

## **Nuclear Law: The Global Debate**

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The book *Nuclear Law: The Global Debate* is a significant and timely addition to the literature on nuclear governance. Rooted in the discussions of the International Atomic Energy Agency's (IAEA) First International Conference on Nuclear Law in 2022, this edited volume, compiled by the IAEA, is thematically organized to underscore the agency's pivotal role and the multifaceted nature of the legal frameworks governing nuclear activities worldwide. The book presents a thoughtfully assembled collection of essays that explore the current and future challenges of nuclear law in a rapidly evolving technological and geopolitical context.

The IAEA, since its founding in 1957, has remained central to the development and variety of challenges associated with technological advances in nuclear technology. IAEA Director General, Rafael Marianno Grossi emphasizes the importance of the agency's role in shaping international nuclear law, particularly its four core pillars: safety, security, safeguards, and liability.

The book offers detailed insights into the legal, policy, and technical aspects of domestic and international nuclear law, while also addressing developments related to broader themes like climate change, technological innovation, and sustainable development.

The widespread potential of nuclear energy has evolved beyond the traditional role of power generation, encompassing technological solutions in clean energy, poverty, climate change, and the broader range of the United Nations' Sustainable Development Goals (UNSDGs). However, it is inherently a dual-use technology, and robust and adaptive legal and

regulatory frameworks are essential to ensure its safe, secure, and peaceful utility. The book highlights the importance of nuclear science and technology as essential to global efforts in fostering equitable, resilient, and sustainable development trajectories.

The global nuclear legal framework is comprised of a mix of legally binding and non-binding treaties and instruments. Its evolution is reflective of developments within the IAEA and countries with developments in nuclear technology, leading to the need for standards in areas ranging from nuclear safety, security, liability, and governance. However, as countries continue to engage in expanding their nuclear energy infrastructure, there is an active need for greater transparency and active stakeholder engagement between technical experts and regulators, with legal experts for sustainable solutions.

The rising interest in nuclear energy as a low-carbon energy source against the growing challenges of climate change has necessitated a greater focus on nuclear safety. The nuclear industry must remain constantly vigilant against the possibility of a serious accident due to the threat of radiation exposure to people, the environment, and infrastructure. The 2011 Fukushima incident in Japan provides a glaring example for national governance structures to reinforce nuclear safety through a robust and vigilant oversight framework. The international legal framework reinforces continuous IAEA inspections with the target of increased transparency and a harmonized approach to the implementation of nuclear safety standards.

The widening impact of climate change worldwide has highlighted the importance of nuclear energy in achieving Net Zero emissions targets. The book reflects on the potential of nuclear energy for a reliable solution for a low greenhouse gas footprint and a need for energy system transformation by countries, reiterating the need for timely decisions and planning. However, any future planning for investment in nuclear technology pre-requires a strong national legal governance mechanism and commitment to

international standards, laid down by IAEA regulations and treaties governing the use of this technology.

Nuclear liability continues to evolve with ongoing deliberations, including issues like interpretation of cost and responsibility for the adverse effects of radiation harm in any untoward eventuality or lapses in weakened systems. Similarly, nuclear security remains intrinsic to the historical evolution of international legal architecture.

The book discusses the Convention on the Physical Protection of Nuclear Material and its Amendment (A/CPPNM) and relates its development from 1980 to the present as a reflection of technological developments like small modular reactors (SMRs) and floating platforms, especially in countries like Russia and the United Kingdom (UK). Nonetheless, this technological change has implicated new dimensions in revision and changes to regulations and standards by legal experts, national experts, regional partners, and the IAEA. The book emphasizes the need for the adoption of a balanced international legal framework clearly defining responsibilities between supplier and host countries in the case of SMRs. These adaptations are needed to address the unique characteristics of SMRs, which provide time-efficient and cost-effective energy solutions vis-à-vis the standard large nuclear power reactors.

Nuclear law, while adopted by different countries of the world, translates into the requirement and understanding of the limitation of its political, technical, and administrative capacity. National nuclear laws and legal governance mechanisms focus on identifying a clear blend of global standards and selective approaches, made achievable through commitment, regional and bilateral partnerships guided and supplemented with the IAEA's expertise and leadership in the nuclear domain.

IAEA provides the historical foundation, continuously evolving along with its member states in dealings with the entire breadth of issues and challenges that form the landscape of global nuclear law. The IAEA safeguards system

involves mutually agreed-upon agreements that form an intrinsic part of nuclear governance in all its member states. These safeguards have changed over the years in response to both technical and political changes. It offers standardized arrangements for countries' comprehensive, facility-specific (in nuclear weapons states), research-based, and safeguards for small quantities. IAEA has retained its leadership in spearheading its role in nuclear technology governance and remains central to developing new solutions to any legal interpretation, whether led by technological developments or international security implications for the nuclear sector.

The case study of the UAE's (United Arab Emirates) nuclear program is presented as a learning opportunity to understand the dynamics involved in a specific country in formulating comprehensive legal, regulatory, and institutional frameworks of a peaceful nuclear power program. This history provides the key information in political, technical, and specifically international partnerships involved in the achievements of operational, regulatory, and legal setups for a national nuclear energy program under the auspices and support of the IAEA.

Similarly, the case study of Morocco highlights its almost six decades of efforts in the development of nuclear and radiological infrastructure. Morocco's example illustrates the integration of its national nuclear agency, the Moroccan Agency for Nuclear and Radiological Safety and Security (AMSSNuR), its regulatory mechanism, and infrastructure in adherence to international nuclear legal standards in safety and security.

This book offers a unique insight into the historical understanding of international nuclear law, while simultaneously addressing the new and evolving debates for its implementation in the future. It includes a diverse range of contributions from legal, political, and technical experts from different Member States of the IAEA. This multiplicity of perspectives enhances the analytical depth of the information in the book and attempts to provide a well-rounded understanding of the global nuclear legal landscape. The inclusion of national case studies adds substantial value,

offering concrete illustrations of how different countries address the legal, regulatory, and institutional aspects of nuclear energy governance while dealing with ongoing technological advancements. By addressing both theoretical and applied dimensions of nuclear law, the book fills an important gap in existing literature.

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