

**Atoms for the Sustainable Future:
Recommendations on Nuclear Energy in the 21st Century**

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Taskforce on Atoms for the Sustainable Future

I. Growing Hope for Nuclear Energy and Deepening Concerns over Nuclear Threats

Nuclear energy has two facets. When it is used for peaceful purposes such as power generation, medical services, agriculture and industry, it can make a contribution to the betterment of the quality of life. However, it also could be used for military or criminal purposes. Thus, there are both great opportunities and great risks.

Nuclear energy can ease energy security competition. As economies grow, energy demands also increase. For example, in Asia where there are rising energy-consuming countries such as China and India, it is predicted that meeting the demand for energy will become a serious challenge not only to each country but to the region as a whole. In other regions such as Africa and Middle East, plans and express of interest in nuclear energy has been increasing. The expectation that nuclear energy will fill the gap between energy demand and supply has become very high.

Nuclear energy is also expected to contribute to global efforts to cope with the global warming problem as its carbon dioxide emissions are much smaller than fossil fuel sources. Comparing among major energy sources including non-fossil fuels, nuclear power is one of the most effective energy sources to reduce CO₂ emissions.

Given the energy security and environmental challenges that we face, we believe that promoting nuclear energy globally would provide an effective way to cope with these challenges. To this end, international cooperation should be deepened and expanded.

While we expect nuclear energy to play an increasing role that will better our lives, nuclear energy also poses serious security challenges.

The world has had to live for more than sixty years with the serious threat of nuclear devastation, a threat that is the result of the huge number of nuclear weapons that could destroy the earth several times over. While this danger continues, we also face rising nuclear proliferation threats caused by the diversion of peaceful nuclear programs to military use, or withdrawal from international non-proliferation treaties and agreements, nuclear terrorism and thefts or illicit trade of nuclear materials by non-state actors.

It is our hope that all nuclear threats will be reduced and eventually eliminated. All human beings should remember that the total elimination of nuclear weapons is the goal of every civilization. All nations must share a common goal regarding nuclear disarmament and make every effort to achieve it, while the legitimate security concerns of every nation must be addressed in the course of achieving this goal.

We also recognize that no other actor, either state or non-state, should be allowed to possess nuclear weapons and weaponization capabilities. Neither should any state and non-state actor assist others' proliferation activities. As the use of nuclear energy spreads, risks and threats that arise from such activities would also rise. In particular, recent challenges such as cases of North Korea and Iran present great risks of proliferation, illustrating insufficiency in international mechanisms to oversee and prevent exploitation of peaceful nuclear activities for military purposes.

One could divert peaceful nuclear facilities into military ones without detection, if safeguards are not properly functioned for such facilities. One could use peaceful nuclear program to accumulate materials and capabilities for military purposes, hiding such intentions, before it would withdraw from the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the International Atomic Energy Agency (IAEA) and other international non-proliferation obligations. Or, one might use peaceful nuclear program to cover clandestine nuclear activities.

Therefore, our great challenge is to establish universal principles for the promotion of nuclear energy to contribute to sustainable growth of the global economy, solution of global warming problems, and meeting energy security needs, in well balance with furthering efforts to pursue the reduction of risks posed by threats of nuclear proliferation, nuclear terrorism, and existing nuclear weapons. We also need to be reminded that concerns over safety of nuclear activities have become further important for maintaining credibility and sustainability of nuclear energy activities. The peaceful use of nuclear energy should not be exploited to acquire nuclear weapons capabilities.

Nuclear terrorism is now perceived as one of the gravest security threats in nuclear-related activities as it is an event with high intensity consequence. While the probability of such event is not so high, once it happens, it would cause a serious damage on society in its economy,

social life, and security order. The security of nuclear materials and facilities must become a priority.

It is extremely important for the international community to make a long-term, sustained commitment to a ‘balanced’ approach to the peaceful use of nuclear energy in a world that is safer from nuclear risks. And we believe that various international fora including G8 Summit meetings should provide platforms for discussing ways to cooperate toward this common goal.

Therefore, we recommend the international community to urgently address the following issues.

II. Toward a More Balanced Approach to Promoting Peaceful Use of Nuclear Energy with Strengthening Global Nuclear Non-Proliferation

We reaffirm that each nation has the “inalienable right” to enjoy the benefits of the peaceful use of nuclear energy in conformity with the provisions of non-proliferation and safeguards obligations in the NPT and the IAEA Statute. This ‘inalienable’ right should not permit the acquisition of sensitive nuclear materials and technology without transparent and plausible plans for strictly peaceful programs.

Since nuclear energy promotes energy security and better protects the environment, we recognize the importance of international cooperation in promoting the peaceful use of nuclear energy. At the same time, it is important that all nations be aware of the risks related to the introduction of nuclear power.

Recommendation 1: Establish the “Three S” as universal guiding principles for safe and secure development of nuclear energy activities

Due to dual nature and necessity of risk management of nuclear energy, states that intend to introduce peaceful nuclear activities must take into account; a) Safety of their facilities and operation; b) Security of facilities and materials; and c) non-proliferation (or Safeguards). (“Three S”: Safety, Security, and Safeguards) There is a new international environment for nuclear activities in which the threat of terrorism is rising, and the needs for nuclear energy have been increasing in developing countries. Therefore, demand is increasing for wider and clear awareness of

the indispensability of “Three S” for the introduction and operation of nuclear power and for the harmonization and , where necessary, strengthening of the rules and regulations governing the “Three S” in an integrated manner, so that the world can enjoy the benefits of nuclear energy while minimizing the nuclear risks. With such integrated, where necessary strengthened and streamlined framework of the “Three S”, prerequisite for the introducing and operating nuclear energy activities will become clearer, and the transparency and sustainability of international cooperation and technology transfer for the peaceful use of nuclear energy will be enhanced.

The G8 should endorse the “Three S” for strengthening nuclear security, nuclear safety and non-proliferation rules and guidelines, and appropriate international fora such as the IAEA could discuss and decide details. It would also be useful to invite nuclear industry into discussion on “Three S” as they have expertise, and are, in many cases, primarily responsible for building and operating nuclear facilities.

It is not our desire to discriminate between ‘haves’ and ‘have-nots’ by setting up this framework. Rather, we propose that the international community (in particular G8 countries) should provide necessary assistance (both technically and financially) to states which have nuclear power plants, or have plans to introduce nuclear power programs to meet requirements of “Three S”. For safe and peaceful promotion, mechanisms for international cooperation should be established in the areas of technical assistance such as human resource development as well as sharing best practice in safety, security and non-proliferation activities.

Recommendation 2: Provide appropriate international financial assistance schemes to nuclear energy programs and projects in developing countries

Capital procurement would be a key to expand nuclear energy worldwide. Nuclear power generation needs a large initial capital investment and requires a long-term payback period. Developing countries need to attract international capital for their nuclear programs. Therefore, the international community should offer innovative financial mechanisms, with which private and public investment for the construction of nuclear reactors would be facilitated, as the IAEA General Conference requested to the Director General of the IAEA (cf. GC(50)/res/13, September 2006 and GC(51)/res/14, September 2007). Other existing financial mechanisms such as World

Bank loans and OECD guidelines for export credit, which currently discriminate against nuclear projects, should be made available for nuclear power projects.

It may also be worth examining the linking of financial support through mechanisms mentioned above with the fulfillment of “Three S” guidelines since it would contribute to enhancing safety and security of nuclear activities, and non-proliferation.

Recommendation 3: Address nuclear energy as an effective tool for coping with global warming and make appropriate schemes to incorporate nuclear energy into such efforts.

Currently, there is no incentive or mechanism to facilitate the utilization of nuclear energy for environmental purposes while nuclear energy is quite effective in terms of reducing CO₂ emission. Such discrimination against nuclear energy might undermine international efforts to cope with global warming. We urge the international community to acknowledge that nuclear energy would be an effective way to contribute to containing the increase of CO₂ emissions. Relevant mechanisms should be available for nuclear energy projects. In particular, we back the creation of a policy mechanism to systematically incorporate the promotion of nuclear energy in the efforts to tackle global warming in the new round of negotiations.

Recommendation 4: Address safety and liability properly both in the domestic regulatory framework and in international cooperation

We recognize that nuclear safety and liability are important issues when introducing nuclear energy program. Confidence in the safety of nuclear power operation is an indispensable basis for promoting nuclear energy. Obtaining such confidence should be put a high priority by government and industry in introducing nuclear power plants.

Lack of a nuclear liability scheme could also be a serious obstacle for states which would provide cooperation and assistance in peaceful nuclear activities. All states should establish liability legislation and a mechanism for compensation related to nuclear accidents, which would be in conformity to internationally established norms and principles for nuclear liability.

The international community should provide cooperation with states which would like to introduce nuclear energy, in establishing a regulatory framework and administrative capacities in properly addressing safety and liability.

Recommendation 5: Universalize the Additional Protocol and enhance the export control regime

(1) Pursue universalization of the Additional Protocol

We believe that universalization of the Additional Protocol (AP) to IAEA safeguards agreements is one of the most important and effective ways to check nuclear proliferation. We recognize that it would be difficult to make the AP obligatory now. However, in the spirit of cooperation, and given the shared interests in reducing nuclear threats, the international community must create a more effective way to utilize the AP in multilateral and bilateral ways, for the objective of non-proliferation.

(2) Make adherence to Additional Protocol a condition for nuclear trade

Strengthening export control measures is essential for preventing proliferation. We strongly encourage the NSG to adopt adherence to the AP as an additional condition for supplying nuclear related materials and technology in the NSG guidelines. If it is difficult, G8 countries may voluntarily declare that concluding the AP will be a condition for the supply of nuclear materials and technology.

While we are aware of concerns over its unconditional extension, a moratorium by the G8 regarding the transfer of sensitive technology and materials to additional states should be extended until a proper guideline or mechanism to regulate nuclear trade is established. In the meantime, we encourage the G8 and NSG to continue to discuss this issue.

Recommendation 6: Explore ways to utilize Assurance of Fuel Supply and Multilateral Approaches to nuclear fuel cycle for promoting non-proliferation and sharing nuclear energy opportunities.

(1) Reliable assurance of supply as key to effective multilateral mechanisms

Assurance of fuel supply for non-nuclear fuel cycle states (or multilateral approaches to nuclear fuel cycle) has significance in shaping and embedding robust non-proliferation norms and habits in the international community. The introduction of such mechanisms would contribute to non-proliferation.

Given Article IV of the NPT, it would be impossible to force all states to join a fuel supply mechanism. But it is important to discuss assurance of supply and multilateral approaches as it would contribute to strengthening international non-proliferation norms. Reliable fuel supply assurance mechanisms are a realistic option to keep nations from developing their own enrichment and reprocessing capabilities.

(2) Multilateral mechanisms should not create new nuclear ‘haves’ and ‘have-nots’

International interdependence is already a fact in the area of nuclear fuel supply, and it will be increasingly important as most ‘national’ fuel cycle programs have international elements. Therefore, for some countries -- such as those with small scale nuclear programs -- it would be more efficient to rely on an international mechanism as a backup to fuel procurement through market mechanisms. Multilateral approaches may provide an alternative measure for states to procure nuclear fuels. Furthermore, international interdependence would help ensure that ‘national’ programs would not divert into military purposes as interdependence could function as a mutual oversight mechanism.

We are aware of concerns about these mechanisms. First, such multilateral fuel cycle arrangements should not distort existing, relatively well-functioning market mechanisms for fuel procurement. Second, consumer states would be concerned over whether they could become a producers’ cartel for nuclear energy, which would extend control over not only the fuel market, but also consumer states’ sovereignty over nuclear programs. There is also concern that such mechanisms could fix the status of supplier states (or ‘nuclear haves’) and consumer states (or ‘nuclear have-nots’) – in other words, they could create another form of discrimination in the international nuclear order. Therefore, it is necessary for such a mechanism to be flexible enough to accept various types of contribution by member states, depending on what they can provide to the mechanism. Such mechanisms must be inclusionary rather than exclusionary. Third, Focusing on enrichment service in the multilateral approaches or assurances of supply is not sufficient in coping with the risk of fuel supply disruption. Envisioning such mechanisms should also pay attention to other functions in the front end process, such as mining, conversion, and fuel fabrication.

Recommendation 7: Address concerns over the backend of fuel cycle

We should also look at the entire nuclear fuel cycle, from mining to spent fuel management. Most countries with civilian nuclear reactors face problems related to management of spent fuel. To make international assurance of supply credible and attractive, we need to address the management of the backend of the fuel cycle. Providing viable spent fuel management options would further increase the reliability of international mechanisms for managing the nuclear fuel cycle.

We also should be reminded that effective management of backend of fuel cycle is important in the context of both non-proliferation as well as nuclear security, and utilization of resources. Measures should be taken for increasing transparency on stockpile of recovered uranium and plutonium. The stockpiles of plutonium should be maintained at appropriate size, and they must be properly protected. For the sake of utilizing them as resources, we may pursue efficient use of recovered uranium and plutonium, such as burning at reactors. It would also contribute the reduction of the stockpiles of such materials.

Recommendation 8: Strengthen enforcement and implementation mechanisms for non-proliferation

(1) Strengthen supplementary measures

Policy measures such as UNSCR1540 and the Proliferation Security Initiative (PSI) are important elements of the international non-proliferation regime. They can play a role in filling gaps that are not covered by other conventional non-proliferation mechanisms such as export controls and IAEA safeguards.

(2) Make conditionalities for withdrawal from NPT

The exploitation of the provision for withdrawal in the NPT (Article X) is a great concern, especially after North Korea's declaration of withdrawal. Exploitation of Article X could undermine the effectiveness of NPT norms. Conditionality for withdrawal from NPT may be properly addressed at the NPT Review Conference.

(3) Strengthen the linkage between IAEA and UN Security Council for enforcement

Enforcement against cases of non-compliance is necessary to maintain the credibility and reliability of the international non-proliferation regime. In this sense, the linkage

of the IAEA and the UN Security Council, which is prescribed in the IAEA Statute, should be reinforced in a way that strengthens the capacity for enforcing non-proliferation rules. The international community's demonstration that it is united and will not tolerate non-compliance with IAEA safeguards agreements through the adoption of resolutions at the UN Security Council, and imposing sanctions by resolutions would strengthen non-proliferation, and deter potential proliferators.

(4) Proper combination among dialogue through ad hoc forum, incentives, and enforcement is important

In the meantime, addressing region-specific or issue-specific security concerns in multilateral fora other than the UN or IAEA can provide effective ways to reduce nuclear threats, and supplement efforts through the UN or IAEA. For example, for imminent proliferation problems such as North Korea and Iran, multilateral negotiation frameworks like the Six-Party Talks and EU3 plus 3, respectively, can play a significant role to secure channels for dialogue with countries concerned and find solutions. The proper combination and balance among dialogue, incentives, and credible enforcement with possibility of sanctions should be utilized for resolving existing proliferation problems.

Recommendation 9: Deepen and widen international collaboration in developing proliferation-resistant technology and sophisticated safeguards and verification technology

A proper combination of political, institutional and technological measures would strengthen capabilities to cope with nuclear proliferation problems. In this sense, the development of proliferation-resistant technology is one promising approach to strengthening non-proliferation efforts. The international community should be further engaged in developing more proliferation-resistant fuel cycle and nuclear reactor technologies and more effective safeguards technologies, through international collaborations such as INPRO, GIF and GNEP. The technological approach to nuclear non-proliferation is important as it might create new ways to pursue nuclear energy while promoting non-proliferation. The technological approach and international cooperation to spur innovative research and development for safer and secure nuclear technologies could be effective approaches as they could supplement other non-proliferation measures.

III. Reducing Nuclear Threats

In order to make the world safer from nuclear threats, all types of security threats derived from nuclear activities should be equally addressed. While a balanced approach for promoting peaceful use of nuclear energy with strengthening safety, security and safeguards intends to strengthen non-proliferation and suppress nuclear terrorism, reducing existing nuclear weapons is another important element in the pursuit of a world free from nuclear threats, enjoying benefits of nuclear energy.

We recognize that the ‘grand bargain’ among the three pillars of the NPT -- non-proliferation, peaceful use of nuclear energy, and nuclear disarmament – continues to be a vital part of the international non-proliferation regime, and each component should be addressed. In particular, it should be reminded that political commitment by nuclear-weapon states of further efforts of nuclear disarmament, which was reassured repeatedly at the 1995 NPT Review and Extension Conference and the 2000 Review Conference, must be faithfully pursued. In order to further widen and strengthen global non-proliferation campaign, disarmament efforts by all nuclear armed states are indispensable. In this context, we need to revisit the importance of addressing and adopting measures for nuclear disarmament.

Recommendation 10: Reemphasize nuclear disarmament and reaffirm the total elimination of nuclear weapons as an important goal for human civilization

We believe that all nuclear-weapon states, whether *de facto* or *de jure*, share a heavy responsibility in reducing nuclear threats from the world. They all should commit to further efforts toward nuclear disarmament, and take concrete steps toward total elimination of nuclear weapons. In this regard, we welcome the progress made by certain states including the United States and Russia on nuclear arms reduction and urge that further concrete steps would be taken by the United States and Russia in achieving less reliance on nuclear weapons for a stable strategic balance, especially through negotiation for post-START I and post-SORT strategic arms control arrangements of two countries. Such efforts by the United States and Russia would lead other countries to make their commitments to reducing nuclear weapons. We believe that such progress will serve to create favorable international circumstances

for nuclear disarmament and non-proliferation toward total elimination of nuclear weapons.

Recommendation 11: Address security incentives for nuclear proliferation

To that end, nuclear-weapon states should take measures that diminish the role of nuclear weapons in security policy to minimize the risk that such weapons would ever be used, and to facilitate a process that ends in their total elimination. These measures should include efforts to eliminate other weapons of mass destructions such as chemical and biological weapons and to improve regional security environments, in particular in conflict-stricken regions since existence of such weapons could be used for the justification of pursuing nuclear weapons.

We also recognize the importance of confidence building for reducing nuclear threats and anxiety by increasing the transparency of both military and civilian nuclear activities, including nuclear doctrines and nuclear energy plans.

Recommendation 12: Achieve early entry-into-force of the CTBT and start negotiation on an FMCT

We recognize the importance of the CTBT and an FMCT in supplementing the NPT in further reducing nuclear threats. We urge states that have not signed or ratified the CTBT to do so swiftly. And we urge members of the Conference on Disarmament not to block FMCT negotiations. In the meantime, we urge all nuclear armed states both inside and outside NPT declaring moratorium of production of fissile materials for weapons purposes, respecting the spirit of an FMCT. Furthermore, we request all nuclear armed states strengthen accountancy and control of their fissile materials for nuclear weapons and disclose information on their status for confidence building purposes.

Recommendation 13: Strengthen international efforts to combat nuclear terrorism and nuclear security concerns

Coping with threats of nuclear terrorism is the current security priority. The international community should unite to confront these threats under the International Convention for the Suppression of Acts of Nuclear Terrorism, the Global Initiative to Combat Nuclear Terrorism and the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities, and by strengthening domestic measures of control

and management over materials and security of facilities. Yet a global effort to cope with nuclear terrorism could be more effective. To do this, G8 countries should offer assistance to other countries to implement effective accounting and control over the stockpile of nuclear, radioactive and other radiological materials.

The Global Partnership against the Spread of Weapons and Materials of Mass Destruction (nuclear, radiological, biological and chemical) was launched at the G8 Kananaskis Summit in June 2002 to cope with the growing threat of terrorists acquiring such weapons and materials. The G8 and their partners have been implementing specific projects, including the securing of nuclear materials, the dismantlement of nuclear submarines and destruction of chemical weapons, in Russia. Because the prospect of related materials, equipment and technology falling into the wrong hands is a global danger, the activities under this Partnership should be globally expanded in scope and membership. In this sense, the G8 Global Partnership could be utilized as a channel for providing necessary financial and technical cooperation to countries urgently necessitating measures to strengthen security and physical protection of nuclear and radiological materials, and implement UNSCR1540.

We also take note on the importance of sharing information, expertise and best practice among like-minded countries on nuclear security and physical protection as well as protecting sensitive information. In particular, efforts to facilitate information sharing and mutual cooperation among nuclear operators and facilities should be promoted.

Conclusion

The world faces serious challenges that could threaten the survival of the human race. Tightening energy supply and global warming are among these imminent challenges. Safe and secure utilization of nuclear energy will play an important role in coping with these problems, by easing pressure from energy security needs and supplying energy with much less CO₂ emission than other major energy sources.

Yet, nuclear energy also poses serious security and safety challenges. It is extremely important that peaceful use of nuclear energy takes into account nuclear security against terrorist

activities, the safe operation of nuclear energy facilities, and preventing proliferation. Without addressing these challenges, the peaceful use of nuclear energy cannot be promoted. Therefore, we must take a balanced approach to strengthen nuclear safety, security, and non-proliferation measures as well as to promote peaceful use in an appropriate, effective manner. In this regard, the “Three S” would provide a useful conceptual framework to comprehensively deal with nuclear risks while developing safe and secure nuclear activities. In addition, nuclear disarmament should be further promoted. Promotion of nuclear disarmament would strengthen norms of the international non-proliferation regime, and thus it would encourage states to be engaged in global non-proliferation efforts. We believe that respecting the “Three S” concept in promoting nuclear energy and sincere promotion of nuclear disarmament are essential for the promotion of nuclear energy to gain universal legitimacy and confidence.

It may take time to realize and implement measures to meet these challenges. But risks are imminent. The G8 must take the initiative in discussing concrete actions and taking immediate steps to reduce such risks.

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