

DIRECTORATE-GENERAL FOR ENERGY



ENERGY IN EUROPE

1999 – ANNUAL ENERGY REVIEW

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

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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 emphasis 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;
- CO₂ 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 CO₂ 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 CO₂ EMISSIONS INCREASED BY 8% SINCE 1990

- World-wide emissions of CO₂ 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 CO₂ emissions increased by 2.4% in both 1995 and 1996. In contrast, warm climatic conditions limited the increase of CO₂ emissions in 1997 to only 0.7%. This illustrates the great sensitivity of short-term variations in CO₂ emissions to the climatic conditions in the industrialised part of the world;
- Since 1990, CO₂ 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;
- CO₂ 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.

CO₂ EMISSIONS IN 1997 WERE 1% BELOW THE 1990 LEVEL

- With weather conditions returning in 1997 to their 1990 level, CO₂ emissions declined substantially (-2.6%) to reach a level below that of 1990. In the period 1990-97, CO₂ 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 CO₂ emissions grew from 24% in 1990 to 28% in 1997. The tertiary-domestic sector stabilised its emissions whilst industry experienced the greatest fall in CO₂ 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 CO₂ emissions have shown a reduction of 0.5% per year on average. The CO₂ 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 CO₂-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 CO₂ 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, CO₂ 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 CO₂ emissions in 2000 compared to their 1990 level. Finally, compared with short-term (10 years) average degree-days, CO₂ 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-Saharan 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.

- **CO₂ emissions** are given only on an indicative basis and were calculated using common emission factors across all countries. At world level, CO₂ 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>