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**Nuclear power development: meeting the world's
energy needs and fulfilling article IV****Working paper submitted by Canada, France and the
Republic of Korea**

1. In the past few years, the potential of nuclear power to meet the world's energy needs has generated renewed interest, as shown, inter alia, by the Conference held in Paris in 2005¹ and the resolution on nuclear power applications adopted by the fiftieth General Conference of the International Atomic Energy Agency (IAEA).² These new perspectives are highly relevant to the implementation of the Treaty on the Non-Proliferation of Nuclear Weapons. Indeed, power applications are an essential part of peaceful uses foreseen in article IV of the Treaty, and international cooperation in this field is a major component of the Treaty's implementation. A large number of countries strongly support the development of peaceful uses for nuclear power and other applications, and are committed to work towards the fullest implementation of article IV.

2. The Treaty establishes the inalienable right to develop research, production and use of nuclear energy for peaceful purposes, in accordance with articles I, II and III of the Treaty. Exercising the right to the benefits of nuclear energy must be a course of action available to all States pursuing in good faith a nuclear programme for peaceful purposes in accordance with their international obligations.

Growing world energy needs

3. A dramatic increase is foreseen in world energy needs in the twenty-first century. Meeting these needs is essential, as energy supply is a condition of the world's development, and particular consideration must be given to the needs of developing countries. In this perspective, a diverse portfolio, including all energy

* Reissued for technical reasons.

¹ International ministerial conference on "Nuclear power for the 21st century", Paris, 21 and 22 March 2005.

² GC(50)/RES/13, adopted 22 September 2006.



sources and, in particular, the responsible use of nuclear energy, will be needed to allow access to sustainable energy and electricity resources in all regions of the world.

4. At the same time, the health of the planet's environment and energy security are serious concerns. Managing global environment issues in a sustainable manner, including curbing air pollution and addressing the risk of climate change, must be regarded as a priority by all Governments.

The potential of nuclear technology to meet world energy needs

5. The potential of nuclear power to meet the world's energy needs has been recognized in the final statement of the Paris Conference and in the above-mentioned IAEA resolution, which affirmed that nuclear power can make a major contribution to meeting energy needs and sustaining the world's development in the twenty-first century, for a large number of both developed and developing countries. Many countries have been conducting nuclear power programmes for several decades, resulting in nuclear power currently providing 16 per cent of world electricity supply, and they intend to pursue the development of their capacities and to promote the worldwide development of nuclear power to meet energy needs. In addition, a number of countries currently without nuclear power have plans for or are considering developing their use of this energy source.

6. The Paris Conference and IAEA resolution have also recognized that nuclear power can make a crucial contribution to the sustainable development strategies of many countries, as nuclear power does not generate air pollution or greenhouse gas emissions.

7. In addition to electricity production, water desalination can be an important resource for countries facing problems of supply of potable water, and nuclear production of hydrogen offers a major potential for the development of hydrogen-based systems.

8. Nuclear power is an advanced and yet proven technology, with a record of safe and reliable production and improving performance. It enjoys a robust industrial and market base, with industrial companies from many countries in all regions of the world involved in global energy technology markets. The market for equipment and fuel is open and effective. In particular, the uranium market is based on a diversified geographical base, including developing countries.

9. Nuclear power is economically competitive under many circumstances. It contributes to the stability of energy prices and reduces dependence on fluctuations in the price of fossil materials, as fuel and operating expenses represent a smaller part of the total cost of nuclear power, as compared with other energy sources. Nuclear power is a long-term investment for sustainable development, and its financing must be considered from this perspective.

The framework for nuclear energy development

10. The development of nuclear energy must take place in an adequate international framework, in which the Treaty and the adherence to international norms play a central role.

11. It must proceed in a manner ensuring non-proliferation objectives and international peace and security. Article IV of the Treaty provides a framework to meet these objectives. The exercise by a non-nuclear-weapon State of its right to develop the activities necessary in order to enjoy the benefits of nuclear power is subject to the respect of its non-proliferation commitments under articles I, II and III of the Treaty, and to the pursuit in good faith of peaceful purposes.

12. As proliferation risks and non-compliance situations are a major challenge today in the implementation of the Treaty, preventing proliferation must be a paramount priority for all parties. States should therefore pay due attention to export control of nuclear material, equipment and technology, and exert particular vigilance with regard to sensitive nuclear material, equipment and technology with proliferation potential.

13. In order to maintain the highest nuclear safety levels, all States having or developing a nuclear power programme should give due consideration to nuclear safety, taking into account the importance of international cooperation for the enhancement of the nuclear safety regime and of nuclear safety worldwide.

14. As nuclear security is a national responsibility, all States must make the necessary arrangements to ensure the highest level of security of nuclear material and facilities. They should also give a high priority to international cooperation, which provides common references and benchmarks and facilitates capacity-building and continuous enhancement.

15. The development of nuclear power must take due account of public acceptance issues and be carried out in a manner that addresses the expectations and concerns of citizens.

16. Solutions exist for the safe and secure management of spent fuel and radioactive waste, and research and development is under way for improved solutions. States have an obligation and responsibility to ensure appropriate options are provided for the management and disposition of nuclear fuel and must ensure that using nuclear power does not create undue burdens or risks for future generations.

17. International research and development programmes are currently carried out to develop innovative nuclear systems providing increased benefits with respect to economy, safety, waste management and non-proliferation. They can and should be oriented according to sustainable development criteria, and provide answers to the needs and concerns of society, taking into account the specific situation of each State. The development of new reactor and fuel cycle designs should give due attention to security and proliferation resistance.

Furthering the application of nuclear technology to meet energy needs and fulfil article IV

18. International cooperation is central to the development of nuclear energy. As regards bilateral cooperation, many countries are engaged in intense international cooperation through a large number of cooperation agreements.

19. Widespread international cooperation is carried out through various international organizations and programmes, including the Nuclear Energy Agency

of the Organization for Economic Cooperation and Development, the European Union and programmes such as those conducted under the Generation IV International Forum.

20. IAEA plays a central role in international cooperation for the applications of nuclear energy, according to its statutory role of accelerating and enlarging the contribution of atomic energy to peace, health and prosperity throughout the world. IAEA programmes provide a key contribution to promoting and fostering the efficient, safe and secure development and use of nuclear energy for peaceful purposes through international cooperation:

(a) By providing global energy analyses that contribute to the objective of fostering sustainable development and protecting the environment, and to a greater understanding and well-balanced picture of the role of nuclear science and technology in a global, sustainable development perspective;

(b) By contributing in that connection to the availability of required sources for financing nuclear projects;

(c) In the continual improvement of nuclear power plant operation, as the principal international forum for the exchange of information and experience in this field among member States and international organizations such as the Nuclear Energy Agency of the Organization for Economic Cooperation and Development and non-governmental organizations such as the World Association of Nuclear Operators;

(d) In promoting improvements and advances in nuclear power, fuel cycle and waste technology, in particular through the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) programme;

(e) In the continual improvement of nuclear safety through the review processes of international conventions and cooperative programmes;

(f) In promoting high-level exchanges on and assessment of the contribution of nuclear power to the satisfaction of energy needs, in particular through high-level conferences.

21. In response to the numerous requests received from States interested in starting a nuclear power programme, IAEA also provides major support in energy planning and the evaluation of energy options, in the evaluation of needs and requirements of these States, and in the establishment of appropriate technical, human, legal and administrative infrastructure for the development of nuclear power.

22. The Technical Cooperation Programme of IAEA is a key vehicle for providing broad support to developing member States with respect to nuclear power and other applications.

23. As another facet of international cooperation, a number of international initiatives have recently been developed for multilateral approaches, which aim at providing a framework for the development of nuclear energy applications in a safe, secure and proliferation-resistant manner. They include, in particular, various proposals for assurances of supply of nuclear fuel and services:

- Nuclear fuel banks, as proposed by the United States of America, the IAEA Director General and the Nuclear Threat Initiative;

- Fuel supply assurances in the framework of the Global Nuclear Energy Partnership proposed by the United States;
- The proposal by the Russian Federation of international centres for the nuclear fuel cycle;
- The proposal by France, Germany, the Netherlands, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland and the United States of the creation of a multilateral mechanism for reliable access to nuclear fuel, which offers a realistic option for providing assured supply of enriched uranium to countries not interested in developing national enrichment capabilities;
- Enrichment bonds proposed by Germany, the Netherlands and the United Kingdom;
- The proposal by Japan of standby arrangements for the supply of nuclear fuel.

Conclusion

24. Nuclear applications make a key contribution to sustainable human development objectives through a broad range of benefits in energy supply, food and agriculture, health and medicine, and industrial activities.

25. Nuclear power has the opportunity to make a major contribution to the satisfaction of national and world energy needs. Beyond being a common undertaking of all signatories of the Treaty, the promotion of the applications of nuclear power is crucial to meeting the challenge of providing sufficient and reliable energy to support the world's sustainable development for the benefit of all. It lies at the very heart of the vision that was the basis for the Atoms for Peace initiative and the Treaty.

26. In that context, international cooperation is an essential element of the development of peaceful uses of nuclear energy, as was foreseen in article IV and in accordance with articles I, II and III of the Treaty. The countries submitting this paper are committed to engaging in the fullest implementation of article IV. They encourage, support and participate in intense international cooperation to achieve the goals of the Treaty.
