

2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons

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Working Paper Recognizing the Nuclear Technologies Capabilities for the Sustainable Development of Humankind Towards a Digital Energy Transition

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Representatives of international and national associations developing activities under the umbrella of the nuclear industry, and their members, covering a variety of nuclear applications, met on the occasion of the Tenth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) held in New York on August 1–26, 2022. To convey their cooperative provision for the NPT as a central pillar to foster collaboration in nuclear energy's peaceful applications and to advance the pursuit of total and nuclear disarmament.

Article IV of the NPT promotes the entire possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of nuclear energy. Parties of the Treaty shall contribute alone or with other states or international organizations to further development. It contains a series of key areas that should be address and strengthen in a set of areas on which we have provided the following recommendations:

1. Increasing the participation of key populations in Human Capacity Building for a Peaceful Nuclear Power Infrastructure
 - 1.1 Promoting human capacity development is critical, with a necessary focus on gender and youth. Increasing the expertise of young professionals will prepare them to overcome the possible next challenges to secure peaceful nuclear digital infrastructure globally, emphasizing the technological skills required to assist and deploy safe and secure systems in the Digital Energy Transition toward global

decarbonization. To ensure safe and reliable digital systems, deep knowledge is needed in several aspects such as Digital Twins, Artificial Intelligence, Blockchain, High-Performance Computing or Quantum Computing.

- 1.2 Parties shall adopt a gender inclusive approach to promote a standing agenda item within the broad victim assistance workstream on specific intergenerational impacts of nuclear weapons testing and use on women and girls, per the TPNW's preambular text. It is necessary to embrace a permanent agenda item on women and disarmament in the framework of the TPNW more generally, paying special attention to the gendered aspect of nuclear politics, multidisciplinary technical knowledge and how it should be contested or rectified.
 - 1.3 Starting an early recruitment process for training and preparation for a career in non-proliferation and disarmament and exposing the apprentices to technical challenges in the field will empower them to continue participating in these and other decision-making processes. It is a necessity to hold national programmes identifying young candidates seeking greater involvement in disarmament and engaging in capacity-building and disarmament education amongst MFA or related staff members.
 - 1.4 Expand access to the NPT for civil society. This should include considerations for small and developing states, delegates who are physically unable to travel, and those who cannot afford the cost of a four-week conference in New York City. This may include online options for all side events and plenary events, and a process for expediting/supporting visa requests. The NPT should consider adding a plenary session dedicated to hearing inputs from civil society.
2. Nuclear Reactor Technologies Attributes, Protection and Promotion
 - 2.1 The NPT, in its current framework, does not establish measures for when a Nuclear Power Plant (NPP) becomes a target or a strategic weapon during an armed conflict. The Treaty does not elaborate on what happens when a state party is denied access to the NPP for peaceful uses due to war or conflict. For an imminent response, sophisticated systems must have access remotely for full control of the NPP. Using tools like virtual reality and 24/7, 365 days surveillance satellite control image will help to identify the possible threats around the NPP borders and prepare an emergency response plan to protect the facility. It is important to mention that storing IT assets in a colocation facility enables rapid and simple access to cloud services, which are frequently included in any strategy for remote working in today's remote/hybrid environment. Thanks to the solid, reliable, and integrated

data center architecture, stakeholders would be able to set up and use the ever-expanding cloud environment more rapidly than they can with in-house IT.

2.2 Only the protection of NPPs is covered under Protocol I to the Geneva Conventions. This implies that research reactors, which make up another sizable category of nuclear facilities intended for peaceful purposes, are not covered. This is one of the Protocol's major flaws, and there are a number of reasons why it is vital to include research reactors on the list of facilities with potential harmful uses.

- Universities and research institutions, often considerably closer to populated regions than nuclear power facilities, house a sizable number of research reactors.
- The existence of 223 research reactors with a total capacity of more than 3000 MW in 53 different nations primarily justifies the necessity of preserving research reactors. Most range up to 100 MW, as opposed to a conventional power reactor's 3000 MW (or 1000 MWe).

2.3 Enlargement and empowerment of the International Atomic Energy Agency (IAEA) capabilities is entrusted with key verification responsibilities under the Treaty. The treaty should explicitly state the role of the IAEA in terms of the response that should be made when an NPP becomes vulnerable as a result of conflict. The nonresponse or lack of a demarcated role for the IAEA could be catastrophic and threaten every principle of nuclear safety. The IAEA should be granted access to the NPP at all times to ensure the continued integrity, viability, safety and security of the plants.

2.4 Explicitly address safety and security protocols within the NPT. This should include the response to be followed if a power plant finds itself in the hands of a hostile party during an armed conflict. For instance a no fly zone over the NPP could be enforced or air defense systems could be implemented. It should be noted that the current NPT framework does not have provisions for enforcement of a no fly zone over a NPP during an armed conflict.

2.5 Generation IV reactors provide a safer and more efficient system that can provide sustainable energy generation and minimize nuclear waste, improving public health and environment protection. These reactor technologies also encompass less risks of disasters and provide increased physical protection to prevent nuclear material diversion. The implementation of Generation IV Reactor Technologies will open a new window for these technologies to embrace the usage of the nuclear fuel cycle and how these may help the evaluation of the cycle waste to lessen the amount of waste produced by the current nuclear fleet. Moreover, Generation IV nuclear energy systems would increase the assurance that they are very unattractive and the least desirable route for diversion or theft of weapons-usable material.

3. Visibility on technological advances for uses in the outer space

- 3.1 Parties to the treaty could secure a space infrastructure relying on a low enriched uranium fission surface power system would draft a framework to expand applications for the lunar surface initiative and the nature of other interplanetary space missions. There are many opportunities of using nuclear fission reactors to carry out space propulsion projects to extend extraterrestrial surface power sources.
- 3.2 Spaceship systems can have an additional economic transportation source for space exploration, through the use of nuclear systems such as Nuclear Thermal Propulsion (NTP), and Nuclear Electric Propulsion (NEP). NTP and NEP can create a fission that will result in gas, electricity and other elements that propel a spacecraft, or can provide astronauts the capacity to extend exploratory missions. There are many opportunities for using nuclear power in space exploration. A working paper on enhancing technological advances to increase peaceful uses of outer space is an opportunity that can be considered for the upcoming NPT review.
- 3.3 Technology transfer and scientific diplomacy exchange shall be encourages as they can facilitate space exploration deployment programs in collaboration with international bodies and agencies with the mandate of space exploration like the United Nations Office for Outer Space Affairs.