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EVOLUTION OF INTERNATIONAL LEGAL FOUNDATIONS FOR THE PEACEFUL USE OF NUCLEAR ENERGY

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Abstract. *This article analyzes the evolution of international legal frameworks governing the peaceful use of nuclear energy, focusing on historical stages, key legal instruments, and the pivotal role of international organizations. Special attention is given to the International Atomic Energy Agency (IAEA), the Nuclear Suppliers Group (NSG), and other institutions involved in ensuring safety, non-proliferation, and technical cooperation. The study highlights the shift from non-proliferation to a broader agenda, encompassing safety, sustainable development, and cyber threats. The article also identifies ongoing challenges related to enforcement, technological progress, and the balance between state sovereignty and international oversight.*

Keywords. *Nuclear energy, IAEA, non-proliferation, international law, nuclear safety, NSG, CTBTO, international organizations, sustainable development, nuclear terrorism, safeguards.*

History and Development of International Norms and Principles in the Field of Nuclear Energy

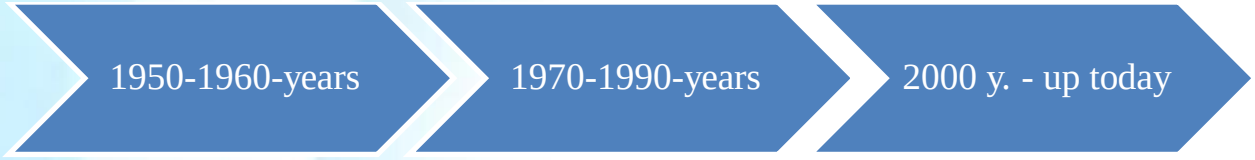
"Nuclear energy can be both a blessing and a curse. The only question is how humanity will choose to use it."[1]

The legal framework for the peaceful use of nuclear energy has evolved in response to several key challenges: the threat of nuclear weapons proliferation, the need for the safe operation of nuclear facilities, and the growing interest of states in nuclear energy as a power source. However, the international community was initially faced with a contradiction: nuclear technologies held immense potential for

[1] In his "Atoms for Peace" speech delivered before the United Nations General Assembly on December 8, 1953, U.S. President Dwight D. Eisenhower emphasized that nuclear energy could serve both the good and the harm of humanity. This address laid the foundation for the establishment of the International Atomic Energy Agency (IAEA) in 1957, whose mission is to promote the peaceful use of nuclear energy and prevent its military application.

ISSN 3060-4567

development while also carrying a tremendous destructive force. The formation of international norms progressed through three major stages:



In the 1950s–1960s, during the Cold War, the emphasis was placed on controlling nuclear materials. It was during this period that the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) emerged, affirming the right of states to develop nuclear energy under the condition of non-proliferation guarantees[2]. However, practice showed that legal obligations alone did not prevent the militarization of nuclear programs, as illustrated by the nuclear ambitions of India and Pakistan in the latter half of the 20th century[3].

The next stage (1970s–1990s) was marked by growing awareness of the risks of nuclear accidents and the need for stricter safety standards. The 1986 Chernobyl disaster became a turning point: international institutions, including the IAEA, revised their approaches to nuclear energy regulation. As a result, key instruments such as the Convention on Early Notification of a Nuclear Accident[4], the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency[5], the Convention on Nuclear Safety (1994)[6], and the Convention on the Physical Protection of Nuclear Material (1979)[7] were adopted. Further negotiations led to the Joint Protocol Relating to the Application of the Vienna and Paris Conventions (1988)[8], as well as the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage and the Convention on Supplementary

[2] Treaty on the Non-Proliferation of Nuclear Weapons (NPT), 1968
[3] George Perkovich. India's Nuclear Bomb: Impact on Global Proliferation. University of California Press, 2001. P. 641
[4] Convention on Early Notification of a Nuclear Accident
[5] Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
[6] Convention on Nuclear Safety (1994)
[7] Convention on the Physical Protection of Nuclear Material (1979)
[8] Vienna Convention on Civil Liability for Nuclear Damage of 21 May 1963//Paris Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960

ISSN 3060-4567

Compensation for Nuclear Damage (1997)[9]. However, these measures were largely reactive, adopted only after major crises had already occurred.

The modern phase (2000s to present) is characterized by a growing focus on sustainable development and the prevention of nuclear terrorism. New challenges, such as cyber threats to nuclear infrastructure and the need for nuclear waste reprocessing, demand a comprehensive reassessment of existing norms[10]. A key issue in this context is balancing technological advancement with oversight: while countries with developed nuclear industries seek greater autonomy, international organizations call for increased transparency[11].

The Role of International Organizations (IAEA and Others) in the Regulation and Oversight of the Peaceful Use of Nuclear Energy

International organizations play a crucial role in ensuring the safe and peaceful use of nuclear energy, monitoring compliance with international norms, and preventing nuclear proliferation. Among the most significant of these are the International Atomic Energy Agency (IAEA), the Nuclear Suppliers Group (NSG), the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), and the Nuclear Energy Agency (NEA) under the OECD.

While international nuclear law relies on various conventions, its effective implementation largely depends on the activities of international organizations. The IAEA, established in 1957, both promotes the peaceful uses of nuclear energy and serves as a control mechanism. It remains the central global body responsible for monitoring nuclear activities and supporting the development of peaceful nuclear technologies. Its key functions include:

- Developing safety standards, such as the IAEA Safety Standards Series[12];

[9] Convention on Supplementary Compensation for Nuclear Damage (1997)
[10] International Atomic Energy Agency (IAEA). Cybersecurity in Nuclear Security: Global Trends and Response Measures. – Vienna: IAEA, 2021. – 72 p.
[11] Furhmann, M. Atomic Assistance: How “Atoms for Peace” Programs Cause Nuclear Insecurity. – Ithaca: Cornell University Press, 2012. – 312 p.
[12] International Atomic Energy Agency. Fundamental Safety Principles. Vienna: IAEA, 2006.

ISSN 3060-4567

- Implementing safeguards, through inspections and verification of nuclear materials to prevent their diversion into military use[13];
- Providing technical cooperation, including technology transfer, expert training, and funding programs for peaceful nuclear applications[14].

Analysis shows that the effectiveness of IAEA safeguards largely depends on the level of cooperation from member states. For example, the agency's robust inspection regime in Iran following the Joint Comprehensive Plan of Action (JCPOA) in 2015 significantly limited the country's uranium enrichment capacity[15]. However, after the U.S. withdrawal from the JCPOA in 2018, Iran gradually reduced its cooperation with the agency, resulting in heightened international tension[16].

The NSG is an informal export control regime comprising 48 countries involved in the supply of nuclear materials and technology. Its main goal is to prevent the transfer of nuclear technologies to states that do not comply with NPT requirements[17].

The NSG plays an important role in limiting access to sensitive technologies. For example, although India possesses nuclear weapons and is not a signatory to the NPT, it received an NSG exemption in 2008 that allowed it to import nuclear fuel and reactors—raising concerns over double standards in non-proliferation efforts[18].

In practice, international regulatory mechanisms often face challenges related to inconsistency. While some states with advanced nuclear sectors demand strict safety compliance, others that are just beginning to develop nuclear energy face barriers in accessing necessary technologies.

[13] International Atomic Energy Agency. The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons. INFCIRC/153 (Corrected), Vienna, 1972.
[14] International Atomic Energy Agency. Technical Cooperation Report for 2021. Vienna: IAEA, 2022
[15] Albright, D., Stricker, A. Iran's Nuclear Program and International Sanctions. Washington, D.C.: Institute for Science and International Security, 2015. – pp. 89–92.
[16] Furhmann, M. Atomic Assistance: How "Atoms for Peace" Programs Cause Nuclear Insecurity. Ithaca: Cornell University Press, 2012. – pp. 57–63.
[17] International Atomic Energy Agency. Guidelines for Nuclear Transfers. INFCIRC/254, Part 1, Rev. 13, 2013.
[18] International Atomic Energy Agency. Guidelines for Nuclear Transfers. INFCIRC/254, Part 1, Rev. 13, 2013.

ISSN 3060-4567

The CTBTO conducts global monitoring for nuclear explosions using a network of seismic, hydroacoustic, and radionuclide stations. Though the Comprehensive Nuclear-Test-Ban Treaty (CTBT) has not yet entered into force, the CTBTO effectively carries out its mandate, having documented, for example, North Korea's nuclear tests[19].

The Nuclear Energy Agency (NEA) under the OECD coordinates nuclear policy among member states. It provides guidance on radioactive waste management, reactor safety, and the sustainable development of nuclear energy[20].

Other institutions, such as the European Atomic Energy Community (Euratom), demonstrate a regional approach to regulation that enables stricter control. However, this experience has not been widely adopted globally, as many states remain wary of ceding sovereignty in matters of energy policy[21].

The development of international nuclear regulation shows that each new phase has brought new challenges, requiring the adaptation of norms and control mechanisms. The initial focus on non-proliferation has shifted toward a broader approach that includes safety, sustainable development, and the prevention of nuclear terrorism. Nonetheless, unresolved issues remain, including the need to reform the system of international safeguards, to find a balance between national sovereignty and international oversight, and to adapt existing norms to modern technological realities.

The role of international organizations in regulating the peaceful use of nuclear energy is complex. On the one hand, they provide a high level of oversight and help prevent nuclear weapons proliferation. On the other hand, institutions such as the IAEA often face limitations in enforcement powers, while mechanisms like the NSG are subject to political compromises. Modern challenges, including cyber threats and the potential revival of nuclear weapons programs by certain states, call for

[19] Kafai Far Mohammad Ali. Peaceful Use of Nuclear Energy and Environmental Protection: International Legal Analysis: Dissertation. Candidate of Law: 12.00.10. Moscow, 2014 — 184 p.
[20] OECD Nuclear Energy Agency. The Role of the NEA in Nuclear Policy. Paris: NEA, 2021. – P. 9-12.
[21] European Atomic Energy Community (EURATOM). Treaty Establishing the European Atomic Energy Community, 1957.

enhanced cooperation among these organizations and a reassessment of some existing norms.

LIST OF REFERENCES

1. Treaty on the Non-Proliferation of Nuclear Weapons (NPT), 1968
2. George Perkovich. India's Nuclear Bomb: Impact on Global Proliferation. University of California Press, 2001. P. 641
3. Convention on Early Notification of a Nuclear Accident
4. Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
5. Convention on Nuclear Safety (1994)
6. Convention on the Physical Protection of Nuclear Material (1979)
7. Vienna Convention on Civil Liability for Nuclear Damage of 21 May 1963//Paris Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960
8. Convention on Supplementary Compensation for Nuclear Damage (1997)
9. International Atomic Energy Agency (IAEA). Cybersecurity in Nuclear Security: Global Trends and Response Measures. – Vienna: IAEA, 2021. – 72 p.
10. Furhmann, M. Atomic Assistance: How "Atoms for Peace" Programs Cause Nuclear Insecurity. – Ithaca: Cornell University Press, 2012. – 312 p.
11. International Atomic Energy Agency. Fundamental Safety Principles. Vienna: IAEA, 2006.
12. International Atomic Energy Agency. The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons. INFCIRC/153 (Corrected), Vienna, 1972.
13. International Atomic Energy Agency. Technical Cooperation Report for 2021. Vienna: IAEA, 2022
14. Albright, D., Stricker, A. Iran's Nuclear Program and International Sanctions. Washington, D.C.: Institute for Science and International Security, 2015. – pp. 89–92.

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15. Furhmann, M. Atomic Assistance: How “Atoms for Peace” Programs Cause Nuclear Insecurity. Ithaca: Cornell University Press, 2012. – pp. 57–63.

16. International Atomic Energy Agency. Guidelines for Nuclear Transfers. INFCIRC/254, Part 1, Rev. 13, 2013.

17. Kafai Far Mohammad Ali. Peaceful Use of Nuclear Energy and Environmental Protection: International Legal Analysis: Dissertation. Candidate of Law: 12.00.10. Moscow, 2014 — 184 p.

18. OECD Nuclear Energy Agency. The Role of the NEA in Nuclear Policy. Paris: NEA, 2021. – P. 9-12.

19. European Atomic Energy Community (EURATOM). Treaty Establishing the European Atomic Energy Community, 1957.