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Nuclear Power Program in Turkey as a Nuclear Newcomer Country*

Nükleere Yeni Giren Bir Ülke Olarak Türkiye'nin Nükleer Güç Programı

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Abstract

Turkey's interest in pursuing a nuclear power program can be attributed to the necessity to meet the country's fast expanding electricity consumption while also assisting economic development. Turkey, as a nuclear newcomer country and a member of the global nonproliferation regime, has been interested in civilian nuclear technology since 1970s. Despite substantial development in domestic energy output, Turkey still relies heavily on imported energy. In this regard, diversification of resources to generate electricity presents significant importance for the country.

Akkuyu Nuclear Power Plant (NPP) project proposes a unique concept for the construction of the country's first NPP with its own model (BOO model). The paper examines Turkey's electricity demand, the motivations for pursuing nuclear energy, and the substance of the parties' intergovernmental agreement for the BOO madel. Finally, as a nuclear newcomer country, the significance of the Nuclear Regulatory Authority (NRA) in the framework of the domestic legal law and international nuclear law is emphasized.

Keywords: Nuclear Energy, Turkey's Energy Policy, Nuclear Law, Akkuyu NPP

Öz

Türkiye'nin nükleer enerji programına ilgi duyması, ülkenin hızla artan elektrik tüketimini karşılarken aynı zamanda ekonomik kalkınmaya da yardımcı olma gerekliliğine bağlanabilir. Nükleere yeni başlayan bir ülke ve küresel nükleer silahların yayılmasını önleme rejiminin bir üyesi olarak Türkiye, 1970'lerden beri sivil nükleer teknolojiyle ilgilemektedir. Yerli enerji üretimindeki önemli gelişmelere rağmen ülkenin enerji ihtiyacı hala büyük ölçüde ithal enerji ile karşılanmaktadır. Bu bağlamda elektrik üretimi için kaynakların çeşitlendirilmesi ülke için büyük önem arz etmektedir.

Akkuyu Nükleer Güç Santrali (NGS) projesi, kendine has modeliyle (BOO modeli) ülkenin ilk NGS'sinin inşası için benzersiz bir konsept önermektedir. Bu noktadan hareketle çalışma Türkiye'nin elektrik talebini, nükleer enerji üretimi için motivasyonlarını ve bu alanda sonuçlandırdığı hükümetler arası anlaşmanın maddelerini incelemektedir. Son olarak, nükleere yeni giren bir ülke olarak, Nükleer Düzenleme Kurumu'nun (NDK) nükleer iç hukuk ve uluslararası nükleer hukuk çerçevesindeki önemi vurgulanmaktadır.

Anahtar Kelimeler: Nükleer Enerji, Türkiye'nin Enerji Politikası, Nükleer Hukuk, Akkuyu NGS

1. INTRODUCTION

Turkey's interest in pursuing a nuclear power program can be attributed to the necessity to meet the country's fast expanding electricity consumption while also assisting economic development. Turkey, as a member of the global nonproliferation regime, has been interested in civilian nuclear technology since 1970s. Despite substantial development in domestic energy output, Turkey still relies heavily on imported energy. Turkey's natural gas and oil needs are highly dependent on imports, whereas domestic coal production meets nearly half of coal demand.

* In this article, the principles of scientific research and publication ethics were followed. / Bu makalede bilimsel araştırma ve yayın etiği ilkelerine uyulmuştur.

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According to MENR, in 2019 Turkey imported 31 million tons crude oil mainly from Russia, Iraq, Kazakhstan, Iran, Saudi Arabia, Nigeria and Libya (MENR, 2023). Oil continues to be Turkey's largest energy source in terms of total final consumption and the second-largest in terms of total supply. Although Turkey's crude oil production is growing it still constitutes a small share of total supply. Natural gas is the second-largest energy source in total final consumption. Turkey relies nearly exclusively on gas imports due to very low domestic gas production, which accounts for less than 1% of total gas demand (IEA 2021: 138).

In the first part of this study, Turkey's energy overview will be evaluated with a particular focus on the country's energy import dependency. Following an overall analysis of energy supply by sources, the current status of Turkey's nuclear energy program from a historical perspective will be assessed. Significant importance of the development of domestic legal law and compliance with international nuclear law is emphasized for Turkey as a country indtroducing nuclear power for the first time.

2. TURKEY'S GENERAL ENERGY OVERVIEW

As a developing country Turkey's energy supply has steadily expanded to meet the demands of its rapidly expanding economy. Despite a growing supply of renewables over the previous decade, Turkey's energy supply has expanded by 92% since 2000. It is seen that fossil fuels accounts for the majority of this increase (IEA, 2021). International Energy Agency (IEA) "Energy Policy Review on Turkey" puts that domestic power generation in Turkey increased by 59% between 2014 and 2019, primarily due to increased renewables and coal production. The Figure 1 below indicates increase in domestic power generation clearly.

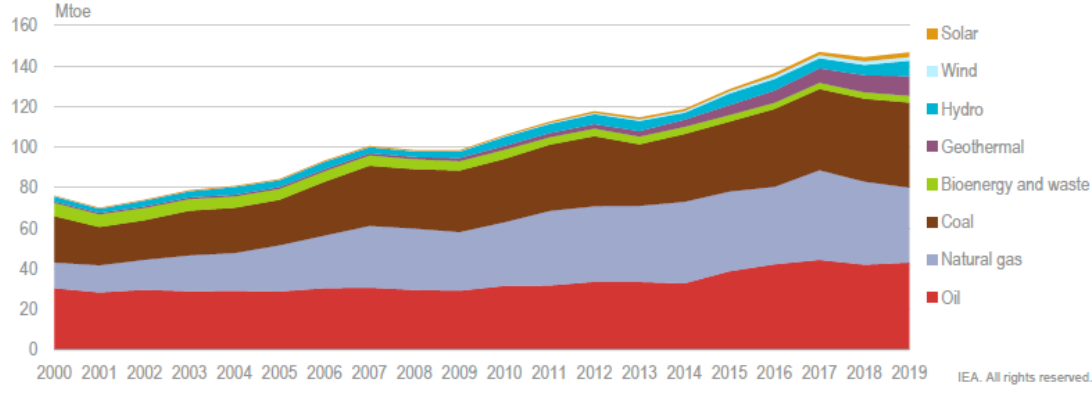

Figure 1. Total primary energy supply by source, Turkey, 2000-19
Source: International Energy Agency (IEA), 2021, Turkey Energy Review, https://www.iea.org/reports/turkey-2021

According to Turkish Ministry of Energy and Natural Resources (MENR) which is the the primary policy institution for the energy sector in the country, the distribution of installed capacity by resource as of the end of April 2023 is as follows: 30.2% hydraulic, 24.3% natural gas, 20.9% coal, 11% wind, 9.5% solar, 1.6% geothermal, and 2.5% other sources (MENR, 2023). Turkey aims to increase the country's self-sufficiency rate in energy resources by enhancing its energy portfolio. The overall Turkish energy strategy is focused on ensuring reliable, sufficient, and timely energy supply. Energy and electricity generation must be obtained in an economical and environmentally friendly manner, while also supporting and orienting planned growth and social development. The National Energy and Mining Policy of Turkey which was announced in 2017 focuses primarily on reducing Turkey's reliance on imported energy resources. To this end it has produced plans based on three considerations: supply security, indigenous production, and potential market predictions. The MENR conducts energy planning studies that take into account short, medium, and long-term policies and initiatives within the scope of the aforementioned objectives.

Turkey has made energy supply security one of the pillars of its energy strategy due to its reliance on oil and gas imports. Jessica Varnum labels this situation as the "chronic energy insecurity" which should be met (Varnum, 2010). To this end, country's energy security program asks for greater domestic oil and gas exploration and production, diversification of oil and gas supply sources and associated infrastructure, and energy consumption reduction through improved energy efficiency. In this context, Turkey has increased its nuclear energy efforts since the early 2000s.

3. TURKEY'S NUCLEAR ENERGY PROGRAM AND NATIONAL LEGISLATION

Shortly after the Atoms for Peace program was announced in 1953, Ankara began seriously considering creating an indigenous nuclear power program. Turkey established the Atomic Energy Commission under the Prime Ministry's

authority in 1956 to manage nuclear research and provide licenses for nuclear power facilities. Construction on Turkey's first nuclear research reactor, the Cekmece Nuclear Research and Education Center, began in 1959. In 1966, the Atomic Energy Commission established a second nuclear research facility in Ankara (Ülgen and Stein, 2012: 71-72, Kibaroğlu, 1997).

Furthermore, since the 1960s, Turkey has undertaken a number of attempts to develop commercial NPPs. Its initial attempt to build an NPP in the late 1960s failed for a variety of reasons, including site selection. After then, despite suggestions for other NPP projects from the 1970s through the 1990s, none of them were ultimately realized due to a variety of factors, including disagreements over the partnership framework and finance arrangements. The Sinop site and the Akkuyu site were chosen as potential locations for the NPP during these attempts. Akkuyu was chosen as the location for Turkey's first nuclear power station and was granted a site license in 1976. Turkey's preferred financing model for potential NPPs was the "build-operate-transfer" (BOT) model, under which "the contractor company pays for the construction and operating costs of a given facility and operates the facility for a predetermined period of time" before "transferring control of the facility to the host government." (Kumbaroğlu, 2015:15, Kibaroğlu, 1997). Overtime, the country's preference has shifted towards a "build-own-operate" (BOO) model for the development and operation of its first NPP in order to solve significant challenges of "financing" and "experienced operators" for the nuclear newcomer countries. In 1982, The Turkish Atomic Energy Authority (TAEK) took over the Atomic Energy Commission which has the authority to create and manage nuclear safety and site licensing regulations. The Turkish government reorganized and enlarged the TAEK's mandate in 2002 (Ülgen and Stein, 2012: 72).

In 2007, the Nuclear Power Plant Construction and Operation and Energy Sale Law (Law No. 5710) was approved and put into effect. The Regulation Regarding the Principles, Procedures and Incentives for the Contracts and the Contest for the Implementation of Law No. 5710 (the Regulation on Implementing Law No. 5710), which lays out the guidelines for the development and operation of NPPs for the generation of electricity as well as the rules governing their energy sales, was published in 2008.

The nuclear regulator is critical in developing and implementing a newcomers' nuclear program. The regulator must be independent in order to enact relevant rules, regulations, and be able to enforce them. In 2018, the Cabinet enacted Decree-Law No. 702 on the Organization and Duties of the Nuclear Regulatory Authority (NRA) and Amendments to Various Laws as one of the transition decree laws. Decree-Law No. 702 is a comprehensive nuclear law that governs nuclear safety, security, safeguards, radiation safety, radiation protection, and other related topics. The Nuclear Regulatory Authority now has control over the TAEK's regulatory functions and related activities. The legal infrastructure of the Nuclear Regulatory Authority was re-established with the Nuclear Regulation Law No. 7381 dated 5 March 2022 and the Presidential Decree on the Organisation and Duties of the Nuclear Regulatory Authority No. 95 (NRA, 2023). According to Decree-Law some basic duties and authorities of the NRA are as follows:

a. To determine the strategy, target, and working principles of the Authority.

b. To issue regulatory requirements and decisions in the areas of its duties and authorities.

c. To grant authorizations; to define and modify the technical, legal, administrative and financial scope and conditions of the authorizations; to restrict, suspend, end and revoke the granted authorizations; to determine and change the duration of the authorizations; to review and evaluate the information and documents submitted to the Authority for or after the authorization; to define and modify the conditions of the authorization given as a result of the evaluation.

d. To inspect or investigate the activities or places within the scope of its duties or authorities or have them inspected or investigated before and after the authorization;

e. To determine issues requiring approval with the scope of safety, security and safeguards; to grant approval and to determine conformity criterion if necessary.

f. To request and evaluate all the required information and documents from the applicants and authorized persons, to use the information and documents in compliance with the confidentiality requirements (NRA, 2023).

Organizational structure of the Turkish Nuclear Regulatory Authority can be seen in the Figure 2 in detail.

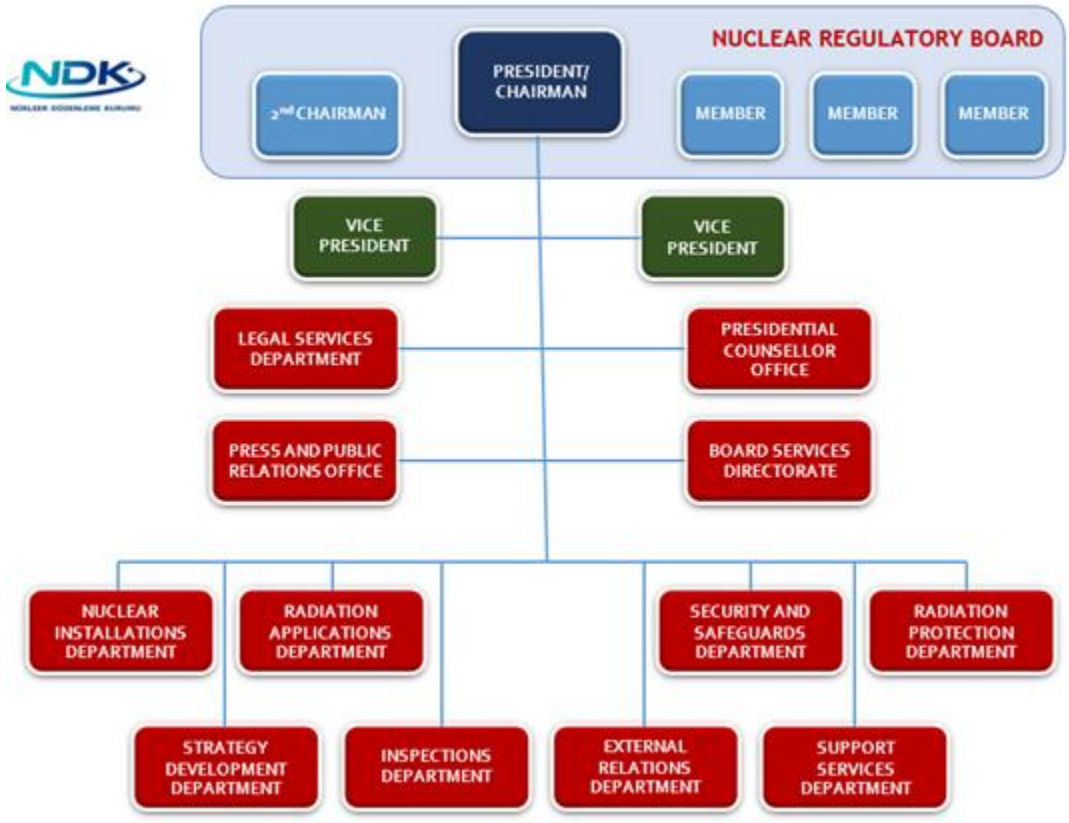

Figure 2. Organizational structure of the Nuclear Regulatory Authority
Source: IAEA 2022 Country Nuclear Power Profiles, "Turkey", https://cnpp.iaea.org/countryprofiles/Turkey/Turkey.htm

3.1 Akkuyu Nuclear Power Plant Project

The Turkish Electricity Trading and Contracting Company (TETAŞ) held a tender for the construction and operation of nuclear power plants, as well as energy sales, in 2008, for the construction of four units at the Akkuyu site. Despite the fact that one consortium bid in the auction, TETAŞ decided to end the competition due to an assessment of the energy sale unit price.

In 2010, Turkey and Russia signed an Intergovernmental Agreement (IGA) for the development and operation of the Akkuyu NPP with four VVER-1200 reactors under the "build-own-operate" (BOO) model (Resmi Gazete, 2010). On December 13, 2010, the Akkuyu Nuclear Power Plant Electricity Generation Joint Stock Company was established for the project's execution phase. TAEK certified Akkuyu NPP Electricity Generation JSC as the owner on February 7, 2011, in accordance with the Nuclear Installations Licensing Decree. Presidential Decree No. 57 establishes the Turkish Energy, Nuclear, and Mining Research Authority (TENMAK) in March 2020 (IEA, 2021). In September 2014, Akkuyu NPP Electricity Generation JSC was renamed and registered as Akkuyu Nuclear JSC (Akkuyu Project Company or APC).

There are unique features of the IGA to build and operate a build–own–operate (BOO) model nuclear power plant in Turkey. Akkuyu NPP would be the first of its kind in this regard. Firstly, the Russian party established a joint stock project business in Turkey originally with a 100% share. The Turkish party allocated Akkuyu site to the project company free of charge until the decommissioning of the NPP which woulde be after 80 years following the start of the operation. According to the IGA the "Russian party's stake will never be below 51% at any time". Regarding the power purchase agreement (PPA) between the parties generated power "shall be bought by TETAS through this PPA for 15 years at USD $0.1235/kWh which is a fixed price". That means over the course of a 15-year power purchase agreement, the Turkish Electricity Trade and Contract Corporation (TETAS) has guaranteed the purchase of 70% of the power produced by the first two units and 30% by the third and fourth units at an average cost of 12.35 US cents per kWh excluding VAT (Kumbaroğlu, 2011: 91). It should also be noted that "70% of the electricity will be generated by Units 1 and 2 and 30% of the electricity will be generated by Units 3 and 4" (Resmi Gazete, 2010).. According to Kumbaroğlu "considering the fact that the agreement refers to a price that is the average of a price for the period 2020-2035 and therefore almost two decades ahead, it appears

to be an economically advantageous deal for Turkey." (Kumbaroğlu, 2011: 91).

Furthermore, "nuclear fuel shall be purchased from suppliers based on long term agreements entered into between APC and the suppliers". Subject to additional agreements that may be signed by the parties, spent nuclear fuel of Russian origin may be reprocessed in the Russian Federation. Furthermore, APC will be responsible for decommissioning and waste management for the NPP (IAEA, 2022).

Regarding human resources management Turkish companies and citizens will be included in the project to the extent possible. Turkish student will get the relevant education in Russia to come back to their country and work in the NPP Project. For the PPA period "USD $0.0015/kWh shall be paid for spent fuel and radioactive waste management; o USD $0.0015/kWh shall be paid for decommissioning". Finally, the project will be subject to all applicable laws, rules and codes in Turkey. All required licenses, permissions and approvals from connected governmental entities will be obtained by APC (IAEA, 2022).

According to MENR there are several reasons why Russian Federation is a good choice for the construction of the country's very first nuclear power plant. First of all, there are only a few countries in the world that have nuclear energy Technologies and the Russian Federation is the market leader in this sector. Russia is also the first country to produce commercial electricity from nuclear energy in 1954. Furthermore, Russian experience type nuclear power stations provide up a large portion of present nuclear electricity generation. Russia is building 14 of the 61 NPPs under construction in the world. Another advantage of Russian NPPs is the full fuel cycle in their offer. Russia also supplies nuclear fuel to various power plants around the world as it is also agreed for the Akkuyu NPP. That means the fuel to be used in the power plant will be manufactured in Russia and taken back to Russia to be reused upon a particular agreement. Moreover, according to Turkish Nuclear Regulation Authority the security systems of the VVER-1200 design to be installed in Turkey mostly consist of systems that do not need electrical power supply in the event of an unusual event or accident (NRA, 2022).

As a recent development in April 2023, fresh nuclear fuel has arrived with an international ceremony for the first reactor of the Akkyu NPP. In this occasion IAEA Director General Rafael Grossi also visited the NPP site and said that Akkuyu NPP project is an important step for "economic and technological progress" of Turkey and "the IAEA will continue to work with Turkey with respect to, among other areas, legal assistance, capacity building and the establishment of a nuclear safety culture, including through further IAEA peer review missions (IAEA 2023).

3.2 Sinop Nuclear Power Plant

Sinop is a candidate site for Turkey's second nuclear reactor. An agreement between the Government of the Republic of Turkey and the Government of Japan on Cooperation for Development of Nuclear Power Plants and the Nuclear Power Industry in the Republic of Turkey was signed on 3 May 2013 which entered into force on 31 July 2015. (Ministry of Foreign Affairs of Japan, 2013; IAEA, 2022)

Mitsubishi Heavy Industries, the leading partner in the Japanese-led consortium to build the Sinop NPP project, completed feasibility studies and developed a feasibility report for site suitability evaluation and financial model development in the context of the Sinop NPP project, and submitted them to MENR in June 2018. Following MENR's examination of the feasibility report and its findings, it was decided not to proceed with Japan on the Sinop NPP project due to the findings of the feasibility report. Turkey is looking for new ways to continue the project. Recently, on 27 January 2023 the Turkish Nuclear Energy Anonymous Company (TÜNAŞ), which was applying for the establishment of a nuclear power plant in Sinop site, was granted the status of "Founder" on 27 January 2023.

As it is very clear, Turkey has had serious previous attempts to introduce nuclear energy to its energy mix. Apart from these two intergovenmental agreements, Turkey has concluded several other bilateral agreements with other countries or organizations in the field of nuclear power. These agreements are summarized in the Table 1.

4. TURKEY'S NUCLEAR ENERGY PROGRAM AND INTERNATIONAL NUCLEAR LAW

In addition to the efforts to construct the legal architecture of the nuclear energy field, a variety of international legislative measures have been adopted as well. As the cornerstone treaty of the global nonproliferation regime, Turkey ratified the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) on 17 April 1980. Turkey is in full cooperation with the IAEA for peaceful uses of nuclear energy. Turkey is also a party to the IAEA Additional Protocols, Convention on Nuclear Safety, Convention on the Physical Protection of Nuclear Materials (CPPNM) and its 2005 Amendment, the Paris Convention on Third Party Liability in Nuclear Energy, Convention on Early Notification of a Nuclear Accident.

Regarding international civil liability, Turkey is a signatory to the Paris Convention on Third-Party Liability in Nuclear

Energy, which was signed in 1960. Turkey also signed and approved the amending Protocols of January 28, 1964 and November 16, 1982. The Amending Protocol was signed on February 12, 2004, and ratified in 2021. The Paris Convention's 2004 amending protocol has a significant importance for the international nuclear civil liability system because it has expanded the concept of "nuclear damage" to include environmental harm and financial costs. Furthermore it established new liability caps as follows: Operators (insured): €700,000,000; Installation State (public funds): €500,000,000; Collective state contribution (Brussels): €300,000,000; suggesting a total of at least €1500,000,000 (Kumbaroğlu, 2011:97).

Table 1. International Treaties, Conventions, and Agreements Signed/Ratified by Turkey

	NAME	SIGNED ON	RATIFICATION
1	Convention on Cooperation in the Atomic Energy Field Between the NATO Members and Its Amendment	22 June 1955	10 September 1956
2	Paris Convention(1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy)	29 July 1960	13 May 1961
3	Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water	5 August 1963	13 May 1965
4	Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July1960	28 January 1964	13 June 1967
5	International Labour Conference Convention Number 115 Concerning the Protection of Workers Against Ionizing Radiation	17 June 1962	25 July 1968
6	Treaty on the Non-Proliferation of Nuclear Weapons	28 January 1969	28 November 1979
7	Convention for the Protection of the Mediterranean Sea Against Pollution	16 February 1976	12 June 1981
8	The International Convention on Railway Transportation	21 March 1985	1 June 1985
9	Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as Amended by the Additional Protocol of 28 January 1964	16 November 1982	23 May 1986
10	Convention on the Physical Protection of Nuclear Material	23 August 1983	7 August 1986
11	Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-based Sources	17 May 1980	18 March 1987
12	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	28 September 1986	3 September 1990
13	Convention on Early Notification of a Nuclear Accident	28 September 1986	3 September 1990
14	Convention on the Protection of the Black Sea Against Pollution	21 April 1992	6 March 1994
15	Convention on Nuclear Safety	24 September 1994	14 January 1995
16	Comprehensive Nuclear-Test-Ban Treaty	3 November 1999	26 December 1999
17	Joint Protocol Relating to the Application of the Vienna and the Paris Conventions	21 September 1988	19 November 2006
18	Synchrotron Light for Experimental Science and Applications in the Middle East	11 September 2002	23 March 2012
19	Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as Amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982	12 February 2004	17 October 2021
20	Amendment to the Convention on the Physical Protection of Nuclear Material	8 July 2005	24 April 2015
21	International Convention for the Suppression of Acts of Nuclear Terrorism	14 September 2005	8 May 2012
22	Agreement Between the Republic of Türkiye and the European Organization for Nuclear Research (CERN) Concerning the Granting of the Status of Associate Member at CERN	12 May 2014	28 April 2015
23	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	-	17 October 2021

Source: IAEA, 2022 Country Nuclear Power Profiles, "Turkey", https://cnpp.iaea.org/countryprofiles/Turkey/Turkey.htm

Table 2. Cooperation Agreements with the IAEA in the Area of Nuclear Power

	NAME	SIGNED ON	RATIFICATION
1	Agreement Between the Government of the Republic of Türkiye and the IAEA for the Application of Safeguards in Connection with the NPT	30 June 1981	20 October 1981
2	Protocol Additional to the Agreement Between the Government of the Republic of Türkiye and the IAEA for the Application of Safeguards in Connection with the NPT	6 July 2000	12 July 2001

Source: IAEA, 2022 Country Nuclear Power Profiles, "Turkey", https://cnpp.iaea.org/countryprofiles/Turkey/Turkey.htm

Table 3. Bilateral Agreements Signed/Approved Between The Republic of Turkey and Other Countries or Organizations in the Field of Nuclear Energy

	NAME	SIGNED ON	RATIFICATION
1	Agreement Between the Government of Canada and the Government of the Republic of Türkiye for Cooperation in the Peaceful Uses of Nuclear Energy	18 June 1985	29 June 1986
2	Agreement Between the Government of the Republic of Türkiye and the Government of the Argentine Republic for Cooperation in the Peaceful Uses of Nuclear Energy	3 May 1988	8 February 1992
3	Agreement Between the Government of Türkiye and the Republic of Bulgaria on Early Notification of a Nuclear Accident and Exchange of Information on Nuclear Facilities	28 July 1997	11 September 1997
4	Agreement Between the Government of the Federal Republic of Germany and the Government of the Republic of Türkiye for Cooperation in the Peaceful Uses of Nuclear Energy	14 January 1998	-
5	Agreement Between the Government of the Republic of Korea and the Government of the Republic of Türkiye for Cooperation in the Peaceful Uses of Nuclear Energy	26 October 1998	12 April 1999
6	Agreement Between the Government of the French Republic and the Government of the Republic of Türkiye for Cooperation in the Peaceful Uses of Nuclear Energy	21 September 1999	18 May 2011
7	Agreement Between the Government of the Republic of Türkiye and the Cabinet of Ministers of Ukraine on Early Notification of a Nuclear Accident and Exchange of Information on Nuclear Facilities	23 November 2000	2 May 2001
8	Agreement Between the United States of America and the Government of the Republic of Türkiye for Cooperation in the Peaceful Uses of Nuclear Energy	26 July 2000	9 July 2006
9	Agreement Between the Government of the Republic of Türkiye and the Government of Romania on Early Notification of a Nuclear Accident	3 March 2008	16 May 2008
10	Agreement Between the Government of the Republic of Türkiye and the Government of the Russian Federation for Cooperation in the Use of Nuclear Energy for Peaceful Purposes	6 August 2009	12 February 2011
11	Agreement Between the Government of the Republic of Türkiye and the Government of the Russian Federation on Early Notification of a Nuclear Accident and Exchange of Information on Nuclear Facilities	6 August 2009	12 February 2011
12	Agreement Between the Government of the Republic of Türkiye and the Russian Federation on Cooperation in Relation to the Construction and Operation of a Nuclear Power Plant at the Akkuyu Site in the Republic of Türkiye	12 May 2010	6 October 2010
13	Agreement Between the Turkish Atomic Energy Authority (the Republic of Türkiye) and the Federal Environmental,Industrial and Nuclear Supervision Service (the Russian Federation) for Cooperation in the Field of Nuclear Licensing and Supervision	8 June 2010	8 June 2010
14	Agreement Between the Government of the Republic of Türkiye and the Government of the Hashemite Kingdom of Jordan for Cooperation in the Use of Nuclear Energy for Peaceful Purposes	17 February 2011	5 June 2015
15	Agreement between the Government of the People's Republic of China and the Government of the Republic of Türkiye for Cooperation in the Peaceful Uses of Nuclear Energy	9 April 2012	2 September 2016
16	Agreement between the Government of the Republic of Türkiye and the Government of Japan for Cooperation in the Use of Nuclear Energy for Peaceful Purposes	3 May 2013	22 April 2014
17	Agreement between the Government of the Republic of Türkiye and the Government of Japan on Cooperation for the Development of Nuclear Power Plants and the Nuclear Power Industry in the Republic of Türkiye and Memorandum of Cooperation Between the Government of the Republic of Türkiye and the Government of Japan on Cooperation on the Development of Nuclear Power Plants and the Nuclear Power Industry in the Republic of Türkiye	3 May 2013	23 May 2015
18	Agreement between the Government of the Republic of Türkiye and the Government of the Republic of Belarus on Cooperation in the Use of Nuclear Energy for Peaceful Purposes	11 November 2016	

Source: IAEA, 2022 Country Nuclear Power Profiles, "Turkey", https://cnpp.iaea.org/countryprofiles/Turkey/Turkey.htm

In Turkish national legislation regarding civil liability Decree No. 83/74045, approved by the Turkish Atomic Energy Authority on December 19, 1983, requires the operator of a nuclear plant to have insurance or other kinds of financial protection, approved by the Turkish Atomic Energy Authority.

Regarding the intergovernmental agreement between Russia and Turkey it can be said that it did not impose any caps on the Project Company's civil liability in the event of a nuclear disaster. According to Article 16 of the aforementioned agreement, Turkey's internal laws and regulations as well as any international agreements to which it is a party or will become a party will be used to assess Turkey's legal obligation to third parties (Kumbaroğlu, 2011: 98).

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management which was signed on 6th October 2021 and entered into force on 21st July 2022 in Turkey also represents asignificant development regarding regulation of international spent fuel and radioactive waste management safety. The Joint Convention as the first legal instrument on this issue establishes "fundamental safety principles and creating a similar "peer review" process to the Convention on Nuclear Safety." (NDK)

Table 1, Table2 and Table 3 provide lists of "International treaties, conventions, and agreements signed/ratified by Turkey", "Cooperation agreements with the IAEA in the area of nuclear power" and "Bilateral Agreements Signed/Approved Between The Republic of Turkey and Other Countries or Organizations in the Field of Nuclear Energy" respectively.

5. CONCLUSION

Electricity demand in Turkey has risen dramatically in recent decades, paralleling economic and social progress. Thus, Turkey intends to boost its energy self-sufficiency rate by diversifying its energy portfolio. The entire Turkish energy strategy is centered on guaranteeing consistent, adequate, and timely energy supply. To meet expanding energy demand without disruption, Turkey is developing programs to cover a large amount of its energy demand, not only by increasing power output from local resources, but also by planning and finalizing nuclear power plant projects on its soil. It can be said that Turkey's interest in pursuing a nuclear power program is driven by the need to meet the country's rapidly increasing electricity consumption and to assist economic development. By meeting rising electric energy demand, the integration of nuclear energy into Turkey's energy supply is regarded as one of the most important strategies of mitigating the hazards associated with reliance on foreign fuels. Following the analyses of Turkey's electrical needs and the reasons for pursuing nuclear energy, the study looks at the country's nuclear energy program from national and international nuclear legal framework. Departing from this point the article assesses the Akkuyu NPP Project as a novel design for the development of the country's first nuclear power plant (BOO model). This model for the development and operation of the country's first NPP aims to solve significant challenges of "financing" and "experienced operators" for Turkey as a nuclear newcomer country. Finally, the significant role of a independent Nuclear Regulatory Authority (NRA) is explained for a nuclear new comer country in the framework of its critical role in enacting relevant regulations, giving recommendations and enforcing them developing and implementing a newcomers' nuclear program.

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