

## Importance of Nuclear Energy as a Means of Electricity and Environmental Impact

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**Abstract:** Many Countries are currently facing energy crisis because of the electricity required to grow the economy and drive local development is inadequate [1]. Striving to use nuclear energy for the production of electricity appeared shortly after the beginning of the 20th century, the scientific discovery that radioactive elements such as radium, according to the principle of equivalence of mass and energy release a tremendous amount of energy. However the means to master release a tremendous amount of energy. And the means to master such energies were impractical; since the highly radioactive elements were inherently short-lived (active selection energy corresponds to a short half-life). However, the desire for the development of atomic energy was extremely strong, despite the fact that not all physicists supported this. The sceptics included, for example, globally recognized authority on physics Ernest Rutherford. The situation changed radically in the late 1930s with the opening nuclear fission. Nuclear (or atomic) energy is defined as the use of isothermal nuclear processes for the production of useful heat and electricity. This process includes nuclear fission, nuclear decay and nuclear fusion. Nuclear fission of many elements of actinides of periodic tables produces nuclear energy directly serving humanity, nuclear decay processes in the form of geothermal energy, and radioisotope thermoelectric generators. Similarly, energy is essential for human development and energy systems are a crucial entry point for addressing the most pressing global challenges of the 21st century, including sustainable economic, and social development, poverty eradication, adequate food production and food security, health for all, climate protection, conservation of ecosystem, peace and security [2]. the current energy system do not meet these challenges.

**Keywords:** Nuclear energy for Electricity, Nuclear Fission, Nuclear Decay Nuclear Fusion

### 1. Introduction

Nuclear (nuclear fission) power plants, excluding the share of offshore nuclear fission reactors, in 2012 provided 13% of the world's electricity. According to information IAEA, there are 437 operating nuclear reactors in 31 countries although not all of them

produce electricity. Besides, there are approximately 140 naval vessels using nuclear engines. [3] The Pros and Cons of nuclear power explore issues of technology, costs and environmental impact in the result of activities carried out in the field of nuclear power. [4] The truth about nuclear energy addresses security issues, nuclear proliferation and economy as of 2013, generating clean energy from sustainable nuclear fusion reactions, with the exception of natural thermonuclear energy sources such as the sun remains a constant area international physical and engineering survey. [5] Del Sesto in Conflicting Nuclear Ideologies: Evidence of the Congress on the Safety of Nuclear Reactors explores the points of view supporters and opponents of nuclear energy. Nuclear energy advocates. See it as an alternative to Middle Eastern oil; energy not hazardous to the environment and not affecting the change climate; a factor of economic growth, financial well-being and non-proliferation of nuclear weapons they are convinced that science and technology of non-proliferation nuclear weapons will solve all practical and political problems associated with nuclear energy. However, after 60 years after the first attempts, the production of fusion energy for a commercial basis remains unlikely before 2050. Problems of production and safe use of nuclear energy is the subject of scientific research in various fields of knowledge, in including in the field of international law. Supporters of its production and uses such as World Nuclear Association, IAEA, and Defender nation for nuclear energy - claim that nuclear energy is safe, sustainable energy source with low carbon dioxide emissions gas. Opponents such as Greenpeace International, Japan National the Institute for Radiological Research (SRWS), on the contrary, argue that nuclear power poses many threats to people and the environment. As arguments to substantiate their position, the latter cite the consequences of accidents at the Chernobyl nuclear power plant (1986), Fukushima (2011) and the island Tremile (1979), and also the aftermath of nuclear accidents on submarines. Analysis in terms of the ratio of the number of deaths per unit generated energy shows that nuclear power is because fewer deaths per unit of energy generated, than other large energy production. Energy production, for

example from coal, oil, natural gas and hydropower resulted in more the number of deaths per unit of energy produced. 'However, it should be noted that the economic costs of accidents at nuclear power plants are very high. Cleaning the molten core of nuclear reactors can take several decades. Evacuation costs victims and compensation for the loss of livelihoods also significant. The accidents that have taken place give rise to natural anxiety. First of all, due to radioactive contamination of the territory of the state of the nuclear power plant and territories neighbouring states. The consequences of such pollution have a long character and serious consequences. This study is based on the belief that nuclear energy has the potential to be reliable, sustainable and a clean energy source that could contribute to greater availability of affordable energy services in all countries. The use of nuclear energy must be profitable, completely safe and reliable. It must protect people and environment. Nuclear energy has long presented environmentalists with a dilemma. How cheap, clean energy source that does not use fossil fuel and does not add greenhouse gases to the atmosphere, it offers an attractive alternative to the energy of traditional power plants, working on coal. At the same time, nuclear energy is associated with issues ecology, inspiring anxiety, including problem burial radioactive waste. The problem of nuclear waste disposal is the most an acute problem in the nuclear power industry. Waste from nuclear power are extremely dangerous, they must be carefully controlled in for several thousand years (according to the standards of the American Agency Environmental Protection Agency, 10 LLC years). For this problem in in reality, there are no solutions, except for the processing of nuclear waste. A major nuclear safety issue is the problem of effective monitoring of nuclear facilities and the process to prevent the proliferation of nuclear weapons carried out International Atomic Energy Agency (IAEA). The mentioned the monitoring system has significant deficiencies that affection the state of nuclear safety. The Agency itself acknowledges that in connection with measurement uncertainty, it cannot detect all possible leaks of nuclear materials. Such fears have real grounds: the public state has confirmed 20 cases of leakage of dangerous materials and more than 200 cases of illegal trafficking in nuclear materials@. Technology nuclear power generation, widespread among countries, and especially the process of converting uranium raw materials into low-enriched uranium, also can be used to produce enriched weapons-grade uranium. All of this is indicative of the risks and threats of nuclear activities. In this connection, there is an obvious need to create effective international legal tools to resolve the above problems

associated with activities of states in the field of production and use of nuclear energy. In the context of the above, the problem of the peaceful use of nuclear energy and its impact on the environment is particularly relevant. Its solution requires the creation of effective international legal and1 tools to protect the environment from negative consequences production and use of nuclear energy. The relevance of the topic of dissertation research is confirmed on-going debate on climate change and impacts nuclear energy on the environment. In this regard, the demand for becomes the study of international legal means and methods, the use of which will ensure the prevention of negative impact nuclear energy on the environment. The fact is that the current international legal norms in the field of nuclear activities are not ensure that the objective of protecting the environment is adequately achieved environment from the negative consequences associated with production and using nuclear energy. Therefore, strategic direction of activity in this area, namely the development of the necessary processes and methods reducing the negative impact of nuclear energy on the environment.

## 2. International Legal Regulation of Nuclear Activities

The development of nuclear energy and the production of destructive systems, such as nuclear weapons pose an unprecedented threat the vitality of the overall environment. The main thing in environmental destruction is that it leads to destruction on a universal basis of the right to life on which all depend other rights. In addition to the hull, the threat of use or the use of nuclear energy and its properties, there are problems associated with the danger associated with the large-scale use of nuclear energy. For example, the Chernobyl accident or the Fukushima events in Japan, when the coast of Japan on March 11, 2011, an earthquake occurred, causing tsunami that damaged the power plant and rendered them unusable self-shutting off systems for cooling a nuclear reactor self-shutting off systems for cooling a nuclear reactor. Despite on-going efforts to eliminate the accidents, the territories adjacent to the station are still too dangerous for the population. This issue raises the issue of security and the long-term cost of nuclear proliferation with the help of nuclear power plants, and on the safety and economic efficiency of such development of events in the face of the risk of unpredictable natural disasters. Such events are not measurable by the risk management system, and in fact, they cannot be foreseen. Peaceful Uses of Nuclear Energy "and all the promises that Olyu entails, paradoxically, often perceived in comparison with the

prospects for the proliferation of nuclear weapons and war. This mixed perception is understandable: materials, knowledge and experience, necessary to build nuclear weapons are often indistinguishable from those that necessary for the production of nuclear energy and research, which determines this approach. It is generally accepted that the primary responsibility for the regulation of the use of nuclear energy lies the national authorities; it was equally recognized that other countries can also be affected. Consequently, the regulation of the use of nuclear energy, like many other aspects of human activity that can have trans-boundary impacts, requires the contribution of international community responsibility to the end, or, as in some cases, joint responsibility to ensure, among other things, homogeneity standards, coordination, pooling of resources and services, and compliance. Therefore, the study of the problems of international responsibility in international environmental law for the illegal use of nuclear energy seems necessary. International environmental law covers legal regulations and processes that are aimed at solving trans-boundary, regional or global environmental problems. International environmental problems generally arise from anthropogenic impact on the environment, such as pollution or the use of resources associated with the processes of production and consumption. Environmental Problems present for international environmental law has at least five distinctive challenges.

**First**, they are largely the result of private activities (non-state actors) than government actions, and international environmental law should either directly connect these actors, or, as in the prevailing approach today, to induce states regulate the activities of private entities within their jurisdiction.

**Secondly**, since international environmental problems or their scientific understanding is developing rapidly and sometimes unexpectedly, International environmental law often operates in conditions uncertainties and must be adapted to changing needs or knowledge.

**Third**, international environmental law must deal with several relationships at once. International environmental problems by definition, not only go beyond state jurisdiction, but and involve social, political, economic processes, which can be expressed through the concept of sustainable development. Besides, since many international environmental issues are closely intertwined with each other, action or inaction on one of them involves one or several others.

**Fourthly**, many international environmental problems, and almost all global environmental problems require cooperation between industrialized and developing countries (history and evolution), touching upon complex and highly stressful questions of justice and opportunities (common, but different)

**Fifth**, international environmental problems not only often require a balance of potentially competing contemporary interests and priorities, but also have significant implications for future generations humanity (equality between generations). The evolution of international environmental law has been shaped by these closely related issues (history and evolution). principles of law (basic principles) emerged as a result of their Regular or soft flection various aspects noted above. Perhaps in recognition of the fact that solving an environmental problem requires cooperation, and not confrontation, the main role of these principles is to help shape the framework for negotiations and international environmental agreements (multilateral environmental agreements) and for the activities of international environmental organizations and institutions.

### 3. Regulation of Safety Environment for the use of Nuclear Energy at a Global Level

It explores the role of the International Atomic Energy Agency (IAEA) and environmental conventions. In this the case, the assessment of environmental damage mainly refers to the state and to the perpetrators. Customary Laws Apply to Act causing damage to the environment. On the regulation of environmental safety of use of nuclear energy at the international level, as usually affected by different areas of customary law applied in different states to prevent the destruction of the environment and in the field peaceful use of nuclear energy. IAEA Board of Governors under the agenda item entitled "Functions of the agency in accordance with the Convention on the Physical Protection of Nuclear Material "took note of information provided by the secretariat in document No.1987 in the sense that the CEO of the agency will take into account all reservations, suggestions and remarks in particular regarding the most a suitable way to determine if a given scope is the application of the Convention on the Physical Protection of Nuclear Material (CPPNM) and agency functions. As indicated in document No. COY / IIP / 521, the IAEA is assigned in in addition to its functions as a depositary, the obligation to act as focal point for matters related to the CPPNM. For example, in in accordance with Article 5 (1) of the CPPNM, the IAEA is obliged to provide any information received by him in relation to the designated members of the central government

responsible for the physical the protection of nuclear material and for the coordination of recovery and response in case of any unauthorized withdrawal, use or changes in nuclear material, or in the event of a real threat of such action. Pursuant to Article 14 (1) of the IAEA, as depositary sends the information it receives from the participating States to due to their obligation to inform the depositary of their laws and the rules relating to the CPPNM. In addition to Article 14 (2), the IAEA informs all States of any information received from a State party regarding the final outcome of the proceedings when the alleged the offender is prosecuted for crimes, set out in the CPPNM. The CPPNM also ensures the IAEA's role in providing assisting States, upon their request, in fulfilling their obligations. For example, in accordance with Article 5 (2), "the participating States have the opportunity to theft, robbery or other illegal seizure of nuclear material or a real threat of this to inform international organizations, including number of the IAEA, about such acts or threats and exchange information with by such organizations in order to protect endangered material." See: Decision 86-87 / 49 and GOV / OR / 678 ( parag. 130 and 131). checking the integrity of a nuclear container or returning it illegally captured nuclear material ". Similarly, Article 5 (3) provides that "the participating States cooperate or consult with each other directly or through international organizations, including the IAEA, in relation to the organization, operation and improvement of systems for the physical protection of nuclear material in the process of international transportation ". The main responsibility of the agency is encouraging and facilitating the development of nuclear power and ensuring that promotion for peaceful purposes; and the re-regulation of environmental standards hygiene and health in cooperation with other international organizations is a secondary responsibility of the agency. Agency standards cover issues such as relocation and handling radioactive materials and nuclear waste. Norms for nuclear safety, modified in 1988, gave less fundamental standards of planning guidelines, structure, creation and management of nuclear power plants. What matters is that the IAEA is empowered in all aspects the use of nuclear energy, including those affecting health and hygiene, but its charter does not provide for standards imposing obligations on the authorities of the participating countries, so that they consider it necessary to fulfil. In only one case do countries feel obligated to comply with the regulations: when the agency grants the requesting country materials, devices and services; according to a number of agency rules has the right to guarantee compliance with standards through agreements, and direct inspectors to locate,

investigate and train in accordance with country standards; and in cases where a country does not comply with them, it can be removed, or the cooperation may be terminated. 1958 Convention of the year on the high seas obliges countries to comply with the IAEA standards for prevention of sea pollution as a result of the discharge of radioactive waste. London Convention on the Prevention of Marine Pollution dumping waste and other materials in 1972 "allows the agency identify hazardous radioactive waste that cannot be dumped into the sea, and reaffirms the obligation of countries to take into account the IAEA discharge standards waste. The IAEA Statute empowers the agency to set standards safety to protect health and minimize the risk to life and property, - the rules that the Agency itself must apply in their work and which the state can apply through its legal acts in the field of nuclear and radiation safety. Standards IAEA security are binding on the agency itself and states that introduce them into their national legislation, and they become binding, or included in bilateral treaties. Comprehensive vault standards security regularly is being revised, and with the help of the IAEA in their application, it has become a key element in global security mode. In the mid-1990s, a major overhaul of the regulations was initiated safety IAEA with a systematic approach to updating the entire code of (y-y-p-p-p-g-regulations, and revised the structure of the Oversight Committee. New standards, resulting from the revision, are of high quality and embody best practice from Member States. With the assistance of the Commission on 1yrms safety, the IAEA works to promote global recognition of and the use of safety standards. Safety standards are effective only in if they are correctly applied in practice. Services IAEA safety, which range from engineering safety, operational safety and safety of transportation and disposal waste to regulatory issues and safety standards in organizations, help Member States apply and evaluate standards efficiency. Such security services allow you to obtain valuable information to share, and all member states are called upon to apply them. The regulation of nuclear and radiation safety is national responsibility and many member states are adopting decisions on the application of the IAEA safety standards in their national legislation. For contracting parties of various international safety conventions IAEA standards are harmonized and a reliable means of ensuring the effective fulfilment of obligations under Conventions. Developers, manufacturers and operators around the world for improve nuclear and radiation safety applies these standards in the production of SFG energy, in medicine, industry, agriculture. Economy, research and education. The IAEA is serious fits the

long-term challenge facing all consumers' and controls everywhere: ensuring a high level of safety when use of nuclear materials and radiation sources. Their continuous use for the benefit of humanity must be carried out safely way, and the IAEA safety standards are designed to assist in achieving this goal. IAEA functions to protect environment, planolarno developed through the Council. IAEA Board of Governors approves publication of safety standards IAEA in the category "Fundamentals of Safety in Nuclear Installations" in June 1993 ^", on the safety of radioactive waste management - in March 1995 ^ 'and on radiation protection and safety of radiation sources in June 1995'®. In 1995, the Council instructed the IAEA Secretariat revise, at the appropriate time, the texts of the three safety fundamentals with "International Atomic Energy Agency. The Safety of Nuclear Installations, Safety Series No. 110, IAEA. Vienna, 1993."International Atomic Energy Agency. The Principles of Radioactive Waste Management, safety series No. 111-F.IAEA, Vienna. 1995.Food and Agriculture Organization of the United Nations, International Atomic Energy Agency, International Labor Organization, Panaraerican Health Organisation, World Health Organization Radiation Protection and the Safety of Radiation Sources, Safety Series No. 120, IAEA, Vienna. 1996.the purpose of combining them **D** a single set of principles that represent a common safety philosophy in all areas of application of the standards safety IAEA. Traditional distinction between nuclear security and radiation protection is hardly justified at a conceptual level. Principles of Nuclear Safety and Radiation Protection in Publications of the three Safety Fundamentals were technically compatible, but expressed in differently. In 2000, the secretariat began the meeting process of the editorial text preparation groups for a common set of principles. Text of the draft Fundamentals security was developed with a broad international consensus to ensure that the Fundamental Principles safety will be supported by all IAEA Member States. Fundamental Safety Principles Co-sponsored European Atomic Energy Community (Euratom), Food and the Agriculture Organization of the United Nations (FAO), International Labor Organization (ILO), Pan American Organization Health (PEP), the United Nations Environment Program (UNEP) and World Health Organization (WHO) (sponsoring organizations).The application of basic safety principles will facilitate the use of international safety standards and will serve consistency in the agreements of different states. That's why it is desirable that all states respect and uphold these principles. The principles will be binding on the IAEA for its work and for states in respect of those

operations in which the agency provides them help. States or sponsoring organizations may adopt guidelines for at their own discretion, in relation to their own activities. In preparation the text of the Safety Fundamentals, all the principles established in the previous Safety Fundamentals publications in three different areas have been reviewed and combined into a coherent, coherent set often new principles. Some of the old security principles, which were expressed as requirements in a more appropriate way were established as such in safety requirements publications. The IAEA's job is made more difficult when Member States tend to neglect the rules and regulations set out by the agency. Recently, we have agencies were narrowly respected, since most states tend to criticize the IAEA for lack of power and authority ^ '.The main requirements and functions are aimed at protecting the environment from nuclear activities, and were well structured by the agency. Question about states boycotting certain provisions of the agency, and fears of for Western influence on the activities of the IAEA, are the main moments of criticism of various experts in this field. Security URL: [http://w^ra-reuters.com/article/2013/09/26/us-Iran-nuclear-IAEA\\_idUSBRE98POXN20130926](http://w^ra-reuters.com/article/2013/09/26/us-Iran-nuclear-IAEA_idUSBRE98POXN20130926) (Assessed on 8 / Oct / 2013). The environment The IAEA faces a number of fundamental challenges such as how to determine the overall dosage and the environmental impact of a peaceful the use of nuclear energy, the necessary knowledge of radioactive material released as a result of all operations in the atomic area. In addition, knowledge of the shape of the material to be released is required, the way it moves and the amount of similar material assimilated or inhaled by humans. Obviously, in most cases, these conditions cannot to be satisfied. Therefore, certain assumptions are needed for in order to calculate the conservatively expected dose of materials that will receive the world's population. Since there were no two almost alike environmental situations and there were no reactions to a negative change normal environment, the results obtained in such calculations are not can be exactly suitable for any place.

#### **4. Activities of the European the Atomic Energy Community in the Field of Environmental Protection as Case of Regional Regulation**

Nuclear safety is an absolute priority for the EU, the first major regional actor to provide a binding legal framework in the field of nuclear safety. The goal is to ensure people's lives and wealth the environment under all circumstances by preventing the spread of dangerous quantities of radioactive materials and preventing nuclear accidents and minimizing the

consequences of use. Europe becomes a real example for the rest of the world in context renewed interest in nuclear energy. Although the IAEA and the European Atomic Energy Community (Euratom) have different international legal status, both are cooperation the international community in the peaceful uses of nuclear energy, and also actively regulate nuclear power. *Radiation levels in Euratom member states.* In states members of Euratom, as in other states, the number and composition of NPP radioactive emissions fluctuate from nuclear power plant to nuclear power plant at a spacing time. NPP release radioactive substances in various forms such as noble gases: krypton-85 and argon-41, as radioactive halogens, as radioactive particles like tritium and carbon-14 - these radioactive emissions are minimal compared to those obtained as a result of processing nuclear fuel. For example, the Sellafield processing station at England and La Hague in France produce more krypton-85 than all nuclear power plants combined. Emissions from Sellafield and La Hague Tritium Reprocessing Plants more than those produced by power plants. Radioactive emissions Sellafield in the Irish Sea are quite substantial. also affect the English Channel. Some of these radioactive substances settle on the bottom of the sea, and part is transferred to the Atlantic and the North Sea. V recent improvements in nuclear technology have allowed reduce emissions from nuclear power plants. Nuclear energy production increased due to growth in the number of operating nuclear power plants. Consequently, the release of radioactive substances into the atmosphere remained the same or increased slightly. *International legal status of Euratom.* Euratom is part of the European Community, which also includes the European Union coal and steel (ECSC) and the European Economic Community (EEC). These associations aiming to provide Western European economic integration, were created by six European states - France, Germany, Italy, the Netherlands, Belgium and Luxembourg - in two stages. In 1951 d. "Six" signed an agreement on the creation of the ECSC. In 1955 g. the Governments of Belgium, the Netherlands and Luxembourg (Benelux) submitted a joint memorandum stating that European unity can only be achieved on the basis of functional economic integration in areas such as transport, sources of conventional and nuclear energy. In June of the same year, the memorandum was considered by the conference ministers of six member countries of the association in Messina (Italy). Ministers endorsed the idea of functional integration, highlighting the need joint development of the nuclear industry. By the

decision of the conference an intergovernmental committee was created under the chairmanship of B. Spaak (Belgium) to consider the need for and the possibility of creating other European Communities to complement the ECSC and for preparation of the corresponding report. The treaty establishing Euratom includes 225 articles (6 sections) and 5 applications. The possibility of the entry of other states is envisaged, moreover, the conditions of admission and the associated possible changes in the agreement on Euratom are subject agreements between states applicants for admission and Member States (art. 205). The main bodies of Euratom are the Council, the Commission, the European Parliament, Agency, Court, Economic and Social Committee and Scientific and Technical Committee. Organizationally, Euratom is directly related to the European the Economic Community (EEC) and with the European Coal and steel (ECSC). According to the convention signed simultaneously with the treaties on the establishment of the EEC and Euratom, the European Parliament, the Court and the Economic and the social committee exists as the common bodies of the Euratom and the EEC. the European Parliament and the Court are also organs of the ECSC. *Environmental protection regulation by Euratom.* In accordance with Treaty establishing the European Atomic Energy Community (Treaty on Euratom) Euratom "is responsible for contributing to improving the standard of living in the member states and in developing relations with other countries by creating the conditions necessary for the earliest creation and growth of the nuclear industry. Like the IAEA Statute, the Treaty on Euratom does not contain specific provisions on the protection of the environment from radioactive contamination. The Euratom Treaty makes it possible to "create uniform standards for safety measures "aimed at protecting the health of a wide the public and health workers, and the provision of application of uniform safety standards. Article 30 of the Euratom Treaty uses the phrase "core standards" to mean: "a) maximum permissible doses compatible with sufficient safety; b) utterly permissible level impact and pollution; v) the fundamental principles governing observation of the condition workers ". This definition covers radiation protection issues and does not affects nuclear safety. Indeed, in a number of cases the Commission Of the European Communities (Commission) emphasizes that its responsibilities in in accordance with the Treaty on Euratom "are confined to aspects of radiation protection and to the elimination of technological problems in safety. "

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## 5. Conclusion

The main conclusions, made as a result of the study, is concluded that the need to create new international monitoring mechanisms and First International Treaty for the Protection of the Environment in Peaceful the

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