
Azerbaijan	7.6	8.5	8.2	8.7	7.0	6.6	7.7	2.3%	-0.8%	-3.0%	-6.5%	17.9%
Belarus	14.7	29.0	26.5	12.1	10.4	10.2	9.9	14.6%	-1.8%	-17.0%	-2.3%	-2.9%
Georgia	5.4	5.9	4.5	0.4	0.2	0.1	0.2	1.8%	-5.5%	-49.1%	-12.6%	38.9%
Kazakhstan	16.1	18.9	22.1	14.2	10.4	9.4	9.9	3.3%	3.2%	-14.0%	-9.5%	5.5%
Kyrgyzstan	2.2	2.9	2.3	0.4	0.5	0.6	0.6	5.7%	-4.9%	-24.7%	9.1%	8.3%
Moldova	6.2	6.2	4.6	1.1	1.0	1.0	1.0	0.0%	-5.7%	-25.8%	-7.2%	5.9%
Russia	310.4	259.5	249.0	149.6	149.5	131.3	139.9	-3.5%	-0.8%	-9.7%	-12.2%	6.5%
Tajikistan	1.9	2.6	1.9	1.2	1.2	1.2	1.3	6.5%	-6.3%	-8.2%	0.0%	3.7%
Turkmenistan	1.3	2.1	6.6	2.9	2.7	3.3	3.0	10.1%	25.8%	-16.4%	22.0%	-9.7%
Ukraine	52.1	66.4	57.3	23.8	25.3	18.7	19.8	5.0%	-2.9%	-15.1%	-25.8%	5.7%
Uzbekistan	7.0	10.3	10.6	8.1	6.9	6.6	6.9	8.0%	0.6%	-8.3%	-3.7%	4.3%
Baltics (1)	10.4	15.3	14.5	7.2	6.3	6.0	5.9	8.0%	-1.1%	-15.3%	-4.5%	-3.0%

(1) Including Baltics olly for statistical reasons

tely recoverable conventional oil resources. Three of the independent states, Azerbaijan, Kazakhstan and Turkmenistan, have the greatest oil production potential in the Caspian Sea region. The development of adequate infrastructures is the key to enabling the Caspian region to join the ranks of major suppliers in world oil trade. Azerbaijan, Kazakhstan and Turkmenistan are surrounded by other countries and cannot get oil to market without crossing the borders of neighbouring countries. Currently, Caspian oil, in relatively small quantities, is able to flow through pipelines into Russia. By the end of the decade, several pipeline routes to the Black Sea are expected to become available. Significantly larger volumes are expected to flow via pipeline through Turkey to the Mediterranean Sea and across Iran to the Persian Gulf. Even China has indicated an interest in obtaining its oil supplies by such pipelines.

Access to Caspian oil is a function of several difficult geopolitical issues such as: ownership of the resources, financing the exploration, production and distribution of the oil, taxation and environmental concerns. The manner in which these issues will be resolved, whether adversarial or co-operative, will determine how quickly oil from the Caspian Basin will enter the international market.

In 1997, CIS became the world's second largest gas producer, overtaken by the United States...

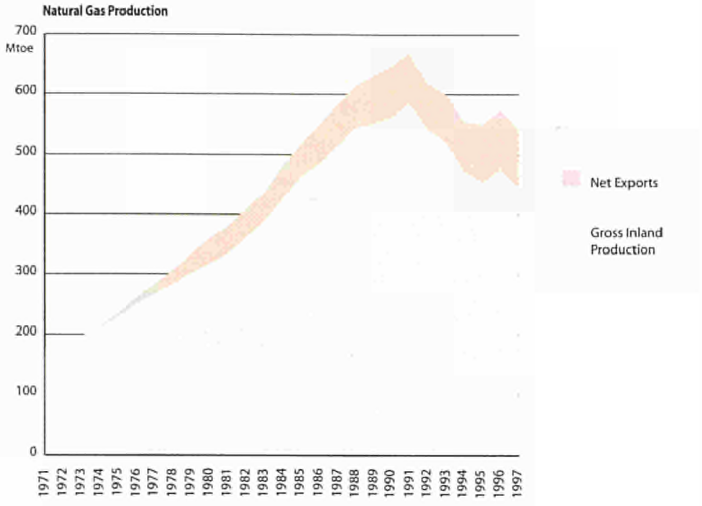
1996 saw a reversal of the downward trend in the natural gas market in much of the CIS region. However, in 1997, both production and consumption again declined. Overall gas consumption in the CIS, which accounted for 22.4% of the world's total consumption in 1997, fell by 5.5% from 1996 levels. Production of natural gas increased steadily to reach a maximum in 1991 (from 360 Mtoe in 1980 to 659 Mtoe in 1991) but subsequently fell by t about 18%, though production rebounded in 1996. Russia, where production is concentrated in West Siberia, was the largest gas producer (84% of the total CIS production). Production from all of Russia's major gas fields, with the exception of Yamburg, is declining. Attention is now focused on new fields in the Yamal Peninsula and the Far East Sakha region. Since 1994, Uzbekistan has become the second producer, far ahead of production in Turkmenistan and Ukraine.

Gazprom, the Russian State gas company, controls more than 95% of Russia's natural gas production, owns and operates 140,000 Km of gas pipeline grids, and runs 26 trading houses and marketing joint ventures in 13 European countries. Gazprom is by far the lar-

CIS : NATURAL GAS

Mtoe	1980	1985	1990	1994	1995	1996	1997	85/80	90/85	95/90	96/95	97/96
								Annual % Change				
Total Production	359.6	520.1	656.3	570.9	562.9	572.7	542.0	7.7%	4.8%	-3.0%	1.7%	-5.3%
Armenia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Azerbaijan	11.3	11.3	8.0	5.2	5.4	5.1	4.5	0.1%	-6.7%	-7.7%	-5.2%	-12.5%
Belarus	0.3	0.2	0.2	0.2	0.2	0.2	0.2	-4.7%	0.4%	-2.2%	-6.5%	0.0%
Georgia	0.2	0.1	0.0	0.0	0.0	0.0	0.0	-22.3%	-6.5%	-27.5%	-70.0%	0.0%
Kazakhstan	3.5	4.4	5.7	3.7	4.8	5.2	7.6	4.7%	5.5%	-3.4%	7.2%	46.6%
Kyrgyzstan	0.1	0.1	0.1	0.0	0.0	0.0	0.0	-1.5%	-3.5%	-17.3%	-27.8%	0.0%
Moldova	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Russia	212.8	372.8	516.6	479.9	470.4	479.2	455.1	11.9%	6.7%	-1.9%	1.9%	-5.0%
Tajikistan	0.2	0.2	0.1	0.0	0.0	0.0	0.0	4.1%	-18.0%	-18.9%	24.5%	0.0%
Turkmenistan	57.1	67.1	68.8	29.2	29.0	28.4	19.5	3.3%	0.5%	-15.9%	-2.0%	-31.3%
Ukraine	45.9	35.5	22.6	14.2	13.9	14.9	14.4	-5.0%	-8.6%	-9.2%	6.6%	-3.1%
Uzbekistan	28.2	27.9	33.0	37.4	38.1	38.2	39.1	-0.2%	3.4%	2.9%	0.4%	2.3%
Baltics (1)	0.0	0.4	1.0	1.1	1.0	1.4	1.5	-	20.2%	-0.4%	44.1%	8.9%
Total Net Import	-42.6	-54.8	-86.9	-83.1	-94.9	-100.1	-87.9	5.2%	9.7%	1.8%	5.5%	-12.1%
Total Gross Inland Consumption	315.9	460.9	559.5	471.5	453.0	471.7	446.2	7.8%	4.0%	-4.1%	4.1%	-5.4%
Armenia	2.4	0.0	3.6	0.7	1.1	0.9	0.6	-100.0%	-	-20.5%	-22.0%	-28.1%
Azerbaijan	11.3	11.4	14.2	7.3	5.8	5.1	5.0	0.2%	4.6%	-16.4%	-11.8%	-1.5%
Belarus	3.7	0.2	11.0	12.2	11.2	11.8	12.8	-44.2%	122.9%	0.4%	5.4%	7.9%
Georgia	3.6	0.1	4.4	2.1	1.2	0.8	0.8	-51.2%	113.2%	-22.6%	-37.0%	4.7%
Kazakhstan	6.4	4.4	11.7	8.9	10.2	7.7	7.5	-7.2%	21.5%	-2.7%	-24.0%	-3.1%
Kyrgyzstan	0.9	0.1	1.6	0.7	0.7	0.9	0.9	-35.6%	74.5%	-14.5%	19.3%	0.0%
Moldova	0.8	0.0	3.3	2.6	2.6	2.9	3.5	-100.0%	-	-4.8%	14.4%	19.7%
Russia	196.0	307.8	365.3	316.9	306.4	324.2	300.3	9.4%	3.5%	-3.5%	5.8%	-7.4%
Tajikistan	0.9	0.2	1.6	0.6	0.7	0.9	0.9	-26.0%	52.5%	-15.0%	27.4%	-7.0%
Turkmenistan	7.2	67.4	12.2	10.6	11.2	9.1	8.6	56.4%	-28.9%	-1.8%	-19.1%	-4.7%
Ukraine	61.7	34.7	91.8	71.7	65.4	69.7	66.4	-10.9%	21.5%	-6.6%	6.5%	-4.7%
Uzbekistan	16.5	28.0	30.6	34.1	32.7	33.9	34.4	11.2%	1.8%	1.4%	3.7%	1.5%
Baltics (1)	4.5	6.6	8.1	3.1	3.6	3.7	4.4	8.0%	4.1%	-14.8%	1.7%	18.6%

(1) Including Baltics only for statistical reasons



gest Russian taxpayer and hard currency earner. Because it has had difficulty making tax payments due to non-payment for supplies received by many of its customers, both domestic and foreign, Gazprom has resorted to curtailment of supplies in some instances and to barter in other instances as a means of reducing debts owed to the company. Consequently, trade among CIS republics has been in decline in the 1990's.

The company controls one-fifth of the world's natural gas reserves. In April 1994, the government took the first steps towards privatising Gazprom, allocating 15% of shares to current and retired employees. Since Gazprom relaxed rules barring foreign investors in 1997, international banks have been pouring money into the gas industry, with export projects, in particular the construction of the Yamal-Europe pipeline, attracting most of the big loans. Gazprom shares, long barred to foreign investors, have been successfully traded on the London stock market since October 1996. The Government subsequently agreed to sell shares in blocks of 2.5%. Potential bidders, at the end of 1997, included the German utility Ruhrgas, Royal Dutch/Shell and Italy's Eni. In late 1998, Ruhrgas, currently Gazprom's biggest export customer, effectively obtained a shareholding in Gazprom.

CIS represented about 23% of the world's fossil fuel reserves...

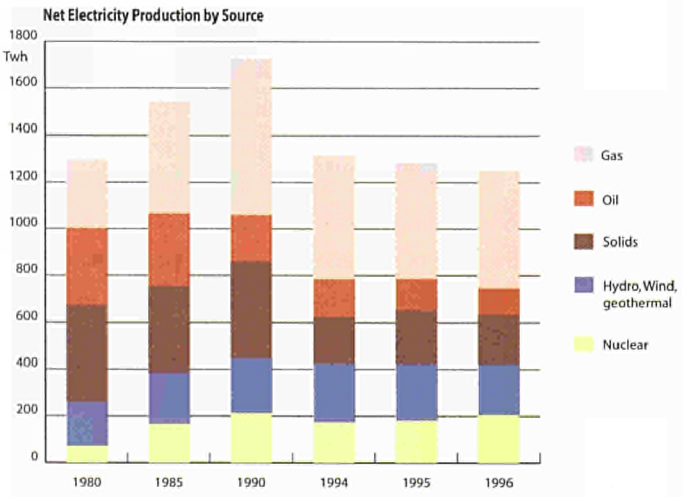
The CIS's oil reserves at end 1997 amounted to about 6.4% of the world's oil reserve, the bulk of which were concentrated in Russia (4.7%). The situation is somewhat more favourable for natural gas with the CIS accounting for 39.2% of world reserves, mainly concentrated in Russia (33.2%). CIS coal reserves totalled 23.4% of world reserves.

Electricity generation dominated by thermal power and more specifically by natural gas...

Electricity generation peaked in 1990, and has declined continuously since then to reach the 1980 level in 1996. Although it has experienced a continuous decrease since 1990 (-35%), thermal generation dominated electricity production, with about two-thirds of total generation in 1996 (three-quarters in 1990). Hydropower output has remained stable since 1990 representing only 17% of electricity production in 1996, but with very large potential in future. Nuclear production, which tripled its contribution from 1980 to 1990, has remained stable since then with the progressive decommissioning of obsolete and unsafe nuclear power plants compensated by the commissioning of new units (Ukraine) or reopening of mothballed units (Armenia). The fuel mix varied by region depending on primary energy production levels and import facilities. The use of solid fuels in thermal power stations remained rather stable over the 1980s but has declined significantly since then (-33%); its share dropping progressively from 40% in 1980 to only 26% in 1996. Gas became the most important fuel for power generation in 1983 (35% of total) and has continued to increase its share (60% of the total in 1997). Gas is projected to remain the dominant fuel for electricity generation mainly due to the more favourable economics of gas-fired generation. The consumption of oil for electricity production decreased by about 54% between 1980 and 1996 as a result of this substitution by gas.

Power sector faces financial crisis while low tariffs and subsidies continue...

The power sector is facing financial crisis as a result of the continued subsidisation of industrial and residential users and a chro-



nic non-payment problem. To illustrate the scale of this problem, recent figures showed that consumers paid for only 84% of electricity supplied in 1997. However, the majority of payments appeared to be in barter goods. Only about 20% were in cash. The Russian government has set a target of 35% cash payments by the end of 1998 but, with the current government prioritising help for manufacturing industry, this objective appears somewhat ambitious. Furthermore, the balance sheets of electricity utilities are burdened by significant, and rising, arrears in both payments and receipts.

The structure of the Russian electricity sector has several flaws, which lead to the inefficient allocation of resources. The industry is split into two parts. Firstly, the regional entities, regulated by Regional Electricity Commissions, have a monopoly on delivering electricity to industrial and commercial end users. The second is UES, which runs the wholesale electricity market. Only nine of the 73 regional entities have the necessary output capacity to meet demand, with the deficit regions buying electricity from UES-owned generators, surplus regions or state-owned nuclear facilities. One of the sector's main problems is that tariffs are set on a cost-plus basis. Thus there is no incentive to improve efficiency or reduce costs. Many regions take output from the local entities first, despite cheaper electricity being available on the wholesale market, resulting in artificially high prices. Therefore, price hikes and the phasing-out of industrial and residential subsidies, which would force both producers and customers to rationalise and cut costs, are unlikely to happen.

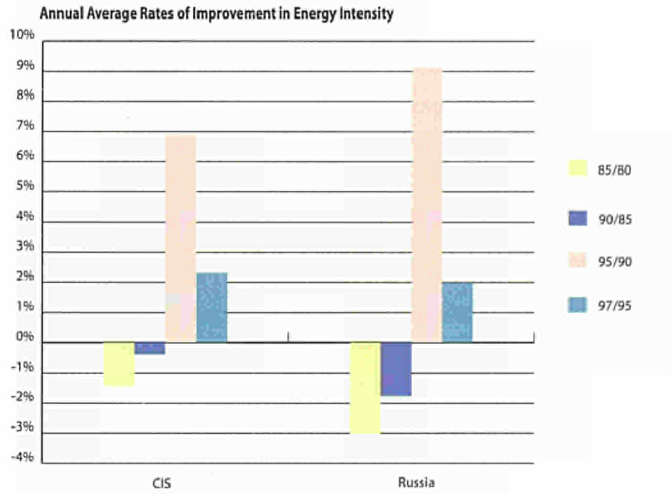
Refining industry in need of rationalisation and upgrading…

In 1996, refinery capacity (10.4 millions barrels day) represented 13% of the world capacity (16% in 1985). Since 1985, the capacity has declined by 1.5% per year. Most of the refineries were constructed in the 1940s and 1950s and are relatively unsophisticated. In addition, the product mix from refineries is not geared towards producing light products such as gasoline. Catalytic cracking accounted for only 4% of primary distillation capacity. Heavy fuel oil now accounts for about half of refinery output. In addition, low investment levels have resulted in poor maintenance and working conditions, leading to inefficient and unsafe plant operation. The utilisation rate of refineries decreased sharply from 79% in 1985 to only 52% in 1997. The most important recent trend for the petroleum industry in Russia has been vertical integration into companies which combine crude production, refining, distribution and retailing in one integrated structure.

COMPETITIVENESS

Energy intensity increased by 17% since 1990 and the near future appears unfavourable…

From 1980 to 1990, considering all the uncertainties about GDP calculation, the energy intensity decreased by about 0.7% per year on average. Before the start of its economic collapse, the former Soviet Union had the highest energy intensity in the world (bearing in mind the suspected undervaluation of GDP). The artificially low energy prices encouraged development of industry that used energy very inefficiently. In general the economy has been weighted heavily towards industry, with a relatively small-service sector. There is some evidence that rather than rationalising production by closing factories, and concentrating it in the most efficient plants, production has been maintained at low levels across many plants resulting in large energy overheads per unit of output. This partly explains why energy consumption has fallen more slowly than GDP since the beginning of the transition period and also why energy intensity increased significantly during this period. A large potential for improvement exists. The region's economies will rebuild through the reduction of the inefficiency in energy use, the commissioning of more efficient technology, the rationalisation of the energy and industrial systems, and the introduction of a price system that properly reflects the market costs of the fuel, in contrast to the artificially low, subsidised prices that characterised the region before 1990. The energy intensity increased sharply by 3.2% per year between 1990 and 1996, but experienced an improvement of 3.3% in 1997. Unfortunately, the financial crisis of 1998, with its expected negative impact on GDP until 2001, may well cause a further deterioration in this indicator.



Capital shortage makes it difficult to raise energy efficiency within the industrial sector. Although progress toward price reforms were under way, more efforts are needed to curb the subsidisation of energy use throughout the economy. Furthermore, industry accounts for a substantial share of total economic activity as the region has a relatively small service sector at least in the present calculation of GDP. The future evolution of energy intensity in industry will depend on the level of capital investment in more efficient equipment, as well as the relative rate of growth of less energy-intensive industrial activities.

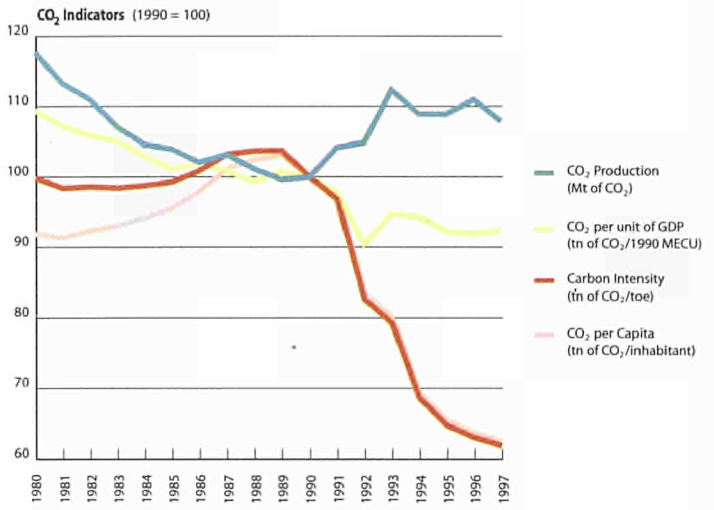
As regards the residential-tertiary sector it must be stressed that energy demand tends to be unresponsive to price changes, partly due to the lack of debt enforcement. In addition, in several parts of the CIS region, household gas and electricity is either unmetered or sold at very low prices, thus reducing price-related incentives to reduce consumption. As a result, residential energy demand appears to be quite unresponsive to falls in income.

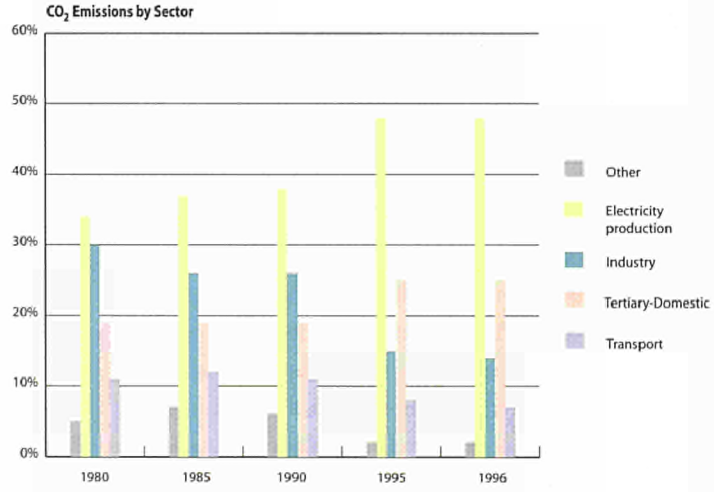
The gross inland consumption per capita, which reached 4.8 toe/capita in 1988, fell to only 3.12 toe/capita in 1997, below the European level. Large discrepancies exist between republics with higher consumption per capita in Russia (4.0 toe/capita in 1997) and much lower levels, largely below 1 toe/capita in some cases, in the Central Asian Republics.

ENVIRONMENT

CO_2 emissions reduced by 37% since 1990…

The CO_2 emissions in the CIS increased from 3253 Mt in 1980 to 3539 Mt in 1990 but then declined to 2213 Mt in 1997 (-37% since 1990) in line with the evolution of gross inland consumption. In addition, the CIS as a whole benefited substantially from the increasing contribution of natural gas in reducing CO_2 emissions. The expected decline of GDP in the near future will certainly amplify this reduction. But, after 2000, it is expected that any economic rebound will cause coal and particularly oil to increase their contribution to gross inland consumption, especially with the expected growth of transport fuel use. This means that the carbon intensity of fossil fuels might increase by about 5-10% over the first decade of the new millennium and consequently led to a resurgence in the growth of CO_2 emissions. Although CO_2 emissions per capita have closely followed the trend in total emissions since 1980, CO_2 intensity per unit of GDP has increased substantially since 1990 - almost regaining the 1982 level in 1997 due to the increasing energy intensity of the economy.





The power sector was by far the largest source of CO_2 emissions. With a maximum level of 1410 Mt reached in 1991, emissions declined until 1996 to the 1980 level and represented about 48% of total emissions (34% in 1980). As this sector was already particularly inefficient (average electrical efficiency of about 20%), any improvement of the power sector will have a significant impact on its CO_2 emissions. All sectors have contributed to the CO_2 emissions reduction recorded since 1990 but to a varying extent: energy branch emissions declined by 80%, industry by 65%, transport by 61%, the power sector by 19% and the tertiary-domestic sector by only 15%.

GLOBAL MARKETS

Energy exports peaked in 1996…

Exports of energy have always been very important for the economy of the former USSR until 1990 (and for Russia as a major CIS component since then), being a source of hard currency, mainly from Western Europe. Exports of energy represented about 22% of energy production in 1997 against 16% in 1990 due to the reduction of both production and gross inland consumption. Total export volumes increased to 260 Mtoe until 1990 from 212 Mtoe in 1980. They dropped by 22% between 1990 and 1992, but recovered the 1990 level in 1997. The largest exported energy remained crude oil, exports of which dropped by 50% between 1990 and 1992; but they recovered their 1980's historical values of about 155 Mtoe in 1997. The main markets for oil exports are Western Europe (91 Mtoe in 1997) and Central Europe (32 Mtoe in 1997) respectively.

Exports of natural gas also reached a peak in 1990 (87 Mtoe) and then decreased by about 5% per year between 1990 and 1992. The decline stopped in 1993, and then exports increased to reach a new absolute peak of about 100 Mtoe in 1996. 1997 experienced a slight decrease of about 5 Mtoe. These variations are connected to the export policy of Russia, which currently exports about 35% of its natural gas production. Of this amount, about 58% is destined for European Union markets and the remainder for Eastern Countries. Western Europe relies on Russian gas to meet about a quarter of its total needs. Trade among the CIS Republics has been in decline because of non-payment for supplies and the subsequent amassing of enormous debts for natural gas, causing reluctance on the part of shippers to provide more gas until these outstanding payments are made.

Gas infrastructure expansion within eastern countries and CIS Republics is underway to meet projected demand growth. Russia in particular is planning significant infrastructure expansion in order to serve expanding European markets. The most significant developments are of the Yamal gas fields in northern Siberia and the construction of the Yamal-Europe pipeline through Belarus and Poland to move gas to market. But the higher production costs in the Yamal fields and the additional cost of building the pipeline will significantly increase the cost of gas supplies from the region.

CIS(1) : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(4)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	1357.8	1512.9	1624.6	1194.8	1198.0	1167.9	2.2%	1.4%	-6.0%	0.3%	-2.5%
Solids	338.7	312.5	300.5	190.5	180.4	174.1	-1.6%	-0.8%	-8.7%	-5.3%	-3.5%
Oil	606.2	598.2	573.5	353.7	353.0	361.6	-0.3%	-0.8%	-9.2%	-0.2%	2.5%
Natural gas	359.6	520.1	656.3	562.9	572.7	540.7	7.7%	4.8%	-3.0%	1.7%	-5.6%
Nuclear	19.0	43.5	55.1	47.9	53.8	53.3	18.0%	4.8%	-2.8%	12.3%	-0.9%
Hydro & Wind	15.9	18.4	20.0	20.6	18.5	18.4	3.0%	1.7%	0.5%	-9.8%	-0.9%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-0.1%	0.0%
Other	18.4	20.2	19.1	19.2	19.6	19.7	1.9%	-1.1%	0.1%	2.2%	0.5%
Net Imports	-212.2	-219.2	-260.0	-244.5	-276.6	-256.6	0.6%	3.5%	-1.2%	13.1%	-7.2%
Solids	-11.1	-8.8	-11.7	-9.2	-7.8	-5.7	-4.5%	5.9%	-4.7%	-15.5%	-26.6%
Oil	-156.9	-153.1	-158.4	-139.6	-167.9	-155.0	-0.5%	0.7%	-2.5%	20.3%	-7.7%
Crude oil	-116.1	-105.1	-108.5	-97.8	-112.0	na	-2.0%	0.6%	-2.1%	14.6%	na
Oil products	-40.9	-48.0	-49.8	-41.8	-55.9	na	3.3%	0.8%	-3.5%	33.8%	na
Natural gas	-42.6	-54.8	-86.9	-94.9	-100.1	-95.1	5.2%	9.7%	1.8%	5.5%	-5.0%
Electricity	-1.6	-2.5	-3.0	-0.8	-0.8	-0.8	8.6%	3.9%	-22.6%	-5.2%	5.4%
Gross Inland Consumption	1131.9	1272.4	1347.8	955.7	932.9	911.1	2.4%	1.2%	-6.6%	-2.4%	-2.3%
Solids	326.8	301.1	288.8	193.4	174.8	168.3	-1.6%	-0.8%	-7.7%	-9.6%	-3.7%
Oil	437.5	430.7	408.3	221.7	195.2	206.5	-0.3%	-1.1%	-11.5%	-11.9%	5.8%
Natural gas	315.9	460.9	559.4	453.0	471.7	445.6	7.8%	4.0%	-4.1%	4.1%	-5.5%
Other (2)	51.7	79.7	91.3	87.6	91.2	90.6	9.1%	2.7%	-0.8%	4.2%	-0.6%
Electricity Generation in TWh	1294.0	1544.0	1727.0	1288.2	1254.8	na	3.6%	2.3%	-5.7%	-2.6%	na
Nuclear	73.0	167.0	211.5	182.2	204.8	na	18.0%	4.8%	-2.9%	12.4%	na
Hydro & wind	184.7	214.4	233.0	239.1	215.7	na	3.0%	1.7%	0.5%	-9.8%	na
Thermal	1036.3	1162.6	1282.5	866.9	834.3	na	2.3%	2.0%	-7.5%	-3.8%	na
Generation Capacity in GWe	266.8	319.3	343.7	342.6	341.8	na	3.7%	1.5%	-0.1%	-0.3%	na
Nuclear	14.0	28.1	37.9	37.9	37.4	na	15.0%	6.2%	0.0%	-1.3%	na
Hydro & wind	52.5	61.3	65.0	66.1	66.1	na	3.1%	1.2%	0.4%	0.0%	na
Thermal	200.2	229.9	240.8	238.6	238.2	na	2.8%	0.9%	-0.2%	-0.1%	na
Average Load Factor in %	55.4	55.2	57.4	42.9	41.9	na	-0.1%	0.8%	-5.6%	-2.3%	na
Fuel Inputs for Thermal Power Generation	342.6	397.9	439.3	374.6	369.5	na	3.0%	2.0%	-3.1%	-1.3%	na
Solids	138.4	129.6	142.7	101.4	96.1	na	-1.3%	1.9%	-6.6%	-5.2%	na
Oil	107.2	104.6	67.8	56.1	49.5	na	-0.5%	-8.3%	-3.7%	-11.8%	na
Gas	97.0	163.7	228.8	214.6	221.5	na	11.0%	6.9%	-1.3%	3.2%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	0.0%	na
Other	0.0	0.0	0.0	2.4	2.4	na	-	-	-	0.0%	na
Average Thermal Efficiency in %	26.0	25.1	25.1	19.9	19.4	na	-0.7%	0.0%	-4.5%	-2.5%	na
Non-Energy Uses	62.2	65.5	75.3	34.9	34.4	na	1.1%	2.8%	-14.2%	-1.5%	na
Total Final Energy Demand	789.7	839.0	892.0	670.3	652.3	na	1.2%	1.2%	-5.6%	-2.7%	na
Solids	189.2	148.6	141.3	60.6	57.2	na	-4.7%	-1.0%	-15.6%	-5.5%	na
Oil	265.7	266.9	265.5	126.1	109.5	na	0.1%	-0.1%	-13.8%	-13.2%	na
Gas	162.6	203.9	248.0	187.4	193.9	na	4.6%	4.0%	-5.5%	3.5%	na
Electricity	82.9	97.5	107.3	81.3	79.9	na	3.3%	1.9%	-5.4%	-1.7%	na
Heat(3)	71.0	101.9	110.8	197.4	194.6	na	7.5%	1.7%	12.3%	-1.5%	na
Other	18.4	20.2	19.1	17.5	17.2	na	1.9%	-1.1%	-1.8%	-1.5%	na
CO_2 Emissions in Mt of CO_2	3253.2	3381.8	3539.4	2318.0	2254.5	2213.0	0.8%	0.9%	-8.1%	-2.7%	-1.8%
Indicators											
Population (Million)	265.97	278.11	288.99	292.31	291.95	291.91	0.9%	0.8%	0.2%	-0.1%	0.0%
GDP (index 1985=100)	85.0	100.0	108.8	65.4	62.5	63.1	3.3%	1.7%	-9.7%	-4.5%	1.0%
Gross Inl Cons./GDP (toe/1990 MEUR)	2009.9	1920.7	1869.4	2204.6	2254.2	2180.2	-0.9%	-0.5%	3.4%	2.3%	-3.3%
Gross Inl Cons./Capita (toe/inhabitant)	4.26	4.58	4.66	3.27	3.20	3.12	1.5%	0.4%	-6.9%	-2.3%	-2.3%
Electricity Generated/Capita (kWh/inhabitant)	4865	5552	5976	4407	4298	na	2.7%	1.5%	-5.9%	-2.5%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	12.2	12.2	12.2	7.9	7.7	7.6	-0.1%	0.1%	-8.3%	-2.6%	-1.8%
Import Dependency (%)	-18.7	-17.2	-19.2	-25.6	-29.6	-28.2	-1.7%	2.3%	5.9%	15.8%	-5.0%

(1) Includes Baltic countries for statistical reasons
(2) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(3) Disruption in statistical series in 1992
(4) Estimates

CIS (1) : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	1131.9	1272.4	1347.8	990.9	955.7	932.9	2.4%	1.2%	-6.6%	-2.4%
Public Thermal Power Generation	325.4	380.5	422.5	390.3	354.4	352.7	3.2%	2.1%	-3.5%	-0.5%
Autoprod. Thermal Power Generation	17.2	17.4	16.8	10.0	20.2	16.8	0.2%	-0.7%	3.7%	-16.4%
Energy Branch	96.3	130.4	131.5	51.1	46.8	45.2	6.2%	0.2%	-18.7%	-3.5%
Final Energy Consumption	789.7	839.0	892.0	688.6	664.7	647.0	1.2%	1.2%	-5.7%	-2.7%
Industry	399.7	386.1	413.5	244.6	233.7	226.5	-0.7%	1.4%	-10.8%	-3.1%
Transport	123.8	134.1	139.9	65.6	67.6	62.0	1.6%	0.9%	-13.5%	-8.2%
Tertiary-Domestic	266.2	318.9	338.6	378.4	363.4	358.6	3.7%	1.2%	1.4%	-1.3%
Energy Intensity (toe/1990 MEUR)	2009.9	1920.7	1869.4	2157.2	2204.6	2254.2	-0.9%	-0.5%	3.4%	2.3%
Public Thermal Power Generation	577.8	574.4	586.1	849.8	817.5	852.1	-0.1%	0.4%	6.9%	4.2%
Autoprod. Thermal Power Generation	30.6	26.3	23.3	21.8	46.5	40.7	-3.0%	-2.4%	14.8%	-12.4%
Industry	709.7	582.7	573.5	532.4	539.1	547.2	-3.9%	-0.3%	-1.2%	1.5%
Transport	219.9	202.4	194.0	142.8	155.9	149.8	-1.6%	-0.8%	-4.3%	-3.9%
Tertiary-Domestic	472.8	481.4	469.7	823.8	838.2	866.3	0.4%	-0.5%	12.3%	3.4%
Energy per Capita (Kgoe/inhabitant)	4256	4575	4664	3389	3269	3196	1.5%	0.4%	-6.9%	-2.3%
Industry	1503	1388	1431	836	800	776	-1.6%	0.6%	-11.0%	-3.0%
Transport	466	482	484	224	231	212	0.7%	0.1%	-13.7%	-8.1%
Tertiary-Domestic	1001	1147	1172	1294	1243	1228	2.8%	0.4%	1.2%	-1.2%
Electricity Share (%)										
Final Energy Consumption	10.5%	11.6%	12.0%	12.3%	12.2%	12.4%	2.1%	0.7%	0.3%	0.9%
Industry	13.9%	16.5%	16.5%	17.0%	16.2%	16.1%	3.5%	-0.1%	-0.4%	-0.4%
Transport	5.3%	5.3%	5.3%	11.7%	10.8%	11.6%	-0.1%	0.3%	15.1%	7.2%
Tertiary-Domestic	7.8%	8.4%	9.3%	9.3%	10.0%	10.1%	1.5%	2.3%	1.3%	1.5%
Total Renewable Consumption (Mtoe)	34.3	38.7	39.1	40.8	40.5	38.2	2.4%	0.2%	0.7%	-5.6%
Hydro	15.9	18.4	20.0	21.3	20.6	18.5	3.0%	1.7%	0.5%	-9.8%
Biomass	18.4	20.2	19.1	19.6	19.9	19.6	1.9%	-1.1%	0.8%	-1.3%
Other	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	0.2%
Renewable intensity (toe/1990MEUR)	60.9	58.4	54.3	88.9	93.4	92.3	-0.8%	-1.4%	11.5%	-1.2%
Renewable per capita (Kgoe/inhabitant)	128.9	139.1	135.4	139.6	138.4	130.8	1.5%	-0.5%	0.4%	-5.5%
CO_2 Emissions (Mt of CO_2)	3253.2	3381.8	3539.4	2456.7	2318.0	2254.5	0.8%	0.9%	-8.1%	-2.7%
Public Thermal Power Generation	1061.9	1187.8	1291.4	1139.0	1044.3	1030.2	2.3%	1.7%	-4.2%	-1.4%
Autoprod. Thermal Power Generation	55.4	54.6	53.1	29.6	66.2	56.4	-0.3%	-0.5%	4.5%	-14.8%
Energy Branch	166.7	222.6	199.9	50.7	43.7	40.0	5.9%	-2.1%	-26.2%	-8.5%
Industry	987.1	866.1	919.3	337.4	338.3	319.8	-2.6%	1.2%	-18.1%	-5.5%
Transport	364.6	392.6	406.6	170.8	177.6	160.4	1.5%	0.7%	-15.3%	-9.7%
Tertiary-Domestic	617.4	658.1	669.1	607.0	580.2	568.1	1.3%	0.3%	-2.8%	-2.1%
Carbon Intensity (tn of CO_2/toe)	2.9	2.7	2.6	2.5	2.4	2.4	-1.6%	-0.2%	-1.6%	-0.4%
Public Power Generation	2.9	2.7	2.6	2.5	2.5	2.4	-1.9%	-0.7%	-1.0%	-1.9%
Public Thermal Power Generation	3.3	3.1	3.1	2.9	2.9	2.9	-0.9%	-0.4%	-0.7%	-0.9%
Autoprod. Power Generation	3.2	3.1	3.2	2.9	3.3	3.3	-0.5%	0.2%	0.7%	1.9%
Autoprod. Thermal Power Generation	3.2	3.1	3.2	3.0	3.3	3.3	-0.5%	0.2%	0.8%	1.9%
Energy Branch	1.7	1.7	1.5	1.0	0.9	0.9	-0.3%	-2.3%	-9.3%	-5.2%
Industry	2.5	2.2	2.2	1.4	1.4	1.4	-1.9%	-0.2%	-8.2%	-2.5%
Transport	2.9	2.9	2.9	2.6	2.6	2.6	-0.1%	-0.1%	-2.0%	-1.6%
Tertiary-Domestic	2.3	2.1	2.0	1.6	1.6	1.6	-2.3%	-0.9%	-4.2%	-0.8%
CO_2 per Capita (kg of CO_2/inhabitant)	12231	12160	12247	8402	7930	7722	-0.1%	0.1%	-8.3%	-2.6%
Industry	3711	3114	3181	1154	1157	1095	-3.4%	0.4%	-18.3%	-5.4%
Transport	1371	1412	1407	584	607	549	0.6%	-0.1%	-15.5%	-9.6%
Tertiary-Domestic	2321	2367	2315	2076	1985	1946	0.4%	-0.4%	-3.0%	-2.0%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	5777	5105	4909	5348	5347	5447	-2.4%	-0.8%	1.7%	1.9%
Public Thermal Power Generation	1886	1793	1791	2480	2409	2489	-1.0%	0.0%	6.1%	3.3%
Autoprod. Thermal Power Generation	98	82	74	64	153	136	-3.5%	-2.2%	15.7%	-10.7%
Energy Branch	296	336	277	110	101	97	2.6%	-3.8%	-18.3%	-4.2%
Industry	1753	1307	1275	735	781	773	-5.7%	-0.5%	-9.3%	-1.0%
Transport	647	593	564	372	410	387	-1.8%	-1.0%	-6.2%	-5.4%
Tertiary-Domestic	1096	993	928	1321	1338	1373	-2.0%	-1.4%	7.6%	2.6%

(1) Includes Baltic countries for statistical reasons

RUSSIA : SUMMARY ENERGY BALANCE

Mtoe	1990	1994	1995	1996	1997(2)	94/90	95/94	96/95	97/96
						Annual % Change			
Primary Production	1262.0	969.0	946.2	948.7	923.1	-6.4%	-2.4%	0.3%	-2.7%
Solids	164.9	112.4	109.5	106.3	100.5	-9.1%	-2.6%	-2.9%	-5.4%
Oil	518.8	317.3	306.6	302.7	306.7	-11.6%	-3.4%	-1.3%	1.3%
Natural gas	516.1	480.9	471.3	480.4	456.4	-1.8%	-2.0%	1.9%	-5.0%
Nuclear	30.6	25.9	26.3	28.8	29.1	-4.0%	1.5%	9.4%	1.2%
Hydro & Wind	14.3	15.1	15.2	13.3	13.0	1.3%	0.2%	-12.6%	-1.7%
Geothermal	0.0	0.0	0.0	0.0	0.0	-0.9%	20.0%	-0.1%	0.0%
Other	17.3	17.3	17.3	17.3	17.3	0.0%	0.0%	0.0%	0.0%
Net Imports	-394.7	-315.1	-314.2	-332.4	-328.1	-5.5%	-0.3%	5.8%	-1.3%
Solids	-0.6	1.0	-2.9	-3.2	-3.6	-	-	10.6%	12.7%
Oil	-262.0	-165.6	-157.6	-171.4	-166.8	-10.8%	-4.8%	8.7%	-2.7%
Crude oil	-204.3	-122.5	-114.4	-118.5	na	-12.0%	-6.6%	3.6%	na
Oil products	-57.7	-43.1	-43.2	-52.9	na	-7.0%	0.3%	22.4%	na
Natural gas	-131.7	-148.8	-152.0	-156.1	-156.1	3.1%	2.2%	2.7%	0.0%
Electricity	-0.4	-1.8	-1.7	-1.7	-1.7	46.0%	-4.3%	-0.5%	0.5%
Gross Inland Consumption	873.8	636.9	621.8	616.2	594.9	-7.6%	-2.4%	-0.9%	-3.4%
Solids	167.0	113.8	108.7	102.9	96.9	-9.1%	-4.5%	-5.3%	-5.8%
Oil	264.6	149.6	149.5	131.3	139.9	-13.3%	0.0%	-12.2%	6.5%
Natural gas	380.3	316.9	306.4	324.2	300.3	-4.5%	-3.3%	5.8%	-7.4%
Other (1)	61.9	56.6	57.1	57.7	57.8	-2.2%	0.9%	1.0%	0.1%
Electricity Generation in TWh	1114.2	848.6	859.0	846.3	na	-6.6%	1.2%	-1.5%	na
Nuclear	117.4	97.8	99.5	109.0	na	-4.5%	1.8%	9.5%	na
Hydro & wind	166.8	175.9	176.3	154.1	na	1.3%	0.2%	-12.6%	na
Thermal	829.9	574.9	583.2	583.2	na	-8.8%	1.5%	0.0%	na
Generation Capacity in GWe	213.1	214.7	210.8	210.8	na	0.2%	-1.8%	0.0%	na
Nuclear	20.2	21.2	21.2	21.2	na	1.2%	0.0%	0.0%	na
Hydro & wind	43.3	43.8	43.8	43.8	na	0.3%	-0.1%	0.0%	na
Thermal	149.5	149.7	145.8	145.8	na	0.0%	-2.6%	0.0%	na
Average Load Factor in %	59.7	45.1	46.5	45.8	na	-6.8%	3.1%	-1.5%	na
Fuel Inputs for Thermal Power Generation	317.3	295.5	276.8	286.0	na	-1.8%	-6.3%	3.3%	na
Solids	65.2	46.7	55.1	58.0	na	-8.0%	17.9%	5.3%	na
Oil	47.1	57.5	45.0	40.9	na	5.1%	-21.8%	-9.0%	na
Gas	205.0	191.3	176.7	187.0	na	-1.7%	-7.6%	5.8%	na
Geothermal	0.0	0.0	0.0	0.0	na	-0.9%	7.1%	0.0%	na
Other	0.0	0.0	0.0	0.0	na	-	-	-	na
Average Thermal Efficiency in %	22.5	16.7	18.1	17.5	na	-7.1%	8.3%	-3.2%	na
Non-Energy Uses	37.0	27.0	29.0	28.8	na	-7.6%	7.8%	-0.8%	na
Total Final Energy Demand	658.8	459.9	452.0	446.2	na	-8.6%	-1.7%	-1.3%	na
Solids	49.4	32.1	28.6	29.4	na	-10.2%	-10.8%	2.7%	na
Oil	168.3	65.1	74.7	64.9	na	-21.1%	14.8%	-13.2%	na
Gas	145.2	105.6	106.2	112.4	na	-7.6%	0.6%	5.8%	na
Electricity	74.2	54.6	53.2	52.9	na	-7.4%	-2.7%	-0.5%	na
Heat	204.3	185.1	171.9	169.3	na	-2.4%	-7.1%	-1.5%	na
Other	17.3	17.3	17.3	17.3	na	0.0%	0.0%	0.0%	na
CO_2 Emissions in Mt of CO_2	2138.3	1520.1	1438.3	1450.7	na	-8.2%	-5.4%	0.9%	na
Indicators									
Population (Million)	148.29	148.35	148.20	147.74	147.42	0.0%	-0.1%	-0.3%	-0.2%
GDP (index 1985=100)	109.1	70.7	67.8	64.4	65.0	-10.3%	-4.1%	-4.9%	0.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	1920.8	2160.5	2200.4	2293.1	2194.2	3.0%	1.8%	4.2%	-4.3%
Gross Inl Cons./Capita (toe/inhabitant)	5.89	4.29	4.20	4.17	4.04	-7.6%	-2.3%	-0.6%	-3.2%
Electricity Generated/Capita (kWh/inhabitant)	7513	5720	5797	5729	na	-6.6%	1.3%	-1.2%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	14.4	10.2	9.7	9.8	na	-8.2%	-5.3%	1.2%	na
Import Dependency (%)	-45.1	-49.5	-50.5	-53.9	-55.1	2.4%	2.1%	6.7%	2.2%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

UKRAINE : SUMMARY ENERGY BALANCE

Mtoe	1990	1994	1995	1996	1997(2)	94/90	95/94	96/95	97/96
						Annual % Change			
Primary Production	135.7	86.3	81.0	79.0	80.5	-10.7%	-6.1%	-2.4%	1.9%
Solids	86.8	48.6	43.4	38.3	40.2	-13.5%	-10.7%	-11.8%	4.9%
Oil	5.3	4.2	4.1	4.1	4.3	-5.4%	-3.4%	1.1%	3.7%
Natural gas	22.6	14.2	14.0	14.9	14.4	-11.0%	-1.6%	6.7%	-3.1%
Nuclear	19.9	17.9	18.4	20.7	20.6	-2.5%	2.4%	12.8%	-0.8%
Hydro & Wind	0.9	1.1	0.9	0.8	0.8	3.6%	-17.7%	-13.2%	8.8%
Geothermal	0.0	0.0	0.0	0.0	0.0	-	-	-	-
Other	0.3	0.3	0.3	0.3	0.2	-2.8%	-2.5%	-2.6%	-3.2%
Net Imports	119.8	75.3	80.9	74.9	71.5	-11.0%	7.4%	-7.4%	-4.5%
Solids	-5.8	2.2	8.5	5.7	4.7	-	286.8%	-33.4%	-17.2%
Oil	54.6	19.6	21.2	14.6	15.1	-22.6%	8.2%	-31.0%	3.3%
Crude oil	53.4	15.9	13.4	9.3	na	-26.1%	-15.8%	-30.6%	na
Oil products	1.2	3.7	7.8	5.3	na	31.5%	111.4%	-31.6%	na
Natural gas	73.5	53.6	51.4	54.8	52.0	-7.6%	-4.1%	6.5%	-5.1%
Electricity	-2.4	-0.1	-0.3	-0.2	-0.3	-56.2%	183.3%	-32.2%	47.6%
Gross Inland Consumption	252.9	165.4	161.8	153.9	152.4	-10.1%	-2.2%	-4.9%	-1.0%
Solids	81.6	50.8	51.9	43.9	44.9	-11.2%	2.3%	-15.4%	2.1%
Oil	60.9	23.8	25.3	18.7	19.8	-20.9%	6.2%	-25.8%	5.7%
Natural gas	91.8	71.7	65.4	69.7	66.4	-6.0%	-8.8%	6.5%	-4.7%
Other (1)	18.6	19.2	19.3	21.6	21.4	0.7%	0.4%	12.0%	-0.9%
Electricity Generation in TWh	298.8	202.9	194.0	181.7	na	-9.2%	-4.4%	-6.3%	na
Nuclear	76.2	68.8	70.5	79.6	na	-2.5%	2.4%	12.8%	na
Hydro & wind	10.7	12.3	10.2	8.8	na	3.6%	-17.7%	-13.2%	na
Thermal	212.0	121.7	113.3	93.3	na	-12.9%	-6.9%	-17.7%	na
Generation Capacity in GWe	54.3	54.2	54.3	54.2	na	0.0%	0.0%	0.0%	na
Nuclear	12.8	12.8	12.8	12.8	na	0.0%	0.0%	0.0%	na
Hydro & wind	4.7	4.7	4.7	4.7	na	0.1%	0.2%	-0.2%	na
Thermal	36.8	36.7	36.7	36.7	na	-0.1%	0.0%	0.0%	na
Average Load Factor in %	62.8	42.7	40.8	38.2	na	-9.2%	-4.4%	-6.3%	na
Fuel Inputs for Thermal Power Generation	94.2	29.9	31.8	28.0	na	-24.9%	6.2%	-11.7%	na
Solids	26.6	15.7	20.4	16.9	na	-12.3%	29.9%	-17.5%	na
Oil	22.0	2.8	2.8	2.1	na	-40.3%	0.0%	-25.4%	na
Gas	45.6	11.4	8.5	9.1	na	-29.3%	-25.0%	6.5%	na
Geothermal	0.0	0.0	0.0	0.0	na	-	-	-	na
Other	0.0	0.0	0.0	0.0	na	-	-	-	na
Average Thermal Efficiency in %	19.3	35.0	30.7	28.6	na	16.0%	-12.3%	-6.8%	na
Non-Energy Uses	3.4	1.1	0.8	0.6	na	-24.5%	-25.3%	-32.6%	na
Total Final Energy Demand	180.3	109.3	104.3	97.7	na	-11.8%	-4.5%	-6.3%	na
Solids	45.6	25.2	22.0	18.9	na	-13.8%	-12.8%	-13.9%	na
Oil	42.6	17.3	18.9	14.1	na	-20.2%	9.4%	-25.4%	na
Gas	34.5	40.4	39.9	42.5	na	4.1%	-1.3%	6.5%	na
Electricity	19.2	12.9	12.3	11.6	na	-9.5%	-4.5%	-5.9%	na
Heat	38.2	13.2	11.0	10.4	na	-23.4%	-16.7%	-5.7%	na
Other	0.3	0.3	0.3	0.3	na	-2.8%	-2.5%	-2.6%	na
CO_2 Emissions in Mt of CO_2	720.7	412.7	409.3	373.0	na	-13.0%	-0.8%	-8.9%	na
Indicators									
Population (Million)	51.89	51.92	51.53	50.72	50.19	0.0%	-0.8%	-1.6%	-1.0%
GDP (index 1985=100)	109.6	70.5	62.2	55.9	54.1	-10.4%	-11.8%	-10.1%	-3.2%
Gross Inl Cons./GDP (toe/1990 MEUR)	2041.8	2074.2	2300.6	2434.0	2490.2	0.4%	10.9%	5.8%	2.3%
Gross Inl Cons./Capita (toe/inhabitant)	4.87	3.19	3.14	3.04	3.04	-10.1%	-1.4%	-3.4%	0.1%
Electricity Generated/Capita (kWh/inhabitant)	5759	3908	3765	3583	na	-9.2%	-3.7%	-4.8%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	13.9	7.9	7.9	7.4	na	-13.0%	-0.1%	-7.4%	na
Import Dependency (%)	47.4	45.5	50.0	48.7	46.9	-1.0%	9.8%	-2.6%	-3.6%

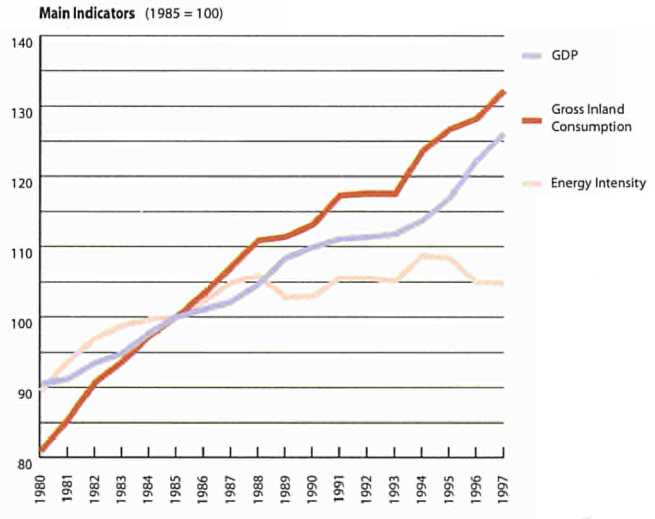
(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

PART VI AFRICA

AFRICA: Recent trends (1980-1997)

- 1997 confirmed the economic recovery observed since 1994
- Biomass covered up to 72% of the final energy demand in sub-Saharan Africa
- The contribution of transportation fuels and electricity remained very low
- Final energy demand is largely dominated by the tertiary-domestic sector
- Growth of gross inland consumption had slowed down since 1980, but rebounded in 1997
- Sub-Saharan oil production increased steadily, sustained by promising offshore West African sites
- Africa accounted for just over 6% of world's fossil fuel reserves
- Electricity is mainly generated in thermal power plants despite a large hydro potential
- The refinery capacity still requires upgrading
- Synthetic fuels developed in South Africa are now subject to closer economic scrutiny
- Energy intensity has improved since 1995
- Gross inland consumption per capita has declined since 1985 and is equivalent to only 15% of EU average
- In 1997, CO_2 emissions were 14% above the 1990 level
- Africa became an increasing exporter of energy with North Africa and sub-Saharan Africa contributing equally

Africa is a diverse continent from both economic and energy perspectives. A natural geographic separation, the Sahara desert, separates the North along the Mediterranean Sea, and all other countries. There are a number of countries with vast resources of oil, gas and coal. However, the energy sector in the region is largely underdeveloped. Africa includes some of the least developed countries in the world and, as a whole, has the lowest average income per capita among the world regions considered in this outlook. Special economic links exist between North African countries and the European Union, particularly concerning oil and gas supplies. For the analysis, two regions are explicitly considered: North Africa including Algeria, Egypt, Libya, Morocco and Tunisia, and, on the other hand, sub-Saharan Africa which includes all other countries.



1997 confirmed the economic recovery observed since 1994...

Between 1980 and 1997, the African population grew steadily by about 2.7% per annum, but only by 2.1% in North Africa since 1990. About 82% of the continent's population is concentrated in sub-Saharan Africa. Over the same period, the annual average GDP growth was limited to 2.0%. Though growth was stable during the 1980's, the economic growth was marked by stagnation between 1990 and 1993 and by a more sustained evolution since then, confirmed by a 3.1% increase in 1997. But it must be stressed that GDP is largely underestimated, as a large fraction of the population is self-sufficient and thus much economic activity is not recorded.

ENERGY OUTLOOK

Biomass covered up to 72% of the final energy demand in sub-Saharan Africa...

The growth of final energy demand slowed down since 1980 to reach only 1.8% in 1997 compared to 2.5% at the beginning of the 1980's. But final demand varies greatly from region to region. Since 1985, the growth in North Africa (+36%) has been systematically higher than in sub-Saharan Africa (+25%). Furthermore, in North Africa, the growth was totally covered by fossil fuels and electricity. Biomass played a major role in sub-Saharan Africa, with the exception of South Africa.

Biomass remained the major contributor to the final energy demand, with a share of about 60% of energy needs even though

the precise levels of use in individual countries are uncertain. For example, some neighbouring countries with similar economic and geographical characteristics show unexplained differences in their level of per capita biomass use. The significant differences in economic development, energy endowment and demography between North, South and the rest of Sub-Saharan Africa are reflected in the pattern of biomass energy use. Sub-Saharan Africa, excluding South Africa, accounted for 92% of the continent's total final biomass consumption in 1996, but consumed only 12% of the continent's final conventional energy. Most biomass energy is consumed in the household sector. The share of biomass in the tertiary-domestic and agriculture sectors was about 83% for the whole continent, 16% in North Africa, 35% in South Africa and 93% for the rest of sub-Saharan Africa. Much of the biomass used in rural households is collected rather than purchased. In urban areas, however, all charcoal and a large part of firewood is traded. Firewood and charcoal production constitute an important source of employment and income for rural people.

	Total Biomass in Final Energy Demand	Share of the region's biomass use	Share of biomass in Final Energy Demand	Per capita energy use (Kgoe)	
	(Mtoe)			Biomass	Conv. Fuels
North Africa	3,4	2%	6%	26	401
Sub-Saharan Africa	183,8	98%	79%	311	83
of which South Africa	11,8	6%	24%	313	996
Total Africa	187,1	100%	65%	260	140

Contribution of transportation fuels and electricity remained very low…

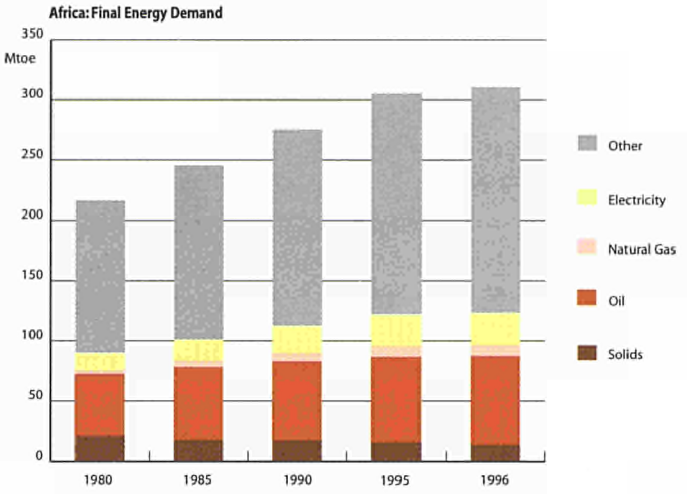
Oil's contribution has remained stable since 1980 at about 24% due to the limited increase of transportation fuel consumption. Car ownership in Africa remains one of the lowest in the world, with only 20 cars per 1000 inhabitants on average. The substitution from coal to both oil and gas is largely due to the evolution of South Africa's final demand. The electricity share increased from 6% to 8% since 1980 but remained very low compared to industrialised countries. Oil consumption of the whole continent remained lower than the UK's oil consumption in 1996. At present, there are low levels of electrification in many African countries. In per capita terms, the contrast is dramatic: in 1996 South Africa consumed 5260 kWh per capita, North Africa 899 kWh per capita and sub-Saharan Africa only 131 kWh per capita.

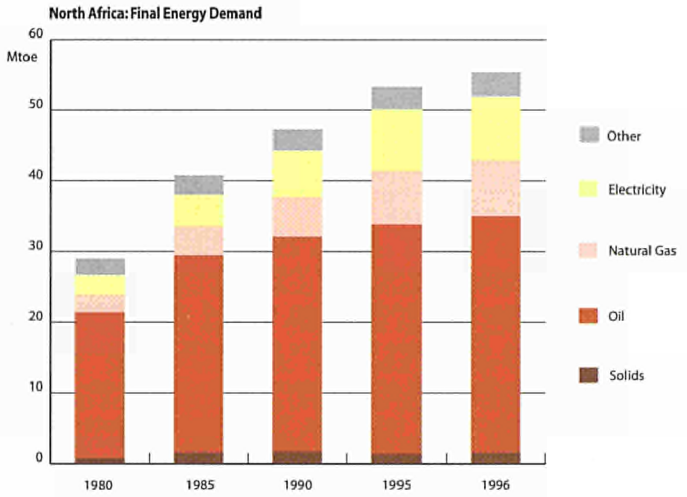
Main items

The tremendous diversity of the African continent, in terms of both economic and energy evolution, is exemplified by its three main sub-regions: North Africa, Sub-Saharan Africa and South Africa. In all three sub-regions continued rapid population growth and urbanisation impose growing strains on economic development and are increasing energy demand. Political instability, weak public administration and burdensome regulation are endemic; and reform of the energy sector remains a priority (as regards pricing, corporate management, attracting foreign capital and energy market liberalisation). Public-private partnerships provide scope for infrastructure investment and technology transfer. However, growing debt burdens remain a major constraint on development in many countries. Sub-Saharan Africa is now widely recognised as the biggest global development challenge: two-thirds of the population live in rural areas with virtually no access to commercial energy; and 40% subsist on incomes below 1 EURO a day. Following the smooth transition to democracy in South Africa, political and economic reform continue to progress but, even here, energy provision remains poor in non-urban areas. Continued development in North Africa must aim to diversify these economies, reducing the current heavy dependence on oil and gas exports in some countries. Elsewhere there are prospects for significant expansion of indigenous energy resources including on- and off-shore hydrocarbon resources, hydro-electric potential (coupled with expanded intra-regional grid connections) and more effective utilisation of biomass and other renewable resources. Unregulated urbanisation has placed huge strains on inadequate infrastructures of all kinds (electricity, public transport, water and sewage, telecommunications). Such urbanisation, and rising use of unleaded gasoline and diesel, contributes to deteriorating air quality.

Final energy demand largely dominated by the tertiary-domestic sector…

Globally, for the whole continent, the domestic and tertiary share in final energy demand is by far the most important, and this feature has accelerated over time, rising from 59% in 1980 to 66% in 1996. The share of industry fell from 24% to 19% over the same period, while the transport sector decreased from 17% to 15%. This is a result of the rural economy prevailing in sub-Saharan Africa, which excludes almost all forms of conventional industrial





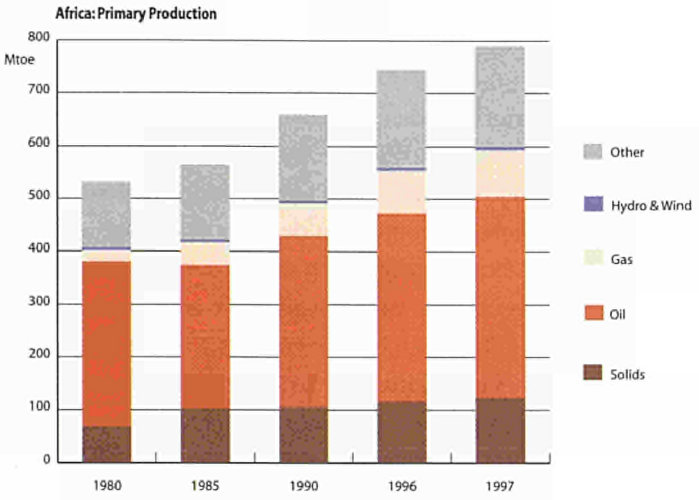
activity, with the exception of South Africa. In this region of more than 553 millions inhabitants, industrial energy consumption remained lower than 19 Mtoe in 1996, slightly below the Spanish industrial demand. A second reason for this predominance of the tertiary-domestic sector is the very low efficiency associated with biomass use: about 15% for a traditional three-stone open fire. Looking more specifically at North Africa, the structure of energy consumption there was closer to that in industrialised countries with 33% for industry, 25% for transport and 42% for the tertiary-domestic sector in 1996.

Growth of gross inland consumption had slowed down continuously since 1980, but rebounded in 1997…

Gross inland energy consumption closely followed the evolution of final demand, with an average annual increase of almost 3.4% during the 1980's, but only 2.2% since 1990 even though energy consumption growth recovered to 3.0% in 1997 in line with the economic rebound. There was a general increase for all primary fuels, with large regional variations. Gas, mainly consumed in North Africa where the production is located, grew on average by 7.8% per year since 1980. Ninety percent of all natural gas consumption in Africa is concentrated in only four countries: Algeria, Egypt, Libya and Nigeria. On the contrary, solid fuels - which increased by about 2.9% on average since 1980, but only by 1.9% since 1990 - are mainly consumed in South Africa, the major African producer. Power generation absorbed 55% of solid fuel consumption and synthetic fuels production in South Africa another 26%. The continent's oil consumption grew on average by about 2.3% per year, but stabilised between 1995 and 1997. The regional evolution was more varied. North Africa features more industrialised countries with transport infrastructures. Oil consumption has grown there by 3.5% since 1980, although growth slowed down progressively and stabilised in 1995. Since then the growth in oil consumption has been limited in sub-Saharan Africa at only 1.2% on average since 1980, exhibiting the same stability since 1995.

Sub-Saharan oil production increased regularly, sustained by promising offshore West Africa sites…

Indigenous energy production in Africa increased by almost 50% over the period 1980 to 1997, but with considerable uncertainty relating to the statistical accounting of biomass production. Over the period, oil remained the major contributor, although its share in primary production decreased from 58% to about 48%. Although the major oil producers (Algeria, Libya and Egypt) are located in North Africa it must be stressed that Sub-Saharan production, driven by Nigeria, Angola and Gabon, increased more rapidly to overtake the level of North Africa in 1997. This evolution will continue as vast areas of offshore West Africa are now considered to be promising oil provinces for future development. In addition, oil revenues are vital for all these producing countries, accounting in most cases for more than 90% of total exports. Given that in some sub-Saharan regions biomass remained the only energy source accessible to people, its use continued to grow. Biomass remained the second energy source, covering 24% o f primary production in 1997. Solid fuels, the third contributor with about 16% of primary production, increased production by 75% since 1980, 97% of the output being from in South Africa with about 117 Mtoe in 1997. Natural gas, mainly produced in North Africa (Algeria and to a lesser extent Egypt), saw its production multiplied by 4.3 since 1980 to contribute to 11% of primary production in 1997. Nuclear, hydro and wind, as well as geothermal, remain marginal even if their contribution has been increasing slowly since 1990.



Africa accounted for a little more than 6 % of the world's fossil fuel reserves…

Africa's oil reserves at end 1997 amounted to about 7% of the world's proven oil reserves. Three OPEC Members accounted for most of these reserves: Libya, Nigeria and Algeria with a share of 42%, 24% and 13% of total reserves respectively. Gas reserves, about 7% of world reserves as for crude oil, were highly concentrated with over half in North Africa (mainly Algeria) and more than one third in Nigeria. Finally the continent's coal reserves, mainly located in South Africa, accounted for 6% of the world's coal reserves.

Electricity mainly generated in thermal power generation despite a large hydro potential….

Electricity generation in Africa grew by almost 5% per year during the 1980's. After a relative slow down at 2.5% per annum between 1990 and 1993, growth was re-established to reach 5.1% in 1996 with the improvement in the economic circumstances. But the world's lowest electricity consumption per capita, only about 537 kWh/inhabitant, demonstrated the current low level of electrification in many African countries. Only around one quarter of African households have access to electricity. In South Africa, about 40% of the population had access to electricity in 1995 and consumed over half the continent's electricity. With the exception of some nuclear power in South Africa, all the incremental electricity production has been covered by thermal generating units which more than doubled their output since 1980. Thermal power units are mainly fed by coal in South Africa, gas in Algeria, Egypt, Nigeria and Tunisia and oil in the rest of Africa. Despite an increase of 50% in hydropower capacity since 1980, hydro production remained relatively flat due to climatic conditions and the political situation in some sub-Saharan countries. Africa, particularly sub-Saharan Africa, has a large hydro potential, which could supply about 1300 TWh per year or twenty times the present production. However, poor integration of the power networks at the sub-regional level limits the development of these hydro resources. Nevertheless, there are plans to link the electricity supply grids of some countries. Furthermore several African countries have recently opened up their electricity sectors to private investment. Morocco, Egypt, Ivory Coast, Nigeria and Ghana have led such privatisation efforts.

The refinery sector still requires upgrading…

In 1997, the refinery capacity, stable since 1988, (2.9 millions barrels day) represented only 3.7% of world capacity (2.5% in 1980). Since 1980, the capacity has grown by 2.1% per year. At the same time, the utilisation rate of the refineries increased from 71% to 86%, remaining at all times below the world average except these last two years. Major refineries were located in Algeria, Egypt, Nigeria, Libya (the major oil producers) and in South Africa. These five countries accounted for about 80% of installed refining capacity. In addition, the refining sector is characterised by its relative simplicity and age. It requires foreign investment to upgrade and enhance processing capability so as to improve its efficiency and permit production of higher value and cleaner oil products.

Synthetic fuels largely developed in South Africa subject to closer scrutiny…

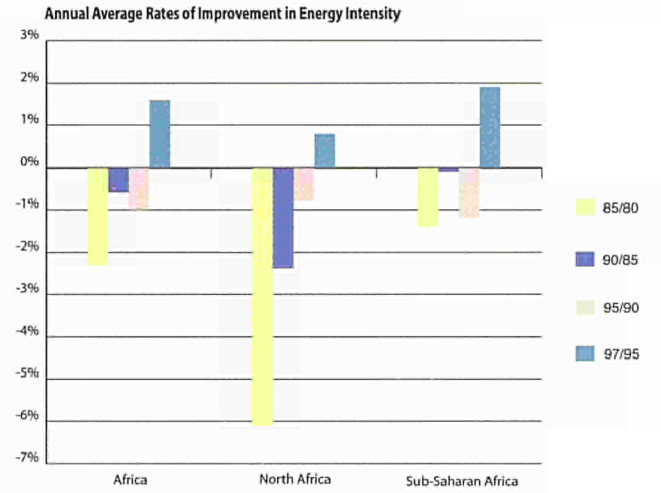
South Africa's reserves of coal, coupled with its lack of oil and gas and its period of international isolation, led it to construct a highly developed synthetic fuels industry. There are three axes: the manufacture of oil products from coal by Sasol; the manufacture of gas from coal; and a small project to produce gasoline from natural gases and condensates. With the end of the oil embargo and the low level of oil prices, the economic case for producing oil and gas from coal will be subject to much closer scrutiny in future.

COMPETITIVENESS

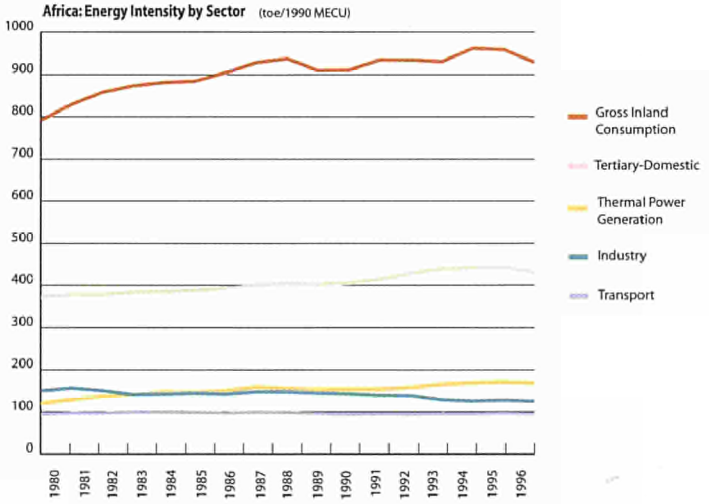
Energy intensity improved since 1995…

Energy intensity for the continent as a whole has increased by roughly 1.4% per year on average between 1980 and 1994, but improved on average by 1.3% per year since then. The major increases occurred in North Africa with a growth of about 3.1% per year on average between 1980 and 1995 with continuing improvement in 1996 but not in 1997. Energy intensity in sub-

Saharan Africa grew by only 1.0% on average between 1980 and 1994 but has improved since then. As in the Middle East, the evolution of the GDP in North Africa and other oil producing countries has been deeply affected by the falling price of crude oil on international markets, resulting in a limited GDP growth of only 2.0% per year on average since 1980. This means that GDP grew less than population and so Africa had a lower GDP per capita in 1995 than in 1980.



The contribution of the various sectors to the energy intensity varied substantially from region to region depending on their industrialisation rate. The contribution of domestic applications, industry and power generation is evenly distributed in north Africa, each of them accounting for about 21% in 1980 and 24% in 1997 when the share of transport declined from 20% to only 15%. On the other hand, the contribution of domestic and tertiary applications climbs to 50% in the sub-Saharan countries and even to 85% in some smaller countries where energy needs are limited to vital ones, mainly cooking requirements.



Gross inland consumption per capita has declined since 1985 and is equivalent to only 15% of EU average…

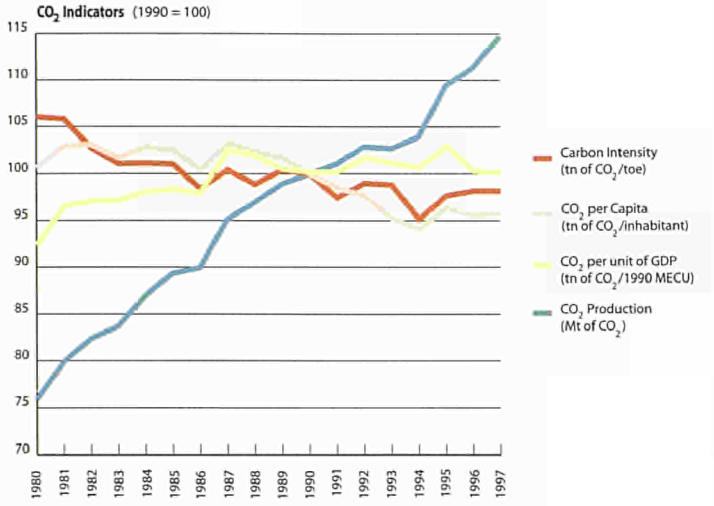
Per capita gross inland consumption underlines the very low level of energy use: fluctuating between 0.56 and 0.60 Toe/inhabitant between 1980 and 1997, about 15% of the average EU level. The figures show a slight but continuous decrease since 1985, driven by sub-Saharan Africa where the living standards have been generally declining over the last twelve years, while consumption per capita increased in North Africa. For Africa as a whole, the main contribution comes largely from domestic applications which stabilised their share at about 47% of total consumption per capita in the period 1980-1997. The contributions of industry and transport have declined continuously since 1980 and represented, in 1995, 13% and 10% respectively, demonstrating the very low level of industrialisation for the whole continent. Regionally this phenomenon is more marked: the share of industry reaching 20% in North Africa but only 11% in sub-Saharan Africa. On the other hand, the share of the power sector increased to reach 17% in 1996, compared to 14% in 1980.

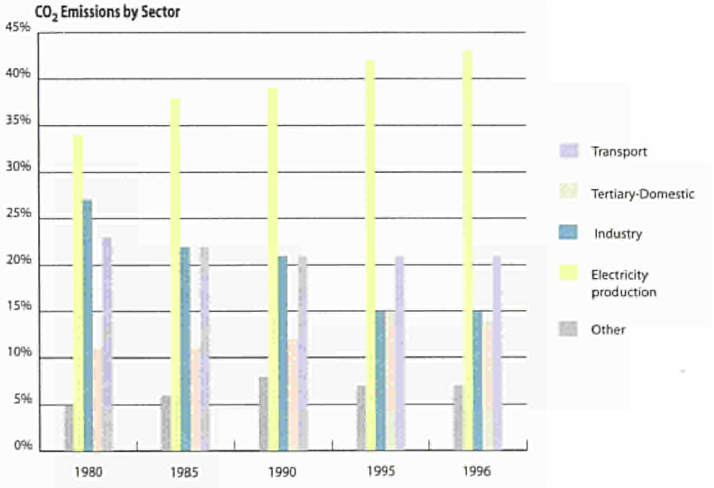
ENVIRONMENT

In 1997 CO_2 emissions were 14% above the 1990 level…

CO_2 emissions in Africa increased by 50% since 1980 to reach 624 Mt of CO_2 in 1997, 14% more than the 1990 level. Over the period, considering the particular structure of energy consumption, the fastest growing sources were power generation and the tertiary-domestic sector (92% and 91% growth respectively over the period). However most of the increase for power stations occurred during the first half of the 1980's while, for the tertiary-domestic sector the increase accelerated after 1990 due to the increasing consumption of oil products. CO_2 emissions from industry, stable during the 1980's, declined sharply between 1990 and 1994 due to the economic recession but have rebounded since 1995. Emissions from the transport sector grew by only 35% since 1980, reflecting the poor state of transport infrastructure.

North Africa, which accounted for 18% of total population, contributed to 38.5% of the continent's total CO_2 emissions, with public power stations emitting 30% of the total. The domestic sector, industry and the transport sector contributed roughly one-fifth each. In the sub-Saharan region, South Africa accounted for 70% of CO_2 emissions due to its economic activities and high dependence on solid fuels. Consequently, the rest of sub-Saharan region represented only 18.5% of total CO_2 emissions with a quite different structure of emissions given the major role played by bio-





mass in the domestic sector. Here transport was responsible for 41% of total emissions, power generation for 19%, the domestic sector for 18% and industry for only 13%.

Per capita CO_2 emissions vary widely. In 1996, they reached a maximum of 7.0 tonne of CO_2 per inhabitant in South Africa, an average value of 1.8 tonne in North Africa as a whole and only 0.2 tonne for the rest of sub-Saharan Africa. For the whole continent the CO_2 emissions per capita decreased over the period by 5%. Although South Africa remained broadly stable since 1990, these emissions increased by about 40% in North Africa as a consequence of industrialisation and increasing living standards but continued to decrease by about 20% in the rest of sub-Saharan Africa due to the declining GDP/capita ratio. As gross inland energy consumption, based on fossil fuels, increased more rapidly than GDP, this implies that the CO_2 content per unit of GDP also increased over the whole period considered, except in 1996.

GLOBAL MARKETS

Africa became an increasing exporter of energy with North Africa and sub-Saharan Africa contributing equally…

Africa became an increasing exporter of energy. Between 1980 and 1997, energy exports grew from 260 Mtoe to 366 Mtoe with sub-Saharan Africa overtaking North Africa in 1997. Oil is by far the major contributor, accounting for 77% of the total energy exports in 1997, with 12.5% for natural gas and 10.5% for coal. Although coal exports, covered totally by South Africa, increased slowly since 1985 (+20%), gas exports, only from North Africa, have almost doubled since then. In 1997 Africa was exporting 46% of its total energy production, but 70% of its fossil fuel production. North Africa exports 71% of its oil production and 57% of its gas production, mainly to the European market. Sub-Saharan Africa exports a little more oil than North Africa, about 76% of its production.

Gas export infrastructures have been recently extended with the doubling of the Transmed pipeline capacity from Algeria to Italy. The Magreb pipeline which runs from the Hassi R'Mel field in Algeria to Seville, Spain (through Morocco), was completed in October 1996, and an extension from Spain to Portugal was completed in February 1997. Although several African LNG projects to supply Europe and the United States have been under consideration for many years, the Nigerian Bonny LNG project is the most advanced. First deliveries are scheduled to begin in 2000. The main contracts, already signed, involve Spain, Turkey, France and Italy. More recently, interconnection of power grids has started both in North Africa and sub-Saharan Africa but all these projects remain under development.

AFRICA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	532.2	566.2	661.6	722.7	748.9	793.9	1.2%	3.2%	1.8%	3.6%	6.0%
Solids	69.8	103.8	105.7	115.8	115.8	123.1	8.3%	0.4%	1.8%	0.0%	6.3%
Oil	310.5	270.0	323.8	340.7	357.6	381.4	-2.8%	3.7%	1.0%	5.0%	6.7%
Natural gas	20.4	42.5	61.5	74.8	79.6	88.7	15.8%	7.7%	4.0%	6.5%	11.4%
Nuclear	0.0	1.4	2.2	2.9	3.1	3.3	-	9.7%	6.0%	4.2%	6.8%
Hydro & Wind	5.2	4.2	4.6	4.9	5.2	5.3	-4.2%	1.8%	1.4%	5.4%	3.4%
Geothermal	0.0	0.0	0.3	0.3	0.4	0.4	30.6%	47.1%	-1.7%	27.2%	0.0%
Other	126.4	144.3	163.5	183.3	187.4	191.7	2.7%	2.5%	2.3%	2.2%	2.3%
Net Imports	-260.6	-241.7	-295.8	-310.8	-328.4	-366.1	-1.5%	4.1%	1.0%	5.7%	11.5%
Solids	-18.4	-30.0	-31.1	-34.9	-34.7	-37.8	10.4%	0.7%	2.3%	-0.6%	8.9%
Oil	-234.1	-190.8	-234.9	-240.3	-254.2	-281.5	-4.0%	4.2%	0.5%	5.8%	10.7%
Crude oil	-231.3	-178.1	-212.5	-217.5	-233.8	na	-5.1%	3.6%	0.5%	7.5%	na
Oil products	-2.8	-12.7	-22.4	-22.8	-20.4	na	35.2%	12.0%	0.3%	-10.3%	na
Natural gas	-8.2	-20.8	-29.6	-35.5	-39.2	-46.7	20.6%	7.3%	3.7%	10.4%	19.2%
Electricity	0.0	0.0	-0.1	-0.1	-0.3	-0.1	-	117.2%	1.4%	229.7%	-69.7%
Gross Inland Consumption	260.2	321.6	363.8	407.6	412.7	425.2	4.3%	2.5%	2.3%	1.2%	3.0%
Solids	51.6	73.5	74.7	81.2	83.0	85.3	7.4%	0.3%	1.7%	2.2%	2.9%
Oil	64.8	76.6	86.8	96.0	93.9	97.3	3.4%	2.5%	2.0%	-2.3%	3.6%
Natural gas	12.2	21.7	31.9	39.2	40.4	41.9	12.1%	8.0%	4.2%	2.9%	3.8%
Other (1)	131.6	149.9	170.3	191.1	195.4	200.6	2.6%	2.6%	2.3%	2.3%	2.6%
Electricity Generation in TWh	197.3	262.5	320.4	368.1	386.7	na	5.9%	4.1%	2.8%	5.1%	na
Nuclear	0.0	5.3	8.4	11.3	11.8	na	-	9.7%	6.0%	4.2%	na
Hydro & wind	60.5	48.7	53.3	57.0	60.1	na	-4.2%	1.8%	1.4%	5.4%	na
Thermal	136.8	208.5	258.6	299.7	314.8	na	8.8%	4.4%	3.0%	5.0%	na
Generation Capacity in GWe	45.4	62.9	82.4	94.8	95.0	na	6.8%	5.6%	2.8%	0.2%	na
Nuclear	0.0	1.0	1.8	1.8	1.8	na	-	13.8%	0.0%	0.0%	na
Hydro & wind	14.5	17.6	20.4	21.5	21.5	na	4.0%	3.0%	1.1%	0.0%	na
Thermal	30.9	44.3	60.2	71.4	71.6	na	7.5%	6.3%	3.5%	0.3%	na
Average Load Factor in %	49.6	47.7	44.4	44.3	46.5	na	-0.8%	-1.4%	0.0%	4.8%	na
Fuel Inputs for Thermal Power Generation	39.3	53.2	61.3	72.5	74.8	na	6.2%	2.9%	3.4%	3.1%	na
Solids	27.6	34.1	38.9	43.8	45.8	na	4.3%	2.7%	2.4%	4.5%	na
Oil	7.6	10.8	11.9	12.9	12.6	na	7.1%	2.0%	1.6%	-2.1%	na
Gas	4.1	8.2	10.1	15.5	16.0	na	15.2%	4.2%	8.9%	3.1%	na
Geothermal	0.0	0.0	0.3	0.3	0.4	na	30.6%	47.1%	-1.7%	27.2%	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	29.9	33.7	36.3	35.5	36.2	na	2.4%	1.5%	-0.4%	1.8%	na
Non-Energy Uses	4.2	7.0	8.7	13.7	13.9	na	10.5%	4.4%	9.6%	1.3%	na
Total Final Energy Demand	216.8	245.6	275.6	305.2	310.7	na	2.5%	2.3%	2.1%	1.8%	na
Solids	21.0	18.0	17.5	16.1	14.2	na	-3.0%	-0.6%	-1.7%	-11.5%	na
Oil	52.3	60.6	65.9	71.1	73.7	na	3.0%	1.7%	1.5%	3.6%	na
Gas	3.0	5.1	6.8	9.0	9.5	na	11.4%	6.0%	5.5%	5.8%	na
Electricity	14.2	17.6	22.1	26.0	26.1	na	4.5%	4.7%	3.3%	0.4%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	126.3	144.2	163.3	183.1	187.1	na	2.7%	2.5%	2.3%	2.2%	na
CO_2 Emissions in Mt of CO_2	415.1	488.9	547.3	598.8	609.5	627.8	3.3%	2.3%	1.8%	1.8%	3.0%
Indicators											
Population (Million)	466.02	538.21	618.08	701.72	720.50	739.45	2.9%	2.8%	2.6%	2.7%	2.6%
GDP (index 1985=100)	90.5	100.0	109.9	116.9	122.2	126.1	2.0%	1.9%	1.3%	4.5%	3.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	789.9	883.4	909.3	957.3	927.1	926.2	2.3%	0.6%	1.0%	-3.2%	-0.1%
Gross Inl Cons./Capita (toe/inhabitant)	0.56	0.60	0.59	0.58	0.57	0.57	1.4%	-0.3%	-0.3%	-1.4%	0.4%
Electricity Generated/Capita (kWh/inhabitant)	423	488	518	525	537	na	2.9%	1.2%	0.2%	2.3%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	0.9	0.9	0.9	0.9	0.8	0.8	0.4%	-0.5%	-0.7%	-0.9%	0.4%
Import Dependency (%)	-98.2	-74.0	-80.0	-74.8	-78.1	-84.7	-5.5%	1.6%	-1.3%	4.4%	8.5%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

AFRICA : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	260.2	321.6	363.8	397.4	407.6	412.7	4.3%	2.5%	2.3%	1.2%
Public Thermal Power Generation	35.6	49.8	58.1	66.1	68.7	70.9	7.0%	3.1%	3.4%	3.3%
Autoprod. Thermal Power Generation	3.7	3.3	2.8	3.3	3.5	3.5	-2.4%	-2.9%	4.3%	-1.4%
Energy Branch	9.2	13.3	18.5	18.7	19.6	19.9	7.6%	6.8%	1.1%	1.7%
Final Energy Consumption	202.6	228.5	255.8	272.8	282.9	288.3	2.4%	2.3%	2.0%	1.9%
Industry	49.4	52.3	56.9	51.8	54.1	55.4	1.2%	1.7%	-1.0%	2.3%
Transport	30.6	35.4	37.1	39.0	40.7	41.8	3.0%	0.9%	1.9%	2.7%
Tertiary-Domestic	122.6	140.8	161.7	182.1	188.1	191.1	2.8%	2.8%	3.1%	1.6%
Energy Intensity (toe/1990 MEUR)	789.9	883.4	909.3	960.4	957.3	927.1	2.3%	0.6%	1.0%	-3.2%
Public Thermal Power Generation	108.1	136.9	145.3	159.8	161.4	159.4	4.8%	1.2%	2.1%	-1.2%
Autoprod. Thermal Power Generation	11.3	9.1	7.1	7.9	8.2	7.8	-4.3%	-4.7%	3.0%	-5.7%
Industry	149.9	143.7	142.3	125.1	127.1	124.4	-0.8%	-0.2%	-2.2%	-2.1%
Transport	93.0	97.3	92.7	94.2	95.6	93.9	0.9%	-1.0%	0.6%	-1.7%
Tertiary-Domestic	372.0	386.6	404.3	440.0	441.9	429.4	0.8%	0.9%	1.8%	-2.8%
Energy per Capita (Kgoe/inhabitant)	582	623	613	606	605	596	1.4%	-0.3%	-0.3%	-1.4%
Industry	110	101	96	79	80	80	-1.7%	-1.1%	-3.5%	-0.4%
Transport	68	69	63	59	60	60	0.0%	-1.8%	-0.7%	0.0%
Tertiary-Domestic	274	273	273	278	279	276	-0.1%	0.0%	0.5%	-1.1%
Electricity Share (%)										
Final Energy Consumption	7.0%	7.7%	8.7%	9.1%	9.2%	9.1%	2.0%	2.3%	1.2%	-1.4%
Industry	17.1%	19.2%	20.7%	23.8%	23.6%	23.8%	2.3%	1.5%	2.7%	0.6%
Transport	1.2%	1.2%	1.0%	1.1%	1.1%	1.0%	-1.1%	-2.5%	0.3%	-2.6%
Tertiary-Domestic	4.3%	5.1%	6.2%	6.7%	6.8%	6.6%	3.2%	3.9%	2.0%	-3.7%
Total Renewable Consumption (Mtoe)	131.6	148.5	168.2	184.0	188.3	192.7	2.4%	2.5%	2.3%	2.4%
Hydro	5.2	4.2	4.6	4.8	4.9	5.2	-4.2%	1.8%	1.4%	5.4%
Biomass	126.3	144.2	163.3	179.0	183.1	187.1	2.7%	2.5%	2.3%	2.2%
Other	0.0	0.0	0.3	0.3	0.3	0.4	30.6%	47.1%	-1.7%	27.2%
Renewable intensity (toe/1990MEUR)	399.4	407.8	420.5	444.7	442.2	432.9	0.4%	0.6%	1.0%	-2.1%
Renewable per capita (Kgoe/inhabitant)	282.3	275.9	272.2	269.3	268.3	267.5	-0.5%	-0.3%	-0.3%	-0.3%
CO_2 Emissions (Mt of CO_2)	415.1	488.9	547.3	568.9	598.8	609.5	3.3%	2.3%	1.8%	1.8%
Public Thermal Power Generation	128.3	175.8	204.9	228.8	238.1	246.5	6.5%	3.1%	3.0%	3.5%
Autoprod. Thermal Power Generation	14.0	12.2	10.3	11.9	12.9	12.6	-2.7%	-3.3%	4.5%	-1.8%
Energy Branch	22.1	31.0	43.7	42.5	43.9	44.4	7.0%	7.1%	0.1%	1.1%
Industry	111.1	108.7	112.3	87.4	91.6	92.1	-0.4%	0.7%	-4.0%	0.5%
Transport	93.9	108.0	112.8	118.2	123.4	126.7	2.8%	0.9%	1.8%	2.7%
Tertiary-Domestic	45.7	53.0	63.0	80.2	89.0	87.2	3.0%	3.5%	7.2%	-2.0%
Carbon Intensity (tn of CO_2/toe)	1.6	1.5	1.5	1.4	1.5	1.5	-1.0%	-0.2%	-0.5%	0.5%
Public Power Generation	3.2	3.2	3.2	3.1	3.1	3.1	0.1%	-0.3%	-0.3%	0.0%
Public Thermal Power Generation	3.6	3.5	3.5	3.5	3.5	3.5	-0.4%	0.0%	-0.3%	0.3%
Autoprod. Power Generation	3.4	3.2	3.3	3.2	3.3	3.2	-1.0%	0.3%	0.0%	-1.1%
Autoprod. Thermal Power Generation	3.8	3.7	3.6	3.6	3.7	3.6	-0.4%	-0.4%	0.2%	-0.4%
Energy Branch	2.4	2.3	2.4	2.3	2.2	2.2	-0.6%	0.3%	-1.0%	-0.6%
Industry	2.3	2.1	2.0	1.7	1.7	1.7	-1.6%	-1.0%	-3.0%	-1.8%
Transport	3.1	3.0	3.0	3.0	3.0	3.0	-0.1%	-0.1%	-0.1%	0.0%
Tertiary-Domestic	0.4	0.4	0.4	0.4	0.5	0.5	0.2%	0.7%	4.0%	-3.5%
CO_2 per Capita (kg of CO_2/inhabitant)	928	947	923	867	889	881	0.4%	-0.5%	-0.7%	-0.9%
Industry	248	210	189	133	136	133	-3.3%	-2.1%	-6.4%	-2.1%
Transport	210	209	190	180	183	183	-0.1%	-1.9%	-0.7%	0.0%
Tertiary-Domestic	102	103	106	122	132	126	0.1%	0.7%	4.5%	-4.6%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	1260	1343	1368	1375	1406	1369	1.3%	0.4%	0.6%	-2.6%
Public Thermal Power Generation	389	483	512	553	559	554	4.4%	1.2%	1.8%	-1.0%
Autoprod. Thermal Power Generation	43	34	26	29	30	28	-4.7%	-5.1%	3.2%	-6.1%
Energy Branch	337	298	281	211	215	207	-2.4%	-1.2%	-5.2%	-3.9%
Industry	285	297	282	286	290	285	0.8%	-1.0%	0.6%	-1.8%
Transport	139	146	157	194	209	196	1.0%	1.6%	5.8%	-6.2%
Tertiary-Domestic	1260	1343	1368	1375	1406	1369	1.3%	0.4%	0.6%	-2.6%

NORTH AFRICA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	205.7	199.4	238.5	254.7	260.9	272.1	-0.6%	3.6%	1.3%	2.4%	4.3%
Solids	0.4	0.4	0.3	0.4	0.3	0.3	1.3%	-7.8%	4.0%	-22.2%	1.8%
Oil	182.9	156.0	177.7	181.9	183.0	185.1	-3.1%	2.6%	0.5%	0.6%	1.1%
Natural gas	19.1	39.4	56.6	68.1	73.1	82.0	15.6%	7.5%	3.8%	7.3%	12.3%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & Wind	1.0	0.9	1.0	1.0	1.1	1.2	-3.1%	2.7%	0.6%	11.2%	6.4%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	2.3	2.7	3.0	3.4	3.4	3.5	2.9%	2.1%	2.5%	1.2%	1.6%
Net Imports	-157.0	-131.3	-158.9	-161.6	-165.7	-175.6	-3.5%	3.9%	0.3%	2.5%	6.0%
Solids	0.6	1.9	2.3	2.5	3.0	3.2	27.6%	3.7%	1.2%	21.2%	6.5%
Oil	-149.4	-112.4	-131.6	-128.6	-129.5	-132.1	-5.5%	3.2%	-0.5%	0.7%	2.1%
Crude oil	-140.8	-93.6	-105.5	-100.9	-103.0	na	-7.8%	2.4%	-0.9%	2.1%	na
Oil products	-8.6	-18.8	-26.1	-27.7	-26.5	na	16.8%	6.8%	1.2%	-4.5%	na
Natural gas	-8.2	-20.8	-29.6	-35.5	-39.2	-46.7	20.6%	7.3%	3.7%	10.4%	19.0%
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	84.6%	-11.1%	7.2%	-56.9%	132.3%
Gross Inland Consumption	44.2	65.4	80.5	90.8	92.4	96.1	8.1%	4.2%	2.4%	1.7%	4.0%
Solids	1.1	2.2	2.7	2.9	3.3	3.5	14.7%	4.2%	0.9%	15.3%	4.3%
Oil	28.9	41.1	46.9	51.0	50.7	52.6	7.3%	2.7%	1.7%	-0.6%	3.7%
Natural gas	10.9	18.6	26.9	32.6	33.9	35.4	11.2%	7.7%	3.9%	3.9%	4.5%
Other (1)	3.3	3.5	4.0	4.4	4.5	4.6	1.2%	2.3%	1.9%	3.4%	3.3%
Electricity Generation in TWh	39.1	66.9	91.5	111.8	116.3	na	11.4%	6.5%	4.1%	4.0%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	11.6	9.9	11.3	11.6	13.0	na	-3.1%	2.7%	0.6%	11.2%	na
Thermal	27.5	57.0	80.2	100.1	103.3	na	15.7%	7.1%	4.5%	3.2%	na
Generation Capacity in GWe	10.9	17.7	23.9	32.2	32.4	na	10.2%	6.2%	6.1%	0.6%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	3.4	3.4	3.7	4.0	4.0	na	0.2%	1.6%	1.6%	0.0%	na
Thermal	7.6	14.3	20.2	28.2	28.4	na	13.6%	7.2%	6.8%	0.7%	na
Average Load Factor in %	40.8	43.1	43.7	39.7	41.0	na	1.1%	0.3%	-1.9%	3.4%	na
Fuel Inputs for Thermal Power Generation	9.0	15.0	18.6	25.4	25.5	na	10.8%	4.4%	6.4%	0.4%	na
Solids	0.4	0.3	0.7	1.4	1.3	na	-1.0%	15.3%	14.6%	-5.0%	na
Oil	5.5	8.2	9.6	10.4	10.1	na	8.4%	3.2%	1.6%	-3.1%	na
Gas	3.1	6.4	8.3	13.6	14.1	na	15.5%	5.2%	10.4%	3.5%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	26.2	32.6	37.0	33.9	34.8	na	4.5%	2.5%	-1.8%	2.8%	na
Non-Energy Uses	1.9	3.3	3.7	5.7	5.6	na	11.4%	2.6%	9.1%	-2.2%	na
Total Final Energy Demand	29.0	40.8	47.2	53.4	55.3	na	7.1%	3.0%	2.5%	3.6%	na
Solids	0.7	1.6	1.7	1.4	1.6	na	18.9%	0.7%	-2.9%	8.0%	na
Oil	20.8	27.9	30.5	32.5	33.5	na	6.0%	1.8%	1.3%	3.1%	na
Gas	2.4	4.1	5.5	7.5	7.9	na	11.6%	5.7%	6.4%	5.9%	na
Electricity	2.8	4.5	6.6	8.7	9.0	na	10.3%	8.0%	5.6%	3.8%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	2.3	2.7	3.0	3.3	3.4	na	2.9%	2.1%	2.4%	1.1%	na
CO_2 Emissions in Mt of CO_2	114.9	168.5	203.8	226.2	231.4	240.1	8.0%	3.9%	2.1%	2.3%	3.8%
Indicators											
Population (Million)	88.35	101.09	114.09	126.84	129.33	131.94	2.7%	2.4%	2.1%	2.0%	2.0%
GDP (index 1985=100)	91.1	100.0	109.2	118.2	124.2	127.1	1.9%	1.8%	1.6%	5.1%	2.3%
Gross Inl Cons./GDP (toe/1990 MEUR)	396.5	534.3	602.0	627.4	607.3	617.2	6.1%	2.4%	0.8%	-3.2%	1.6%
Gross Inl Cons./Capita (toe/inhabitant)	0.50	0.65	0.71	0.72	0.71	0.73	5.3%	1.8%	0.3%	-0.2%	1.9%
Electricity Generated/Capita (kWh/inhabitant)	442	662	802	881	899	na	8.4%	3.9%	1.9%	2.0%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	1.3	1.7	1.8	1.8	1.8	1.8	5.1%	1.4%	0.0%	0.3%	1.7%
Import Dependency (%)	-343.4	-195.0	-192.1	-172.4	-174.0	-178.0	-10.7%	-0.3%	-2.1%	0.9%	2.3%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

NORTH AFRICA : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	44.2	65.4	80.5	86.3	90.8	92.4	8.1%	4.2%	2.4%	1.7%
Public Thermal Power Generation	8.4	14.3	17.7	23.6	24.5	24.5	11.1%	4.4%	6.6%	0.3%
Autoprod. Thermal Power Generation	0.6	0.7	0.9	1.0	1.0	1.0	5.0%	3.8%	1.4%	2.4%
Energy Branch	6.4	9.2	14.6	11.5	12.0	12.3	7.7%	9.6%	-3.8%	2.0%
Final Energy Consumption	28.9	40.7	47.1	50.8	53.2	55.2	7.1%	3.0%	2.5%	3.6%
Industry	11.0	14.8	17.4	16.0	17.2	18.3	6.2%	3.2%	-0.1%	5.9%
Transport	8.9	12.8	12.7	12.8	13.3	13.7	7.7%	-0.2%	0.9%	2.7%
Tertiary-Domestic	9.0	13.0	17.0	22.0	22.7	23.2	7.6%	5.5%	5.9%	2.4%
Energy Intensity (toe/1990 MEUR)	396.5	534.3	602.0	605.2	627.4	607.3	6.1%	2.4%	0.8%	-3.2%
Public Thermal Power Generation	75.6	116.6	132.6	165.9	168.9	161.2	9.1%	2.6%	5.0%	-4.6%
Autoprod. Thermal Power Generation	5.3	6.1	6.7	6.9	6.7	6.5	3.1%	1.9%	-0.2%	-2.6%
Industry	98.3	121.0	129.7	111.9	119.1	120.0	4.2%	1.4%	-1.7%	0.7%
Transport	79.5	104.9	94.8	89.6	91.8	89.7	5.7%	-2.0%	-0.6%	-2.3%
Tertiary-Domestic	81.1	106.5	127.4	154.5	156.8	152.8	5.6%	3.6%	4.2%	-2.6%
Energy per Capita (Kgoe/inhabitant)	634	825	904	890	920	918	5.4%	1.8%	0.4%	-0.2%
Industry	157	187	195	165	175	181	3.5%	0.8%	-2.2%	3.9%
Transport	127	162	142	132	135	136	5.0%	-2.6%	-1.1%	0.8%
Tertiary-Domestic	130	165	191	227	230	231	4.9%	3.0%	3.7%	0.5%
Electricity Share (%)										
Final Energy Consumption	9.5%	11.1%	14.1%	16.5%	16.4%	16.4%	3.0%	4.9%	3.0%	0.1%
Industry	13.0%	12.5%	14.3%	21.3%	20.5%	20.2%	-0.8%	2.8%	7.5%	-1.9%
Transport	0.1%	0.2%	0.3%	0.4%	0.4%	0.4%	8.5%	13.1%	5.2%	1.8%
Tertiary-Domestic	14.6%	20.2%	24.1%	22.3%	22.5%	22.8%	6.6%	3.6%	-1.3%	1.2%
Total Renewable Consumption (Mtoe)	3.3	3.5	4.0	4.3	4.4	4.5	1.2%	2.3%	1.9%	3.4%
Hydro	1.0	0.9	1.0	0.9	1.0	1.1	-3.1%	2.7%	0.6%	11.2%
Biomass	2.3	2.7	3.0	3.4	3.3	3.4	2.9%	2.1%	2.4%	1.1%
Other	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-
Renewable intensity (toe/1990MEUR)	29.8	28.8	29.6	30.2	30.0	29.6	-0.7%	0.5%	0.3%	-1.6%
Renewable per capita (Kgoe/inhabitant)	37.6	34.9	34.7	34.7	34.3	34.8	-1.5%	-0.2%	-0.2%	1.4%
CO_2 Emissions (Mt of CO_2)	114.9	168.5	203.8	216.1	226.2	231.4	8.0%	3.9%	2.1%	2.3%
Public Thermal Power Generation	24.4	40.5	50.4	66.0	68.7	68.6	10.6%	4.5%	6.4%	-0.2%
Autoprod. Thermal Power Generation	1.8	2.3	2.8	3.0	3.0	3.0	5.0%	3.8%	1.4%	2.4%
Energy Branch	16.0	23.3	36.7	29.4	30.6	31.2	7.7%	9.6%	-3.6%	1.9%
Industry	27.5	37.7	43.2	35.5	39.0	41.6	6.5%	2.7%	-2.0%	6.8%
Transport	27.2	39.3	38.8	38.8	40.3	41.4	7.7%	-0.3%	0.8%	2.6%
Tertiary-Domestic	17.9	25.3	31.9	43.4	44.7	45.6	7.1%	4.8%	7.0%	2.0%
Carbon Intensity (tn of CO_2/toe)	2.6	2.6	2.5	2.5	2.5	2.5	-0.2%	-0.3%	-0.3%	0.6%
Public Power Generation	2.6	2.7	2.7	2.7	2.7	2.7	0.7%	0.1%	0.0%	-0.9%
Public Thermal Power Generation	2.9	2.8	2.8	2.8	2.8	2.8	-0.4%	0.0%	-0.2%	-0.5%
Autoprod. Power Generation	3.1	3.1	3.1	3.1	3.1	3.1	0.0%	0.0%	0.0%	0.0%
Autoprod. Thermal Power Generation	3.1	3.1	3.1	3.1	3.1	3.1	0.0%	0.0%	0.0%	0.0%
Energy Branch	2.5	2.5	2.5	2.5	2.5	2.5	0.0%	-0.1%	0.2%	-0.1%
Industry	2.5	2.5	2.5	2.2	2.3	2.3	0.3%	-0.5%	-1.9%	0.9%
Transport	3.1	3.1	3.1	3.0	3.0	3.0	0.0%	0.0%	-0.2%	-0.1%
Tertiary-Domestic	2.0	1.9	1.9	2.0	2.0	2.0	-0.5%	-0.7%	1.0%	-0.3%
CO_2 per Capita (kg of CO_2/inhabitant)	1648	2125	2287	2230	2290	2299	5.2%	1.5%	0.0%	0.4%
Industry	394	476	484	366	394	413	3.8%	0.3%	-4.0%	4.8%
Transport	390	496	435	400	408	411	5.0%	-2.6%	-1.3%	0.8%
Tertiary-Domestic	257	319	358	448	453	453	4.4%	2.3%	4.8%	0.2%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	1030	1376	1524	1516	1563	1521	6.0%	2.1%	0.5%	-2.7%
Public Thermal Power Generation	219	331	377	463	474	451	8.6%	2.6%	4.7%	-5.0%
Autoprod. Thermal Power Generation	16	19	21	21	21	20	3.1%	1.9%	-0.2%	-2.6%
Energy Branch	246	308	323	249	269	273	4.6%	0.9%	-3.6%	1.6%
Industry	244	321	290	272	279	272	5.7%	-2.0%	-0.8%	-2.3%
Transport	161	206	239	305	309	300	5.1%	2.9%	5.3%	-2.9%
Tertiary-Domestic	1030	1376	1524	1516	1563	1521	6.0%	2.1%	0.5%	-2.7%

SUB-SAHARAN AFRICA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	326.5	366.8	423.1	468.0	488.0	521.8	2.4%	2.9%	2.0%	4.3%	6.9%
Solids	69.4	103.3	105.4	115.4	115.5	122.8	8.3%	0.4%	1.8%	0.1%	6.4%
Oil	127.5	114.0	146.1	158.8	174.5	196.3	-2.2%	5.1%	1.7%	9.9%	12.5%
Natural gas	1.3	3.1	5.0	6.7	6.5	6.6	18.7%	9.9%	6.0%	-2.0%	1.4%
Nuclear	0.0	1.4	2.2	2.9	3.1	3.3	-	9.7%	6.0%	4.2%	6.8%
Hydro & Wind	4.2	3.3	3.6	3.9	4.1	4.2	-4.5%	1.6%	1.6%	4.0%	2.6%
Geothermal	0.0	0.0	0.3	0.3	0.4	0.4	30.6%	47.1%	-1.7%	27.2%	0.0%
Other	124.0	141.6	160.5	179.9	184.0	188.2	2.7%	2.5%	2.3%	2.2%	2.3%
Net Imports	-103.6	-110.4	-136.9	-149.2	-162.7	-190.4	1.3%	4.4%	1.7%	9.0%	17.1%
Solids	-18.9	-32.0	-33.4	-37.3	-37.6	-40.9	11.1%	0.9%	2.2%	0.8%	8.7%
Oil	-84.6	-78.4	-103.3	-111.8	-124.7	-149.3	-1.5%	5.7%	1.6%	11.6%	19.7%
Crude oil	-90.5	-84.5	-107.0	-116.7	-130.7	na	-1.4%	4.8%	1.7%	12.0%	na
Oil products	5.8	6.1	3.7	4.9	6.0	na	0.9%	-9.6%	6.2%	22.2%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	-0.1	-	-	-	-	-
Electricity	0.0	0.0	-0.1	-0.1	-0.3	-0.1	-	66.7%	1.6%	217.8%	-68.5%
Gross Inland Consumption	216.0	256.2	283.2	316.8	320.3	329.1	3.5%	2.0%	2.3%	1.1%	2.8%
Solids	50.4	71.3	71.9	78.3	79.7	81.9	7.2%	0.2%	1.7%	1.7%	2.8%
Oil	36.0	35.5	39.9	45.0	43.1	44.7	-0.3%	2.4%	2.4%	-4.1%	3.6%
Natural gas	1.3	3.1	5.0	6.7	6.5	6.6	18.7%	9.9%	6.0%	-2.0%	0.4%
Other (1)	128.2	146.3	166.4	186.8	190.9	195.9	2.7%	2.6%	2.3%	2.2%	2.6%
Electricity Generation in TWh	158.2	195.6	228.8	256.3	270.4	na	4.3%	3.2%	2.3%	5.5%	na
Nuclear	0.0	5.3	8.4	11.3	11.8	na	-	9.7%	6.0%	4.2%	na
Hydro & wind	48.9	38.8	42.0	45.4	47.2	na	-4.5%	1.6%	1.6%	4.0%	na
Thermal	109.3	151.5	178.4	199.6	211.5	na	6.7%	3.3%	2.3%	5.9%	na
Generation Capacity in GWe	34.4	45.2	58.5	62.6	62.6	na	5.6%	5.3%	1.4%	0.0%	na
Nuclear	0.0	1.0	1.8	1.8	1.8	na	-	13.8%	0.0%	0.0%	na
Hydro & wind	11.1	14.2	16.7	17.5	17.5	na	5.0%	3.3%	1.0%	0.0%	na
Thermal	23.3	30.0	40.0	43.2	43.2	na	5.2%	5.9%	1.6%	0.0%	na
Average Load Factor in %	52.4	49.4	44.6	46.7	49.3	na	-1.2%	-2.0%	0.9%	5.5%	na
Fuel Inputs for Thermal Power Generation	30.3	38.2	42.7	47.1	49.3	na	4.7%	2.3%	2.0%	4.6%	na
Solids	27.3	33.8	38.2	42.4	44.4	na	4.4%	2.5%	2.1%	4.8%	na
Oil	2.1	2.5	2.3	2.5	2.5	na	3.7%	-2.1%	1.7%	2.2%	na
Gas	0.9	1.8	1.8	1.9	1.9	na	14.2%	0.4%	0.9%	0.3%	na
Geothermal	0.0	0.0	0.3	0.3	0.4	na	30.6%	47.1%	-1.7%	27.2%	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	31.0	34.1	35.9	36.4	36.9	na	1.9%	1.0%	0.3%	1.2%	na
Non-Energy Uses	2.3	3.7	4.9	7.9	8.2	na	9.7%	5.9%	9.9%	3.9%	na
Total Final Energy Demand	187.8	204.7	228.4	251.8	255.3	na	1.7%	2.2%	2.0%	1.4%	na
Solids	20.3	16.4	15.8	14.6	12.7	na	-4.2%	-0.7%	-1.6%	-13.4%	na
Oil	31.5	32.7	35.4	38.7	40.3	na	0.8%	1.6%	1.8%	4.1%	na
Gas	0.6	1.0	1.4	1.5	1.6	na	10.5%	7.1%	1.9%	5.3%	na
Electricity	11.4	13.1	15.5	17.3	17.1	na	2.8%	3.4%	2.2%	-1.3%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	124.0	141.6	160.3	179.7	183.8	na	2.7%	2.5%	2.3%	2.2%	na
CO_2 Emissions in Mt of CO_2	300.2	320.5	343.5	372.6	378.1	627.8	1.3%	1.4%	1.6%	1.5%	66.0%
Indicators											
Population (Million)	377.66	437.12	503.99	574.88	591.18	607.51	3.0%	2.9%	2.7%	2.8%	2.8%
GDP (index 1985=100)	90.2	100.0	110.2	116.3	121.2	125.5	2.1%	2.0%	1.1%	4.3%	3.5%
Gross Inl Cons./GDP (toe/1990 MEUR)	991.2	1060.2	1063.6	1127.3	1093.2	1084.8	1.4%	0.1%	1.2%	-3.0%	-0.8%
Gross Inl Cons./Capita (toe/inhabitant)	0.57	0.59	0.56	0.55	0.54	0.54	0.5%	-0.8%	-0.4%	-1.7%	0.0%
Electricity Generated/Capita (kWh/inhabitant)	419	447	454	446	457	na	1.3%	0.3%	-0.4%	2.6%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	0.8	0.7	0.7	0.6	0.6	1.0	-1.6%	-1.5%	-1.0%	-1.3%	-0.2%
Import Dependency (%)	-47.1	-42.6	-47.7	-46.4	-50.1	-57.2	-2.0%	2.3%	-0.6%	7.9%	14.2%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

SUB-SAHARAN AFRICA : MAIN INDICATORS

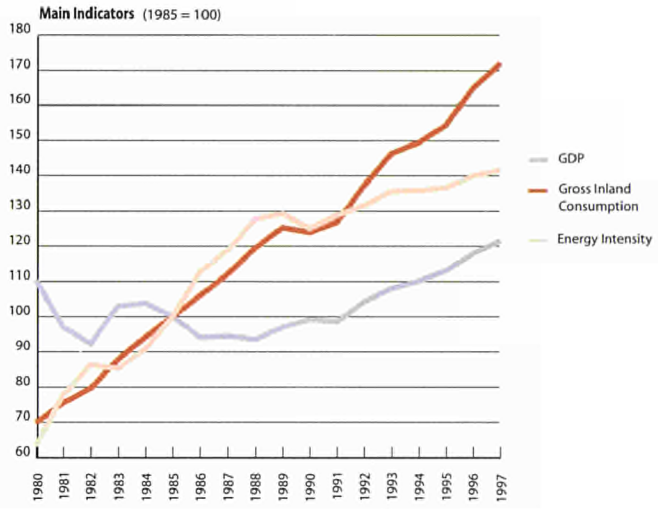
	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	216.0	256.2	283.2	311.1	316.8	320.3	3.5%	2.0%	2.3%	1.1%
Public Thermal Power Generation	27.2	35.6	40.4	42.5	44.3	46.4	5.5%	2.6%	1.8%	4.9%
Autoprod. Thermal Power Generation	3.1	2.5	1.9	2.3	2.5	2.5	-4.0%	-5.3%	5.6%	-2.8%
Energy Branch	2.8	4.1	3.9	7.1	7.5	7.6	7.5%	-0.9%	14.2%	1.2%
Final Energy Consumption	173.7	187.8	208.7	222.1	229.7	233.1	1.6%	2.1%	1.9%	1.5%
Industry	38.4	37.5	39.6	35.8	36.9	37.1	-0.5%	1.1%	-1.4%	0.7%
Transport	21.8	22.6	24.4	26.2	27.4	28.1	0.7%	1.6%	2.3%	2.7%
Tertiary-Domestic	113.5	127.7	144.7	160.0	165.4	167.9	2.4%	2.5%	2.7%	1.5%
Energy Intensity (toe/1990 MEUR)	991.2	1060.2	1063.6	1147.1	1127.3	1093.2	1.4%	0.1%	1.2%	-3.0%
Public Thermal Power Generation	124.7	147.1	151.7	156.7	157.5	158.4	3.4%	0.6%	0.8%	0.6%
Autoprod. Thermal Power Generation	14.4	10.5	7.3	8.5	9.0	8.4	-6.0%	-7.1%	4.4%	-6.8%
Industry	176.3	155.2	148.7	132.1	131.2	126.7	-2.5%	-0.9%	-2.5%	-3.4%
Transport	99.9	93.5	91.6	96.7	97.5	96.0	-1.3%	-0.4%	1.2%	-1.5%
Tertiary-Domestic	521.0	528.5	543.4	590.0	588.7	573.0	0.3%	0.6%	1.6%	-2.7%
Energy per Capita (Kgoe/inhabitant)	572	586	562	557	551	542	0.5%	-0.8%	-0.4%	-1.7%
Industry	102	86	79	64	64	63	-3.3%	-1.8%	-4.0%	-2.1%
Transport	58	52	48	47	48	48	-2.2%	-1.3%	-0.3%	-0.1%
Tertiary-Domestic	301	292	287	286	288	284	-0.6%	-0.4%	0.0%	-1.3%
Electricity Share (%)										
Final Energy Consumption	6.6%	7.0%	7.4%	7.5%	7.5%	7.3%	1.2%	1.3%	0.3%	-2.7%
Industry	18.3%	21.8%	23.4%	24.9%	25.1%	25.6%	3.6%	1.5%	1.4%	1.9%
Transport	1.7%	1.8%	1.4%	1.5%	1.4%	1.3%	0.5%	-4.2%	-0.7%	-3.2%
Tertiary-Domestic	3.5%	3.5%	4.1%	4.5%	4.6%	4.3%	0.1%	2.7%	2.7%	-7.3%
Total Renewable Consumption (Mtoe)	128.2	145.0	164.3	179.7	183.9	188.2	2.5%	2.5%	2.3%	2.3%
Hydro	4.2	3.3	3.6	3.8	3.9	4.1	-4.5%	1.6%	1.6%	4.0%
Biomass	124.0	141.6	160.3	175.6	179.7	183.8	2.7%	2.5%	2.3%	2.2%
Other	0.0	0.0	0.3	0.3	0.3	0.4	30.6%	47.1%	-1.7%	27.2%
Renewable intensity (toe/1990MEUR)	588.5	599.8	616.9	662.5	654.5	642.4	0.4%	0.6%	1.2%	-1.9%
Renewable per capita (Kgoe/inhabitant)	339.6	331.6	325.9	321.5	319.9	318.4	-0.5%	-0.3%	-0.4%	-0.5%
CO_2 Emissions (Mt of CO_2)	300.2	320.5	343.5	352.8	372.6	378.1	1.3%	1.4%	1.6%	1.5%
Public Thermal Power Generation	103.9	135.3	154.5	162.8	169.4	177.9	5.4%	2.7%	1.9%	5.0%
Autoprod. Thermal Power Generation	12.2	9.9	7.6	8.9	9.9	9.6	-4.1%	-5.3%	5.5%	-3.0%
Energy Branch	6.1	7.7	7.0	13.1	13.3	13.3	4.9%	-1.9%	13.8%	-0.7%
Industry	83.6	70.9	69.2	51.9	52.7	50.5	-3.2%	-0.5%	-5.3%	-4.2%
Transport	66.7	68.7	74.0	79.4	83.0	85.3	0.6%	1.5%	2.3%	2.7%
Tertiary-Domestic	27.7	27.7	31.1	36.7	44.3	41.6	0.0%	2.3%	7.3%	-6.1%
Carbon Intensity (tn of CO_2/toe)	1.4	1.3	1.2	1.1	1.2	1.2	-2.1%	-0.6%	-0.6%	0.4%
Public Power Generation	3.4	3.4	3.3	3.3	3.3	3.3	0.3%	-0.3%	-0.1%	0.1%
Public Thermal Power Generation	3.8	3.8	3.8	3.8	3.8	3.8	-0.1%	0.1%	0.0%	0.1%
Autoprod. Power Generation	3.4	3.3	3.3	3.3	3.3	3.3	-1.1%	0.6%	-0.1%	-1.3%
Autoprod. Thermal Power Generation	3.9	3.9	3.9	3.9	3.9	3.9	-0.1%	0.0%	0.0%	-0.2%
Energy Branch	2.1	1.9	1.8	1.8	1.8	1.7	-2.4%	-1.1%	-0.3%	-1.9%
Industry	2.2	1.9	1.7	1.4	1.4	1.4	-2.8%	-1.6%	-4.0%	-4.8%
Transport	3.1	3.0	3.0	3.0	3.0	3.0	-0.2%	-0.1%	0.0%	0.0%
Tertiary-Domestic	0.2	0.2	0.2	0.2	0.3	0.2	-2.3%	-0.2%	4.5%	-7.4%
CO_2 per Capita (kg of CO_2/inhabitant)	795	733	681	631	648	640	-1.6%	-1.5%	-1.0%	-1.3%
Industry	221	162	137	93	92	85	-6.0%	-3.3%	-7.8%	-6.8%
Transport	177	157	147	142	144	144	-2.3%	-1.4%	-0.3%	-0.1%
Tertiary-Domestic	73	63	62	66	77	70	-2.9%	-0.6%	4.5%	-8.6%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	1378	1326	1290	1301	1326	1291	-0.8%	-0.6%	0.6%	-2.7%
Public Thermal Power Generation	477	560	580	600	603	607	3.3%	0.7%	0.8%	0.7%
Autoprod. Thermal Power Generation	56	41	28	33	35	33	-6.1%	-7.1%	4.4%	-7.0%
Energy Branch	384	293	260	191	187	172	-5.2%	-2.4%	-6.3%	-8.1%
Industry	306	284	278	293	295	291	-1.5%	-0.5%	1.2%	-1.5%
Transport	127	115	117	135	158	142	-2.1%	0.3%	6.2%	-9.9%
Tertiary-Domestic	1378	1326	1290	1301	1326	1291	-0.8%	-0.6%	0.6%	-2.7%

Part VII MIDDLE EAST

MIDDLE EAST: Major trends (1980-1997)

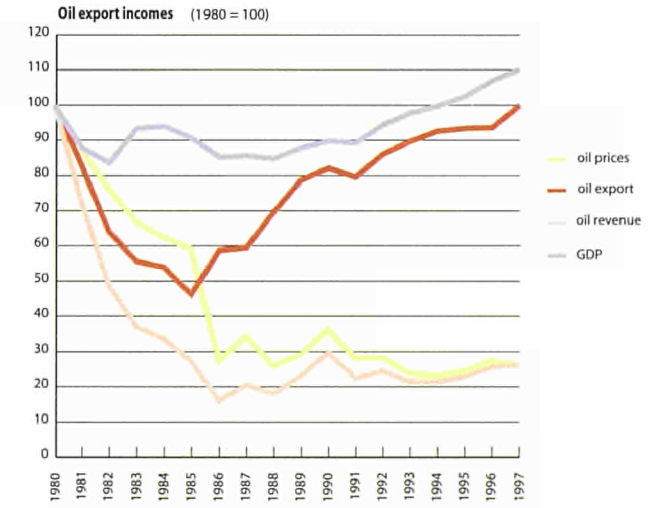
- Economic development is becoming less dependent on oil revenues
- Despite weak GDP growth final energy demand has more than doubled since 1980
- Tertiary-domestic sector dominated final demand for structural reasons, but industry is increasing rapidly
- Electricity's contribution stabilised in the tertiary-domestic sector but increased in industry
- Oil products dominated the energy market although gas increased to reach 37% in 1997
- Oil production close to the historical peak of 1974
- The Middle East accounted for 50% of world hydrocarbon reserves
- First steps towards private investments in power generation
- Oil refineries heavily dedicated to exports
- Related to GDP evolution, energy intensity increased continuously, but its growth rate slowed down in the 1990's
- CO_2 emissions increased by 5.4% per year since 1990
- Despite the financial crisis, Asia remained by far the largest market for oil exports

This region includes 13 different countries: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen. These countries together represent a population of 157 million inhabitants, growing by more than 3% per year over the last 6 years. Over this period, the region has undergone several wars, involving two or more countries (Lebanon, Iran-Iraq, Gulf war...) inflicting severe damage to basic industrial and energy infrastructures. The situation has become progressively more peaceful and clear progress in welfare and industrial activity is noticeable. The region is also one of contrasts, including some developing countries but others which show characteristics of highly-industrialised countries.



Economic development is becoming less dependent on oil revenues...

Economic development in this region continues to be mainly influenced by crude oil prices and production as many of these economies rely heavily on the extraction and exportation of a single commodity. In other words, oil price and production fluctuations induce significant changes in the terms of trade and export incomes. Between 1980 and 1985, the combination of low oil prices and falling oil exports reduced oil revenues by 40% with a consequent GDP reduction of about 10%. The rapid decline in oil prices in 1986 by more than 50% was coupled with a GDP slump of about 5.5%. After four years of stagnation, GDP rose steadily in the 1990s at an average yearly rate of 2.9% until 1997. At the same time, oil prices remained quite low even during the Gulf War but exports increased regularly to recover their 1980's level in 1997. The progressive development of the economy outside the oil industry reduced the sensitivity of GDP to oil revenues, principally during the 1990's when GDP increased by 20% whereas oil revenues declined by 14%.



In many countries in the region, an informal social contract exists whereby the population benefits from the fact that their country is a large net oil exporter. Much of the benefit comes in the form of low energy prices. However, these subsidies reduce the profitability of the energy distribution companies. The situation is made worse by the fact that many publicly-owned enterprises do not pay their energy bills. Subsidies not only reduce the energy prices paid by consumers, but also result in large public sector deficits when oil prices or production are low.

ENERGY OUTLOOK

Despite weak GDP growth final energy demand has more than doubled since 1980…

Despite weak GDP **final energy demand** has more than doubled since 1980 under the pressure of increasing population and industrial development. With the exception of the Gulf War period, this growth has been quite steady, about 5% per on average since 1980; and relatively uniform over the whole region with the exceptions of Iran and Oman which grew substantially faster; and of Kuwait and Qatar which remained stable. The shares of Iran and Saudi Arabia, the two major contributors, increased continuously to reach 64% of the whole region's energy consumption in 1996 compared with 58% in 1980.

MIDDLE EAST : FINAL ENERGY CONSUMPTION (MTOE)

	1980	1985	1990	1994	1995	1996
Middle East	87.9	118.6	144.1	184.3	188.2	199.0
Industry	35.4	39.0	26.0	44.0	44.8	49.1
Transport	30.1	42.1	41.1	56.6	59.4	60.8
Tertiary-Domestic	22.4	37.4	76.8	83.6	83.9	89.0
Iran	28.5	43.1	47.7	72.1	73.8	80.4
Industry	10.5	16.9	5.7	21.5	21.1	24.3
Transport	4.6	6.2	7.1	17.8	20.1	20.9
Tertiary-Domestic	13.4	20.0	34.9	32.7	32.6	35.1
Saudi Arabia	22.3	26.5	38.3	44.2	43.5	46.6
Industry	12.6	6.7	4.7	4.3	4.1	4.8
Transport	7.6	12.5	9.9	12.3	12.1	12.8
Tertiary-Domestic	2.1	7.2	23.8	27.7	27.3	29.0

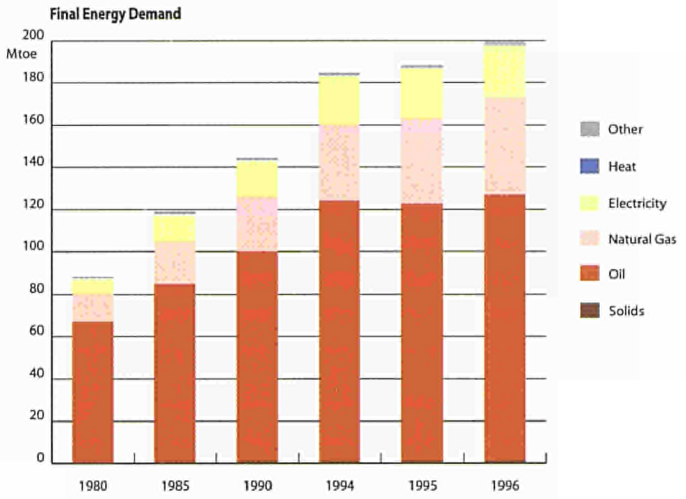
Consumption by fuel highlights the major contribution of hydrocarbons and electricity, the shares of both solid fuels and biomass being less than 1% of total final demand. Since 1980, the incremental energy demand of about 111 Mtoe was met by oil products for 54%, second by natural gas for 29% and finally by electricity for 16%. During the same period, the consumption of oil products doubled, that of natural gas tripled and electricity increased fourfold approximately. This means that the weight of oil products in final consumption was declining slowly. In 1996, oil accounted for 63% (76% in 1980), gas for 23% and electricity for 12%. This underlines the efforts made by national governments over a number of years to develop indigenous gas consumption, in place of oil products, thus increasing oil exports and consequently oil revenue. This was particularly the case in Iran and Saudi Arabia.

Main items

The Middle East is the most energy-orientated region of the world. In recent years, both the development of non-OPEC sources of oil and falling real oil prices in international markets have reduced oil-related export earnings and hence government revenues. But, in 1997, the Middle East accounted for some 65% of global oil and a third of world gas reserves. These geological realities dictate that the Middle East will increase its significance in global energy balances over the next few decades and that much of the region will continue to rely very heavily upon oil and gas revenues. The growth in population is matching that of GDP, with the result that regional average per capita incomes are growing quite slowly. Huge income inequalities remain given the control of oil revenues by states and royal households. Attempts continue to diversify many economies away from crude oil exports - particularly by adding value to basic natural resources through refining, petrochemicals and iron and steel, but also by an emerging electrical/electronic goods sector. Population growth and continued economic development are increasing regional energy demand. Gas use is expanding, especially in power generation but also in final end use sectors. In the medium and longer term, gas exports to Asia and Europe will assume much greater economic and strategic importance. Electricity demand is growing very quickly. Partly because of continued subsidisation of consumer prices, many electric utilities' self-financing ratios are inadequate to finance capacity expansion or to provide adequate incentives to attract external private capital. This suggests that liberalisation and privatisation efforts will need to accelerate, particularly in the power sector; but they will need to be accompanied by pricing and regulatory reforms, too.

Tertiary-domestic sector dominated final demand for structural reasons, but industry was increasing rapidly...

The evolution of final demand by sector was largely dominated by the tertiary-domestic sector which quadrupled its consumption since 1980, though the growth rate has declined to around 2% since 1990. As a consequence its share in total final demand increased from 25% in 1980 to 45% in 1996. Although this results



from a general phenomena of rapid increases in living standards during the 1980's in a region where some countries presented the highest world income per capita, it was certainly reinforced by low energy prices in force into some countries. The rapid increase of the population was combined with rising energy consumption per capita which increased from 244 kgoe/inhabitant in 1980 to 573 kgoe/inhabitant in 1997 or an increase by 135%. Industrial energy consumption, deeply affected by the Gulf War which reduced the 1990 energy demand to only 90% of the 1980 level, grew by 11.3% on average since 1991, sustained by industrial development in the region. This impressive diversification out of oil, combined with associated services (banking, insurance...) became the driving force of GDP growth. Energy consumption for transport has only doubled since 1980, driven mainly by Iranian demand. Total vehicle ownership in the Middle East has remained largely unchanged in recent years, at about 100 vehicles per thousand people. There are two reasons for this. First, car ownership levels are highly dependent on income distribution. Second, women are actively discouraged from driving in some countries and this policy will inevitably limit the proportion of the population that owns cars.

Electricity's contribution stabilised in the tertiary-domestic sector but increased in industry...

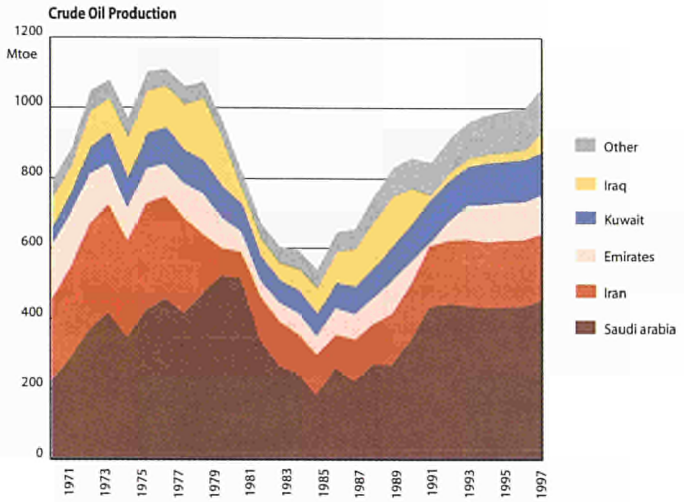
The electricity share in final demand reached 12.4% in 1996 from 7.6% in 1980. Both in the industrial and domestic sectors, the share's evolution fluctuated widely, partly because of the statistical uncertainties about data on the share of electricity consumption by end uses over the period. Bearing this reservation in mind, the share of electricity in industry increased from 4% in 1980 to 8.7% in 1997 due to the development and modernisation of industrial infrastructures. But this contribution remained particularly low compared to industrialised countries. On the other hand, electricity's share in the tertiary-domestic sector remained at 23% during the whole period. In addition, the contribution of electricity to final energy demand varied widely within the region, depending upon the prosperity, geographical implantation and economic activity of the countries. The highest levels were observed in rich countries developed around a big city: Kuwait (33%), United Arab Emirates (21%), Oman (21%) and Qatar (19%). Among other well-industrialised countries, Israel (25%) and Saudi Arabia (16%) sustained their contribution. The lowest shares of electricity in final demand were in Iran (8%) and Yemen (5%).

Oil products dominated the energy market although gas increased to reach 37% in 1997...

Gross inland energy consumption grew by about 5.4% on average in the period 1980-1997. Oil products dominated the energy market although their contribution declined in favour of natural gas, the share of which increased from 25% in 1980 to 37% in 1997. Nevertheless, hydrocarbons together met about 97% of all energy requirements in 1997. Energy policy trends are promoting further diversification of supply, by substituting gas use for oil, more of which is thus reserved for export. Solids contributed a little less than 2%. Israel and Iran accounted for most of the 6.5 Mtoe of coal consumed in 1997, mainly for power generation. Renewables, mainly limited to hydro, represented less than 1%. Only two countries, Iran and Syria, generated about 90% of the region's hydroelectricity. Saudi Arabia and Iran accounted together to 81% of region's gross inland consumption, a stable situation since 1980.

Oil production close to the historical peak of 1974...

Indigenous energy production is largely dominated by oil, which accounted for 89% of total production in 1997 compared with 96% in 1980. Oil production has fluctuated widely over the last 25 years, influenced by the world economic situation and by local circumstances (the Iran-Iraq War and Gulf War). Peaking in 1974 at a level of 1106 Mtoe, oil production fell to 548 Mtoe in 1985 or 51% below this peak. Since then, there has been a sustained increase, except for a drop of 1.5% in 1991 (when production losses in Iraq and Kuwait were not wholly compensated by strong increases in Iran and Saudi Arabia), so that in 1997 the production level was again close to the 1974 peak output. Historically, Saudi Arabia has assumed the role of swing producer, thus experiencing significantly larger fluctuations than those observed at the regional level. But since 1991, the output from the three main producers, Saudi Arabia, Iran and the Emirates has remained stable, with all the increase coming from Kuwait and the more marginal producers. In 1997 Iraqi production doubled compared to the 1996 level following a partial relaxation of the United



Nations embargo but its output still remains much below its historical level. The expansion of oil production will require sustained efforts by some producing countries to attract investment capital to finance a wide range of production capacity expansion projects.

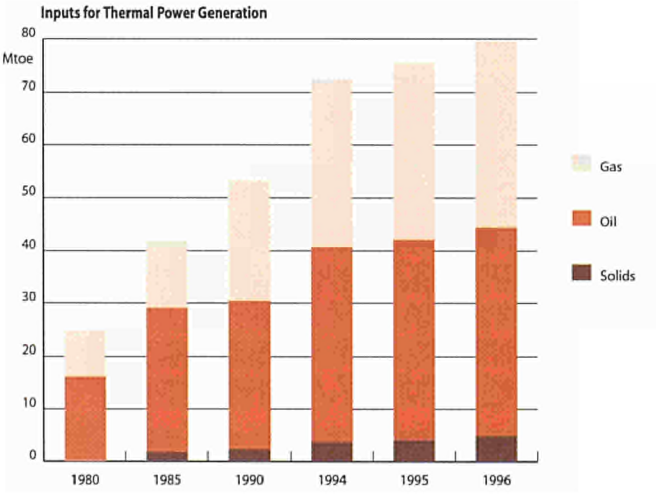
Regional production of natural gas has more than tripled since 1980. The main producers, Saudi Arabia with 38 Mtoe, Iran with 36 Mtoe and the United Arab Emirates with 30 Mtoe, accounted for 79% of total production against only 58% in 1980. Iran has the world's second largest natural gas reserves, exceeded only by those of Russia. Development of the 321 trillion cubic feet South Pars Field, which accounts for an estimated 40% of Iran's gas reserves, is a priority for the Iranian government. The development of these reserves should help Iran maintain its oil output by using gas in enhanced oil recovery gas injection schemes, as well as providing a potentially important export commodity. In 1997, the energy companies Total (France), Gazprom (Russia) and Petronas (Malaysia) signed an agreement with the Iranian National Petroleum Company to commence development of the South Pars reserves. The agreement was signed despite the threat of sanctions under the US Iran-Libya Sanctions Act of 1996.

The Middle East accounted for 50% of world hydrocarbon reserves...

Middle East oil reserves at end 1997 amounted to about 65.2% of world reserves, due to the major contributors: Saudi Arabia (25.2%), Iraq (10.8%), UAE (9.3%), Kuwait (9.3%) and Iran (9%). The reserves/production ratio reached 88 years, more than twice the world average. The situation regarding gas reserves was also impressive with 34% of world gas reserves being located in the region, mainly in Iran (15.8%); and a reserves/production ratio well above 100 years. However, regional coal reserves are negligible. This means that the Middle East accounts for 50% of world hydrocarbon reserves but only 15.2% of total global fossil fuel reserves.

First step towards private investments in power generation...

Electricity generation in the region grew on average by about 8.4% a year since 1980, but by only 6.5% a year on average since 1990. The region's electricity fuel mix was dominated by oil and gas, which in 1996 accounted for 89% of total generation. Since 1980, the most interesting feature has been the switch from oil to gas-fired generation, as countries in the region seek to free up oil for export. Most of the existing power plants utilise steam boilers burning heavy fuel oil, natural gas and crude oil. Gas turbines and diesel engines are used for mid-merit and peaking duty. However, the majority of the Middle East's new generating capacity is likely to be gas-fired. This increasing contribution of gas provides the opportunity for the future deployment of high efficiency combined cycle power stations. Israel is the only country in the region to use coal-fired power stations, with a coal-based capacity in 1995 of 3125 MWe. Hydroelectric capacity in the region was about 5 GWe in 1996, most of it in Iran and Syria. These two countries accounted for 91% of total hydroelectricity generation in 1996.



In recent years, a lack of power generation capacity has resulted in electricity shortages in some countries. The summer peak load for air conditioning places a heavy strain on available capacity, and power shortages usually occur in the summer. Many of the countries in the region have experienced financial difficulties in their power generation sectors because of rapid growth in electricity demand and inadequate tariff structures. Given that the power sector investment budget for many Middle East countries is often a significant proportion of total annual government expenditure, governments are increasingly forced to examine full-cost pricing and private sector involvement. Iran is currently restructuring its national electricity industry, considering allowing greater private participation in electricity supply and removing restrictions on

foreign ownership. In the same way, the Saudi Government is also for the first time relying on international capital markets to fund electricity projects. In addition, a build-own-operate (BOO) scheme was opened for a planned 1,750 MWe oil-fired project.

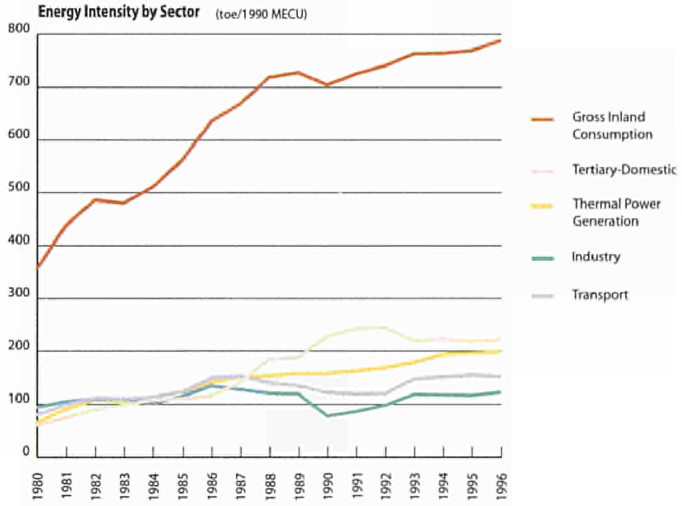
Oil refineries heavily dedicated to exports…

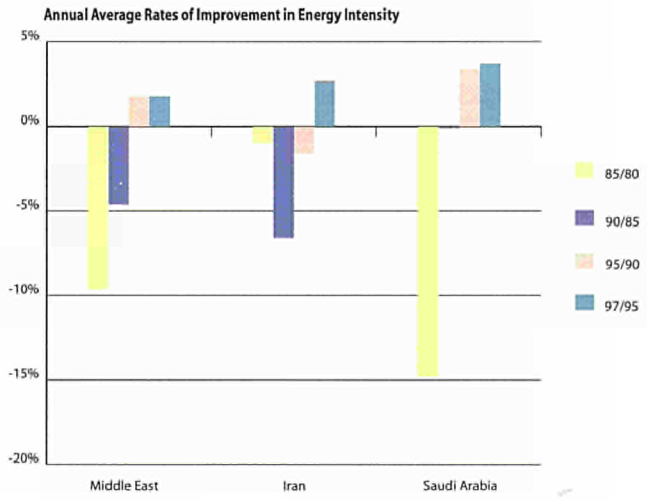
In 1997, **the refinery capacity** (5.8 millions barrels day) represented 7.3% of world capacity (4.4% in 1980). Since 1980, this capacity grew on average by 2.9% per year, mainly led by Saudi Arabia (7.6% per year). At the same time, the utilisation rate of the refineries remained above 95%, the highest level in the world. Refineries were heavily dedicated to exports outside the Middle East, such exports accounting for about 45% of their total production in 1997.

COMPETITIVENESS

Related to GDP evolution, energy intensity increased continuously, but its growth rate slowed down in the 1990's…

The energy intensity indicator was particularly difficult to analyse as GDP was heavily influenced by oil revenues, especially during the 1980's. Since then, the development of both industry and services, independent of oil activities, has led to economic diversification and tended to stabilise and reinforce GDP growth. As a result of flat GDP and increasing gross inland consumption, energy intensity has increased significantly since 1980: by about 10% per year during the early 1980's and by about 5% in the late 1980s. However, because of the regular GDP increase during the 1990's, the energy intensity growth rate slowed down progressively since 1990 to reach only 1.2% in 1997. As a result energy intensity more than doubled since 1980. From being comparable to the European Union's intensity in 1980, it was more than three times higher in 1997. In addition, very large variations exist within the region. Major increases occurred in Iraq (15.8% per year on average since 1980), the United Arab Emirates (+7.1%) and Saudi Arabia (+5.6%). This trend resulted from rapid and diversified industrialisation in many countries and improving living standards. All sectors contributed to the energy intensity growth but the major increase occurred in the tertiary-domestic sector where it has almost quadrupled since 1980 in spite of a relative stabilisation since 1990, resulting from the sustained growth of GDP partly driven by a reinforcement of services. At the same time, energy intensity of industry, pushed by rapid industrialisation of the whole region, started to increase rapidly during the 1990's with an average yearly growth of about 9.3% since 1991, following the Gulf War. The energy intensity of transport increased sharply during the early 1980's, remained quite stable during the late 1980's but rebounded again in the 1990's.



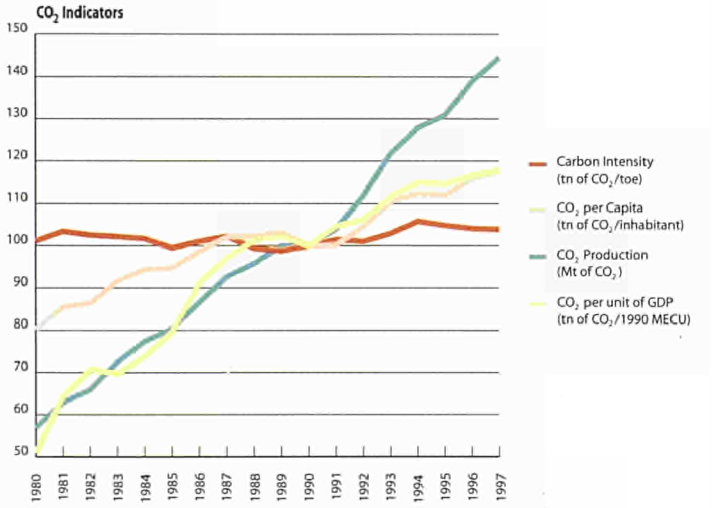


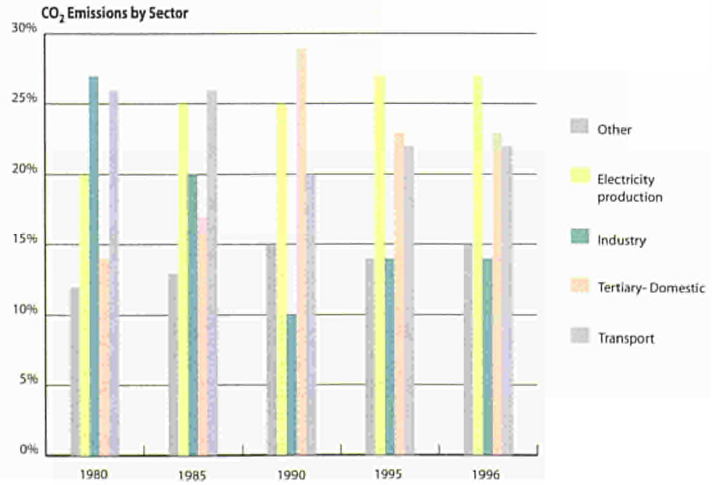
Energy consumption per capita (2.07 Toe/inhabitant) increased at a much slower rate, due to the lower demographic growth experienced in the Middle East (3.5% yearly increase during the 1980's, and 3% since 1990). Since 1980, the domestic and tertiary contribution (0.57 Toe/inhabitant in 1996) has more than doubled due to increasing living standards; that of industry reduced by a quarter, although it started to recover from the early 1990's; while transport consumption per capita has remained stable since 1985. Extreme discrepancies exist between countries, with the highest consumption per capita in the United Arab Emirates (14 toe) and the lowest in Yemen (0.2 toe).

ENVIRONMENT

CO_2 emissions have been increasing by 5.4% per year since 1990...

The CO_2 emissions of the Middle East countries have increased regularly by about 5.6% per year since 1980, with an acceleration in the early 1990's. Iran and Saudi Arabia together contributed 59% of the total CO_2 emissions of the region, with an increasing share since 1980 (54%). Power generation, the major contributor with 27% of the emissions in 1996, and industry with 29%, including the energy branch mainly represented by the refinery sector, showed the sharpest increase since 1990 as a result of the region's industrial development being based almost exclusively on oil products and electricity consumption. Emissions from the domestic and tertiary sector, after a considerable increase of more than 14% per year during the 1980's, seem to have stabilised since 1993 and those from transportation since 1994.





The carbon intensity (tn CO_2/toe) remained quite stable, confirming the global stability of the fuel mix in the Middle East between 1980 and 1995. **CO_2 emissions per capita** grew on average by 2.2% per year since 1980. Industry's contribution declined sharply during the 1980's in line with industrial production.; but it rebounded after 1990 due to new developments. The contribution of transport remained relatively constant since 1980, corresponding to stable motorization in the region but rebounded after 1990 due to new industrial needs. **CO_2 emissions per unit of GDP** increased on average by 5.6% per year since 1980 but this growth rate has slowed continuously to reach only 0.7% a year since 1994.

GLOBAL MARKETS

Despite the financial crisis, Asia remained by far the largest market for oil exports...

The Middle East is the **most important net exporter of energy in the world**. However, this results mainly from exports of crude oil and, to a lesser extent, oil products. Some 80% of the 1062 Mtoe oil produced during 1997 was exported, 87% as crude. The volume of oil exported has increased regularly since 1985 at an average rate of about 6.6% per year although it stabilised between 1993 and 1996. This resulted from a limited increase of world oil consumption between 1992 and 1996, only 1.4% per year on average, combined with additional crude production in industrialised countries as a consequence of the OPEC oil export policy to stabilise oil prices. But cold weather in the United States and Europe, combined with unexpected growth in Asia and Japan despite the financial crisis, caused oil exports to rise by more than 6.7% in 1997, compared to only 2.2% on average between 1990 and 1996. At the same time, Iraqi oil exports restarted with the relaxation of the oil embargo. Asia, excluding Japan, was the foremost importer of oil from the Middle East (accounting for 35% of oil exports from this region) followed by Japan (24%) and Western Europe (21%) - the United States absorbing only 10% of Middle East oil exports.

Gas is presently exported as LNG through facilities in Abu Dhabi, Qatar and Oman. But several pipeline projects to supply gas to Asian countries, such as India and Pakistan, as well as to western European countries with transit via Turkey, have been proposed or are under development.

MIDDLE EAST : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	999.8	599.0	949.7	1107.7	1127.3	1196.3	-9.7%	9.7%	3.1%	1.8%	6.1%
Solids	0.6	0.8	0.8	0.7	0.6	0.6	6.8%	1.5%	-3.7%	-11.4%	5.2%
Oil	961.4	542.4	862.7	994.7	1003.5	1061.9	-10.8%	9.7%	2.9%	0.9%	5.8%
Natural gas	36.2	53.9	83.7	109.6	120.3	131.0	8.3%	9.2%	5.5%	9.8%	8.8%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & Wind	0.8	1.1	1.6	1.8	1.8	1.9	4.8%	9.1%	2.0%	2.1%	1.4%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.8	0.9	0.9	1.0	1.0	1.0	2.7%	0.2%	1.3%	0.6%	1.1%
Net Imports	-854.8	-394.6	-701.3	-796.7	-798.9	-853.9	-14.3%	12.2%	2.6%	0.3%	6.9%
Solids	0.0	2.0	2.8	4.9	5.0	5.9	113.9%	6.9%	11.8%	2.2%	18.7%
Oil	-852.5	-394.0	-700.2	-796.2	-798.3	-852.2	-14.3%	12.2%	2.6%	0.3%	6.7%
Crude oil	-812.8	-340.7	-617.0	-700.9	-698.9	na	-16.0%	12.6%	2.6%	-0.3%	na
Oil products	-39.7	-53.3	-83.2	-95.3	-99.5	na	6.1%	9.3%	2.7%	4.4%	na
Natural gas	-2.3	-2.5	-3.8	-5.3	-5.5	-7.5	1.9%	8.7%	6.8%	3.1%	37.2%
Electricity	0.0	0.0	0.0	-0.1	0.0	-0.1	20.6%	1.6%	6.4%	-52.1%	108.8%
Gross Inland Consumption	133.5	191.3	237.2	295.6	315.8	329.3	7.5%	4.4%	4.5%	6.8%	4.3%
Solids	0.6	2.7	3.4	5.2	6.0	6.5	35.0%	5.1%	8.7%	14.9%	8.9%
Oil	97.4	135.3	151.4	183.4	192.2	196.6	6.8%	2.3%	3.9%	4.8%	2.3%
Natural gas	33.9	51.4	79.9	104.3	114.8	123.4	8.7%	9.2%	5.5%	10.1%	7.5%
Other (1)	1.6	1.9	2.5	2.7	2.8	2.8	3.9%	5.3%	1.7%	2.3%	-0.2%
Electricity Generation in TWh	95.6	172.4	237.6	326.8	346.1	na	12.5%	6.6%	6.6%	5.9%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	9.7	9.6	14.8	15.6	15.8	na	-0.2%	9.1%	1.0%	1.2%	na
Thermal	85.9	162.8	222.8	311.2	330.3	na	13.6%	6.5%	6.9%	6.1%	na
Generation Capacity in GWe	27.0	54.4	72.6	87.1	88.4	na	15.0%	6.0%	3.7%	1.6%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	1.6	3.0	3.1	4.6	4.6	na	13.1%	1.1%	7.9%	0.0%	na
Thermal	25.4	51.4	69.5	82.5	83.9	na	15.1%	6.2%	3.5%	1.7%	na
Average Load Factor in %	40.4	36.2	37.4	42.8	44.7	na	-2.2%	0.6%	2.8%	4.2%	na
Fuel Inputs for Thermal Power Generation	24.7	41.9	53.2	75.6	79.6	na	11.2%	4.9%	7.3%	5.3%	na
Solids	0.0	1.8	2.4	4.2	4.9	na	-	5.2%	11.8%	18.6%	na
Oil	16.0	27.1	27.9	37.9	39.4	na	11.1%	0.6%	6.3%	4.0%	na
Gas	8.7	13.0	22.9	33.5	35.3	na	8.4%	12.0%	8.0%	5.1%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	30.0	33.4	36.0	35.4	35.7	na	2.2%	1.5%	-0.3%	0.8%	na
Non-Energy Uses	4.9	9.9	12.2	14.6	15.6	na	14.8%	4.4%	3.6%	6.7%	na
Total Final Energy Demand	87.9	118.6	144.1	188.2	199.0	na	6.2%	4.0%	5.5%	5.7%	na
Solids	0.6	0.8	1.0	1.2	1.2	na	6.9%	4.6%	2.3%	1.9%	na
Oil	66.5	84.1	99.1	121.7	126.0	na	4.8%	3.3%	4.2%	3.5%	na
Gas	13.4	20.0	26.1	40.5	45.7	na	8.3%	5.5%	9.2%	12.8%	na
Electricity	6.7	12.6	16.6	23.3	24.6	na	13.5%	5.8%	7.0%	5.6%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.8	1.2	1.3	1.4	1.5	na	8.1%	2.0%	2.5%	1.4%	na
CO_2 Emissions in Mt of CO_2	353.8	499.9	622.5	814.4	864.3	900.0	7.2%	4.5%	5.5%	6.1%	4.1%
Indicators											
Population (Million)	91.89	109.92	129.65	151.43	155.20	159.40	3.6%	3.4%	3.2%	2.5%	2.7%
GDP (index 1985=100)	110.4	100.0	99.1	113.1	117.9	121.5	-2.0%	-0.2%	2.7%	4.3%	3.0%
Gross Inl Cons./GDP (toe/1990 MEUR)	355.8	562.8	704.4	768.9	787.7	797.2	9.6%	4.6%	1.8%	2.5%	1.2%
Gross Inl Cons./Capita (toe/inhabitant)	1.45	1.74	1.83	1.95	2.03	2.07	3.7%	1.0%	1.3%	4.2%	1.5%
Electricity Generated/Capita (kWh/inhabitant)	1041	1568	1833	2158	2230	na	8.5%	3.2%	3.3%	3.3%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	3.9	4.5	4.8	5.4	5.6	5.6	3.4%	1.1%	2.3%	3.5%	1.4%
Import Dependency (%)	-591.8	-191.1	-282.0	-256.7	-241.8	-245.3	-20.2%	8.1%	-1.9%	-5.8%	1.5%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

MIDDLE EAST : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	133.5	191.3	237.2	286.1	295.6	315.8	7.5%	4.4%	4.5%	6.8%
Public Thermal Power Generation	23.4	40.6	51.9	71.1	74.1	78.1	11.6%	5.0%	7.4%	5.4%
Autoprod. Thermal Power Generation	1.2	1.3	1.3	1.4	1.4	1.4	0.4%	0.3%	2.3%	0.4%
Energy Branch	16.5	25.0	37.3	44.8	46.4	51.1	8.6%	8.3%	4.5%	10.2%
Final Energy Consumption	87.8	118.5	144.0	184.2	188.1	198.9	6.2%	4.0%	5.5%	5.7%
Industry	35.4	39.0	26.0	44.0	44.8	49.1	2.0%	-7.8%	11.5%	9.6%
Transport	30.1	42.1	41.1	56.6	59.4	60.8	7.0%	-0.5%	7.6%	2.4%
Tertiary-Domestic	22.4	37.4	76.8	83.6	83.9	89.0	10.8%	15.5%	1.8%	6.1%
Energy Intensity (toe/1990 MEUR)	355.8	562.8	704.4	764.2	768.9	787.7	9.6%	4.6%	1.8%	2.5%
Public Thermal Power Generation	62.4	119.5	154.0	189.9	192.8	194.9	13.9%	5.2%	4.6%	1.1%
Autoprod. Thermal Power Generation	3.3	3.7	3.8	3.6	3.7	3.6	2.4%	0.5%	-0.4%	-3.7%
Industry	94.2	114.8	77.3	117.4	116.5	122.4	4.0%	-7.6%	8.5%	5.1%
Transport	80.1	123.8	122.1	151.2	154.4	151.7	9.1%	-0.3%	4.8%	-1.8%
Tertiary-Domestic	59.7	110.0	228.2	223.4	218.2	221.9	13.0%	15.7%	-0.9%	1.7%
Energy per Capita (Kgoe/inhabitant)	1453	1741	1830	1942	1952	2035	3.7%	1.0%	1.3%	4.2%
Industry	385	355	201	298	296	316	-1.6%	-10.8%	8.1%	6.9%
Transport	327	383	317	384	392	392	3.2%	-3.7%	4.3%	-0.1%
Tertiary-Domestic	244	340	593	568	554	573	6.9%	11.7%	-1.3%	3.5%
Electricity Share (%)										
Final Energy Consumption	7.6%	10.6%	11.5%	12.1%	12.4%	12.4%	6.9%	1.7%	1.4%	-0.1%
Industry	4.2%	8.1%	10.2%	8.7%	8.9%	8.7%	14.2%	4.7%	-2.8%	-1.4%
Transport	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	-	-	0.8%	6.8%
Tertiary-Domestic	23.1%	25.1%	18.1%	22.1%	23.0%	22.8%	1.7%	-6.3%	4.9%	-0.9%
Total Renewable Consumption (Mtoe)	1.6	2.0	2.6	2.8	2.8	2.8	4.1%	5.2%	1.7%	1.3%
Hydro	0.8	0.8	1.3	1.3	1.3	1.4	-0.2%	9.1%	1.0%	1.2%
Biomass	0.8	0.9	0.9	1.0	1.0	1.0	3.4%	-0.1%	1.2%	-0.3%
Other	0.0	0.2	0.4	0.4	0.5	0.5	-	9.2%	5.5%	4.9%
Renewable intensity (toe/1990MEUR)	4.3	5.8	7.6	7.4	7.2	7.0	6.2%	5.4%	-0.9%	-2.9%
Renewable per capita (Kgoe/inhabitant)	17.6	18.0	19.7	18.8	18.4	18.2	0.5%	1.8%	-1.4%	-1.2%
CO_2 Emissions (Mt of CO_2)	353.8	499.9	622.5	795.6	814.4	864.3	7.2%	4.5%	5.5%	6.1%
Public Thermal Power Generation	67.3	119.5	149.0	204.6	213.2	225.2	12.2%	4.5%	7.4%	5.6%
Autoprod. Thermal Power Generation	3.8	3.8	3.9	4.1	4.4	4.4	0.4%	0.2%	2.4%	0.4%
Energy Branch	42.6	65.0	95.8	113.5	116.9	128.5	8.8%	8.1%	4.1%	10.0%
Industry	97.1	99.3	64.6	112.9	114.5	125.0	0.5%	-8.2%	12.1%	9.2%
Transport	92.2	129.2	126.1	173.5	182.0	186.4	7.0%	-0.5%	7.6%	2.4%
Tertiary-Domestic	50.8	83.1	183.1	187.0	183.5	194.9	10.3%	17.1%	0.0%	6.2%
Carbon Intensity (tn of CO_2/toe)	2.6	2.6	2.6	2.8	2.8	2.7	-0.3%	0.1%	1.0%	-0.7%
Public Power Generation	2.8	2.9	2.8	2.8	2.8	2.8	0.8%	-0.6%	0.2%	0.3%
Public Thermal Power Generation	2.9	2.9	2.9	2.9	2.9	2.9	0.5%	-0.5%	0.0%	0.2%
Autoprod. Power Generation	3.0	3.0	3.0	3.0	3.0	3.0	0.0%	0.0%	0.1%	0.0%
Autoprod. Thermal Power Generation	3.0	3.0	3.0	3.0	3.0	3.0	-0.1%	0.0%	0.1%	0.0%
Energy Branch	2.6	2.6	2.6	2.5	2.5	2.5	0.2%	-0.2%	-0.4%	-0.2%
Industry	2.7	2.5	2.5	2.6	2.6	2.5	-1.5%	-0.5%	0.6%	-0.4%
Transport	3.1	3.1	3.1	3.1	3.1	3.1	0.0%	0.0%	0.0%	0.0%
Tertiary-Domestic	2.3	2.2	2.4	2.2	2.2	2.2	-0.4%	1.4%	-1.7%	0.1%
CO_2 per Capita (kg of CO_2/inhabitant)	3850	4548	4801	5401	5378	5569	3.4%	1.1%	2.3%	3.5%
Industry	1056	904	499	766	756	805	-3.1%	-11.2%	8.7%	6.5%
Transport	1004	1175	973	1178	1202	1201	3.2%	-3.7%	4.3%	-0.1%
Tertiary-Domestic	553	756	1412	1270	1212	1256	6.5%	13.3%	-3.0%	3.6%
CO_2 per unit of GDP (tn of CO2/1990 MEUR)	943	1470	1848	2125	2118	2156	9.3%	4.7%	2.8%	1.8%
Public Thermal Power Generation	179	351	442	546	554	562	14.4%	4.7%	4.6%	1.3%
Autoprod. Thermal Power Generation	10	11	12	11	11	11	2.4%	0.4%	-0.3%	-3.8%
Energy Branch	114	191	284	303	304	321	11.0%	8.3%	1.3%	5.5%
Industry	259	292	192	302	298	312	2.5%	-8.1%	9.2%	4.7%
Transport	246	380	374	463	473	465	9.1%	-0.3%	4.8%	-1.8%
Tertiary-Domestic	135	244	544	500	477	486	12.6%	17.3%	-2.6%	1.8%

SAUDI ARABIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	533.1	200.8	368.8	470.7	475.0	494.4	-17.7%	12.9%	5.0%	0.9%	4.1%
Solids	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Oil	524.6	185.0	343.4	437.8	439.2	456.9	-18.8%	13.2%	5.0%	0.3%	4.0%
Natural gas	8.5	15.8	25.4	32.9	35.8	37.5	13.1%	10.0%	5.4%	8.7%	4.8%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & Wind	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	-	-	-	-	-
Other	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Net Imports	-493.7	-139.8	-303.7	-385.2	-380.9	-396.8	-22.3%	16.8%	4.9%	-1.1%	4.2%
Solids	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Oil	-493.7	-139.8	-303.7	-385.2	-380.9	-396.9	-22.3%	16.8%	4.9%	-1.1%	4.2%
Crude oil	-484.6	-124.0	-253.7	-342.2	-332.3	na	-23.9%	15.4%	6.2%	-2.9%	na
Oil products	-9.1	-15.8	-50.0	-43.0	-48.6	na	11.7%	25.9%	-3.0%	12.9%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	0.1	-	-	-	-	-
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Gross Inland Consumption	35.4	52.2	63.3	83.7	92.2	95.3	8.1%	3.9%	5.7%	10.3%	3.4%
Solids	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Oil	26.8	36.5	37.9	50.7	56.4	57.8	6.3%	0.8%	6.0%	11.3%	2.3%
Natural gas	8.5	15.8	25.4	32.9	35.8	37.6	13.1%	10.0%	5.4%	8.7%	5.0%
Other (1)	0.0	0.0	0.0	0.0	0.0	0.0	14.8%	34.5%	-2.7%	-58.0%	-100.0%
Electricity Generation in TWh	20.5	44.3	64.9	93.9	97.8	na	16.7%	7.9%	7.7%	4.2%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Thermal	20.5	44.3	64.9	93.9	97.8	na	16.7%	7.9%	7.7%	4.2%	na
Generation Capacity in GWe	7.4	15.9	19.7	20.9	21.1	na	16.4%	4.4%	1.3%	0.8%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Thermal	7.4	15.9	19.7	20.9	21.1	na	16.4%	4.4%	1.3%	0.8%	na
Average Load Factor in %	31.4	31.9	37.7	51.2	52.9	na	0.3%	3.4%	6.3%	3.4%	na
Fuel Inputs for Thermal Power Generation	4.1	10.7	13.0	20.0	21.0	na	21.3%	3.9%	9.1%	5.1%	na
Solids	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Oil	3.4	7.3	8.7	13.5	14.6	na	16.4%	3.6%	9.1%	8.0%	na
Gas	0.6	3.4	4.2	6.5	6.5	na	39.1%	4.5%	9.0%	-0.8%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	43.2	35.6	43.0	40.3	40.0	na	-3.8%	3.9%	-1.3%	-0.9%	na
Non-Energy Uses	0.9	4.8	4.2	5.5	5.8	na	38.2%	-2.3%	5.5%	4.2%	na
Total Final Energy Demand	22.3	26.5	38.3	43.5	46.6	na	3.5%	7.7%	2.6%	7.2%	na
Solids	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Oil	21.0	22.3	25.0	26.5	28.4	na	1.2%	2.4%	1.1%	7.3%	na
Gas	0.3	1.1	9.0	10.7	11.6	na	33.5%	52.9%	3.5%	8.7%	na
Electricity	1.1	3.1	4.3	6.4	6.6	na	23.5%	6.6%	8.1%	4.2%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	14.8%	34.5%	-2.7%	-58.0%	na
CO_2 Emissions in Mt of CO_2	95.3	128.7	179.5	217.6	234.0	na	6.2%	6.9%	3.9%	7.5%	na
Indicators											
Population (Million)	9.37	12.38	15.80	18.98	19.41	19.97	5.7%	5.0%	3.7%	2.3%	2.9%
GDP (index 1985=100)	134.8	100.0	120.8	135.0	140.4	143.1	-5.8%	3.8%	2.3%	4.0%	1.9%
Gross Inl Cons./GDP (toe/1990 MEUR)	385.3	766.8	769.6	910.1	964.8	978.7	14.8%	0.1%	3.4%	6.0%	1.4%
Gross Inl Cons./Capita (toe/inhabitant)	3.77	4.22	4.00	4.41	4.75	4.77	2.3%	-1.0%	1.9%	7.8%	0.4%
Electricity Generated/Capita (kWh/inhabitant)	2182	3580	4107	4947	5040	na	10.4%	2.8%	3.8%	1.9%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	10.2	10.4	11.4	11.5	12.1	na	0.4%	1.8%	0.2%	5.2%	na
Import Dependency (%)	-1246.7	-229.4	-466.8	-450.4	-404.8	-402.8	-28.7%	15.3%	-0.7%	-10.1%	-0.5%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

IRAN : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	84.0	127.7	180.6	217.1	220.9	224.4	8.7%	7.2%	3.7%	1.8%	1.6%
Solids	0.6	0.8	0.8	0.6	0.6	0.6	6.8%	0.8%	-4.3%	-11.5%	5.6%
Oil	75.9	113.9	158.9	186.4	187.3	186.7	8.5%	6.9%	3.2%	0.5%	-0.3%
Natural gas	6.5	11.9	19.8	28.7	31.7	35.7	12.8%	10.6%	7.7%	10.5%	12.7%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & Wind	0.5	0.5	0.5	0.6	0.6	0.6	-0.2%	1.9%	3.6%	1.4%	1.3%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.6	0.7	0.7	0.7	0.7	0.7	3.6%	0.0%	1.0%	0.4%	0.8%
Net Imports	-44.0	-72.0	-106.4	-132.7	-129.6	-128.4	10.4%	8.1%	4.5%	-2.3%	-0.9%
Solids	0.0	0.1	0.2	0.3	0.4	0.4	10.8%	32.0%	4.6%	16.5%	7.2%
Oil	-43.9	-72.1	-105.4	-132.9	-129.9	-128.8	10.4%	7.9%	4.7%	-2.2%	-0.8%
Crude oil	-38.2	-77.0	-112.1	-129.5	-127.0	na	15.1%	7.8%	2.9%	-1.9%	na
Oil products	-5.7	4.9	6.7	-3.4	-2.9	na	-	6.2%	-	-15.9%	na
Natural gas	-0.2	0.0	-1.2	-0.1	-0.1	0.0	-	-	-41.8%	0.0%	-
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Gross Inland Consumption	38.9	54.1	71.6	82.5	89.3	94.3	6.8%	5.8%	2.9%	8.3%	5.6%
Solids	0.6	0.8	1.0	0.9	0.9	1.0	7.1%	4.7%	-1.9%	-2.4%	6.2%
Oil	30.9	40.2	50.8	51.6	55.5	56.2	5.4%	4.8%	0.3%	7.5%	1.4%
Natural gas	6.4	11.9	18.5	28.6	31.6	35.7	13.4%	9.2%	9.1%	10.5%	13.0%
Other (1)	1.1	1.2	1.2	1.3	1.4	1.4	1.9%	0.8%	2.2%	0.9%	1.1%
Electricity Generation in TWh	22.4	39.2	59.1	85.0	90.9	na	11.9%	8.5%	7.5%	6.9%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	5.6	5.6	6.1	7.3	7.4	na	-0.2%	1.9%	3.6%	1.4%	na
Thermal	16.8	33.7	53.0	77.7	83.5	na	15.0%	9.5%	7.9%	7.4%	na
Generation Capacity in GWe	5.3	13.4	17.6	26.3	26.8	na	20.4%	5.5%	8.4%	1.9%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	0.9	1.8	1.8	2.5	2.5	na	16.2%	0.0%	6.7%	0.0%	na
Thermal	4.5	11.6	15.8	23.8	24.3	na	21.1%	6.3%	8.6%	2.1%	na
Average Load Factor in %	48.2	33.4	38.4	36.9	38.8	na	-7.1%	2.8%	-0.8%	5.0%	na
Fuel Inputs for Thermal Power Generation	4.5	8.9	12.6	18.2	19.1	na	14.9%	7.2%	7.6%	4.6%	na
Solids	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Oil	3.0	7.0	6.3	8.1	8.5	na	18.3%	-2.2%	5.4%	4.5%	na
Gas	1.4	1.9	6.4	10.1	10.5	na	5.9%	27.0%	9.6%	4.6%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	32.4	32.5	36.1	36.7	37.7	na	0.1%	2.1%	0.3%	2.7%	na
Non-Energy Uses	1.3	1.4	5.0	6.1	6.8	na	2.1%	28.9%	3.9%	10.4%	na
Total Final Energy Demand	28.5	43.1	47.7	73.8	80.4	na	8.6%	2.1%	9.1%	9.0%	na
Solids	0.6	0.8	1.0	1.0	1.0	na	7.1%	4.4%	0.2%	0.0%	na
Oil	20.8	28.8	36.2	46.3	48.9	na	6.8%	4.6%	5.0%	5.7%	na
Gas	4.9	10.0	6.0	20.2	23.9	na	15.3%	-9.8%	27.7%	18.2%	na
Electricity	1.7	2.8	3.9	5.6	5.9	na	11.0%	6.8%	7.6%	5.5%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.6	0.7	0.7	0.7	0.7	na	3.6%	0.0%	1.0%	0.4%	na
CO_2 Emissions in Mt of CO_2	97.2	148.9	173.2	256.3	276.2	na	8.9%	3.1%	8.1%	7.8%	na
Indicators											
Population (Million)	39.12	46.37	53.73	61.18	62.51	63.97	3.5%	3.0%	2.6%	2.2%	2.3%
GDP (index 1985=100)	75.6	100.0	96.4	120.6	126.6	130.7	5.8%	-0.7%	4.6%	5.0%	3.2%
Gross Inl Cons./GDP (toe/1990 MEUR)	524.9	551.5	757.4	697.0	719.2	735.6	1.0%	6.6%	-1.6%	3.2%	2.3%
Gross Inl Cons./Capita (toe/inhabitant)	0.99	1.17	1.33	1.35	1.43	1.47	3.2%	2.7%	0.2%	6.0%	3.1%
Electricity Generated/Capita (kWh/inhabitant)	572	846	1100	1389	1453	na	8.1%	5.4%	4.8%	4.6%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	2.5	3.2	3.2	4.2	4.4	na	5.3%	0.1%	5.4%	5.5%	na
Import Dependency (%)	-108.8	-129.3	-143.3	-157.2	-142.1	-132.6	3.5%	2.1%	1.9%	-9.6%	-6.6%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

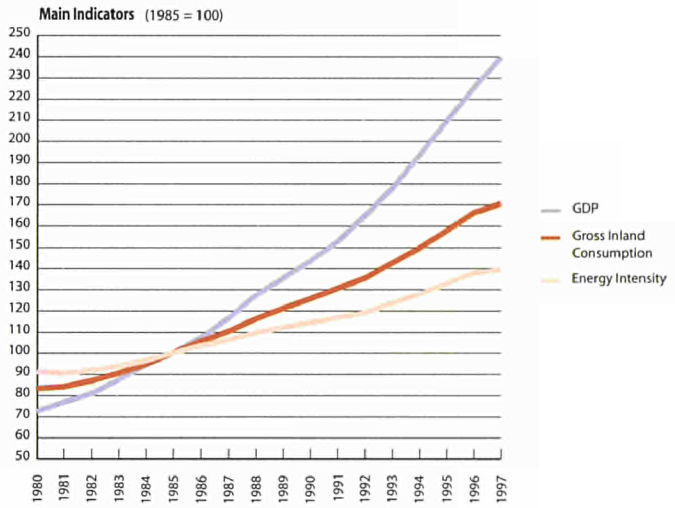
Part VIII ASIA

ASIA: Major trends (1980-1997)

- Since 1990 GDP has grown by 7.3% per year on average, and population by only 1.5%…
- … but the financial crisis, commencing in mid-1997 will slow down growth in the near future
- Final energy demand, still dominated by biomass and solid fuels, increased on average by 3.5% per year since 1980
- Growth in the transport sector is the driving force in the growth of final energy consumption
- Electricity and oil demand are both highly income-elastic
- The share of solid fuels in gross inland energy consumption grew to reach 40% in 1997
- Primary energy requirements were based on indigenous energy sources,, with the exception of oil
- Asia represented 21% of world fossil fuel reserves, principally solid fuels
- Electricity generation is largely dominated by solid fuels, locally available at low cost
- Rapid expansion of generation capacity argues in favour of foreign investment …
- …even if the financial crisis has delayed many planned projects
- Asia remained the most dynamic market world-wide for power generation from renewables
- Large refinery expansion programmes to meet increasing domestic oil products demand
- Energy intensity has improved by 2.8% per year since 1980, mainly driven by China
- Energy consumption per capita reached only 20% of the European Union level
- CO_2 emissions increased by 45% since 1990
- The contributions of the power sector and industry, roughly the same in 1996, reached 67% of total CO_2 emissions
- Increasing energy dependency, mainly related to oil imports from the Middle East

Since 1990 GDP has grown by 7.3% per year on average, and population by only 1.5%...

Asia is the largest world region, characterised by a population that grew by 1.8% per year on average during the 1980's but by only 1.5% on average since 1990. This is as a result of the sharp reduction in the Chinese population growth rate. GDP growth has been 7.3% per year on average since 1980 even though the Asian financial crisis slowed down growth in some East Asian countries in 1997. Despite this sustained evolution, the region is still characterised by a rather low level of economic development (GDP per capita in 1997 was 23 times lower than the European Union average). However, the four NICs (Hong Kong, Singapore, South Korea and Taiwan) enjoyed a GDP per capita only 45% below the European average in 1997.



ASIA : GDP/CAPITA (THOUSAND 1990 EUR/INHABITANT)

	1980	1985	1990	1994	1995	1996	1997(1)
ASIA	0.27	0.34	0.45	0.57	0.61	0.64	0.67
China	0.12	0.18	0.25	0.38	0.41	0.45	0.48
India	0.19	0.23	0.28	0.31	0.32	0.34	0.35
NICs	3.01	3.95	5.83	7.30	7.76	8.16	8.56
Other	0.20	0.25	0.31	0.40	0.42	0.45	0.47
European Union	11.81	12.76	14.58	14.96	15.27	15.48	15.85

(1) Estimates

…but the financial crisis initiated in mid-97 will slow down growth in the near future

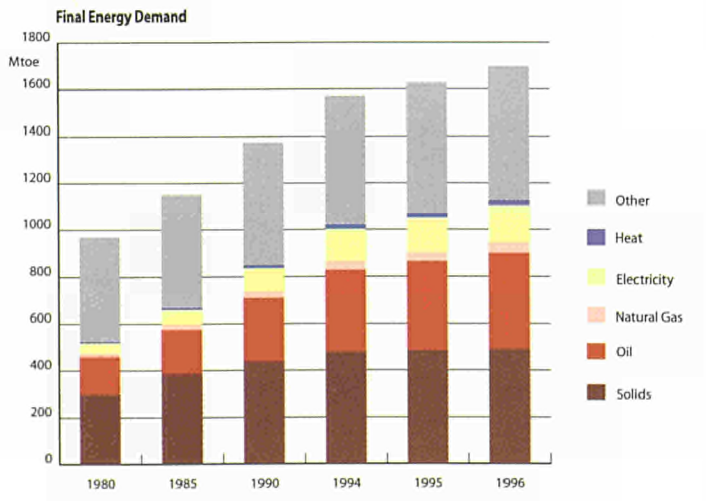
The severe pressure on foreign exchange markets in many East Asian countries has accentuated internal financial strains (increasing interest rate and depressed equity markets) and constrained economic activity (adverse terms of trade, declines in private sector net worth, increases in the cost of capital and major credit limitations). The countries most affected by the economic crisis that originated in Asia in mid-97 (Thailand, Malaysia, South Korea, Indonesia and the Philippines) have undertaken various economic policies to restore economic growth, and there have been some positive signs that their economies are beginning to turn around rapidly. China and India have also been affected by the crisis, although by not nearly as much. The main impact could be a

reduction of foreign investment. Early 1998, this financial crisis spread to some Latin America countries and to many countries in transition, especially Russia, with severe impacts in the- latter. The impact of the financial difficulties in the East Asian countries began to affect the energy markets, and particularly the oil market, towards the end of 1997 and carried over into the first half of 1998.

ENERGY OUTLOOK

Final energy demand, still dominated by biomass and solid fuel, increased on average by 3.5% per year since 1980...

Sustained by the strong economic growth, **final energy demand** increased steadily by 3.5% per year on average, or less than 50% of the GDP growth rate. Biomass still remained the largest single component of final energy demand even though its contribution has been declining continuously from 46% in 1980 to 34% in 1996. Biomass consumption was concentrated in three major countries: China (207 Mtoe), India (201 Mtoe) and Indonesia (45 Mtoe). Despite a continuous slowing down of growth, solid fuel remained the second component, its share declining from 34% in 1985 to only 29% in 1996. Demand for other fuels has been increasing since 1985 in line with GDP: natural gas at 6.5% per year on average, oil at 7.5%, distributed heat at 8.3% and electricity at 8.5%. Consequently, incremental demand since 1990 was satisfied mainly by oil products (44% of the overall increment), followed by electricity (18%), biomass (16%), solid fuels (15%), gas (4%) and derived heat (2%). China accounted for about 48% of the total regional final energy demand in 1995 but only 37% of incremental demand since 1990, followed by India with 21% (19% of incremental demand) and the NICs with only 10% (but 21% of incremental demand).



Main items

In recent years, Asia has been the main engine of the global economy. Growth in some countries faltered following the economic crisis which unfolded progressively from mid 1997 and affected East Asia in particular. The crisis, based upon large-scale movement of funds and especially upon poor financial supervision, led to currency depreciation, liquidity shortages, falling incomes and rising unemployment. In turn, this led to social unrest but has stimulated some restructuring of financial systems and reform of corporate governance. Chiefly for other reasons, Japan is experiencing its worst and most prolonged recession since 1945. The other giant regional economies, China and India - comprising nearly 38% of the global population - were largely unaffected, though falling intra-regional trade has imposed some second-round effects upon their economies. Within much of the region the progress towards market-based economies remains slow - with heavy state regulation and energy prices often set far below costs, particularly for oil products and electricity. These factors have stimulated energy demand but also reduced investment resources leading to financing difficulties and to cancellation or deferral of some projects, especially in the power sector. Biomass and coal dominate the energy balances of China and India. Elsewhere energy use is somewhat more diversified and gas demand has grown strongly since 1990. After a period of sustained and rapid growth, regional oil demand has slackened recently, leading to lower international oil prices. But, given growth in overall fossil fuel demand, CO_2 emissions are rising rapidly and becoming a significant component of incremental global emissions – a trend likely to continue.

Growth in the transport sector is the driving force in the growth of final energy consumption...

Increasing business and industrial activity, combined with increasing household incomes and growing urban populations, have led to a rising demand for transport across Asia even if the transportation sector is still underdeveloped in China and India. Road transport in particular remained limited in these countries both for freight haulage and for personal travel, but is likely to develop rapidly in the future. Passenger car ownership rates differ substantially among the Asian countries. South Korea has a passenger car density of 132 cars per 1000 inhabitants, both China and India have rates of approximately 3 to 4 cars per 1000 inhabitants. In 1995 new car registration grew by almost 40% in China, India and Malaysia. About 50% of the increase in oil demand since 1990

has been accounted for by the transport sector, the energy consumption of which grew by about 7.6% per year since 1990.

Energy demand growth by the industrial sector resulted from the region's strong economic performance. In most countries, the industrial sector continued to be dominated by coal but significant increases in oil and gas demand occurred especially in East Asian countries. Energy-intensive industries, such as iron and steel, chemicals, cement and pulp and paper, accounted for 50% to 80% of final industrial energy demand. As a consequence of the rapid expansion of the basic chemical industry, the consumption related to non-energy uses, mainly petrochemical feedstocks, exploded between 1990 and 1996, multiplying by 2.7 to reach 90 Mtoe. This recent development accelerated oil product consumption.

Electricity and oil demands were highly income-elastic…

The share of the tertiary-domestic sector in final energy consumption declined from 58% in 1980 to 48% in 1996 given growth of both the transport sector (from 8% to 13%) and industry (from 34% to 39%). In the domestic-tertiary sector, the consumption of non-commercial biomass energy is far larger in absolute terms than the consumption of commercial energy: biomass accounted for 74% of this sector's energy consumption in 1980 and still for 64% in 1996. This consumption was mainly located in China and South Asia (India, Pakistan and Bangladesh). Though solid fuel remained the second contributor, major increases occurred for electricity (+9.9% per year on average since 1980) and oil products (+6.0%). The demand for the latter, and for natural gas where available, was highly income-elastic. Household income, combined with the development of services, is expected to continue to be the major determinant of both the amount of energy consumed and the choice of fuel used. Demographic trends, such as urbanisation, also affect the development of the energy use levels in the tertiary-domestic sector.

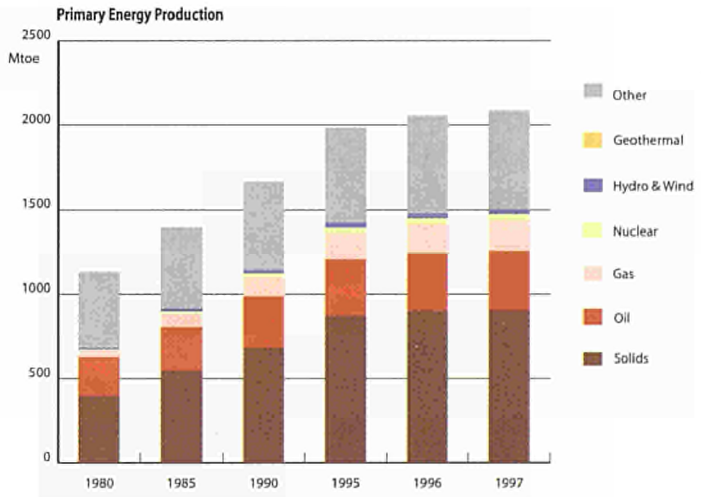
The sustained growth in electricity demand reflects the very low level of consumption per capita (750 kWh compared to 6460 kWh in the European Union). In industry, still its primary market, the share of electricity grew from 9% in 1980 to 13.5% in 1996. This rapid expansion was partly due to a shift toward less labour-intensive activities and the increased penetration of electric technologies such as arc furnaces in iron and steel production. In the tertiary-domestic sector, a rapid increase in ownership of electrical appliances and the continuing electrification of rural areas have both contributed to the high growth of electricity demand.

Share of solid fuels in gross inland energy consumption increased to reach 40% in 1997...

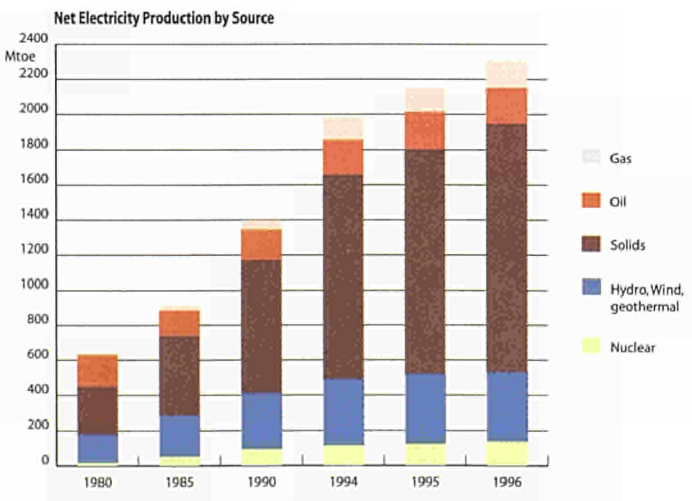
Gross inland energy consumption has been growing in the period 1980-1997 by about 4.3% per year on average with all primary fuels contributing. Coal remained the dominant fuel in the region, bolstered by the strong growth in China and India, although it has the lowest growth rate of the three major fossil fuels. The contribution of coal was particularly important in China where its share in gross inland energy consumption reached 61% in 1996, increasing from 51% in 1980. Even if its growth rate was limited to 1.6% per year on average since 1980, biomass remains the second main contributor, mainly in China and South Asia, at a level comparable with oil. The NICs and South East Asian countries rely most heavily upon oil although natural gas consumption in some of these countries has been growing at an explosive rate. Nuclear energy developed rapidly in the 1980's (growing over 20% per year on average) but stabilised in the early 1990's before new plants were developed in China and South Korea since 1993. In 1997 each primary fuel contributed to the gross inland consumption as follows: solid fuels with 40% (36% in 1980), biomass with 25% (39% in 1980), oil with 26% (21% in 1980); natural gas with 6% (2% in 1980), nuclear with 2% (almost nil in 1980) and hydro with 1% (as in 1980).

Primary energy requirements were based on indigenous sources, with the exception of oil...

Primary energy production in Asia evolved on the basis of indigenous energy sources, with the exception of oil which has led to growing oil imports since 1985. Primary production was largely dominated by solid fuels with 43% of total production in 1997 (35% in 1980). China and India represented about 78% and 15%



of the total region's production respectively in 1997 due to their reserves (11% of total world reserves for China and 7% for India). The share of biomass decreased substantially from 39% in 1980 to 28% in 1997, as biomass production increased on average by 1.6% per year since 1980 while total primary energy production increased by 3.7% per year. The major biomass producers in 1997 were China (208 Mtoe), India (205 Mtoe), Indonesia (45 Mtoe), Pakistan (23 Mtoe) and Thailand (23 Mtoe). Since 1990, however, stable production in China means that biomass production has increased more rapidly in other countries, except in the NICs where its use remained negligible. The share of oil decreased from 20% in 1980 to 17% in 1997 with a growth rate slowing down progressively since the beginning of the 1990's. China was the biggest oil producer in 1997 (161 Mtoe) followed by Indonesia (78 Mtoe), Malaysia (40 Mtoe) and India (36 Mtoe); together these four countries account for 90% of the region's oil production. Oil producers in Far East Asia are beginning to reap the benefits of enhanced exploration and extraction technologies. A significant increase in output potential is projected at the turn of the century for many countries (India, deepwater offshore fields in the Philippines, Vietnam, Malaysia, Papua New Guinea...). Natural gas production increased continuously in the period by 8.6% per year on average since 1980, to reach 181 Mtoe in 1997 or about half that of crude oil production. Indonesia (64 Mtoe), Malaysia (33 Mtoe), China (21 Mtoe) and India (21 Mtoe) were the four main sources of this increase. The 1997 financial crisis resulted in delays to many energy projects in developing Asia. Nevertheless many natural gas projects in this part of the world are proceeding, some of them benefiting from hydroelectric project postponement. Nuclear energy production was dominated by the NICs which accounted for 93% of total nuclear energy in 1990 but only 82% in 1997 due to the commissioning of more nuclear plants in China since 1993.



Asia represented 21% of the world's fossil fuel reserves, principally solid fuels...

In late 1997, Asian oil reserves amounted to about 3.8% of world reserves, mostly (2.3%) located in China. The oil reserves/production ratio was only 15.6 years, significantly below the world average. The situation for gas reserves was more comfortable, with about 5.9% of world reserves and a reserves/production ratio close to 38 years. Finally, coal reserves, mainly located in China (11%), India (6.8%) and Indonesia (3.1%), accounted for only 21.3% of world reserves. As a result of this, Asia represented 16.3% of total world fossil fuel reserves.

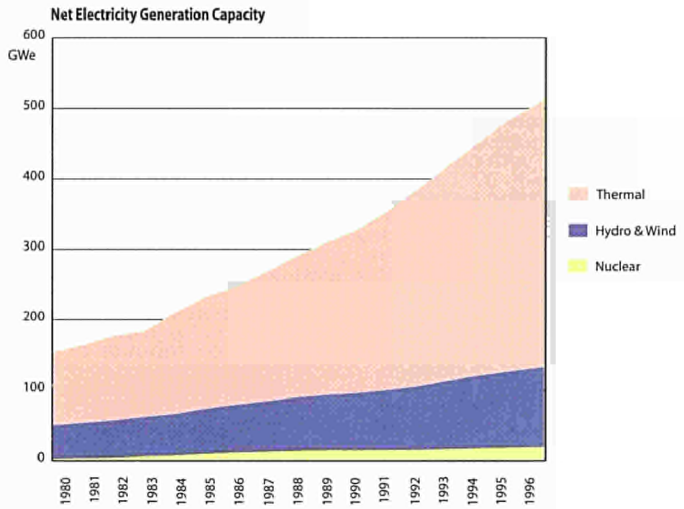
Electricity generation largely dominated by solid fuels, locally available at low cost...

Electricity generation in Asia grew steadily by 8.4% per year over the period 1980-1996, though this growth rate slowed down progressively. Thermal generation dominated electricity production (78% in 1996) with nuclear and hydro accounting for 6% and 16% of total generation respectively. Solid fuels, which are widely produced around the region at low cost, dominated thermal generation of electricity. In 1996, solid fuels accounted for 79% of thermal generation (60% in 1980); oil and gas representing 11% and 9% respectively (37% and 2% in 1980). The contribution of natural gas is growing, sustained by the exploitation of indigenous resources in producing countries and by the development of IPP projects, mainly located in Southeast Asia, often associated with the importation of LNG.

Rapid expansion of generation capacity argues in favour of foreign investment...

The total generation capacity reached 511 GWe in 1996 and the rate of expansion was very substantial: 7.8% per year on average or about 31 GWe of new capacity per year since 1990. Conventional thermal plants dominate this market, mainly steam coal power units (the bulk of Chinese generation capacity) but combined cycles units started to be developed where indigenous gas resources are available. In 1996, thermal units accounted for 75% of total generation capacity (69% in 1980), hydro and wind for 22% (29% in 1980) and nuclear for 4% (2% in 1980). In the next ten years, according to most estimates, China will require about 15 GWe additional capacity each year and India about 10 GWe. This would represent about 40-50% of additional world capacity requirements. Faced with this challenging situation, most of the Asian countries are looking to foreign investment and electricity privatisation. Foreign investment has played a critical role in financing 10% of the expansion of China's electric power infrastructure between 1979 and 1996 and, in the near future, China expects forei-

gn investment to supply 20% of its electric power investment capital through joint ventures and build-operate-transfer (BOT) schemes. In 1991, the national Indian government enacted legislation to encourage private sector involvement in independent power production. Of the 40 GWe of generating capacity planned to be built between 1997 and 2002, nearly half is expected to be funded from private sources and foreign capital will account for much of that investment. To varying degrees, power shortages and high investment needs have induced changes in electric utility policy in several other Asian countries over the past decade. Pakistan has been one of the most aggressive nations in adopting and implementing electricity reforms followed by the Philippines, Thailand, and Indonesia…



… even if the financial crisis delayed many planned projects

While much of the planned new independent power producer (IPP) capacity was seen as a relatively sure bet a couple of years ago, the financial crisis has caused delays and cancellations of many of the projects planned or under construction. The problems affecting independent power producers in Asia relate to the sharp devaluation of currencies and the financial crisis which will cause a slowdown in the growth of both economic output and energy demand. Currency devaluations have proved to be a problem for IPP projects, primarily because of pressure being placed on them to accept lower prices for their electricity than were originally agreed to in their long-term contracts with electricity distributors, usually national utilities. Because most of the costs of IPP projects are based in US dollars, the acceptance of lower prices by project owners would mean lower or negative returns on project investment. On the other hand, the electricity distributors are not in a position to raise rates to end-use consumers of electricity, because national governments typically have control over end-use prices and are unwilling to grant requests for increases. Reduced expectations for future growth in electricity demand also mean that less new generating capacity will be needed than previously expected, delaying or eliminating the need for some of the planned IPP projects. In total an estimated 11 GWe of new capacity has recently been postponed or cancelled.

The profitability of the power plants owned and operated by state-owned utilities has also been adversely affected, because capital, operating and maintenance costs incurred by the utilities have generally risen substantially. Three main factors contributed to the cost increases: payments for imported fuels usually listed in US dollars; equipment costs, much of which is imported, also expressed in US dollars; and higher interest rates.

Asia remained the most dynamic market world-wide for power generation from renewables…

Asia is one of the most dynamic markets world-wide for power generation from renewables. China is aggressively developing its hydroelectric resources. In addition to the controversial 18 GWe Three Gorges Dam on the Yangtse River, about 20 GWe of other hydroelectric projects are currently under construction. The construction of the Three Gorges project began in 1994, and is expected to be completed in 2009. The Chinese Government has had problems securing financing, largely because of international concerns about the environmental impact of the dam. In spite of the high potential for hydroelectric development in India, the environmental issues and high costs involved have until now limited projects to 11.3 GWe of new hydro capacity. On the other hand, India is one of the world's largest producers of wind energy. In 1996, India had 829 MWe of installed wind capacity, with some 1.5 GWe of further capacity in various stages of planning. The American Wind Energy Association forecasts that India and China will be amongst the five top growth markets for wind energy over the period to 2005.

Refinery expansion programmes to meet increasing domestic oil products demand...

In 1997, **the refinery capacity** (12.2 millions barrels per day) represented 15.4% of the world capacity (7.6% in 1980). Since 1980, the capacity grew by 4.0% per year largely under China's leadership (4.9% per year). In 1997, China represented about 35% of the total refinery capacity of the region, against 30% in 1980. Over the same period major refinery expansion occurred in South Korea where installed capacity increased by 20% but capacity in Indonesia decreased by 8%. At the same time, the utilisation rate of the refineries increased from 79% to 92%, remaining consis-

tently above the world average. In order to meet increasing domestic oil demand the region has embarked on an ambitious refinery expansion programme, partially based on joint ventures with foreign investors.

COMPETITIVENESS

Under the pressure of China, energy intensity has improved by 2.8% per year since 1980...

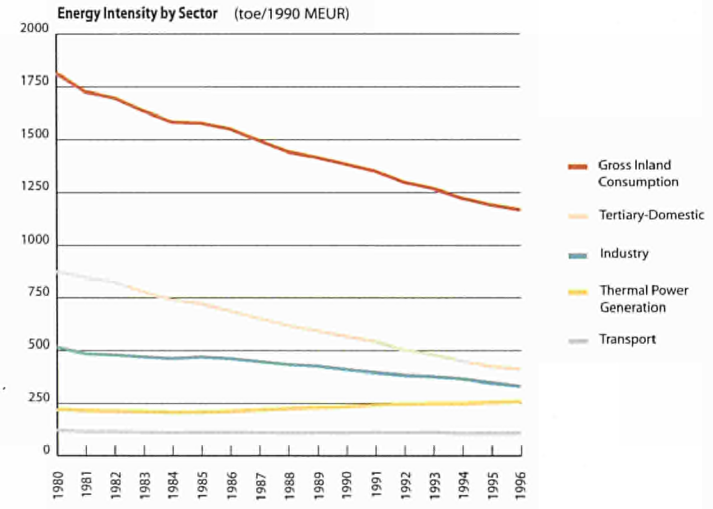
The **energy intensity** indicator for the region has improved significantly (by about –2.8% per year on average) since 1980 and this trend has accelerated since the early 1990's. This was mainly sustained by the Chinese improvement since 1980 (-5.7% per year on average) though other countries also registered significant gains: Nepal (-2.1%), Hong Kong (-2.0%), Sri Lanka (-1.9%), India, Indonesia and Bangladesh (-1.6%). However, energy intensities in some other developing countries, such as Malaysia and Philippines, are increasing. Apart from the CIS, China currently has an energy intensity that is amongst the highest in the world. Compared to the European Union, China was about 8 times more energy intensive. But the Asian region presents widely differing patterns as the energy intensity of the NICs was close to that of the United States in 1996 but still 70% higher than that of the European Union.

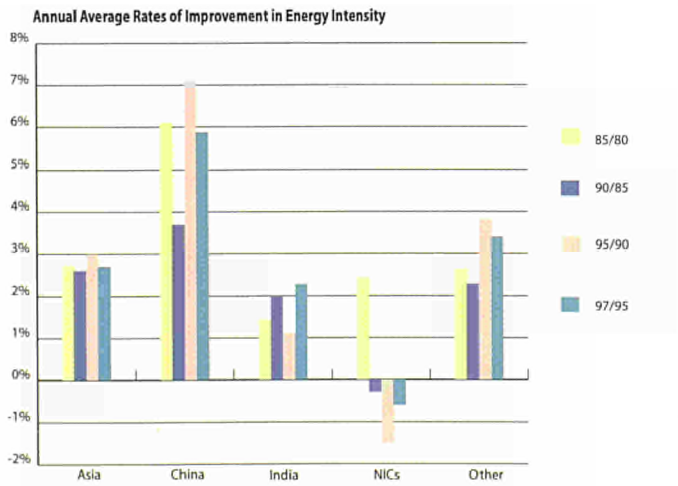
The exceptionally rapid decrease of China's energy intensity has been questioned by several authors. The World Bank, along with a number of other sources, claims that official statistics tend to underestimate the level of national income mainly for the following reasons: official statistics for some service sectors are still weak; the national accounting system provides incomplete coverage of the national economy; and the added value of agriculture is underestimated. In addition inflation rates have been underestimated and real economic growth rates overestimated in official Chinese statistics. This explains the very high energy intensity observed for China in the early 1980's. Using the GDP estimates of the World Bank for energy intensity calculations provides a "more typical" picture: China's commercial energy intensity decline in the last 15 years falls to 3.4% per year.

ASIA : ENERGY INTENSITY

toe/1990 MEUR	1980	1985	1990	1994	1995	1996	1997(1)
ASIA	1813.4	1578.5	1382.3	1221.0	1188.1	1164.0	1123.8
China	5077.5	3712.2	3073.4	2224.8	2125.5	2005.9	1882.6
India	1822.5	1695.5	1535.4	1478.7	1452.9	1430.8	1385.7
NICs	438.9	387.9	392.8	430.1	422.4	427.6	427.3
Other	2402.6	2105.3	1875.8	1597.9	1548.6	1505.0	1445.6
European Union	285.5	272.5	247.3	240.4	239.8	244.2	237.2

(1) Estimates





The continual improvement of energy intensity has been mainly sustained, at both the regional and Chinese level, by the tertiary-domestic sector (-53% since 1980). This is in spite of improving standards of living both in cities and rural zones, and by the industrial sector (-35% since 1980) notwithstanding the rapid industrialisation of the region. On the other hand, the contribution of transport remained stable but, as is often the case for developing economies, increased personal wealth has resulted in the desire for more individual and comfortable means of transport. This will prove a major challenge in the future. Finally the weight of power generation was increasing as the share of electricity in the final demand rose continuously, but also due to the thermal inefficien-

cy of the power sector. For example, there are many problems associated with Chinese power plants, such as small unit size, inconsistent coal quality and low load factors due to low plant availability or lack of fuel. As result, the average thermal efficiency of electricity generation in Chinese fossil fuel plants ranges between 27% and 29% compared to around 38% in OECD countries. In the same way, the large-scale use of biomass in the tertiary-domestic sector was associated with low end-use conversion efficiency and hence low useful energy. Hence the progressive replacement of biomass by commercial energy will lead to significant efficiency improvements in this sector even if it is accompanied by wide diffusion of electrical appliances.

Energy consumption per capita reached only 20% of the European level...

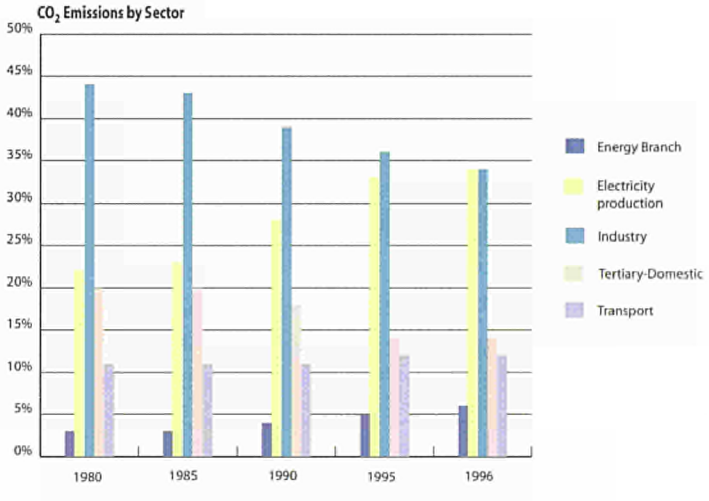
The gross inland consumption per capita increased by 52% between 1980 and 1997 but remained at the rather low level of 0.76 toe/capita - only 20% of the European Union level. One of the lowest levels occurred in India with 0.50 toe/capita, still lower than the African average, while the NICs' consumption per capita progressively approached the EU level.

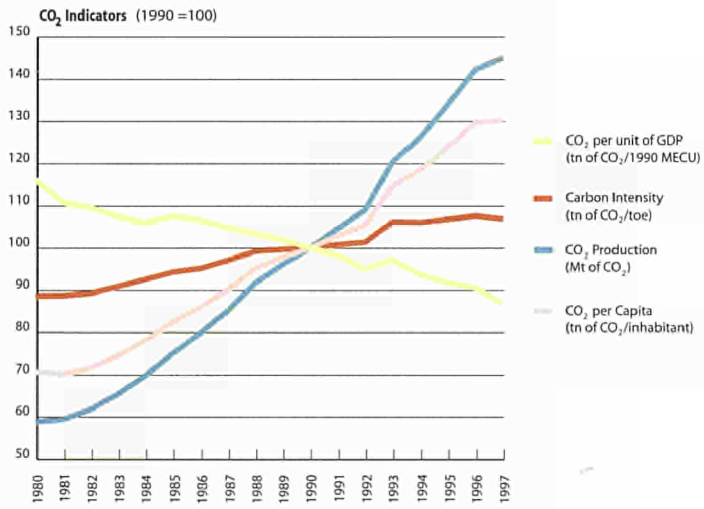
ENVIRONMENT

CO_2 emissions increased by 45% since 1990...

China and India are presently the world's first and second fastest growing sources of greenhouse gases, respectively. The air quality deterioration and the pollution from the growing use of coal as a fuel is expected to worsen, especially as much additional coal-fired power capacity is put on stream, unless adequate regulatory measures are built-in from the design stage. On the other hand, a recent study completed by the International Energy Agency reported that most of the coal-fired capacity in Southeast Asian countries is not fitted with FGD equipment, primarily because of cost but also because most plants in the region currently use low-sulphur coal. The study concludes that public concern over pollution is likely to increase as living standards rise, but at present the emphasis is on increasing electricity generation to satisfy demand and ensure economic growth. This view is prevalent in Asian countries, and more generally in developing countries when negotiating their Kyoto targets.

CO_2 emissions have been increasing continuously since 1980 (5589 Mt of CO_2 in 1997, compared to 3854 Mt in 1990 and 2263 Mt in 1980), resulting in a 45% rise since 1990. As the increasingly dominant position of solid fuels induces an increase in the carbon intensity of fossil fuels, emissions are increasing 24% more rapidly than gross inland energy consumption. Consequently, the share of Asia in total world CO_2 emissions has doubled since 1980, increasing from 12.5% to 25%. This trend must nevertheless be compared with other indicators. Per capita CO_2 emissions stemming from higher standards of living increased by 3.6% since 1980, with a more sustained growth since 1990. But CO_2 intensity per unit of GDP declined by only 1.4% per year on average since 1980, also with an acceleration during the 1990's.





Contributions of power sector and industry, roughly the same in 1996, reached 67% of total CO_2 emissions...

Looking at sectoral CO_2 emissions at the regional level, by far the largest sector in terms of emissions was industry with 34% of total emissions (44% in 1980). The power sector, mainly based on solids, increased continuously to approach the industrial contribution in 1996 (33% of the total in 1996 against 21% in 1980), partly explained by the low conversion efficiencies. But this

means that substantial gains can be achieved in the near future. The tertiary-domestic sector, where renewable energy continued to make a significant impact, reduced its share of emissions from 20% in 1980 to only 14% in 1996 though its emissions volume increased by more than 60% over this period. More significantly, it must be stressed that the CO_2 emissions growth rate in this sector declined continuously from 5.3% per year on average between 1980 and 1985 to only 0.7% per year on average during the first half of the 1990's despite a general increase in living standards. The contribution of the transport sector has remained quite stable since 1980 with about 11% of total emissions though transport's volume of emissions has multiplied by 2.6 since 1980.

GLOBAL MARKETS

Increasing energy dependency, mainly related to oil imports from the Middle East...

With an energy dependency in 1997 of about 12%, Asia is increasingly a net importer of energy. This is true for oil (net imports of 290 Mtoe, supplied mainly by the Middle East) and solid fuels (net imports of 30 Mtoe). But Asia remained a net exporter of natural gas (about 35 Mtoe since 1990). Exports accounted for 31% of indigenous production in 1990, but this share fell to only 20% in 1997 in line with increasing indigenous consumption. Exports consisted mainly of LNG to Japan. At a national level, this broad picture differs widely. China, with an overall energy dependence near zero, is a net exporter of solid fuels but has become a net importer of oil since 1993 (oil imports representing about 16% of its oil consumption in 1997. India remained a net importer of all commercial energy sources except natural gas, with oil accounting for 88% of total 1997 imports. The NICs, without significant fossil fuel reserves, are all major net energy importers. Indeed, they depended on foreign supplies for 87% of their consumption in 1996, the remainder being mainly supplied by nuclear power. The situation of other developing Asian countries was a little more complex. Their apparent self-sufficiency resulted in fact from a balancing of their oil imports (100 Mtoe in 1997) by their exports of coal (30 Mtoe) and natural gas (55 Mtoe).

ASIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	1137.5	1404.0	1675.8	1989.9	2063.1	2096.0	4.3%	3.6%	3.5%	3.7%	1.6%
Solids	402.6	550.7	684.8	874.2	905.3	907.6	6.5%	4.5%	5.0%	3.6%	0.3%
Oil	226.8	261.4	304.9	335.9	341.4	351.2	2.9%	3.1%	2.0%	1.6%	2.9%
Natural gas	44.8	76.8	111.7	153.9	170.5	181.5	11.4%	7.8%	6.6%	10.8%	6.4%
Nuclear	3.8	13.2	24.0	32.1	35.2	35.9	28.2%	12.7%	6.0%	9.4%	2.2%
Hydro & Wind	13.3	18.8	25.4	31.8	31.5	30.6	7.2%	6.2%	4.6%	-0.9%	-2.7%
Geothermal	1.8	4.4	5.7	7.1	7.6	8.0	19.9%	5.0%	4.7%	6.5%	5.5%
Other	444.3	478.6	519.4	554.7	571.6	581.0	1.5%	1.6%	1.3%	3.0%	1.7%
Net Imports	19.5	0.9	85.4	213.5	252.7	283.6	-45.9%	148.2%	20.1%	18.4%	12.2%
Solids	7.0	23.7	30.6	23.1	20.5	30.4	27.8%	5.2%	-5.4%	-11.6%	48.5%
Oil	30.8	7.7	90.2	225.7	269.5	289.5	-24.2%	63.7%	20.1%	19.4%	7.4%
Crude oil	23.5	14.2	67.4	169.4	214.9	na	-9.6%	36.6%	20.2%	26.8%	na
Oil products	7.3	-6.5	22.8	56.3	54.7	na	-	-	19.8%	-2.9%	na
Natural gas	-18.2	-30.5	-35.4	-35.5	-37.6	-36.8	10.9%	3.0%	0.0%	6.1%	-2.2%
Electricity	0.0	0.1	0.1	0.1	0.4	0.5	10.8%	-3.2%	19.8%	189.6%	35.8%
Gross Inland Consumption	1148.4	1378.3	1732.2	2174.5	2291.8	2350.7	3.7%	4.7%	4.7%	5.4%	2.6%
Solids	411.2	552.8	707.9	891.5	929.4	938.0	6.1%	5.1%	4.7%	4.3%	0.9%
Oil	247.3	264.1	373.7	539.2	583.8	612.3	1.3%	7.2%	7.6%	8.3%	4.9%
Natural gas	26.6	46.3	76.2	118.0	132.5	144.7	11.7%	10.5%	9.2%	12.3%	9.2%
Other (1)	463.2	515.1	574.5	625.8	646.1	655.8	2.1%	2.2%	1.7%	3.2%	1.5%
Electricity Generation in TWh	634.2	905.1	1400.3	2145.8	2302.0	na	7.4%	9.1%	8.9%	7.3%	na
Nuclear	14.7	50.8	92.2	123.3	134.9	na	28.2%	12.7%	6.0%	9.4%	na
Hydro & wind	154.3	218.2	295.4	369.6	365.4	na	7.2%	6.2%	4.6%	-1.1%	na
Thermal	465.2	636.1	1012.7	1653.0	1801.6	na	6.5%	9.7%	10.3%	9.0%	na
Generation Capacity in GWe	153.4	230.8	325.8	479.9	511.5	na	8.5%	7.1%	8.1%	6.6%	na
Nuclear	2.9	9.5	14.5	18.1	19.3	na	27.1%	8.8%	4.6%	6.7%	na
Hydro & wind	44.6	61.8	79.0	105.4	110.9	na	6.7%	5.1%	5.9%	5.2%	na
Thermal	105.9	159.6	232.3	356.5	381.3	na	8.6%	7.8%	8.9%	7.0%	na
Average Load Factor in %	47.2	44.8	49.1	51.0	51.4	na	-1.1%	1.8%	0.8%	0.7%	na
Fuel Inputs for Thermal Power Generation	140.5	183.4	295.9	469.4	509.3	na	5.5%	10.0%	9.7%	8.5%	na
Solids	84.2	132.2	223.9	365.5	401.5	na	9.4%	11.1%	10.3%	9.8%	na
Oil	51.6	39.1	48.1	57.5	55.7	na	-5.4%	4.3%	3.6%	-3.1%	na
Gas	3.0	7.6	18.2	39.3	44.5	na	20.7%	18.9%	16.7%	13.5%	na
Geothermal	1.8	4.4	5.7	7.1	7.6	na	19.9%	5.0%	4.7%	6.5%	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	28.5	29.8	29.4	30.3	30.4	na	0.9%	-0.3%	0.6%	0.4%	na
Non-Energy Uses	19.2	22.9	32.8	78.1	88.7	na	3.6%	7.5%	19.0%	13.5%	na
Total Final Energy Demand	967.1	1145.2	1369.3	1622.8	1693.8	na	3.4%	3.6%	3.5%	4.4%	na
Solids	298.7	388.0	441.2	485.2	490.0	na	5.4%	2.6%	1.9%	1.0%	na
Oil	158.9	184.9	268.1	379.8	411.3	na	3.1%	7.7%	7.2%	8.3%	na
Gas	13.2	21.1	28.3	38.5	42.3	na	9.9%	6.0%	6.4%	9.8%	na
Electricity	44.7	63.6	97.6	144.6	156.6	na	7.3%	8.9%	8.2%	8.3%	na
Heat	7.4	9.1	14.8	20.1	22.0	na	4.3%	10.1%	6.3%	9.6%	na
Other	444.3	478.6	519.4	554.7	571.6	na	1.5%	1.6%	1.3%	3.1%	na
CO_2 Emissions in Mt of CO_2	2263.4	2889.8	3853.5	5166.1	5486.7	5589.1	5.0%	5.9%	6.0%	6.2%	1.9%
Indicators											
Population (Million)	2313.8	2534.6	2784.1	3013.4	3057.5	3103.5	1.8%	1.9%	1.6%	1.5%	1.5%
GDP (index 1985=100)	72.5	100.0	143.5	209.6	225.5	239.6	6.6%	7.5%	7.9%	7.6%	6.2%
Gross Inl Cons./GDP (toe/1990 MEUR)	1813.4	1578.5	1382.3	1188.1	1164.0	1123.8	-2.7%	-2.6%	-3.0%	-2.0%	-3.5%
Gross Inl Cons./Capita (toe/inhabitant)	0.50	0.54	0.62	0.72	0.75	0.76	1.8%	2.7%	3.0%	3.9%	1.1%
Electricity Generated/Capita (kWh/inhabitant)	274	357	503	712	753	na	5.4%	7.1%	7.2%	5.7%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	1.0	1.1	1.4	1.7	1.8	1.8	3.1%	4.0%	4.4%	4.7%	0.4%
Import Dependency (%)	1.7	0.1	4.9	9.7	10.9	12.0	-48.4%	139.6%	14.8%	12.2%	9.9%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

ASIA : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	1148.4	1378.3	1732.2	2062.6	2174.5	2293.4	3.7%	4.7%	4.7%	5.5%
Public Thermal Power Generation	135.1	173.7	284.0	407.1	450.6	490.1	5.2%	10.3%	9.7%	8.8%
Autoprod. Thermal Power Generation	3.7	5.2	6.2	10.3	11.6	14.6	7.3%	3.6%	13.3%	25.8%
Energy Branch	27.0	33.8	61.1	103.7	110.0	122.8	4.6%	12.5%	12.5%	11.6%
Final Energy Consumption	960.7	1138.6	1360.3	1559.0	1610.0	1680.0	3.5%	3.6%	3.4%	4.4%
Industry	328.2	410.6	514.1	620.9	638.7	658.9	4.6%	4.6%	4.4%	3.2%
Transport	77.8	99.5	139.7	182.9	200.4	216.2	5.0%	7.0%	7.5%	7.9%
Tertiary-Domestic	554.7	628.4	706.6	755.2	770.9	804.9	2.5%	2.4%	1.8%	4.4%
Energy Intensity (toe/1990 MEUR)	1813.4	1578.5	1382.3	1221.0	1188.1	1164.8	-2.7%	-2.6%	-3.0%	-2.0%
Public Thermal Power Generation	213.3	198.9	226.6	241.0	246.2	248.9	-1.4%	2.6%	1.7%	1.1%
Autoprod. Thermal Power Generation	5.8	6.0	5.0	6.1	6.3	7.4	0.6%	-3.6%	5.0%	16.9%
Industry	518.2	470.3	410.2	367.6	349.0	334.6	-1.9%	-2.7%	-3.2%	-4.1%
Transport	122.9	113.9	111.5	108.3	109.5	109.8	-1.5%	-0.4%	-0.4%	0.3%
Tertiary-Domestic	876.0	719.7	563.8	447.1	421.2	408.8	-3.9%	-4.8%	-5.7%	-2.9%
Energy per Capita (Kgoe/inhabitant)	496	544	622	695	722	750	1.8%	2.7%	3.0%	3.9%
Industry	142	162	185	209	212	215	2.7%	2.7%	2.8%	1.7%
Transport	34	39	50	62	66	71	3.1%	5.0%	5.8%	6.3%
Tertiary-Domestic	240	248	254	254	256	263	0.7%	0.5%	0.2%	2.9%
Electricity Share (%)										
Final Energy Consumption	4.7%	5.6%	7.2%	8.6%	9.0%	9.3%	3.7%	5.1%	4.6%	3.8%
Industry	9.0%	10.0%	11.7%	12.5%	13.1%	13.5%	2.0%	3.2%	2.4%	3.2%
Transport	0.6%	0.9%	1.0%	1.1%	0.8%	0.8%	7.9%	1.7%	-3.6%	-2.0%
Tertiary-Domestic	2.6%	3.5%	5.1%	7.2%	7.7%	8.2%	5.6%	8.2%	8.4%	6.3%
Total Renewable Consumption (Mtoe)	459.4	501.7	550.4	586.2	593.6	610.6	1.8%	1.9%	1.5%	2.9%
Hydro	13.3	18.8	25.4	30.0	31.8	31.4	7.2%	6.2%	4.6%	-1.1%
Biomass	444.3	478.6	519.4	549.1	554.6	571.5	1.5%	1.6%	1.3%	3.0%
Other	1.8	4.4	5.7	7.1	7.2	7.7	19.9%	5.1%	4.7%	7.2%
Renewable intensity (toe/1990MEUR)	725.4	574.6	439.2	347.0	324.3	310.1	-4.6%	-5.2%	-5.9%	-4.4%
Renewable per capita (Kgoe/inhabitant)	198.5	198.0	197.7	197.4	197.0	199.7	-0.1%	0.0%	-0.1%	1.4%
CO_2 Emissions (Mt of CO_2)	2263.4	2889.8	3853.5	4866.4	5166.1	5493.4	5.0%	5.9%	6.0%	6.3%
Public Thermal Power Generation	484.0	640.1	1051.5	1507.8	1670.0	1815.3	5.8%	10.4%	9.7%	8.7%
Autoprod. Thermal Power Generation	13.6	19.5	23.1	38.1	43.4	54.9	7.5%	3.4%	13.5%	26.4%
Energy Branch	69.3	82.6	148.5	252.4	265.6	310.7	3.6%	12.5%	12.3%	17.0%
Industry	989.7	1242.0	1515.8	1816.8	1855.9	1891.8	4.6%	4.1%	4.1%	1.9%
Transport	250.7	316.4	435.8	561.7	614.8	662.5	4.8%	6.6%	7.1%	7.8%
Tertiary-Domestic	456.0	589.2	678.8	668.8	701.3	742.2	5.3%	2.9%	0.7%	5.8%
Carbon Intensity (tn of CO_2/toe)	2.0	2.1	2.2	2.4	2.4	2.4	1.2%	1.2%	1.3%	0.8%
Public Power Generation	3.1	3.0	3.1	3.2	3.2	3.2	-0.6%	0.4%	0.6%	0.7%
Public Thermal Power Generation	3.6	3.7	3.7	3.7	3.7	3.7	0.6%	0.1%	0.0%	-0.1%
Autoprod. Power Generation	3.7	3.7	3.7	3.7	3.7	3.7	0.3%	-0.4%	0.3%	0.6%
Autoprod. Thermal Power Generation	3.7	3.8	3.7	3.7	3.7	3.8	0.3%	-0.2%	0.2%	0.5%
Energy Branch	2.6	2.4	2.4	2.4	2.4	2.5	-1.0%	-0.1%	-0.1%	4.8%
Industry	3.0	3.0	2.9	2.9	2.9	2.9	0.1%	-0.5%	-0.3%	-1.2%
Transport	3.2	3.2	3.1	3.1	3.1	3.1	-0.3%	-0.4%	-0.3%	-0.1%
Tertiary-Domestic	0.8	0.9	1.0	0.9	0.9	0.9	2.7%	0.5%	-1.1%	1.4%
CO_2 per Capita (kg of CO_2/inhabitant)	978	1140	1384	1639	1714	1797	3.1%	4.0%	4.4%	4.8%
Industry	428	490	544	612	616	619	2.8%	2.1%	2.5%	0.5%
Transport	108	125	157	189	204	217	2.9%	4.6%	5.4%	6.2%
Tertiary-Domestic	197	232	244	225	233	243	3.4%	1.0%	-0.9%	4.3%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	3574	3310	3075	2881	2823	2790	-1.5%	-1.5%	-1.7%	-1.2%
Public Thermal Power Generation	764	733	839	893	912	922	-0.8%	2.7%	1.7%	1.0%
Autoprod. Thermal Power Generation	21	22	18	23	24	28	0.9%	-3.8%	5.2%	17.5%
Energy Branch	109	95	119	149	145	158	-2.9%	4.6%	4.1%	8.8%
Industry	1563	1422	1210	1076	1014	961	-1.9%	-3.2%	-3.5%	-5.2%
Transport	396	362	348	333	336	336	-1.8%	-0.8%	-0.7%	0.2%
Tertiary-Domestic	720	675	542	396	383	377	-1.3%	-4.3%	-6.7%	-1.6%

NICS : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	18.0	27.7	34.1	32.4	34.5	34.9	9.0%	4.3%	-1.0%	6.4%	1.1%
Solids	10.2	11.5	8.2	2.7	2.3	2.1	2.5%	-6.5%	-19.8%	-14.7%	-9.8%
Oil	0.2	0.2	0.3	0.1	0.1	0.1	3.7%	4.6%	-27.9%	-3.8%	0.0%
Natural gas	1.6	1.1	1.2	0.8	0.7	0.7	-7.5%	1.8%	-6.3%	-14.8%	0.0%
Nuclear	3.0	11.9	22.3	26.7	29.1	29.5	31.2%	13.5%	3.6%	9.2%	1.4%
Hydro & Wind	0.4	0.9	1.3	1.0	1.0	1.1	16.6%	6.6%	-4.4%	4.0%	2.5%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	2.6	2.1	0.9	1.1	1.2	1.4	-4.1%	-16.4%	5.4%	11.6%	13.2%
Net Imports	70.4	81.4	147.3	239.7	258.9	267.5	2.9%	12.6%	10.2%	8.0%	3.3%
Solids	8.1	22.7	33.2	51.8	53.7	60.0	22.8%	7.8%	9.3%	3.7%	11.7%
Oil	62.3	58.7	110.7	174.6	188.9	188.9	-1.2%	13.5%	9.5%	8.2%	0.0%
Crude oil	74.4	73.6	107.7	170.9	190.1	na	-0.2%	7.9%	9.7%	11.2%	na
Oil products	-12.1	-14.9	3.0	3.7	-1.2	na	4.2%	-	3.9%	-	na
Natural gas	0.0	0.0	3.5	12.7	15.6	18.0	-	-	29.2%	22.7%	15.9%
Electricity	0.0	-0.1	-0.2	0.5	0.6	0.5	22.4%	10.3%	-	19.5%	-16.3%
Gross Inland Consumption	83.4	103.9	163.8	247.5	266.5	282.5	4.5%	9.5%	8.6%	7.7%	6.0%
Solids	17.2	32.7	41.1	49.6	54.2	62.1	13.6%	4.7%	3.9%	9.2%	14.7%
Oil	58.5	55.4	93.8	155.0	164.4	169.0	-1.1%	11.1%	10.6%	6.0%	2.8%
Natural gas	1.6	1.1	4.7	13.5	15.9	18.8	-7.5%	34.1%	23.8%	17.5%	18.0%
Other (1)	6.0	14.8	24.3	29.3	32.0	32.5	19.6%	10.5%	3.8%	9.3%	1.5%
Electricity Generation in TWh	99.5	142.8	239.3	373.9	405.7	na	7.5%	10.9%	9.3%	8.5%	na
Nuclear	11.7	45.5	85.8	102.3	111.7	na	31.2%	13.5%	3.6%	9.2%	na
Hydro & wind	4.9	10.6	14.5	11.6	11.5	na	16.6%	6.6%	-4.4%	-1.5%	na
Thermal	82.9	86.7	139.0	259.9	282.5	na	0.9%	9.9%	13.3%	8.7%	na
Generation Capacity in GWe	23.8	43.1	52.6	76.0	81.5	na	12.6%	4.1%	7.7%	7.3%	na
Nuclear	1.9	8.0	12.8	13.8	14.8	na	33.9%	9.8%	1.5%	7.2%	na
Hydro & wind	2.8	4.9	5.1	7.0	7.4	na	11.8%	0.9%	6.5%	6.2%	na
Thermal	19.2	30.2	34.7	55.3	59.4	na	9.5%	2.8%	9.8%	7.5%	na
Average Load Factor in %	47.7	37.8	52.0	56.2	56.8	na	-4.5%	6.6%	1.6%	1.1%	na
Fuel Inputs for Thermal Power Generation	18.7	19.4	30.8	51.1	52.8	na	0.7%	9.7%	10.6%	3.4%	na
Solids	2.3	11.0	15.0	23.2	26.4	na	37.0%	6.4%	9.1%	13.7%	na
Oil	16.4	8.4	13.6	21.0	18.4	na	-12.5%	10.0%	9.2%	-12.4%	na
Gas	0.0	0.0	2.3	6.9	8.0	na	-	-	24.5%	16.9%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	38.1	38.4	38.8	43.7	45.9	na	0.2%	0.2%	2.5%	5.0%	na
Non-Energy Uses	3.4	5.8	7.7	9.7	10.1	na	11.7%	5.8%	4.7%	4.2%	na
Total Final Energy Demand	57.9	69.4	108.2	165.8	175.7	na	3.7%	9.3%	8.9%	6.0%	na
Solids	13.2	18.4	21.2	18.5	19.5	na	6.8%	2.8%	-2.6%	5.3%	na
Oil	33.8	37.4	66.3	109.0	114.8	na	2.1%	12.1%	10.5%	5.3%	na
Gas	0.9	0.9	2.3	7.7	7.7	na	1.4%	20.0%	27.7%	-0.7%	na
Electricity	7.4	10.5	17.6	28.8	31.6	na	7.2%	11.0%	10.3%	9.6%	na
Heat	0.0	0.0	0.0	0.6	0.7	na	-	-	-	21.9%	na
Other	2.6	2.1	0.9	1.1	1.4	na	-4.1%	-16.3%	5.3%	21.4%	na
CO_2 Emissions in Mt of CO_2	226.8	269.1	413.4	619.2	649.5	695.4	3.5%	9.0%	8.4%	4.9%	7.1%
Indicators											
Population (Million)	63.09	67.88	71.51	75.54	76.37	77.22	1.5%	1.0%	1.1%	1.1%	1.1%
GDP (index 1985=100)	70.9	100.0	155.7	218.7	232.7	246.8	7.1%	9.3%	7.0%	6.4%	6.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	438.9	387.9	392.8	422.4	427.6	427.3	-2.4%	0.3%	1.5%	1.2%	-0.1%
Gross Inl Cons./Capita (toe/inhabitant)	1.32	1.53	2.29	3.28	3.49	3.66	3.0%	8.4%	7.4%	6.5%	4.8%
Electricity Generated/Capita (kWh/inhabitant)	1577	2103	3346	4950	5312	na	5.9%	9.7%	8.1%	7.3%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	3.6	4.0	5.8	8.2	8.5	9.0	2.0%	7.8%	7.2%	3.8%	5.9%
Import Dependency (%)	79.1	73.7	82.3	89.5	89.2	87.2	-1.4%	2.2%	1.7%	-0.3%	-2.3%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

CHINA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	608.6	761.9	894.0	1072.9	1101.3	1113.1	4.6%	3.3%	3.7%	2.6%	1.1%
Solids	303.9	427.4	529.1	680.4	698.3	704.6	7.1%	4.4%	5.2%	2.6%	0.9%
Oil	107.9	127.1	140.8	150.0	157.3	160.8	3.3%	2.1%	1.3%	4.9%	2.2%
Natural gas	12.0	10.8	12.8	16.7	18.7	21.0	-2.0%	3.4%	5.5%	12.1%	11.9%
Nuclear	0.0	0.0	0.0	3.3	3.7	3.1	-	-	-	11.7%	-16.2%
Hydro & Wind	5.0	7.9	10.9	16.4	16.2	15.6	9.7%	6.5%	8.5%	-1.4%	-3.5%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	179.9	188.5	200.4	206.1	207.0	208.0	0.9%	1.2%	0.6%	0.5%	0.5%
Net Imports	-19.7	-39.1	-32.0	-10.1	-7.1	12.4	14.7%	-3.9%	-20.6%	-29.6%	-
Solids	-2.3	-2.9	-8.4	-20.4	-23.0	-17.8	4.8%	23.5%	19.5%	12.8%	-22.7%
Oil	-17.4	-36.3	-23.8	10.8	16.2	30.5	15.8%	-8.1%	-	50.8%	88.1%
Crude oil	-13.2	-30.3	-21.4	-1.1	2.2	na	18.1%	-6.7%	-44.4%	-	na
Oil products	-4.3	-6.0	-2.4	11.9	14.0	na	7.0%	-16.9%	-	17.7%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	0.2	-	-	-	-	-
Electricity	0.0	0.1	0.2	-0.5	-0.3	-0.5	-	11.5%	-	-33.4%	50.1%
Gross Inland Consumption	593.1	705.5	856.2	1058.6	1097.7	1121.0	3.5%	3.9%	4.3%	3.7%	2.1%
Solids	306.6	404.8	515.4	658.1	679.0	686.8	5.7%	4.9%	5.0%	3.2%	1.2%
Oil	89.7	93.3	116.5	158.4	173.4	186.7	0.8%	4.5%	6.3%	9.5%	7.7%
Natural gas	12.0	10.8	12.8	16.7	18.7	21.2	-2.0%	3.4%	5.5%	12.1%	13.0%
Other (1)	184.9	196.6	211.5	225.4	226.6	226.3	1.2%	1.5%	1.3%	0.6%	-0.2%
Electricity Generation in TWh	300.6	410.7	621.2	1007.7	1080.0	na	6.4%	8.6%	10.2%	7.2%	na
Nuclear	0.0	0.0	0.0	12.8	14.3	na	-	-	-	11.7%	na
Hydro & wind	58.2	92.4	126.7	190.6	188.0	na	9.7%	6.5%	8.5%	-1.4%	na
Thermal	242.4	318.3	494.5	804.3	877.7	na	5.6%	9.2%	10.2%	9.1%	na
Generation Capacity in GWe	65.8	87.0	137.9	217.2	236.5	na	5.7%	9.6%	9.5%	8.9%	na
Nuclear	0.0	0.0	0.0	2.2	2.2	na	-	-	-	0.0%	na
Hydro & wind	20.3	26.4	36.0	51.0	55.6	na	5.4%	6.4%	7.2%	9.0%	na
Thermal	45.6	60.6	101.8	164.0	178.8	na	5.9%	10.9%	10.0%	9.0%	na
Average Load Factor in %	52.1	53.9	51.4	53.0	52.1	na	0.7%	-0.9%	0.6%	-1.6%	na
Fuel Inputs for Thermal Power Generation	78.3	99.1	154.2	249.1	271.4	na	4.8%	9.2%	10.1%	9.0%	na
Solids	57.9	81.8	138.0	235.1	258.5	na	7.2%	11.0%	11.2%	10.0%	na
Oil	20.2	16.9	15.2	13.3	12.2	na	-3.5%	-2.1%	-2.7%	-8.3%	na
Gas	0.2	0.3	0.9	0.7	0.7	na	11.7%	23.8%	-3.5%	-5.7%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	26.6	27.6	27.6	27.8	27.8	na	0.7%	0.0%	0.1%	0.2%	na
Non-Energy Uses	8.3	7.1	7.3	45.3	52.7	na	-3.2%	0.4%	44.2%	16.3%	na
Total Final Energy Demand	497.7	594.8	694.4	793.2	814.1	na	3.6%	3.1%	2.7%	2.6%	na
Solids	230.5	299.2	345.0	392.8	394.1	na	5.4%	2.9%	2.6%	0.3%	na
Oil	51.8	60.1	79.5	99.8	109.6	na	3.0%	5.8%	4.7%	9.8%	na
Gas	6.8	7.9	10.8	9.1	10.3	na	3.2%	6.4%	-3.4%	13.0%	na
Electricity	21.3	29.9	44.0	65.9	71.8	na	7.0%	8.0%	8.4%	8.9%	na
Heat	7.4	9.1	14.8	19.5	21.3	na	4.3%	10.1%	5.7%	9.2%	na
Other	179.9	188.5	200.4	206.1	207.0	na	0.9%	1.2%	0.6%	0.5%	na
CO_2 Emissions in Mt of CO_2	1412.5	1794.1	2277.0	3006.8	3171.0	na	4.9%	4.9%	5.7%	5.5%	na
Indicators											
Population (Million)	981.2	1051.0	1135.2	1203.3	1215.4	1228.2	1.4%	1.6%	1.2%	1.0%	1.1%
GDP (index 1985=100)	61.5	100.0	146.6	262.1	287.9	313.3	10.2%	7.9%	12.3%	9.9%	8.8%
Gross Inl Cons./GDP (toe/1990 MEUR)	5077.5	3712.2	3073.4	2125.5	2005.9	1882.6	-6.1%	-3.7%	-7.1%	-5.6%	-6.1%
Gross Inl Cons./Capita (toe/inhabitant)	0.60	0.67	0.75	0.88	0.90	0.91	2.1%	2.4%	3.1%	2.7%	1.1%
Electricity Generated/Capita (kWh/inhabitant)	306	391	547	837	889	na	5.0%	7.0%	8.9%	6.1%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	1.4	1.7	2.0	2.5	2.6	na	3.5%	3.3%	4.5%	4.4%	na
Import Dependency (%)	-3.3	-5.5	-3.7	-1.0	-0.6	1.1	10.7%	-7.6%	-23.9%	-32.1%	-

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

INDIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	221.9	278.3	333.6	386.2	402.5	407.9	4.6%	3.7%	3.0%	4.2%	1.4%
Solids	58.1	75.5	104.3	135.7	141.6	137.4	5.4%	6.7%	5.4%	4.4%	-3.0%
Oil	9.6	31.0	35.6	38.0	34.9	36.3	26.4%	2.8%	1.3%	-8.2%	4.0%
Natural gas	1.2	3.8	10.1	15.6	17.3	20.5	25.3%	21.5%	9.0%	11.0%	18.6%
Nuclear	0.8	1.3	1.6	2.0	2.2	3.1	10.7%	4.3%	4.4%	10.5%	41.9%
Hydro & Wind	4.0	4.4	6.2	6.3	5.9	5.6	1.9%	7.0%	0.3%	-5.0%	-5.0%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	148.1	162.3	175.8	188.7	200.5	204.9	1.8%	1.6%	1.4%	6.3%	2.2%
Net Imports	23.5	16.8	29.7	50.4	58.5	67.6	-6.5%	12.1%	11.1%	16.1%	15.6%
Solids	0.3	1.1	3.5	5.4	5.7	7.6	32.3%	24.7%	9.3%	6.2%	32.8%
Oil	23.2	15.7	26.1	44.8	52.6	59.7	-7.6%	10.8%	11.4%	17.3%	13.5%
Crude oil	16.3	13.0	20.6	27.4	34.2	na	-4.4%	9.6%	5.9%	24.9%	na
Oil products	6.9	2.6	5.6	17.4	18.4	na	-17.7%	16.3%	25.7%	5.5%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	0.1	-	-	-	-	-
Electricity	0.0	0.0	0.1	0.1	0.1	0.1	19.7%	-	2.3%	0.0%	0.0%
Gross Inland Consumption	242.0	292.3	359.8	436.7	462.1	472.6	3.8%	4.2%	3.9%	5.8%	2.3%
Solids	56.3	76.3	105.9	142.0	149.1	145.0	6.3%	6.8%	6.0%	5.0%	-2.7%
Oil	31.5	44.1	60.1	82.1	87.0	93.1	6.9%	6.4%	6.4%	5.9%	7.1%
Natural gas	1.2	3.8	10.1	15.6	17.3	20.6	25.3%	21.5%	9.0%	11.0%	19.3%
Other (1)	152.9	168.0	183.7	197.0	208.8	213.8	1.9%	1.8%	1.4%	6.0%	2.4%
Electricity Generation in TWh	119.3	183.4	289.4	417.8	435.1	na	9.0%	9.6%	7.6%	4.1%	na
Nuclear	3.0	5.0	6.1	7.6	8.4	na	10.7%	4.3%	4.4%	10.5%	na
Hydro & wind	46.6	51.0	71.7	72.7	69.1	na	1.9%	7.0%	0.3%	-5.0%	na
Thermal	69.7	127.4	211.6	337.5	357.6	na	12.8%	10.7%	9.8%	6.0%	na
Generation Capacity in GWe	33.3	52.3	73.7	93.7	96.7	na	9.4%	7.1%	4.9%	3.2%	na
Nuclear	0.9	1.3	1.6	2.0	2.2	na	9.1%	3.3%	5.1%	11.0%	na
Hydro & wind	11.8	15.5	18.8	21.3	21.1	na	5.6%	3.9%	2.6%	-0.9%	na
Thermal	20.6	35.5	53.3	70.4	73.4	na	11.4%	8.5%	5.7%	4.3%	na
Average Load Factor in %	40.9	40.0	44.9	50.9	51.3	na	-0.4%	2.3%	2.6%	0.9%	na
Fuel Inputs for Thermal Power Generation	22.3	34.1	62.7	100.5	108.5	na	8.9%	12.9%	9.9%	7.9%	na
Solids	19.0	30.2	56.7	92.6	100.0	na	9.7%	13.4%	10.3%	7.9%	na
Oil	2.8	2.7	2.7	2.5	2.5	na	-0.6%	-0.5%	-1.1%	0.0%	na
Gas	0.5	1.2	3.3	5.4	6.0	na	21.4%	22.8%	10.0%	11.0%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	26.9	32.1	29.0	28.9	28.4	na	3.6%	-2.0%	-0.1%	-1.8%	na
Non-Energy Uses	4.7	5.9	7.7	9.4	10.2	na	4.9%	5.5%	3.9%	8.6%	na
Total Final Energy Demand	210.3	251.7	290.6	334.5	351.9	na	3.7%	2.9%	2.9%	5.2%	na
Solids	30.6	43.0	46.1	48.5	47.1	na	7.0%	1.4%	1.0%	-2.9%	na
Oil	23.2	32.5	44.5	62.6	67.6	na	7.0%	6.5%	7.1%	8.0%	na
Gas	0.6	2.4	5.6	7.7	8.5	na	30.8%	18.5%	6.3%	11.0%	na
Electricity	7.7	11.4	18.5	27.1	28.2	na	8.3%	10.2%	7.9%	4.1%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	148.1	162.3	175.8	188.7	200.5	na	1.8%	1.6%	1.4%	6.3%	na
CO_2 Emissions in Mt of CO_2	291.1	422.3	591.7	811.8	855.6	na	7.7%	7.0%	6.5%	5.4%	na
Indicators											
Population (Million)	687.33	765.15	849.52	929.36	945.12	961.41	2.2%	2.1%	1.8%	1.7%	1.7%
GDP (index 1985=100)	77.0	100.0	136.0	174.4	187.4	197.9	5.4%	6.3%	5.1%	7.5%	5.6%
Gross Inl Cons./GDP (toe/1990 MEUR)	1822.5	1695.5	1535.4	1452.9	1430.8	1385.7	-1.4%	-2.0%	-1.1%	-1.5%	-3.2%
Gross Inl Cons./Capita (toe/inhabitant)	0.35	0.38	0.42	0.47	0.49	0.49	1.6%	2.1%	2.1%	4.1%	0.5%
Electricity Generated/Capita (kWh/inhabitant)	174	240	341	450	460	na	6.7%	7.3%	5.7%	2.4%	na
CO2 Emissions/Capita (t of CO2/inhabitant)	0.4	0.6	0.7	0.9	0.9	na	5.4%	4.8%	4.6%	3.6%	na
Import Dependency (%)	9.7	5.7	8.3	11.5	12.6	14.3	-10.0%	7.5%	6.9%	9.7%	13.0%

(1) Includes nuclear. hydro and wind. net imports of electricity. and other energy sources.
(2) Estimates

PART IX LATIN AMERICA

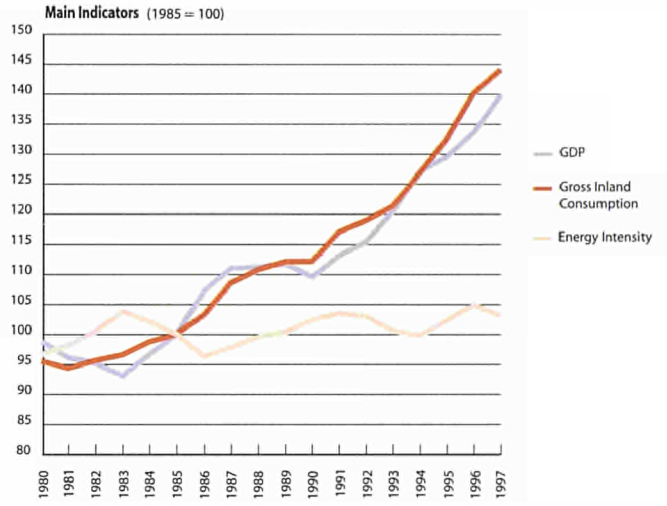
LATIN AMERICA: Recent evolution (1980-1997)

- GDP growth accelerated during the 1990's to peak at 4.3% in 1997
- Increasing final energy consumption, driven by growing economic activities, peaked in 1996
- The sectoral structure of final energy demand remained stable since 1980 though transportation was growing
- Electricity demand has doubled since 1980
- Gross Inland Consumption dominated by oil and renewable energy sources
- Hydrocarbon production boosted by technological improvements and privatisation
- Latin America represented only 3% of world's fossil fuel reserves
- Hydro dominated electricity generation but use of natural gas accelerated
- Privatisation and electricity reform measures continued apace in 1997
- Energy intensity peaked in 1996 at about the world average level
- CO_2 emissions have increased by 31% since 1990
- Oil accounted for 93% of increasing exports of energy

GDP growth accelerated during the 1990's to peak at 4.3% in 1997...

Latin America includes all the countries of Central and South America (excluding Mexico) and the Caribbean islands. It is a mix of large and medium sized countries, such as Brazil or Venezuela, located in South America and a multitude of smaller ones with different economic structures and energy resources, mainly located in Central America. Latin America experienced rather modest economic growth during the 1980's of about 1% per annum. GDP growth accelerated during the 1990's to peak at 4.3% in 1997. Economic growth was especially strong in Argentina, Peru, Chile and Venezuela. On the other hand, problems related to fiscal and monetary policies have prevented higher growth in Brazil, which accounts for one third of the region's total GDP. In 1997, the average GDP per capita in Latin America was 2.2 thousand 1990 EUR, or seven times less than the European average, but more than triple that of Asia.

A key aspect of the Latin American economy is the process of trade liberalisation. This has already had significant effects on economic and energy developments in the region. Many countries are striving to stabilise inflation and modernise their industries using imported technology and capital. Liberalisation is likely to have a significant impact on energy use, through upgrading the technological infrastructure of the region.



GDP PER CAPITA : REGION COMPARISON

Thousand 1990 EUR / inhabitant	1980	1985	1990	1994	1995	1996	1997
European Union	11.99	12.76	14.58	14.96	15.27	15.48	15.85
Middle East	4.08	3.09	2.60	2.54	2.54	2.58	2.59
Latin America	2.16	1.97	1.97	2.13	2.14	2.17	2.22
Central and Eastern Europe	1.85	1.92	1.84	1.53	1.61	1.67	1.72
CIS (1)	2.12	2.38	2.49	1.57	1.48	1.42	1.43
Asia	0.27	0.34	0.45	0.57	0.61	0.64	0.67
Africa	0.71	0.68	0.65	0.61	0.61	0.62	0.62

(1) Including Baltic countries for statistical reasons

ENERGY OUTLOOK

Increasing final energy demand, driven by growing economic activities, peaked in 1996...

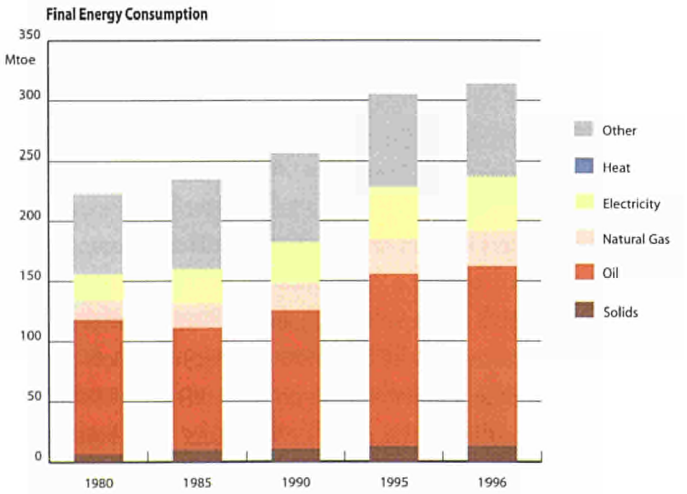
Final energy demand has increased steadily by about 1.4% per year during the 1980's, marked by a depressed economic situation, mainly during the first half of the decade. Since 1990, sustained by economic growth, final energy demand grew by 3.5% per year. The additional consumption was mainly covered by oil (57% of the overall increment), electricity (19%) and gas (13%) although

1 Excluding Mexico

biomass consumption stagnated due to the progressive stabilisation of the Brazilian alcohol programme resulting from market deregulation. This programme stimulated the development of biomass but has suffered from low oil prices on the international market since the beginning of the 1990's. One country, Brazil, accounted for about 43% of total final energy demand in Latin America and its share has been relatively stable since 1980. Argentina with 12% of total final consumption and Venezuela with 10% followed it. Therefore, developments in regional final energy demand were largely dominated by the evolution of Brazilian demand, except in the case of natural gas whose evolution was determined by Argentina and Venezuela which are also the region's main gas producers and consumers. In 1996, Brazil accounted for 72% of Latin America's total coal demand, with Colombia, Chile, and Argentina accounting for much of the remainder. In Brazil, the steel industry accounted for almost two-thirds of the country's total coal consumption, relying on imports of coking coal to produce coke for use in its blast furnaces.

The sectoral structure of final energy demand remained stable since 1980 though transportation was growing...

The sectoral composition of final energy consumption has remained largely unchanged since 1980. The industrial sector's share went from 39% in 1980 to 37% in 1996; transportation from 30% to 32% and the tertiary-domestic sector remained stable. This is the result of a number of phenomena. The share of industrial production in the gross domestic product remained stable, in spite of a marked reduction in major countries during the economic recession in the first half of the 1980's, although in other less developed regions this share was increasing. The share of energy-intensive industries was increasing as a result of the transfer of heavy industries from the industrialised countries. The increasing energy consumption per employee in the service sector follows improvements in infrastructure (buildings, computing facilities, air conditioning...). The evolution of tertiary-domestic energy demand depends on per capita income levels, the urbanisation rate and the speed of substitution of non-commercial fuels by commercial energy. In some Latin American countries, there has already been a restructuring of energy prices in recent years to



Main items

The continued trade liberalisation of many Latin American countries has underpinned their improving economic performance and their progressive transformation into more modern, industrialised economies. In particular, the MERCOSUR common market agreement – which came fully into force in 1995 - now embraces a free trade area of some 200 million people in Argentina, Brazil, Paraguay and Uruguay, with associate membership of Bolivia and Chile. Many countries are also in the midst of substantial internal reforms as a means of increasing the stability of their economies, reducing inflation and attracting inward investment. Central to these reforms have been moves to liberalise and privatise their energy sectors. Particularly rapid progress is being made to liberalise the electricity and downstream gas industries. Already some two-thirds of the region's electricity generation is based upon hydro power. Yet the region, and especially Brazil, has huge unexploited hydro-electricity potential which is being further developed by several large new projects. Gas production is rising very steeply, based upon expanding reserves in Argentina, Peru and Venezuela. Regional integration of electricity and gas networks is a marked feature of contemporary economic development. Venezuela, an OPEC member, has huge petroleum reserves especially in the form of heavy oil deposits; and Brazil is developing its large Campos off-shore oil basin. Vast, low-cost, near-surface coal deposits exist in Chile which has about 75% of regional coal reserves. Whilst regional coal production still remains low in global terms, exports are rising. This rapid expansion of a more modern energy supply base has reduced the regional significance of traditional biomass consumption, other than in the remoter rural areas. However, a distinctive characteristic of the Latin American regional energy balance (especially that of Brazil) is the industrial use of biomass in various forms - such as charcoal in steel making, bagasse in steam raising and sugar-cane alcohol in the transport sector.

bring them closer to international levels. In other countries, however, end-use energy prices remain below international levels. As in the OECD, the contribution of transport to final consumption of oil is close to 62%, reflecting traffic growth, especially in major cities (Sao Paulo, Rio de Janeiro and Buenos Aires...).

Transportation is the largest growth market in Central and South America, accounting for more than 80% of incremental oil demand since 1980. About 40% of the region's growth in transport oil demand occurred in Brazil, which has the largest population and economy in the region. Compared to other developing regions, Latin America has a relatively high degree of vehicle ownership, reflecting higher per capita incomes, high levels of urbanisation, a history of low, subsidised prices for transport fuels across the region and the large distance between cities. But there are large differences within the region and a substantial potential for increased vehicle ownership still exists as income rises.

Electricity demand has doubled since 1980...

Electricity demand grew by 4.7% on average since 1980, more than twice as fast as GDP. This growth led to a doubling of electricity demand since 1980. The share of electricity in final energy demand reached 15% in 1996 from 12% in 1985 and only 10% in 1980. In 1996, about 39% of this electricity was consumed in industry and 57% in the tertiary-domestic sector. In both sectors, but mainly in the tertiary-domestic sector, the share of electricity in total final demand was expanding, reflecting rising income levels, urbanisation, structural and technological shifts in the industrial sector and the increasing use of electrical appliances in the residential/commercial sector. In addition, the level of electrification varies widely throughout Latin America, as electricity's share in final energy demand ranged from 1.4% in Haiti to 18.9% in Uruguay. Broadly, electrification was somewhat lower in Central America (Costa-Rica and Jamaica excepted) than in South America.

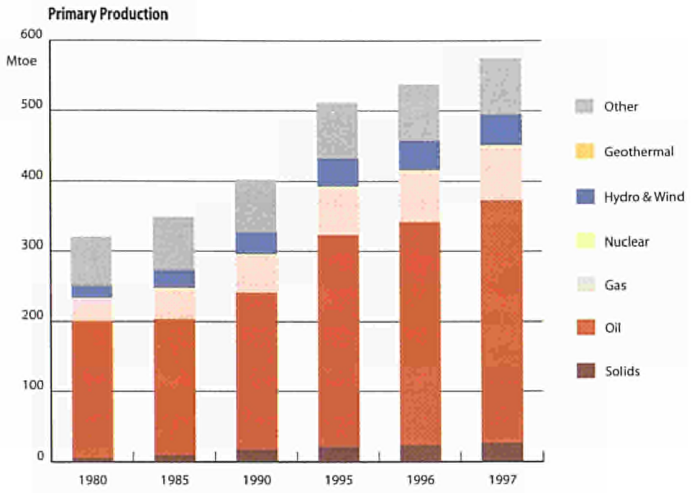
Gross Inland Consumption dominated by oil and renewable energy sources...

Gross inland energy consumption was dominated by oil (49% of the total in 1997 from 55% in 1980). Renewable energy sources, mainly biomass (81 Mtoe in 1997) and hydro (44 Mtoe in 1997), came second in satisfying 29% of total demand in 1997 as in 1980. Natural gas consumption more than doubled over the last fifteen years, representing 17% of the total in 1997 (11% in 1980). Solid fuels remained marginal with only 5% of the 1997 total, the bulk of consumption (63%) being located in Brazil. There is also some contribution from nuclear energy in Argentina and Brazil, but it represented less than 1% of the total in 1997. Since 1990, the incremental consumption of energy of about 97 Mtoe has been met by oil (55 %), natural gas (26%), hydro (13%) and biomass (5%), respectively, while solid fuels remained stable.

The predominance of oil in the overall energy balance, and the importance of hydro in the generation of electricity, are two striking features of the region as a whole. However, the energy systems of individual countries are quite distinct, with Argentina being one of the most gas-intensive countries in the world, while the energy sectors of the poorest countries are still dominated by biomass. In the near future, gas consumption - which increased by about 7.6% in 1996 and 6.1% in 1997 - will continue to expand rapidly. Several important pipelines were under construction in 1997. The first Uruguay-Argentina connection was at the point of becoming operational. Progress was also made on the Bolivia-to-Brazil line, as well as on two Argentina-to-Brazil lines. Negotiations were underway to build another pipeline connection between Argentina and Brazil via a planned 3,000 km Mercosur Pipeline. There are also several pipelines under construction between Argentina and Chile, in particular the Atacama pipeline which is expected to be used to fuel gas-fired electricity generating plant in Chile.

Hydrocarbon production boosted by technological improvements and privatisation...

Indigenous **energy production** has grown since 1980 by more than 3.5% per year on average, with an even more noticeable acceleration in 1996 (5.0%) and 1997 (7.0%). Production was dominated by oil (60% of the total in 1997) followed by biomass (14%), natural gas (13%), hydro and wind (8%), solid fuels (5%) and nuclear (less than 1%). In 1997, Venezuela accounted for 52% of oil and 36% of natural gas production in Latin America. Other major oil producers were Brazil (14%), Argentina (13%) and Columbia (10%). Over the past three years, Venezuela has raised both its oil production capacity and output by more than 10 Mtoe each year. The participation of foreign joint venture partners is a key element of Venezuela's plans to increase oil production. The partners are providing both investment capital and technical expertise. Other oil producers in Latin America have significant potential for increasing output over the next decade. Within 5 years, both Brazil and Colombia are expected to join the relatively short list of world-wide producers whose oil output exceeds 1 million barrels per day. Development of natural gas production and infrastructure has accelerated since the early 1990's under the pressure of both privatisation of former state gas companies and increasing private foreign investment in pipelines. At the same time, the libe-



ralisation of energy markets in South America as a whole has given Argentina an opportunity to supply growing gas demand in Brazil, Chile and Uruguay. Brazil was mainly responsible for hydro and biomass production (54% and 48% respectively of the region's production). Finally, several new low-cost coal producers, including Colombia and Venezuela, have expanded coal production in recent years and are rapidly penetrating world coal markets.

Latin America represented only 3% of world's fossil fuel reserves...

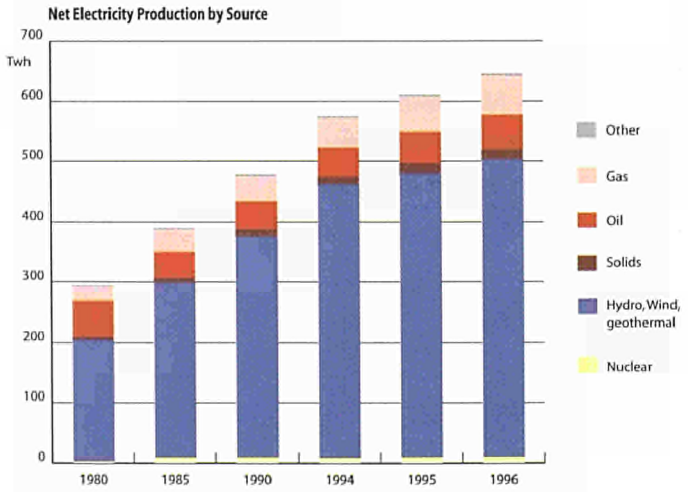
Latin America's oil reserves at end 1997 amounted to about 8.3% of world reserves, with a major part (7%) located in Venezuela, the only OPEC member in this region. If its extra-heavy deposits in the Orinoco belt are included in reserves, then its total oil resources are comparable to those of Saudi Arabia. The region's oil reserves/production ratio reached 37.5 years, roughly the world average. 4.4% of world gas reserves are also concentrated in Venezuela, the major regional producer together with Argentina. Finally, coal reserves, mainly located in Colombia and Brazil, accounted for only 1% of world's reserves. As a result of this, Latin America represented only 3% of world's fossil fuel reserves.

Hydro dominated electricity generation but use of natural gas accelerated...

Electricity generation in the region grew steadily by 5.0% per year on average in the period 1980-1996. Hydroelectric dams remained the dominant source of electricity generation in Central and South America with 75% of total output in 1996 (67% in 1980). Brazil supplied more than half of hydro production. Thermal generation, 24% of total generation in 1996, has grown by 1.7% on average during the 1980's but by 5.4% on average since 1990. Input needs are covered mainly by oil (35% in 1996) and gas (42% in 1996) followed by solid fuels (11%) and biomass (8%). Oil has been a significant fuel in electricity generation but its importance has been declining. Its share of thermal generation fell from about 60% in 1980 to 35% in 1996. In place of oil, gas-fired generation is becoming increasingly popular, based on increased exploitation of the region's gas reserves (particularly in Venezuela and Argentina), development of infrastructure to deliver gas across Latin America as well as growing environmental concerns. Because heavy dependence on the hydroelectric resources in the region has led to problems in maintaining electricity supplies in times of drought, major South American countries have been attempting to construct a natural gas infrastructure to develop gas-firing capacity. Several major natural gas-fired projects are currently under construction, and more are planned in anticipation of completion of major gas pipeline agreements signed in 1996 for lines connecting Bolivia and Brazil, Venezuela and Brazil, and Argentina and Chile, as well as other projects expanding gas grids within individual countries.

Privatisation and electricity reform measures continued apace in 1997...

Central and South America was an early pioneer in the privatisation of electricity and the implementation of electricity reforms. In 1997, Brazil followed the path, first of Chile and later of Argentina, in aggressively selling off state-owned electricity assets to the private sector. Several other Latin American countries (Columbia, Peru...) have also privatised electricity assets. Central and South American energy needs have given rise to regional, cross-border investment, development and trade in electricity and natural gas.



Uruguay, in an attempt to establish itself as a hub of regional electricity trade, is promoting a number of transmission and generation projects that would connect Argentina and Brazil through Uruguay. In 1997, the National Grid Company of the United Kingdom announced plans to build a transmission line between the Argentine coast and the Andes. Venezuela also intends to export electricity to Brazil; and Venezuela's Edelca has proposed the construction of a 4,160 km line linking the two countries. There is also a regional electricity grid evolving in Central America, although at a somewhat hesitant pace. In December 1995, the presidents of Costa-Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama endorsed a proposal to construct a 1,500 km transmission line connecting Guatemala, Honduras and Panama.

The total generation capacity reached 153 GWe in 1996, of which 67% was hydro (56% in 1980), 32% thermal units (43% in 1980) and 1% nuclear. Since 1980, new plant commissioning has been shared between hydro for 59 GWe (78% of the total), thermal for 15 GWe and nuclear for 1 GWe. Many countries of Central and South America rely heavily on hydroelectricity for electricity generation. In Brazil, 86% of the installed capacity consists of hydropower. Hydro also accounted for 50% or more of the total installed capacity in Chile, Colombia, Paraguay, Peru and Venezuela. Although many of the region's hydroelectric resources have been developed, there are still plans to add substantial further hydro capacity in the near future: about 5 GWe in Brazil, 0.5 GWe in Argentina and 0.6 GWe in Chile. The region's unexploited hydro potential remains, with Asia, the largest in the world.

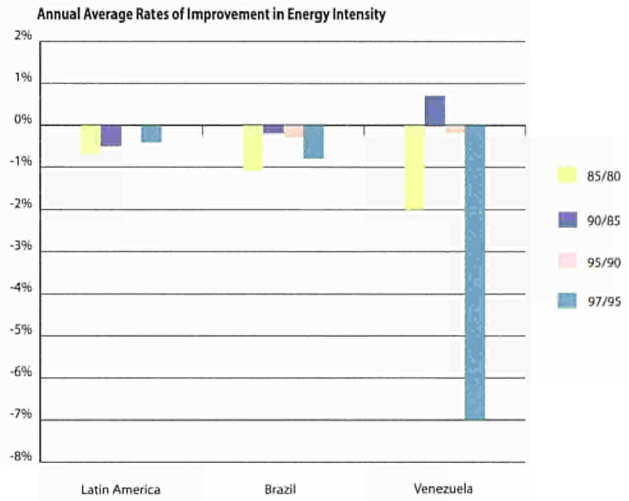
Refining capacity increasing slowly...

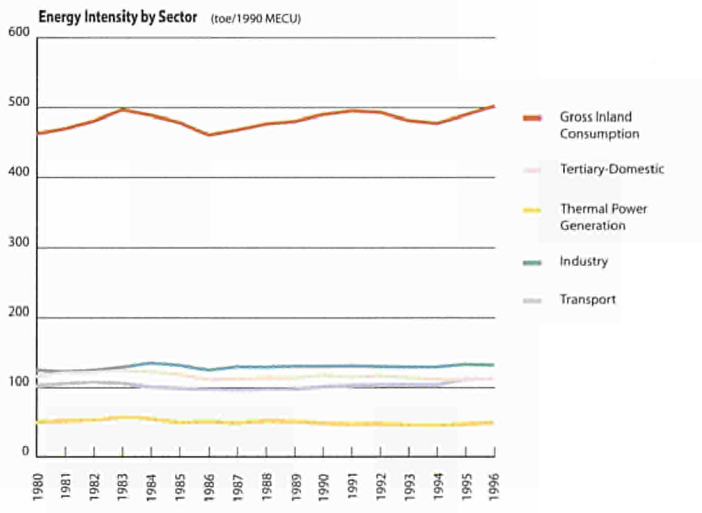
In 1997, the regional **refinery capacity** (6.37 million barrels or a 3.1% increase over 1996) represented 8.0% of world capacity (9.3% in 1980). Whereas about 2 million barrels day of refining capacity was closed in the first half of the 1980's, since 1985 the installed capacity has grown by about 1.0% per year on average. But the utilisation rate of the refineries (80% in 1997 from 75% in 1985) increased more slowly than the world average (84% in 1997 from 74% in 1985).

COMPETITIVENESS

Energy intensity peaked in 1996 at about the world average level...

The **energy intensity** indicator for the region evolved differently in the period 1980-1997. It increased by 0.7% per year over the period 1980-1985, by 0.5% over the period 1986-1990, decreased by 0.6% on average between 1990 and 1994 but rebounded in 1995 and 1996 by 2.5% to peak at 502 toe/million 1990_, a little above the world average. Energy intensity declined by 1.8% in 1997 to be close to the 1990 value. This reflects contrasting economic conditions in the region since 1980. The economic recession in the early 1980's, through lower utilisation of industrial capacity, induced increasing energy intensity of industry. At the same time, development of services and improving standards of living stimulated energy consumption in the tertiary-domestic sector, although gross domestic production remained flat. Between 1986 and 1990, the restoration of economic growth resulted in a declining industrial energy intensity due to the acceleration of investment. This is despite the development of energy-intensive industries which have been relocated from the OECD countries. At the same time, the negative impact of the tertiary-domestic sector continued, reinforced by the transport sector where motorization accelerated. Finally, since 1990, the increasing





LATIN AMERICA : ENERGY INTENSITY

toe/1990 MEUR	1980	1985	1990	1995	1996	1997 (1)
Latin America	462.3	478.4	489.6	489.3	501.7	492.8
Argentina	343.9	377.7	390.1	393.6	396.1	366.2
Brazil	338.4	356.8	361.0	365.7	372.3	371.8
Colombia	847.1	875.0	845.9	777.9	777.5	753.9
Venezuela	995.4	1097.0	1059.9	1070.0	1248.5	1225.1

(1) estimates

energy intensity of the transport sector compensated largely for the gains observed in the tertiary-domestic sector while energy intensity in industry fluctuated with economic activity.

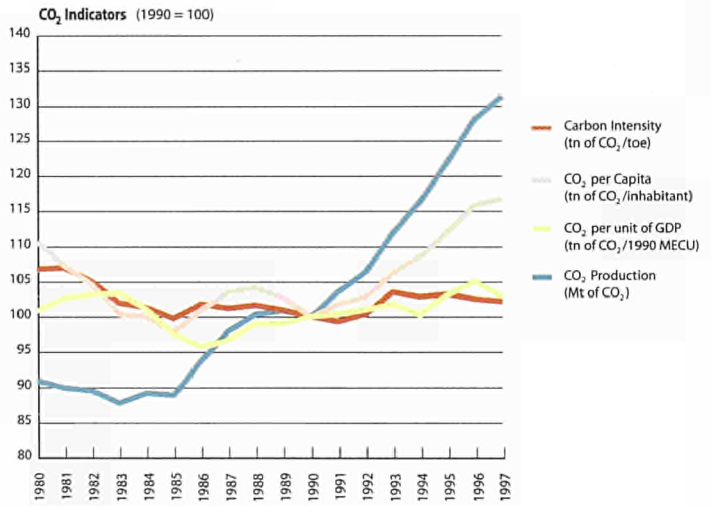
Energy intensity analysis by country showed significant national differences within the region. Argentina and Brazil, amongst the more developed countries, were characterised by energy intensities of around 375 toe/1990 MEUR, comparable with some OECD countries. In contrast, Venezuela and many Central America countries have energy intensities three to five times higher, in line with levels observed in developing countries. The energy consumption per capita, quite stable during the 1980's, has been increasing since 1990, growing by 4.1% in 1996 and 1.1% in 1997. By sector, increasing trends appeared clearly since 1985 in transport and since 1990 in the tertiary-domestic sector due to improving living standards and greater motorization. Nevertheless, the per capita consumption in 1996 remained well below the European level with only 40% for industry, 32% for transport and only 23% for tertiary and domestic sector.

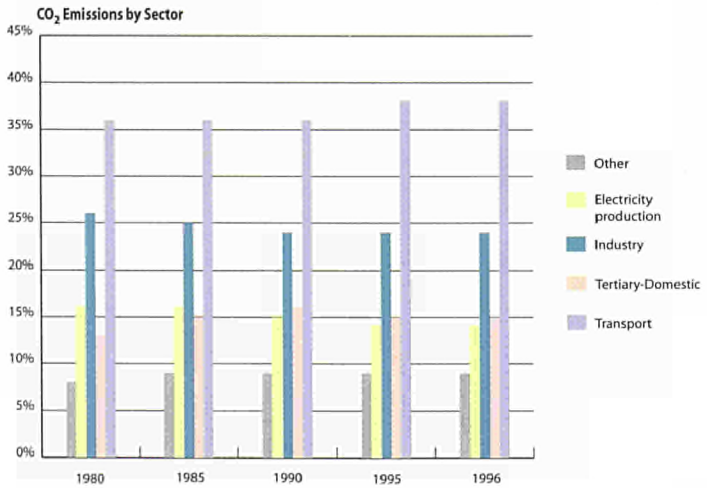
ENVIRONMENT

CO_2 emissions increased by 31% since 1990...

In broad terms, CO_2 emissions have been continuously increasing since 1980 (781 million tonnes of CO_2 in 1997, compared to 595 million tonnes in 1990, 529 million tonnes in 1985 and 541 million tonnes in 1980). Major contributors were Brazil (33% of the total in 1996), Argentina (16%) and Venezuela (16%). Whereas CO_2 emissions increased annually by 1.0% on average during the 1980's, emissions growth has accelerated significantly to reach 4.0% per year on average since 1990 due to the fact that fossil fuels have accounted for 82% of the region's incremental energy consumption since 1990. This evolution, quite disturbing in the post-Kyoto context, was reinforced by other indicators. CO_2 emissions per capita decreased by 1.0% per year during the 1980's but increased by 2.5% since 1990 and the movement was accelerating. CO_2 intensity per unit of GDP, quite stable during the 1980's, grew by about 0.8% per year on average over the last six years. Finally, only the carbon intensity has been stable since 1980.

Looking at CO_2 emissions by sector at a regional level, the largest sector is transport. It easily occupied the first place with about 38% of total emissions in 1996 against 36% in 1980. Industry accounted for about 24%, decreasing slowly since 1980 (26%). The tertiary-domestic sector was quite stable at about 15%, the same share as the electricity generation sector. Since 1990, about 44% of incremental CO_2 emissions have arisen from the transport sector, 24% from industry, 12% from the power sector, 10% from the tertiary-domestic sector and 10% from the energy branch (hydrocarbon production and transformation).





GLOBAL MARKETS

Oil accounted for 93% of increasing exports of energy...

Over the whole period, Latin America was increasingly a net **exporter of energy**. Oil accounted for 93% of total energy exports in 1997 (123 Mtoe compared with 28 Mtoe in 1980), of which three quarters consisted of crude oil and one quarter of refined products. Since 1980 crude exports have multiplied by four, although exports of refined products have halved. In 1997, net oil exports of Venezuela, a founding member of OPEC, represented more than the net total oil exports of the region, with Argentina and Colombia also increasing their contribution since the beginning of the 1990's. Oil exports are mainly oriented towards the United States (83% of the total), Western Europe being the second largest export destination with only 7% in 1997. Brazil, the second largest oil producer of the region, still imports almost twice its own national production mainly from the Middle East and West Africa. Despite the limited production of solid fuels, the region became a net exporter in 1990, due to the efforts made by Columbia to exploit its reserves. But net regional exports of coal remained small as Brazil absorbed a large part of the coal available on the regional market.

LATIN AMERICA : NET OIL IMPORTS

Mtoe	1980	1985	1990	1995	1996	1997
Latin America	-27.7	-43.5	-51.0	-101.5	-99.3	-122.7
Argentina	1.3	-3.7	-4.8	-14.4	-18.1	-21.7
Brazil	44.6	23.3	30.7	35.9	41.5	40.2
Colombia	1.3	-0.7	-11.5	-17.0	-18.5	-20.0
Venezuela	-98.2	-71.7	-86.2	-134.4	-135.4	-155.7

(1) estimates

LATIN AMERICA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	319.9	350.8	403.8	513.5	539.4	577.0	1.9%	2.9%	4.9%	5.0%	7.0%
Solids	6.2	10.5	18.3	22.6	24.4	27.7	11.2%	11.6%	4.3%	8.3%	13.3%
Oil	194.0	192.0	222.9	299.9	316.8	344.0	-0.2%	3.0%	6.1%	5.6%	8.6%
Natural gas	32.8	43.1	52.0	67.3	72.2	76.7	5.6%	3.9%	5.3%	7.4%	6.2%
Nuclear	0.6	2.4	2.5	2.5	2.6	2.9	31.3%	0.8%	0.1%	3.2%	14.1%
Hydro & Wind	17.2	24.6	31.2	40.2	42.0	43.6	7.4%	4.8%	5.2%	4.7%	3.6%
Geothermal	0.4	0.8	0.9	0.8	0.8	0.8	14.1%	1.2%	-0.6%	-2.7%	0.0%
Other	68.7	77.4	76.1	80.2	80.4	81.4	2.4%	-0.3%	1.0%	0.3%	1.2%
Net Imports	-22.6	-38.8	-51.7	-103.7	-103.5	-132.8	11.4%	5.9%	14.9%	-0.2%	28.4%
Solids	5.1	5.0	-0.6	-2.0	-4.2	-10.0	-0.4%	-	26.3%	112.8%	141.1%
Oil	-27.7	-43.5	-51.0	-101.5	-99.3	-122.7	9.4%	3.2%	14.7%	-2.2%	23.6%
Crude oil	31.2	-6.4	-14.0	-78.4	-76.1	na	-	16.9%	41.2%	-2.9%	na
Oil products	-58.9	-37.1	-37.1	-23.1	-23.1	na	-8.8%	0.0%	-9.0%	0.2%	na
Natural gas	0.0	-0.1	-0.2	-0.1	0.0	0.0	30.5%	34.8%	-8.6%	-94.1%	327.6%
Electricity	0.0	-0.3	0.2	0.0	0.0	0.0	90.3%	-	-	-23.3%	30.3%
Gross Inland Consumption	288.8	302.4	339.1	400.9	423.9	435.8	0.9%	2.3%	3.4%	5.7%	2.8%
Solids	11.0	15.7	17.2	19.3	20.2	17.7	7.5%	1.7%	2.4%	4.6%	-12.3%
Oil	158.2	138.8	159.5	190.8	205.7	212.8	-2.6%	2.8%	3.6%	7.8%	3.5%
Natural gas	32.8	43.0	51.8	67.1	72.2	76.6	5.6%	3.8%	5.3%	7.6%	6.1%
Other (1)	86.9	104.9	110.6	123.7	125.9	128.7	3.8%	1.1%	2.3%	1.7%	2.2%
Electricity Generation in TWh	299.4	396.0	486.5	620.1	656.1	na	5.7%	4.2%	5.0%	5.8%	na
Nuclear	2.3	9.1	9.5	9.6	9.9	na	31.3%	0.8%	0.1%	3.2%	na
Hydro & wind	199.9	286.0	362.3	467.2	489.0	na	7.4%	4.8%	5.2%	4.7%	na
Thermal	97.2	100.8	114.7	143.4	157.3	na	0.7%	2.6%	4.6%	9.7%	na
Generation Capacity in GWe	77.4	106.9	129.5	146.1	152.6	na	6.7%	3.9%	2.4%	4.5%	na
Nuclear	0.4	1.7	1.7	1.7	1.7	na	35.3%	0.0%	0.0%	0.0%	na
Hydro & wind	43.4	62.5	85.2	96.7	102.2	na	7.6%	6.4%	2.6%	5.7%	na
Thermal	33.6	42.7	42.6	47.7	48.8	na	4.9%	0.0%	2.3%	2.2%	na
Average Load Factor in %	44.2	42.3	42.9	48.5	49.1	na	-0.9%	0.3%	2.5%	1.3%	na
Fuel Inputs for Thermal Power Generation	31.4	31.6	34.0	39.0	41.8	na	0.1%	1.5%	2.8%	7.0%	na
Solids	2.3	3.1	4.1	4.7	4.8	na	5.9%	5.7%	2.9%	2.9%	na
Oil	18.5	13.2	13.2	14.0	14.8	na	-6.5%	0.0%	1.1%	6.0%	na
Gas	8.2	11.9	13.1	16.3	17.7	na	7.6%	1.9%	4.5%	8.9%	na
Geothermal	0.4	0.8	0.9	0.8	0.8	na	14.1%	1.2%	-0.6%	-2.7%	na
Other	1.9	2.6	2.7	3.2	3.5	na	6.0%	1.2%	3.1%	10.2%	na
Average Thermal Efficiency in %	26.6	27.4	29.0	31.6	32.4	na	0.6%	1.1%	1.7%	2.5%	na
Non-Energy Uses	12.2	18.5	22.1	26.6	27.8	na	8.6%	3.7%	3.7%	4.5%	na
Total Final Energy Demand	222.4	234.2	254.9	304.5	313.4	na	1.0%	1.7%	3.6%	3.0%	na
Solids	7.0	10.4	11.2	13.2	13.8	na	8.3%	1.6%	3.3%	4.1%	na
Oil	111.2	100.8	114.6	142.3	147.9	na	-1.9%	2.6%	4.4%	4.0%	na
Gas	15.9	20.1	21.8	28.9	29.6	na	4.8%	1.6%	5.7%	2.6%	na
Electricity	21.6	28.0	34.0	43.1	45.2	na	5.3%	3.9%	4.9%	5.0%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	66.7	74.8	73.2	77.0	76.9	na	2.3%	-0.4%	1.0%	-0.1%	na
CO_2 Emissions in Mt of CO_2	541.1	529.2	595.1	726.0	762.5	781.3	-0.4%	2.4%	4.1%	5.0%	2.5%
Indicators											
Population (Million)	289.29	320.76	352.34	383.71	389.93	396.41	2.1%	1.9%	1.7%	1.6%	1.7%
GDP (index 1985=100)	98.8	100.0	109.6	129.6	133.7	139.9	0.2%	1.8%	3.4%	3.1%	4.6%
Gross Inl Cons./GDP (toe/1990 MEUR)	462.3	478.4	489.6	489.3	501.7	492.8	0.7%	0.5%	0.0%	2.5%	-1.8%
Gross Inl Cons./Capita (toe/inhabitant)	1.00	0.94	0.96	1.04	1.09	1.10	-1.1%	0.4%	1.7%	4.1%	1.1%
Electricity Generated/Capita (kWh/inhabitant)	1035	1234	1381	1616	1683	na	3.6%	2.3%	3.2%	4.1%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	1.9	1.6	1.7	1.9	2.0	2.0	-2.5%	0.5%	2.3%	3.3%	0.8%
Import Dependency (%)	-7.6	-12.5	-15.0	-25.4	-24.0	-30.1	10.4%	3.7%	11.1%	-5.5%	25.5%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

LATIN AMERICA : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
							Annual % Change			
Gross Inland Consumption (Mtoe)	288.8	302.4	339.1	383.6	400.9	423.9	0.9%	2.3%	3.4%	5.7%
Public Thermal Power Generation	22.6	21.8	24.0	25.7	28.5	30.7	-0.7%	1.9%	3.5%	7.8%
Autoprod. Thermal Power Generation	8.4	9.0	9.2	10.3	9.7	10.2	1.2%	0.5%	1.2%	5.3%
Energy Branch	17.1	17.7	21.0	26.6	24.4	27.7	0.7%	3.5%	3.0%	13.4%
Final Energy Consumption	214.0	220.4	241.1	275.5	291.1	300.1	0.6%	1.8%	3.8%	3.1%
Industry	77.8	83.3	90.1	103.8	108.9	111.5	1.4%	1.6%	3.9%	2.3%
Transport	63.8	62.5	70.0	82.7	90.7	94.3	-0.4%	2.3%	5.3%	4.0%
Tertiary-Domestic	72.4	74.6	81.0	88.9	91.5	94.3	0.6%	1.7%	2.5%	3.0%
Energy Intensity (toe/1990 MEUR)	462.3	478.4	489.6	477.3	489.3	501.7	0.7%	0.5%	0.0%	2.5%
Public Thermal Power Generation	36.2	34.6	34.6	32.0	34.8	36.3	-0.9%	0.0%	0.1%	4.5%
Autoprod. Thermal Power Generation	13.5	14.2	13.2	12.9	11.8	12.1	1.0%	-1.4%	-2.2%	2.2%
Industry	124.6	131.7	130.1	129.2	132.9	131.9	1.1%	-0.2%	0.4%	-0.8%
Transport	102.2	98.9	101.0	103.0	110.7	111.6	-0.7%	0.4%	1.9%	0.8%
Tertiary-Domestic	115.8	117.9	116.9	110.6	111.6	111.5	0.4%	-0.2%	-0.9%	-0.1%
Energy per Capita (Kgoe/inhabitant)	998	943	963	1016	1045	1087	-1.1%	0.4%	1.7%	4.1%
Industry	269	260	256	275	284	286	-0.7%	-0.3%	2.1%	0.7%
Transport	221	195	199	219	236	242	-2.4%	0.4%	3.6%	2.3%
Tertiary-Domestic	250	232	230	236	238	242	-1.5%	-0.2%	0.7%	1.4%
Electricity Share (%)										
Final Energy Consumption	10.1%	12.7%	14.1%	14.7%	14.8%	15.1%	4.7%	2.1%	1.0%	1.8%
Industry	14.4%	17.6%	18.5%	18.6%	18.3%	18.5%	4.0%	1.1%	-0.3%	0.8%
Transport	0.2%	0.2%	0.3%	0.2%	0.2%	0.2%	6.3%	1.4%	-7.0%	3.6%
Tertiary-Domestic	14.1%	17.7%	21.1%	23.7%	25.1%	25.9%	4.6%	3.5%	3.5%	3.3%
Total Renewable Consumption (Mtoe)	86.3	102.8	108.0	118.5	121.2	123.3	3.6%	1.0%	2.3%	1.7%
Hydro	17.2	24.6	31.2	38.7	40.2	42.0	7.4%	4.8%	5.2%	4.7%
Biomass	68.7	77.4	75.9	78.9	80.2	80.4	2.4%	-0.4%	1.1%	0.3%
Other	0.4	0.8	0.9	0.9	0.8	0.8	14.1%	1.2%	-0.6%	-2.7%
Renewable intensity (toe/1990MEUR)	138.1	162.7	155.9	147.5	148.0	145.9	3.3%	-0.8%	-1.0%	-1.4%
Renewable per capita (Kgoe/inhabitant)	298.2	320.6	306.5	314.0	316.0	316.2	1.5%	-0.9%	0.6%	0.1%
CO_2 Emissions (Mt of CO_2)	541.1	529.2	595.1	692.3	726.0	762.5	-0.4%	2.4%	4.1%	5.0%
Public Thermal Power Generation	67.4	63.7	70.2	74.4	82.9	89.3	-1.1%	1.9%	3.4%	7.8%
Autoprod. Thermal Power Generation	19.3	19.0	19.3	21.9	19.6	19.9	-0.3%	0.4%	0.3%	1.6%
Energy Branch	45.8	45.7	54.6	69.4	62.2	70.5	-0.1%	3.6%	2.6%	13.3%
Industry	141.2	131.3	142.2	166.7	175.4	182.4	-1.4%	1.6%	4.3%	4.0%
Transport	195.6	191.4	214.0	252.9	277.4	288.4	-0.4%	2.3%	5.3%	4.0%
Tertiary-Domestic	71.9	78.1	94.6	107.0	108.5	111.9	1.7%	3.9%	2.8%	3.1%
Carbon Intensity (tn of CO_2/toe)	1.9	1.7	1.8	1.8	1.8	1.8	-1.4%	0.1%	0.6%	-0.7%
Public Power Generation	1.7	1.3	1.2	1.1	1.2	1.2	-4.9%	-1.4%	-0.9%	1.9%
Public Thermal Power Generation	3.0	2.9	2.9	2.9	2.9	2.9	-0.5%	0.1%	-0.1%	-0.1%
Autoprod. Power Generation	2.2	2.0	2.0	2.0	1.9	1.8	-1.6%	0.0%	-0.9%	-3.6%
Autoprod. Thermal Power Generation	2.3	2.1	2.1	2.1	2.0	1.9	-1.5%	-0.1%	-0.9%	-3.6%
Energy Branch	2.7	2.6	2.6	2.6	2.6	2.5	-0.7%	0.1%	-0.3%	-0.1%
Industry	1.8	1.6	1.6	1.6	1.6	1.6	-2.8%	0.0%	0.4%	1.6%
Transport	3.1	3.1	3.1	3.1	3.1	3.1	0.0%	0.0%	0.0%	0.0%
Tertiary-Domestic	1.0	1.0	1.2	1.2	1.2	1.2	1.1%	2.2%	0.3%	0.1%
CO_2 per Capita (kg of CO_2/inhabitant)	1870	1650	1689	1834	1892	1955	-2.5%	0.5%	2.3%	3.3%
Industry	488	409	404	442	457	468	-3.5%	-0.3%	2.5%	2.3%
Transport	676	597	608	670	723	740	-2.5%	0.4%	3.5%	2.3%
Tertiary-Domestic	248	243	269	283	283	287	-0.4%	2.0%	1.0%	1.5%
CO_2 per unit of GDP (tn of CO_2/1990 MEUR)	866	837	859	862	886	902	-0.7%	0.5%	0.6%	1.8%
Public Thermal Power Generation	108	101	101	93	101	106	-1.3%	0.1%	0.0%	4.5%
Autoprod. Thermal Power Generation	31	30	28	27	24	24	-0.6%	-1.4%	-3.0%	-1.5%
Energy Branch	73	72	79	86	76	83	-0.3%	1.8%	-0.8%	9.9%
Industry	226	208	205	207	214	216	-1.7%	-0.2%	0.8%	0.8%
Transport	313	303	309	315	339	341	-0.7%	0.4%	1.8%	0.8%
Tertiary-Domestic	115	123	137	133	132	132	1.4%	2.0%	-0.6%	0.0%

BRAZIL : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	62.1	95.2	99.1	106.4	112.3	116.3	8.9%	0.8%	1.4%	5.5%	3.5%
Solids	2.5	3.5	1.9	2.0	1.9	2.1	7.1%	-11.5%	1.2%	-7.1%	15.1%
Oil	9.3	28.6	35.2	37.9	42.9	45.1	25.1%	4.2%	1.5%	13.4%	4.9%
Natural gas	1.0	2.2	3.3	4.3	4.8	5.0	17.4%	8.3%	5.0%	12.0%	5.6%
Nuclear	0.0	0.9	0.6	0.7	0.6	0.8	-	-7.9%	2.4%	-3.6%	30.4%
Hydro & Wind	11.1	15.3	17.8	21.8	22.9	24.0	6.7%	3.0%	4.2%	4.7%	5.0%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	38.2	44.7	40.4	39.8	39.3	39.2	3.2%	-2.0%	-0.3%	-1.4%	-0.2%
Net Imports	48.2	29.5	40.9	48.9	54.7	53.4	-9.4%	6.8%	3.6%	11.9%	-2.3%
Solids	3.7	5.9	7.9	9.9	10.0	9.9	10.2%	5.7%	4.8%	1.0%	-1.1%
Oil	44.6	23.3	30.7	35.9	41.5	40.2	-12.1%	5.7%	3.1%	15.6%	-3.0%
Crude oil	43.4	27.4	31.0	26.8	30.5	na	-8.8%	2.5%	-2.9%	14.0%	na
Oil products	1.2	-4.1	-0.2	9.1	11.0	na	-	-43.1%	-	20.3%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	0.2	-	-	-	-	-
Electricity	0.0	0.2	2.3	3.0	3.1	3.0	-	69.2%	5.9%	3.4%	-3.3%
Gross Inland Consumption	109.6	122.1	135.9	155.7	163.1	168.1	2.2%	2.2%	2.8%	4.8%	3.1%
Solids	5.8	9.9	9.4	11.7	12.1	12.1	11.1%	-0.9%	4.5%	2.9%	0.0%
Oil	53.5	48.9	62.1	74.3	80.4	83.8	-1.8%	4.9%	3.6%	8.1%	4.2%
Natural gas	1.0	2.2	3.3	4.3	4.8	5.2	17.4%	8.3%	5.0%	12.0%	9.6%
Other (1)	49.3	61.1	61.0	65.3	65.9	67.0	4.4%	0.0%	1.4%	0.9%	1.8%
Electricity Generation in TWh	139.4	193.7	222.8	275.6	289.8	na	6.8%	2.8%	4.3%	5.1%	na
Nuclear	0.0	3.4	2.2	2.5	2.4	na	-	-7.9%	2.4%	-3.6%	na
Hydro & wind	128.9	178.4	206.7	253.9	265.8	na	6.7%	3.0%	4.2%	4.7%	na
Thermal	10.5	11.9	13.9	19.2	21.6	na	2.6%	3.1%	6.7%	12.4%	na
Generation Capacity in GWe	33.3	44.1	53.1	59.0	60.8	na	5.8%	3.8%	2.2%	2.9%	na
Nuclear	0.0	0.7	0.7	0.7	0.7	na	-	0.0%	0.0%	0.0%	na
Hydro & wind	27.5	37.1	45.6	51.3	53.1	na	6.1%	4.2%	2.4%	3.4%	na
Thermal	5.8	6.4	6.8	7.1	7.0	na	2.0%	1.4%	0.7%	-0.3%	na
Average Load Factor in %	47.8	50.1	47.9	53.3	54.5	na	1.0%	-0.9%	2.1%	2.2%	na
Fuel Inputs for Thermal Power Generation	2.6	3.1	3.5	4.9	5.3	na	3.7%	2.5%	6.9%	9.2%	na
Solids	0.8	1.2	1.1	1.4	1.4	na	8.8%	-2.3%	5.6%	-0.5%	na
Oil	1.3	1.0	1.3	1.9	2.2	na	-4.7%	4.4%	9.0%	13.9%	na
Gas	0.0	0.0	0.1	0.2	0.2	na	-	-	19.9%	24.6%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.5	0.9	1.1	1.3	1.5	na	12.0%	4.8%	4.3%	10.5%	na
Average Thermal Efficiency in %	35.1	33.3	34.2	34.0	35.0	na	-1.0%	0.5%	-0.1%	3.0%	na
Non-Energy Uses	6.7	12.3	14.9	16.5	17.2	na	13.1%	3.9%	2.1%	4.3%	na
Total Final Energy Demand	96.9	102.6	110.1	127.3	132.2	na	1.2%	1.4%	2.9%	3.9%	na
Solids	4.1	7.0	7.4	9.6	10.0	na	11.3%	0.9%	5.5%	3.9%	na
Oil	44.2	36.1	43.7	54.9	58.7	na	-4.0%	3.9%	4.6%	7.0%	na
Gas	0.6	1.2	1.6	2.3	2.6	na	16.0%	5.5%	6.9%	15.9%	na
Electricity	10.2	14.4	18.1	22.1	23.1	na	7.1%	4.7%	4.0%	4.5%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	37.7	43.9	39.3	38.5	37.8	na	3.1%	-2.2%	-0.4%	-1.8%	na
CO_2 Emissions in Mt of CO_2	167.9	158.4	189.5	238.5	254.2	na	-1.2%	3.7%	4.7%	6.6%	na
Indicators											
Population (Million)	121.29	135.26	148.00	159.22	161.37	163.60	2.2%	1.8%	1.5%	1.3%	1.4%
GDP (index 1985=100)	94.7	100.0	110.0	124.4	128.0	132.1	1.1%	1.9%	2.5%	2.9%	3.2%
Gross Inl Cons./GDP (toe/1990 MEUR)	338.4	356.8	361.0	365.7	372.3	371.8	1.1%	0.2%	0.3%	1.8%	-0.1%
Gross Inl Cons./Capita (toe/inhabitant)	0.90	0.90	0.92	0.98	1.01	1.03	0.0%	0.3%	1.3%	3.4%	1.6%
Electricity Generated/Capita (kWh/inhabitant)	1149	1432	1506	1731	1796	na	4.5%	1.0%	2.8%	3.7%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	1.4	1.2	1.3	1.5	1.6	na	-3.3%	1.8%	3.2%	5.2%	na
Import Dependency (%)	43.3	23.6	29.7	31.0	33.1	31.3	-11.5%	4.7%	0.8%	6.7%	-5.3%

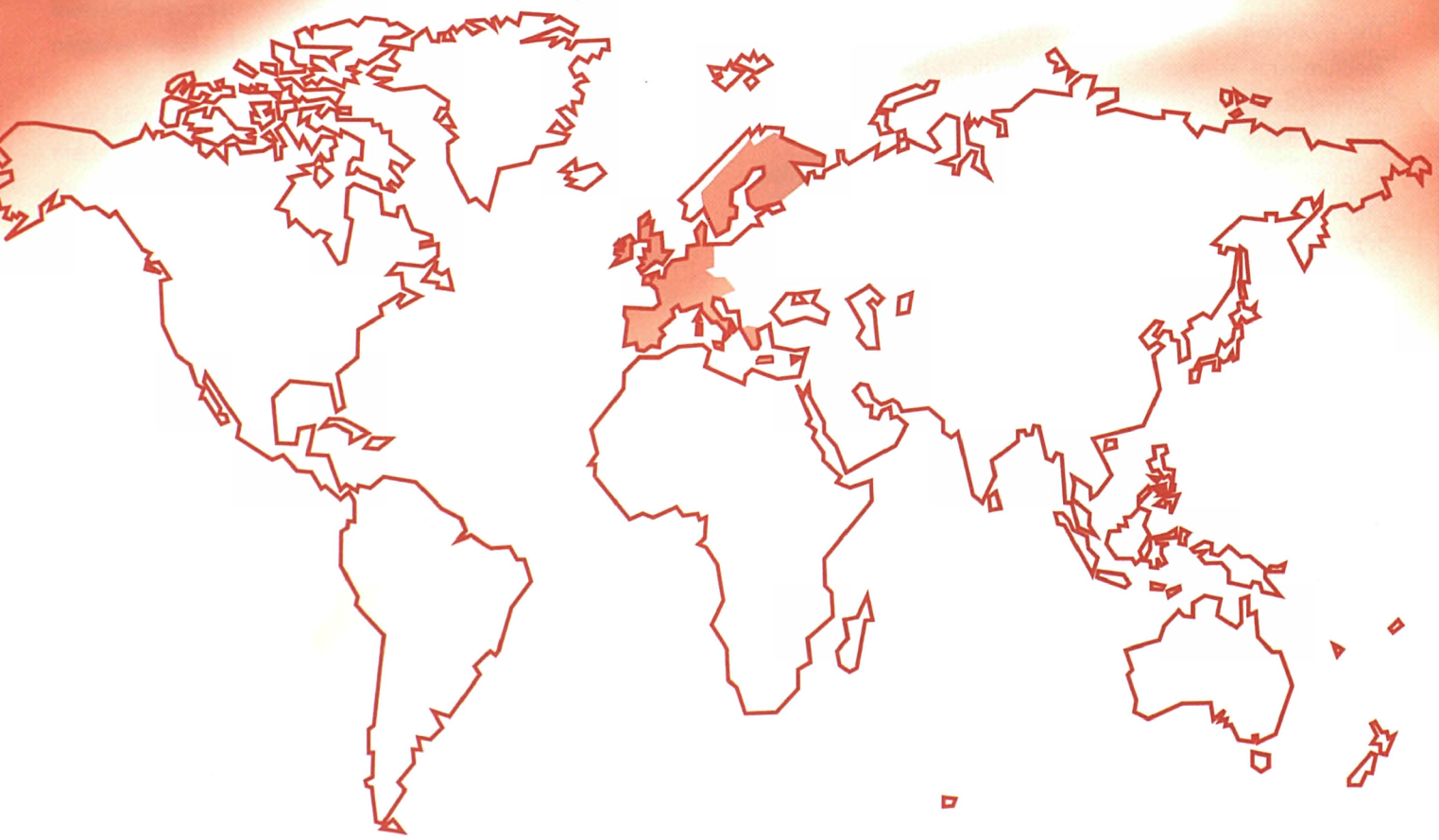
(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

VENEZUELA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	132.9	111.2	130.8	187.1	194.0	216.9	-3.5%	3.3%	7.4%	3.7%	11.8%
Solids	0.0	0.0	1.3	2.9	2.1	3.4	0.0%	120.5%	16.2%	-24.9%	59.4%
Oil	116.8	91.0	105.7	154.2	160.4	180.6	-4.9%	3.1%	7.8%	4.1%	12.6%
Natural gas	14.8	18.3	20.2	25.1	26.3	27.4	4.3%	2.0%	4.5%	4.7%	4.2%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Hydro & Wind	1.3	1.9	3.2	4.4	4.6	5.0	9.2%	10.3%	6.8%	4.7%	7.0%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	0.0	0.0	0.3	0.5	0.5	0.6	-15.1%	118.9%	10.1%	0.0%	10.1%
Net Imports	-98.1	-71.6	-87.3	-137.1	-137.4	-159.0	-6.1%	4.0%	9.4%	0.2%	15.7%
Solids	0.1	0.1	-1.1	-2.6	-1.9	-3.2	3.3%	-	18.5%	-26.5%	66.0%
Oil	-98.2	-71.7	-86.2	-134.4	-135.4	-155.7	-6.1%	3.7%	9.3%	0.8%	15.0%
Crude oil	-69.6	-45.0	-54.8	-98.4	-98.7	na	-8.4%	4.0%	12.4%	0.3%	na
Oil products	-28.6	-26.8	-31.4	-36.0	-36.7	na	-1.3%	3.2%	2.8%	2.0%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	-0.1	-	-	-	-	-
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	-100.0%	-	-	-23.6%	30.8%
Gross Inland Consumption	35.0	36.9	40.5	47.9	55.0	56.7	1.0%	1.9%	3.4%	14.8%	3.1%
Solids	0.1	0.2	0.2	0.2	0.2	0.2	2.8%	5.9%	-0.5%	-5.2%	-4.3%
Oil	18.8	16.4	16.8	17.6	23.3	23.6	-2.7%	0.4%	1.0%	32.3%	1.4%
Natural gas	14.8	18.3	20.2	25.1	26.3	27.3	4.3%	2.0%	4.5%	4.7%	4.0%
Other (1)	1.3	2.0	3.3	4.9	5.2	5.5	9.1%	11.2%	8.3%	4.3%	7.2%
Electricity Generation in TWh	36.9	49.0	59.3	73.4	75.4	na	5.9%	3.9%	4.4%	2.6%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	14.6	22.6	37.0	51.4	53.8	na	9.2%	10.3%	6.8%	4.7%	na
Thermal	22.3	26.3	22.3	22.0	21.5	na	3.4%	-3.2%	-0.3%	-2.1%	na
Generation Capacity in GWe	8.5	15.5	18.5	20.0	21.5	na	12.9%	3.6%	1.5%	7.8%	na
Nuclear	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Hydro & wind	2.7	5.0	10.0	10.7	12.2	na	12.9%	15.0%	1.3%	14.6%	na
Thermal	5.8	10.5	8.5	9.3	9.3	na	12.8%	-4.2%	1.8%	0.0%	na
Average Load Factor in %	49.7	36.0	36.6	42.0	40.0	na	-6.2%	0.3%	2.8%	-4.8%	na
Fuel Inputs for Thermal Power Generation	7.6	8.6	7.0	6.4	6.5	na	2.5%	-4.0%	-1.7%	1.0%	na
Solids	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Oil	3.7	2.7	1.9	0.9	0.8	na	-6.2%	-6.6%	-14.3%	-10.9%	na
Gas	3.9	5.9	5.1	5.5	5.7	na	8.7%	-3.0%	1.8%	3.0%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	8.4%	35.4%	-100.0%	-	na
Average Thermal Efficiency in %	25.3	26.4	27.5	29.5	28.6	na	0.9%	0.8%	1.4%	-3.1%	na
Non-Energy Uses	1.2	1.1	1.4	1.4	1.4	na	-0.3%	3.8%	0.8%	0.1%	na
Total Final Energy Demand	22.6	24.9	25.6	32.8	32.0	na	2.0%	0.6%	5.1%	-2.4%	na
Solids	0.1	0.2	0.2	0.2	0.2	na	2.8%	5.9%	-0.5%	-5.2%	na
Oil	11.4	12.4	13.1	17.1	16.2	na	1.6%	1.2%	5.5%	-5.5%	na
Gas	8.4	9.1	8.3	10.3	10.3	na	1.6%	-1.6%	4.2%	0.8%	na
Electricity	2.6	3.3	3.9	4.7	4.8	na	4.7%	3.0%	4.1%	1.4%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.1	0.5	0.5	na	-34.3%	143.0%	35.3%	0.0%	na
CO_2 Emissions in Mt of CO_2	88.5	97.6	95.7	118.3	119.8	na	2.0%	-0.4%	4.3%	1.2%	na
Indicators											
Population (Million)	14.87	17.14	19.50	21.84	22.31	22.80	2.9%	2.6%	2.3%	2.1%	2.2%
GDP (index 1985=100)	104.8	100.0	113.6	133.2	131.1	137.7	-0.9%	2.6%	3.2%	-1.6%	5.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	995.4	1097.0	1059.9	1070.0	1248.5	1225.1	2.0%	-0.7%	0.2%	16.7%	-1.9%
Gross Inl Cons./Capita (toe/inhabitant)	2.36	2.15	2.07	2.19	2.46	2.49	-1.8%	-0.7%	1.1%	12.4%	0.9%
Electricity Generated/Capita (kWh/inhabitant)	2478	2858	3041	3362	3378	na	2.9%	1.3%	2.0%	0.5%	na
CO_2 Emissions/Capita (t of CO_2/inhabitant)	6.0	5.7	4.9	5.4	5.4	na	-0.9%	-2.9%	2.0%	-0.9%	na
Import Dependency %	-275.4	-191.5	-212.0	-282.5	-247.1	-276.5	-7.0%	2.1%	5.9%	-12.5%	11.9%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.
(2) Estimates

PART X SHORT-TERM ENERGY OUTLOOK FOR THE EUROPEAN UNION



SUMMARY

Based on monthly data, deliveries to final consumers in the European Union increased by about 2.1% in 1998, while gross inland energy consumption increased by about 1.8%. Sustained economic growth was compensated by weather conditions resulting in degree-days about 1% below the 1997 level. Consumption of oil grew by 3.3%. The increasing deliveries of all transportation fuel is driven by kerosene and automotive diesel. It is only partially compensated by lower consumption of heavy fuel oil in the power sector. Consumption of natural gas increased by 2.9% under the pressure of the power sector and final consumers despite the relative stability of heating requirements. Demand for solid fuels was down 0.7% on account of lower demand by final consumers. The production of nuclear energy declined by 1.2% and renewable energy, mainly biomass, increased by 1.9%. Annual CO_2 emissions increased by 1.5%, 0.6% below the 1990 level.

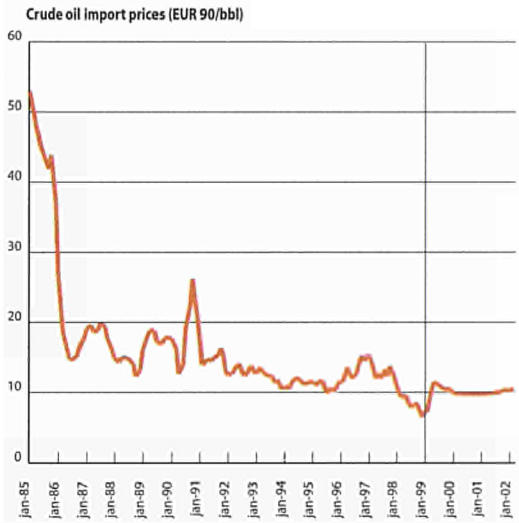
Combining the forecast growth of the European economy (Spring 99 Economic forecast – DG II) and the return to long-term average temperatures results in a growth of gross inland energy consumption of 1.3% per year on average between 1998 and 2001. In fact the gross inland energy consumption will increase by about 55 Mtoe until 2001 but with very contrasted evolution by fuel. Although oil's contribution will slowly increase by 12.5 Mtoe, solid consumption will show a 25 Mtoe reduction while natural gas consumption will increase by 55.5 Mtoe. This increase, associated with the rapid expansion of gas consumption by the power sector, will allow CO_2 emissions to be stabilised in 2001 just above the 1990 level. This is the consequence of both the continuous energy intensity gains observed during the 90's (about 1% per year on average), and the fall in carbon intensity (about 1% per year on average) obtained from the larger contribution of natural gas in substitution of solids and oil as well as the growing contribution of carbon-free energy sources.

So the STEO energy forecast can be considered as: neutral regarding economic growth; very prudent in terms of climatic conditions; and conservative concerning gas consumption in the power sector. The CO_2 emissions forecast, suggesting a limited overstepping of the objective of stabilising emissions in 2000 just above the 1990 level, can be considered as extremely prudent.

WORKING ASSUMPTIONS FOR THE PERIOD 1999-2001

The short-term energy forecasts are related to the short- and medium-term economic forecasts[1] provided by the European Commission's Directorate General for Economic Affairs (DG II). The main predetermined variables and their values are:

- Sustained GDP growth rates of 2.5% on average over the period 1999-2001, with a high of 2.7% in 2000;
- Private consumption is foreseen to grow by 2.4% on average, demonstrating a marked deceleration from 2.6% in 2000 to 2.2% in 2001;
- Gross fixed capital formation should be sustained with an average growth by 3.8% peaking at 4.8% in 2000;
- Industrial production, which increased by 3.4% in 1998, is expected to grow between 3.1% in 2000 and 2.0% in 2001;
- Normal weather conditions, defined as the average of the last 25 years' observations, are assumed to prevail from 1999 to 2001, after considering weather conditions for the first four months of 1999;
- The average price of European Union crude imports, including freight and insurance charges, is presumed to recover up to 14.09 $/bbl after the slowdown observed in 1998, and to stabilise at this level until 2001.



In the EU, overall, 1998 turned out well. But since the last quarter of that year the outlook has become clouded due to more negative indicators. Consequently, the slowdown in 1999 is likely to be more pronounced than first expected and real GDP growth will be limited to 2.1 %. However, the fundamentals remain healthy and the dip is expected to be only temporary so that an acceleration of real GDP growth to 2.7 % in 2000 is possible. The slowdown is provoked by the impact of faltering export demand on investment and stock-building. Private consumption remains largely

[1] Short-term energy outlook - Spring 1999 forecast for 1999-2000 - European Economy - Supplement A n°4 April 1999

MACROECONOMIC, ENERGY PRICES AND WEATHER ASSUMPTIONS

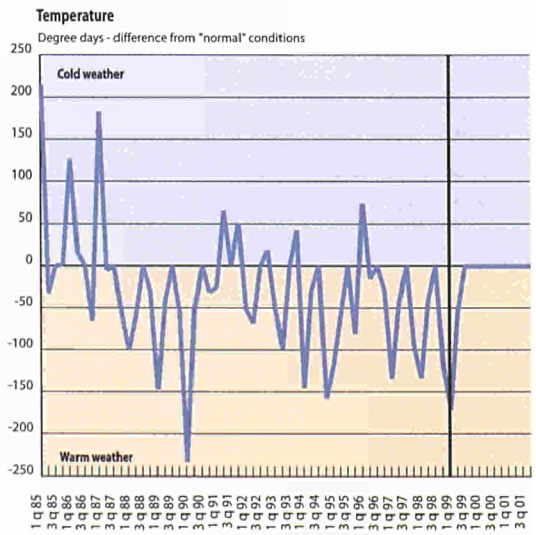
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
A. MACROECONOMIC INDICES (1990=100)												
A.1. Gross Domestic Product	100.0	101.2	102.3	101.8	104.7	107.2	108.9	111.9	115.1	117.5	120.7	123.6
% change from prior year		*1.2*	*1.1*	*-0.5*	*2.9*	*2.4*	*1.6*	*2.7*	*2.9*	*2.1*	*2.7*	*2.4*
A.2. Private Consumption	100.0	101.6	103.6	103.3	104.9	106.8	109.0	111.3	114.5	117.4	120.5	123.1
% change from prior year		*1.6*	*2.0*	*-0.3*	*1.6*	*1.8*	*2.0*	*2.2*	*2.8*	*2.6*	*2.6*	*2.2*
A.3. Gross Fixed Capital Formation	100.0	101.4	100.9	94.3	96.5	99.6	100.9	103.8	108.9	112.9	118.3	122.0
% change from prior year		*1.4*	*-0.5*	*-6.5*	*2.3*	*3.2*	*1.4*	*2.8*	*4.9*	*3.7*	*4.8*	*3.1*
A.4. Industrial Production	100.0	99.8	98.8	95.0	99.1	101.6	101.8	105.1	108.7	111.2	114.7	117.0
% change from prior year		*-0.2*	*-1.0*	*-3.9*	*4.4*	*2.5*	*0.1*	*3.3*	*3.4*	*2.3*	*3.1*	*2.0*
A.5. Iron&Steel Production	100.0	98.3	95.1	90.3	98.3	101.0	98.6	105.4	108.7	112.3	115.1	117.8
% change from prior year		*-1.7*	*-3.2*	*-5.1*	*8.9*	*2.7*	*-2.4*	*7.0*	*3.1*	*3.3*	*2.5*	*2.3*
A.6. Chemical Production	100.0	100.8	103.7	102.7	108.9	111.9	115.2	122.2	125.4	127.8	132.5	134.8
% change from prior year		*0.8*	*2.9*	*-0.9*	*6.0*	*2.8*	*2.9*	*6.1*	*2.6*	*1.9*	*3.7*	*1.8*
B. EXCHANGE RATE												
1 ECU = xx US$	1.3	1.24	1.30	1.17	1.19	1.31	1.27	1.14	1.12	1.09	1.10	1.10
% change from prior year		*-2.6*	*4.6*	*-9.6*	*1.4*	*10.1*	*-3.0*	*-9.9*	*-2.0*	*-2.8*	*1.0*	*0.0*
C. INTERNATIONAL ENERGY PRICES												
Imported Crude Oil (EUR90/toe)	136.0	109.3	95.5	89.2	82.5	79.2	95.8	95.1	62.5	72.7	70.9	72.2
Imported natural Gas (EUR90/toe)	89.8	99.6	79.1	77.6	71.8	70.1	69.5	76.6	68.6	62.0	65.8	64.2
Imported Steam Coal (EUR90/toe)	77.7	71.4	65.5	54.6	51.9	57.8	54.7	52.3	46.9	48.9	48.4	48.2
D. WEATHER												
Degree Days	2141	2549	2357	2354	2126	2202	2486	2185	2167	2233	2457	2457
% change from prior year		*19.0*	*-7.5*	*-0.1*	*-9.7*	*3.6*	*12.9*	*-12.1*	*-0.8*	*3.0*	*10.0*	*0.0*

unscathed under the influence of growing real income and buoyant consumer confidence which contrasts sharply with the negative mood in industry.

Some South East Asian countries may be starting to climb out of the trough, but the devaluation of the Brazilian Real underlined the fragility of the emerging markets and tipped Latin America into recession. In Japan, despite the fiscal stimulus injected and measures taken to reform the banking system, the economy will be facing another, albeit smaller, contraction this year. The Russian crisis is sharper than foreseen and is having a greater impact on the Central and Eastern European countries. All this has led to a further deterioration of the international environment which the good news coming from the US could not offset. However, the world economy is expected to recover gradually, so that by 2000 it will no longer exert a negative influence on the European Union.

The general government deficit (-1.5 % of GDP in the European Union) turned out better than expected in 1998, mainly thanks to stronger growth and lower interest rates. The underlying budgetary positions, however, did not show significant improvements. Based on the measures in national budgets presented by the Member States the general government deficit should remain at 1.5% of GDP in 1999 and should see a small reduction in 2000 to 1.3 % for the European Union as a whole.

Among demand components, net exports and equipment investment are likely to suffer most in 1999 while consumption and construction should prove more robust. Indeed, the external shock which affects the European economies has asymmetric effects across economic agents: positive for consumers but negative for industrial producers, while the service sector is relatively sheltered. In 1999 both exports and imports of goods and services are forecast to slow further towards 3.5% and 4.7% respectively. Finally, private consumption should remain relatively strong. Unemployment is likely to continue declining because negative developments in industry are more than offset by positives ones



in the services sector; declining inflation boosts purchasing power; lower interest rates foster consumption. According to the forecast, private consumption should grow by 2.6% in 1999.

As regards 2000, a rebound in EU GDP growth to 2.7% is forecast, assuming robust domestic forces and a gradual improvement in the world environment. In sharp contrast to the years 1994-97, when trade exerted a strongly positive influence on GDP growth and helped sustain activity, the European Union will have to rely mainly on its own forces to realise the rebound. As already seen, private consumption is expected to be practically unscathed by the slowdown, which provides a robust outlook for producers. The slowdown in output growth is assumed to be only temporary and limited to the manufactured goods sector.

The weather effect is measured using so-called degree-days, which are a function of temperature. After one warm year in 1998 the temperature is assumed, after considering preliminary information available for the beginning of 1999, to return to the long-term average causing an increase of 3% in this coldness indicator for the year 1999, and 10% for the year 2000.

METHODOLOGICAL NOTE

The forecasts are made with a neural network system. The system was constructed to estimate and forecast final demand of energy by fuel (13 aggregates) on a monthly basis. The energy balance is produced based on technical data (e.g. electricity generation capacity) and information from Member States about their primary energy production. This work has been completed with the assistance of Muse sprl using the "Insights" computer program developed by Pavilion Technologies NV/SA.

The data used are monthly deliveries to final consumers as provided by Eurostat. There may be some notable differences compared to annual energy balances. To quantify them, total annual energy consumption computed from monthly data is on average 1% below the final yearly data, excluding biomass. But, for some fuels or some years, differences can be more significant. All historical data before 1990 were revised in order to merge all official data now available for ex-GDR by the SOEC.

RESULTS

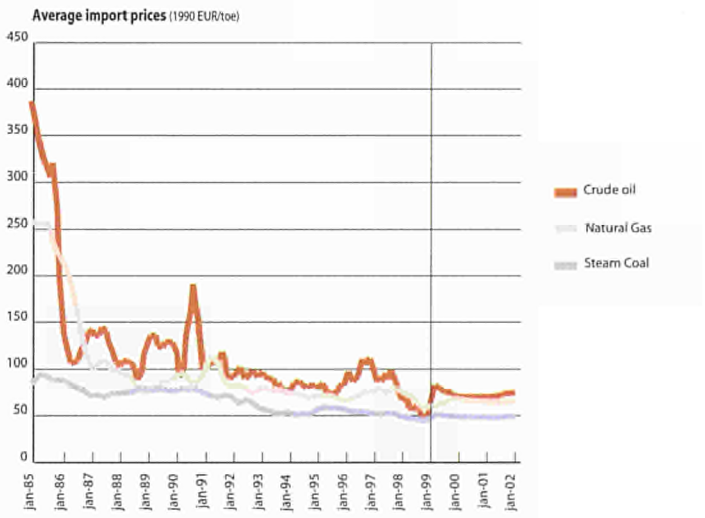
1. Energy prices

Different forms of energy can often act as substitutes for each other. Consequently, their prices also affect one another. Oil has a long history of being the price leader in world energy markets causing quick changes in all energy prices but, on the other hand, itself being much more slowly affected by prices and demand for other forms of energy. In the forecast it is expected that the price of natural gas will broadly follow the evolution of the crude oil price but with a six month lag.

Energy prices in final consumer markets (including excise duties and VAT) are influenced by the changes in corresponding international markets. Between 1990 and 1995 prices for oil products and natural gas declined in line with crude prices on international markets. Increasing crude oil prices in 1996, reinforced in the first months of 1997 by higher US$ exchange rates, reversed this trend. The first months of 1998 saw a rapid decline in oil prices reflected in the price evolution. The forecast period assumes a recovery of oil prices to about 14$/bbl as an average for the whole year followed by a relative stabilisation until 2001. For the forecast period, average excise taxes are assumed to increase slowly in real terms.

The changes in gasoline and diesel prices are different. Despite declining crude oil prices between 1992 and 1995 gasoline and diesel prices have increased slowly since 1992 under the pressure of fiscal measures. Consequently, the 34% reduction of crude oil prices in 1998 resulted in only a 2% reduction in gasoline prices and 9% in diesel prices.

For industrial consumers, the downward trend of energy prices for natural gas and coal was largely amplified in 1998 and in 1999, considering the time lag delay (6 to 9 months) in the response to lower oil prices. Electricity prices, which fell by about 4% in 1998, will continue to decline slowly until 2001 under the pressure of the liberalised market.

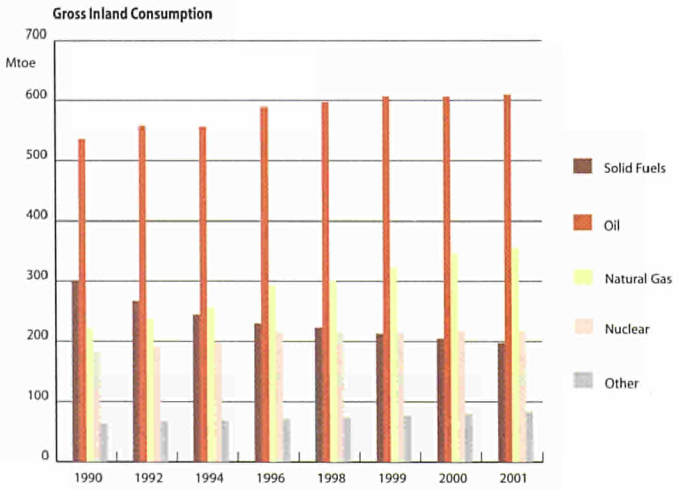


FINAL CONSUMER ENERGY PRICES IN REAL TERMS

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
A. Oil Products												
Prices (EUR90/toe)												
Gasoline	982	1031	1012	1019	1049	1054	1055	1095	1071	1102	1121	1124
Growth rate from previous period in %		*5.0*	*-1.9*	*0.7*	*2.9*	*0.5*	*0.1*	*3.8*	*-2.2*	*2.9*	*1.7*	*0.2*
Diesel	547	567	544	562	562	554	580	584	538	565	586	590
Growth rate from previous period in %		*3.6*	*-3.9*	*3.2*	*-0.1*	*-1.5*	*4.9*	*0.7*	*-8.0*	*5.0*	*3.8*	*0.6*
Domestic Heating Oil	382	394	346	346	316	310	330	332	276	289	300	302
Growth rate from previous period in %		*3.2*	*-12.1*	*-0.2*	*-8.6*	*-1.9*	*6.4*	*0.7*	*-17.0*	*4.8*	*3.9*	*0.5*
Industrial Heating Oil	282	286	234	239	219	213	238	235	185	193	200	201
Growth rate from previous period in %		*1.4*	*-18.0*	*2.1*	*-8.3*	*-2.8*	*11.7*	*-1.5*	*-20.9*	*4.3*	*3.4*	*0.5*
Residual Fuel Oil	124	111	101	98	107	115	118	112	92	98	98	98
Growth rate from previous period in %		*-10.6*	*-8.6*	*-3.1*	*9.2*	*7.4*	*2.1*	*-4.4*	*-18.6*	*7.3*	*-0.5*	*-0.1*
B. Natural Gas												
Prices (EUR90/toe)												
Household	322	351	341	322	327	314	286	306	277	252	264	261
Growth rate from previous period in %		*9.0*	*-3.0*	*-5.4*	*1.5*	*-4.1*	*-8.9*	*7.0*	*-9.5*	*-8.9*	*4.9*	*-1.3*
Industry	139	135	126	119	116	115	120	128	100	90	93	91
Growth rate from previous period in %		*-3.1*	*-6.6*	*-5.7*	*-2.1*	*-0.9*	*3.7*	*6.8*	*-21.6*	*-9.8*	*2.3*	*-1.3*
C. Coal												
Prices (EUR90/toe)												
Household	308	310	307	299	301	302	301	297	284	291	290	289
Growth rate from previous period in %		*0.6*	*-0.8*	*-2.8*	*0.8*	*0.3*	*-0.2*	*-1.5*	*-4.5*	*2.6*	*-0.3*	*-0.4*
Industry	96	91	88	85	82	81	78	77	74	76	75	75
Growth rate from previous period in %		*-5.0*	*-3.2*	*-2.8*	*-4.4*	*-1.3*	*-3.0*	*-1.3*	*-3.8*	*1.9*	*-0.2*	*-0.5*
D. Electricity												
Prices (EUR90/100 kWH)												
Household	11.72	11.61	11.51	11.47	11.55	11.41	10.91	10.53	10.10	10.02	9.88	9.83
Growth rate from previous period in %		*-0.9*	*-0.9*	*-0.3*	*0.7*	*-1.2*	*-4.4*	*-3.5*	*-4.0*	*-0.8*	*-1.5*	*-0.5*
Industry	6.27	6.23	6.12	5.96	5.77	5.56	5.20	5.01	4.77	4.67	4.53	4.50
Growth rate from previous period in %		*-0.6*	*-1.7*	*-2.6*	*-3.2*	*-3.6*	*-6.5*	*-3.6*	*-4.8*	*-2.0*	*-3.1*	*-0.6*

2. Energy Demand

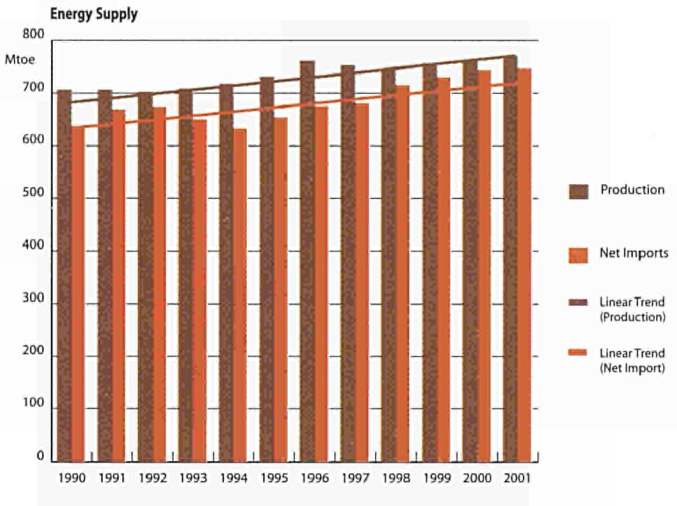
Based on monthly data, deliveries to final consumers in the European Union increased by about 2.1% in 1998, sustained economic growth being largely reinforced by low energy prices while climatic conditions remained constant compared to 1997. These deliveries will increase by 1.5% per year on average in the period 1999-2001, with a major growth by 2.1% in 1999 due to colder temperatures, continuation of low energy prices, mainly for gas, considering the time lag delay (6 to 9 months) in the price mechanism, and economic growth of 2.1%. Gross inland energy consumption increased by 1.8%, but is expected to increase by only 1.3% per year on average until 2001 due to increasing efficiency in the power sector. During the forecast period (1999-2001), gross inland energy consumption will increase by about 55 Mtoe but with very different evolution by fuel. Although oil's contribution will increase slowly by 12 Mtoe, absorbed by transportation demand, solid consumption will demonstrate a 25 Mtoe reduction, while natural gas consumption will increase by 56 Mtoe. The residual will be covered by non-fossil fuels (nuclear, hydro, wind, geothermal and biomass) with biomass contributing about 50%. Results show solid fuels steadily losing their share in



gross inland consumption from 23% in 1990 to 13.5% in 2001, being overtaken by nuclear in importance. The oil share, which increased slowly between 1990 (41%) and 1998 (42.5%), will decline slowly to reach 41.6% in 2001. Natural gas became the second most important fuel in 1993 and is the only fuel whose share will steadily increase, rising from 17% in 1990 to 21.4% in 1998 and

24.3% in 2000. The non-fossil fuel contribution increased from 19% in 1990 to 20.5% in 1998, and is expected to stay around this figure until 2001.

Total domestic energy production is expected to resume an upward trend as a result of moderate increases in both natural gas and crude production. On the other hand, solid fuel production, which declined by 7.5 % in 1998, is expected to continue its decline but a little more slowly. Non-fossil fuel energy sources are expected to continue to grow in the near future, at a slow rate for nuclear and hydro, but at a more sustained one for biomass and especially geothermal. Altogether, the share of net imports in total energy supply increased slightly from 47.5% in 1990 to 49.1% in 1998. As domestic energy production and gross inland consumption are expected to grow at a similar rate, the energy import dependency of the European Union is likely to be stable until 2001 at around 49.4%.



Solid Fuels

Total demand for **hard coal** has decreased steadily since 1990. The economic recession of 1993 accelerated this downward trend and solid fuel demand dropped sharply (10%) during that year. Between 1993 and 1998 demand dropped by 1.6% per year on average. The downward trend is expected to accelerate in the near future displaying an average annual decline of 4.9% between 1998 and 2001. The power generation sector is the driving force for hard coal demand. Faced with an ageing stock of power plants, reinforced by the competition from natural gas for both economic and environmental reasons, hard coal will lose market share in the electricity market, mainly in the United Kingdom, Germany, Denmark and Italy. This evolution will be reinforced with the growing liberalisation of the electricity market in the European Union. Consumption by the power sector, relatively stable between 1993 and 1998 at around 110 Mtoe, will decline by 12.5% between 1999 and 2001. Industry and the domestic and tertiary sectors will also accelerate their switch away from coal, mainly due to its inconvenience of use and environmental pressures. In 1994, for the first time net imports of hard coal exceeded domestic production, and this trend will be maintained in the medium term; but it must be noted that, facing a substantial decline in gross inland consumption, coal imports will also start to decline in 1999.

Production and consumption of **coke** is closely connected to the activity level of the iron and steel industry and, to a limited extent, some domestic and tertiary consumers. In all these sectors, demand for coke has been relatively stable since 1992 with limited fluctuation in relation to the iron steel production. In the forecast period, the sustained activity of the iron and steel sector will induce a stabilisation of consumption despite the progressive conversion to electric arc furnaces.

Lignite consumption showed a 42% reduction between 1990 and 1998 in two phases: a 40% reduction between 1990 and 1995 due to the restructuring of the new Länder in Germany, followed by a very slow decline. This restructuring mainly affected deliveries to final consumers, while consumption by power generation declined slowly to become by far the major market for lignite consumption. In the near future, lignite will continue its slow decline, as the consumption of the power sector will be reduced by only 5% between 1999 and 2001. On the other hand, deliveries to final consumers will decline by 10% in accordance to the 1990-98 trend - leading to such final consumption becoming marginal.

Oil

Gross inland oil consumption is expected to increase slowly between 1998 and 2001. Domestic production of crude oil is expected to continue to grow, although slowly, to meet 27% of gross inland consumption in 2001 compared to only 22% in 1990. Since 1993 refinery output has exceeded total domestic demand, with an excess of about 5% for export, including bunkers. This figure is expected to increase a little until 2001.

Deliveries to final consumers will increase slowly by 0.8% per year on average in the forecast period. Transport demand dominates the oil sector. Its share peaked in 1995 with 45% of total oil consumption and stabilised until 1998. The forecast period expects the share of transport in gross inland oil consumption to recover, reaching 46% in 2001. In fact, 81% of increasing consumption by final users will be for transportation fuel. Gasoline consumption is foreseen to increase slowly (0.3% per year on average) over this period, although diesel consumption

SUMMARY ENERGY BALANCE (MTOE)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Production												
Solid Fuels	210.4	189.8	176.5	155.9	136.5	135.3	130.3	125.1	115.7	114.0	111.8	109.7
Hard Coal	121.1	117.7	111.8	95.8	79.4	81.7	77.4	73.6	64.2	63.1	62.0	60.9
Lignite	89.4	72.1	64.8	60.1	57.1	53.6	52.9	51.5	51.5	51.0	49.8	48.8
Oil	116.6	116.1	119.6	124.6	153.4	156.5	158.1	155.0	160.0	162.3	164.8	167.1
Natural Gas	132.5	144.8	146.6	157.4	158.7	164.5	185.3	181.2	180.9	185.4	188.5	190.9
Heat	184.4	190.6	194.2	203.1	202.1	206.8	217.5	219.6	217.3	219.2	221.0	222.7
Nuclear	182.1	188.3	191.7	200.5	199.7	204.4	214.8	216.8	214.3	215.1	216.5	218.2
Geothermy	2.3	2.3	2.5	2.6	2.5	2.5	2.7	2.8	3.0	4.1	4.5	4.5
Primary Electricity	23.5	24.5	26.1	26.6	26.8	26.7	26.5	27.5	27.6	28.1	28.3	28.5
Other	38.9	40.6	39.4	40.7	40.2	41.2	42.7	43.7	44.8	46.2	48.0	50.0
Total	706.4	706.4	702.4	708.4	717.8	731.1	760.3	752.2	746.1	755.3	762.4	768.9
Growth rate from previous period in %		*0.0*	*-0.6*	*0.9*	*1.3*	*1.9*	*4.0*	*-1.1*	*-0.8*	*1.2*	*0.9*	*0.9*
Net Imports												
Solid Fuels	88.4	97.8	98.7	84.8	88.2	93.9	94.2	100.0	105.9	97.3	92.3	87.2
Hard Coal	85.5	94.3	95.7	81.2	84.3	89.0	89.9	94.9	99.0	90.1	84.8	79.4
Oil	454.1	475.2	478.0	468.3	443.8	449.0	469.7	465.0	486.2	490.1	489.1	491.8
Natural Gas	92.4	94.4	95.2	94.3	98.4	108.8	110.9	115.0	120.8	141.3	160.4	165.4
Electricity	2.2	1.3	1.6	2.0	1.6	1.5	0.1	0.5	1.9	1.3	1.2	1.8
Total	637.1	668.7	673.5	649.5	632.0	653.2	674.8	680.4	714.8	730.0	743.1	746.2
Growth rate from previous period in %		*5.0*	*0.7*	*-3.6*	*-2.7*	*3.4*	*3.3*	*0.8*	*5.0*	*2.1*	*1.8*	*0.4*
Bunkers												
Petroleum Products	35.2	35.1	35.8	36.7	35.5	35.2	38.1	41.0	42.3	43.2	44.1	44.9
Gross Inland Consumption												
Solid Fuels	301.5	286.5	267.8	243.0	244.7	235.8	230.0	224.5	222.8	212.7	205.4	198.1
Growth rate from previous period in %		*-5.0*	*-6.5*	*-9.2*	*0.7*	*-3.7*	*-2.5*	*-2.4*	*-0.7*	*-4.5*	*-3.5*	*-3.5*
Hard Coal	209.2	211.2	200.8	179.1	182.2	176.5	172.9	167.8	165.5	155.3	148.9	142.3
Coke	1.9	2.0	0.9	2.6	5.1	5.0	3.2	4.6	5.1	5.6	5.9	6.2
Lignite	90.5	73.3	66.1	61.3	57.4	54.3	53.9	52.1	52.3	51.8	50.6	49.6
Oil	536.2	553.8	558.6	557.2	556.9	575.0	590.0	578.7	598.0	607.3	607.0	610.5
Growth rate from previous period in %		*3.3*	*0.9*	*-0.2*	*-0.1*	*3.2*	*2.6*	*-1.9*	*3.3*	*1.5*	*0.0*	*0.6*
Natural Gas	221.9	239.1	238.4	251.3	257.3	270.9	294.1	292.9	301.5	324.9	347.1	357.0
Growth rate from previous period in %		*7.7*	*-0.3*	*5.4*	*2.4*	*5.3*	*8.6*	*-0.4*	*2.9*	*7.7*	*6.9*	*2.8*
Heat	184.4	190.6	194.2	203.1	202.1	206.8	217.5	219.6	217.3	219.2	221.0	222.7
Growth rate from previous period in %		*3.3*	*1.9*	*4.6*	*-0.5*	*2.3*	*5.1*	*1.0*	*-1.1*	*0.9*	*0.8*	*0.8*
Nuclear	182.1	188.3	191.7	200.5	199.7	204.4	214.8	216.8	214.3	215.1	216.5	218.2
Geothermy	2.3	2.3	2.5	2.6	2.5	2.5	2.7	2.8	3.0	4.1	4.5	4.5
Primary Electricity	23.5	24.5	26.1	26.6	26.8	26.7	26.5	27.5	27.6	28.1	28.3	28.5
Growth rate from previous period in %		*4.1*	*6.5*	*2.0*	*0.9*	*-0.3*	*-1.0*	*3.9*	*0.2*	*1.9*	*0.8*	*0.8*
Other	38.9	40.6	39.4	40.7	40.2	41.2	42.7	43.7	44.8	46.2	48.0	50.0
Growth rate from previous period in %		*4.2*	*-3.0*	*3.4*	*-1.3*	*2.4*	*3.8*	*2.3*	*2.4*	*3.2*	*3.9*	*4.1*
Total	1306.6	1335.1	1324.4	1322.0	1328.0	1356.4	1400.8	1387.0	1412.0	1438.4	1456.8	1466.8
Growth rate from previous period in %		*2.2*	*-0.8*	*-0.2*	*0.5*	*2.1*	*3.3*	*-1.0*	*1.8*	*1.9*	*1.3*	*0.7*
Import Dependency (%)												
Hard Coal	40.9	44.7	47.7	45.3	46.3	50.4	52.0	56.6	59.8	58.0	57.0	55.8
Oil	79.5	80.7	80.4	78.8	74.9	73.6	74.8	75.0	75.9	75.4	75.1	75.0
Natural Gas	41.6	39.5	39.9	37.5	38.2	40.2	37.7	39.3	40.1	43.5	46.2	46.3
Total	47.5	48.8	49.5	47.8	46.3	46.9	46.9	47.7	49.1	49.3	49.5	49.4
Growth rate from previous period in %		*2.8*	*1.4*	*-3.5*	*-3.0*	*1.3*	*-0.1*	*1.6*	*3.1*	*0.3*	*0.5*	*-0.3*
Deliveries to Final Consumers (*)												
Solid Fuels	96.2	81.4	70.1	62.4	58.1	51.6	50.6	48.3	47.1	45.8	44.5	43.0
Oil	468.3	476.6	481.3	482.8	483.7	498.7	505.5	507.3	522.5	528.7	531.3	536.0
Natural Gas	191.5	209.8	208.9	216.5	218.8	229.0	245.2	237.8	241.3	253.3	263.7	264.5
Derived Gases	15.9	15.3	13.8	12.6	12.5	12.7	11.9	12.8	11.4	11.1	11.6	11.4
Electricity	158.4	161.7	162.5	164.1	165.7	170.5	175.1	176.5	181.1	185.2	189.1	191.9
Biomass	33.8	35.2	34.1	35.3	34.7	35.4	36.3	37.2	38.1	39.1	40.1	41.1
Total	964.1	980.0	970.8	973.8	973.4	997.9	1024.5	1019.9	1041.4	1063.2	1080.2	1087.8
Growth rate from previous period in %		*1.7*	*-0.9*	*0.3*	*0.0*	*2.5*	*2.7*	*-0.4*	*2.1*	*2.1*	*1.6*	*0.7*

(*) includes some deliveries to electricity autoproducers and non-energy consumption
N.B.: Differences between the numbers in the table and EU annual energy balances originate from the discrepancies between annual and monthly-based statistics

SOLID FUELS : SUPPLY AND DISPOSAL (MTOE)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
A. HARD COAL												
Production	121.1	117.7	111.8	95.8	79.4	81.7	77.4	73.6	64.2	63.1	62.0	60.9
Growth rate from previous period in %		*-2.8*	*-5.0*	*-14.3*	*-17.1*	*3.0*	*-5.3*	*-4.9*	*-12.8*	*-1.8*	*-1.8*	*-1.7*
Net imports	85.5	94.3	95.7	81.2	84.3	89.0	89.9	94.9	99.0	90.1	84.8	79.4
Growth rate from previous period in %		*10.4*	*1.5*	*-15.1*	*3.8*	*5.6*	*1.0*	*5.6*	*4.3*	*-9.0*	*-5.8*	*-6.4*
Total supply	206.5	212.0	207.5	177.0	163.7	170.7	172.9	167.8	165.5	155.3	148.9	142.3
stock var	2.6	-0.8	-6.7	2.1	18.5	5.8	5.6	1.8	2.3	2.2	2.1	4.0
Gross Inland Consumption	209.2	211.2	200.8	179.1	182.2	176.5	172.9	167.8	165.5	155.3	148.9	142.3
Growth rate from previous period in %		*1.0*	*-4.9*	*-10.8*	*1.7*	*-3.1*	*-2.0*	*-3.0*	*-1.4*	*-6.1*	*-4.2*	*-4.4*
Transformation input	177.1	177.3	169.5	151.2	155.8	154.5	149.9	147.7	147.9	138.0	133.1	127.5
of which :												
Thermal Power generation	123.7	123.6	118.0	107.9	110.1	109.5	114.4	104.3	110.8	107.0	101.3	96.9
Growth rate from previous period in %		*0.0*	*-4.6*	*-8.5*	*2.0*	*-0.5*	*4.6*	*-8.9*	*6.3*	*-3.4*	*-5.4*	*-4.3*
Coking plants	38.6	44.6	40.8	37.8	35.9	37.7	35.5	33.9	31.2	28.1	29.2	28.1
Growth rate from previous period in %		*15.4*	*-8.5*	*-7.4*	*-4.9*	*4.9*	*-5.7*	*-4.5*	*-8.2*	*-9.9*	*4.1*	*-3.9*
Deliveries to final consumers	32.1	33.9	31.2	28.0	26.4	22.0	23.0	20.1	17.6	17.4	15.7	14.8
Growth rate from previous period in %		*5.7*	*-7.9*	*-10.4*	*-5.7*	*-16.7*	*4.8*	*-12.7*	*-12.4*	*-1.3*	*-9.4*	*-5.7*
B. COKE												
Net Imports	1.8	2.2	1.6	2.4	3.6	4.2	3.2	4.5	6.1	6.4	6.7	7.0
Gross Inland Consumption	1.9	2.0	0.9	2.6	5.1	5.0	3.2	4.6	5.1	5.6	5.9	6.2
Coking Plants Production	21.5	20.3	19.3	16.6	14.6	15.0	15.7	16.0	16.1	14.5	15.1	14.5
Deliveries to Final Consumers	23.4	22.3	20.2	19.2	19.7	20.0	18.8	20.1	21.2	20.1	21.0	20.7
Growth rate from previous period in %		*-4.7*	*-9.3*	*-4.8*	*2.6*	*1.1*	*-5.6*	*6.7*	*5.6*	*-5.2*	*4.5*	*-1.4*
C. LIGNITE												
Production	89.4	72.1	64.8	60.1	57.1	53.6	52.9	51.5	51.5	51.0	49.8	48.8
Gross Inland Consumption	90.5	73.3	66.1	61.3	57.4	54.3	53.9	52.1	52.3	51.8	50.6	49.6
Growth rate from previous period in %		*-19.0*	*-9.8*	*-7.3*	*-6.3*	*-5.4*	*-0.8*	*-3.4*	*0.4*	*-1.0*	*-2.3*	*-2.0*
Transformation Input	49.8	48.1	47.3	46.1	46.1	44.7	44.8	43.4	43.7	43.2	42.6	41.9
Public Power Generation	48.1	47.3	46.5	45.4	45.5	44.2	44.3	43.0	43.4	42.9	42.3	41.6
Growth rate from previous period in %		*-1.7*	*-1.6*	*-2.5*	*0.3*	*-3.0*	*0.2*	*-3.0*	*1.1*	*-1.2*	*-1.4*	*-1.7*
Deliveries to Final Consumers	40.8	25.2	18.6	15.2	12.0	9.6	8.7	8.1	8.2	8.3	7.7	7.4
Growth rate from previous period in %		*-38.1*	*-26.1*	*-18.4*	*-21.3*	*-19.5*	*-9.4*	*-7.0*	*1.6*	*0.3*	*-6.9*	*-3.9*
Of which electricity autoproduction	4.7	4.8	3.5	3.0	2.6	2.4	1.7	1.5	1.4	1.3	1.2	1.1

N.B. : Differences between the numbers in the table and EU annual energy balances originate from the discrepancies between annual and monthly-based statistics

will increase by about 1.5% per year between 1998 and 2001. This is due to the increasing contribution goods transport by road and the confirmation of the progressive dieselisation of the car fleet. Aviation kerosene use, after the jump registered in the mid-90's as a consequence of the liberalisation of air markets, will continue to increase between 1998-2001 but at a more limited rate of 3.7% per year on average compared to 5.6% per year over the last three years.

Heating gas oil, faced with the competitiveness of natural gas in the household heating and industrial markets, will manage to stabilise its contribution in growing markets. Finally, the fall in fuel oil consumption by industrial users, a 23% reduction over the last three years, will continue at a rate of about 4.4% per year on average mainly as a result of price competition and environmental constraints. This situation will be mirrored in the **power sector** where the reduction will reach 4.7% per year on average due to major conversion from oil to gas in Italy and decommissioning of older oil-fired plants in some other member states.

Driven by petrochemical consumption, the contribution of other products will continue to increase but there, also, the competition with natural gas will slow down the growth rate to 1.3% per year on average over the forecast period compared to about 3.5% over the last three years.

As a consequence of these developments, refinery output will be more oriented to the gas oil cut (gas oil and kerosene together), although the share of the bottom of the barrel, including bitumen and assimilated products, will still be reduced to represent less than 15% in 2001. Given the increasing environmental quality requirements for all oil products this will favour the profitability of complex refineries.

OIL AND NATURAL GAS : SUPPLY AND DISPOSAL (MTOE)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
A. OIL												
A.1. Supply												
Primary Production	116.6	116.1	119.6	124.6	153.4	156.5	158.1	155.0	160.0	162.3	164.8	167.1
Crude	113.8	112.6	115.3	119.8	152.7	155.8	157.6	154.7	159.3	161.7	164.2	166.4
Oil Products	2.8	3.5	4.3	4.9	0.7	0.7	0.5	0.4	0.7	0.7	0.7	0.7
Net Imports	454.1	475.2	478.0	468.3	443.8	449.0	469.7	465.0	486.2	490.1	489.1	491.8
Bunkers	35.2	35.1	35.8	36.7	35.5	35.2	38.1	41.0	42.3	43.2	44.1	44.9
Gross Inland Consumption	536.2	553.7	558.6	557.9	556.9	575.0	590.0	578.7	598.0	607.3	607.0	611.5
Growth rate from previous period in %		*3.3*	*0.6*	*-2.0*	*-5.2*	*1.2*	*4.6*	*-1.9*	*3.3*	*1.5*	*0.0*	*0.6*
Transformation Energy Consumption	68.0	77.1	77.3	75.0	73.2	76.2	84.6	77.2	78.3	78.5	75.7	74.5
Refineries Input	555.6	572.6	590.5	612.3	630.4	627.0	646.0	655.1	667.6	675.8	679.0	685.1
Refineries Net Output	531.7	541.8	560.6	580.4	598.8	594.7	613.0	621.6	633.6	641.2	644.3	650.1
Power Generation input	44.0	46.3	47.3	43.2	41.6	43.9	42.7	39.2	40.0	38.5	36.8	34.7
A.2. Final Consumers												
Total	468.3	476.6	481.3	482.8	483.7	498.7	505.5	507.3	522.5	528.7	531.3	536.0
Growth rate from previous period in %		*1.8*	*1.0*	*0.3*	*0.2*	*3.1*	*1.4*	*0.4*	*3.0*	*1.2*	*0.5*	*0.9*
Motor Gasoline	123.3	125.1	127.7	125.5	123.4	122.0	121.9	121.7	123.9	124.7	125.3	125.2
Growth rate from previous period in %		*1.4*	*2.1*	*-1.8*	*-1.7*	*-1.1*	*0.0*	*-0.2*	*1.9*	*0.6*	*0.5*	*-0.1*
Kerosene	30.0	29.8	32.1	33.6	35.7	37.2	39.3	41.0	43.8	45.6	47.4	48.9
Growth rate from previous period in %		*-0.6*	*7.7*	*4.7*	*6.2*	*4.2*	*5.6*	*4.3*	*7.0*	*3.9*	*4.1*	*3.0*
Gasoil (total)	186.4	197.7	197.4	207.7	206.2	210.6	220.9	219.6	223.5	227.4	226.2	229.7
Growth rate from previous period in %		*6.0*	*-0.1*	*5.2*	*-0.7*	*2.2*	*4.9*	*-0.6*	*1.8*	*1.7*	*-0.5*	*1.5*
Automotive Diesel	92.8	97.2	101.8	101.0	109.5	111.0	110.2	113.9	117.7	120.0	122.3	123.1
Growth rate from previous period in %		*4.7*	*4.7*	*-0.7*	*8.4*	*1.4*	*-0.7*	*3.4*	*3.3*	*2.0*	*1.9*	*0.6*
Heating gas oil	93.6	100.4	95.7	106.7	96.7	99.6	110.7	105.7	105.9	107.3	103.9	106.6
Growth rate from previous period in %		*7.3*	*-4.8*	*11.5*	*-9.4*	*3.1*	*11.2*	*-4.6*	*0.2*	*1.4*	*-3.2*	*2.6*
Heavy fuel oil	35.3	35.5	34.4	35.9	35.7	34.2	30.2	27.8	26.2	24.8	24.2	22.9
Growth rate from previous period in %		*0.8*	*-3.2*	*4.2*	*-0.4*	*-4.1*	*-11.7*	*-8.1*	*-5.7*	*-5.3*	*-2.3*	*-5.4*
Other Products	93.2	88.5	89.7	80.2	82.7	94.7	93.2	97.4	104.9	106.3	108.1	109.2
Growth rate from previous period in %		*-5.1*	*1.3*	*-10.6*	*3.2*	*14.5*	*-1.6*	*4.5*	*7.8*	*1.3*	*1.7*	*1.1*
B.NATURAL GAS												
Primary Production	132.5	144.8	146.6	157.4	158.7	164.5	185.3	181.2	180.9	185.4	188.5	190.9
Net Imports	92.4	94.4	95.2	94.3	98.4	108.8	110.9	115.0	120.8	141.3	160.4	165.4
Gross Inland Consumption	221.9	239.1	238.4	251.3	257.3	270.9	294.1	292.9	301.5	324.9	347.1	357.0
Growth rate from previous period in %		*7.7*	*-0.3*	*5.4*	*2.4*	*5.3*	*8.6*	*-0.4*	*2.9*	*7.7*	*6.9*	*2.8*
Transf. Input & Own Consump.	30.5	29.4	29.5	34.8	38.5	41.9	49.3	55.4	59.9	71.2	83.1	90.1
Growth rate from previous period in %		*-3.6*	*0.5*	*18.0*	*10.6*	*8.8*	*17.7*	*12.2*	*8.1*	*18.9*	*16.7*	*8.5*
Own consumption	6.7	6.9	7.1	7.7	8.6	9.0	9.4	9.0	9.1	9.4	9.5	9.6
Public Power Generation	23.8	22.5	22.4	27.1	30.0	32.9	39.6	46.0	50.3	61.4	73.1	80.0
Available for Final Consumption	191.5	209.8	208.9	216.5	218.8	229.0	245.2	237.8	241.3	253.3	263.7	264.5
Growth rate from previous period in %		*9.6*	*-0.4*	*3.6*	*1.0*	*4.7*	*7.1*	*-3.0*	*1.4*	*5.0*	*4.1*	*0.3*
of which electricity autoproduction	7.5	7.9	8.1	8.8	9.5	11.2	12.3	13.6	15.3	16.8	17.9	19.1

N.B.: Differences between the numbers in the table and EU annual energy balances originate from the discrepancies between annual and monthly-based statistics

Natural Gas

Natural gas demand has increased by 3.9% since 1990, with a jump of 8.6% in 1996 due to climatic conditions. In 1998, despite warmer weather, gas consumption still increased by 2.9%. Between 1990 and 1998, with similar climatic conditions, about 75% of the total increase in gross inland consumption was met by gas. The main reasons were higher consumption in power generation (+27 Mtoe), an accelerating trend since 1995, and final consumption sectors (+50 Mtoe). Over the forecast period, natural gas demand is anticipated to increase by 5.7% annually with major increases in 1999 (+7.7%) and 2000 (+6.9%) due to the climate effect and a more moderate growth in 2001 (+2.8%).

During the forecast period, the bulk of the increase in gas consumption comes from the power sector where gas use increases by 16.7% per year on average. This results both from the liberalisation of the electricity market, favouring combined cycle investment, and environmental concerns leading to repowering and conversion of coal- and oil-fired units to natural gas. Additionally, the new development of smaller sized plants by

autoproducers almost wholly based on gas (gas turbine and gas driven engines) will increase the pressure on gas. Finally, given the higher efficiency of gas-based technologies, price competition will also be in favour of gas. Globally, some 18 to 22 GWe of power capacity able to burn natural gas will be completed by 2001 including new investments, repowering and conversion programmes.

Domestic production of natural gas is expected to increase by 5.5% until 2001, with imports increasing by 37% over the same period. Consequently, import dependency on natural gas is predicted to increase from 40% in 1998 to 46% in 2001.

Electricity

Demand for electricity has increased steadily for many years driven by the tertiary-domestic sector and, to a lesser extent, industry. In 1997, demand growth reached 2.6% in line with the sustained economic growth although very mild climatic conditions continued. Final electricity demand is expected to continue to grow by 2.0% annually on average until 2001, demonstrating an elasticity of about 0.8 versus GDP but this evolution is deeply influenced by the climate effect in 1999 and 2000 which boosts the demand growth beyond 2.0%.

ELECTRICITY : SUMMARY BALANCE

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
A.1. Generation (Twh)												
Total Gross Generation	2162.6	2231.0	2229.3	2240.4	2270.6	2335.5	2415.6	2428.4	2475.2	2534.5	2587.7	2621.8
Growth rate from previous period in %		*3.2*	*-0.1*	*0.5*	*1.3*	*2.9*	*3.4*	*0.5*	*1.9*	*2.4*	*2.1*	*1.3*
Produced by Pumping	13.8	14.9	16.2	13.9	13.1	16.2	17.9	17.5	19.3	17.7	18.1	20.1
Primary production (Hydro)	273.5	284.7	303.2	309.1	311.8	311.0	307.8	319.8	320.4	326.4	329.2	331.9
Growth rate from previous period in %		*4.1*	*6.5*	*2.0*	*0.9*	*-0.3*	*-1.0*	*3.9*	*0.2*	*1.9*	*0.8*	*0.8*
Derived production :	1875.3	1931.4	1909.9	1917.3	1945.6	2008.3	2090.0	2091.1	2135.5	2190.4	2240.5	2269.8
Nuclear	719.9	744.4	757.8	792.7	789.4	808.0	849.1	857.2	847.1	850.4	855.8	862.7
Growth rate from previous period in %		*3.4*	*1.8*	*4.6*	*-0.4*	*2.4*	*5.1*	*1.0*	*-1.2*	*0.4*	*0.6*	*0.8*
Conventional Thermal	1152.1	1183.8	1148.6	1121.0	1152.8	1196.9	1237.1	1230.0	1284.2	1334.2	1378.4	1400.8
Growth rate from previous period in %		*2.7*	*-3.0*	*-2.4*	*2.8*	*3.8*	*3.4*	*-0.6*	*4.4*	*3.9*	*3.3*	*1.6*
Geothermal	3.2	3.2	3.5	3.7	3.4	3.4	3.8	3.9	4.2	5.7	6.3	6.3
Absorbed by Pumping	19.4	21.1	23.2	19.5	18.5	22.6	25.2	24.7	28.1	25.2	25.8	25.6
Own consumption	114.3	125.2	121.0	116.6	118.4	122.8	118.9	124.0	125.4	129.6	131.5	133.8
Total Net Generation	2050.2	2105.8	2108.3	2123.7	2152.1	2212.8	2296.1	2304.4	2349.7	2404.9	2456.3	2486.0
Growth rate from previous period in %		*2.7*	*0.1*	*0.7*	*1.3*	*2.8*	*3.8*	*0.4*	*2.0*	*2.4*	*2.1*	*1.2*
A.2. Disposal (Twh)												
Total Net Generation	2025.3	2084.6	2085.1	2104.3	2133.6	2191.6	2270.8	2279.7	2321.5	2379.7	2430.5	2460.0
Net Imports	25.4	15.5	18.2	23.6	18.0	17.4	0.8	5.4	21.6	14.7	14.3	20.9
Total Available	2050.7	2100.2	2103.3	2127.9	2151.6	2209.0	2271.6	2285.1	2343.2	2394.4	2444.9	2480.9
Growth rate from previous period in %		*2.4*	*0.1*	*1.2*	*1.1*	*2.7*	*2.8*	*0.6*	*2.5*	*2.2*	*2.1*	*1.5*
Distribution losses	134.8	140.7	135.0	139.4	144.4	143.9	154.5	153.1	156.6	159.5	163.7	165.6
Consumption Internal Market	1915.8	1959.5	1968.3	1988.5	2007.2	2065.1	2117.1	2132.0	2186.6	2234.9	2281.2	2315.3
Energy Branch Consumption	73.9	78.8	78.8	80.8	80.8	82.6	81.0	79.8	80.7	81.5	82.6	83.8
Available for Final Consumption	1841.9	1880.7	1889.5	1907.7	1926.4	1982.5	2036.1	2052.1	2105.9	2153.4	2198.6	2231.6
Growth rate from previous period in %		*2.1*	*0.5*	*1.0*	*1.0*	*2.9*	*2.7*	*0.8*	*2.6*	*2.3*	*2.1*	*1.5*
B. Input to Conventional Thermal Power Stations (Mtoe)												
Solids												
Hard coal	123.7	123.6	118.0	107.9	110.1	109.5	113.4	103.9	110.4	107.0	101.7	97.4
Growth rate from previous period in %		*0.0*	*-4.6*	*-8.5*	*2.0*	*-0.5*	*3.6*	*-8.5*	*6.3*	*-3.1*	*-4.9*	*-4.2*
Lignite	54.7	52.9	50.6	48.9	48.5	46.9	46.3	44.7	45.2	44.4	43.7	42.9
Growth rate from previous period in %		*-3.3*	*-4.3*	*-3.4*	*-0.7*	*-3.5*	*-1.2*	*-3.4*	*1.0*	*-1.7*	*-1.6*	*-1.7*
Oil	44.0	46.3	47.3	42.5	41.6	43.9	42.7	39.2	40.0	38.5	36.8	34.7
Growth rate from previous period in %		*5.0*	*2.3*	*-10.1*	*-2.2*	*5.4*	*-2.6*	*-8.2*	*2.1*	*-3.8*	*-4.5*	*-5.7*
Gas												
Natural gas	31.3	30.4	30.5	35.9	39.5	44.1	51.8	59.6	65.5	76.9	88.9	97.6
Growth rate from previous period in %		*-3.0*	*0.5*	*17.6*	*10.0*	*11.7*	*17.3*	*15.2*	*9.9*	*17.3*	*15.7*	*9.7*
Derived gas	2.4	2.2	2.1	2.2	2.4	2.5	2.7	3.0	3.0	2.7	2.5	2.3
Growth rate from previous period in %		*-8.2*	*-4.7*	*6.7*	*6.7*	*6.5*	*8.6*	*8.5*	*1.3*	*-8.4*	*-8.3*	*-8.1*
Other	5.1	5.4	5.3	5.4	5.5	5.8	6.5	6.5	6.6	7.1	8.0	8.9
Growth rate from previous period in %		*4.9*	*-2.2*	*2.8*	*1.5*	*5.0*	*11.9*	*1.2*	*1.5*	*7.4*	*11.8*	*12.3*
TOTAL	261.2	260.7	253.8	242.9	247.6	252.6	263.4	257.0	270.8	276.6	281.6	283.9
Growth rate from previous period in %		*-0.2*	*-2.6*	*-4.3*	*1.9*	*2.0*	*4.3*	*-2.5*	*5.4*	*2.2*	*1.8*	*0.8*

N.B.: Differences between the numbers in the table and EU annual energy balances originate from the discrepancies between annual and monthly-based statistics

The power sector will experience further rapid changes in the near future. The evolution of coal and gas consumption, and consequently of CO_2 emissions, vary considerably between different forecasts. **New investment** will be oriented mainly to gas fuelled power stations, with a large contribution from combined cycle plants stimulated by the progressive liberalisation of the EU electricity sector. On the other hand, co-generation units are being promoted in nearly all member states, further increasing the contribution of gas based technologies. More than 10 GWe of these kind of units based on natural gas are expected to be commissioned over the next three years. Finally, repowering, conversion of existing units to natural gas, and substitution to gas in polyvalent units mainly in Belgium, Denmark, Germany, Italy and the United Kingdom, will complete the rapid switch to natural gas in power stations. In addition, the market perceptions of the power sector itself are changing rapidly, modifying their investment programmes accordingly. Between 1997 and 1998, their perception of the likely contribution of gas increased from 56 Mtoe in 1996 to about 97 Mtoe in 2000 with a subsequent reduction of hard coal consumption. This significantly affects the structure of gross inland energy consumption and hence CO_2 emissions. Our present forecast does not foresee quite such a bullish development of gas demand, even though consumption of about 89 Mtoe of natural gas is predicted in 2000.

Nuclear electricity production is likely to increase slowly over the next three years due to new commissioning (1.5 GWe) and upgrading of existing units associated with steam generator replacements. Hydropower production is assumed to stay at around its 1997 level. Geothermal production, being almost marginal in the total picture, is expected to increase as some new units will be commissioned in Italy. Considering the non-fossil production, the major increase will surely be in wind power under the pressure of Germany, Denmark, Spain, Netherlands, Italy and the United Kingdom. Together, these four non-fossil sources are expected to account for 48.3% of total generation in 2001 compared to 50% in 1998, bringing them to the same level as in 1990. Consequently, conventional thermal generation of electricity will play a major role in covering additional requirements in the forecast period. Lignite supported by indigenous production will decline very slowly, decommissioning of existing units being not totally compensated by new ones. Hard coal and oil, penalised by economic and environmental considerations, will see their contributions decline by 12% and 13% respectively between 1998 and 2001. In 1996, gas became the second most important fuel in thermal power generation ahead of lignite and oil and, as discussed above, is predicted to reinforce this position significantly by 2001 to become the largest single contributor amongst the fossil fuels.

Energy Indicators

The **energy intensity** in the European Union improved by 0.7% p.a. between 1990 and 1998 benefiting from clement climate conditions in 1998. This evolution is particularly significant, as climatic conditions were comparable in 1990 and 1998. During the forecast period, energy intensity is forecast to improve by 1.1% per annum, profiting from sustained economic activity over the whole period accompanied by technological improvements in all sectors. The energy system benefits from strong equipment replacement investment and improved general performance in all sectors, in particular the power sector. On the other hand, energy consumption per capita will increase by about 3% between 1998 and 2001 as it did between 1995 and 1998.

CO_2 emissions increased by 1.5% in 1998 compared to 1997, to reach a level just below that of 1990. Over the forecast period, considering average climate conditions, they will increase by about 0.6% per annum on average to give in 2000 a level 1.1% above that of 1990. So the political objective of CO_2 emission stabilisation in 2000 could remain achievable. This is mainly due to two factors: the continuous energy intensity gains observed during the 90's (about 1% per year on average) resulting from technological improvements; and the carbon intensity slowdown (about 1% per year on average) obtained from the larger contribution of natural gas instead of solids and oil as well as the intensification of carbon-free energy sources. Reflecting these major trends, CO_2 emissions per unit of GDP declined by 18% during the 90's and CO_2 emissions per capita decreased by 2.3%.

SHORT TERM FORECAST - MAIN INDICATORS (1990 = 100)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
CO_2 emissions (million tn of CO_2)	100.0	100.5	98.1	96.3	96.3	97.7	100.3	97.9	99.4	100.6	101.1	101.1
Enegy Intensity (toe/1990 MECU)	100.0	101.0	99.1	99.4	97.1	96.9	98.4	94.9	93.9	93.7	92.4	90.8
Energy per capita (toe/inhabitant)	100.0	101.7	100.4	99.8	99.9	101.7	104.7	103.4	105.0	106.6	107.7	108.1
Carbon Intensity (tn of CO_2/toe)	100.0	98.4	96.8	95.1	94.8	94.1	93.5	92.2	92.0	91.4	90.7	90.1
CO_2 per unit of GDP (tn of CO_2/1990 MECU)	100.0	96.8	93.5	92.2	89.6	88.9	89.7	85.3	84.2	83.4	81.7	79.7
CO_2 per Capita (tn of CO_2/inhabitant)	100.0	100.1	97.1	94.9	94.6	95.7	98.0	95.4	96.5	97.5	97.7	97.4

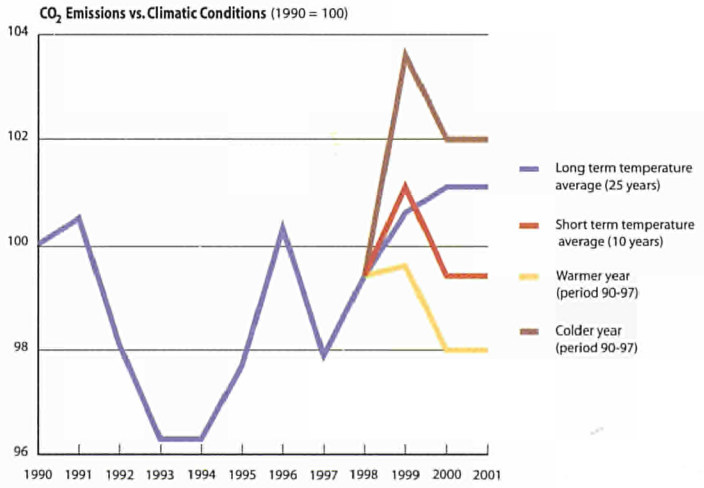
N.B.: Differences between the numbers in the table and EU annual energy balances originate from the discrepancies between annual and monthly-based statistics

Result sensitivity

Three main factors could influence the short-term energy forecast: the evolution of economic growth, climatic conditions and the evolution of the power sector.

- The economic growth in 1999 largely reflects recent economic development (issues in Asia and Latin America). Projections for 2000 and 2001 are more optimistic, reflecting the already observable improving economic situation in emerging countries, a positive growth in Japan already expected for the second quarter of 1999 and a soft landing of the US economy. Considering these evolutions, economic forecasts can be considered as neutral. If, for some unexpected reasons, economic growth was underestimated at the horizon of 2001 at a level of 0.5% to account for uncertainties, this could induce in 2001 an increase of energy consumption of a maximum of 0.4% or 6 Mtoe, concentrated mainly on gas and electricity. Consequently, CO_2 emissions should be increased at maximum by some 0.2% to 0.4%.
- Evolution of short-term climatic conditions (1989-1998) indicates that the short term (10 years) average degree-days are about 7.3% below the long-term average (25 years). If one believes that the greenhouse effect is already inducing an increase of average temperatures, then the short-term average degree-days are perhaps more representative of the evolution of climatic conditions. This means that average temperature could be underestimated in the forecast leading to an overestimate of energy consumption and CO_2 emissions in 2001 of some 1.7%. The climatic conditions considered in the forecast are clearly one of the most sensitive variables. If the weather conditions replicate in 2000 the warmer year registered since 1990, CO_2 emissions will be 2% lower than in 1990. This is of particular interest as these conditions were very close to the 1990 ones meaning that, excluding climatic variations, CO_2 emissions in 2000 will be about 2% lower than in 1990. On the other hand, a repeat of the colder climatic conditions observed since 1990 will result in an increase by 2% of CO_2 emissions in 2000 compared to the 1990 level. Finally, compared with short-term (10 years) average degree-days, CO_2 emissions will be 0.6% lower in 2000 than in 1990.
- The rapid conversion of the power sector to gas consumption is one of the key factors to achieve stability of CO_2 emissions at the 2000 horizon. To quantify the impact of this conversion, it can be considered that each variation of gas consumption of about 15 Mtoe by the power sector results in a variation of total CO_2 emissions of 1%. But the STEO forecast already remains below the latest estimates of gas consumption provided by the power sector itself.

Consequently, the STEO forecast can be considered as: neutral regarding economic growth; prudent in terms of climatic conditions; and conservative concerning gas consumption in the power sector. So the CO_2 emissions forecast - a limited overstepping of the objective of a stabilisation of emissions in 2000 - can also be considered as very prudent.



Potential impact of higher oil prices

Since establishing the main assumptions used to produce the short-term energy forecast, oil prices for the reference Brent crude have increased significantly from 10.5$/bbl in February 1999 to 23.2 $/bbl in September 1999. In early October prices declined to around 22$/bbl. Many oil experts forecast an annual average price of 17$/bbl in 1997 and around 18$/bbl in 2000 and 2001. These recent oil price changes must be placed in the perspective of long-term price evolution. This new short-term forecast now reflects the average prices observed between 1991 and 1997: around 18$/bll. In this context 1998 must be see as an exceptional year characterised by very low oil prices. Even though the latest oil prices are about 20% higher than those assumed in the elaboration of the short-term energy forecast, it must be stressed that the increase in the crude price is heavily dampened for final consumers who face heavy taxation on oil products. This is particularly true for transportation fuels and for tertiary-domestic uses. By returning to their historical level, these oil price increases will not modify significantly the behaviour of economic actors. A recent statement by the new Commissioner, Mr Solbes, confirms that, considering the present macro-economic scenario, economic growth will be in line with the spring 1999 forecast for the year 1999 and perhaps a little more optimistic for the year 2000.

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The review is presented here in 10 parts according to the most important world regions.

Part I provides an overview of world energy by region.

Part II analyses in detail the European Union including summary tables on energy prices.

Part III looks at the rest of the OECD, by regions: NAFTA, OECD Pacific and EFTA

Part IV analyses Central and Eastern Europe in detail.

Part IV provides information on the CIS.

The other parts look at the other world regions but in less detail.

Finally, the Short-Term Energy Outlook for the European Union is reviewed for the period 1998-2000.

The overall objective of the Community's energy policy is to help ensure security of energy supplies for European citizens and businesses at competitive prices and in an environmentally compatible way. DG XVII initiates, coordinates and manages energy policy actions at European level in the fields of solid fuels, oil and gas, electricity, nuclear energy, renewable energy sources and the rational use of energy. The most important actions concern the security of energy supply and international energy cooperation, the integration of energy markets, the promotion of sustainable development in the energy field and finally the promotion of energy research and technological development through demonstration projects. DG XVII manages several programmes as Synergy, Save, Altener and Thermie. More information is available in DG XVII's pages on Europa, the Commission's server on the Worldwide Web.

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DG II	Directorate-General for Economic and Financial Affairs of the European Commission
DG XVII	Directorate-General for Energy of the European Commission
EFTA	European Free Trade Agreement
Energy Intensity	Ratio of Energy Consumption to GDP
EU	European Union
GCC	Gulf Co-operation Council
GDP	Gross Domestic Product
GIC	Gross Inland Consumption
GW	GigaWatt, or 10^9 Watt
IEA	International Energy Agency
IMF	International Monetary Fund
kgoe	Kilogram oil equivalent
kl	Thousand litre
km	Kilometer
kWh	Thousand Watt.hour
l	Litre
MEUR	Million EURO
Mt	Million metric tonne
Mtoe	Million toe
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-operation and Development (excluding Hungary, Czech Republic and Poland)
OLADE	Organizacion Latinoamericana de Energia
SOEC	Statistical Office of the European Communities
STEO	Short-Term Energy Outlook for the European Union
t	Metric tonne, or 1000 kilograms
toe	Tonne of oil equivalent, or 10^7 kilocalories, or 41.86 GJ
TWh	Tera Watt.hour, or 10^{12} Watt.hour
UN	United Nations
WB	World Bank

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