

Position Paper on PINC

Introduction

Foratom welcomes the European Commission's initiative to draft a 5th Illustrative Nuclear Programme (PINC). A new and comprehensive PINC investigating the prospects, drivers and constraints of nuclear should serve as a roadmap for nuclear energy and thus stimulate action and help coordinate development of investment in the field. The PINC should be a timely reminder that the nuclear sector has a **key role to play in enhancing competitiveness, promoting sustainable development, fighting climate change and in strengthening the security of energy supply in the EU.**

Objectives

- **PINC – a strong need for a long-term vision on nuclear energy**

The Communication of the Commission on PINC is an opportunity for a forward looking analysis of the prospects for development of nuclear power in the European Union. The upcoming document should present a concrete long-term vision for the nuclear sector and discuss possible scenarios assuming different shares of nuclear electricity and the impact they would have on security of supply, competitiveness and sustainability in the EU. PINC should also contribute to setting clear targets for long-term, low-carbon electricity production in the EU.

- **Publication of PINC will strengthen the energy debate**

The recent Green Paper 'A European Strategy for Sustainable, Competitive and Secure Energy' highlighted a number of pressing concerns facing Europe's future energy needs. Specifically, that the EU's import dependency is rising and reserves are concentrated in just a few countries, global energy demands are growing rapidly, oil and gas prices are increasing and our climate is getting warmer.

The Green Paper declares that the EU can play a useful role in ensuring that all costs, advantages and drawbacks of nuclear power are identified for a well informed, objective and transparent debate. A new PINC at this time has a mandate to fulfill such a role and should be used as the primary tool for stimulating serious discussion on the role and importance of nuclear in helping tackle the challenges faced by the EU.

- **PINC needs to stress the importance of strengthening security of supply**

Nuclear energy contributes to security of energy supply in the EU. Uranium is available from a wide range of sources in different parts of the world, which are politically stable. Current estimates for world uranium reserves indicate sufficient

resources to support a significant expansion of nuclear energy¹. In addition, already existing technologies will permit a more efficient use of these resources (e.g. next generation reactors). The fuel volume requirements of a nuclear power plant are relatively small, compared to fossil fuels and EU operators stock fuel supply for several years, thereby contributing to the security of supply.

▪ **PINC reflection on the importance of nuclear in promoting economic development**

Recent international studies (e.g. OECD²) have shown that nuclear electricity in almost all cases is more competitive than electricity from fossil fuels. Any rise in uranium prices would have only a minor impact on the cost of nuclear electricity as it represents only 5-10% of the overall cost of producing nuclear electricity. The cost of nuclear electricity has shown itself to be stable and predictable, and has the advantage of being able to compensate for electricity price increases resulting from fluctuations in fossil fuel costs.

The PINC should stress that clean, affordable and reliable sources of energy, like nuclear electricity, play a vital role in economic development. Also, the nuclear industry represents an important indigenous added value to the goals of the Lisbon strategy. For the European industry, in particular energy intensive industries, stable, predictable and affordable energy prices are of paramount importance to boost economic growth and create jobs in the EU. Most nuclear power plants operate continuously as a base load with very high capacity factors, as they are normally only stopped for refuelling and routine maintenance.

▪ **PINC should stress wider use of low emitting technologies**

Nuclear energy as a part of a balanced energy mix has a role in reducing dependency on fossil fuels and thus minimising the long-term negative impact on the climate. During operation, nuclear power plants release no greenhouse gas emissions into the atmosphere. When analysed in detail, the life-cycle greenhouse gas emissions of a nuclear MWh are up to 100 times inferior to those of the most efficient natural gas technology and equivalent or inferior to those of most wind power installations³. Today, the use of nuclear electricity in the EU25 contributes by saving nearly 700 million tonnes of CO₂ emissions a year, which is equivalent to the annual emissions of the whole private European car fleet. Furthermore, nuclear power plants generate electricity with hardly any emissions of sulphur dioxide or nitrogen oxides, key agents for acid rain and petrochemical air pollution.

¹ According to the Joint report of IAEA and NEA/OECD "Uranium 2005: Resources, Production and Demand" (p. 78), there is 270 years of 2004 world nuclear electricity generation with total conventional resources and 675 years if phosphates are included.

² Nuclear Energy Agency OECD (2005), Projected Costs of Generating Electricity.

³ Sources: 1) Meier & al. (2005) *US electric industry response to carbon constraints, Lifecycle assessment of supply side alternatives*, Energy Policy 33, 1099-1108, University of Wisconsin-Madison, 2) IAEA Bulletin (2000) *Greenhouse gas emissions of electricity generation chains, Assessing the difference*, <http://www.iaea.org/Publications/Magazines/Bulletin/Bull422/article4.pdf>, 3) OECD-NEA *Nuclear Energy and the Kyoto Protocol* (2002), 4) *Environmental Product Declaration of Electricity from Torness Nuclear Power Station*, May 2005.

- **PINC – an opportunity to put Kyoto back on track**

The Communication of the Commission on PINC is an opportunity to promote nuclear power in the replacement or next phase of the Kyoto Protocol. The non-mention of nuclear power within the Clean Development Mechanisms defined under the protocol has effectively excluded the largest non-emitting primary fuel at a time when it is most needed. The EU leads the world in its nuclear share of the energy mix and the next PINC is a timely opportunity to extol the virtues of this technology as a means to meet the growing energy needs of the world whilst mitigating the harmful effects of global warming.

- **Maintaining of know-how and technological leadership of the EU**

European nuclear industry currently enjoys a world leadership role in reactor design, fuels and services; its R & D activities in nuclear science and technology are among the best in the world. In order to keep those employed in the nuclear fuel cycle as an essential component of the EU energy industry, know-how and expertise in the nuclear field needs to be maintained and enhanced. The nuclear industry contributes significantly to job creation in the European Union. However, political support is crucial to keeping the interest of educated graduates in the nuclear energy sector. In order for the EU to maintain its world leadership in safe and clean nuclear energy technology, further investment needs to be stimulated. It is important that PINC also discusses the potential bottlenecks for the future development of nuclear energy, in particular industrial capacity to produce large nuclear power plants components.

- **PINC should reflect progress of nuclear safety, waste strategies and decommissioning financing**

The EU has an excellent long-term safety record and safety is of paramount importance for the nuclear energy sector. The economic performances of nuclear plants have been improved following technical upgrades and safety enhancements which have also led to the extension of their lifetimes. In the opinion of the nuclear industry, any further common frame of reference for nuclear safety should enhance predictability and efficiency and should promote harmonization of national licensing requirements. The statutory role of the national safety authorities should be maintained and the international cooperation between them should be encouraged.

The nuclear industry is highly committed to working closely with the regulators in order to enhance the harmonisation of safety standards in the EU. With that objective, the industry has launched the European Nuclear Installations Safety Standards (ENISS) initiative which works as a forum for exchanging information about and keeping abreast of new national and international regulatory activities, and for articulating a shared industry position on safety requirements in the various countries. The ENISS is engaged closely in discussions with WENRA with respect to the “Reference Levels” and is seen as a major stakeholder representing the nuclear industry position.

The nuclear industry takes a full responsibility to ensure that nuclear waste is taken care of in a safe way. Low and intermediate level waste repositories are already operating in many EU Member States. The technological solutions for high level radioactive waste treatment exist and the industry has continued to develop and advance its waste management processes in order to reduce both volume and increase safety. The current strategies for the disposal of radioactive waste include surface storage and reprocessing. In some Member States plans have been approved in order to dispose high level waste in deep geological repositories. Credible technological solutions for the safe disposal of radioactive waste exist and can be implemented with the necessary political will. A common, European frame of reference for the management of radioactive waste is desirable, in particular in the field of final repositories.

The industry also considers that financial arrangements for nuclear plant decommissioning should be established and managed in such a way as to secure availability of adequate resources when they are needed.

Projections for the development of nuclear energy

▪ Current status of nuclear energy in the EU and worldwide

There are currently 147 nuclear reactors operating safely and economically in 13 of the 25 EU Member States, totalling 130 GW. Since the 4th Illustrative Nuclear Programme of 1997, the nuclear industry in the EU has evolved significantly. Extensive nuclear new build projects and life extension decisions in many European Member States and Acceding Countries show that a new momentum for nuclear is gaining ground. Finland is currently building its fifth nuclear reactor to be operational in 2009/2010. France and the Baltic States have decided on a nuclear new build. The United Kingdom, Czech Republic, Slovakia, Poland, Slovenia, Bulgaria, Romania and recently the Netherlands and Sweden announced plans to build or upgrade nuclear reactors, or extend the life-time of existing plants. Many other countries are reassessing their energy policies in light of increasing electricity demand and worries over future security of supply.

Worldwide, in many countries such as Japan, South Korea, USA, Russia, South Africa, China and India plans for major nuclear new build are advancing.

▪ EU25 requires major nuclear new build

Globally, nuclear power will grow significantly in the years to come, in particular in the developing countries. For this reason the European Union must maintain its industrial and technological leadership in this field. Specifically, the EU and Member States must encourage a positive investment climate for the energy sector, promoting security of supply, if it is to compete successfully in the world's economy.

At present, low-CO₂ energy sources supply 21% of EU25 primary energy consumption. Nuclear is by far the major contributor (15%), before biomass (4%)

and hydro (1.5%). Thus, maintaining nuclear share in EU25 electricity generation mix is essential if the EU wants to give itself low-CO₂ energy strategic objectives. According to the European Commission (Annex to the Green Paper on Energy) the share of electricity production for the EU25 in 2030 will amount to nearly 4 500 TWh. Maintaining the share of nuclear generated electricity at the present level of 31% will mean generating nearly 1400 TWh of electricity from nuclear power plants which can be translated into the equivalent to 174 GW, operating at 8 000 hours a year. For the basis of this calculation it is assumed that with feasible life extensions the average lifetime of nuclear power reactors in the EU will be approximately 50 years. With this assumption, 38 nuclear reactors, totalling 25 GW, currently operating in the EU25, which were built before 1980, will shut down by 2030. Building a nuclear reactor is an approximately 10 year process from application to power production. Replacing the missing generating capacity and meeting the forecast increase of electricity demand while keeping the share of nuclear generated electricity will require building 3 GW of new nuclear capacity per year before 2030.

- **Enhancing investment**

Investment in infrastructure should be promoted in order to support the development of nuclear energy. The PINC should reflect the recent encouraging trends and send positive signals to interested stakeholders. Also, acceleration, streamlining and clearness of authorisation procedures in Member States and increasing transparency in the market would help future investment in the energy sector. Harmonisation of regulatory and licensing procedures is of key importance for boosting investment in nuclear power plants and infrastructure. The Member States should ensure that a stable policy framework, as well as a regulatory and market framework is in place to enable companies making timely investments and to provide clarity on timescales of licensing.

- **PINC should encourage a strategic plan for technology and innovation**

Research initiatives have already made substantial progress and advanced reactor designs performed in multinational R&D programmes *Generation IV* and *INPRO* will in the near future represent a further step forward in nuclear fuel efficiency and nuclear safety.

In the longer term, large scale use of energy should valorise the use of hydrogen which is now seen as a future energy carrier able to reduce CO₂ emissions and to replace fossil fuels in transport and fixed installations. Hydrogen can be produced by electrolysis of water enabling utilisation of nuclear plants off-peak capacity or by chemical dissociation of water using very high temperature reactors developed within the Generation IV framework. Furthermore, desalination of sea water is another field where nuclear energy can play a major role in solving this emerging concern in many parts of the world.

▪ **PINC should highlight the role of nuclear energy in EU external relations**

Relations of the European Union with the third countries should take into account nuclear technology exports. EU is the world leader in safe nuclear technology and it can contribute significantly to promoting nuclear science, practices and safety culture in the third countries thus enabling them to stimulate economic growth and fight climate change. Export of nuclear technology also represents an important value for the EU's economy by enhancing its competitiveness on the world markets.

Conclusion

The 2007 PINC needs to refer directly to the central role nuclear plays in the debate on Europe's future energy needs. European Commission President Barroso, during the press conference presenting the Green Paper on Energy in March 2006, indicated that there is a need *"for over half of the European Union's energy being secure and low carbon sources within 20 years"*. The other essential element in the energy policy for Europe, he mentioned is sustainability and he indicated that *"we (the European Union) have to accelerate the transition to a low carbon economy using both new energies and existing ones. There should be no taboos in this debate"*.

Nuclear energy can effectively address such challenges. It is therefore an important part of the solution and a vital component of the energy mix. The industry is engaged in an open dialogue with the public, decision-makers and the media in order to ensure that in the overall EU energy debate the role nuclear energy is emphasised.

Underlining the investments already made by stakeholders in the nuclear field and encouragement in the PINC for longer-term commitment will help stimulate concerted action by those with a role to play in ensuring Europe's secure energy future. As stated in the Article 40 of the Euratom Treaty, PINC should serve to stimulate actions and facilitate coordinated development of investment in nuclear field. Therefore, it is of key importance for the European Commission to use this opportunity and present a long-term vision for the development of nuclear energy and indicate production targets for nuclear energy and all types of investment required for their attainment.

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A LIST OF USEFUL RESOURCES FOR THE PINC

1. International Energy Agency (2005), World Energy Outlook 2004
2. International Energy Agency (2006), World Energy Outlook 2005: Middle East and North America Insights
3. Joint Science Academies' Statement 2006: Energy Sustainability and Security
4. OECD Nuclear Energy Agency (2001), Nuclear Energy in a Sustainable Development Perspective
5. OECD Nuclear Energy Agency (2002), Nuclear Energy and the Kyoto Protocol
6. OECD Nuclear Energy Agency and the International Atomic Energy Agency - A Joint Report (2005), Uranium 2005: Resources, Production and Demand, Vienna
7. OECD Nuclear Energy Agency (2006), Advanced Nuclear Fuel Cycles and Radioactive Waste Management
8. World Association of Nuclear Operators (2006), 2005 Performance Indicators
9. World Nuclear Association Position Statement (2005) Can Uranium Supplies Sustain the Global Nuclear Renaissance?
10. Nuclear Energy Agency OECD (2005), Projected Costs of Generating Electricity
11. Royal Academy of Engineering (2004), The Cost of Generating Electricity
12. IAEA (2005), Energy Indicators for Sustainable Development: Guidelines and Methodologies

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