

THE EUROPEAN UNION'S NUCLEAR POLICY AND THE APPLICANT COUNTRIES ENERGETIC STRATEGY

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***ABSTRACT** : The nuclear power plays a crucial role in combating global warming, emits no greenhouse or acid rain gases and decreases the energy external dependence. Nevertheless, the European Commission considers the future of nuclear energy in Europe uncertain, because it depends not only on energy demand and environmental issues but also on nuclear reactor's safety and waste problem. The most EU countries have imposed legal or policy restrictions on building nuclear power plants, some of them have made decisions to phase out the use of nuclear power. On the contrary, the EU applicant countries, with low per-capita energy consumption, rely their sustainable development of energetic sector on nuclear power.*

1. INTRODUCTION

The nuclear power is an important feature in today's energy supply, providing nearly a quarter of OECD electricity, being an important element in energy security. The nuclear technology is a mature, established one, with 40 years of successful operation behind it. However, the nuclear power growth during the last two decades slows down, despite its environmentally sustainable basis. The most EU countries have adapted a moratorium or have decided to close the nuclear power plants, while the EU applicant countries consider the nuclear option very important for sustainable development of the energetic sector.

2. ENVIRONMENTAL ISSUES

In the Green Paper of the European Union it is revealed that the issue of the struggle against climate changes is a major challenge, and that commitments made in the Kyoto Protocol

are only the first step. Greenhouse gas emissions are on the increase in the Union, as they are all over the world. About 7% (ca. 300 Mt of emissions in the EU in 2010) of the greenhouse gases emitted in the Union is possible to be avoided through nuclear energy.

One of the causes of the slowdown in nuclear growth during the last two decades, especially the absence of new orders for very high investment costs in nuclear plants, was nuclear accidents in Three Mile Island (1979) and Chernobyl (1986). Different from the TMI accident, which caused no physical harm to anybody, in the Chernobyl accident radioactive materials were spread over large areas of Europe.

The public concerns about plant safety, accidents, environmental protection and disposal of long-lived plant wastes have rising impact.

The two most important environmental questions facing nuclear power today are the fate of long-lived radioactive waste (the weak point) and climate change (the strong point). Most countries with operating nuclear plants developed in the past two decades technical procedures and suitable site for safely isolating radioactive wastes (geological isolation). But these facilities will not be operational before 2020 (may be 2010 in the USA).

Nuclear power is a potential contributor to reducing carbon dioxide emissions, because the electricity generation accounts for about one third of those emissions. A strong commitment to reduce of carbon dioxide could have an important positive effect on the prospectus for nuclear power in coming decades.

The main question of the Green Paper is as follows: “Seeing that nuclear energy is one of the elements in the debate on tackling the issues of climate change and energy autonomy, how can the Community find a solution to the problem of nuclear waste, reinforcing nuclear safety and developing research into reactors of the future, in particular fusion technology?”

The environmental issues are of increasing importance and policy – makers must take it into account.

3. ENERGY EXTERNAL DEPENDENCE

Due to the higher and higher energy needs, the EU countries are importing more and more energy products. If no measures are taken, during the next 20 to 30 years 70% of the Union’s energy requirements will be covered by imports. At present 45% of oil imports come from the Middle East and 40% of natural gases from Russia.

TABLE 1. The contribution of nuclear in electrical energy generation

	State	No. of reactors	Electrical Power GWe	Nuclear Generation Share (%)
	EU Member			
1	France	59	62.4	77
2	Belgium	7	5.7	56
3	Sweden	11	9.4	39
4	Finland	4	2.4	32
5	Germany	19	21.1	31
6	Spain	9	7.5	28
7	United Kingdom	35	12.9	22
8	Netherlands	1	0.4	4
	EU Applicants			
1	Lithuania	2	2.3	74
2	Slovakia	6	2.4	54
3	Bulgaria	4	2.5	45
4	Hungary	4	1.7	42
5	Slovenia	1	0.6	38
6	Czech Republic	6	3.7	19
7	Romania	1	0.7	11

In 2000, the main EU net importer countries were Italy (-44347 GWh), the Netherlands (-17850GWh), the UK (-14174 GWh) and Finland (-11800GWh) while the main UE net exporters were France (69479 GWh) and Austria (1296 GWh). The search for greater energy security could once again work in favour of nuclear power.

Nuclear power plants in Europe produce 35% of the EU's electricity. The contribution of nuclear in electrical energy production for EU members and applicants is presented in table 1

4. EU NUCLEAR PERSPECTIVES

The political priority in the Union, for increasing security of supply and combating climate change, are new and renewable energy sources. The officials of the Directorate General

for Energy and Transport of the European Commission have done calculations that would indicate that during the next two decades they might need between 200 and 300 GWe of new generating capacity, not taking into consideration the replacement of the existing park.

The Commission's Green Paper regarding the role of nuclear, together with coal, oil, gas and renewable as energy options, concludes that the future of nuclear energy in Europe is uncertain. It depends on several factors beyond energy demand, like the solution of the nuclear waste problem, the safety of reactors in Eastern Europe applicant countries, and policies to combat global warming.

The primary energy supply by fuel and the energy sources for electricity generation in 2000, and the previsions for 2030 in EU are presented in the table 2 [2,3,4].

TABLE 2. Fuel shares of electricity generation and primary energy supply projection for 2030

	Energy Sources for Electricity Generation		Primary Energy Supply			
	World -2000	OECD -2000	World -2000	OECD -2000	EU -2000	EU -2030
Coal	39.1%	37%	23.5%	21%	16%	19%
Nuclear	16.9%	24%	6.8%	11%	15%	6%
Oil	7.9%	7%	34.9%	41%	41%	38%
Hydro	18.7%	17%	13.7%	6%	6%	8%
Gas	17.4%	15%	21.1%	21%	22%	29%

Source: IEA, Electricity Information 2000

The role of nuclear power will decline, because few new reactors will be built and some will be retired.

Several EU countries (Sweden, Spain, the Netherlands, Germany, and Belgium) have adopted a moratorium, while the three member states (Finland, France, and the United Kingdom) have not taken yet a negative decision.

Greece is concerned with seismic safety of nuclear power plants. In Denmark, based on 1985 parliament decision, nuclear power should not be considered in energy planning. In Austria, since 1978, the law prohibits construction or operation of nuclear power plants. A referendum in Italy (1987) stipulates that no new plants be built, and all existing nuclear plants be shut down (they are now closed by law, since 1990). Almost half of OECD countries have placed restrictions on building nuclear power plants.

5. SITUATION AND PERSPECTIVES FOR NUCLEAR POWER IN APPLICANT COUNTRIES

The contribution of nuclear in electricity generation in the EU candidates [table 1] amounts to 11% (Romania) and 74% (Lithuania). Because of difference in per-capita electricity consumption between EU members and applicants the electricity demand in the near future for EU accession countries will rise. The governments of these countries consider the nuclear option the mile stone of their energetic strategy, taking into account that the nuclear power plants: - reduce reliance on imported fossil fuels; - emit no greenhouse or acid rain gases; - play a crucial role in combating global warming. Often, the national policy is not in accordance with the EU recommendation for the “Energy” chapter.

In the EU “Country Report for **Romania** – 2001” the Romanian government is requested to postpone the commissioning of the second reactor (700 MW) of the Cernavoda Nuclear Power Plant (from five identical reactor units designed initially) until a minimum investment cost is obtained and to get the capacity for sustaining the energetic strategy. The report highlights that the energy efficiency is low and the existing power plants have a capacity surplus. In reality, from the 20 Gwe installed in 1989 in the electric plants from Romania, more than a half are inefficient, or have expired lifetime, some being already decommissioned. The increasing consumption of electrical energy required in 2001 a pick power of 9GW, but the per-capita electricity demand in Romania account to 3000 kWh, compared to 15000 kWh in UE countries.

The report regarding the **Czech Republic** shows that “the zero action”, i.e. the decommissioning of the Temelin nuclear power plant needs to be taken into consideration. In fact, the design of the Temelin power plant was modified and upgraded to bring the plant up to internationally accepted safety standards. The Czech energy policy took the realistic approach that in short term Dukovany (4x440 MW) and Temelin (2x1000 MW) NPPs would provide and ideal source of base-load power. Dukovany is expected to operate until 2025 and Temelin is planned to run at least to 2040. More than 60% of Czech citizens support the nuclear policy of the government.

In **Slovakia**, completion of the reconstruction work of Bohunice NPP (units 1 and 2) substantially increased nuclear safety. Units 1 and 2 of the Mochovce plant, completed in 1998 and 1999 with enhanced safety features recommended by the IAEA, have brought an important contribution to the production of safe, reliable and environmentally friendly energy in Slovakia.

Nuclear is the key sector of the Bulgarian electricity system, which enables **Bulgaria** to cover about 45% of the electricity needs of the Balkan Region (the export in 2001 in the amount of 7 billion kWh). The early closure of the four oldest units of Kozloduy NPPs has been requested by the European Union as a precondition for Bulgaria's access to the EU. Units 1 and 2 have already been closed.

In November 1999 Bulgaria signed a Memorandum of understanding (MOU) under which this country agreed to close units 1 and 2 before 2003. The EU insisted that the closure dates for units 3 and 4 be reached by the end of 2006, but there has been a Bulgarian proposal for the units to be allowed to operate after 2006, taking into account the recent safety improvements. Units 5 and 6 have been upgraded to higher safety standards and will continue to generate electricity. In Bulgaria there is a strong public support for nuclear, a clear majority of the citizens are in favour of nuclear power as an energy source. The Bulgarians are receptive to arguments in favour of the closure of Kozloduj only in the context of the further development of nuclear energy and with the compensation payments under the EU's Euratom treaty in return.

Nuclear Energy continues to play a decisive role in the electricity supply of **Hungary**. The two chapters of the negotiations on EU accession, "Energy" and "Environment" were closed. Hungary does not request a transitional period in the field of nuclear energy, nuclear safety and radiation protection. The nuclear-related issues of the environment are considered to be proper.

The nuclear power plant Ignalina, **Lithuania**, with two reactors, of the same type as the Chernobyl reactors, was modernized. Because this NPP produces almost 80% of the electricity demand, the government decided to postpone the closing of the reactors until 2009. The EU officials consider that decision as a serious brake for Lithuania's access into the European Union.

During the debates of the European Parliament regarding the nuclear policy of the applicant countries, they highlight the idea that the candidate countries cannot be asked to observe more rigid security regulations regarding nuclear power plants, except those operating for the European Community and these are sovereign countries and thus have the right to decide what actions to be taken with regard to the energetic sector.

6. REFERENCES

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