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# Europe's growing energy vulnerability

Report
Committee on Economic Affairs and Development
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*Summary*

Most European countries experience growing energy consumption and increasing dependence on imported fossil fuels. This is a source of concern because of rising global competition over primary energy resources, driven by economic development and population growth, as well as by Europe's ambitious environmental commitments under the Kyoto Protocol. Moreover, the recent surge in the price of oil (and, as a result, also of gas and coal) and geopolitical uncertainties as regards the continuity of sufficient oil supplies add to Europe's energy vulnerability.

The report points to the economic and political implications of such growing dependence, especially over the longer term when global reserves of fossil fuels will diminish dramatically. It calls for a reinvigorated public debate to facilitate informed political choices – starting with the European Union and its internal energy market – as regards priority areas of action in support of research, resource development, strategic reserves, investment in power generation, network infrastructure and regulation at pan-European level. At the same time, it suggests that individual countries should be free to choose their own mix of energy resources as these reflect the national situation while aiming to reduce reliance on any one type of energy or a single supplier.

Given the limited indigenous energy resources in most European countries, Europe has a vital interest in intensifying the energy dialogue with its closest partners in order to minimise the physical, economic and political risks posed to the security of energy supplies for both importing and exporting countries. It should also seek to stabilise energy demand through improvements in energy end-use efficiency and greater incentives for energy savings in sectors such as transport, power and construction. Finally, the report asks the member states of the Council of Europe to shape coherent policies for developing alternatives sources of energy, without neglecting any of the traditional ones.

same time, a country-specific mix of energy resources reflecting the national situation is desirable for individual countries, as are efforts to reduce reliance on any one type of energy or a single supplier, especially in Central and Eastern Europe.

8. The Assembly refers to its Resolution 1413 (2004) on avoiding electricity blackouts in Europe, in which it maintains that substantial energy savings can be reached throughout Europe without impairing living standards or industrial output. This is essential for stabilising energy demand in Europe through further improvements in energy end-use efficiency and greater incentives for energy savings in the transport, power and construction sectors.

9. Given the limited indigenous energy resources in most European countries, Europe has a vital interest in intensifying the energy dialogue with its closest partners in order to minimise the physical, economic and political risks to the security of energy supplies for both importing and exporting countries. In the Council of Europe area, this implies strengthening long-term energy co-operation with, amongst others, the Russian Federation and the countries in the Caspian Sea region. The Assembly in this context reiterates its call, contained in Resolution 1324 (2003) on Europe and the development of energy resources in the Caspian Sea region, for the countries concerned to secure the best use of their energy resources by reaching early agreement on the legal status of the Caspian Sea, ratifying the Energy Charter Treaty and its Protocol on Energy Efficiency and Related Environmental Aspects and by concluding the negotiations for a Transit Protocol.

10. The Assembly in conclusion calls on the member states of the Council of Europe:

i. to jointly shape coherent pan-European framework policies permitting greater energy savings and a gradual shift toward alternative sources of energy, including biofuels and hydrogen-driven fuel cells for use in hybrid vehicles, in order to replace the rapidly diminishing reserves of fossil fuels;

ii. to engage in the modernisation of coal-fired plants currently in operation and to develop further "clean coal" technologies and carbon sequestration techniques;

iii. against the background of growing scarcity of fossil fuels and stricter environmental constraints under the Kyoto process, to take under renewed consideration, where applicable, their policies on nuclear energy;

iv. to pursue joint research on thermonuclear fusion and to allocate the necessary financial resources for building the International Thermonuclear Experimental Reactor (ITER project);

v. to ensure adequate safety measures for the long-term disposal of highly radioactive nuclear waste and to encourage a debate on the development of regional repositories;

vi. to invest additional resources in the development of new technologies for the enhanced use of renewable energy sources, in particular bio-fuels;

vii. to support and participate in the European Union's Emission Trading Scheme;

viii. to agree on priority areas for joint energy research, resources development, strategic reserves, investment in generation and network infrastructure and regulatory frameworks;

ix. to have energy prices better reflect the real cost of this resource to society, induce energy-saving behaviour and ensure fairer competition between different sources of energy;

x. to draw up national energy saving plans, disseminate energy-efficient technologies, remedy the imbalance between different modes of transport and implement more energy saving measures in buildings.

power cuts and blackouts is an important issue, the present report does not specifically address it, since Mr Melčák has already done so in a separate report (see doc. 10350 on "Avoiding electricity blackouts in Europe").

4. For the purposes of this report, Europe is taken to include all Council of Europe member states except Andorra, Liechtenstein and San Marino due to these countries' limited size. Furthermore, in terms of presentation, Europe has been divided into Western Europe (WE)[1], Central, Eastern and Southern Europe (CESE)[2], plus the Russian Federation and some CIS countries[3] (R&CIS). The report draws mainly on data and information from the Energy Information Administration (EIA) of the US Department of Energy[4], the International Energy Agency (IEA), the European Commission (notably its Green Paper "Towards a European Strategy for the Security of Energy Supply"[5], hereafter referred to as the Green Paper) and Eurostat.

## 2. ENERGY IN EUROPE: CURRENT TRENDS

5. The present section reviews Europe's present energy situation as regards consumption, production and trade patterns, as well as related environmental issues. *Primary energy* is defined as all energy consumed by end-users, excluding electricity, but including the energy consumed by utilities to generate electricity. We will refer mostly to the Btu (British thermal unit)[6] measurement unit. Unless otherwise indicated, all data used in this chapter is from the EIA.

### 2.a. Energy Consumption (Demand)

6. As the figure below illustrates, *total primary energy consumption* (including the amounts lost in the generation, transmission and distribution of energy) has grown in most of Europe over the past decade. Between 1992 and 2002, consumption has grown annually by an average of 1.1% in Western Europe and 2.3% in Central, Eastern and Southern Europe (CESE). In the R&CIS region, energy consumption has fallen steadily (primarily as a result of the collapse of production following the disintegration of the Soviet Union), but has recuperated somewhat in more recent years (at an average annual growth of 1.6% between 1999 and 2002). On a global level, Europe accounted for nearly 29% of world primary energy consumption in 2002 (WE 16.4%, CESE 3.7% and R&CIS 8.6%), with EU-15 alone absorbing 19% of world oil, 16% of natural gas, 10% of coal and 35% of uranium in 1999.

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[1] EU-15 plus Iceland, Norway and Switzerland.

[2] Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, the "the former Yugoslav Republic of Macedonia", Malta, Poland, Romania, Serbia and Montenegro, Slovak Republic, Slovenia, and Turkey.

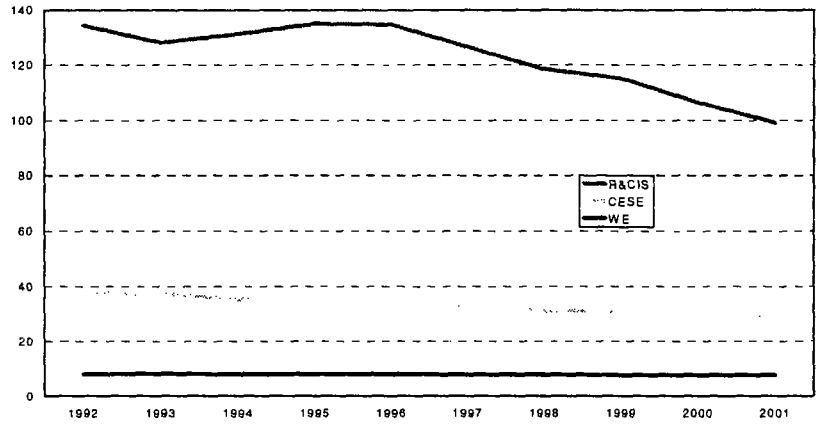
[3] Armenia, Azerbaijan, Georgia, Moldova, and Ukraine.

[4] www.eia.doe.gov.

[5] COM (2000) 769 final, 29 November 2000.

[6] The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit). 1 M ($10^6$) Btu is $2.931 \times 10^{-4}$ G ($10^9$) Wh, while 1 G Wh is 3412 M Btu. 1 M Btu is $2.52 \times 10^{-8}$ M toe (tonnes of oil equivalent), while 1 M toe is $3.968 \times 10^7$ M Btu.

**Average Primary Energy Intensity (Thousand Btu): 1992-2001**




9. The table below shows the average shares of different energy sources in total primary energy consumption in OECD Europe[7], EU-15 and EU-25[8]. Although the share of oil in total consumption has decreased since the oil crises of the 1970s, it still dominates the European energy balance. While the use of coal is generally declining, the use of natural gas continues to increase[9]. On the whole, renewable sources of energy (hydropower; geothermal, solar, wind, and biomass - wood and waste - energy) clearly make a deplorably small contribution to Europe's total energy consumption (with only 7.8% in OECD Europe and 5.9% in EU-15 – and most of this is hydropower). Although the potential is significant, renewable energy sources are at the moment insufficiently exploited in most of Europe.

**Total Primary Energy Consumption by Energy Type (% of total consumption): 2002**

| | OECD Europe | EU-15 | EU-25* |
|---|---|---|---|
| Petroleum | 40.7% | 43.1% | 38.4% |
| Natural Gas | 22.7% | 23.5% | 22.6% |
| Coal | 16.3% | 13.5% | 18.5% |
| Net Nuclear Electric Power | 12.6% | 13.9% | 14.4% |
| Net Hydroelectric Power | 6.4% | 4.4% | 5.8%** |
| Other | 1.4% | 1.5% | 0.3% |

Note: Other includes net geothermal, solar, wind, and biomass (wood and waste) electric power.
* in 2000 (Eurostat data); ** all renewables

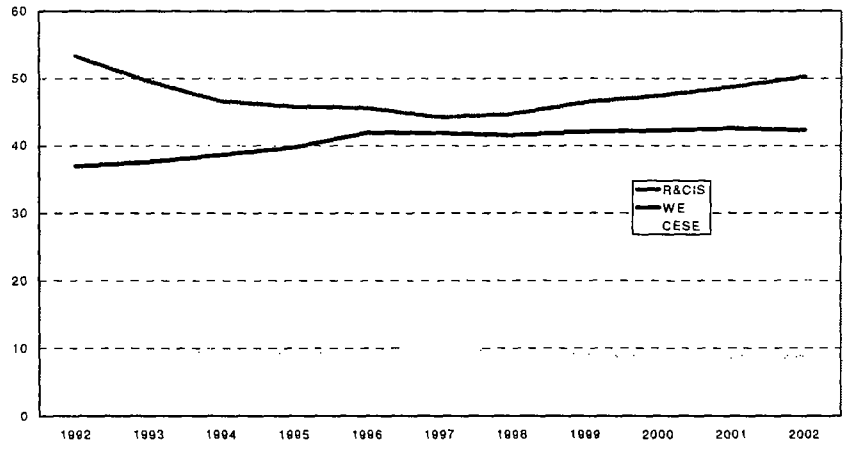
10. The exploitation of renewables varies, however, from country to country - mainly because of diverse geographical and climatic conditions, but also because of policy differences. According to Eurostat, the share of renewable energy sources in total domestic energy consumption within EU-15 in 2001 ranged from around one-fifth/one-quarter in Austria, Finland and Sweden to just around 1-2% in Belgium, Germany, Ireland, Luxembourg, the Netherlands and the UK. Variations are also noteworthy with regard to nuclear energy. Whereas nuclear energy consumption is nil in some countries, the share of nuclear energy in total consumption is quite substantial in others, such as in France where the nuclear sector represents as much 37% of total primary energy consumption and generates 77% of all electricity.

[7] The European member countries of the Organisation for Economic Co-operation and Development (OECD) - EU-15 plus Czech Republic, Hungary, Iceland, Norway, Poland, Slovak Republic and Switzerland.

[8] Similarly, in 1998, the average shares for EU-30 countries (i.e., EU-25 plus Bulgaria, Norway, Romania, Switzerland and Turkey) were: 40% oil; 21% gas; 19% solid fuels (namely coal); 14% nuclear; and 6% renewables (Green Paper).

[9] Between 1991 and 2002 natural gas consumption as a share of total energy consumption in EU-25 increased from 19% to 23% (Eurostat).

**Total Primary Energy Production (Quadrillion Btu): 1992-2002**




16. In terms of different energy sources, the production of oil, gas and nuclear power accounts for around one-fifth and one-quarter each of total energy production in both OECD-Europe and EU-15. The production of coal as part of total energy production is slightly higher in OECD-Europe than in EU-15, while renewable energy sources (i.e., hydropower and other) yield only around 12% in both country groups. Nevertheless, the production of renewables as part of total primary energy production in Europe has increased, albeit slightly. For example, in EU-25, the share of renewables in total energy production rose from 8.1% in 1991 to 10.6% in 2002.

**Total Primary Energy Production by Energy Type (in % of total production): 2002**

| | OECD Europe | EU-15 |
|---|---|---|
| Petroleum | 28.0% | 21.2% |
| Dry Natural Gas | 22.5% | 25.7% |
| Net Nuclear Electric Power | 20.2% | 28.7% |
| Coal | 16.8% | 12.2% |
| Net Hydroelectric Power | 10.2% | 9.0% |
| Other | 2.2% | 3.2% |

Note: 'Other' includes net geothermal, solar, wind, and biomass (wood and waste) electric power.

17. The Russian Federation is clearly Europe's "energy giant". In 2002, it was (after Saudi Arabia) the second largest world producer of crude oil (with 10.7% of world production) as well as the largest producer of natural gas (accounting for 22.7% of world production), the sixth largest hard coal producer, and, in 2001, the fifth largest producer of both nuclear power and hydropower.[12]

18. Some other European countries are also strong in energy production internationally. For example, with regard to crude oil, Norway and the UK were the seventh and the tenth largest producers in 2002. In that year the UK, the Netherlands and Norway were the fourth, sixth and eighth producer, respectively, of natural gas, while Poland and Ukraine were the seventh and ninth largest hard coal producers. Furthermore, in 2001, France was the world's second largest producer of

[12] Key World Energy Statistics: 2003, International Energy Agency.

currently are net coal exporters might have to import 12% of their coal needs by 2020 (as imports may be cheaper than domestic production).

25. Following from their strong positions as oil producers, the Russian Federation, Norway and the UK are also big exporters (the second, third and ninth largest, respectively, in 2002). Russia was also the largest exporter of natural gas in 2002, while Norway and the Netherlands were fourth and fifth. With regard to hard coal, Russia and Poland were the fifth and ninth largest exporters[20].

26. Germany, Italy, France, the Netherlands, and Spain are all among the world's ten largest importers of crude oil, while the same countries and Turkey are also among the ten largest natural gas importers. Germany, the UK, Spain, the Netherlands, and Russia are also among the ten largest importers of hard coal. The Russian Federation is EU-15's single largest supplier of natural gas (with 40% of total EU gas imports in 2001), while the Middle East provided 45% of total EU oil imports in 2001).[21]

### 2.d. Environmental Commitments

27. Carbon dioxide ($CO_2$) emissions are considered to be a major cause behind what is commonly believed to be a current process of global warming. They result from the use of fossil fuels, especially for the generation of electricity. The burning of oil is believed to account for 42% of world $CO_2$ emissions, coal for 38% and gas for 20%, while their use in the world electric power industry accounts for 39% of total energy-related emissions[22]. The Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), signed in December 1997[23], aims to induce countries to reduce emissions of $CO_2$ and other greenhouse gases (that is, methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride ($SF_6$)). Parties to this agreement are to decide how to meet their respective emission reduction goals during a five-year period (2008-2012).

28. Ahead of the entry into force of the Kyoto Protocol[24], the EU has made its target commitments legally binding. EU member countries are expected to reduce, by 2008-2012, their emissions of greenhouse gases to, on average, 8% below their 1990 levels. To reach this goal, the Emissions Trading Directive obliges the member countries to set out national emissions targets and to produce National Allocation Plans (NAPs) specifying the total amounts of $CO_2$ emissions allocated to each industry sector and larger facility (granting them a formal right to emit a certain amount of $CO_2$). Emission allowances can then be traded on an EU market[25], starting in 2005. The Directive was to have been transposed into the national law of member states by the end of 2003, but to date only four countries (Austria, Germany, France and Sweden) have fully complied. Furthermore, only eight NAPs have been approved[26], while another ten are currently being evaluated[27]. Seven countries are hence still behind schedule[28].

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[20] Key World Energy Statistics: 2003, International Energy Agency.

[21] Green Paper.

[22] Key World Energy Statistics: 2003, International Energy Agency.

[23] To date, 141 parties have signed, ratified or accepted the Protocol. Most Council of Europe members have either ratified or approved the Protocol (excepting Albania, Bosnia and Herzegovina, Serbia and Montenegro, and Turkey).

[24] It has to be ratified by at least 55 countries accounting for 55% of total emissions from the industrialised countries. The Protocol entered into force on 16 February 2005,- 90 days after Russia's ratification.

[25] Allowing the "best-performing" entities to sell their remaining emissions credits to those with difficulties in meeting their target levels.

[26] The NAPs of Denmark, Ireland, the Netherlands, Slovenia and Sweden have been approved without further examination, while those of Austria, Germany and the UK have been approved subject to some technical changes.

[27] Namely those of Belgium, Estonia, France, Finland, Latvia, Lithuania, Luxembourg, Portugal, the Slovak Republic and Spain.

[28] Namely Cyprus, the Czech Republic, Greece, Hungary, Italy, Malta, and Poland.

### 3.a. Fossil Fuels: oil, coal and natural gas

32. Proven global **oil** reserves, according to a British Petroleum study[30], presently stand at 1.15 trillion barrels, or about 10% more than in 1980. With current extraction levels, this means plentiful oil supplies for at least the four coming decades. However, while world oil reserves can be considered fairly abundant, western European reserves – notably those of Norway and the UK - are more limited, at only around nine and five years, respectively, of annual production at present levels. The Green Paper estimates - assuming no change in consumption patterns or related technologies - that the EU has proven reserves for only eight years. The oil reserves of the Russian Federation and Azerbaijan are estimated to be somewhat higher, lasting for at least another two decades.

33. Global competition for oil is clearly becoming fiercer as the energy needs of fast-developing larger countries like China and India are soaring. In 2003 alone, the Chinese economy expanded by over 9% with booming energy-intensive industries, such as steel and aluminium production, and rapidly growing car usage - leading to roughly a third of the rise in global oil consumption and propelling the country into the world's second largest oil consumer behind the US. Being a net importer of oil since 1994, China nowadays draws on imports for half of its oil needs. This clearly contributes to putting an upward pressure on oil prices, reinforcing the current trend.

34. While oil prices remained relatively low and stable for most of the 1990s, they have increased and oscillated greatly in the last five years or so. On the whole, however, although oil use might be expected to diminish slightly due to price volatility and environmental concerns over $CO_2$ emissions, it will continue to remain an essential component in Europe's energy balance. There are currently few real substitutes for oil in the largest oil-consuming sector, that of transport, even though the use of biofuels is strongly promoted at EU level and the development of hydrogen cells promising. These new energy forms will face better chances to compete with oil products in terms of cost if the price of oil goes up further.

35. As a voracious consumer of energy and the world's second largest exporter of coal, China has also had a big effect on coal prices, which rose by more than 80% in 2004, a level unseen since the early 1980s. Even though it is the world's largest coal producer, the country's growing energy needs will certainly require more coal for internal use and permit less for export. To sustain their economic success, some big Asian economies like China, India and Korea are also embracing other forms of energy, especially nuclear power and natural gas, but will no doubt remain big consumers of oil and coal for a long while yet.

36. Four-fifths of Europe's fossil fuel reserves are **coal** and other solid fuels such as lignite, peat and oil shale. Within the EU, coal is today commonly used as a back-up fuel and almost exclusively for the generation of electricity. Coal-based power generation – accounting for 32% in EU-25 – is particularly important to Poland (96%), the Czech Republic (75%), Greece (71%), Germany (51%), Bulgaria (40%), Spain (38%) and the UK (32%). However, most European coal is highly uncompetitive compared with imported coal. It is costly to mine due to difficult geological conditions and also in part due to social provisions that are more extensive than in other world regions. Furthermore, coal is bulky and requires large storage areas, putting it at a physical disadvantage *vis-à-vis* oil and gas. It also causes pollution at every production stage and during utilisation.

37. The lack of competitiveness of coal is causing many European countries to abandon its extraction. Although the EU's production of coal has doubled with enlargement, future output is expected to decline as further restructuring of the coal mining industries, especially in Poland and the Czech Republic, continues. Western European coal use will suffer, partly also due to obsolete infrastructure. The IEA estimates that around 40% of western Europe's coal plants will need to be replaced by 2015. Modern technologies, however, promise a somewhat brighter future for coal, with efficiency enhancement and cleaner performance through state-of-the-art technical solutions such as $CO_2$ emissions capture and sequestration.

[30] BP Statistical Review of World Energy.

44. For nuclear power to play full part in Europe's energy balance and to make significant contribution to the security of energy supply, the management of radioactive waste has to improve. Whether such waste comes from nuclear power stations or medical and industrial uses, it needs to be handled in an even safer, more economic, more environmentally acceptable and more publicly accountable manner than up to now. Apart from the low- and intermediate-level waste – which constitutes more than 90% of the total and which can be recycled into low radioactivity end-product for storage through a well-mastered process – materials that are highly radioactive and often have long-lasting activity (such as spent nuclear fuel) require heavy protection and/or complex reprocessing before final storage. Some radioactive isotopes (e.g. Americium-243, Plutonium-239 and Technetium-99) require isolation for many thousand years.

45. The quantities of radioactive waste generated by the nuclear power sector should in all fairness be seen in comparison with those of overall industrial waste. Thus, in the EU-15, high activity radioactive waste in 2000 was about 500m³ compared to 50 000m³ for all types of radioactive waste, about 10 million m³ of toxic industrial waste and one billion m³ of industrial waste. Nevertheless, despite the relatively small volume, high-level waste represents 99% of the total radioactivity resulting from nuclear fission. While low- and intermediate-level waste are disposed of routinely for periods of between 100 and 300 years in sealed containers on protected sites, solutions for long-lived waste are more difficult to find. Many OECD countries are working on projects for the geological burial of such waste. Even though radioactive waste management is widely regarded as a national responsibility, the option of international repositories should also be envisaged.

46. Apart from the conventional nuclear power generation employing nuclear fission reactions to produce heat and electricity, research is aiming to develop thermonuclear fusion comparable to the energy-producing process in the sun and stars. Considered as an inexhaustible (converting hydrogen isotopes, plentiful in nature, into helium), clean (end-of-reaction helium is chemically neutral) and safe (any malfunctioning stops the reaction chain) energy source, fusion is subject to an important global research network. The European Union, the US, China, Japan, South Korea, and Russia have all agreed to combine their scientific and financial resources in building ITER (International Thermonuclear Experimental Reactor) but the project has stalled since December 2003 over disagreements on the site (the EU, China, and Russia favour the French city of Cadarache, while the US, South Korea, and Japan back the Japanese town of Rokkashomura). However, even if research is advancing towards the testing and practical application phase, commercially exploitable power from fusion is not expected to flow before another four to five decades.

47. Conventional nuclear energy currently generates about 17% of the world's electricity and is likely to remain an inevitable energy option in many countries for several more decades, at least until such time as abundant, clean and safe electricity at competitive prices can start flowing from thermonuclear fusion or other technological innovations. In the meantime, the world community must ensure that nuclear power stations currently in operation and those to be built in future function at the highest possible safety level, and that sufficient resources are invested in nuclear waste treatment. The set-up of national laws and international agreements governing nuclear energy is already on the whole comprehensive and complete. This demonstrates strong governmental involvement in the sector, and one that should be made to prevail also in deregulated markets.

### 3.c. Renewables

48. As pointed out in previous sections, renewable energy sources (solar, wind, hydro and geothermal energy, as well as biomass, biofuels, hydrogen and combustible waste) are, on the whole, under-utilised in Europe despite their potential in most countries. A 1996 EU Green Paper[31] and a 1997 White Paper[32] on renewable energy sources have set a political, though not legally binding, goal of increasing the share of energy from renewable resources in total EU's energy

[31] "Green Paper - Energy for the Future: Renewable Sources of Energy", COM (1996) 576, 20 November 1996.

[32] "White Paper - Energy for the Future: Renewable Sources of Energy", COM (97) 599 final, 26 November 1997.

54. Energy markets in Europe are commonly very concentrated and competition limited. The concentration of the electricity market is particularly high in Greece, Ireland, France, Belgium, Portugal, the Czech Republic, the Slovak Republic, and Italy, where the largest provider caters for between 40% and 85% of the total supply. Similarly, with regard to gas, in most cases one company controlled well over 50% of the gas produced or imported[33].

55. In the past few years, however, much progress has been made towards the completion of an internal and liberalised energy market within the EU. The process started in 1999, when some large firms were allowed to choose their electricity and gas suppliers. The entering into force of the new gas and electricity Directives on 1 July of this year extended competition further (with the final step to full market opening expected by 2007). The Directives include measures against anti-competitive behaviour (such as state aid) and seek to ensure a coherent regulatory framework to encourage investments in the generation and transmission infrastructure (for electricity) as well as interconnections and network infrastructure (also for gas).

56. The liberalisation process might, however, be constrained by public demands for state intervention to ensure security of electricity supply, especially following last year's blackouts. Some fear that the deregulation process might undermine incentives for industry to invest in the maintenance of networks and spare capacity. Another worry is that liberalisation will take place at the expense of environmental matters.

57. One crucial question to be answered is about the future of the nuclear energy industry. It forms the object of a heated public debate in some countries, while in others, such as Sweden, it is being reduced in scope via the closure of plants. However, nuclear power is attracting new supporters. One reason is the dilemma aptly expressed by the then Director General for energy of the European Commission, Loyola de Palacio, when she said: "The EU can shut down lots of nuclear plants quickly, or it can meet the Kyoto targets – but not both".

58. However, sustaining or expanding nuclear facilities will be costly. Up to 75% of the lifetime costs (which does not include decommissioning) of a nuclear electricity plant are incurred upfront, compared to around 25% for a gas-fired plant. While a new nuclear plant costs around USD 1 500 – 2 000 per kW of installed capacity, a coal plant costs around USD 1 000 per kW and a gas plant even less (given current coal and gas prices)[34]. Although most argue that nuclear energy is not possible in a liberalised market because of high financing costs, there are innovative "market-friendly" ways of supporting nuclear power generation[35]. It is also necessary to support further research and high safety standards on the storage and management of nuclear waste.

59. Although the use of renewables is increasing step by step, they still play only a marginal role in Europe's energy balance. An eager promoter of renewables, the EU itself is still a far way from reaching the 12% target as a share in total energy consumption. If the situation is to improve, stronger policies and instruments are needed to support the use of new technologies, in particular those meant to lower emissions in the transport sector (such as hydrogen-powered fuel cells or bioethanol). Suggested actions to support renewables include ensuring fair access for renewables to the electricity market, fiscal and financial measures (notably subsidies and tax incentives) and national strategies to be defined by each EU member country. Moreover, profitable energies (such as oil, gas and nuclear power) could help finance the development of renewable energy technologies. Nevertheless, even a significant increase in the use of renewable energy sources will not be enough to cover the ever-increasing demand for energy.

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[33] Energy Infrastructure and Security Supply, COM (2003) 743 final, 19 December 2003.

[34] "Bailing Out Big Business", The Economist, 6 May 2004.

[35] For example, the new nuclear power plant in Finland is supported by a coalition of around 60 companies (including many energy-intensive pulp and paper industries). The coalition has agreed to cover some of the initial costs (with the rest to be financed by commercial debt) and to purchase a certain amount of power once the plant is completed.

64. Demand management would also assist Europe in meeting its environmental commitments. At present, Europe is unfortunately not in a position to respond to the challenge of climate change in general or – and this holds also for EU members - meet the Kyoto Protocol commitments. In order to comply with the Kyoto Protocol, more stringent measures and policies are clearly called for in most European countries. In this regard, a recent Commission Communication on energy infrastructure and security supply[38] calls for initiatives to reduce emissions from the power sector, constrain growth in demand through energy efficiency and introduce common rules for the taxation of energy products.

65. In conclusion, your Rapporteur would like to stress the need to approach energy needs and solutions on a country-by-country basis in order to identify the right "energy mix" and policy combination for each individual country. Nevertheless, within the EU, there is a parallel need for a common energy strategy (if not a coherent energy policy). At the very least, a harmonisation of energy taxes is called for.

## 5. CONCLUDING REMARKS

66. It is in the obvious economic, political and social interest of Europe to establish a sustainable energy future for its citizens. Joint efforts by individual countries and on an institutional European level are needed to manage supply and demand, as well as for better energy co-operation and sharing, including within the framework of the European Energy Charter and its Protocols. At the forefront of supranational energy policy making, the European Union has been advocating various measures to ensure the security of energy supplies while calling for efforts to reduce greenhouse gas emissions. This requires a substantial shift towards the use of alternative or currently underexploited energy sources, greater energy savings at all levels and the revision of the existing Trans-European Energy Network guidelines in the light of recent and future EU enlargements.

67. Modern technologies and coherent regulation can contribute significantly to establishing a better balanced, more diversified and more stable European energy system. Adequate investment is necessary in energy supply infrastructure and technological research, particularly with regard to renewables. The perspective of high and rising oil prices – currently around $46 a barrel – and other fossil fuels is an added argument for a wide ranging reshuffling of European energy industries towards greater diversification, strengthening and renovation of existing capacities, while assuring sustainable provisions for future needs. Whatever policy orientations are undertaken, they must be sufficiently long-term, stable and trustworthy to reassure industrial entities and investors in terms of risk management and profitability. Finally, there needs to be a permanent dialogue with the public in order to shape a broadly shared vision of common energy policies and orientations at European level.

[38] COM (2003) 743 final, 19 December 2003.