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The future of nuclear energy in the European Union

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The Commission's Green Paper

Energy Security

The Commission's Green Paper on security of supply was published in November 2000. Since that date it has been the subject of a debate around a number of essential questions. A number of them are worth briefly repeating to set the scene in Europe.

- The European Union is consuming more and more energy and importing more and more energy products. External dependence for energy is constantly increasing.
- If no measures are taken, in 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 gas from Russia
- The European Union now has to face new challenges. These include:
  - Enlargement - to perhaps 30 Member States with different energy structures
  - Liberalisation of the sector. The competition introduced in the electricity sector by the internal market is changing the conditions of competitiveness
  - Environmental concerns, which are nowadays shared by the majority of the public and which include damage caused by the energy supply system.

On the specific issue of the environment, the struggle against climate changes is a major challenge. The commitments made in the Kyoto Protocol are only a first step. Greenhouse gas emissions are on the rise in the Union as in the rest of the world.

The energy debate "should take into account that current energy demand is covered by 41% oil, 22% gas, 16% coal (hard coal, lignite and peat), 15% nuclear and 6% renewables. If nothing is done, the total energy picture in 2030 will continue to be dominated by fossil fuels: 38% oil, 29% gas, 19% solid fuels, 8% renewables and barely 6% nuclear."

Of the eight Member States of the European Union now operating nuclear power plants, five (Sweden, Spain, the Netherlands, Germany and Belgium) have adopted or announced a moratorium. Italy renounced nuclear power after a referendum in 1987. This leaves three Member States – Finland, France and the United Kingdom – who

[1] The views expressed in this paper are those of the author and do not necessarily reflect those of the European Commission or its Services

have not taken a negative decision. Needless to say, all eyes are fixed on Helsinki for tomorrow's decision by the Parliament.

Personally I have doubts that the importance of nuclear will decline to such an extent. However, I have no special insights as to its possible future. We have done calculations that would indicate that during the next two decades, we might need between 200 and 300 GWe of new generating capacity. Replacement of the existing park could almost double this amount. Even if these predictions turn out to be far wide of the mark, it is still clear that there will be a substantial market for new capacity. I should point out now that this is the only bit of "crystal ball gazing" that I will do during this talk. I will not speculate on nuclear's possible share of this market-only some of the other factors that could influence its future as an energy source.

However, before discussing our view of the future of the nuclear option, I would like to highlight for you our political priority in the energy sector – new and renewable sources of energy.

New and renewable sources of energy

First the good news…

- Renewable energy sources have the potential to play a much larger role than they presently do.
- There has been significant progress in renewable energy technology in recent years. For example, wind energy is now widely recognised as a viable option.
- There are really no supply problems (except for sun in Belgium!).
- Over last 15 or so years, there has been a steady increase in energy production from renewables (around 30%). In the wind energy sector the recent increase has been nothing short of spectacular (2000% in 10 years).
- Most renewables produce little or no greenhouse gases so do not contribute to climate change.

Unfortunately…

- Targets for steadily increasing the share of renewables have not been achieved.
- The 30% increase in energy production over 15 years is insignificant in absolute terms
- The development of new sites, in particular for hydroelectricity, often meets with strong local resistance.
- There are obstacles of a structural nature – especially for the generation of electricity.
- Most importantly, many renewable sources are more expensive than conventional fuels.

In conclusion

- New and renewable energy sources are a political priority in the Union - for increasing security of supply and combating climate change.
- The Commission has set a target of doubling the share of renewables in global energy consumption from 6% in 1997 to 12% in 2010.
- However, their development calls for:
  - major efforts in terms of research and technological development
  - investment aid and
  - operational aid.

The role of nuclear

In the Green Paper, nuclear is grouped together with coal, oil, gas and renewables as "***less than perfect***" energy options.

Together with coal it is classed as an "***undesirable***" and referred to as a "***source of energy in doubt***" which is ***"tainted by the original sin of dual usage (civil and military) in the fuel cycle***".

The Green Paper concludes that the future of nuclear energy in Europe is uncertain. It depends on several factors beyond energy demand. These include:

- a solution to the problems of managing nuclear waste,
- the economic viability of the new generation of power stations
- the safety of reactors in Eastern Europe, in particular applicant countries
- policies to combat global warming.

The question

According to the Green Paper, the "essential question" for nuclear is:

How can the Community:

- ***develop fusion technology and reactors for the future;***
- ***reinforce nuclear safety; and***
- ***find a solution to the problem of nuclear waste?***

The main issues in nuclear future

None of the topics raised in the question are new. In fact the Community has been working on all of them for over 20 years – and in some cases even longer. Millions of Euros – in fact, in some instances, ***billions of Euros*** – have been spent tackling them.

Fusion technology

By far the largest Community financial contribution into research in the nuclear area is into fusion technology. Collaboration started in 1978. It has enabled Europe to assume a leading position world-wide in the development of fusion. Close to 800 M€ was allocated to this work under the Fifth Framework Programme and a similar amount has been proposed under the Sixth Programme.

This is not a short-term solution. If everything goes to plan, the next research reactor[2] could be working by 2020 – but a first decision has yet to be made concerning its site. After that, if all goes well, it is hoped that an electricity-producing reactor could be operating by 2050. Full commercial operation would likely take somewhat longer. It is clear that these activities could – if successful - only influence European energy production in the longer term.

Research into fission reactors

The Community's Framework Programme directs some research into new reactor systems. However, the funding on this research is around two orders of magnitude less than on fusion.

This should not, of course, be taken as a lack of interest by the Commission in this area of new reactor technology. It is a realisation that the development of new reactors can – and should - be left to the industry.

As you probably know better than Commission officials, there are already a number of advanced reactors that have been developed – some of which are already in operation or ready to be built. In Europe, designs are in the process of being developed to meet the very detailed European Utility Requirements (EUR).

For the medium-term future, the Commission is involved in the US-led Generation IV activity.

So it appears to me that when new nuclear plants will be required, there will be several attractive designs on the market. These are expected to have a number of advantages over the present generation of plants:

- better economics (with lower investment costs and construction times),
- simpler designs,
- modular units and,
- more passive safety features.

Reinforcing nuclear safety

When the authors of the European Atomic Energy Community drafted the

[2] The International Thermonuclear Experimental Reactor (ITER)

EURATOM Treaty, thoughts of nuclear installation safety and radioactive waste were not uppermost in their minds. For several years there was no Community activity directly dealing with nuclear installation safety. It was not until 1975 that the Community woke up to the seriousness of the issue. By then, nuclear power programmes in its then Member States had progressed and diverged along very different routes. Moreover, not only were many of the installations very different, but the national systems regulating them were also different.

Because of these different historical backgrounds, legal frameworks, type and number of reactors and different approaches to regulation (of a greater or lesser prescriptive nature) there have been no significant attempts in the past to establish common rules to be applied across the Community.

However, as a result of co-operation between the main actors in the EU since the 1970s, there is a "***non-binding acquis***" that is built on fundamental common principles. These form the basis of all the EU national nuclear safety regulations.

This slow route to harmonisation of regulations and practices appeared acceptable to most players until enlargement became an issue in the 1990s. As a result a number of Soviet-designed nuclear reactors could soon be located in the Community. This brought calls for the Candidate Countries to meet Western safety standards.

For the first time in its history, the European Union started the process of carrying out an evaluation of nuclear safety in an independent State. In fact, in all the candidate countries. The Council's report is being used in the negotiations on enlargement. Monitoring activities are also being undertaken. However, this can not be the end of the process as far as nuclear safety is concerned.

The debate on nuclear safety in the context of enlargement raised vital questions about what are Western standards for nuclear safety.

In this context the declaration on the subject of nuclear safety by the Laeken Summit is very important.

"The European Council undertakes to maintain a high level of nuclear safety in the Union. It stresses the need to monitor the security and safety of nuclear power stations. It calls for regular reports from Member States' atomic energy experts, who will maintain close contact with the Commission.

One month ago, my Commissioner, Vice President De Palacio, appeared before a Parliamentary committee and addresses this very issue. As she said, she does not understand how we – in the European Union – can adopt detailed standards for the quality of water in rivers and lakes but not have a common approach to nuclear safety. She made it very clear that she wished to propose a Community approach to nuclear safety in the form of common standards and European mechanisms of control that would guarantee the application of the same methods and criteria throughout an enlarged Europe. The objective is to ensure that all States would have equivalent levels of nuclear safety.

Of course, this is not to imply that we think there should be a change to the existing responsibilities. Far from it. The operator must retain the primary responsibility for nuclear safety – under the control of the national regulatory bodies. This is a system that works well and should – must – continue to work well into the future. The

standards of nuclear safety in the Union are high and must remain high if nuclear energy is to have a future.

The first framework proposal paving the way for establishing more detailed European nuclear safety standards might then be expected sooner rather than later. We hope that the nuclear industry – and the nuclear regulators – will work closely with us in advancing this vitally important activity.

A solution to the problem of nuclear waste

A Public Opinion survey conducted in October 2001 – within weeks of the events of 11 September - shows that the majority of people in the European Union would support the nuclear energy option ***if the waste can be safely managed***. In response to the statement *"if all the waste is managed safely, nuclear power should remain an option for electricity generation in the European Union"* there are two people in agreement for every one against. In only one Member State, Austria, do those people who disagree outnumber those who agree. This for us highlights the important need to address this issue.

Undoubtedly the biggest issue concerning radioactive waste management is that of high level waste. All other aspects have already reached the industrial stage and a large majority of the waste has already been disposed of.

There is a very broad consensus on the concept of geological disposal. The necessary technologies to do it have all been tried and tested. Research and development will continue to refine data, models, and concepts. In fact research on the management of radioactive waste will be the key element in the Community's Sixth Framework Programme.

However, the experts have very little, if any doubt that we could dispose safely of wastes today. There are now no technical reasons to delay decisions on disposal.

The delays in identifying sites for geological repositories must be a cause for concern.

Because of this, the Commission is preparing a proposal for a framework Directive on the management of spent nuclear fuel and radioactive waste. This would require Member States to prepare a detailed strategy or work programme for radioactive waste and report on this to the Commission at regular intervals. It would also seek to impose a relatively strict timetable on progress towards siting and developing geological and other repositories. In this way we hope that the Community will advance more rapidly towards an acceptable – and fully transparent – solution to the issue of its wastes.

Before leaving this issue, I would just like to mention briefly the issue of funding radioactive waste management in the longer term. It is clear that much of the waste – especially the high-level and long-lived waste – will not have been disposed of when the reactors producing it have closed. It is clear that the companies producing these waste will need to make the funds available to assure the long term safety of this waste. This is also true for any spent nuclear fuel that has not been reprocessed or will not be reprocessed. We will address this very important topic in a new Directive concerning the creation and management of funds to cover these liabilities and all others relating to the decommissioning of nuclear facilities.

Conclusions

There are a number of very important factors that will influence the future of nuclear energy inside the European Union. Some of these have not been discussed here as they are self-evident. The first and foremost of these is the continuing safe operation of the existing nuclear facilities. The second is the demand for energy, in particular electricity. The third is the nuclear sector's ability to meet a share of this demand in a competitive way.

If the demand materialises, there are likely to be reactors available that can further improve nuclear competitiveness while maintaining its recent excellent safety record. It will be the market that should determine which, if any, of the technologies and designs will succeed – and which will not.

If new plants are to be built, greater Public acceptance might be realised if they meet the same high level of safety standards throughout the Union. Here the Commission has a very important role to play together with the nuclear regulators and the industry. We will make proposals about EU nuclear safety standards in the near future.

The safe disposal of high level waste does not, on the other hand, have the advantage of having been shown to be feasible. However, the experts are convinced that it is. To ensure that it is done, the Commission will soon be proposing European legislation covering the preparation and publication of plans for radioactive waste management in all States of the Union and proposing a timetable for setting up disposal sites. It will also bring forward proposals concerning the creation and management of funds for waste management and other liabilities that remain after the end of a nuclear facility's economic life.

Public concerns about nuclear need to be addressed clearly and openly. Better information should be available. The whole nuclear sector has a very important role to play here. However, it must be able to expect strong support and clear decisions from governments. Otherwise our inability to act will pass on a dangerous legacy to our children – and nuclear will be left with a future that never was.

Greater transparency, better communication and more involvement by the Public in the decision making process – coupled with political will to address, rather than avoid, the issues – will create the basis for the future of nuclear energy in Europe and elsewhere in the world. The Commission will strongly promote such an approach.

Vice-President De Palacio has gone very clearly on record insisting that the nuclear option must remain open if we are to have any chance of meeting our Kyoto targets. The Directorate General for Energy and Transport is committed to work to keep the option open. It is clear that ***our task is not now to specifically promote the use of any specific nuclear technology but to create the environment in which nuclear energy can be used safely in those States wishing to do so***. The Commission will do everything it can to promote – with full openness and transparency - the conditions necessary for the nuclear option to remain open safely.

Brussels, 23 May 2002