Bianka FLEKÁCSNÉ KOCSIS*

International, EU law and National Legal Frameworks on the use of atomic energy**

Abstract

This study aims to present the main international, European Union and domestic legal rules on use of atomic energy by applying the method of comparative analysis. Current reason of this topic is the ongoing Paks 2 project. An industrial project like this requires a highly complex and lengthy licensing process and the nuclear power plant units need to comply with several international, European Union and domestic regulations not only during the licensing process, but throughout erection and operation periods as well. Connected with that, this study examines various legal rules on safety application of using atomic energy, underlining the following topics: liability, safety, and nuclear waste management. In Hungary the Hungarian Atomic Energy Authority is liable for adaptation of the relating regulation. It supplies its tasks by cooperating with several international and European Union authorities.

Keywords: Paks 2 project, atomic energy, comparative legal analysis, nuclear safety

1. Introduction

Nowadays the topic of energy production have gained further importance. Continuous economic and technical developments presume stable energy supplies which are accompanied by a strong social demand. Whereas, one must not forget about environmental protection obligations – namely, how can the continuously rising energy demand be met, while protecting the environment, taking, care of the interests of future generations and reaching sustainable development goals. An appropriate solution could be the use of renewable energy sources – however this requires such environmental and geographical conditions with which a state could meet its entire energy demand. Unfortunately the aforementioned resources are not common in every state. Therefore, such a method of energy production is required which provides a stable and continuous energy supply, for example atomic energy production. This way of energy production was chosen by Hungary when it integrated[1] the atomic

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* dr. jur., Government Office of Borsod-Abaúj-Zemplén County, Directorate of Land Administration, Department of Land Administration 1, e-mail: kocsis.bianka7@gmail.com

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[1] It is noteworthy, that it does not mean an exclusive commitment around the method of atomic energy production. It serves only as an alternative to renewable energy production.

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energy in its 'energy-mix' (the so-called atom-carbon-green scenario).[2] In light of the aforementioned takes the so-called Paks 2 project – the most significant industrial investment of Hungary – place. On the one hand, it consists of a procedure on the extension of the operational period. On the other hand, it means the actual expansion of the Paks Nuclear Power Plant (there is an ongoing licensing process for the two new units to be built up in addition to the two existing ones). The project requires a highly complex and lengthy licensing process and the nuclear power plant units need to comply with several international, European Union and domestic regulations not only during the licensing process, but throughout erection and operation periods as well.

The aim of this study is to provide an overview on the legislative framework with which such a nuclear power plant needs to comply in order to assure a safe operation period. This contribution uses the methods of descriptive and comparative analysis, since not only the Hungarian but European Union law is going to be addressed.

My hypothesis is, that the Hungarian legislation complies with international and European Union security requirements. Considering, that the use of atomic energy can be particularly diverse, the current study intends to focus only on its use for peaceful purposes (the use for military purposes is out of the scope of the present contribution).[3] This study intends to shed light on three aspects: liability, nuclear security, safe handling of spent fuel states and radioactive waste – to this end, the current research intends to find out what kind of legal requirements are necessary in order to ensure safe use of atomic energy for peaceful purposes.

Having regarded the above mentioned, the present article aims to – amongst others – give answers to the following questions: what kind of positive or negative effects does the atomic energy production has? What kind of international, European and domestic obligations need to be observed, in order to achieve the safe operation of a nuclear power plant? Which national, international, and European organizations are responsible for the supervision of construction works of a nuclear power plant and for safe operation?

2. Advantages and Disadvantages of Atomic Energy Use

Similarly to any other energy production method, atomic energy production also has several advantages and disadvantages.

As regards to atomic energy production, the most common disadvantage is definitely its dangerous nature, through it means a sort of security risk. This may not need to be elaborated further, since the recent nuclear accidents, such as the explosion of the nuclear power plant in Chernobyl[4] or the Fukushima nuclear accident,[5] are well-

[2] National Energy Strategy (NES) 2012, 14.

[3] Despite of the fact, that the peaceful use of atomic energy might include regulations on the prohibition of the use of atomic energy for military purposes, the present study does not intend to cover that area. For the aforementioned, see: Lamm 2013b; Sulyok 2013.

[4] The Fukushima nuclear disaster happened on 26 April 1986, in a nuclear power plant between Chernobyl and Pripjaty, Ukraine. The explosion resulted in a human death toll of thousands, however it also had an indirect consequence, such as serious adverse reaction – like cancer – as a result of the high radiation levels.

known facts. The effects of such events are long-lasting, not only with regard to the environment but for human beings as well. Such effects might be the possible negative impacts of atomic energy production to the environment or to the ecosystem (for instance the emitted heat load from the cooling of the nuclear power plant), or the issue of handling or storing of nuclear waste.

As far as the advantages of nuclear energy use are concerned, it can be argued, that is has its own positive effects which confirms its worth to be involved in a state's 'energy-mix'. In this regard, the most important factor is, that it functions as a stable and continuous energy source compared to the renewable energy sources (for example, water, wind, sun) which are highly dependent on weather conditions. It is a climate-friendly technology, since, it does not emit any greenhouse gas, thus it contributes to climate protection (amongst others, it could mean an essential tool in order to reach the aims, set out in the Paris Agreement[6]). Atomic energy production is cost-efficient and when it takes out a considerable part of a state's energy production, then it results in the reduction of electricity prices – for example in Hungary – where the Paks Nuclear Plant produces a considerable amount of electricity – the consumer price of electricity amounts to 35 HUF/ kW/h. Meanwhile in Germany – which refuses to use atomic energy – and in Denmark, where the use of renewable energy sources amount to 30% of the total energy consumption, as a result of the aid, provided to producers, dependent on weather conditions, the consumer price is 94 HUF.[7] As for another positive note on the side of nuclear power plants, their operational life is much longer, than of the renewable energy sources, namely the operational life of a nuclear power plant can be about 60 years, while those power plants which operate through renewable energy sources may last for only a 20-25 year period. Last, but not least, it is noteworthy, that, based on recent events, lessons have been learned and currently, there are such international, European, and national legislations in force, which – when applied adequately – can regulate the use of atomic energy in a safe and secure manner.[8]

3. International Legal Framework

3.1. Significant International Treaties with Regard to the Use of Atomic Energy

Along with several other states, Hungary has acceded to many multilateral international treaties, regarding safe use of atomic energy. On the national level,

[5] While the Chernobyl nuclear accident was a result of human negligence, the Fukushima nuclear catastrophe was caused by an environmental disaster (notably an earthquake and the following tsunami) on 11 March 2011. A high amount radioactive materials were released from the power plant, which resulted in an air pollution for distances of tens of kilometres away from the place of explosion. According to the International Nuclear Event Scale (INES), the nuclear incident was rated as the highest, INES 7. (See further: Index 2011)

[6] The central aims of the Paris Agreement are: ending fossil fuel production, achieve a significant decrease in carbon-dioxide emission, keeping global temperature rise well below 2 degrees Celsius, or at least limit the temperature increase even further to 1.5 degrees Celsius. For further details, see: United Nations 2020.

[7] Eck 2018, 4.

[8] Ibid. 3.

the Hungarian Atomic Energy Authority has duties in connection with the implementation of the international agreements.

In this regard, the following international instruments[9] needs to be mentioned: (1) Statute of the International Atomic Energy Agency; (2) Agreement on the Privileges and Immunities of the International Atomic Energy Agency, approved on 1 July 1959. in Vienna; (3) Convention on the Organisation for Economic Co-operation and Development (OECD) and its Supplementary Protocols and Declarations; (4) Agreement between the Government of the Republic of Hungary and the Organisation for Economic Co-operation and Development on the Privileges and Immunities granted to the; (5) Agreement on an International Energy Program, concluded at Paris on 18 November 1974 and its Protocols, and Resolution C(74)203 (Final) of the Organisation for Economic Co-operation and Development, establishing an OECD Nuclear Energy Agency; (6) Resolution of the Organisation for Economic Co-operation and Development, establishing an OECD Nuclear Energy Agency; (7) Treaty on the Non-Proliferation of Nuclear Weapons, as agreed on the XXII. Session of the United Nations General Assembly on 12 June 1968; (8) Agreement between the Government of the Republic of Hungary and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, signed on the 6 March 1972. in Vienna;[10] (9) Convention on the Physical Protection of Nuclear Material; (10) Convention on Early Notification of a Nuclear Accidents, signed on the 26 September 1986, in Vienna; (11) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, signed on the 26 September 1986, in Vienna; (12) Revised supplementary agreement between the Government of the Republic of Hungary and the International Atomic Energy Agency on Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA, as signed on 12 June 1989; (13) Vienna Convention on Civil Liability for Nuclear Damage, as signed on the 21 May 1963; (14) Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention; (15) Convention on Nuclear Safety signed on the 21 September 1994, in Vienna; (16) Comprehensive Nuclear-Test-Ban Treaty as agreed on by the United Nations General Assembly on 10 September 1996;[11] (17) Protocol Additional to the Agreement between the Republic of Hungary and the International Atomic Energy Agency for the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons, as signed on the 6 March 1972 in Vienna;[12] (18) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste management, in the framework of the International Atomic Energy Agency; (19) Convention Concerning International Carriage by Rail as amended by the Vilnius Protocol (COTIF), signed in Bern on 9 May 1980 and 3 June 1999; (20) Agreement on the implementation of Article III, (1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons and its Protocols; (21) Amendment to the Convention on the Physical Protection of Nuclear Material adopted in the framework

[9] HAEA 2020b.
[10] Application is suspended as of 1 July 2007 by the Act LXXXII of 2006 para. 6 § (1).
[11] Not yet in force.
[12] Application is suspended as of 1 July 2007 by the Act LXXXII of 2006 para. 6 § (1).

of the IAEA in 1979, and published by Legislative Decree 8 of 1987, as signed during the high level diplomacy conference of the IAEA on 8 June; (22) Regulation concerning the international carriage of dangerous goods by rail (RID – Appendix C to the Convention); (23) Agreement between the Government of Hungary, the Ministerial Cabinet of Ukraine and the Government of the Russian Federation on the transport of nuclear material between Hungary and the Russian Federation through the territory of Ukraine; (24) Convention Concerning International Carriage by Rail (COTIF), as amended by the Vilnius Protocol and its Annex 'C' as adopted on 3 June 1999; (25) Annexes 'A and 'B' of the European Agreement concerning the International Carriage of Dangerous Goods; (26) Annexed Regulations of the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN), as signed on the 26 May in Geneva.

Beyond the aforementioned international treaties, Hungary is a contracting party to several bilateral agreements, as further strengthening the safe use of atomic energy thus advancing cooperation with neighbouring states. In this regard, the following international agreements[13] needs to be mentioned: (a) Agreement on questions of mutual interest in the field of nuclear facilities between the Government of the Hungarian People's Republic and the Government of the Republic of Austria signed at Vienna, 29th April, 1987; (b) Agreement between the Government of the Hungarian People's Republic and the Government of Canada for cooperation in the peaceful uses of nuclear energy signed at Budapest, 27th November 1987; (c) Agreement on questions of mutual interest in the field of nuclear safety and radiation protection between the Government of the Republic of Hungary and the Government of the Federal Republic of Germany signed at Budapest, 26th September 1990; (d) Agreement on mutual notification and cooperation in the field of nuclear safety and radiation protection between the Government of the Republic of Hungary and the Government of the Czech and the Slovak Federative Republic signed at Vienna, 20th September 1990; (e) Agreement between the Government of the Republic of Hungary and the Government of the United States of America for cooperation in the peaceful uses of nuclear energy signed at Vienna, 10th June 1991; (f) Agreement for early exchange of information in the event of a radiological emergency between the Government of the Republic of Hungary and the Government of the Republic of Slovenia signed at Budapest, 11th July 1995; (g) Agreement for early exchange of information in the event of a nuclear accident between the Government of the Republic of Hungary and the Government of Romania signed at Bucharest, 26th May 1997; (h) Agreement for early exchange of information in the event of a nuclear accident and for mutual notification and cooperation in the field of nuclear safety and radiological protection between the Government of the Republic of Hungary and the Government of Ukraine signed at Budapest, 12th November 1997; (i) Agreement for early exchange of information in the event of a radiological emergency between the Government of the Republic of Hungary and the Government of the Republic of Croatia signed at Zaghreb, 11th June 1999; (j) Agreement for cooperation in the peaceful uses of nuclear energy and transfers of nuclear material between the Government of the Republic of Hungary and the Government of Australia, signed at Budapest, 8th August 2001.; (k) Protocol between

[13] HAEA 2020b.

the Government of the Republic of Hungary and the Government of the Russian Federation on the conditions of transfer of spent fuel of the Paks Nuclear Power Plant of Russian origin to the Russian Federation signed at Moscow, on 29th April 2004; (l) Agreement between the Government of the Republic of Hungary and the Government of the Russian Federation on cooperation in the field of transfer of spent fuel of the research reactor to the Russian Federation signed at Moscow, 22nd July 2008; (m) Agreement between the Government of Hungary and the Government of the Socialist Republic of Vietnam on training, research, regulatory and technical cooperation in the peaceful uses of nuclear energy signed at Budapest, 16th September; (n) Agreement between the Government of Hungary and the Government of the Republic of Korea for cooperation in the peaceful uses of nuclear energy signed at Seoul, 18th October 2013; (o) Agreement between the Government of Hungary and the Government of the Russian Federation for cooperation in the peaceful uses of nuclear energy, signed at Moscow, 14th January 2014; (p) Agreement between the Government of the Republic of Serbia and the Government of Hungary for the early exchange of information in the event of radiological emergency, signed at Beograd, 1st July 2014; (q) Agreement for cooperation on the peaceful uses of atomic energy between the Government of Hungary and the Government of the Kingdom of Saudi Arabia.

3.2. Liability for Nuclear Damages under International Law

Regulations of liability for nuclear damage on the international level is based on two essential documents: the 1963 Vienna Convention on Civil Liability for Nuclear Damage, and the 1960 Paris Convention on Nuclear Third Party Liability. Both documents address liability towards third parties, therefore nuclear damages, which are suffered by a nuclear facility or persons or other facilities which are in contractual (or other legally relevant) relations with it, falls outside the scope of the above-mentioned conventions.[14]

Without the detailed description of the two documents[15] it is still noteworthy, that while there are some areas which are being similarly regulated by both of the documents, they still set a different framework for nuclear liability. One of the most important difference, which gives rise to most of the issues, is the area of limitation of liability. On the one hand, it differs regarding the financial limitations, on the other hand it deviates on the period of prescription.

The Paris Agreement, regulates the minimum and maximum liability of the operator in an amount of SDR 5–15 million. However, before the Agreement entered into force, it already became clear, that the SDR 15 million is a fairly low price, therefore the Brussels Supplementary Convention was adopted in 1963 (which was amended several times) which describes a complicated, three-tyre compensation system: (a) at the first tyre, the state in which the nuclear installation is set up, needs to provide

[14] Kecskés 2013, 11.

[15] As for a detailed overview of the conventions and on the topic of liability for nuclear damages on the international and national level see further: Kocsis & Szilágyi 2017, Kecskés 2013, Lamm 2013a.

an amount of SDR 5 million (which includes interests and other costs) by insurance or other financial security; (b) at the second tyre, the damages of SDR 5–175 million needs to be provided from public funds; (c) lastly at the third tyre the damages of SDR 175–300 million needs to be provided from the funds, contributed jointly by the contracting parties.[16]As opposed to the structure of the Paris Agreement, under the Vienna Convention only the minimum liability of the operator is being regulated in an amount of USD 5 million. The 1997 Protocol introduced amendments, regarding the latter Convention, by raising the amount of liability. Pursuant to the latter amendment, the liability of the operator for a nuclear incident, may be limited: (a) to not less, than 300 million SDR; or (b) to not less, than 150 million SDR (in which case the difference between 150–300 million SDR is payed from public funds made available by the state which compensates the nuclear damage) or (c) to not less, than 100 million SDR for a maximum of 15 years from the date of entry into force of the Protocol. Nonetheless, the aforementioned amount might be decreased, however in that case the amount between the 100 million SDR and the established needs to be provided from state funds.[17] It is similar in both methods, that they only provide a framework within states parties are allowed to determine the amount of compensation. As a result of the above-mentioned, there are considerable differences in compensation rates.

The International Atomic Energy Agency and the OECD are continuously making an effort to harmonise the two liability systems since the 1960s. The main reason behind this approach is, that the two liability systems are operating independently from each other and both of the systems provide compensation only for those damages which occurred on the territory of states parties. The main aims of the harmonisation are the following: (a) allowing for compensation of states parties to one of the conventions from states parties to the other convention when the nuclear incident happens in a transnational; (b) eradicate those events, when applications of both of the conventions are required in the same case.[18]

In order to achieve the desired harmonisation, two approaches[19] has been prepared: (a) instead of the two conventions only one agreement should be adopted (b) besides the two conventions another treaty should be facilitated – for the achievement of the latter, two options occurred: (b/1) states parties to the Paris Agreement ratify the Vienna Convention; (b/2) a protocol would be added to both of the conventions with the exact same content or the harmonisation could also be achieved through a common protocol. Through the latter method, a joint protocol was established in 1989, which entered into force in 1992 (and was ratified by Hungary, and promulgated by Governmental Decree 130/1992 (IX.3.).

In connection with the joint protocol, it is noteworthy that, claims cannot be based solely on the joint protocol. This document was established as a complementary tool to the Paris Agreement and the Vienna Convention. The aim of the Protocol is to extend liability to states parties to the other convention.[20]

[16] Kecskés 2013, 13.
[17] Ibid. 14–15.
[18] Lamm 2013a, 21.
[19] Ibid. 21–22.
[20] Ibid. 24.

3.3. Nuclear Security under International Law

This contribution intends to shed light on two of the conventions of this area. One of the most important instruments is the 1996 Convention on Nuclear Safety, which was established under the aegis of the IAEA. Curiosity of the Safety Convention is its so-called incentive feature. It means, that the document does not contain per se sanctions, or any other special dispute settlement methods in case of infringements of its provisions. Instead of them, the parties of the Convention chose a special method in order to monitoring the observation of the Convention. They held review meetings in every third year, to which all of the Member States make national reports. And these national reports are negotiated in the framework of a peer review by experts of other Member States.

The fact, that this area of law requires a specific regulation became even clearer as the aftermath of the Chernobyl nuclear incident. Therefore the Convention focuses primarily on prevention.

Further obligations set by the document were arranged in three groups according to their topics, which make the basic pillars of the Convention. Accordingly nuclear safety can be guaranteed in three ways: (a) through legislation and regulation, (b) with the general safety questions, moreover (c) from the side of installation safety. Of course, prevention must be in the middle through the whole process.[21]

In the framework of the first pillar, the main task of the Member States is the establishment of the appropriate normative background. On the one hand, it means exact legislation activity (e.g. creation of national safety standards, formation of permission system of nuclear installations, guaranteeing of monitoring and evaluation, etc.). On the other hand, this part of the Convention obliges the parties to formation and regulation of official regime. Finally, this pillar sets the rule that each contracting party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.[22]

Among the safety questions constituting the second pillar, we can find six safety principles and safety realizing methods, namely the followings: (a) priority of nuclear safety ; (b) the support of nuclear safety through ensuring the highest financial and human resources; (c) quality assurance; (d) continuous assessment and verification of nuclear safety; (e) radiation protection; (f) nuclear emergency preparedness.[23]

The third pillar appear as legi speciali for the second pillar, thus it contains detailed regulation of the general nuclear safety provisions, differentiated according to the periods of existence of the nuclear installation. In this part the Convention contains special safety provisions on the following activities relating to the nuclear installations: (a) siting, (b) design and construction, (c) operation.[24]

[21] Kecskés & Silye 2013, 70.
[22] Ibid. 70–71.
[23] Ibid. 71–73.
[24] Ibid. 73–75.

Under the aegis of the IAEA, the Convention on the Physical Protection of Nuclear Material was adopted in 1980.[25] This Convention needs to be applied to nuclear material used for peaceful purposes while in international nuclear transport, however it also contains provisions on prevention and defence measures of nuclear-terrorism.

The Convention provides the definition of nuclear material and those acts which are required to be criminalised by states parties, since according to Article 7 § 1: "The intentional commission of (a) an act without lawful authority which constitutes the receipt, possession, use, transfer, alteration, disposal or dispersal of nuclear material and which causes or is likely to cause death or serious injury to any person or substantial damage to property or to the environment; (b)a theft or robbery of nuclear material; (c) an embezzlement or fraudulent obtaining of nuclear material; (d) an act constituting a demand for nuclear material by threat or use of force or by any other form of intimidation; (e) threat: (e/1) to use nuclear material to cause death or serious injury to any person or substantial damage to property or to the environment (e/2) to commit an offence described in sub-paragraphs (b) and (e) in order to compel a natural or legal person, international organization or State to do or to refrain from doing any act (f) an attempt to commit any offence described in sub-paragraphs (a) to (f)."

3.4. Safe Management of Spent Fuel and Radioactive Waste

As part of the IAEA's meaningful activity, [26] the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management[27] was adopted on 5 September in 1997.

The Convention addresses two main issues in an integrated structure, namely the management of spent fuel and radioactive waste. The current document defines the notion of radioactive waste, which means "radioactive material in gaseous, liquid or solid form for which no further use is foreseen by the Contracting Party or by a natural or legal person whose decision is accepted by the Contracting Party, and which is controlled as radioactive waste by a regulatory body under the legislative and regulatory framework of the Contracting Party."[28] Spent fuel is defined as: "means nuclear fuel that has been irradiated in and permanently removed from a reactor core."[29]

The provisions of the Joint Safety Convention serve three objectives: (a) to achieve and maintain a high level of safety worldwide in spent fuel and radioactive waste management, through the enhancement of national measures and international co-operation, (b) to ensure that during all stages of spent fuel and radioactive waste management there are effective defenses against potential

[25] This Convention was promulgated in Hungary by Legislative Decree 8 of 1987, which is still in force.
[26] On the adoption process of the Convention see further: Silye 2013, 47–50.
[27] Hereafter: Joint Safety Convention.
[28] Ibid. 2. h).
[29] Ibid. 2. n).

hazards with particular attention to sustainable development goals (c) to prevent accidents with radiological consequences and to mitigate their consequences.[30]

The present instrument shows some similarities to the Convention on Nuclear Safety, namely, both conventions sets the obligation for states parties to observe safety requirements defined therein, furthermore, both conventions enable for the international supervision of the aforementioned(this is being achieved through supervision of state reports).[31]

4. European Union Legal Framework

4.1. Sources of EU Law with Regards to the Use of Atomic Energy

Under EU law, regulations on the use of atomic energy can be found on every level, however most of the regulations can be found in directives and regulations.

Fundamental provisions can be found in the founding Treaties:[32] (a) European Atomic Energy Community (EAEC or Euratom) Treaty (1957);[33] (b) Consolidated Version of the Treaty on the Functioning of the European Union; (c) Accession Treaty to the European Union (Accession Treaty).

As from the area of nuclear safety a directive[34] and its amendments must be mentioned: (a) Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations; (b) Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations.

Regarding the management of radioactive waste and spent fuel the most important provisions can be found in the Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.[35]

Provisions on radiological protection can be found in various,[36] such as: (a) Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom; (b) Council Directive 89/618/Euratom of 27 November 1989 on informing the general public about health protection measures to be applied and steps to be taken in the event of a radiological emergency; (c) Council Directive 90/641/Euratom of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionizing radiation during their activities in controlled areas; (d) Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public

[30] Ibid. Art. 1.
[31] Silye 2013, 51.
[32] HAEA 2020a.
[33] Hereafter: Euratom Treaty.
[34] HAEA 2020a.
[35] Ibid.
[36] Ibid.

against the dangers arising from ionizing radiation; (e) Council Directive 97/43/Euratom of 30 June 1997 on health protection of individuals against the dangers of ionizing radiation in relation to medical exposure, and repealing Directive 84/466/Euratom; (f) Council Directive 2003/122/Euratom of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources; (g) Council Directive 2013/51/Euratom of 22 October 2013 laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption.

Safeguard clauses can be found in the following regulations:[37] (a) Commission Regulation (Euratom) No 302/2005 of 8 February 2005 on the application of Euratom safeguards – Council/Commission statement; (b) Commission Regulation (Euratom) No 3227/76 of 19 October 1976 concerning the application of the provisions on Euratom safeguards; (c) Commission Regulation (Euratom) No 220/90 of 26 January 1990 amending Commission Regulation (Euratom) No 3227/76 of 19 October 1976 concerning the application of the provisions on Euratom safeguards; (d) Commission Regulation (Euratom) No 2130/93 of 27 July 1993 amending Regulation (Euratom) No 3227/76 concerning the application of the provisions on Euratom safeguards.

Having regarded the shipment of nuclear substances the following sources of EU law can be mentioned[38]: (a) Council Regulation (Euratom) No 1493/93 of 8 June 1993 on shipments of radioactive substances between Member States; (b) Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel; (c) 2008/312/Euratom: Commission Decision of 5 March 2008 establishing the standard document for the supervision and control of shipments of radioactive waste and spent fuel referred to in Council Directive 2006/117/Euratom (notified under document number C(2008) 793); (d) Commission Recommendation of 4 December 2008 on criteria for the export of radioactive waste and spent fuel to third countries (notified under document number C(2008) 7570).

4.2. EU Legal Framework on the Use of Atomic Energy for Peaceful Purposes in the Founding Treaties

Energy policy is a particularly sensitive area through from the perspective of the EU and the member states as well. It is part of the shared competences. It was introduced in the TFEU, as a separate title, only in 2009 by the Treaty of Lisbon under paragraph 194. (energy policy measures were adopted prior to this introduction as well, however since then they are established upon a common legal basis.[39]

According to paragraph 194. TFEU, energy policy belongs to those fields where the ordinary legislative procedure of the European Parliament and the Council applies. Nevertheless, measures, adopted under these provisions "without prejudice to Article 192(2)(c) shall not affect Member State's right to determine the conditions for

[37] Ibid.
[38] Ibid.
[39] Fodor 2014, 17–18.

exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply."[40]

Nuclear industry occupies a central place under the energy policy, therefore the provisions of the TFEU does not apply as a primary source, but the provisions of the Euratom Treaty. Whereas, for the regulation of other energy sources – on which the Euratom Treaty does not contain provisions – Article 194 TFEU applies. The reason behind this differentiation is, that it constitutes a highly sensitive area under member states policies, therefore they did not intended to relinquish a major part of their control in that area.[41]

The sensitivity of this area also explains why the legislation on energy mostly consists of directives. Under directives, member states have a wider margin and their sovereignty does not become significantly limited.

The European Atomic Energy Community Treaty was adopted for the following purposes: (a) promoting research and disseminating technical information; (b) setting uniform safety standards to protect the public and industry workers; (c) to facilitate research; (d) to ensure civil nuclear materials are not diverted to other uses, particularly military.[42]

4.3. EU Legislation in the Field of Nuclear Safety

The most significant provisions are provided by Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations.[43]

The Nuclear Safety Directive was adopted with the objective of establishing a Community framework in order to maintain and promote the continuous improvement of nuclear safety and its regulation and to ensure that Member States shall provide for appropriate national arrangements for a high level of nuclear safety to protect workers and the general public against the dangers arising from ionizing radiations from nuclear installations.[44]

The scope of the directive applies to those nuclear installations[45] which operates under the licence, determined therein[46] and also to the use of atomic energy in every stage of operation. Whereas, the present Directive establishes a Community legal basis

[40] TFEU, Art. 194 (2).
[41] Fodor 2014, 25.
[42] European Parliament 2020.
[43] Hereafter: Nuclear Safety Directive.
[44] Nuclear Safety Directive, Art. 1.
[45] Under the scope of the Directive, a *nuclear installation* means (a) an enrichment plant, nuclear fuel fabrication plant, nuclear power plant, reprocessing plant, research reactor facility, spent fuel storage facility; and; (b) storage facilities for radioactive waste that are on the same site and are directly related to nuclear installations listed under point (a) – Nuclear Safety Directive, Art. 3.1.
[46] Pursuant to Article 3 Paragraph 4 of the Directive, *licence* means: any legal document granted under the jurisdiction of a Member State to confer responsibility for the siting, design, construction, commissioning and operation or decommissioning of a nuclear installation.

in the area of nuclear energy policy, however it allows member states to adopt different legislations when those provide a higher level of protection.[47]

Pursuant to the Directive, member states are required to establish a competent regulatory authority which is functionally separate from any other body or organisation concerned with the promotion, or use of nuclear energy – including electricity production – in order to ensure effective independence from undue influence in its regulatory decision making.[48] The competent legal authority has the legal power to[49] fulfil its obligations in connection with the national framework, established under the Nuclear Safety Directive. In this regard it has the following powers: "(a) the adoption of national nuclear safety requirements; (b) the provision of a system of licensing and prohibition of operation of nuclear installations without a licence; (c) the provision of a system of nuclear safety supervision; (d) enforcement actions, including suspension of operation and modification or revocation of a licence."[50]

The Directive places special emphasis on providing information to the public, therefore member states are obliged to ensure, that information in relation to the regulation of nuclear safety is made available to the workers and the general public. This obligation needs to be undertaken by the competent authority, save in the case when providing the information to the public would jeopardise other interests, defined in national or international legislation.[51]

4.4. Management of Spent Fuel and Radioactive Waste under EU Law

The Nuclear Safety Directive also serves as a basis of the regulation of the management of spent fuels and radioactive waste. This area is further regulated by Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.[52]

The subject-matter of the Directive (in light of the above mentioned) is the establishment of a Community framework for ensuring responsible and safe management of spent fuel and radioactive waste to avoid imposing undue burdens on future generations. Therefore, it obliges member states to introduce high level safety arrangements and it places special emphasis on providing information to the public.[53]

The scope of the directive covers such activities: "(a) spent fuel management when the spent fuel results from civilian activities; (b) radioactive waste management, from generation to disposal, when the radioactive waste results from civilian activities."[54]

[47] Nuclear Safety Directive Art. 2 (1)–(2).
[48] Ibid. Art. 5 (1)–(2).
[49] Ibid. Art. 5 (3).
[50] Ibid. Art. 4 (1).
[51] Ibid. Art. 8.
[52] Hereafter: Directive on the Management of Spent Fuel and Radioactive Waste.
[53] Ibid. Art. 1.
[54] Ibid. Art. 2 (1).

The general principles are set out in Article 4 of the Directive, of which the most significant is, that, it obliges member states to establish national policies on the management of radioactive waste and it also sets out member state liabilities.[55] Another focal point of the present article, is the provision on the disposition of radioactive waste: "Radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an agreement, taking into account the criteria established by the Commission in accordance with Article 16(2) of Directive 2006/117/Euratom, has entered into force between the Member State concerned and another Member State or a third country to use a disposal facility in one of them."[56]

It is noteworthy, that the present directive shows some similarities to the convention with the same subject, e.g. definitions are perfectly harmonised in the two documents. The reason behind this approach is, that they would like to ensure, that the principles and requirements does not differ and are legally binding in the EU. However, the two documents shows a significant difference. While the convention is legally binding, it means a significant difficulty to apply it and to enforce it. Whereas, the application and enforcement of the directive is ensured by the Commission and the Court of Justice of the EU. Thus, it seems as a more efficient tool for ensuring the maintenance and development of the safe management of spent fuel and radioactive waste.[57]

5. Legislative Framework in Hungary

5.1. The Importance of Hungary's Electric Power and Atomic Energy Production

Before introducing the legislative framework, this chapter intends to give a quick overview of electricity production in Hungary and to shed light on the role of the Paks Nuclear Power Plant and the energy produced therein.

As a result of the rapid technological, industrial and economic development, there is a growing demand for energy. According to certain calculations, the overall demand for electricity is going to increase by 1%/year in Hungary,[58] which means[59] that until 2027 it is going to require 5500 megawatts, until 2032, 7000 megawatt available generation capacity, in order be able to provide the energy that the energy which is lacking because of the shutdown of national power plants. In 2017, Hungary consumed 45 057,4 GWh electric power, which is a historical record, and it amounts to a 2,6% increase, compared to the consumption in 2016. This trend continued in 2018, when net electric power consumption amounted to a 1,15% increase compared to the year of 2017.[60] Amongst EU member states, Hungary is one of those which require the most import electricity. This high demand raises the issue of supply-security, which is

[55] Silye 2013, 61–62.
[56] Directive on the Management of Spent Fuel and Radioactive Waste, Art. 4 (4).
[57] Silye 2013, 61–62.
[58] Aszódi 2016.
[59] Eck 2018, 2.
[60] MEKH & MAVIR Zrt. 2019.

deepened by the fact, that Hungary's import electricity typically comes from Polish, Ukrainian, and Czechs coal-fired power plants, which are going to be shut down in the following 10-15 years.[61]

As regards to the composition of the production of electric power on the national level, nuclear energy production amounts to a quarter of it(which is, according to 2018 data, amounts to 22,7% of total production). As a conclusion, the Paks Nuclear Power Plant is the most significant in the country, which has a total capacity of 2012,8 MW. Besides the aforementioned, there are 22 bigger power plants units taking part in the systemic coordination (4744,1 MW), and 16 is fuelled with hydrocarbon, 3 with coal and lignite, and a further 3 primarily with biomass.

Smaller power plants are taking part in the systemic coordination as well. Three of those are fuelled with biomass (114,9 MW), 11 with hydrocarbon (564,3MW). Besides the above-mentioned 5 solar power plants (77 MW) and 4 wind power plants (53,2 MW) take part in the systemic coordination.[62] The following figure 1[63] summarizes the above-mentioned:

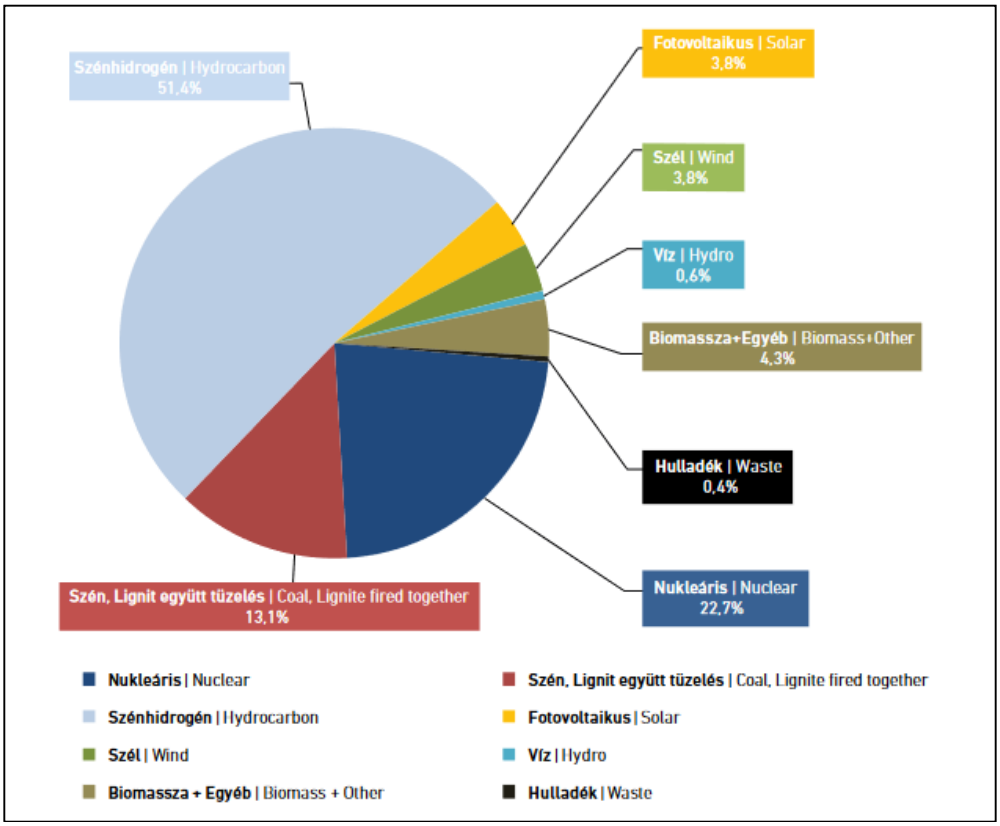

Figure 1

[61] Eck 2018, 6.
[62] MEKH & MAVIR Zrt. 2019, 42.
[63] Installed total generation capacity of all of the national power plants in terms of primary sources on 3 December 2018. Source of Figure 1: MEKH & MAVIR Zrt. 2019, 42.

5.2. Legal Framework Regarding the Peaceful Utilization of Atomic Energy

Regulations, implemented, based on international and EU law regulations mean the core part of national law. As part of the national legislation, the Fundamental Law of Hungary does not explicitly contain regulations on the use of atomic energy, however it contains provisions which also need to be applied with regards to nuclear activities and installations.

Furthermore, it contains fundamental rights which need to be applied in this area as well (it includes the right to access data of public,[64] or the right to a healthy environment[65]). The most important regulations are set out in the Atomic Energy Act. Further ministerial and governmental decrees also contain relevant provisions in tis area.[66] In this regard the following instruments need to be mentioned: (a) Govt. decree 112/2011. (VII. 4.). on the scope of authority of the Hungarian Atomic Energy Authority[67] in relation to European Union obligations and international obligations in connection with atomic energy, on the designation of co-authorities contributing to the regulatory proceeding of the Hungarian Atomic Energy Authority, on the scale of fines and on the scientific council assisting the work of the Hungarian Atomic Energy Authority, (b) Decree 7/2007. (III.6.) IRM of the Minister of Justice and Law Enforcement on the rules of accountancy for and control of nuclear materials, (c) Govt. Decree 167/2010. (V. 11.) on national nuclear emergency preparedness and response (d) Govt. Decree 155/2014. (VI. 30.) on the safety requirements for facilities ensuring interim storage or final disposal of radioactive wastes and the corresponding authority activities.

Last but not least HAEA Guidelines needs to be mentioned, since the HAEA acts as the atomic energy supervisory body and under scope of its competence it is entitled to adopt guidelines regarding the fulfilment of provisions on nuclear safety.

5.3. Core Elements of the Atomic Energy Act

Before providing an extensive overview of provisions of the Act, the scope and the definitions need to be addressed.

The scope of the Aea. covers the peaceful use of atomic energy, the corresponding rights and responsibilities, furthermore over the protection of human kind and living and living and lifeless environment against harmful effects of ionizing radiation having natural and artificial origin.[68] It can be seen from this provision, that Aea. does not contain provisions on the use of atomic energy for military purposes. It addresses only the peaceful utilization (which typically means electric power production by a nuclear power plant, however, radioactive isotopes and ionising radiation can also be used in healthcare, industry, agriculture, science education or education).

[64] The Fundamental Law of Hungary, para. VI. (3).
[65] Ibid. para. XXI.
[66] Parts of the laws in this area serves as an implementation tool of international treaties.
[67] Hereafter: HAEA.
[68] Aea. para. 1 (1).

One of the fundamental terms in the Act, is the use of atomic energy. This definition can be found in 2 § 1. Aea. According to this notion, the use of atomic energy covers, on the one hand, all activities, related to nuclear or other radioactive materials and activities corresponding to facilities or equipment meant for the use of atomic energy. On the other hand, it also extends to the activities which corresponds to installations and equipment which create ionizing radiation. This definition clearly shows, that radioactive and nuclear materials are not synonyms:[69] (a) a radioactive material is natural or artificially produced substance emitting ionizing radiation, one or more components of which contain such a radionuclide, the activity or activity-concentration of which shall not be neglected from radiation protection point of view; (b) while a nuclear material is a type of radioactive material, which is applicable or can be made applicable to create self-sustaining nuclear chain reaction or, especially uranium, thorium, plutonium and any other material, which contains one or any composition of them in a concentrate that can be retrieved economically, except for the ores and ore wastes produced by mining and ore processing. It follows, that the nuclear material is a type of radioactive material with special features.

In the area of the use of atomic energy, the licensee[70] has a main role. She/he is the one amongst the users of atomic energy, who perform the activities bound to a license.

As it is common for most of the operating activities, atomic energy production means no exception as it also creates waste of which the management means a central issue. In this context, the following definitions needs to be elaborated upon. Radioactive waste,[71] means a kind of radioactive material which is not used anymore and which cannot be managed as conventional waste because of its radiation protection characteristics. However, spent fuels, stemming from nuclear energy production are not necessarily becoming waste at the first stage. The possibility of reprocessing[72] which is a kind of process or operation, which purpose is to extract radioactive isotopes from spent fuel for further use.

The Act contains provisions on a series of issues which may rise in connection with the use of atomic energy. Pursuant to the Act, nuclear accidents[73] include every such extraordinary event that causes nuclear damage. Nuclear damage[74] includes the loss of human life, all non-material loss due to damage to physical integrity and health of persons, all damage to property furthermore,, the costs of reasonable recovery of all environmental damage occurring together with these, the costs of reasonable and necessary measures actually implemented to mitigate or eliminate the non-material loss and the damage, if they are caused by an extraordinary event with nuclear fuel, radioactive product or waste in a nuclear facility, or nuclear material originating from, transported from or sent to a nuclear facility within the nuclear facility or during transport.

[69] Ibid. para. 2. 3–4.
[70] Ibid. para. 2. 22.
[71] Ibid. para. 2. 15.
[72] Ibid. para. 2. 43.
[73] Ibid. para. 2. 24.
[74] Ibid. para. 2. 23.

5.3.1. Regulations on Nuclear Safety in the Atomic Energy Act

Paragraphs 3–5/A of the Atomic Energy Act, sets out the principles of the use of atomic energy. Its application is the fundamental requirement of safe use of atomic energy. These provisions are in line with the principles, set out by the International Atomic Energy Agency.

According to the IAEA definition[75] these principles can be classified into three main groups: (a) principles on beneficial use, (b) principles on responsible use, (c) principles of sustainable use. The principles of benefits and transparency belong to the first group. Benefit means here, that the use of nuclear energy should provide benefits that outweigh the associated costs and risks. Paragraph 4 § (1) "Aea. is in line with the above-mentioned, since it states, that: Atomic energy shall be used only such a way that does not cause danger to human life, health of present and future generations, living conditions, the environment and material goods above a risk level accepted by the society and necessarily undertaken during the performance of other economical activities." The principle of transparency draws attention to, that beneficial use should be accompanied by transparency. The Aea. aims to implement these provisions when it sets out the obligation of the licensee to inform the public, and the citizens right to obtain the information.[76] Under responsible use, the following needs to be understood: (b/1) protection of people and the environment, (b/2) security, (b/3) non-proliferation, (b/4) long term commitment. The first one means that while using nuclear energy, protection of people and the environment needs to be given particular consideration – while complying with IAEA safety rules and each of the international standards. The principle of security requires that during the use of nuclear energy, due account should be given to the risk of the malicious use of nuclear and other radioactive material. (This principle aims to draw attention to the above-mentioned danger of the serious issues emerging out of the use of atomic energy, therefore steps should be taken in order to eradicate these problems). The principle of non-proliferation sets out the obligation of the fight against the proliferation of nuclear weapons and it draws attention to the fact, that the proliferation of the use of nuclear energy bears the inherent risk of the proliferation of nuclear weapons, therefore prevention is crucial. Applying the principle of long term commitment,[77] is highly important, since as it stems from the nature of atomic energy use, it is a complex process, which requires concrete planning in order to obtain all the benefits and to be able to guarantee the application of international and national laws, which can be obtained by it. In line with the aforementioned, the Aea. intends to promote the application of the principle of responsible use, by setting the aim of the protection of the human being and the environment, as a primary safety requirement[78] against the harmful effects of ionizing radiation. Furthermore, it states, that safety has priority over anything else, during the use of atomic energy[79] (it gives extensive details[80] on the

[75] IAEA, 2008, 1–2.
[76] Aea. para. 4 (4) and (11).
[77] IAEA 2008, 5.
[78] Aea. para. 4/A.
[79] Ibid. para. 4 (2).

requirements of safe use), furthermore it establishes the rules of the management of spent fuel and radioactive waste[81] (for which, ultimate responsibility is born by the state). Sustainable use includes two principles: (c/1) resource efficiency, and (c/2) continual improvement.

The principle of resource efficiency[82] means, that the construction, operation and decommissioning of nuclear facilities require the use of natural resources, therefore they need to aim towards the reduction of the use of non-renewable sources and to minimize waste production. The principle of continual development, needs to prevail in the technological and the engineering sphere, namely in the fields of internal and external safety, economy, non-proliferation and environmental protection. In light of the principle of continual development, the Aea. places great emphasis on the importance of the development of science and technology and the training of professionals,[83] and on the continuous supervision of nuclear safety requirements and modernisation.[84]

The user of atomic energy is responsible for the safe use of atomic energy and for the application of safety requirements.[85] Therefore, the licensee – taking into account the operational experiences and latest improvements on safety issues – is obliged to pursue continuous activity in order to increase safety. In this regard the licensee. In this regard the licensee is obliged to provide continuous information[86] to the public.

The Government is responsible for the direction and oversight of the safe use of atomic energy, and it pursues this task through its ministers and the HAEA.[87] Therefore it is worth to scrutinize the activity of the HAEA in detail which is going to be addressed in a separate chapter.[88] Nonetheless it is notable, that the Aea. contains provisions not only with regard to the HAEA but to the tasks of ministers[89] which are the following: the minister in charge (a) disposes of the Central Nuclear Financial Fund, (b) inform the HAEA of the Government decisions concerning its activity, (c) determines in a decree, in agreement with the minister responsible for taxation, the administration fee to be paid to the HAEA.

One of the essential elements of the safe use of atomic energy is maintaining an accountancy for and control of radioactive and nuclear material. The HAEA maintains

[80] Ibid. para. 4 (3)–(5).
[81] Ibid. para. 5/A.
[82] IAEA 2008, 5–6.
[83] Aea. para. 4 (8).
[84] Ibid. para. 5 (1).
[85] Use of atomic energy is of strategic importance in providing electric power in Hungary. See further: Olajos & Gonda 2013.
[86] In order to fulfil its obligation to inform the public, the Paks Nuclear Power Plant Zrt. established a set of web pages: (a) www.atomeromu.hu (b) www.mvmpaks2.hu. What is more, it publishes its monthly *Atomerőmű* journal, which is also available online and the citizens of Paks may receive it free of charge.
[87] Aea. paras. 6 (1)–(2).
[88] See: Chapter 6 on organizations, pursuing activities on the field of the use of atomic energy for peaceful purposes.
[89] Aea. para. 8 (5).

three such accountancies: (a) central accountancy system, (b) National Dose Registry of Radiation Workers, (c) accountancy of radiation protection experts. The central accountancy system[90] is a system of local accountancies – it supervises whether the central and the local accountancy systems contain the same data, and it scrutinizes the data on radioactive materials in the local accountancy compared to the actual stock. The present accountancy – except for the names and contact data – is a certified public record. The data, collected therein are not open to the public for national safety purposes. That is the reason why only persons, specified in the Aea. are entitled to obtain data from these accountancies for specific purposes. The aforementioned can be summarized as the followings: (a/1) All persons or organizations possessing radioactive and nuclear material that are obliged to supply data are authorized to obtain data on themselves. (a/2) To conduct penal procedures, implement punishment and actions, and to conclude statement of facts in a civil lawsuits – the court is entitled to obtain data. (b/3) Finally, in order to pursue its tasks, – the police and national intelligence service or the health state administration organization is entitled to obtain data from the central accountancy. The National Dose Registry of Radiation Workers [91] contains data on a specific area, namely on the individual doses of workers exposed to occupational radiation. The HAEA can only use these data for the verification of the compliance with the dose limits established for occupational exposure. The HAEA only allowed to manage the data until the given worker exceeds or exceeded 75 years of age but not longer than 30 years after the end of his/her employment in a radiation hazardous job. The third accountancy, run by the HAEA is the Radiation protection expert accountancy.[92] According to the Aea., only those persons may perform radiation protection expert activity who possesses the radiation protection qualifications, described in the Government decree on protection against ionizing radiation and the corresponding licensing, reporting and inspection system.

The fulfilment and examination of radiation protection training and retraining shall be recorded. The successful fulfilment of the examination is justified by the certificate issued by the organizer of the training. The record and the data of the issued certificates are required to be stored in the above-mentioned accountancy. Persons, eligible for the request of data are similar to those who may obtain data from the central accountancy (and the purpose of request is also the same). Data from all three accountancies may be used for statistical purposes. Besides the HAEA, the user of atomic energy is also obliged to maintain a local register[93] on the location, physical and chemical properties of the possessed radioactive materials and the pursued activity therewith, (as it was discussed above, these serve as a basis for the central accountancy).

The concept of safety area also serves the safe use of nuclear energy. Pursuant to the Aea, the environment of nuclear facilities and radioactive waste repositories – including its underground parts – may be designated as safety area to protect the facility, its environment and the population. On such areas, restrictions and prohibitions may be established, pursuant to the Aea. As such, those are required to be

[90] Ibid. para. 16.
[91] Ibid. para. 16/A.
[92] Ibid. para. 16/C.
[93] Ibid. para. 16 (2).

recorded into the register of real estates. The restrictions and prohibitions can be the following: (a) prohibition of allotment, (b) prohibition of building, (c) restrictions on mining rights, (d) restrictions of rights to use land, (e) restrictions on mining rights, (d) restrictions of rights to use water, (f) restrictions of other rights of use. In the following instances there is a possibility to expropriate areas within the safety area: (a) If the prohibition or restriction ordered within the safety area puts an end to or significantly hinders the ordinary use of the real estate, or (b) if it is justified by the safe use of the facility to be constructed to serve the use of atomic energy. A further safety provision creates the possibility of the aviation prohibition above the nuclear power plant, research reactor and spent fuel interim storage facility. Lastly, it is noteworthy, that damage caused by prohibitions and restrictions ordered within the safety area, and by construction of nuclear facility or radioactive waste repository and by works performed within the safety area in relation to these facilities shall be compensated.[94]

5.3.2. Management of Spent Fuel and Radioactive Waste

Precaution, prevention and sustainable development are particularly important principles in the field of environmental protection. In light of these principles it is necessary to pay attention to the management of waste of nuclear energy production. As it could be seen, the principle of responsible use also requires the management of such materials through a safe way with due diligence and appropriate anticipation. Therefore, the Aea. contains strict provisions regarding the storage and disposal of radioactive waste and spent fuel. In light of the aforementioned, the Act sets out, that license can only be granted for the use of atomic energy if the safe disposal of radioactive waste and spent nuclear fuel is ensured (in harmony with the latest justified scientific results and international expectations and experiences).[95] Thus, the licensee should take care of the storage and safe disposal of radioactive waste and spent fuel, long before the beginning of the operational period, more specifically at the licensing stage. According to the legal provisions, the storage can only be accorded as safe, when: (a) the protection of human health and environment is ensured throughout these activities, and (b) the impact on human health and environment is not greater beyond the national borders than the level accepted for inland.[96]

In connection with the management of spent fuel and radioactive waste, the Government shall propose and the Parliament shall approve (in line with the principles set out in the Aea., in harmony with the international) a national policy[97] and it needs to be revised every five years. The national programme[98] shall cover the management of spent fuel and radioactive waste from the generation of the disposal and the decommissioning of the nuclear facility.

In this regard, the Central Nuclear Financial Fund is important to be mentioned, since the aim of this Fund relates to the management of spent fuel and radioactive

[94] Ibid. para. 34–37.
[95] Ibid. para. 38 (1).
[96] Ibid. para. 38 (3).
[97] Ibid. para. 5/B.
[98] Ibid. para. 5.

waste. It is a separate state fund, exclusively earmarked for financing the construction and operation of disposal facilities for the final disposal of radioactive waste, as well as for the interim storage of spent fuel and the closure of the nuclear fuel cycle, and the decommissioning of nuclear facility.[99]

The Nuclear Power Plant shall pay a certain amount of money into the Fund monthly. This payment serves the purpose of the assurance of the incurred costs in the occasion of future events. Such events might be the following: (a) the final disposal of radioactive waste, (b) interim storage of spent fuel and (including the disassembling of storage), (c) the closure of the nuclear fuel cycle, (d) the decommissioning of the nuclear power plant and (e) the financial support provided to the monitoring and information aimed local government associations.[100] This Financial Fund is highly important, since, amongst others, it may provide for the reimbursement of the unforeseen costs of the decommissioning of the nuclear power plant. A relatable example[101] is the case of the Fort St. Vrain power plant, located in Colorado, USA. Its construction costs amounted to a USD 224 million in the '70s and its decommissioning, which started in 1993, cost USD 333 million.

5.3.3. Liability for Damages According to the Atomic Energy Act

An important aspect in the legal framework on atomic energy[102] are the rules of liability. It can be seen from the chapter on the international legal framework, that this is a particularly special area, which is governed by a plenty of international conventions to which Hungary is a state party.

In principle, compensation of nuclear damage must be paid by the licensee of the nuclear facility.[103] The licensee can only be exempted from the liability in cases, determined by the Aea.:[104] (a) if the nuclear damage is the consequence of a nuclear accident directly triggered by an unavoidable external cause (armed conflict, war, civil war, armed uprising or a devastating natural disaster of an extraordinary character). (b) If the licensee proves, that the nuclear damage suffered by the claimant occurred in part or in whole as a result of his gross negligence, or is the consequence of such a wilful and unavoidable act or omission of the claimant which was expressly aimed at creating the damage. Aside from the aforementioned exceptions, set out by the Act, the exclusion or limitation of the liability for nuclear damage is null and void. Regarding the value, due date and method of the compensation of nuclear damage the provisions, Act V of 2013 on the Civil Code of Hungary[105] needs to be applied. Thus, in case of non-material damage, emerged through the loss of human life or any personal injury, regulations of the grievance award are applicable. In any other case, rules of the Civil

[99] Ibid. para. 62 (1).
[100] Ibid. para. 63 (1).
[101] Szilágyi 2010, 182–183.
[102] On the legal framework on atomic energy, see further: Szilágyi 2010.
[103] Aea. para. 48 (1).
[104] Ibid. para. 49.
[105] Hereafter: Ptk.

Code on extra-contractual liability are applicable.[106] It can be concluded, that, liability for nuclear damages is a type of absolute responsibility.[107]

However, the amount of the licensee's liability for damages is limited.[108] The limitation[109] depends on the type of the nuclear facility:[110] (a) a nuclear power plant, nuclear district heating plant and a facility producing, storing or processing nuclear fuel shall not exceed SDR 100 million. (b) In any other nuclear facility, and any other nuclear damage, arising as a result of accidents during the transport or storage of nuclear fuel, the liability of the licensee shall not exceed SDR 5 million at each case. The nuclear damage in excess of the amount defined above, shall be compensated by the State of Hungary. However, there is a limit of SDR 300 million. According to Csilla Csák, transnational nuclear damages shed light on the anomaly that, based on the aforementioned limited liability system, the chance of the injured party to be compensated for the total damage, might be questionable.[111] With regard to the injured parties' claim of compensation, the Aea. sets out an objective and a subjective limitation period.[112] . The subjective limitation period is three years, which commences on the date when the person entitled for compensation of nuclear damage learned or could have learned about the occurrence of the nuclear damage. The objective limitation period is ten years from the date of the nuclear accident. In addition to these, the Aea. establishes a further rule of limitation on the case of stolen, lost, thrown away or abandoned nuclear materials. Here, the limitation period is principally ten years (from the date of the occurrence of a nuclear accident), however it can be extended to a maximum of twenty years (which commences from the occurrence of the above mentioned events). Who has received full compensation for the same nuclear damage or claim on grievance fee or under any other title is not entitled to be compensated for nuclear damage.[113]

6. The Role of Leading Organizations in the Field of the Peaceful Use of Atomic Energy

Similarly to any other area of law, which requires a special legislative framework, in the field of the use of nuclear energy, there are such organizations, which harmonise the rules and activities of the area. As it was examined above, the Hungarian Atomic Energy Agency plays the central role in the supervision and regulatory oversight of the use of nuclear energy. Stemming from its special functions, specific rules apply to

[106] Aea. para. 48/A (2).
[107] This means, that it is an absolute form of liability without exculpation. Csák Csilla és Hornyák Zsófia emphasized it in their joint presentation: Csák & Hornyák 2016.
[108] Aea. para. 52.
[109] This is measure in a special unit of account, which is the SDR. The definition of the SDR can be found in the Aea. Para 2. 25.: Special Drawing Rights – an international unit of account, which is stipulated by the National Currency Fund.
[110] This legal provision is based on the 1963 Vienna Convention on Civil Liability for Nuclear Damage. See further: Kecskés 2013.; and Lamm 2013a.
[111] Csák 2012.
[112] Aea. para. 57.
[113] Ibid. para. 59.

employees of the HAEA, since the provisions of Act CXCIX of 2011 needs to be applied to the government officers and public service officials with the derogations, set out in the Aea.[114] The HAEA functions as a government office, therefore it is supervised by the designated minister, whereas its decisions cannot be changed or eliminated in supervisory role.[115] The HAEA submits annual reports to the Government and the Parliament in the following topics: (a) safe application of atomic energy, (b) preparatory actions for the construction of a new nuclear facility or radioactive waste repository, or for the expansion of an existing nuclear power plant with an additional unit containing nuclear reactors.[116]

As it was discussed earlier, the most significant task of the HAEA is the regulatory oversight in the area of the use of atomic energy. In order to pursue this task it may relies on four main regulatory instruments: (a) licensing, (b) inspection, (c) assessment, and (d) enforcement. Licensing[117] can be used by the Authority, prior to the commencement activity, since the authority judges, whether implementation will comply with the requirements and determines the conditions of implementation and other connecting tasks. Granting a license should always be based on safety analysis, in which it must be justified, that during the performance of the licensed activity and the result of the activity, nuclear safety is guaranteed and that special regulations are applied. The HAEA issues more than 150 licenses every year, meanwhile involving co-authorities in the licensing process. Apart from the regulatory licencing procedure, in case of various further facilities, consent from a higher level is required. Thus, amongst others: (a/1) for the acquisition of ownership of a nuclear facility and radioactive waste repository or transferring the right of its use by any right, the Preliminary consent of the Government is required. (a/2) For the commencement of preparatory actions for the construction of a new nuclear facility or for the expansion of an existing nuclear power plant with an additional unit, Preliminary consent of the Parliament is required. (a/3) For the construction and operation of a nuclear power plant, the licenses of the Hungarian Energy and Public Works Regulatory Authority is further required. Inspection[118] is pursued during the realization of the activity. During inspection, the aim of the HAEA is to identify whether the laws, regulations, decisions and guidelines are applied. Differentiation can be seen between the three types of inspection: (b/1) during a comprehensive inspection, the operation of the nuclear facility, and the management process is being examined. (b/2) Revealing inspection intends to reveal issues in connection with safe operation. (b/3) Ad-hoc inspection intends to inspect processes of a given lifecycle of the nuclear facility. Through this kind of inspection, the HAEA pursues a double aim – it is allowed to conduct these inspections unannounced, in order to examine, whether the laws on the performed activity are being applied. Otherwise, the aim can be to obtain information, which may serve as an initiator for future authority procedures. The HAEA performs assessment[119] after termination of an

[114] Ibid. para. 6 (3).
[115] Ibid. para. 8 (1).
[116] Ibid. para. 8 (3).
[117] HAEA 2016c.
[118] HAEA 2016a.
[119] HAEA 2016b.

activity or a process under its supervision. Every year, the Authority evaluates safety performance of the nuclear facilities under its supervision.

In Hungary, there are four nuclear facilities under the supervision if the HAEA: (c/1) Paks Nuclear Power Plant, (c/2) Spent Fuel Storage, (c/3) Training Reactor of the Budapest University of Technology and Economics, and (c/4) Budapest Research Reactor. Last, but not least, with regards to the enforcement[120] it can be stated, that the HAEA has several opportunities for intervention in order to enforce the application of laws. One of the well-known tools is the fine, which is typically used as a last resort.

Besides the regulatory oversight of the use of atomic energy, the HAEA performs several further tasks[121] in the field of nuclear energy, amongst others: (a) it may make proposals for legislative preparatory work, (b) informs the public on decisions, issued in its scope of competence, and further important information, (c) it is responsible for maintaining contact between international and European organizations, (d) it supervises the fulfilment of obligations under international and European regulations, (e) it performs nuclear-accident prevention activities, and (f) performs general construction authority tasks. It is in touch with several nuclear organizations, since it is the responsible Authority for the implementation of international and European Union obligations and cooperation. In this regard, cooperation with the International Atomic Energy Agency and the OECD Nuclear Energy Agency[122] are the most significant. The IAEA is an intergovernmental organization, established by the United Nations. Its headquarters can be found in Vienna. Its duty is two folded: on the one hand, it promotes safe use of atomic energy, on the other, it supervises the application of the Nuclear Non-Proliferation Treaty. The OECD NEA is also an intergovernmental organization, however its scope of activities are different. Its aim is to promote cooperation and exchange of information among states parties, furthermore the harmonisation of rules, governing nuclear safety, management of radioactive waste, nuclear liability and radiation protection. Besides cooperating with such international organizations, the scope of activities of the HAEA includes that it takes part in the work of international forums of nuclear issues, such as the Western European Nuclear Regulators Association (WENRA), European Safeguards Research and Development Association (ESARDA), European Nuclear Security Regulators Association (ENSRA), Heads of the European Radiological Protection Competent Authorities (HERCA), VVER Authorities Forum. Furthermore, the HAEA cooperates with nuclear power plants, research centres, and authorities, responsible for the nuclear safety in neighbouring countries. It also keeps in touch with states[123] operating VVER

[120] HAEA 2016c.

[121] These are only the main duties of the Authority. The detailed description can be found in the Aea. para.8 (4), and in para. 1–1/B.§ of Govt. decree 112/2011. (VII.4.) on the scope of authority of the Hungarian Atomic Energy Authority in relation to European Union obligations and international obligations in connection with atomic energy, on the designation of co-authorities contributing to the regulatory proceeding of the Hungarian Atomic Energy Authority, on the scale of fines and on the scientific council assisting the work of the Hungarian Atomic Energy Authority.

[122] Hereafter: OECD NEA.

[123] For example: Csehország, Finnország, Szlovákia és Oroszország.

type reactors, and with their partner authorities.[124] In Hungary, the HAEA is responsible for the coordination tasks and execution of the Euratom treaty. Therefore, it is a member of European Union working groups dealing with nuclear issues, namely in the work of the WPAQ (the Council's Working Party on Atomic Questions) which is the most important preparatory body. What is more, the HAEA is a member of the European Nuclear Safety Regulators Group (ENSREG) which provides advice to the Commission and helps in order to achieve a common point of view on the safety of nuclear facilities and the safe management of spent fuel and radioactive waste. Furthermore it facilitates the coordination and cooperation amongst national nuclear authorities.[125]

7. Summary

It can be concluded, that the initial hypothesis, namely that, the Hungarian legal framework complies with safety requirements of international and EU law, has been justified, since it perfectly reflects international standards. The main legal sources on the use of atomic energy and the installation of nuclear power plants are the following: in Hungarian law: Atomic Energy Act. In EU Law: Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, and regarding the management of radioactive waste and spent fuel the most important provisions can be found in the Council Directive 2011/70/Euratom of 19 July 2011. In international law: 1963 Vienna Convention on Civil Liability for Nuclear Damage, 1960 Paris Convention on Nuclear Third Party Liability, 1996 Convention on Nuclear Safety, the 1980 Convention on the Physical Protection of Nuclear Material, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

The requirement of the establishment of authorities with special competency which takes a leading role in every lifecycle – from installation, through operation until decommission – of the power plant, can be found at every level. In Hungary this task is being fulfilled by the Hungarian Atomic Energy Authority. Besides its regulatory oversight responsibility, one of the most important tasks of the HAEA includes the cooperation with EU institutions and the harmonisation of national laws with international standards. Performing this task, the Authority closely cooperates with the International Atomic Energy Agency, the OECD Nuclear Energy Agency, the WPAQ and the ENSREG. It is also a common feature in the three levels of regulation, that the construction of nuclear power plants and the use of atomic energy requires the possession of a license. In order to obtain the license, they need to fulfil several safety requirements. The importance of sustainability can be observed at every level and in light of this the requirement of the safe management of nuclear waste is a precondition of the installation of a power plant. The dangers of atomic energy production required the topic of liability to be examined. Given, the characteristics of the activities, its environmental impacts can be transnational, therefore the harmonisation of regulations in this area is crucial.

[124] Körmendi 2017, 18.
[125] Ibid. 18.

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