Miklós Vilmos MÁDL[1]

Hungary's Nuclear Legislation in Light of a Nuclear Renaissance[2]

Abstract

In recent years, the notion of a renaissance in nuclear energy has garnered increasing attention, as it is one of the few electricity-generating means that can supply stable, base-load electricity whilst concurrently aligning with the pressing imperatives of climate protection. In such a prosperous climate for nuclear development, it is worth looking into national nuclear law frameworks and analysing their adequacy for increased deployment of nuclear power plants. Among the paramount considerations from the perspective of a successful nuclear renaissance stands the issue of notoriously protracted and complex licensing procedures. There is no international licensing authority, nor there is a common licensing framework, licensing is in the remit of national authorities, resulting in a diverse array of regulatory approaches to licensing. In an era characterized by heightened interest in nuclear new build initiatives, it is incumbent upon us to examine our current regulatory frameworks—acknowledging both their merits and their deficiencies—as such inquiry is indispensable to any further developments that aim to make these systems more conducive to a nuclear renaissance, whilst upholding nuclear safety as the foremost priority. This article aims to present the nuclear licensing framework applicable to new build nuclear power plants in Hungary. To understand the licensing process, the article will address the position of the nuclear regulatory body within this process, alongside the principal statutory instruments governing the deployment of new nuclear power plants. The core of the article will focus on the licensing stages leading up to the operation of a new nuclear power plant, illustrated with recent practical insights gleaned from the Paks II project. Furthermore, recognising that advanced nuclear technologies form a prominent subject within the contemporary discourse of the nuclear renaissance, the article will also address their prospective deployment. In doing so, it will address the licensing challenges associated with them, and how these could be potentially resolved. The central

1 | PhD Student, Ferenc Deák Doctoral School of Law, University of Miskolc; Researcher, Central European Academy, Hungary. ORCID: https://orcid.org/0009-0003-9645-5594
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hypothesis advanced herein is that a thorough understanding of our existing licensing frameworks—together with their attendant advantages and shortcomings—constitutes a necessary precondition for participation in the nuclear renaissance. Only by engaging in such critical reflection, and by drawing upon the experiences of other states, can one aspire to establish licensing procedures that are not only more efficient and effective but also unwavering in their commitment to the maintenance of nuclear safety.
Keywords: Licensing, nuclear new build, SMRs, nuclear law, Paks II, nuclear safety

1. Introduction

In recent years, nuclear energy has once again assumed a position of heightened prominence within public and policy discourse. This resurgence of interest, often described as a 'nuclear renaissance,' stems largely from the growing recognition that the ambitious climate goals[3] we set for ourselves, are, for most countries, unattainable through reliance on renewable sources alone. While renewable energy sources remain crucial to the green transition, they still have their limitations—chief among them being their volatile nature and consequent inability, in many cases, to supply consistent base-load power.[4] Few energy sources possess the dual capacity both to be carbon neutral and to provide base load power. It is thus unsurprising that nuclear energy has re-entered the strategic calculus of numerous states. This renewed focus on nuclear power as a solution to our energy needs was further catalysed by by geopolitical developments, most notably the Russian-Ukrainian crisis, which has brought into sharp relief the imperatives of self-sufficiency and elevated the importance of resilient, nationally controlled generating capacities. Hungary, in line with this tendency, in its 2024 National Energy and Climate Plan[5] articulates an unequivocal commitment to nuclear energy, recognising it as a key contributor to the country's energy security while advancing its climate goals.[6] At present, this dedication is set to be realized by further life-extension of the existing Paks I nuclear facility and constructing the Paks II plant. Parallel to these developments, Hungary is also investigating the potential integration of advanced nuclear technologies, including small modular reactors (SMRs).[7]

Amidst this context of a potential nuclear renaissance, it becomes critical to analyse existing legal frameworks to understand their functioning, as any future developments driven by the renaissance aiming to modernise must inevitably build upon these frameworks.

3 | Such as the Fit for 55 package.

4 | Of course certain exceptions do exist—most notably hydroelectric power—but that requires favourable geographic attributes which are not uniformly available across all national territories.

5 | Regulation (EU) 2018/1999 of the European Parliament and of the Council

6 | National Energy and Climate Plan 2024, 18.

7 | Ibid. 80

This article thus endeavours to present a thorough analysis of the legal regulation of the nuclear energy sector in Hungary. In doing so, it offers a sound basis for comparative evaluation from which valuable conclusions may be drawn regarding the benefits and shortcomings of the current legal framework.

Particular emphasis is placed upon licensing issues, as these procedures are crucial in materializing a nuclear renaissance.[8] Throughout this analysis, the author begins by delineating the role of nuclear energy in Hungary and its projected trajectory, before examining the institutional framework, including the regulatory authority entrusted with oversight of the sector, as well as the principal legislative instruments that govern it. The core of the article is dedicated to an exploration of the licensing framework of the sector, outlining the stages leading up to the operation of a new nuclear power plant. Throughout this discussion, the author will attempt to showcase the practical implications of the different licensing stages through the example of Paks II. Since the previously portrayed nuclear renaissance also encompasses the potential deployment of next-generation nuclear technologies such as SMRs, the author will dedicate the last section of the article to discussing the prospects of these novel plants in Hungary.

2. Hungary and its history with nuclear energy

Hungarians have played a significant and distinguished role in the global history of nuclear science. Although a detailed exposition on their contributions lies beyond the scope of this article it would be remiss not to mention two eminent figures: Ede Teller[9], who emigrated to the United States and took part in the Manhattan Project—thereafter becoming known as the "father of the hydrogen bomb"—and Leó Szilárd,[10] likewise an émigré to the United States, whose discovery of the nuclear chain reaction stands as a foundational breakthrough in the field.

Hungary's relationship with nuclear installations dates back to the 1950s, when the Central Physics Research Institute[11] of the Hungarian Academy of Sciences proposed the construction of a research reactor in cooperation with the Soviet Union.[12] This proposal led to the conclusion of an interstate agreement between Hungary and the USSR, delineating the respective obligations of each party.[13] The research reactor was envisaged to be a crucial source of information to preparing for electricity-generating reactors, which were expected to become viable within a

8 | Kiser & Otero 2024, 1–2.
9 | Teller & Brown 1962,
10 | Lanouette & Szilárd 2024,
11 | Central Research Institute for Physics (Központi Fizikai Kutatóintézet).
12 | Government Proposal No. 4081/1955 concerning the construction of an experimental nuclear reactor, at pp. 3 (4081/1955. A kísérleti atomreaktor építéséről, Előterjesztés, 3.)
13 | Jéki 2000, 16.

15- to 20-year horizon.[14] The first Hungarian nuclear reactor was built in the Buda Hills in 1959 with an initial capacity 2 MW, subsequently increased in 1967 to 5 MW as part of its overhaul.[15] In 2023, the operating licence of the research reactor was extended for further 10 years with specific conditions.[16]

The success of the research reactor soon catalysed a broader vision: that of constructing a nuclear power plant for electricity generation. In pursuit of this goal, educational programmes were established at Hungarian universities to train future professionals in the sector, leading to the idea of building a university reactor. Ultimately Budapest University of Technology was selected as the best place to construct it.[17] In this period, the first legislation governing the sector was also adopted,[18] including rudimentary provisions on licensing. In practice, however, these procedures were largely informed by the regulatory practices of other nations and the International Atomic Energy Agency (IAEA) guidelines. Under these provisions, a licence was granted in 1966 for the construction of a domestically designed training reactor, which reached first criticality in 1971.[19] True to its intended purpose, professionals educated in the reactor proved pivotal to the Paks I project.

The subsequent milestone in Hungary's nuclear development was establishing a power-generating nuclear plant. In 1966, pursuant to a resolution of the Council of Ministers,[20] an interstate agreement was signed between Hungary and the Soviet Union,[21] regarding the construction of two blocks, each with an output of 800 MW. The first unit was scheduled for commissioning in 1975.[22] Under the terms of the Convention, the Soviet party undertook responsibility for the design, fuel supply, and provision of major components, while the Hungarian side assumed responsibility for selecting the site and for construction and assembly works. The agreement further addressed financing, with the Soviet Union extending a loan of 50 million roubles at a 2% interest rate, repayable over ten years via importing Hungarian goods to the Soviet Union. This arrangement was

14 | Government Proposal No. 4081/1955 concerning the construction of an experimental nuclear reactor, at pp. 1 (4081/1955. A kísérleti atomreaktor építéséről, Előterjesztés, 1.)

15 | OAH 2023, 6.

16 | BKR-HA0074, határozat Energiatudományi Kutatóközpont Budapesti Kutatóreaktor üzemeltetési engedélye.

17 | Institute of Nuclear Techniques of the Budapest University of Technology and Economics (BME Nukleáris Technikai Intézet)

18 | 10/1964. (V.7.) Korm. rendelet a sugárzó (radioaktív) anyagokról és készítményekről

19 | Institute of Nuclear Techniques of the Budapest University of Technology and Economics (BME Nukleáris Technikai Intézet).

20 | A Magyar Forradalmi Munkás-Paraszt Kormány 3397/1966. számú határozata a magyarországi atomerőmű megépítése tárgyában a Szovjetunió kormányával kötendő együttműködési megállapodásról

21 | Magyar Népköztársaság területén létesítendő atomerőmű építése során folytatandó együttműködésről szóló, 1966. december 28-án kelt Egyezmény

22 | Ibid. Section 1–2.

considered quite beneficial from a Hungarian perspective, as it enabled repayment through the export of products that would have faced difficulty competing on the open market.[23] In the following year a resolution[24] was issued, which stated that the plant would provide around 15-16% of Hungary's electricity needs and it would be sited somewhere in Tolna County, close to the Danube. Ultimately, the decision was made[25] to select Paks as the location, and despite underlying political motivations, nuclear safety considerations prevailed as the decisive factor in the location decision.[26] Notwithstanding initial progress, a policy debate emerged regarding the economic viability of the nuclear project suggesting supplementing it with other types of power plants based on their perceived better economics.[27] In the course of this debate of energy generation, nuclear power lost favour and project was formally postponed.[28] Owing to Hungary's obligations under its treaty with the Soviet Union, the Hungarian Government sought clarification as to whether the postponement would be acceptable. In its communication to the Soviet side, Hungary reaffirmed its commitment to the project and argued that a deferral could be mutually beneficial, as it could result in installing a more modern plant.[29] Soon the answer came back from the Soviet side that they had nothing against the modification of the Convention.[30] In 1970, the formal decision was made to postpone the project to the period of 1980-1985.[31] The Ministry of Heavy Industry later issued a decision confirming the new timeline for the project's implementation.[32] Based on this mutual agreement the Interstate Convention had to be modified. The Hungarian delegation was entrusted[33] not only to set a later implementation date, but also to modify the project's scale to four 500 MW units.[34] In July of 1970, the Convention was amended by an additional protocol envisaging the construction of a nuclear power plant with an aggregated capacity of 1900-2000 MW. The first two 440 MW units were scheduled for commissioning

23 | Bosák 2016
24 | 3004/1967. MT. határozat
25 | Paksi Atomerőmű üzemidő hosszabbítás Előzetes Környezeti Tanulmány 2004, 14.
26 | Jegyzőkönyv az Erőmű és hálózattervező Vállalat Vállalati Zsürijének 1967. február 16-i üléséről. Tárgy: 800 MW atomerőmű telepítési hely vizsgálata
27 | Szabó 2004, 103–162.
28 | Ibid. 140–162.
29 | Apró Antal levélváltása M. A. Leszecsko szovjet miniszterelnök-helyettessel az atomerőmű építésének elhalasztásáról MOL XIX-A-2-gg-21-338-1969 (349. d.)
30 | MOL XIX-A-2-gg-21-343-1969 (Doc. No. 349)
31 | A Magyar Forradalmi Munkás-Paraszt Kormány 3009/1970. számú határozata a szovjet segítséggel történő első magyar atomerőmű létesítésére kötött egyezmény határidejének módosításáról
32 | Resolution No. 3068/1970 of the Ministry of Heavy Industry, See: Szabó 2004, 220–225.
33 | Szabó 2004, 194–209.
34 | This during the negotiations it was corrected by the soviet party that there is no such reactor as 500 MW one. They can either offer the 440MW or the 1000MW. Interestingly this increase of capacity was not intentional on the side of Hungary which is also visible by lack of technical knowledge on the reactors. See: Szabó 2004, 200–209.

by 1980, with the remaining units to follow with the entire 2000 MW plant until 1985.[35]

Legislative reforms accompanied the project's advancement. In 1976, a resolution was made by the Council of Ministers,[36] expressing that the nuclear safety licensing has to be determined by the President of the National Atomic Energy Commission in coordination with the Minister of Heavy Industry, and based on Soviet regulatory standards.[37] From a modern perspective—particularly in relation to the principle of regulatory independence—it is noteworthy that the nuclear safety provisions were adopted by the Ministry, which was itself the key stakeholder in the building of the plant. However, one might contend that in the political and industrial context of the time, the Ministry's interest extended beyond mere economic considerations.[38] The substantive safety regulations adopted during this period took the form of what are known as Blue-Books—essentially Hungarian translations of Soviet standards orignially issued by the State Mining Technical Inspectorate and the State Atomic Energy Committee of the USSR.[39]

The first comprehensive legislative instrument governing the nuclear sector in Hungary was enacted in 1978.[40] This decree delineated the respective responsibilities of state authorities in relation to the nuclear power plant. It vested the Minister of Heavy Industry with the authority to establish the safety requirements applicable to the plant's implementation, commissioning, operation, and licensing. Meanwhile, the National Atomic Energy Commission was tasked solely with the coordination of inter-authority activities in relation to the plant.[41] Mirroring broader development in international nuclear law, the decree also codified fundamental nuclear law principles such as the responsibility of the operator.[42] Based on this decree, the Minister of Heavy Industry issued a decree in the following year covering the assigned areas.[43] Much like our contemporary legislation, this ministerial decree has set out detailed rules in the form of annexes covering the implementation, commissioning, operation and licensing of the plant.[44] While these provisions were already being applied in practice, the decree served to codify their

35 | Jegyzőkönyv A Magyar Népköztársaság Forradalmi Munkás-Paraszt Kormánya és a Szovjet Szocialista Köztársaságok Szövetségének Kormánya között 1966.december 28-án, atomerőműnek a Magyar Népköztársaságban történő létesítésében való együttműködésről kötött Egyezményhez. 1970. július 3-án

36 | A minisztertanács 3296/1976. sz. határozata a paksi atomerőmű 1760 MW teljesítményű első kiépítésének beruházási javaslatáról

37 | Ibid.

38 | Szabó 2004, 567–585.

39 | Tóth 2024, 146.

40 | 10/1978. (II.2.) MT rendelet az atomerőművel kapcsolatos egyes feladatokról

41 | Ibid. Section. 13.

42 | Ibid. Section 1. (3).

43 | 5/1979. (III. 31.) NIM rendelet az atomerőmű biztonságtechnikai kérdéseiről

44 | Ibid. art 2.

use.[45] Under this framework, two distinct nuclear safety licences were introduced for new nuclear facilities: the implementation licence and the operating licence, the latter also covering the commissioning stage.[46] The State Energy and Energy Safety Inspectorate acted as the first-instance authority, while the Ministry of Heavy Industry's National Energy Authority served as the appellate body.[47]

A further milestone came with the adoption of the first Act on Atomic Energy in 1980,[48] which which remained in force until it was superseded in 1996 by the current legislation. The Act, together with its implementing decree, introduced broader regulation of the sector, covering areas that had hitherto remained unaddressed—most notably, third-party nuclear liability.[49] This represented a significant innovation, as such liability had previously been treated under the general regime of strict liability for hazardous activities, as provided in the 1959 Civil Code. Although at the Act's adoption, Hungary was not yet party to the principal international conventions of the sector,[50] the legislator nonetheless sought to align the domestic framework with emerging global standards. In the domain of regulation and licensing, the implementing decree conferred upon the Minister of Heavy Industry the power to establish safety requirements and issue the relevant licences. These licences were to be supplemented[51] with the opinion of the State Commissioning and Handover Committee.[52] It was under these provisions that the plant's first reactor received its licence and commenced commercial operation in 1983.[53]

For over 40 years, the Paks I Nuclear Power Plant has been a cornerstone of Hungary's electricity mix, consistently accounting for more than 40% of national electricity generation. Following the expiration of their initial 30-year operational lifespans—beginning with the first unit in 2012,[54] shortly in the wake of the Fukushima accident—their operating licences were extended for another 20 years, thereby reinforcing Hungary's energy security. Given the delays associated with the construction of the Paks II and the renewed emphasis on national energy autonomy in the wake of the Russian-Ukrainian crisis,[55] the prospect of

45 | Szabó 2004, 567–585.
46 | 5/1979. (III. 31.) NIM rendelet az atomerőmű biztonságtechnikai kérdéseiről, Section 4.
47 | Ibid. Section 3.
48 | 1980. évi I. törvény az atomenergiáról
49 | Ibid.
50 | Hungary acceded to the 1963 Vienna Convention and the Joint Protocol in the year of the regime change 1989.
51 | 5/1979. (III. 31.) NIM rendelet az atomerőmű biztonságtechnikai kérdéseiről, Section 24.
52 | An intermediary position was filled in by the „Állami Indító és Ellenőrző Átvételi Bizottság (AIB)" which was not a licensing authority but looked at crucial points of safety before the actual licensing steps. See: Szabó 2004, 567–585.
53 | 1983 Állami energetikai és energiabiztonságtechnikai felügyele, Paksi Atomerőmű I. blokk meghatározottt időtartamra szóló üzemeltetési engedélye
54 | OAH, HA5601 határozat, Parksi Atmerőmű 1. blokkjának a tervezett üzemidő lejártát követő további működése tárgyában
55 | See more: Hartvig et al. 2024,

further extending the operational lifespan of Paks I appears not only rational but also prudent. Although the Hungarian Parliament passed a resolution in 2022 in support of such a course,[56] the ultimate decision lies with the competent regulatory authority.

3. Regulatory authority

As evidenced by the foregoing analysis, regulatory functions in the sector in Hungary were initially distributed among various ministerial bodies. Nonetheless, authorities with sector-specific mandates—albeit with primarily advisory roles—have existed since the inception of nuclear energy in the country. Notably, the National Atomic Energy Commission was established in 1955[57] to oversee matters regarding the peaceful utilisation of nuclear energy. Over time, its remit steadily expanded. The implementing decree of the 1980 Atomic Act only prescribed that the safety requirements for the use of atomic energy have to be developed by the relevant minister in agreement with the Commission's president.[58] However, a significant shift occurred following the political transition, embodied in Government decree 104/1990.[59] In its philosophy, this instrument entailed a departure from this centralised approach by entrusting the authority with regulatory functions which was not directly involved in promoting the use of nuclear energy. The Commission itself was composed of a president appointed by the Prime Minister and other members appointed by respective ministers, thereby theoretically retaining a degree of political influence. In order to empower the Commission to exercise its new public administrative mandate, the Hungarian Atomic Energy Authority (HAEA) was established under the management of the Commission's president.[60]

Subsequently, the 1996 Atomic Energy Act led to the reregulation of both the Commission and the Authority in 1997.[61] This reform enhanced the authority's independence—an evolution that was no mere coincidence, as Hungary had acceded to the Convention on Nuclear Safety earlier that year, thereby assuming the obligation to ensure an effective separation[62] between the regulatory body and entities engaged in the promotion or utilisation of nuclear energy.[63]

56 | 56/2022. (XII. 8.) OGY határozat
57 | 4621/XII.15/1955 MT határozat az országos atomenergia bizottság létrhozásáról
58 | 12/1980. (IV. 5.) MT rendelet az atomenergiáról szóló 1980. évi I. számú törvény végrehajtásáról, Section 5.
59 | 104/1990. (XII. 15.) Korm. rendelet az Országos Atomenergia Bizottság, valamint az Országos Atomenergia Hivatal feladatáról és hatásköréről
60 | Kádár & Majoros 2024, 690.
61 | 87/1997. (V. 28.) Korm. rendelet az Országos Atomenergia Bizottság feladatáról, hatásköréről, valamint az országos Atomenergia Hivatal feladat- és hatásköréről, bírságolási jogköréről
62 | See more: MacKenzie 2010, 50., Burns et al. 2022, 190–191., Stoiber et al. 2003, 27–28., Sexton 2015, 39–41., Michel 2021, 14–16.
63 | Convention on Nuclear Safety 1994, Section 7–8.

In anticipation of accession to the European Union, Hungary further strengthened the independence of its regulatory framework in 2003 by removing the Commission[64] from its supervisory position over the HAEA.[65] The competences and tasks of the authority were accordingly revised,[66] ensuring that it could neither be instructed in the exercise of its regulatory functions, nor have its decisions altered by any superior administrative power.[67] This then newly adopted independent decision-making power was a crucial step in ensuring effective regulatory autonomy.[68]

In 2004, Hungary acceded to both the European Union and the Euratom Community. Within the latter framework, significant strides were made in bolstering the independence of the regulatory authorities particularly following the adoption of the 2014 revised Nuclear Safety Directive,[69] which incorporated the lessons drawn from the stress tests[70] conducted after the Fukushima Daiichi accident.[71] Reflecting the directive's commitments to strengthening the independence of regulators from undue governmental influence,[72] the final major structural reform took place regarding the HAEA in 2021.[73] Under this reform, the HAEA was restructured from a central governmental agency into an independent regulatory body. Since 2022, the HAEA has operated in this format, reporting directly to the National Assembly,[74] and its president has been vested with decree-making authority.[75] This structure of the regulatory organ compared to other national structures entails a level of autonomy which goes beyond the generally accepted measures of ensuring effective independence.[76] Regulatory independence, though often invoked to prevent interference from pro-nuclear interests, is equally vital—if not more so during a time of nuclear renaissance—in safeguarding against undue influence from unfounded anti-nuclear agendas. By reporting to the National Assembly and provided with the authority to effectively regulate in the sector, the regulator gained stability, ensuring its decisions are driven by expertise rather

64 | 2003. évi XLII. törvény a földgázellárásról

65 | OAH 2006, 33. Nevertheless, under the Act on Atomic Energy the HAEA was still to be supervised by a minister. This, in practice, was the Minister of Interior and the authority's budget was included in the budget of the ministry.

66 | 114/2003. (VII. 29.) Korm. rendelet az Országos Atomenergia hivatal feladatáról, hatásköréről és bírságolási jogköréről, valamint az Atomenergia Koordinációs Tanács tevékenységéről

67 | OAH 2006, 33.

68 | OECD NEA 2014, 14–15.

69 | Council Directive 2014/87/Euratom,

70 | Aradszki & Borsos 2024, 331. The stress test did not reveal significant shortcomings in the case of the Paks plant.

71 | See more: Burns 2012,

72 | Florea 2022, 75.

73 | 2021. évi CXIV. törvény az atomenergia-felügyeleti szerv jogállásával összefüggésben egyes törvények módosításáról

74 | Fundamental Law of Hungary, Art. 23.

75 | Ibid. art T.

76 | Cook 2022, 115.

than shifting political oscillations on nuclear. This sense of stability and impartiality also strengthens the credibility of the authority's decisions. Financial autonomy constitutes a cornerstone of effective regulatory independence, for without adequate and independent financial provision, the Authority would be unable to discharge its statutory functions with efficacy. The HAEA's finances are managed as a separate chapter within the central finances of the National Assembly. This arrangement ensures that any changes to its budget may only be approved by the National Assembly itself,[77] thereby insulating the Authority from executive influence and securing its fiscal independence from the Government. In addition to this appropriated budgetary support, the HAEA is endowed with supplementary revenue streams derived directly from the exercise of its regulatory functions.[78] These include annual regulatory fees remitted by licensees,[79] charges levied for the conduct of licensing procedures,[80] and fines imposed by them.

The institutional architecture of nuclear regulatory bodies exhibits considerable variation across jurisdictions,[81] but in practice, there are two predominant models. The first is a commission-based structure, such as the US Nuclear Regulatory Commission, wherein regulatory authority is vested in a collegiate body. The second model vests regulatory powers in a singular executive authority—typically a director or president—who acts as the head of the regulatory institution. The HAEA adheres to this latter model, being headed by a president appointed by the Prime Minister for nine years.[82]

As is the case in other jurisdictions, the principal mandate of the authority is to ensure the safe and secure utilisation of nuclear energy and of nuclear and radioactive materials, while simultaneously safeguarding against the proliferation of nuclear weapons.[83] In pursuit of these overarching objectives, the functions of nuclear regulatory authorities customarily cover three core domains: licensing, inspection and enforcement. Licensing involves evaluating whether an activity complies with the regulatory requirements prior to the granting of authorisation. Once a licence has been issued, inspections are conducted to ascertain continued compliance with those requirements. Where non-compliance is detected, enforcement measures are employed to compel a return to conformity with the regulatory framework.[84]

In light of the constraints of brevity, the present discussion shall be confined to the regulator's new nuclear power plant licensing functions. In accordance with the internationally recognised permission principle, the licensing of nuclear

77 | 1996. évi CXVI. törvény az atomenergiáról, art. 6(6).
78 | Kádár & Majoros 2024, 690–691.
79 | 1996. évi CXVI. törvény az atomenergiáról, Section 19.
80 | Ibid. Section 8(1c).
81 | Burns et al. 2022, 169.
82 | 1996. évi CXVI. törvény az atomenergiáról, Section 6/A.
83 | Kádár & Majoros 2024, 692.
84 | This task is enshrined in the CNS, the JC and the Nuclear Safety Directive.

power plants follows a cradle-to-grave approach, covering every lifecycle stage of the plant. The major installation-level licences for new nuclear power plants in Hungary are the site, implementation, commissioning, and operation licences. At each of these stages, the foremost priority of the regulator revolves around nuclear safety. While the authority evaluates the licence application and grants authorisations accordingly, such approval does not absolve the licensee of its primary duty to ensure nuclear safety. The grant of a licence does not in any way attenuate the enduring applicability of the responsibility principle.[85] The procedural regime governing these licensing activities is grounded in the General Administrative Procedural Code,[86] which functions as *lex generalis*. Nevertheless, owing to the sector's technical and legal particularities, the Act on Atomic Energy introduces special provisions serving as *lex specialis*. These tailored procedural rules, which will be considered in greater detail in the subsequent section, reflect the distinctive regulatory demands of the nuclear field.

The language employed in the documentation pertaining to the licensed design constitutes a matter of critical importance, especially for countries which do not have indigenous nuclear technology. Variations in technical terminology, coupled with the inherent difficulties of translation, may present significant hurdles during the licensing procedures. To address this, the Act on Nuclear Energy[87]—distinctly diverging from the General Administrative Procedural Code—permits the submission of technical documentation in the English language for procedures involving the nuclear safety of nuclear installations. While this approach could be quite beneficial in mitigating translation-related challenges, its practical utility remains questionable in instances where the technology originates from a non-English-speaking country.

A further point of divergence lies in the limited concept of the party to public administrative proceedings, more commonly known in the Hungarian legal terminology as "client" within the context of licensing procedures for new nuclear power plants. Under the prevailing domestic framework, this designation is limited to the licensee,[88] individuals whose property lies within the affected zone, and those whose rights are recorded in the land registry.[89] Such a formulation is markedly more restrictive than that found in the model provisions of the International Atomic Energy Agency (IAEA), which adopt a broader interpretation encompassing 'other persons substantially impacted.'[90]

Another salient distinction is that, unlike in general administrative procedures, summary and automatic decision-making procedures are expressly

85 | Responsibility principle enshrines the primary responsibility of the operator.
86 | 2016. évi CL. törvény az általános közigazgatási rendtartásról
87 | 1996. évi CXVI. törvény az atomenergiáról, Section 11/A(3a)
88 | Defined as a 'user of nuclear energy who carries out an activity subject to a licence.'
89 | Kádár & Majoros 2024, 703.
90 | Stoiber et al. 2010, 45.

precluded due to the complexities and risks associated with the field. However, recent amendments to the Atomic Energy Act have introduced simplified licensing procedures during the implementation stage, specifically for systems and components deemed to pose lower risk. These new procedural avenues—namely the 'notification acknowledgment' and the 'derogation notification acknowledgment'[91] mechanisms—seek to alleviate regulatory burdens by obviating the need to duplicate licensing efforts at the manufacturing or procurement stages. Historically, such components were subject to repeated evaluations up until the commissioning or operational phase of the plant, placing a significant burden upon the regulatory authority without yielding commensurate gains in nuclear safety.[92] The notification acknowledgment procedure enables the authority, through providing information, to review a component before its manufacture commences. The process is subject to a strict 15-day timeframe, during which no possibility for a deficiency clearance may be undertaken, and it may result in one of five determinations: the authority may acknowledge the notification; decline it; impose conditions for acknowledgment; set hold-back and inspection points; or combine conditional acknowledgment with such hold-back and inspection points.[93] In practice, this new procedural construct is designed to provide the regulator with timely insight at an early stage, without the lengthy initial licensing procedure, while recognising that the relevant components will eventually undergo formal licensing during the commissioning and operation licensing stages.[94] Accordingly, the integrity of the permission principle remains intact. This amendment is based on the HAEA's new supervisory concept program, which also expanded the role of authorised inspection organisations which are independent form the authority and the licensee and assigned responsibility for their registry to the HAEA. The participation of these authorized inspection organizations in verification of conformity are either prescribed under law or they can also be involved by the licensee and or with the consent by the licensee by the vendor, moreover their verifications may be accepted by the authority without further review.[95] These organizations are also involved in the 'notification acknowledgment' procedures, either when required by law for certain components, when engaged by the licensee, or when the authority mandates inspection and hold points as part of the procedure, in such cases, the activity may only proceed after approval by the authorised inspection organization.

The final procedural divergence – highlighted here – embedded within the Atomic Energy Act relates to the temporal dimension of regulatory proceedings. This deviation is not without justification, as the procedures in question

91 | 1996. évi CXVI. törvény az atomenergiáról, Section 15
92 | Kádár & Majoros 2024, 710.
93 | 1996. évi CXVI. törvény az atomenergiáról, Section 15
94 | Kádár & Majoros 2024, 711.
95 | 1/2022. (IV. 29.) OAH rendelet a nukleáris létesítmények nukleáris biztonsági követelményeiről és az ezzel összefüggő hatósági tevékenységről, Section 29/A.

necessitate the submission of voluminous technical documentation, which must undergo comprehensive scrutiny prior to the issuance of any licensing decision. The precise duration of these procedures shall be considered in connection with the individual licences in a subsequent section. Interestingly, despite the explicit procedural timeframes prescribed within the Act, there exist no tailored provisions addressing instances in which the HAEA fails to meet the procedural deadlines. Consequently, the general administrative procedural rules apply. Pursuant to these general provisions, where an authority exceeds the procedural deadline, it becomes liable to pay the client a due fee, in case there is no such fee, 10,000 forints (approximately 25 EUR) has to be paid.[96] The standard fee in administrative procedures is 3,000 forints (less than 8 EUR),[97] a sum wholly negligible when juxtaposed with the enormous cost of a nuclear project where delays can lead to extra costs in the millions of euros. While it is self-evident that the authority must not be unduly hastened at the expense of nuclear safety—which must at all times remain paramount—this framework offers minimal incentive for the authority to adhere rigorously to procedural deadlines.

The final procedural element warranting clarification regarding the procedures of the authority concerns the scope of legal remedies. In this regard, the Atomic Energy Act includes special provisions: decisions rendered of the HAEA may be challenged only through administrative proceedings by those parties formally recognised as clients, there exists no right of administrative appeal against such decisions.

4. The legislative framework governing the nuclear sector

At the constitutional level, there exist no provisions that make explicit reference to nuclear energy. However, naturally certain provisions, particularly those related to fundamental rights, remain inherently relevant from a nuclear perspective. These rights have been invoked in past legal challenges[98] and may well re-emerge in future proceedings, particularly amid a prospective nuclear renaissance.

As previously mentioned, the first Act in the sector was adopted in 1980. This statute marked a significant milestone in the evolution of Hungary's nuclear legal architecture. Despite its limited scope —confined to the safe use of nuclear energy and liability issues—it was considered, for its time, a forward-looking and progressive piece of legislation.[99] Despite efforts after the regime change to update the legislation in line with international developments and address existing lacunae,[100]

96 | 2016. évi CL. törvény az általános közigazgatási rendtartásról, Section 51.
97 | 1990. évi XCIII. törvény az illetékről, Section 29.
98 | See more on the fundamental right aspects of nuclear energy in Hungary: Kocsis 2016, 137–156.
99 | Lamm 1997, 160.
100 | Lamm 1997, 162.

it became evident that a new Act was required—one that would comprehensively reflect Hungary's international obligations. Owing to a confluence of factors,[101] this legislative renewal did not materialise until 1996.

Hungary follows a *single nuclear law* model, whereby a single Act governs several areas, including liability, safeguards, and security. This stands in contrast to the *separate-law* model, where these areas would be addressed individually.[102] As a result the Act is a comprehensive and wide-ranging piece of legislation, albeit one whose treatment of individual subject areas varies considerably in depth and detail.[103] Article 1 of the Act delineates its scope, stating that it governs the peaceful use of nuclear energy, the attendant rights and obligations, as well as the protection of both the public and the environment from the hazards posed by ionising radiation, whether of natural or artificial origin.

From the perspective of the licensing, the Act sets out the overarching framework rather than the detailed provisions. Chapter III of the Act enumerates the principal installation-level licences which must be secured prior to a new nuclear power plant commencing power generation. These are as follows::

- a site inspection licence,
- a site assessment licence,
- an implementation licence,
- a commissioning licence, and
- an operation licence.[104]

In addition to these nuclear-safety related licences issued by the HAEA, the Act also requires the preliminary consent of the National Assembly for preliminary works on a new plant.[105] It further references other requisite licences, such as those issued by the Hungarian Energy and Public Utility Regulatory Authority.[106] Although the Act contains only limited provisions on licensing, it grants the president of the authority to develop detailed rules governing licensing.[107]

Consequently, based on the mandate conferred by the Act, the HAEA adopted a decree setting forth the nuclear safety requirements applicable to nuclear installations and the related regulatory activities.[108] This decree is structured in two principal parts, the first of which comprises a relatively concise general part. This portion lays down provisions of general applicability to nuclear installations, among them the basics of licensing.

101 | Ibid. such as the negotiations on the revision of the Vienna Convention.
102 | Cook 2022, 108.
103 | See more on the areas covered by the act: Kocsi Fekácsné 2020, 202–229.
104 | Ibid. Section 17.
105 | Ibid. Section 7.
106 | Ibid. Section 33.
107 | Ibid. Section 68(12).
108 | 1/2022. (IV. 29.) OAH rendelet a nukleáris létesítmények nukleáris biztonsági követelményeiről és az ezzel összefüggő hatósági tevékenységről

More importantly, however, the decree also has ten annexes, collectively designated as the 'nuclear safety rules,' which contain the detailed mandatory provisions on licensing. Initially these rules, annexed to Decree No. 5/1979 NIM of the Ministry of Industry, were referred to as 'nuclear power plant safety regulations,' At that time, the rules applied exclusively to nuclear power plants and were predominantly grounded in Soviet regulatory models.[109] The term 'nuclear safety rules' was subsequently introduced[110] in the wake of the adoption of the new Act on atomic energy, reflecting a marked philosophical shift. No longer based on Soviet precedents, these rules began to align with the standards promulgated by the IAEA.[111] New government decrees on which the 'nuclear safety rules' were based were adopted in 2005[112] and 2011,[113] in this latter iteration, the current ten-annex structure of nuclear safety rules was established. Following a structural reorganisation of the regulatory authority, which provided it with legislative power in the sector, provisions had hitherto been issued as government decrees were reissued in the form of HAEA decrees such as Decree 1/2022. HAEA, which now contains the 'nuclear safety rules.' However, one notable shortcoming of this reissuance arises from its lower position in the hierarchy of legal norms, Unlike its predecessor in the hierarchy of legal norms, an HAEA decree cannot be contrary to Government, prime ministerial, and ministerial decrees, or those of the president of the Hungarian National Bank either. Although the issuance of the decree by the sector's most technically competent authority enhances its regulatory credibility, this demotion in the legal hierarchy from the level of government decrees arguably undermines the overall effectiveness of this structural change.

The requirements contained in the nuclear safety rules are reviewed every five years, designed to ensure their alignment with the most recent national and international developments, including those emanating from relevant international organisations.[114] This revision process is rooted in international obligations and to some extent it mirrors the peer-reviews conducted under the Convention on Nuclear Safety (CNS), the Joint Convention (JC), and the Nuclear Safety Directive. Since other countries also follow similar procedures, incorporating the recommendations of international organisations, this practice contributes to a certain degree of regulatory harmonisation.

The system of nuclear safety rules constitutes a notably intricate regulatory framework. Certain annexes are drafted with broad applicability, extending to a

109 | Tóth 2024, 147.
110 | 87/1997. (V.28.) Korm. rendelet az Országos Atomenergia Bizottság feladatáról, hatásköréről valamint az országos Atomenergia Hivatal feladat- és hatásköréről, bírságolási jogköréről
111 | Tóth 2024, 148.
112 | 89/2005. (V.5.) Korm. rendelet a nukleáris létesítmények nukleáris biztonsági követelményeiről és az ezzel összefüggő hatósági tevékenységről
113 | 118/2011. (VII. 11.) Korm. rendelet a nukleáris létesítmények nukleáris biztonsági követelményeiről és az ezzel összefüggő hatósági tevékenységről
114 | Kádár & Majoros 2024, 703.

range of nuclear facilities—including nuclear power plants, research reactors, and storage facilities—while others are specific to particular types of installations. From the perspective of licensing new nuclear power plants, the most pertinent annexes are the following: NSR-7, which covers the site inspection and assessment, NSR-3a, that regulates the design requirements of new power plant units, and NSR-9, which regulates the requirements applicable during the design and implementation stages.

The final set of instruments to be considered within the framework of nuclear licensing are the guidelines issued by the HAEA. These guidelines outline methods for complying with the requirements contained in the 'nuclear safety rules.' While these methods in the guidelines are not binding on the applicant, following them has significant practical implications. Where an applicant chooses to follow the methods in the guidelines, to demonstrate compliance with the 'nuclear safety rules' then the authority is naturally not going to evaluate the adequacy of the method,[115] as it was recommended by them. However, since the guidelines are not mandatory, applicants may opt for alternative methods, but in this case, the authority will extensively evaluate the correctness, appropriateness and completeness of the alternative method,[116] which evaluation has to be financed by the licensee.[117] In this regard, guidelines offer a useful degree of flexibility within the licensing system—particularly in respect of the assessment and integration of advanced technologies. However, this flexibility comes at a price: deviation from the established guidance may lead to protracted procedures and increased financial burden, rendering the guidelines a double-edged sword in regulatory practice. It is also noteworthy that the guidelines are subject to regular revision. In addition to periodic reviews, licensees may also initiate requests for updates.

5. Licensing stages of New Build Nuclear Power Plants

Licensing a nuclear power plant constitutes a procedure of exceptional complexity. In Hungary a new nuclear power plant requires several thousands of licences before the facility may lawfully commence operations.[118] Given the sheer number of licences, it is neither practicable nor meaningful to enumerate—let alone analyse—each one in detail. Therefore, the ensuing sections shall be confined to the discussion of the installation-level nuclear safety[119] licensing stages of new

115 | 1/2022 (IV. 29.) OAH rendelet a nukleáris létesítmények nukleáris biztonsági követelményeiről és az ezzel összefüggő hatósági tevékenységről
116 | Ibid. Section 3.
117 | Aradszki & Borsos 2024, 344.
118 | In the case of Paks II. it will be around 7000-8000 licences until the operation of the plant can begin. A large number of these licences are manufacturing, construction and installation licences.
119 | Naturally, there are not only safety-related licences issued by the authority, but also physical protection of the plant, dose limits, etc.

nuclear power plants, as administered by the HAEA. This will be supplemented, where relevant, by reference to other key licences which, though issued by other authorities other than the HAEA, exert a material influence on the trajectory of the nuclear safety licensing. Practical insights from the Paks II project will be interwoven where appropriate.

As is the case with national nuclear legal frameworks more broadly, the architecture of nuclear safety licensing systems varies across jurisdictions. Some states adopt a single-step licensing model whereby a unified licence encompasses the siting, construction and initial operation of the plant. Others opt for a segmented or staggered regulatory approach, issuing distinct licences at each significant stage of the project's progression. Hungary falls in the latter category requiring individual licences corresponding to each critical milestone in the development of the plant. Although no universally applicable model can be prescribed, the IAEA generally supports the staggered approach to licensing, recognising that it affords enhanced regulatory oversight and enables the competent authority to engage in a continuous evaluative process.[120] Nevertheless, proponents of the single-step model argue that the holistic assessment of all relevant factors within a consolidated procedure permits a more integrated and potentially better-informed regulatory determination.

5.1. Decision in principle or justification stage

The prerequisite to any other licensing step in the deployment of a nuclear power plant is the justification stage. While not, in the strict sense, a licensing phase, justification is more akin to a policy decision on the given country embarking on the deployment of a nuclear power plant, as such, it is heavily influenced by the current political climate.[121] Within the legal order of the European Community, the justification stage is prescribed by the Basic Safety Standards Directive (BSS Directive), requiring that nuclear practices shall be justified; that is, they may only proceed where it can be demonstrated that the benefits to individuals and society outweigh the potential health detriments arising from ionising radiation.[122] Given that such a balancing exercise involves socio-political, economic, and ethical considerations, it falls beyond the remit of the regulatory authority.[123] Regulatory bodies must maintain strict neutrality towards nuclear energy: they are neither to advocate for its deployment nor to oppose it.

In Hungary, the requirement for justification is codified under Section 7 of Act CXVI of 1996 on Atomic Energy ("the Atomic Energy Act"), which requires that the National Assembly provide preliminary consent before any further licensing may

120 | IAEA 2023, 27–28.
121 | Cook 2022, 193.
122 | Council Directive 2013/59 Euratom, Article 5.
123 | Engstedt 2020, 89.

be undertaken. While this preliminary consent from the perspective of State-led projects is largely procedural, it carries more significance for private projects, which are imaginable in the case of SMRs such as those proposed for industrial applications. In such cases, the evaluation of the potential benefits and harms can lead to conflicts between the private entities involved and the state.

In case of the Paks II project, the preliminary consent for the project was given with an overwhelming majority of the Parliament pursuant to Parliamentary Resolution 25/2009 (IV. 2.) OGY, a concise and unelaborate decision endorsing the initiative. The resolution was grounded in the findings of the 2007 Teller project,[124] which assessed the feasibility of establishing a new nuclear power plant in Hungary. Interestingly, the documentation underpinning this project was not readily available to the public, although it concerned the spending of thousands of billions of forints in public funds. This lack of transparency prompted litigation under the Act on the Right of Access to Data of Public Interest, ultimately compelling the release of the underlying documents.[125] The foundations of this policy decision[126] did not escape scrutiny. The Parliamentary Commissioner for Future Generations voiced criticism, asserting that the justification had not been supported by a sufficiently robust evaluation of the necessity of constructing an additional nuclear power plant in Hungary.[127]

Following the National Assembly's consent, preliminary work on the Paks II project was commenced. In 2012, MVM Magyar Villamos Művek Zrt. (MVM Hungarian Electricity Works Private Company Limited by Shares)—a state-owned company also owner of the Paks I plant—established the MVM Paks II. Atomerőmű Fejlesztő Zártkörűen Működő Részvénytársaság (MVM Paks II Nuclear Power Plant Development Private Company Limited by Shares). Later that same year, the project was deemed a priority investment for national economy and crucial to our energy security.[128]

5.1.1. Convention between the Government of Hungary and Government of the Russian Federation

A further pivotal step in the advancement of the Paks II project was the promulgation of the intergovernmental Convention between the governments of Hungary and the Russian Federation on the cooperation in the peaceful uses of nuclear energy, enacted into Hungarian law as Act II of 2014. This convention set forth that the parties would cooperate in deploying two new reactor units at the

124 | After the decision in principle in 2009 the Project was renamed Lévai-project.
125 | Tolna Megyei Bíróság 13.Gf.40.024/2011/4. számú ítélete
126 | See more: Kocsis 2016, 230–231.
127 | Parliamentary Commissioner for Future Generations JNO-128/2010. számú állásfoglalása.
128 | 1194/2012. (VI. 18.) Korm. határozat a Paksi Atomerőmű telephelyén létesülő új atomerőművi blokkal (blokkokkal) kapcsolatos további feladatok meghatározásáról

Paks site, each with minimum electrical output of 1,000 MW; however, the precise reactor type to be deployed was not defined within the instrument.[129] Additionally, the convention provided that the Russian Federation would supply nuclear fuel to the new units for a period of 20 years, with a provision allowing for an extension of this arrangement. This 20 year fuel supply was ultimately modified to ten years due to diversification reasons following the procedure of the Euratom Supply Agency. Furthermore, the Convention stipulated as an option that spent nuclear fuel could be transported back to the territory of the Russian Federation for reprocessing.

The Convention prompted significant public and legal controversy. In 2014, the political party 'Együtt' initiated a referendum initiative posing the question: 'Do you agree that no new nuclear power plant units should be built in Hungary with the help of a public deficit-increasing loan?'[130] This initiative was rejected by the National Election Office, which based its decision on the Fundamental Law of Hungary, which precludes national referenda on obligations arising from international treaties.[131] In the Office's view, Article 1 of the Convention established such an international obligation.[132] The proponents of the referendum challenged this decision by lodging an application for review to the Curia (Supreme Court of Hungary), arguing that Article 1 did not impose a specific obligation on a project. The Curia, however, dismissed this contention, affirming the National Election Office's interpretation.[133] Dissatisfied with the ruling the proponents of the initiative filed a constitutional complaint with the Constitutional Court, which complaint was ultimately dismissed on the grounds that it did not raise any constitutional law issue of fundamental importance.[134] The decision to bar the referendum provoked criticism. Detractors argued that the Curia interpreted the commitment to cooperate in Article 1—and the Convention in its entirety—with undue breadth. The Court, they contended, improperly inferred the existence of a public deficit-increasing loan arrangement from the Convention, despite the absence of any explicit reference thereto in the text. At the time the Curia rendered its decision, no loan agreement enshrining such a financial arrangement had yet been concluded. On this view, the Convention should have been construed more narrowly, with careful scrutiny of whether it actually contained a commitment directly corresponding to the subject of the proposed referendum.[135] Nevertheless, the Curia adopted a more substantive approach.[136] Although the Convention did not explicitly reference a public

129 | 2014. évi II. törvény a Magyarország Kormánya és az Oroszországi Föderáció Kormánya közötti nukleáris energia békés célú felhasználása terén folytatandó együttműködésről szóló Egyezmény kihirdetéséről art.Sections 5–6.
130 | See more: Csink 2014, 37–42.
131 | Fundamental Law of Hungary, Article 8(d).
132 | NVB 91/2014. indokolás II. pont
133 | Kúria Knk.IV.37.178/2014/3. határozata
134 | 3195/2014. (VII. 15.) AB végzés
135 | Csink 2014, 37–42.
136 | Ibid.

deficit-increasing loan, given the scale of the project, it is difficult to conceive of any other feasible arrangement. While the critique of the Curia's decision—namely, that it drew overly broad conclusions from the text of the Convention—is well reasoned, the countervailing view that, in a project of such profound and long-term significance to Hungary's energy portfolio and economic development, the final decision ought to lie with the electorate,[137] warrants closer scrutiny. The domain of nuclear energy is inherently technical, marked by a high degree of complexity and unpredictability, rendering it exceedingly difficult for the general public to form a fully informed judgment. Moreover, the ease with which emotionally charged, anti-nuclear arguments—often devoid of scientific rigour—may be disseminated and absorbed by public opinion results in an uneven playing field, where balanced discourse between opposing views is seldom achievable. Experiences from other countries, notably Germany, demonstrate that where nuclear-related decisions are driven purely by political rhetoric, untethered from scientific expertise, the outcomes may lead to grave disadvantages.

Subsequently, a loan agreement was concluded between the contracting parties and thereafter promulgated by the Hungarian Parliament in 2014.[138] The agreement set forth that the Russian Federation undertook to extend a loan facility of up to EUR 10 billion for the purpose of financing the design, construction and commissioning of the two nuclear units, covering 80% of the project total costs, with the remaining 20%, as well as any cost overruns, to be borne by Hungary.[139] The repayment of the loan is structured over a period of 21 years, to be discharged through biannual instalments. Repayment is scheduled to commence upon the commissioning of the units, but in any event no later than 15 March 2026.[140] The repayment terms are delineated into three successive periods: during the first 7 years, Hungary is to repay 25% of the used loan amount at an interest rate of 4.50%; in the second 7-year period, 35% of the used loan is to be repaid at an interest rate of 4.80%; and during the final 7 years, the remaining 40% of the used loan is to be repaid at an interest rate of 4.95%.[141] In the event of late payment, a default interest rate equal to 150% of the applicable contractual interest for the respective period shall be imposed. Furthermore, should any payment remain outstanding for a period exceeding 180 days, the Russian Federation has the right to demand immediate repayment of the entire principal loan amount with all accrued interest.

Concerning the loan agreement, it is worth apposite to briefly address the state aid considerations arising from the case. While a comprehensive legal analysis

137 | Ibid.

138 | 2014. évi XXIV. törvény az Oroszországi Föderáció Kormánya és Magyarország Kormánya között a Magyarország Kormányának a magyarországi atomerőmű építésének finanszírozásához nyújtandó állami hitel folyósításáról szóló megállapodás kihirdetéséről

139 | Ibid. Section 1.

140 | Ibid. Section 3.

141 | Ibid. Section 3–4.

of this subject would warrant its own article, the following outlines the essential points. In 2015, Hungary formally notified the European Commission of the Paks II project, expressing that in its view, the arrangement did not constitute a state aid measure. However, their reasoning was rejected by the Commission, which subsequently initiated a state aid investigation. In the final analysis, the Commission found that the aid was compatible with the internal market and approved the measure.[142] Interestingly, the Euratom Treaty contains no specific provisions on state aid, as such measures were originally deemed to align with the fundamental aims of the Treaty.[143] The question of how state aid rules under the Treaty on the Functioning of the European Union (TFEU) are to be applied within the nuclear sector was clarified Court of Justice of the European Union in Case C-594/18 P Austria v Commission, concerning the state aid measure provided to the Hinkley Point C nuclear power plant. The Court of Justice held in this case that the provisions of the TFEU apply in cases where the Euratom Treaty is silent. The Court further held that state aid rules are not inconsistent with the previously mentioned objectives of the Euratom Treaty and thus should be applied in the case of nuclear power plants.[144] Returning to the decision of the Commission, it was later challenged by Austria before the General Court, which dismissed the action.[145] However, Austria appealed this decision before the Court of Justice and as of 2025, the Advocate General, Laila Medina, has opined that the appeal ought to be upheld.

Owing to considerable delays in the implementation of the project—delays which now render the commencement of operations more probable to begin in the 2030s—the original loan repayment commencement date of 2026 proved untenable. Consequently, the parties proceeded to amend the loan agreement in 2021,[146] specifically revising the provisions governing the repayment schedule. Pursuant to this amendment, Hungary shall repay the loan over a period of sixteen years, commencing from the date of commissioning of the units, but no later than 2031. Essentially, this amendment postponed the first repayment date by five years, from 2026 to 2031, while simultaneously shortening the overall repayment period from 21 to 16 years. On the face of it, this adjustment does not seem to improve Hungary's position much. However, the underlying rationale is that it is more favourable to start the repayment when the plant is operational and generating revenue. That said, as of 2025, the presumption that the plant will indeed be operational by 2031 is itself increasingly uncertain. The instalments were also changed accordingly: under the amended terms, 10% of the utilised loan is to be repaid in the first two years at an interest rate of

142 | Commission Decision (EU) 2017/2112
143 | Södersten 2022, 811–812.
144 | Sikora 2020, 517–518.
145 | Case T-101/18 Austria v Commission
146 | 2021. évi LXXI. törvény a Magyarország Kormánya és az Oroszországi Föderáció Kormánya között a Magyarország Kormányának a magyarországi atomerőmű építésének finanszírozásához nyújtandó állami hitel folyósításáról szóló, 2014. március 28-án kelt megállapodás módosításáról szóló jegyzőkönyv kihirdetéséről

3.95%; 40% is to be repaid over the subsequent seven years at 4.50% interest; and the final 50% is to be repaid in the last seven years, at an interest rate of 4.80%.

Another additional pivotal development in the trajectory of the Paks II project was the 2015 resolution of the National Assembly, whereby legislation was enacted: an Act granting the Paks II project special status in view of its exceptional significance for the national economy.[147] Among its various provisions, the Act prescribed that documentation and contractual materials related to the project would be exempt from disclosure as data of public interest for a period of 30 years.[148] In effect, this legislative measure essentially rendered the whole documentation of the project inaccessible to the public. In 2016,[149] this stringent confidentiality regime was partially relaxed. The exemption was no longer applied wholesale to all documents, but rather limited to specific trade and technical information, the disclosure of which could either compromise national security interests or infringe intellectual property rights. Notwithstanding this legislative change, the contracts related to the project remained undisclosed. This impasse was ultimately broken in 2019, when the Budapest Regional Court of Appeal[150] rendered a landmark judgment obliging Paks to release the relevant information, including the Engineering, Procurement and Construction (EPC) contract—albeit with the caveat certain sections may lawfully remain redacted.

Regarding the contractual framework underpinning the project, a 'turnkey' Engineering, Procurement and Construction (EPC)[151] contract, drafted in English, was executed between the parties in 2014,[152] along with an equally important Operation and Maintenance Agreement and Fuel Supply Agreement. While a comprehensive analysis of these instruments lies beyond the scope of this discussion, certain pivotal elements warrant emphasis. Under the EPC contract, the Russian party, in its capacity as contractor, is obliged to deliver a turnkey nuclear power plant in compliance with the owner's requirements and applicable regulatory provisions. Conversely, Paks, as the owner, is responsible for making the site available to the contractor free of charge, ensuring its protection at its expense throughout the project, and supplying all pertinent information concerning the site. Of particular legal and practical import is the provision allocating responsibility for the licensing process: under the terms of the agreement, the contractor is designated as the party primarily responsible for securing the requisite licences, with the owner under a duty to render reasonable assistance. However, in practice, the

147 | 2015. évi VII. törvény a Paksi Atomerőmű kapacitásának fenntartásával kapcsolatos beruházásról, valamint az ezzel kapcsolatos egyes törvények módosításáról

148 | Ibid. Section 5.

149 | 2016. évi XIX. törvény a Paksi Atomerőmű kapacitásának fenntartásával kapcsolatos beruházásról, valamint az ezzel kapcsolatos egyes törvények módosításáról szóló 2015. évi VII. törvény módosításáról

150 | A Fővárosi Ítélőtábla Pf. 20775/2019/7. számú határozata

151 | See more: Frank & Fork 2022, 501.

152 | Paks II Engineering, Procurement and Construction (EPC) Contract

differences in the applied standards necessitated a more active role by the owner than mere assistance, who has effectively assumed a leading position in the licensing procedure. Since its original execution, the EPC contract has undergone six amendments, the majority of which pertain to adjustments in project deadlines.

5.2. Site licence

According to the guidance of the IAEA, the siting of a nuclear power plant is an activity for which generally no specific licence is required by national legislations, thus they do not refer to it as one particular licensing stage.[153] Instead, the IAEA foresees the licensing of the site as an integral component of the Preliminary Safety Analysis Report (PSAR),[154] which is to be prepared prior to the authorisation of the construction and is assessed by the regulatory authority in tandem with the evaluation of the plant's design during the construction licensing phase. This position should not, however, be understood as a negation of the importance of site selection. On the contrary, the IAEA has developed detailed practices for selecting an adequate site for a nuclear plant, although it refrains from subsuming these procedures under the rubric of a specific 'site licence'. Accordingly, the IAEA advocates a two-stage approach to site selection. The first stage entails a broad site evaluation process to identify possible locations for nuclear power plants, a task it recommends should be carried out by a ministry or national authority. The second stage involves the detailed evaluation and assessment of a specific proposed site, a responsibility placed upon the prospective licensee.[155]

In Hungary, a markedly different approach has been adopted in contrast to the methodology endorsed by the IAEA. A dedicated site licensing stage has been established as the first nuclear safety licence issued by the HAEA within the broader authorisation process for the construction of a new nuclear power plant. This site licensing process itself is further subdivided into two distinct stages. Proponents of the non-separate site licence approach claim that incorporating site evaluation into the construction licensing procedure—wherein it is considered alongside the key design parameters—yields a more informed and holistic regulatory decision. However, such an approach places greater pressure on the regulator. Conversely, the existence of a separate site licence approach distributes regulatory workload more evenly. While it is true that, at this preliminary juncture, the plant's design is not yet subject to a comprehensive evaluation, the licensee still has to assess the suitability of the proposed site in light of the envisaged design.

The first phase of site licensing in Hungary consists in the granting of the site inspection and assessment licence. As part of this licence, the license applicant

153 | IAEA 2015, 8.
154 | IAEA 2010, 52.
155 | Stoiber et al. 2010, 62–63.

presents the site inspection and assessment program, which sets forth the methods and theoretical consideration intended to be used in evaluating the site, together with a justification demonstrating the adequacy of such methods for the purposes of site assessment. The general rules of the site inspection and assessment licensing stage are contained in Annex I of the NSRs, while more detailed provisions specific to this process are contained in Annex VII, which is specifically dedicated to the site inspection and assessment procedure. Further guidance is provided by Regulatory Guideline 1.1, concerning the siting licence of nuclear installations. At this stage, the primary task of the regulatory authority is to determine whether these presented evaluation methods are adequate for evaluating a site or not. The licence application must include methodologies for evaluating a range of factors, including but not limited to: geotechnical hazards, meteorological conditions, seismic activity, external man-made hazards, floods, fire hazards and biological hazards, etc.[156] The objective of this preliminary stage is to enable the prospective licensee to obtain a decision early on whether the proposed methods are methodologically sound, sufficiently comprehensive, and appropriately tailored to cover all relevant aspects of site suitability.[157] Once these methods are endorsed and subsequently applied to a specific site, their suitability will not be subject to further challenge, thereby ensuring that the site assessment proceeds in a manner that is both effective and procedurally secure.[158]

Paks II, submitted its application for the site inspection and assessment licence in April 2014. Under the applicable regulatory framework, the HAEA was afforded a period of 120 days within which to evaluate the licence application, a period which also encompassed the conduct of a public hearing—an obligatory component of every installation level nuclear safety licence. During the evaluation, the HAEA sought the expert opinion of the 'Hungarian Office of Mining and Geology, Pécs Mining Department' which acted in the capacity of a specialised authority with regard to the geological dimensions of the proposed development. In November In November 2014, albeit beyond the statutory time limit, the HAEA issued the site inspection and assessment licence to Paks II, subject to the fulfilment of certain conditions.[159] From a procedural standpoint, it is noteworthy that at this junction in the licensing process, Paks II held the status not of a licensee, but merely that of an applicant. The legal transition from applicant to licensee occurs only upon obtaining this licence, thus during the procedure the applicant also has to prove that they are qualified to become a licensee.[160] The temporal validity of the site inspection and assessment licence extends until the authority issues the site licence, but may not in any event exceed a period of five years.

156 | NBSZ (NSR) 7.
157 | 1.1. számú útmutató, Nukleáris létesítmények telephely-engedélyezése, 9.
158 | OAH 2025, Telephely-értékelés
159 | OAH, HA5919 határozat, Telephely vizsgálati és értékelési engedély
160 | 1996. évi CXVI. törvény az atomenergiáról art. 17(7).

The second stage of the site licensing procedure involves obtaining the actual site licence. Unlike the site inspection and assessment licence, this phase does not have a dedicated NSR annex, as it is principally concerned with the practical application of the previously approved evaluation methodologies to a specific site. The same regulatory guidelines as those applicable to the inspection and assessment stage remain in force at this juncture. During this stage, the licensee is required to establish two principal assertions: firstly, that no disqualifying conditions exist which would render the proposed site unsuitable for the siting of a nuclear power plant; and secondly, that the site-specific data, obtained through the application of the previous methods, substantiate the future construction of the plant. The findings of the assessments and inspections are included in the final report document, which forms the core of the licence application.[161] This final report demonstrates that the evaluation follows the preapproved methods, and must clearly state whether the findings support a positive or negative determination as to the suitability of the site.[162] Should the licensee elect to employ alternative methods, the report must also provide a substantiated justification for their adequacy.

Paks II submitted its application for the site licence in October 2016, which was issued with some conditions in March 2017,[163] thus exceeding once more the prescribed 120-day evaluation period. The conditions attached to the licence were predominantly technical in nature rather than legal. However one noteworthy requirement imposed upon Paks II was the obligation to carry out an analysis examining the potential effects of site-related activities on the safety of the adjacent Paks I plant, and to submit this assessment prior to the commencement of any implementation works. This obligation aptly reflects a particularly distinctive and complicating feature of the project—namely, that it is situated in the immediate vicinity of an operational nuclear power station.

In 2021, the temporal scope of the site licence was extended, as the implementation licence had yet to be obtained, and the original five-year validity period was approaching its expiration. Under the Nuclear Safety Rules, an extension may be granted by the HAEA, provided the original licensing conditions remain satisfied. In accordance with this framework, the HAEA duly extended the site licence in 2022, prolonging its validity by a further five years.[164]

In the case of Paks II, this less conventional specific site licensing approach, presented notable challenges for the IAEA. The Agency had anticipated that the documentation of the site would be included in the Preliminary Safety Analysis Report (PSAR), customarily submitted during the implementation (construction) licensing stage. However, in the case of Paks II project, such extensive site documentation was absent from the PSAR, as it had already been submitted during

161 | 1.1. számú útmutató, Nukleáris létesítmények telephely-engedélyezése, 18.
162 | Ibid. 18.
163 | OAH, P2-HA0008 határozat, Telephelyengedély
164 | OAH, P2-HA0264 határozat, Telephelyengedély időbeli hatályának meghosszabbítása

the earlier phases of the site inspection and assessment, and the subsequent site licensing stages.[165]

5.3. Other licences affecting the course of implementation licensing procedure

As previously mentioned, obtaining the implementation licence is contingent upon the prior acquisition of additional authorisations issued by authorities other than the nuclear regulator. These ancillary licences occupy differing positions within the broader implementation licensing framework, yet they share the common feature of constituting prerequisites for the issuance of the implementation licence itself. This section shall address two such pivotal authorisations: firstly, the Authorisation in Principle for a Power Plant with Significant Impact on the Electricity System; and secondly, the Environmental Licence. Although both are expressly referenced in the Act on Atomic Energy, their substantive regulation is not contained therein but is instead governed by distinct pieces of legislation.

5.3.1. Preliminary licence issued by MEKH

The first of the requisite ancillary authorisations is the Authorisation in Principle for a Power Plant with a Significant Impact on the Electricity Grid, issued by the Hungarian Energy and Public Utility Regulatory Authority (MEKH). This licence, governed by the provisions of the Act on Electricity, is required in the case of plants exceeding 500 MW in capacity.[166] The purpose of this preliminary licence is to evaluate, at an early stage, the prospective integration of such a large-scale installation into the national electricity system, with particular regard to the availability of domestic reserves. This preliminary assessment is conducted prior to the commencement of other licensing procedures in which the authority would be limited to examining the formal adequacy of the application materials.[167] Additionally, this stage provides the possibility to the grid operator to identify what infrastructural upgrades might be needed to accommodate the projected output of the plant. By conducting this analysis at a preliminary stage, the legislation seeks to forestall a scenario in which grid infrastructure might prove inadequate at the time the plant enters into commercial operation. The Act on Electricity specifically mentions that for nuclear power plants, this licence may only be applied for after the decision-in-principle has been granted by the National Assembly. Furthermore, it stipulates that the implementation licensing procedure may not be initiated until the MEKH's authorisation-in-principle has been granted. In the case of the Paks II project, this authorisation was duly issued in 2017. This authorisation-in-principle is not the

165 | Katona 2024, 408–409.
166 | 2007. évi LXXXVI. törvény a villamos energiáról, Section 80/A
167 | 2007. évi LXXXVI. törvény indoklása a villamos energiáról

sole licence which has to be obtained under the Act on Electricity. The electrical implementation licensing procedure for power plants with a capacity exceeding 50 MW likewise applies to Paks II, and this licence was obtained in 2020.[168]

5.3.2. Environmental licence[169]

Although environmental licensing falls outside the ambit of the nuclear safety licensing regime, it nonetheless constitutes an indispensable element in the authorisation process of a new nuclear power plant, given the paramount importance of environmental protection in relation to such installations—a principle underscored by international instruments such as the Convention on Nuclear Safety (CNS).[170] In some countries, environmental licences are issued also by the nuclear regulatory authority itself, while in others this task is entrusted to a separate authority, which may not, in all cases, oversee the entire environmental licensing process.[171] The initial question in this context is whether the construction of a nuclear plant constitutes a 'use of the environment' within the meaning of Act LIII of 1995 on the General Rules of Environmental Protection. Unsurprisingly, the answer to this question is affirmative.[172] In Hungary, nuclear power plants—irrespective of their generating capacity—are required an integrated environmental licence, specifically an Environmental Impact Assessment (EIA) procedure.[173] This requirement is not only mandated under domestic law, but also constitutes an obligation under European Union law.[174] The Paks II project initiated preliminary consultations regarding the environmental licence in 2012, and by 2014, the Environmental Impact Assessment had been completed. This assessment addressed a wide range of potential environmental effects, including noise pollution, dust emissions, cooling water (thermal) discharges into the Danube, and the management of radioactive waste.[175] Public hearings were held in the course of the national EIA procedure, though no material objections were raised therein. In addition to the domestic EIA, a transboundary environmental impact assessment was also required under Hungary's obligations pursuant to the Espoo Convention. Accordingly, in 2015, a transboundary EIA procedure was launched, resulting in seven public hearings being conducted in participating states. This procedure was brought to a conclusion in 2016.[176] Subsequently, later that same year, the Baranya

168 | MEKH H 2413/2020 erőmű létesítésére vonatkozó engedély
169 | See more: Bujtás & Pécsi 2024, 511–555.
170 | Convention on Nuclear Safety 1994.
171 | Raetzke 2013, 69–70.
172 | Kocsis 2017, 79.
173 | 314/2005. (XII. 25.) Korm. rendelet a környezeti hatásvizsgálati és az egységes környezethasználati engedélyezési eljárásról
174 | Directive 2011/92/EU of the European Parliament and of the Council
175 | Kocsis 2017, 84.
176 | Baranya Megyei Kormányhivatal 78-140/2016 környezetvédelmi engedély 74

County Government Office issued the first-instance environmental licence to the plant.[177] However, this decision was swiftly challenged by environmental and anti-nuclear organisations. In 2017, the Pest County Government Office upheld the first instance decision.[178] Dissatisfied with the outcome, the same organisations sought judicial review of the licensing decision, but their challenge was ultimately dismissed by the courts.[179] The crucial nature of the environmental licensing process in relation to the nuclear safety licensing procedure lies in the fact that the implementation licence may not be issued in the absence of a valid the environmental licence. While the applicant is permitted to initiate the implementation licensing procedure prior to obtaining the environmental licence, the implementation licence itself cannot be granted until the latter has been secured.

Additionally, in the context of environmental licensing, a few remarks must be made concerning the licence extension of the Paks I nuclear power plant.[180] Although the necessity of conducting EIAs for the long-term operation of existing nuclear installations is a subject of ongoing debate—and regulatory practices across jurisdictions remain far from uniform[181]—Hungary, elected to conduct an EIA during the Paks I licence extension process. What is more, both the licensee and the Authority were of the opinion that a transboundary EIA is not needed for a licence extension.[182] However, due to significant international interest in the authorisation procedure, a transboundary environmental impact assessment was ultimately initiated, in accordance with the provisions of the Espoo Convention. Some commentators have characterised this particularly rigorous approach to environmental impact assessment as a form of retrospective rectification—a compensatory measure, as it were—for the absence of such procedures during the original licensing of the plant.[183] However, the rationale behind this approach is arguably more nuanced. On the one hand, at the level of the European Community, the first directive[184] mandating EIAs was only adopted in 1985, three years after the commissioning of the first unit of Paks I. Prior to that, environmental impact assessments were not yet a standard procedural requirement.[185] On the other hand, while a full-scale EIA procedure was not carried out initially, certain environmental aspects—such as the plant's impact on air and water quality—were nonetheless subject to scrutiny.[186]

As various legal scholars and practitioners have observed, environmental assessment procedures, though not themselves determinative of the fate of a

177 | Ibid.
178 | Pest Megyei Kormányhivatal PE-KTF/203-40/2017. határozat
179 | Kocsis 2019, 67.
180 | See more: Paulovics 2020, 360–375.
181 | Sexton Nick 2022, 22.
182 | Elter, Katona & Pécsi, 9.
183 | Emmerechts & Bourdon 2020, 11.
184 | Council Directive 85/337/EEC
185 | Bond & Wathern 1999, 234.
186 | 3296/19876. MT. határozat

nuclear project, are designed to ensure that authorisation decisions are made on the basis of the most complete and reliable information available.[187] This principle lies at the heart of all licensing regimes. Nevertheless, the influence of such procedures on public perception—and by extension, on the broader social acceptability of nuclear energy—ought not to be underestimated.

5.4. Implementation licence

In the licensing sequence, the stage following the granting of the implementation licence diverges from the approach applied to site licensing, in that subsequent licences have to be obtained separately for each reactor unit, rather than through a single licence for the whole plant as in the case of the site licensing procedure. The implementation licence thus serves as something of a transitional stage while the licensee may submit a unified application covering all proposed units, the regulatory authority is required to issue individual decisions for each reactor unit separately.

Hungarian legislation does not provide for a dedicated pre-licensing stage where a given reactor design may be granted generic approval in advance of plant-specific licensing. Nevertheless, given the relatively modest scale of Hungary's nuclear energy programme—and the correspondingly limited number of reactors that might realistically be deployed—this omission has not, to date, presented a major regulatory obstacle. That said, in the wake of a nuclear renaissance with SMRs, the introduction of such a design certification stage may warrant reconsideration in future regulatory reforms.

Nevertheless, while it does not constitute a formal pre-licensing phase, there exists an important preliminary stage which may materially influence the course of the implementation licensing procedure. This step is the submission of the Preliminary Safety Information (PSI), a document which serves a dual function: first, to demonstrate that the proposed plant complies with the safety requirements; and second, to provide the regulatory authority with adequate information at an early stage of the process. Within the PSI, the licensee is expected to evidence compliance with nuclear safety rules by presenting data from reactors similar to or identical to the one proposed. Although the submission of the PSI is not mandatory, it holds considerable practical relevance. In particular, its timely submission enables a reduction in the statutory timeframe for the implementation licensing procedure from eighteen months to twelve., However, the implementation licence application itself may only be lodged twelve months after the PSI has been submitted.

Turning to the implementation licence proper, it is by far the most comprehensive and extensive of all nuclear safety licences, as it includes the entire design of the plant. Notwithstanding its scope, the implementation licence does not in itself authorise the commencement of any physical construction works. Rather, it functions as

187 | Sexton Nick 2022, 23.

an 'umbrella licence' which permits obtaining individual licences for building,[188] manufacturing procurement, and installation works, collectively referred to as system and component nuclear safety licences. As such, the implementation licence, in its capacity as an 'umbrella licence' constitutes a detailed and authoritative confirmation that the overall design concept of the plant is sound and that the plant, as envisaged, may be operated safely on the chosen site. The regulatory framework governing the implementation licensing process is set out across three annexes to the Nuclear Safety Rules: NSR 1, governing the nuclear safety procedures of installations; NSR 3a, which sets out design requirements for new nuclear power plant units; and NSR. 9, which details the provisions governing the design and construction phase of new nuclear installations. These are complemented by their corresponding guidelines, which offer further elaboration and practical interpretation.

The central document in the implementation licensing process is the Preliminary Safety Analysis Report (PSAR), which substantiates the plant's compliance with all applicable regulatory requirements necessary for the plant's implementation. The content and structure of the PSAR is detailed in a separate guideline, which itself extends to over 200 pages.[189] Besides the core contents of the PSAR, a wide array of supplementary technical and supporting documentation must be submitted. For instance, while the PSAR contains the summaries of the deterministic and probabilistic safety analyses, their comprehensive versions are provided as separate attachments.[190] The PSAR can specify building works—though the scope of these is strictly limited—and long-lead manufacturing components in respect of which the building and manufacturing licences can be obtained before the implementation licence is issued, provided these are expressly approved in advance by the regulatory authority. This procedural flexibility was introduced by the legislature in recognition of the complexity and duration of the implementation licensing process, with the aim of enhancing project efficiency by allowing preparatory works on time-critical components to proceed. However, any risk arising from this approach—namely, that the implementation licence might ultimately not be issued—rests entirely with the licensee.[191]

Another key document in the licensing process is the Nuclear Accident Response Action Plan, which has to first be submitted at this stage, and then continuously revised, to ensure preparedness for radiological emergencies. Since the new Paks II plant is being built adjacent to the operational Paks I facility, these action plans have to be aligned with those already in place for the existing units.[192]

188 | See more: Kádár & Majoros 2024, 692. As of 2016 the HAEA also acts as a general building authority and building supervisory authority in the nuclear safety zone of the nuclear installations.
189 | N3a.34. sz. útmutató, Új atomerőművek biztonsági jelentései.
190 | N1.2. sz. útmutató, Új atomerőművi blokk létesítési engedélyezési dokumentációjának tartalmi és formai követelményei, 22.
191 | 1996. évi CXVI. törvény az atomenergiáról, Section 12(7).
192 | N1.2. sz. útmutató, 17.

In the case of the Paks II licensing process, the PSI was submitted in 2015, projecting the reduction of the implementation licensing process from 18 to 12 months. The formal implementation licence application, accompanied by very extensive documentation, was submitted in 2020. The PSAR alone comprised in excess of 37,000 pages, supplemented by a further 40,000 pages of technical documentation, with the authority subsequently requesting more than 200,000 pages of further documentation.[193] In parallel, the licensee used the opportunity to licence long-lead manufacturing components prior to the implementation licence being issued. Consequently, the manufacturing licenses of the core catchers were granted before[194] the issuance of the implementation licence, one of them has already arrived on.[195] The IAEA was also involved in evaluating the implementation license application. Their group of experts made some remarks; however, their overall opinion of the documentation was positive. The HAEA ultimately granted the implementation licences for both units in August 2022. However, the procedure, which ought to have been completed within twelve months by virtue of the PSI, extended to a full twenty-four months. Moreover, the licences were not granted unconditionally: the HAEA imposed a hold-point requiring the submission of a revised PSAR.[196] A revised version of the PSAR was submitted later that same year, followed by an extended period of iterative consultation between the licensee and the authority, This process culminated in the submission of the final version in 2024.[197] Although not formally mandated by law, the HAEA initiated a procedure to evaluate the removal of the hold-points, which subsequently led to the granting of an unconditional implementation licence.[198] Currently, this marks the latest stage in the Paks II licensing process in relation to installation-level authorisations. Meanwhile, system- and component-level licences are still being issued based on the implementation licence. As part of this ongoing process, the first concrete pouring—expected to occur in March 2025—is anticipated to formally designate the Paks II project as an active nuclear power plant construction under the criteria of the International Atomic Energy Agency.

5.5. Commissioning licence

The next installation-level nuclear safety licence to be obtained following the plant's construction is the commissioning licence. Unlike the previous licensing stages, no dedicated annex or standalone guideline has been issued specifically

193 | OAH 2025, Létesítési engedélyezés
194 | On 30 June 2022, which meant that in reality, the benefits of long-lead manufacturing licensing were not fully harnessed.
195 | Paks II. 2024
196 | OAH, P2-HA0375 határozat, Létesítési engedély
197 | OAH 2024
198 | OAH, P2-HA0696 határozat, Visszatartási pont feloldása

for this phase. However, it is addressed within the framework of NSR 1, beginning from Section 1.2.4.0100, as well as in the guideline concerning the Safety Analysis Report of New Nuclear Power Plants.

This licensing stage confirms that the plant was built according to the design intent, and that the as-built facility conforms with both the expectations of the regulatory authority and the applicable regulatory requirements.[199] The central document of the commissioning stage is the Preliminary Final Version of the Safety Analysis Report (SAR)—an updated and actualised version of the PSAR. This revised SAR must incorporate the details of the commissioning programme, including its various stages, the stakeholders involved, and updated technical data based on the completed construction of the facility.[200] The said commissioning program governs the initial start-up of the plant encompassing the systems checks, tests and the evaluation of these results.[201] The aim of this evaluation is to assess whether the plant is fit for commissioning in accordance with the relevant requirements. The subsequently performed commissioning is the confirmation of the correct functioning of the plant's systems. Once obtained, the commissioning licence allows the licensee to undertake the first fuel load into the reactor, execute the commissioning program in its entirety—including the active testing of systems—and, most significantly, proceed with the initial start-up and operation of the plant at nominal capacity.

Another critical document of the commissioning phase is the finalised version of the Nuclear Accident Response Action Plan, initially submitted during the implementation licensing stage. This plan has to be updated according to the commissioning process and submitted as part of the licence application prior to the arrival of the first nuclear fuel at the site.[202] The statutory duration of the commissioning licensing procedure is 11 months, and the licence is valid for 12 months. However, in view of the inherently time-consuming nature of the requisite testing and the staged nature of the initial operational activities, the authority is entrusted with discretion to extend the duration of the licence, provided that a well-founded justification is duly submitted.

5.6. Operation licence

While the commissioning licensing stage allows for test operation, it does not permit commercial operation; for that purpose, the operation licence must be obtained. This licence is sought on the basis of the operational insights gained during the commissioning phase, which serve to inform and substantiate the licence application. As with earlier stages, the central document of the operation licence application is the final iteration of the Safety Analysis Report (SAR). This

199 | 1/2022 (IV. 29.) OAH rendelet, Section 12(1).
200 | N3a.34. sz. útmutató, Új atomerőművek biztonsági jelentései, 150.
201 | Ibid. Section 145–149.
202 | N1.2. sz. útmutató, 19.

definitive version consolidates the findings and experiences accrued during the commissioning stage, elaborates on the changes that have occurred compared to the commissioning stage, and demonstrates that the safe operation of the plant is provided under it. The approach that the operation licence is based on the commissioning experiences aligns with the obligations under the Convention Nuclear Safety (CNS),[203] which prescribes that operation must be predicated on a prior commissioning program. In addition to the SAR, in order to obtain the licence, it is equally important to prove that the radioactive waste and spent fuel originating from the plant is going to be stored. This requirement entails providing evidence that such materials will be handled in accordance with the latest scientific knowledge and in compliance with internationally accepted standards—whether through final or interim storage solutions. Although the CNS does not explicitly prescribe such storage as a condition for licensing, it does require that due consideration be given to waste disposal as part of operational planning.[204] The statutory duration of the operation licensing procedure is eleven months, mirroring that of the commissioning licence., Upon completion of the review, should the authority determine that all criteria are met, the operation licence is granted. This licence entitles the licensee to operate the unit in accordance with the terms and conditions therein, for a defined operational period. This operational period is determined by the authority based on the specifications of the plant. Although it may vary from plant to plant, but it cannot exceed the reactor's operational lifespan. In essence, the operation licensing stage is the final step before commercial operation. It is during this phase that all documentation of the plant is brought to its final form, and the experiences of the commissioning stage are evaluated.

6. Deployment of Small Modular Reactors (SMRs) in Hungary

In this potential nuclear renaissance, many countries express a strong dedication towards SMRs, —a trend observable even within our region, as evidenced by initiatives in Romania or Poland. While Hungary's enduring interest in nuclear remains unequivocal, its approach to advanced nuclear technologies has, thus far, been comparatively measured.

Currently, Paks I operates under licences valid until the period 2032-2037, which coincides with the anticipated commissioning timeline of Paks II. However, the licences of Paks I, will most likely be renewed once more for another 10 or 20 years, resulting in a prolonged phase of simultaneous operation between the two plants. It is within this prospective overlap that Hungary must confront a pivotal strategic question—if nuclear power remains a cornerstone of national energy

203 | Convention on Nuclear Safety 1994, Section 19(I).
204 | Ibid. 19(VIII).

policy, should the country pursue the construction of a new large-scale nuclear facility, or instead transition to the deployment of SMRs as a means of replacing the ageing Paks I infrastructure? This question gains heightened significance in view of recent industrial developments across Hungary that will likely result in considerable increases in electricity demand. Notable examples include the BYD automotive factory in Szeged and the BMW production facility in Debrecen. In light of such decentralised industrial expansion, SMRs would seem like a reasonable option. This realisation has emerged across multiple levels. In 2023, the Minister of Energy, Csaba Lantos, expressed his belief that a third nuclear power plant is needed in Hungary, around 2029-2030, probably in the form of an SMR in proximity to regions exhibiting increased electricity consumption.[205] A similar position is reflected in the long-term planning of the Hungarian Electricity Works Company (MVM), whose Strategy 2035 envisions the possible deployment of a 300 MW SMR within Hungary as part of its broader energy diversification efforts.

SMRs pose a host of legal and regulatory challenges to the existing nuclear law frameworks.[206] Historically, the national nuclear licensing frameworks were developed with a view to accommodating conventional, large-scale nuclear power plants, and as such, they do not always accommodate the particularities of SMRs with ease or flexibility.[207] The case is similar in Hungary, where the nuclear licensing framework was tailored to accommodate conventional large nuclear power plants, more specifically pressurised water reactor (PWR) technologies.[208] The technological specificity embedded in the structure of the licensing system renders it fundamentally incompatible with alternative reactor types. Accordingly, SMRs employing boiling water reactor (BWR) or CANDU technologies cannot currently be licensed under the prevailing legal framework—still less those utilising advanced reactor technologies, such as high-temperature gas-cooled or molten salt reactors. Thus, under the current legal framework, only SMR designs based on PWR technology may be eligible for licensing, significantly constraining the diversity of viable options. In addition to technological limitations, the regulatory approach itself poses further obstacles. Broadly speaking, two principal models of regulatory oversight may be distinguished: the prescriptive-based and the performance-based approaches. The former provides the licensee with a detailed description on how to meet a given objective, while the latter sets a performance objective and then entrusts the licensee to meet this target in the way they deem it appropriate. Although prescriptive approaches have a lot of benefits from the perspective of SMRs, the detailed concrete characteristics contained in the legislation to which SMRs would have to adhere can be considered excessive in light

205 | Világgazdaság 2023
206 | See more on the challenges that SMRs pose to the international nuclear law framework: Van Kalleveen 2022, 4–13.
207 | Ramana, Berzak Hopkins & Glaser 2013, 556–557.
208 | Adroján & Rétfalvi 2022, 4.

of their smaller size and increased safety.[209] In contrast, a performance-based model—by setting safety goals without a mandated method to reach it—offers greater flexibility and is more conducive to the licensing of advanced and innovative reactor designs[210]. Hungarian nuclear regulation, as articulated in the Nuclear Safety Rules (NSRs), broadly aligns with a performance-based approach, albeit supplemented by some prescriptive elements.[211] These prescriptive provisions, typically contained in accompanying regulatory guidelines, do not per se preclude the licensing of SMRs; however, deviation from the prescribed methods invariably entails longer procedures and increased costs. Therefore, while the framework may not impose an outright barrier to SMR deployment, it does render the process more onerous for non-conventional designs. An additional barrier in the national legal frameworks in front of SMRs is the excessive emergency preparedness zones (EPZs) that reflect large-scale plants and have significant financial implications. The size of these and the associated cost with the maintenance of these zones combined with the fact that SMRs in given applications should be located nearby the end users, means that these traditional approaches are not adequate for SMRs.[212] Indeed, many SMR developers advocate for the reduction—or in certain cases, the complete removal—of EPZs, leveraging the reactors' enhanced safety profiles and passive safety features to justify a more flexible, goal-setting approach. In Hungary, we have a traditional large minimum 30 km EPZ, which could be burdensome for SMR designs planned to be deployed, it would be prudent to reassess the EPZ requirements, and consider adopting a more performance-based and proportionate framework, rather than maintaining fixed numerical thresholds.

Devising efficient and effective regulatory solutions for advanced technologies such as SMRs is an inherently complex undertaking. Regulatory authorities generally do not have experience with these plants from which they can draw conclusions, moreover even if they have the designs are so varied that a licensing solution appropriate for one reactor would not necessarily be readily applicable to another. Generally, these licensing solutions should take into consideration the specific features SMRs, the fact they seek to be standardised the increased safety features, their economics which is different from the economies underpinning large conventional nuclear power plants. In addressing these national regulatory constraints, international cooperation emerges as a crucial instrument. Such cooperations that may assume a wide array of forms—ranging from informal information-sharing networks among regulatory bodies, to more structured initiatives aimed at developing harmonised licensing frameworks.[213]

209 | Sam, Sainati, Hanson & Kay 2023, 4.
210 | Dandy 2020, 7–36.
211 | Móga 2019, 3.
212 | Sam, Sainati, Hanson & Kay 2023, 4.
213 | Olajos 2016, 367–396.

Hungary to this end, has actively pursued international cooperation across multiple levels. A notable example of this engagement is the strategic partnership established between Hungary and the United Kingdom, centred upon the industrial development of Small Modular Reactors. This partnership not only signals Hungary's general commitment to the advancement of SMR technologies, but also reflects a particular interest in the Rolls-Royce reactor design.[214] This dedication comes after the HAEA signed a Memorandum of Understanding with the United Kingdom's Office for Nuclear Regulation (ONR) in 2024, a key aspect of which focused on SMR[215] regulatory experience sharing, particularly in connection to the development of the Rolls-Royce technology. Although, at present, the most advanced regulatory discussions concern the Rolls-Royce design, this by no means implies a definitive commitment to its deployment in Hungary. In fact, the Hungarian Foreign Minister has recently expressed interest in alternative technologies, including that offered by Westinghouse.[216] In parallel, Hungary also participates in a number of multilateral initiatives concerning the deployment of SMRs under the auspices of IAEA, Euratom, and the EU. As of yet, however, no formal announcement has been made regarding potential legislative or regulatory amendments to accommodate SMR deployment, nor is it presently known what such amendments, if introduced, might entail.

7. Conclusions and *de lege ferenda* proposals in the context of a nuclear renaissance

Hungary's association with nuclear energy spans several decades and, for the foreseeable future, nuclear power will remain a cornerstone of our electricity generation portfolio. The domestic legal framework governing the peaceful use of nuclear energy has undergone a marked evolution—transforming from the early transpositions of Soviet-type regulations into a sophisticated modern regime aligned with binding international instruments and reflective of the soft law developments of international organisations. Since the inception of the Paks II project, significant progress has been achieved in refining this legislative framework, with various legal innovations introduced in response to the practical challenges encountered. One unequivocal conclusion emerges: the realisation of nuclear projects serves not only as a testbed for the operability of the regulatory framework but also as a catalyst for its evolution. This dynamic has been manifestly evident in the case of Hungary, where the implementation of the Paks II project has prompted numerous legislative amendments aimed at streamlining procedures without compromising

214 | Portfolio 2025
215 | Világgazdaság 2024
216 | Portfolio b 2025

nuclear safety. Such developments include, inter alia, the licensing of long lead manufacturing items the 'notification acknowledgment' and 'derogation notification acknowledgement' procedures or the elevated role of the authorised inspection organisations. Experts directly involved in the project have observed that, were the licensing procedure of the Paks II to begin under the current legal regime, the timeline for its execution would be appreciably shorter due to the more mature and responsive regulatory architecture now in place.

A crucial consideration that should go hand in hand with adopting more streamlined licensing procedures is the position of the regulator in the sector. To the uninitiated, increased procedural efficiency may give the superficial impression of a retreat from safety—an inference that is wholly unfounded, particularly when one considers the markedly improved safety characteristics of Generation III+ reactors. Nonetheless, when such streamlined procedures are adopted by truly independent—both from politics and the industry—expert bodies then the validity of these decisions is a lot less questionable. In this regard, the structural reorganisation of the HAEA in 2022 has yielded a favourable situation, as Hungary now benefits from an effectively independent regulator entrusted not only with supervisory but also with legislative competences in the nuclear domain. Currently, the Hungarian legislative and regulatory landscape provides a solid foundation for a nuclear renaissance. However, it remains more attuned to the continued deployment of conventional nuclear technologies—particularly in view of the ongoing construction of Paks II and the anticipated extension of the operating licences of Paks I—than to the prospective deployment of advanced technologies such as Small Modular Reactors. Should Hungary, as part of this emerging renaissance, choose to pursue SMR deployment, certain elements of the extant licensing regime would need to be reconsidered to accommodate the distinct characteristics of such technologies. Although the author does not endeavour to present a comprehensive analysis on how to advance the licensing of these technologies, several preliminary considerations may be identified for further scholarly exploration.

A key requirement for a licensing regime suitable to SMRs is that it be both efficient and economically proportionate. Traditional long-licensing systems are invariably costly, and these costs are largely fixed irrespective of plant capacity—meaning that smaller reactors bear a disproportionately high licensing cost per megawatt. Any legal or procedural innovation that reduces the financial and temporal burden of licensing would, therefore, materially support the viability of SMR deployment.

Given that SMRs are proposed to be built more in a factory environment and then transported to the site, the works at the actual site are supposed to take a lot shorter then for conventional plants. Moreover, SMRs vendors also generally claim that sites should be less of a limiting factor on their deployment. Considering these features, two proposals can be made. Firstly, for SMRs, it is worth looking into making the licensing process more front-loaded and introducing pre-licensing or design certification procedures to provide more certainty to the applicant and familiarize the authority early on with the proposed design. These procedures, currently absent from the Hungarian framework, could provide prospective applicants with greater regulatory certainty at an early stage while simultaneously allowing the authority to familiarise itself with the proposed design. This would be particularly advantageous given the standardised nature of SMR technologies, which are not intended to be extensively adapted to individual national frameworks. Secondly, although the separate site licensing stage is believed to be a beneficial element of the traditional licensing process, it is worth considering how its possible effectiveness could be increased to respond to the less site-dependent features of SMRs. This can be done either by a more risk-informed approach to the siting licence, weighing in their increased safety, but then the design considerations should be more accentuated, or by moving towards a joint licence for the implementation and the siting. Regarding the implementation licensing stage, it is worth addressing the possibility of deploying multiple SMRs of the same design in the country at different locations. Such a question would not be raised for conventional plants in a country the size of Hungary, but for industrial SMRs it is imaginable that the same design could be deployed at multiple locations. In these cases, the implementation licensing procedures should consider the previous evaluation and seek to not replicate all the assessments that are not necessary. The form of how to prevent this multiplication of the same procedures can be done in different ways, possibly in the form of a general implementation licence for the given design. Another issue that is worth assessing is the modularization of SMRs. Compared to large-scale plants SMRs are proposed to be deployed with larger unit numbers, but the currently in Hungary in case of implementation, commissioning, and operation stages licences are issued by the units, and in case of the latter two even the application cannot be submitted jointly for multiple units that is not an issue for large scale plants since there are fewer units which are not going to reach the commissioning and operation stage simultaneously. In the case of the commissioning and operation stages, due to their respective aims, it can still be argued that the licences should be granted by units, but it might make the procedure more efficient if the applications could be launched together for multiple units, reflecting their more standardized nature. Such an approach if the units would reach commissioning and operations simultaneously, could reduce procedural burdens.

Beyond the legal and procedural issues outlined herein, it must be acknowledged that the deployment of advanced reactors will inevitably bring forth novel regulatory challenges that cannot yet be fully anticipated. The first licensing procedures will likely encounter unforeseen complexities. Nevertheless, until such time as deployment begins in earnest, the country should strive to prepare as much as possible by paying attention to international development the outcomes of which can be implemented through the periodic review of the legislative framework.

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