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

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The Japan Institute of International Affairs
Taskforce on Atoms for a Sustainable Future

Foreword

We are now at a critical juncture. We must choose whether to continue our current high-carbon economy out of mere habit, which could eventually lead to fierce competition over limited resources, or to dauntlessly move toward transforming our economy into a low-carbon one with more sustainability.

If we are to choose the latter, our most urgent task is to find ways to consistently seek out more balanced economic growth on a global scale, to ensure energy security, and to ease global warming.

While the pursuit of renewable energy sources such as solar power, wind power, biomass, and others will certainly contribute to realizing a low-carbon economy, the wise utilization of nuclear energy must be incorporated into our efforts toward a more sustainable economy and society.

At the same time, we cannot just close our eyes to the potential risks associated with nuclear energy. We now face serious challenges such as the risk of nuclear proliferation, in particular to states with less concern about global norms and to non-state actors; the threat of theft of nuclear materials and terrorism using nuclear materials against citizens and social infrastructure; and the risk of nuclear accidents. We understand that properly addressing such risks would be essential to promoting nuclear energy, and we believe that human wisdom will prevail. We also note the importance of balancing the need to strengthen non-proliferation with the enhancement of nuclear disarmament to satisfy the security concerns of a broader range of states.

In order to consider a balanced approach toward promoting nuclear energy while containing the risks associated with nuclear energy, the

Japan Institute of International Affairs launched a taskforce on “Atoms for a Sustainable Future” in 2007. The taskforce, led by Ambassador Tetsuya Endo, former deputy chairman of the Atomic Energy Commission of Japan, and former representative of the Japanese government to the International Atomic Energy Agency (IAEA), consists of leading Japanese experts on nuclear energy, research and development, international law, international security and the environment.

The taskforce submitted its policy recommendation paper to the Ministry of Foreign Affairs of Japan in January 2008. It contained 13 recommendations, including adoption of the “Three S” (or safety, security and safeguards (or non-proliferation)) concept, for the Government of Japan, which chaired the G8 Summit Meeting in 2008, as well as for the international community in dealing with this important issue.

Our recommendations, including the “Three S” concept, were incorporated into G8 statements. However, our mission to encourage the safe and secure utilization of nuclear energy is yet to be finished. Since submitting our paper, we have continued to discuss our ideas with our colleagues in various parts of the world, and have received a broad range of feedback and input.

This booklet is the outcome of the taskforce’s extensive examination and discussion of the future of nuclear energy and sustainable economies. We are calling for immediate actions by policymakers and leaders in the industry with a view to bringing about greater use of secure and safe nuclear energy. We hope that this booklet will make a modest contribution to discussions and measures aimed at our goal of a sustainable future.

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Executive Summary

The world faces serious challenges that could threaten the survival of the human race. Tightening energy supplies 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 far fewer carbon dioxide (CO_2) emissions than other major energy sources. The world seems to have entered a 'Nuclear Renaissance.'

Yet nuclear energy also poses security, safety and non-proliferation challenges. Like other cutting-edge technologies, nuclear energy has two facets: a sunny side and a shadowy side. 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 can also be used for military or criminal purposes. Thus, there are both great opportunities and great risks.

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. We believe that various international fora should provide platforms for discussing ways to cooperate toward this common goal.

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

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There is a new international environment for nuclear activities in which the need for nuclear energy has been increasing in developing countries. This mandates broader and clearer awareness of the indispensability of the '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.

The 'Three S' should not be perceived as unilateral imposition by industrialized states of strict regulation on or barriers to developing countries' pursuit of nuclear energy that may result in creating new nuclear 'haves' and 'have-nots.' For safe and peaceful promotion of nuclear energy, the establishment of mechanisms for international cooperation could be also effective, especially in the areas of technical assistance for developing human resources and sharing best practices in safety, security and non-proliferation activities.

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- **Reducing Nuclear Threats**

We recognize that the 'grand bargain' among the three pillars of the NPT -- non-proliferation, the 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 properly addressed. Pursuing nuclear disarmament and strengthening nuclear non-proliferation are mutually reinforcing. In addition, in order to further widen and strengthen the 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.

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All states regardless of NPT status should act to reinforce disarmament and non-proliferation norms. It is important that all states adhere to global norms of disarmament and non-proliferation. The entire global nuclear community now bears a special responsibility to envision and implement measures to reinforce disarmament and non-proliferation norms that could make the global non-proliferation regime more sustainable in the long run.

It may take time to realize and implement measures to meet these challenges, but the risks are imminent. The international community must begin discussing concrete steps and taking immediate actions to reduce such risks in order to ensure the best utilization of nuclear energy for a sustainable future.

I. Introduction

The world faces serious challenges that could threaten the survival of the human race. Tightening energy supplies 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 far fewer carbon dioxide (CO_2) emissions than other major energy sources.

Yet nuclear energy also poses security, safety and non-proliferation challenges. Like other cutting-edge technologies, nuclear energy has two facets: a sunny side and a shadowy side. 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 can also be used for military or criminal purposes. Thus, there are both great opportunities and great risks.

It is extremely important that the peaceful use of nuclear energy take into account nuclear security against terrorist activities, the safe operation of nuclear energy facilities, and the prevention of proliferation. Without addressing these challenges, the peaceful use of nuclear energy cannot be promoted.

1. Growing Needs of Nuclear Energy

First, on the sunny side, nuclear energy can ease energy security competition. The world seems to have entered a 'Nuclear Renaissance.' 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 for individual countries but for the region as a whole. In other regions such as Latin America, Africa and the Middle East, plans and expressions of interest in nuclear energy have been increasing. The expectation that nuclear energy will fill the gap between energy demand and supply has become very high.

Second, nuclear energy is expected to contribute to global efforts to cope with the global warming problem as its CO_2 emissions are much less than those from fossil fuel sources. Alternative energy sources such as solar and wind power are also considered environmentally-friendly. However, their environmental advantage is constrained by low energy density, high cost, and lack of consistency in supply. Among major energy sources, including non-fossil fuels, nuclear power is one of the most effective energy sources for reducing CO_2 emissions.

Given the energy security and environmental challenges that we face, the role of nuclear energy will become all the more important. 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.

2. Deepening Concerns over Nuclear Threats

While we expect nuclear energy to play an increasing role in bettering our lives, we need to pay great attention to the shadowy side of nuclear energy. Nuclear energy also poses serious security challenges, and such challenges have seemingly become more serious.

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. The international nuclear non-proliferation regime, with the Nuclear Non-Proliferation Treaty (NPT) as its cornerstone, is under serious challenge from North Korea's ambition for possessing nuclear weapons, Iran's pursuit of its own fuel cycle capabilities, A.Q. Khan's nuclear black market, etc.

Nuclear technology is no longer a cutting-edge technology. This fact suggests that anyone can gain relatively easy access to and acquisition of nuclear technology. Dual-use technology and materials are widely handled by diverse companies and engineers of various nationalities, even non-member states of the Nuclear Suppliers Group (NSG). Sensitive nuclear technology could be acquired in the name of the 'inalienable right' to the peaceful use of nuclear energy. Once such sensitive technology falls into the hands of a state determined to go nuclear, that state could achieve its objective by diverting peaceful nuclear programs to military use and withdrawing from international non-proliferation treaties and agreements. The threats of nuclear terrorism and thefts of or illicit trade in nuclear materials and technology by non-state actors are also of grave concern.

3. Agenda for a Sustainable Nuclear Future

Under such circumstances, what can we do to promote the sunny side of nuclear energy, i.e., the peaceful use of nuclear energy, while containing the shadowy side, i.e., various security and safety risks, and the misuse of nuclear energy?

For promoting the sunny side, we need a renewed recognition of the principles for promoting nuclear energy to contribute to sustainable growth in the global economy, to solve global warming problems, and to meet energy security needs, in balance with further efforts to reduce the risks posed by the threats of nuclear proliferation, nuclear terrorism, and existing nuclear weapons. We also need to be reminded that concerns over the safety of nuclear activities have become increasingly important for maintaining the credibility and sustainability of nuclear energy activities. We should give the utmost attention to the reduction, safe storage and disposition of nuclear waste.

To contain the shadowy side, we need to strengthen global non-proliferation efforts so that the peaceful use of nuclear energy is not exploited to acquire nuclear weapons capabilities. We recognize that no other actor, either state or non-state, should be allowed to possess nuclear weapons and weaponization capabilities. Neither should any state or non-state actor assist others' proliferation activities. As the use of nuclear energy spreads, the risks and threats that arise from such activities will increase. In particular, recent challenges such as the cases of North Korea and Iran present great risks of proliferation, illustrating inadequacies in the international mechanisms that oversee and prevent exploitation of peaceful nuclear activities for military purposes.

Peaceful nuclear facilities could be diverted into military ones without detection if safeguards do not properly function for such facilities. A peaceful nuclear program could be used to accumulate materials and capabilities for military purposes, hiding such intentions before withdrawal from the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the

International Atomic Energy Agency (IAEA) and other international non-proliferation obligations. A peaceful nuclear program could also be used to cover clandestine nuclear activities. In order to prevent such actions, we need to fix the weakest links in the international nuclear non-proliferation regime so that the regime can meet new realities and challenges.

We also should not forget that nuclear non-proliferation and disarmament are two sides of the same coin. They have to be promoted hand-in-hand. Progress in nuclear disarmament would convince non-nuclear weapon states to further associate themselves with global efforts to strengthen non-proliferation while reductions in the threat of nuclear proliferation would motivate nuclear weapon states to accelerate the process of nuclear disarmament.

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.

Nuclear terrorism is now perceived as one of the gravest security threats in nuclear-related activities as it would have such severe consequences. While the probability of such an event is not high, it would cause serious damage to economic, social 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. 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 urgently address the following issues.

II. Toward a More Balanced Approach to Promoting Peaceful Use of Nuclear Energy by 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 non-proliferation provisions and safeguards obligations in the NPT and the IAEA Statute. This 'inalienable' right should not permit the acquisition of sensitive nuclear materials and technology in the absence of transparent and plausible plans for strictly peaceful purposes.

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.

1. Developing Appropriate Social and Policy Infrastructure for Nuclear Energy

Recommendation 1: Establish the 'Three S' as a universal guiding principle for safe and secure development of nuclear energy activities

The 'Nuclear Renaissance' should be welcomed from the viewpoints of energy security and global environmental protection, but without blind optimism. Due to the dual nature of nuclear energy and the necessity for nuclear energy risk management, states that intend to introduce peaceful nuclear activities must take into account: a) the safety of their facilities and operations; b) the security of facilities and materials; and c) non-proliferation (or safeguards), that is,

Safety, Security, and Safeguards or the 'Three S's. On 'Safety,' ensuring safety in the operation of nuclear facilities is an indispensable condition for nuclear power programs to be accepted by the local community. At the same time, it is important to note that a nuclear accident anywhere could have adverse impacts globally on the promotion of nuclear energy. On 'Security,' nuclear facilities and nuclear materials could be identified by terrorists as targets, generating growing concern over terrorism. They also could make and use 'dirty bombs' with radioactive materials. The use of 'dirty bombs' could cause serious environmental, social and economic damage. Therefore, as a measure for winning confidence in nuclear energy activities, nuclear security should be given more attention. It must be noted that 'Safeguards' in the context of the 'Three S' refer to any measures designed to prevent nuclear proliferation. This is not intended to undermine the significance of other non-proliferation measures, although 'Safeguards' remain at the center of a wide spectrum of non-proliferation measures.

There is a new international environment for nuclear activities in which the need for nuclear energy has been increasing in developing countries. This mandates broader and clearer awareness of the indispensability of the '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 an integrated and, where necessary, strengthened and streamlined framework for the 'Three S', the prerequisites for 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.

It should be noted, however, that the introduction of the 'Three S' concept is not intended to create a gap between nuclear 'haves' and 'have-nots.' Instead, it means that international cooperation in introducing nuclear energy must accompany cooperation in building a firm regulatory/management infrastructure for nuclear power programs based on the 'Three S' concept in countries that introduce nuclear energy programs. In other words, countries providing nuclear cooperation must realize the essentiality of providing support for capacity building in the 'Three S' to reduce various risks related to nuclear energy over the long run.

The 'Three S' is being increasingly recognized as a foundation for introducing peaceful nuclear programs. In its declaration, the July 2008 G8 summit meeting endorsed the 'Three S' concept for strengthening nuclear security, nuclear safety and non-proliferation rules and guidelines. Working out the details and implementing the concept would be left to the appropriate international institutions and/or mechanisms such as the IAEA. It would also be useful to invite the nuclear industry into discussions on the 'Three S' as they have expertise and are, in many cases, primarily responsible for building and operating nuclear facilities. Still, it is important to raise awareness of this concept worldwide.

As mentioned above, it is not our desire to discriminate between the 'haves' and the 'have-nots' by setting up this framework. The 'Three S' should not be perceived as unilateral imposition by industrialized states of strict regulation on or barriers to developing countries' pursuit of

nuclear energy. Rather, we consider it essential that the international community (in particular exporting countries and appropriate institutions) provide opportunities for dialogue and necessary assistance (both technical and financial) to states that have nuclear power plants or that have plans to introduce nuclear power programs so that they can meet the requirements of the 'Three S'. This process would require cooperation with the IAEA. For the safe and peaceful promotion of nuclear energy, the establishment of mechanisms for international cooperation could be also effective, especially in the areas of technical assistance for developing human resources and sharing best practices in safety, security and non-proliferation activities.

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

Introducing a nuclear power program requires solid infrastructure in various aspects, including human resource development, regulatory legislation and agencies, technological capabilities, and financial procurement capabilities (a comprehensive list of such needs is shown in the IAEA's "Milestones in Development of a National Infrastructure for Nuclear Power"). Above all, capital procurement would be a key to expanding nuclear energy worldwide since 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. In this regard, the IAEA Secretariat should further examine and elaborate on the report (GC(52)/res/12, September 2008) submitted at the request of

the IAEA General Conference 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 the mechanisms mentioned above with the fulfillment of the 'Three S' guidelines since this would contribute to enhancing the safety and security of nuclear activities as well as non-proliferation.

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

Global warming is one of the most imminent problems that humanity faces. Currently, there is no incentive or mechanism to facilitate the utilization of nuclear energy for environmental purposes, even though nuclear energy is quite effective in terms of reducing CO_2 emissions. Utilization of nuclear energy is excluded from the Clean Development Mechanism (CDM). Such discrimination against nuclear energy might undermine international efforts to cope with global warming. To begin with, we urge the international community to acknowledge that nuclear energy would be an effective way to contribute to containing the increase of CO_2 emissions. Then, serious consideration should be given to the establishment of a relevant mechanism for utilizing nuclear energy projects for environmental purposes. In particular, we back the creation of a policy mechanism to systematically incorporate the promotion of nuclear energy into the efforts to tackle global warming in the new round of negotiations on a post-Kyoto Protocol mechanism.

2. Toward Strengthening the 'Three S'

Safety

Recommendation 4: Ensure nuclear safety as a top priority for introducing nuclear programs and promote international cooperation

Confidence in the safety of nuclear power operations is an indispensable basis for promoting nuclear energy. Obtaining such confidence should be a high priority for government and industry in introducing nuclear power plants because confidence in the safe operation of nuclear facilities is undoubtedly one of the most important prerequisites for the hosting communities in accepting nuclear facilities. Nuclear safety also inspires international confidence, in particular, in neighboring states.

To develop the regulatory frameworks and other domestic infrastructure, administrative capacity and technically competent experts needed in this area, international cooperation in sharing information and good practices, technical cooperation, finance and other approaches must be further encouraged, in conjunction with nuclear industrial cooperation.

It is also important that the international community encourage states to accede to international conventions for nuclear safety, such as the Convention on Nuclear Safety, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, the Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency, the Convention on Early Notification of a Nuclear Accident and others.

Recommendation 5: Address liability properly both in domestic regulatory frameworks and in international cooperation

Historically, successful development of nuclear energy programs has paid great attention not only to developing industrial policy to support the nuclear industry, but also to establishing a nuclear liability system under which the nuclear industry would be able to reduce the risk and burden of nuclear incidents and local communities hosting nuclear plants would be well supported and compensated in the event of a nuclear incident. We recognize that nuclear safety and liability are important issues when introducing nuclear energy programs. In addition, nuclear accidents could inflict trans-border damage on neighboring countries. To respond properly to such situations, the international community needs appropriate international arrangements on regulations and compensation as well as coordination of laws and regulations on nuclear liability among countries. For example, in Asia, there are more than 100 nuclear power plants in operation, and more are either under construction or planned. Asian countries have their own domestic liability schemes, but these have not been coordinated for standardization on substances and procedures for application, in particular for trans-border accidents.

The lack of a domestic nuclear liability scheme and international coordination could also be a serious obstacle for international cooperation and assistance in peaceful nuclear activities since it would pose some risks and uncertainty with regard to supplier liability. All states, particularly new nuclear power states, should establish liability legislation and a mechanism for compensation relevant to nuclear accidents that would be in conformity with internationally established norms and principles for nuclear liability.

The international community should provide cooperation to states wishing to introduce nuclear energy in establishing a regulatory framework and administrative capacities to properly address safety and liability, and acceding to relevant international treaties.

Security

Recommendation 6: Strengthen international efforts to combat nuclear terrorism and address nuclear security concerns

Coping with threats of nuclear terrorism is the current security priority. Terrorism in general has become the gravest concern for international security and ordinary people. To eliminate terrorism, it is essential that we deal with the root causes and eliminate the 'seed bed' of terrorism. In the meantime, should terrorism be linked to nuclear activities, the level of threat would be incomparably high. Therefore, it is critical to shut any route of access by terrorists to nuclear materials and to prevent terrorists or other non-state actors from committing themselves to illicit transfer of materials and technology. To that end, all states should develop strong domestic regulatory and enforcement mechanisms based on United Nations Security Council Resolution (UNSCR) 1540.

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 strengthen domestic control and management over materials and facility security.

Yet a global effort to cope with nuclear terrorism could be more effective. The G8 countries should offer assistance to

other countries to implement effective accounting and control over their stockpiles 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 in Russia, including the securing of nuclear materials, the dismantlement of nuclear submarines and the destruction of chemical weapons. Then its activities were expanded to Ukraine. 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 the necessary financial and technical cooperation to countries urgently requiring measures to strengthen security and physical protection of nuclear and radiological materials, and for implementing UNSCR 1540 and successive resolutions.

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

Safeguards (Non-Proliferation)

Recommendation 7: 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 the 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 globally shared interests in reducing nuclear threats, all countries should sign and ratify the AP at their earliest convenience. The international community must create a more effective way to utilize the AP in multilateral and bilateral ways for the purpose 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 Nuclear Suppliers Group (NSG) to adopt adherence to the AP as an additional condition for supplying nuclear-related materials and technology in the NSG guidelines. The Additional Protocol is useful as a guarantee to secure greater transparency on the end-use of shipped technology and material. If this is too difficult, the G8 and leading countries such as China 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 NSG and other international fora to continue discussing means to ensure effective oversight and intrusive access to transferred technology and material.

Recommendation 8: Explore ways to utilize assurance of fuel supply and multilateral approaches to the nuclear fuel cycle in promoting non-proliferation and sharing nuclear energy opportunities

(1) Make reliable assurance of supply key to effective multilateral mechanisms

Recently, various measures have been discussed to strengthen the international non-proliferation regime that is under serious challenge. Above all, discourse over multilateral control of nuclear fuel cycles has been revitalized. Currently, there are twelve proposals being floated.

Given Article IV of the NPT, it would be impossible to force all states to join a fuel supply mechanism. It is also arguable whether fuel supply assurance mechanisms are a realistic incentive to keep nations from developing their own enrichment and reprocessing capabilities. In particular, determined proliferators would not give up their pursuit of acquisition of fuel cycle capabilities even if their fuel supply were to be guaranteed. Nevertheless, reliable assurance of supply mechanisms would function as an effective backup to market mechanisms for nuclear fuel, and eventually provide great incentives for states to join such mechanisms.

It is important to discuss assurance of supply and multilateral approaches as these would contribute to strengthening international non-proliferation norms. At the very least, assurance of fuel supply for non-nuclear fuel cycle states (or multilateral approaches to the nuclear fuel cycle) has

significance in shaping and embedding robust non-proliferation norms and habits in the international community.

(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 become 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 means for states to procure nuclear fuels. Furthermore, international interdependence would help ensure that 'national' programs would not be diverted for 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 the possible emergence of a nuclear energy producers' cartel that would extend control over not only the fuel market, but also consumer states' sovereignty over their 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 mechanisms to be flexible enough to accept various types of contribution by member states, depending on what they can provide to the mechanisms. Such mechanisms must be inclusionary rather than exclusionary. Third, focusing on

enrichment service in the multilateral approaches or on assurances of supply is not sufficient in coping with the risk of fuel supply disruption. Attention should also be paid to other functions in the front end process, such as mining, conversion, and fuel fabrication, when envisioning such mechanisms.

Recommendation 9: Address concerns over the back end of the 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 relating to the management of spent fuel. To make international assurance of supply credible and attractive, we need to address the management of the back end 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 the back end of the fuel cycle is important in the context of both non-proliferation and nuclear security, as well as utilization of resources. Measures should be taken to increase the transparency of stockpiles of recovered uranium and plutonium. The stockpiles of plutonium should be maintained at appropriate sizes, and they must be properly protected. We may pursue efficient use of recovered uranium and plutonium, such as burning them in reactors, for the sake of utilizing them as resources. This would also contribute to the reduction of the stockpiles of such materials.

Recommendation 10: Strengthen implementation and enforcement mechanisms for non-proliferation

Despite international coordinated efforts and negotiations, the international community has so far been unable to stop nuclear weapon development by North Korea and Iran's attempt to acquire its own capability of uranium enrichment, or a potential breakout capability. The lack of cooperation by North Korea and Iran with the inspection agency and the whole international community has severely undermined the credibility and effectiveness of the multilateral non-proliferation regime**.** They have demonstrated the limits in implementation and enforcement of the existing non-proliferation regime. Even though these crises originated in an era before the IAEA Safeguards mechanism was strengthened with the introduction of Additional Protocols, the stalemate in the prolonged negotiations for resolving these problems symbolize the weakening credibility of the NPT-IAEA system, in particular, in preventing 'determined' countries from pursuing nuclear weapon programs.

On-going efforts by the international community to negotiate with such states must be appreciated, but unfortunately both the Six-party Talks on North Korean nuclear issues and negotiations between the EU3+3 and Iran are not making substantial breakthroughs toward full resolution of these problems. If the international community fails to properly address the nuclear problems of North Korea and Iran and stop their quest for nuclear weapons, we may have to be concerned that potential nuclear aspirants might learn lessons from the experiences of North Korea and Iran.

If the international non-proliferation regime fails to address these problems with total dismantlement of the nuclear threats from the two countries, the credibility of the

non-proliferation regime could be further undermined. Recognizing that proliferation is the most serious security threat to all the countries in the world, going beyond the interests of individual countries, the international community should coordinate in approaching these proliferation concerns. Furthermore, to prevent other countries from following suit, resolving these two cases and pursuing measures to strengthen enforcement and implementation of the non-proliferation regime should be done in a combined manner.

(1) Strengthen supplementary measures

Policy measures such as UNSCR 1540 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. Under UNSCR 1540, UN member states should sincerely develop and implement domestic measures to prevent non-state actors from being involved in covert and overt proliferation activities. PSI could also facilitate awareness of the importance of domestic enforcement and international cooperation in enforcement against illicit transactions and the transportation of sensitive materials and technology.

(2) Set conditionalities for withdrawal from the NPT

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 the NPT may be properly addressed at the NPT Review Conference and the UN Security Council. For example, we may consider a conditionality for withdrawal that would

require non-compliance with the NPT or the IAEA Statute to be rectified before a member state would be allowed to withdraw from the Treaty or the IAEA.

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

Enforcement in 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 the imposition of sanctions authorized by these resolutions enforcement would strengthen non-proliferation and deter potential proliferators.

The UN Security Council could also launch more intrusive verification teams in coordination with the IAEA, in cases of serious non-compliance.

(4) Promote proper combinations of dialogue through ad hoc fora, incentives, and enforcement

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 made through the UN or IAEA. For example, for imminent proliferation problems such as North Korea and Iran, multilateral negotiation frameworks such as the Six-party Talks and the EU3 + 3 could play significant roles in securing channels for dialogue with the countries concerned and finding solutions (although these two examples have not been successful so far). Proper and

balanced combinations of dialogue, incentives, and credible enforcement with the possibility of sanctions should be utilized for resolving existing proliferation problems.

Recommendation 11: Deepen and widen international collaboration in developing more proliferation-resistant technology, sophisticated safeguards and verification technology

We need to utilize every measure available to us in order to effectively respond to the threat of nuclear non-proliferation. Such measures include institutional and technological measures in addition to political ones. Institutional measures mean IAEA safeguards and measures such as mechanisms for the assurance of fuel supply and multilateral approaches to the nuclear fuel cycle, whereas technological measures imply the development of proliferation-resistant technologies that make it more difficult to divert nuclear material for nuclear weapon purposes.

It is widely recognized that strengthening safeguards through universal adherence to the Additional Protocol, which aims to enhance the ability of the IAEA to detect undeclared nuclear material or activities, or improving the technology to verify non-diversion of nuclear material, would play an important role in the enhancement of nuclear non-proliferation. In addition, the technological approach, i.e., the development of proliferation-resistance technology, is another promising approach that, in combination with other measures, could enhance nuclear non-proliferation in an optimized manner. For example, technology to extract weapon-usable plutonium, mixed with other elements in the reprocessing of spent fuel can be considered proliferation-resistant technology because it makes diversion more difficult in the sense that it requires extra processes to separate out weapon-usable plutonium.

International discussion of proliferation resistance has been revitalized in the context of the development of next-generation nuclear energy systems, including fast reactors, since around 2000. Advanced nuclear states should be further engaged in developing more proliferation-resistant fuel cycle and nuclear reactor technologies, and more effective safeguards technologies, in their respective research and development programs or through such multilateral collaboration fora as INPRO, GIF and GNEP as well as bilateral cooperation programs.

For the development of proliferation-resistant technology, objective and quantitative evaluation of the proliferation resistance of each candidate technology is required. However, there is no clear international consensus on methodologies for evaluating proliferation resistance. It is also important, therefore, for the international community to reach a consensus on such methodologies and a common understanding on the extent to which proliferation resistance is required for the introduction of next-generation nuclear energy systems.

We need to achieve an optimization of next-generation nuclear energy systems as a whole, taking also into account other requirements such as safety, economic competitiveness, and reduction of environmental burden. An international consensus on the methodologies for evaluating proliferation resistance will help make it easier to achieve such optimization.

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. A balanced approach of promoting the peaceful use of nuclear energy, bolstering safety, security and safeguards to strengthen non-proliferation and suppress nuclear terrorism, and reducing existing nuclear weapons is another important element in the pursuit of a world free from nuclear threats that would enable us to enjoy the benefits of nuclear energy.

We recognize that the 'grand bargain' among the three pillars of the NPT -- non-proliferation, the 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 properly addressed. Pursuing nuclear disarmament and strengthening nuclear non-proliferation are mutually reinforcing. In particular, it should be remembered that the political commitment of nuclear-weapon states to further efforts in nuclear disarmament, reiterated at the 1995 NPT Review and Extension Conference and the 2000 Review Conference, must be faithfully pursued. In order to further widen and strengthen the 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 12: 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 around the world. They should all commit to further efforts toward nuclear disarmament, and take concrete steps toward the total elimination of nuclear weapons. We welcome the progress made by certain states, including the United States and Russia, on nuclear arms reduction. In this regard, the opinions in favor of the elimination of nuclear weapons expressed in op-eds of the *Wall Street Journal* in January 2007 and January 2008 by Henry Kissinger, George Schulz, William Perry and Sam Nunn, or the 'Gang of Four,' are very encouraging. They say that total elimination of nuclear weapons is still a long-term goal, but they suggest that a safer world without nuclear weapons is an achievable goal for humanity, and they also tell us that it is time to take clear and firm steps toward that goal. The op-eds by the 'Gang of Four' are also indicative of the trend towards diminishing the strategic and political roles of nuclear weapons. We need to consolidate this trend.

Therefore, we urge that further concrete steps be taken by the United States and Russia for achieving security with less reliance on nuclear weapons. Although nuclear weapons would play certain roles in a stable strategic balance for the time being, it should be reiterated that such a strategic balance should be replaced with one without nuclear weapons. As the first step, we expect that negotiations for post-START I and post-SORT strategic arms control arrangements between the two countries would result in deep cuts in both deployed and reserve nuclear warheads. Such efforts by the United States and Russia would lead other countries to make their own commitments to reducing nuclear weapons.

Other nuclear armed states should take steps toward the goal of total elimination of nuclear weapons now.

To begin with, they should make their nuclear capabilities and doctrines transparent through declarations.

In order to further encourage nuclear weapon states to engage in nuclear disarmament, it is also worth considering the establishment of an international mechanism to constantly monitor and verify the dismantlement of nuclear arsenals. Although we need to carefully examine financial efficiency and other conditions, this could be pursued either through strengthening the NPT review process by establishing a standing secretariat or by establishing a multilateral mechanism for monitoring compliance and implementation of international commitments under the treaty. For building trust and confidence between nuclear weapon states and non-nuclear weapon states, approaches involving non-nuclear weapon states in the verification process might well be pursued.

We believe that such progress would serve to create international circumstances for nuclear disarmament and non-proliferation favorable to the total elimination of nuclear weapons.

Recommendation 13: Address security incentives for nuclear proliferation

To that end, nuclear-weapon states should take measures that diminish the role of nuclear weapons in their security policies 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 destruction such as chemical and biological weapons and to improve regional security environments, particularly in conflict-stricken regions,

since the presence of such weapons could be used to justify the pursuit of nuclear weapons.

We also recognize that an unstable regional security order could motivate states to pursue the nuclear option. Measures to decrease strategic incentives (or regional security concerns) that could drive states to go nuclear should be considered and implemented alongside measures to develop non-proliferation institutional mechanisms. Security assurance through a multilateral framework that includes both non-proliferation/disarmament and non-aggression commitments may be negotiated as a confidence building measure. Security assurance could be useful in both reducing incentives to possess nuclear weapons as a deterrent and shaping relationships among regional rivals by diminishing the role of nuclear weapons in cases of conflict.

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 not only nuclear doctrines but also nuclear energy plans.

Recommendation 14: Achieve early entry-into-force of the CTBT and start negotiations on an FMCT

We recognize the importance of the CTBT and an FMCT to supplement the NPT in further reducing nuclear threats. Test bans and moratoria contribute to putting off upgrades of existing weapons and development of new weapons. Although 180 countries (as of September 2008) have already signed the CTBT and 145 have ratified it, the treaty has not yet entered into force because some Annex 2 states have not deposited their instruments with the UN Secretary General. We urge those states that have not signed or ratified the

CTBT to do so promptly. In particular, nuclear weapon states that have not ratified should do so without delay. Other Annex 2 states should also fulfill their responsibilities in reducing global nuclear threats by signing and ratifying the CTBT.

We also urge members of the Conference on Disarmament not to block FMCT negotiations. We believe that verification of fissile material production is desirable even if theoretically it may not detect violations perfectly. However, it is unproductive to set verification issues as a condition for entering into negotiations. Details of a verification mechanism should be discussed during negotiations. Similarly, linking FMCT negotiations with other unrelated matters can also be seen as intended to block negotiations.

In the meantime, we urge all nuclear armed states both inside and outside the NPT to declare a moratorium of the production of fissile materials for weapons purposes, respecting the spirit of an FMCT. Furthermore, we request that 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.

IV. Conclusion: Toward a more sustainable non-proliferation regime

The world faces serious challenges that could threaten the survival of the human race. Coping with energy security and global warming are the most urgent tasks in securing a sustainable future for humanity. Nuclear energy will play an important role in this respect by easing pressure from energy

security needs and supplying energy with far fewer CO_2 emissions than other major energy sources.

Yet nuclear energy may also pose challenges if safety, security and proliferation concerns are not properly addressed. If nuclear energy is to play a significant role in a sustainable future for human beings, the key will be for the peaceful use of nuclear energy to take into account nuclear security against terrorist activities, the safe operation of nuclear energy facilities, the prevention of proliferation and the promotion of nuclear disarmament. Without addressing these challenges, the peaceful use of nuclear energy cannot have a sustainable future either. Therefore, we stress the importance of 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 pursuing safe and secure nuclear activities.

In discussing the sustainability of a world free of the threat of nuclear weapons, we also need to consider the sustainability of the global non-proliferation regime and the universal norms that the regime has provided. All states regardless of NPT status should act to reinforce universal disarmament and non-proliferation norms.

A decision by the NSG in September 2008 to make India an exception to the NSG guidelines may have raised the risk of undermining the universal norms of non-proliferation provided by the NPT. Some observers have pointed out and criticized the inconsistency of this decision with the existing consent on the 'grand bargain' of NPT (among non-proliferation obligations, nuclear disarmament efforts

and the right to peaceful use of nuclear energy). The decision might disappoint states loyal to the NPT's 'grand bargain.' Some argue that the NPT has become irrelevant to the reality of global proliferation concerns, and that accepting India as a legitimate partner in global non-proliferation efforts is more important. However, it is indeed vital that India play an active role in strengthening global efforts to prevent the proliferation of nuclear weapons. Equally important, though, is to make efforts to ensure all states adhere to global norms of disarmament and non-proliferation.

The importance of the universal norms and universal adherence to them is that they certainly reduce the diplomatic and financial costs of keeping states in compliance with the non-proliferation rules prescribed in the NPT and the IAEA Safeguards Agreement, and that they encourage states to spontaneously cooperate in strengthening non-proliferation efforts. If the sense of adherence (or loyalty) of member states to the global non-proliferation regime declines, the international community will have to pay a higher price to dissuade states from going nuclear and to maintain non-proliferation. The entire global nuclear community, including India, should be aware that the nuclear deal with India is a critical exception to the universal norms. It therefore has imposed on the community a special responsibility to envision and implement measures to reinforce disarmament and non-proliferation norms that could make the global non-proliferation regime more sustainable in the long run.

Nuclear disarmament should also be further promoted for a sustainable future. Promoting nuclear disarmament would strengthen the norms of the international non-proliferation regime, and thus it would encourage states to engage in global non-proliferation efforts. It is also important that we

recognize nuclear disarmament as the goal to be achieved, not just as a goal to be held up as an ideal. Nuclear armed states both within and outside the NPT should start considering and taking actions toward elimination of their nuclear weapons.

We also recognize that nuclear disarmament and non-proliferation are two sides of the same coin. Promoting nuclear disarmament would facilitate international cooperation in non-proliferation, and strengthened efforts in nuclear non-proliferation would provide a foundation for further reduction of nuclear weapons. We believe that respecting the 'Three S' concept in promoting nuclear energy and sincerely encouraging nuclear disarmament are essential in helping nuclear energy gain universal legitimacy and confidence.

It may take time to realize and implement measures to meet these challenges, but the risks are imminent. The international community must begin discussing concrete steps and taking immediate actions to reduce such risks in order to ensure the best utilization of nuclear energy for a sustainable future.

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