



# Policy Recommendations

To ensure the safe and secure use of existing and new nuclear energy sources, support economic vitality, and protect people and the environment

The Global Nexus Initiative (GNI) held a series of workshops from 2015-2017 to explore the intersection of nuclear power, climate, and security issues, and develop smart policy responses to today's challenges. These meetings involved dozens of experts from around the world and resulted in 22 policy recommendations which are detailed in three policy memos.

## Policy Memo 1

### The Role and Responsibility of Nuclear Power in a Carbon Constrained World

December 2015

Achieving the international community's goal of limiting global temperature increases to 2° Celsius will require a significant transformation in the way the world produces and consumes energy. GNI urges policymakers to recognize the existing and potential contribution of nuclear power in reducing global carbon emissions. Policy changes simultaneously should enhance public support, safety, and security, and strengthen international confidence in nuclear power programs.

1. The participants and supporters of the United Nations Framework Convention on Climate Change process should acknowledge the existing and potential contribution of nuclear power as part of a suite of technologies that can address increasing levels of greenhouse gas concentrations in the atmosphere. Also, public policies should be developed that recognize the unique value of nuclear power and that will discourage the premature retirement of existing nuclear facilities and replacement with higher emitting alternatives.
2. A review of nuclear policy issues is needed in light of climate goals and the growing demand for electricity. It should result in changes that enhance public support, safety, and security and achieve a significant reduction in greenhouse gas emissions. The nuclear industry and its related organizations should partner with civil society to develop common objectives and cooperation that can forthrightly address the value and concerns associated with nuclear power. Additional policy and partnership opportunities could include multi-national cooperation to support the development, demonstration, and coordinated licensing of advanced reactors, which offer benefits beyond the existing generation of power plants.
3. The nuclear governance system must adapt to evolving circumstances and challenges by enhancing the capacity of the newcomer countries to fulfill their responsibilities for safety, security, and safeguards. The nuclear safety capacity building must start early. It also is necessary to address the weak links in the nuclear security regime, which lags the nuclear safety and safeguards systems in its effectiveness. These advancements should be augmented with improvements in nuclear education, training, and assistance. Together these enhancements will strengthen international confidence in the nuclear programs of all states.

## Policy Memo 2

### A Framework for Advanced Nuclear Reactor Deployment: Policy and Issues

September 2016

The next generation of nuclear reactors are at a critical crossroad between technology development and deployment. GNI explains that near-term demonstration projects, advanced licensing procedures, and enhanced safety, security, and safeguards measures are critical if the next generation of reactors are to inspire public confidence, enable commercial success, and meaningfully contribute to climate goals

1. While a significant number of large-scale light water nuclear reactors are under construction or contemplated, primarily in developing countries, next generation nuclear reactors may offer a promising technological and economic solution to the looming decline in the existing power reactor fleet in developed countries. However, there are still many uncertainties associated with these reactors that need to be addressed including economic, safety, safeguards and security considerations. At present, many of the advanced reactor designs are at the conceptual stage, though many of the concepts have been previously demonstrated in some form. An acceleration toward the demonstration phase for these reactors is required if they are to meet the clean energy needs identified in the Paris agreement.
2. As next generation reactor deployment is pursued it must be with a clear understanding of the urgency imposed by aggressive climate objectives. There are carbon reduction benefits from both the existing light water reactor fleet and future advanced reactors. An unacceptable outcome, in light of the Paris Agreement, is to allow carbon emissions to rise if nuclear power's zero emissions are reduced through retirements and alternative technologies are not adequate to compensate, causing increased reliance on higher carbon emitting sources of energy.
3. The international market for advanced reactors needs to be realistically assessed and potential purchasers and operators need to identify the required reactor characteristics, costs and the timeframe on which deployment is needed.
4. To achieve timely deployment of next generation reactors, it essential that research and development test beds and demonstration platforms be created in the near term. This will assist in effectively addressing the issues associated with reactor licensing, affordability, risk management, safety, safeguards, security and waste management. It also will push forward the most promising designs and support continued innovation. Moving to this stage will require political will and financial support beyond the short term. The number of advanced reactor technologies will certainly be reduced as the demonstration phase proceeds, and as that occurs there is value in narrowing the diversity of designs and harmonizing the licensing requirements for these reactors across borders to the extent possible. This could allow for the sale of fleets of plants in a manner similar to jetliners and avoid the problem of reactors having unique characteristics or requiring redesigns in each country.

5. Unlike in the early nuclear era, the prototyping and demonstration of advanced reactors are unlikely to be wholly government financed, except in state dominated economies. In free market economies, advanced reactor designs generally will be much more dependent on private financing. However, the effort may prove to be too expensive and risky for the private sector to shoulder alone. Therefore, the best path forward is a cost-sharing private-public partnership through the demonstration phase. Governments can demonstrate political encouragement by providing facilities, expertise and possibly some financial support and the private sector can contribute to the technology demonstration, assess the most promising reactor concepts, and drive the process according to market demands.
6. The licensing process in the U.S. for next generation reactors must be advanced if these technologies are to be a realistic and deployable option that will meet international climate and energy objectives. The Nuclear Regulatory Commission should engage with technology innovators in a staged process and offer meaningful and useful feedback on regulatory matters as the design is being developed and demonstrated. This will encourage continued private investment and allow for the down-selection of the most promising and mature technologies.
7. Equally important is the use of international regulatory fora, such as the Organization for Economic Cooperation and Development Nuclear Energy Agency's Multinational Design and Evaluation Programme for the development of international licensing standards for advanced reactors. Pursuing a harmonized, consistent, and high-quality international regulatory regime would create greater international confidence that the advanced reactor class has collectively addressed concerns about safety, security and safeguards protections.
8. High levels of safety, safeguards and security should be incorporated into the initial reactor designs. These features should be rigorously tested against realistic and challenging scenarios to further strengthen these systems.
9. The fuel cycle for any advanced reactor should minimize the opportunities for proliferation. In particular, the international community should oppose advanced reactor fuel cycles that are designed for the specific purpose of breeding a surplus of plutonium for future use in nuclear reactors. It also should oppose the stockpiling of separated plutonium and the use of uranium-235 fuel enrichments that exceed 20 percent.
10. In tandem with the development of next generation reactor concepts, the international community should acknowledge and address the significant gaps that exist in the global nuclear security regime by strengthening the international legal framework.

## Policy Memo 3

### Evolving Nuclear Governance for a New Era

April 2017

The global nuclear governance system is facing a series of new challenges that require effective responses from a strong coalition of governments, the nuclear industry, professional associations, and the nuclear nonproliferation, security, and safety expert communities. GNI calls for a strengthening of the system through realistic continuous improvement, a demonstrated commitment to norms and standards by nuclear suppliers and users, and a greater appreciation of nuclear power as a geopolitical tool.

1. A key nuclear governance principle that needs to be established and widely accepted is “realistic continuous improvement.” This means that the system requires regularized attention to identify gaps and weaknesses and that actions should be taken on a rolling basis to address these issues and new challenges that may arise. Continuous improvement requires identifying problems and challenges and addressing them proactively, not in response to an incident. The emphasis on realistic improvement is to ensure that all actions taken positively impact nuclear operations and strengthens the system against known and potential dangers. The goal is to strengthen weak links, improve safety and security culture, but not impede operations and progress.
2. The nuclear security regime, in particular, needs to be strengthened and universalized along with the nuclear safety and safeguards systems. For nuclear security, this will require a move toward common standards, greater transparency of non-sensitive information, expansion of peer reviews, sharing of best practices, and consideration of an international agreement on nuclear security. The safeguards regime has been strengthened by the introduction of the Additional Protocol that grants the International Atomic Energy Agency (IAEA) the authority to verify a state’s safeguards obligations including at undeclared facilities. But, there are still nations that have not brought it into force. There should not be complacency with the existing nuclear safety system and improvements should continually be sought. The Convention on Nuclear Safety requires peer reviews, for example, but does not have an enforcement mechanism. The IAEA’s international safety standards are non-binding, and it does not have the authority to conduct an inspection without an invitation from the Member State.
3. Initiatives that have begun to create strong strategic alliances among the key nuclear governance stakeholder communities should be expanded, strengthened, and institutionalized. The Global Nexus Initiative is one example of this new approach that has brought the nuclear industry and civil society into closer collaboration. Another example is the Nuclear Industry Steering Group for Security (NISGS). This is an industry initiative that seeks to continue the role that nuclear companies played during the Nuclear Security Summits and strengthen its relationship with governments and the IAEA. The NISGS should create an opportunity for regularized collaboration with non-governmental experts on nuclear security issues, and the expert community should organize itself to effectively interact with this group. Additional initiatives that can further strengthen these relationships should be developed and supported.

4. The development of effective and approachable communication and messaging on the importance of nuclear governance and its improvement requires more attention and honing to increase its salience and value. A key part of the strategy for improving nuclear governance is the ability to communicate effectively to the public and all stakeholders on the value of steps being taken to continually strengthen the management and oversight of nuclear operations. The nuclear landscape is highly technical, and in general, the global public is not knowledgeable about the in-depth aspects of its operations.
5. The emerging nuclear suppliers must demonstrate an enduring commitment to protecting and instituting existing norms and exhibit a willingness to take leadership in initiating improvements in the nuclear governance system.
6. Existing suppliers, particularly in the United States, Japan, and Europe, must maintain strong influence in ensuring that existing norms are maintained and are not compromised. They also must retain adequate influence to continue to move the supplier norms in a positive direction. Achieving these objectives will be easier and more effective if these countries maintain active nuclear programs and continue active engagement with international partners on technology and regulatory development.
7. There needs to be a greater appreciation for the impact that nuclear supply has on the political and strategic objectives of the recipient and supplier nations. A cooperative relationship must be created that can last for up to 100 years to encompass the full term of reactor building, operation, and decommissioning. Ignoring the geopolitical implications of this relationship can impact a range of foreign policy, security, and economic interests of various nations, including the ability to strengthen the nuclear governance system.
8. Additional assistance from the experienced nuclear operating states is required to support newcomer nuclear nations in preparing for and effectively and safely operating nuclear power installations. This task should be shared with the IAEA, which is already very active in this area. A clear focus must be on assessing the needs of the nuclear newcomers in order to establish the regimes required to ensure the safe, secure, and proliferation-resistant operation of any plant.
9. Nations deploying significant additional nuclear power reactors and those developing advanced reactors, in cooperation with the IAEA, need to address in greater detail how the nuclear governance system will adapt to a potential significant increase in the number of reactors worldwide and the multi-technology environment that may develop by mid-century.

Formed in 2015, the Global Nexus Initiative (GN) brings together for the first time experts from the nuclear industry, nuclear security, and environmental communities to examine the complex challenges posed by the intersection of climate change, energy demand, and global security. GNI is co-sponsored by the Partnership for Global Security and the Nuclear Energy Institute.