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To join or not to join? A cost-benefit framework for non-nuclear states considering adherence to the Joint Convention

*By Annabelle Teo and Wolfram Tonhauser**

1. Introduction

The year 2026 marks the twenty-fifth anniversary of the entry into force of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention).[1] Adopted under the auspices of the International Atomic Energy Agency (IAEA), the Joint Convention is the first and only legally binding instrument to address radioactive waste and spent fuel at the global level in a comprehensive manner.[2]

Since its inception, the aspiration for the Joint Convention has been to "obtain the widest possible adherence",[3] an objective that remains unchanged today.[4] Current IAEA Director General Rafael Mariano Grossi has repeatedly stressed that the Joint Convention is relevant both to countries with nuclear power programmes and to any country using radioactive sources.[5] Virtually every state has some form of radioactive waste on its territory, due to the extensive use of radiation and radioactive substances in applications ranging from energy to medicine, industry, agriculture and research.[6] Achieving universal

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1. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (1997), IAEA Doc. INFCIRC/546, 2153 UNTS 357, entered into force 18 June 2001.
2. Tonhauser, W., A. Wetherall and L. Thiele (2022), "International Legal Framework on Nuclear Safety: Developments, Challenges and Opportunities", in NEA, *Principles and Practice of International Nuclear Law*, OECD Publishing, Paris, pp. 123-124.
3. IAEA (1997), General Conference Resolution: "Measures to Strengthen International Co-operation in Nuclear, Radiation and Waste Safety", IAEA Doc. GC(41)/RES/11, para. 3.
4. IAEA (2025), General Conference Resolution: "Nuclear and Radiation Safety", IAEA Doc. GC(69)/RES/7, para. 18, urges "all Member States that have not yet done so, particularly those managing radioactive waste or spent fuel, to become Contracting Parties to the Joint Convention". Johnson, P.L. (2022), "The Law of the International Atomic Energy Agency", in NEA, *Principles and Practice of International Nuclear Law*, OECD Publishing, Paris, p. 36, n. 63, notes that past General Conference resolutions have consistently urged the same.
5. IAEA, News Story, "Focus on Safety of Spent Fuel and Radioactive Waste Management at 7th Review Meeting of the Joint Convention" (28 June 2022).
6. IAEA (n.d.), "The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: An Overview", www.iaea.org/sites/default/files/24/09/24-01066e_web.pdf, p. 1 (accessed 19 June 2026).

adherence ensures that these wastes, regardless of their location, will be governed by the baseline standards set out in the Joint Convention.

However, to date, only 93 states have ratified or acceded to the Joint Convention.[7] While this figure includes nearly all countries operating nuclear power reactors for electricity generation (i.e. nuclear states),[8] participation is low among countries without such reactors (i.e. non-nuclear states). Bringing the latter group of countries into the fold is therefore crucial to expanding the reach of the Joint Convention.

But what would persuade a non-nuclear state to join? In theory, it would do so if the perceived benefits outweigh the costs. Cost-benefit-type reasoning is an established tool of public policymaking[9] and can likewise inform decisions on whether to become a party to an international legal instrument. Yet, the cost-benefit proposition of the Joint Convention is not evident to most non-nuclear states, in part because of limited guidance that explains the decision to join in cost and benefit terms relevant to their circumstances. Though there is no shortage of literature interpreting and analysing the Joint Convention from a legal perspective, applying this knowledge to cost-benefit decision making is still relatively underexplored.[10]

This article seeks to fill that gap. It examines the decision to become a party to the Joint Convention through a cost-benefit lens, aiming to be comprehensive enough to encompass the relevant considerations, yet flexible enough for any non-nuclear state to draw its own conclusions. A clear grasp of costs and benefits lends structure and clarity to the deliberation process, so that states can arrive at an informed and considered decision. In turn, this may encourage more states to conclude that becoming a party to the Joint Convention is in their best interests, thereby advancing the goal of its universalisation.

With the above in mind, the rest of this article is organised as follows. Section 2 gives a brief overview of the Joint Convention's substantive and procedural provisions, selectively highlighting those that are most pertinent to cost-benefit analysis. Section 3 proposes a cost-benefit framework with two layers. The first identifies each cost and benefit item and the key factors influencing their quantification, and the second combines them in a matrix to assess trade-offs across four possible scenarios in which non-nuclear states may find themselves. Section 4 argues that adherence to the Joint Convention would be advantageous for non-nuclear states that either anticipate developing nuclear energy or are proximate to nuclear or prospective nuclear neighbours.

One final point regarding scope should be clarified. It is sometimes suggested that a non-nuclear state need not join the Joint Convention if it has already made a political commitment to the Code of Conduct on the Safety and Security of Radioactive Sources

7. IAEA (2025), "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management", www.iaea.org/sites/default/files/22/06/jointcon_status.pdf (accessed 8 July 2026).
8. Of the 31 countries currently operating nuclear power reactors for electricity generation, only three – India, Iran (Islamic Republic of) and Pakistan – are not Contracting Parties to the Joint Convention. See *Ibid.* and IAEA (2026), "PRIS Power Reactor Information System: In Operation & Suspended Operation", https://pris.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx (accessed 9 Mar. 2026).
9. Atkinson, G., et al. (2018), *Cost-Benefit Analysis and the Environment: Further Developments and Policy Use*, OECD Publishing, Paris, p. 3.
10. To the authors' knowledge, no published work has offered a comprehensive and systematic cost-benefit framework for analysing the decision to accede to the Joint Convention from the perspective of non-nuclear states. The closest analogue is the IAEA's activities to promote the Joint Convention, which inform interested Member States about the Convention's obligations and benefits, and challenges of becoming a Contracting Party (see e.g. IAEA (2025), "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: News", Joint Convention Newsletter Issue No. 12, pp. 12-14). Although these promotional activities come close to imparting a cost-benefit mode of thinking, they are limited in reach to attending participants and constrained by available resources.

(Code of Conduct)[11] and its supplementary guidance.[12] However, the relationship and potential overlap between the Joint Convention and the Code of Conduct are complex matters capable of reshaping the cost-benefit assessment, which in turn warrants separate investigation and hence falls outside the scope of this article.

2. Overview of the Joint Convention

This section provides an overview of the substantive and procedural aspects of the Joint Convention, with reference to the following primary documents:

- the Joint Convention;[13]
- the Rules of Procedure and Financial Rules (RPFR);[14]
- the Guidelines regarding the Review Process (GRP);[15] and
- the Guidelines regarding the Form and Structure of National Reports (GNR).[16]

At the outset, it should be reiterated that the aim of this article is not to restate existing legal interpretations and analyses, but to summarise concisely and focus on those elements most essential to laying the groundwork for the subsequent cost-benefit analysis. This overview is therefore selective and makes no attempt to cover every detail of the Joint Convention.[17]

a. Nature and structure

There is much that can be said about the nature and structure of the Joint Convention. For present purposes, however, three characteristics merit special mention.

Firstly, the Joint Convention is built on two pillars.[18] The first pillar, comprising the technical and governance safety provisions, is substantive in nature. It establishes the principles and requirements for the safe management of spent fuel and radioactive waste, setting international benchmarks that Contracting Parties are expected to implement within their national systems. The second pillar, comprising the peer review provisions, is procedural in nature. It creates the mechanism for monitoring and ensuring compliance with the Convention, based on Contracting Parties reporting and reviewing their implementation

11. IAEA (2004), Code of Conduct on the Safety and Security of Radioactive Sources, IAEA Doc. IAEA/CODEOC/2004, IAEA, Vienna.
12. IAEA (2012), *Guidance on the Import and Export of Radioactive Sources*, IAEA Doc. IAEA/CODEOC/IMO-EXP/2012, IAEA, Vienna; IAEA (2018), *Guidance on the Management of Disused Radioactive Sources*, IAEA Doc. IAEA/CODEOC/MGT-DRS/2018, IAEA, Vienna.
13. Joint Convention, *supra* note 1.
14. IAEA (2023), "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: Rules of Procedure and Financial Rules", IAEA Doc. INFCIRC/602/Rev. 7 (RPFR).
15. IAEA (2025), "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: Guidelines regarding the Review Process", IAEA Doc. INFCIRC/603/Rev. 11 (GRP).
16. IAEA (2024), "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: Guidelines regarding the Form and Structure of National Reports", IAEA Doc. INFCIRC/604/Rev. 5 (GNR).
17. Certain aspects of the Joint Convention may be more or less pertinent for cost-benefit purposes, so those highlighted in this article should not be regarded as exhaustive. The article also assumes that readers have a basic familiarity with the Joint Convention and its workings. Readers new to the subject are encouraged to first skim through the primary documents (i.e. the texts of the Joint Convention, RPFR, GRP and GNR) and consult the further readings cited in the footnotes as needed.
18. Handl, G. (2003), "The IAEA Nuclear Safety Conventions: An Example of Successful 'Treaty Management'?", *Nuclear Law Bulletin*, No. 72, OECD Publishing, Paris, pp. 8-9.

of the various provisions. Although the two pillars overlap,[19] distinguishing between substantive and procedural elements is a helpful way to frame the discussion, especially when navigating through costs and benefits.

Secondly, the Joint Convention is designed as an incentive convention.[20] This sets it apart from traditional multilateral treaties, which typically rely on controls and sanctions to enforce compliance.[21] Instead, the Joint Convention embraces a softer, facilitative approach rooted in enlightened self-interest, whereby Contracting Parties meet their obligations and advance safety through encouragement, co-operation and peer review.[22]

Thirdly, the Joint Convention was not intended to establish a fundamentally new regime for spent fuel and radioactive waste management, but rather to consolidate and formalise the status quo.[23] By the time of its negotiation, broad agreement had already emerged on safety fundamentals,[24] leading some scholars to interpret the Convention as an effort to elevate soft law into hard law and to codify internationally recognised norms and good practices in technical and binding language.[25] Because the Joint Convention largely reflects existing consensus, adherence to it should be seen less as a costly, sweeping overhaul but more as a modest step to reaffirm the shared values of responsible global citizenship. This shift in viewpoint can materially influence the perception of costs and benefits.

b. Substantive provisions

The following two subsections examine the provisions of the Joint Convention and its accompanying rules and guidelines, along the substantive-procedural divide mentioned earlier. In a nutshell, the Joint Convention has 44 articles that are divided into 7 chapters.

- Chapter 1 (discussed in subsection 2.b(i)) sets out the objectives, definitions and scope of application.
- Chapters 2 to 4 (discussed in subsection 2.b(ii)) contain the bulk of the substantive technical and governance safety provisions.

19. Although the provisions related to the peer review process have been described in this article as "procedural", they also have substantive dimensions. Handl, G. (2003), *supra* note 18, pp. 9-10 and 16-18, argues that peer review serves not only to ensure compliance with existing obligations but also to facilitate the progressive improvement of nuclear safety through periodic adjustments. In this way, the Joint Convention's peer review process embodies both: 1) regime-building and regime-maintenance roles; and 2) law-application and lawmaking functions.
20. Joint Convention, *supra* note 1, preamble.
21. Handl, G. (2003), *supra* note 18, pp. 8-9, n. 13 and pp. 10-11.
22. *Ibid*., p. 8, n. 12; de Wright, T. (2007), "The 'Incentive' Concept as Developed in the Nuclear Safety Conventions and its Possible Extension to Other Sectors", *Nuclear Law Bulletin*, No. 80, OECD Publishing, Paris, pp. 38-39.
23. Joint Convention, *supra* note 1, preamble, explains that its provisions draw on principles contained in the following documents: 1) IAEA (1996), *International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources*, IAEA Safety Series, No. 115, IAEA, Vienna (superseded by IAEA (2014), *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*, IAEA Safety Standards Series, General Safety Requirements, No. GSR Part 3, IAEA, Vienna); 2) IAEA (1995), *The Principles of Radioactive Waste Management*, IAEA Safety Series, No. 111-F, IAEA, Vienna (superseded by IAEA (2006), *Fundamental Safety Principles: Safety Fundamentals*, IAEA Safety Standards Series, Safety Fundamentals, No. SF-1, IAEA, Vienna); and 3) international standards relating to the transport of radioactive materials. These documents represented the international consensus on the fundamental concepts and requirements in their respective areas.
24. IAEA (2006), *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, IAEA International Law Series, No. 1, IAEA, Vienna, pp. 61-62, paras. 10 and 17; Jankowitsch, O. (1994), "The Convention on Nuclear Safety", *Nuclear Law Bulletin*, No. 54, OECD Publishing, Paris, p. 14.
25. Tonhauser, W. and O. Jankowitsch (1997), "The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management", *Nuclear Law Bulletin*, No. 60, OECD Publishing, Paris, p. 21.

- Chapter 5 contains specific provisions on the transboundary movement of spent fuel and radioactive waste, as well as on disused sealed sources.[26]
- Chapter 6 (discussed in subsection 2.c) contains the bulk of the procedural peer review provisions.
- Chapter 7 concludes with final clauses and other provisions on general issues of treaty law.

In addition to the text of the Joint Convention, the Contracting Parties have adopted the RPFR, the GNR and the GRP mentioned above, which together lay down a comprehensive set of rules and guidelines to facilitate the peer review process. The RPFR concern procedural and financial matters. The GNR (discussed in subsection 2.c(i)) concern the contents of national reports and the GRP (discussed in subsection 2.c(ii)).

i. Definitions and scope of application

Chapter 1 defines what is (and what is not) included in the scope of the Joint Convention. Earlier, Section 1 alluded to the wide spectrum of back-end nuclear fuel cycle facilities and activities falling within the Convention's purview. Figure 1 below presents a more detailed summary, albeit without setting out the definitions in full.[27]

26. See Tonhauser, W. and O. Jankowitsch (1997), *Ibid.*; Reyners, P. (2010), "Three International Atomic Energy Agency Codes", in NEA (ed.), *International Nuclear Law: History, Evolution and Outlook*, OECD Publishing, Paris; Strack, L. (2004), "The Safety Regime Concerning Transboundary Movement of Radioactive Waste and its Compatibility with the Trade Regime of the WTO", *Nuclear Law Bulletin*, No. 73, OECD Publishing, Paris.
27. Readers are encouraged to refer to the full text of Chapter 1 of the Joint Convention when engaging in interpretation, since a number of concepts and terms have specialised meanings tailored to the needs of the Convention.

Figure 1: Summary of the Joint Convention's definitions and scope of application

Coverage	Terminology	Exclusions
Spent fuel from civilian nuclear reactors[28]	• "Spent fuel": Nuclear fuel irradiated in and permanently removed from a reactor core.[29] • "Spent fuel management": All activities relating to the handling or storage of spent fuel, excluding off-site transportation.[30] • "Spent fuel management facility": Any facility or installation which primary purpose is spent fuel management.[31]	• Spent fuel reprocessing[32] • Spent fuel of military or defence origin[33]
Radioactive waste from civilian applications[34]	• "Radioactive waste": Radioactive waste (gaseous, liquid or solid) for which no further use is foreseen, and which is controlled as radioactive waste.[35] • "Radioactive waste management": All activities, including decommissioning activities, relating to the handling, pretreatment, treatment, conditioning, storage or disposal of radioactive waste, excluding off-site transportation.[36] • "Radioactive waste management facility": Any facility or installation which primary purpose is radioactive waste management.[37]	• Radioactive waste that contains only naturally occurring radioactive materials outside the nuclear fuel cycle[38] • Radioactive waste of military or defence origin[39]
Discharges from regulated activities[40]	• "Discharges": Planned and controlled releases into the environment of radioactive materials (liquid or gaseous) from regulated nuclear facilities.[41]	

28. Joint Convention, *supra* note 1, Article 3(1).
29. *Ibid*., Article 2(n).
30. *Ibid*., Article 2(o). This provision adds that it may also involve discharges. There is also a definition for "storage".
31. *Ibid*., Article 2(p).
32. *Ibid*., Article 3(1). This provision excludes spent fuel held at reprocessing facilities as part of a reprocessing activity, unless the Contracting Party declares reprocessing to be part of spent fuel management.
33. *Ibid*., Article 3(3). This provision excludes spent fuel within military or defence programmes, unless it is declared as spent fuel for the purposes of the Joint Convention by the Contracting Party or if and when such materials are transferred permanently to and managed within exclusively civilian programmes.
34. *Ibid*., Article 3(2).
35. *Ibid*., Article 2(h). This provision contains further nuances not captured in this summary.
36. *Ibid*., Article 2(i). This provision adds that it may also involve discharges. There are also definitions for "decommissioning", "disposal" and "storage".
37. *Ibid*., Article 2(j). This provision adds that it includes a nuclear facility in the process of being decommissioned only if it is designated by the Contracting Party as a radioactive waste management facility.
38. *Ibid*., Article 3(2). This provision excludes waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of the Joint Convention by the Contracting Party.
39. *Ibid*., Article 3(3). This provision excludes radioactive waste within military or defence programmes, unless it is declared as radioactive waste for the purposes of the Joint Convention by the Contracting Party or if and when such materials are transferred permanently to and managed within exclusively civilian programmes.
40. *Ibid*., Article 3(4). This provision expressly mentions the application of Articles 4, 7, 11, 14, 24 and 26.
41. *Ibid*., Article 2(c). This provision contains further nuances not captured in this summary.

ii. Nuclear and radiation safety requirements

The provisions in Chapters 2 and 3, in essence, oblige Contracting Parties to ensure that individuals, society and the environment are protected against radiation and other risks arising from spent fuel and radioactive waste management.[42] This involves, *inter alia*:

- taking appropriate steps and procedures across all stages, including siting, design, construction, operation, disposal and closure;
- conducting safety reviews and assessments of existing and proposed facilities;
- applying protective defences and methods to address radiological and non-radiological hazards; and
- minimising waste and avoiding undue burdens on future generations.

It should be noted that Chapters 2 and 3 are drafted in almost parallel terms, the key distinction being that Chapter 2 deals with spent fuel while Chapter 3 deals with radioactive waste.[43] For example, Article 4 in Chapter 2 mirrors Article 11 of Chapter 3, Article 5 mirrors Article 12 and so on. This was a deliberate choice by the drafters to recognise radioactive waste and spent fuel as separate categories of material[44] while subjecting both to the same safety objectives and management principles within a single treaty framework.[45] It is for this reason that the Convention was named a "Joint Convention".[46]

This joint structure creates a duality that has an impact on the balancing of costs and benefits. Non-nuclear states need only meet the obligations in Chapter 3 (and not Chapter 2) if they do not possess spent fuel.[47] At the same time, by virtue of treaty relations, they are entitled to the fulfilment by nuclear states of the obligations under both Chapters 2 and 3. In other words, non-nuclear states are subject to only part of the Convention's substantive scope and the associated costs, while benefitting from its full scope vis-à-vis nuclear states. This asymmetry is clearly in favour of non-nuclear states and enhances the cost-benefit proposition if their counterparts are nuclear states (Subsection 3.c will develop this argument more fully).

Further consideration should also be given to Articles 6 and 13 of the Joint Convention. These provisions embody principles now regarded as core doctrines of environmental protection for nuclear activities, including justification, environmental impact assessment and public participation.[48] More specifically, Articles 6(1)(iv) and 13(1)(iv) establish duties to consult and to provide information on the potential transboundary effects of proposed

42. Tonhauser, W. and O. Jankowitsch (1997), *supra* note 25, p. 11.
43. *Ibid.*, p. 9.
44. Radioactive waste is radioactive material "for which no further use is foreseen" whereas spent fuel may be regarded either as waste "to dispose" or "as a valuable resource" intended for reprocessing (Joint Convention, *supra* note 1, preamble, para. (vii) and Articles 2(h) and 2(n); IAEA, "What is Radioactive Waste", *IAEA Bulletin*, Vol. 55, No. 3, IAEA, Vienna, p. 3).
45. Joint Convention, *supra* note 1, preamble, para. (ii); IAEA (2006), *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, IAEA International Law Series, No. 1, IAEA, Vienna, p. 17; Tonhauser, W. and O. Jankowitsch (1997), *supra* note 25, pp. 14-15.
46. De Kageneck, A. and C. Pinel (1998), "The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management", *International & Comparative Law Quarterly*, Vol. 47, No. 2, Cambridge University Press, London, pp. 410-412.
47. Note however the peculiar position of a subset of non-nuclear states, namely those that operate research reactors but not power reactors. Under the Joint Convention, it is immaterial whether spent fuel originates from power reactors or research reactors, as the same obligations governing its management apply in either case (GNR, *supra* note 16, para. 26). For the sake of analytical simplicity, this article does not distinguish between non-nuclear states with or without research reactors, though the distinction is acknowledged and highlighted where relevant.
48. Nick, K.S. and P. Bowden (2022), "Nuclear Activities and Environmental Protection: The International Legal Framework", in NEA, *Principles and Practice of International Nuclear Law*, OECD Publishing, Paris, p. 221.

spent fuel and radioactive waste management facilities. These duties are owed to Contracting Parties that are in the vicinity of and likely to be affected by such facilities. Upon request, general data relating to the facility must be provided to enable them to evaluate the likely safety impact on their territory. The rights to consultation and information function as important safeguards, particularly where no other frameworks or protections under international environmental law are available. This point will be returned to in Subsection 3.b(ii) as a major incentive for a non-nuclear state facing actual or prospective deployment of spent fuel facilities in the region to join the Joint Convention.

The provisions in Chapter 4, in essence, oblige Contracting Parties to establish frameworks governing the safety of spent fuel and radioactive waste management.[49] This involves, *inter alia*:

- taking appropriate legislative, regulatory and administrative measures and other steps;
- establishing a system of licensing and control underpinned by national safety regulations and requirements;
- establishing a regulatory body that is vested with adequate authority, competence and resources and that exercises effective independence in the discharge of its regulatory functions; and
- implementing adequate quality assurance, radiological protection and emergency preparedness programmes.

Most of the governance-related safety provisions in Chapter 4 are based on international standards in force at the time of negotiation of the Joint Convention[50] and hence are likely to be familiar and manageable.[51] In fact, most states should already have the necessary institutional and regulatory infrastructure in place, and it may simply be a matter of extending existing arrangements to cover spent fuel and radioactive waste management facilities as well, with the final costs most likely to be lower than initially anticipated.

c. Procedural provisions

Chapter 6 establishes the peer review process, which rests on two cornerstones:[52]

- the reports submitted by each Contracting Party, which describe the measures taken to implement its obligations under the Joint Convention (National Reports); and[53]
- the meetings held by the Contracting Parties to review, discuss and seek clarification on these reports (Review Meetings).[54]

National Reports and Review Meetings lie at the heart of the peer review system, operating in tandem to appraise performance, identify shortcomings and encourage continuous improvement, through the identification of areas of good performance, good practices and overarching issues.

i. National Reports

Since National Reports are the primary material being peer reviewed, clear standards and guidelines on their preparation are essential. The GNR address this need by giving Contracting Parties direction on the substantive content of National Reports, as well as

49. Tonhauser, W. and O. Jankowitsch (1997), *supra* note 25, p. 11.
50. IAEA (1996), *supra* note 23.
51. See Burns, S.G. et al. (2022), "Regulation, Licensing and Oversight of Nuclear Activities", in NEA, *Principles and Practice of International Nuclear Law*, OECD Publishing, Paris, pp. 167-209.
52. Handl, G. (2003), *supra* note 18, p. 16.
53. Joint Convention, *supra* note 1, Article 32.
54. *Ibid.*, Article 30.

their organisation and presentation.[55] As a relatively short document, it is an easy read, and further summary would add little value. Rather than repeating what is already stated in the GNR, a more useful exercise is to draw attention to those aspects most important for helping prospective Contracting Parties to form a realistic picture of the costs of preparing National Reports.

At the outset, it should be noted that, while the GNR envisage that National Reports will take a meaningful amount of work, drafting them is not an insurmountable task. In fact, the GNR do not stipulate a minimum, maximum or recommended length for National Reports, leaving Contracting Parties to determine what is necessary to account for their implementation of the Joint Convention, provided the National Reports are sufficiently informative to permit genuine evaluation and sufficiently concise to keep review manageable.[56] In practice, more than half of non-nuclear states submit National Reports between 20 and 80 pages in length.[57]

While page counts give a rough sense of overall effort, this metric does not capture the varying demands in different portions of the National Report. Prospective Contracting Parties should also be aware of which portions are likely to be the most challenging for them. The GNR provide a template for National Reports, which is divided into individual sections, each addressing one article or a group of articles of the Joint Convention.[58] Past experience shows that four sections tend to be the most challenging for non-nuclear states:

- Section B: Policies and Practices;
- Section E: Legislative and Regulatory System;
- Section F: Other General Safety Provisions; and
- Section H: Safety of Radioactive Waste Management.[59]

This is not surprising, as these sections relate to the chapters of the Joint Convention that are noted in Subsection 2.b(ii) as containing the bulk of the substantive provisions. But the GNR also ease this difficulty by offering more detailed guidance on these sections, such as how the relevant articles should be approached, what information should be included and how certain issues should be tackled.[60]

Another notable component of the National Report concerns the list of radioactive waste management facilities and the inventory of radioactive waste.[61] These may appear unassuming, and the GNR do not elaborate on the practical challenges involved, but their

55. GNR, *supra* note 16, para. 1.
56. *Ibid.*, paras. 3(a) and 3(c).
57. IAEA (n.d.), "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management Documents", www.iaea.org/topics/nuclear-safety-conventions/joint-convention-safety-spent-fuel-management-and-safety-radioactive-waste/documents (accessed 19 June 2026). For the Eighth Review Meeting of the Contracting Parties to the Joint Convention, 87 National Reports were published on the Joint Convention public website, of which 56 were submitted by non-nuclear Contracting Parties. Among these 56 reports, 4 countries submitted reports of fewer than 10 pages, 7 countries submitted 11-20 pages, 10 countries submitted 21-30 pages, 4 countries submitted 31-40 pages, 4 countries submitted 41-50 pages, 8 countries submitted 51-60 pages, 4 countries submitted 61-70 pages, 4 countries submitted 71-80 pages, none submitted 81-90 pages, 3 countries submitted 91-100 pages and 8 countries submitted more than 100 pages. Report lengths ranged from 4-186 pages, with an average length of 53.9 pages and a median length of 49.5 pages. Based on the interquartile range, more than half of the reports fall between 20 and 80 pages in length.
58. GNR, *supra* note 16, para. 11.
59. For non-nuclear states operating research reactors, a fifth section, G. Safety of Spent Fuel Management, may also be relevant. This will not be discussed further for the reasons explained in note 47.
60. GNR, *supra* note 16, pp. 4-6.
61. Again, for non-nuclear states operating research reactors, the list of spent fuel management facilities and the inventory of spent fuel may also be relevant. This will not be discussed further for the reasons explained in note 47.

compilation can be time- and labour-intensive. For new Contracting Parties conducting such inventories for the first time, historical records and data may have to be retrieved and analysed. Liaising with other stakeholders may also be part of the process if input from licensees or users is needed, which adds complexity and co-ordination. The arduousness of this task should therefore not be underestimated.

Having said that, the workload to prepare initial National Reports is demanding but usually eases with subsequent Reports. The GNR expect the first National Report to be more comprehensive because it introduces for the first time the country's policies, practices, legislation, regulations, and institutional arrangements relating to spent fuel and radioactive waste. This initial requirement, however, is relaxed for future reporting cycles.[62] Subsequent National Reports may focus more on documenting the delta from previous submissions, namely, any new updates, significant changes, progress achieved, and responses to issues and recommendations from the preceding Review Meeting.[63]

Since Review Meetings take place on a three-year cycle, new National Reports are due once every three years.[64] When reporting obligations under the Convention on Nuclear Safety[65] are factored in at the same time, the effective preparation window may be further compressed, possibly impacting resources and costs.

ii. Review Meetings

Since Review Meetings are the primary forum where peer review takes place, clear standards and guidelines on their conduct are essential. The GRP address this need by delineating the procedures, steps and responsibilities involved so that meetings can proceed in an orderly and efficient manner[66] and in a manner that supports robust and candid discussions, constructive exchanges of views and opportunities for mutual learning.[67]

Because the GRP are more extensive than the GNR, it may be helpful to start with a big-picture summary of the GRP's guidance on Review Meetings. To this end, two flowcharts are presented below. Figure 2 sets out a skeletal outline of the stages leading up to the Review Meeting. Figure 3 fleshes out more concrete details, such as the purpose of each stage, the key actions and decisions made, and the documents produced.

62. GNR, *supra* note 16, paras. 3(d) and 4(d).
63. *Ibid*., paras. 3(d), 3(e), 4(d) and 4(g).
64. Joint Convention, *supra* note 1, Article 32(1).
65. Convention on Nuclear Safety (1994), IAEA Doc. INFCIRC/449, 1963 UNTS 293, entered into force 24 Oct. 1996.
66. Improving the efficiency of the review process is a key priority, as evidenced by the establishment of the Working Group on Burden Reduction and Efficiency of the Joint Convention Review Process at the 8th Review Meeting of the Contracting Parties to the Joint Convention. The Working Group convened for the first time in October 2025 and is scheduled to meet again in July 2026. Although it does not make formal decisions, it provides a platform for developing proposals to reduce the workload of officers and enhance the overall efficiency of the peer review process. So far, ten proposals have been submitted and discussed and are expected to undergo further refinement in advance of the next meeting (IAEA (2025), *supra* note 10, p. 11).
67. GRP, *supra* note 15, para. 2.

Figure 2: Simplified flowchart outlining the overall stages of Review Meetings

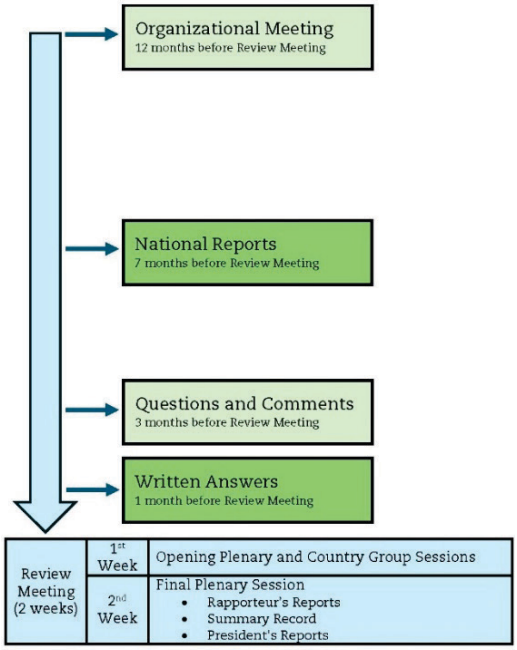
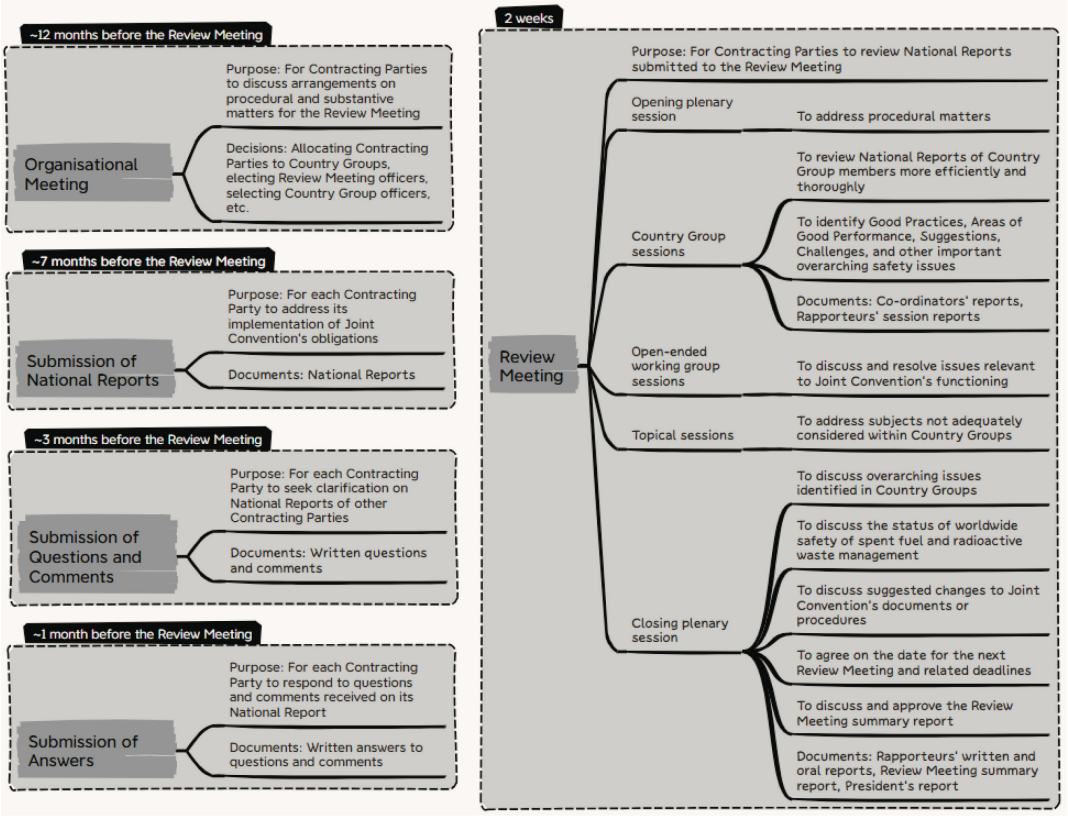


Figure 3: Detailed flowchart elaborating the individual stages of Review Meetings[68]



68. Created by the authors using Xmind (https://app.xmind.com).

With this basic orientation to Review Meetings, several cost-benefit-relevant observations may be made.

A central theme underpinning many features of Review Meetings is the optimisation of review quality. High-quality, thorough reviews raise the bar for Contracting Parties and are often perceived and experienced as a source of increased costs. What tends to be overlooked, however, are the corresponding benefits. The same rigorous standards are applied uniformly, meaning that each Contracting Party can expect others to be held to an equivalent level of scrutiny of their implementation of the Joint Convention. For states concerned about neighbouring spent fuel and radioactive waste management activities, the prospect of reciprocal, rigorous scrutiny may, on balance, be good news.

This emphasis on review quality is reflected in two avenues within the Review Meeting timeline that enable a deeper examination of National Reports. These avenues serve as important tools of accountability and will be revisited in Subsection 3.b(ii) as a substantial benefit of becoming a Contracting Party.

The first avenue is the written questions and answers process, which allows Contracting Parties to seek clarification on the contents of National Reports in advance of the Review Meeting. Up to three months prior to the meeting, any Contracting Party may submit written questions and comments on any part of any National Report,[69] to which the authoring Contracting Party must respond no later than one month before the meeting.[70] This process has been well-utilised. At the most recent 8th Review Meeting, 62 Contracting Parties posted a total of 5 239 written questions and comments, and 5 113 written answers were furnished.[71]

The second avenue is Country Group sessions. In the first week of the Review Meeting, Contracting Parties split into Country Groups, a setting where a smaller number of group members devote their attention to an in-depth review of the National Reports from within the group.[72] Country Group sessions may allocate up to four hours to the focussed presentation and discussion of each National Report,[73] during which members may again raise further questions, comments or other interventions.[74] Notably, these Country Groups are not closed, as Contracting Parties outside the group may also attend and participate, albeit with lower priority than members.[75]

Along the same lines, three elements contribute significantly to the quality and rigour of Review Meetings.

Firstly, each Contracting Party is regarded as a fundamental contributor to the review process and is entrusted with two cardinal duties: to openly undergo review by others and to diligently undertake review of others.[76] The success of Review Meetings and the attainment of the objectives of the Joint Convention depend on each Contracting Party actively participating and discharging these duties to the best of their abilities.[77]

Secondly, in addition to reviewing one another, the review process aims to facilitate the sharing of experiences among peers and learning from each other's approaches to safety challenges.[78] This happens most intensely during Country Group sessions,[79] making the composition of these groups especially significant. In this regard, the GRP's method for

69. GRP, *supra* note 15, paras. 40 and 67.
70. *Ibid.*, para. 68.
71. IAEA (2025), "Summary Report of the 8th Review Meeting of the Contracting Parties to the Joint Convention", available at: www.iaea.org/sites/default/files/jc-rm8-04-rev2_summary-report-28mar2025.pdf, para. 15.
72. *Ibid.*, paras. 3, 41 and 66.
73. *Ibid.*, para. 46.
74. *Ibid.*, para. 44.
75. *Ibid.*, paras. 43-44.
76. *Ibid.*, paras. 52-55.
77. *Ibid.*, para. 2; Tonhauser, W., A. Wetherall and L. Thiele (2022), *supra* note 2, p. 132.
78. IAEA (2025), *supra* note 71, para. 2.
79. *Ibid.*, para. 41.

assigning Contracting Parties to Country Groups is designed to distribute more advanced countries, with greater expertise in spent fuel and radioactive waste management, evenly across all groups.[80] This ensures that every Country Group will have a diversity of role models and practical experiences from which good practices may be learned.[81]

Thirdly, officers are appointed to oversee and manage Country Group sessions,[82] guiding the discussion toward a comprehensive and constructive review of National Reports.[83] These officers are also responsible for producing various types of reports, a point that becomes relevant again in Subsection 3.b(ii), as some of these reports offer additional insight into, and closer monitoring of, safety situations beyond what can be obtained from National Reports alone.

3. Cost-benefit framework

Following the overview of the substantive and procedural aspects of the Joint Convention, particularly those with cost-benefit implications, this section proposes a decision making framework for non-nuclear states contemplating adherence to the Joint Convention.

The framework consists of two layers. The first layer involves identifying costs and benefits separately. The second layer moves from the individual identification of costs and benefits to a more integrated assessment of their trade-offs. Section 2 examines the Joint Convention's obligations, including the expectations around a state's own compliance and the compliance of other Contracting Parties. Building on this, Subsections 3.a and 3.b examine, at a conceptual level, the principal costs and benefits attendant upon these obligations, as well as some considerations to bear in mind when approaching their quantification. Subsection 3.c depicts four alternative scenarios of nuclear power engagement, illustrating the relative trade-offs in each scenario and whether the net effect is likely to favour adherence to the Joint Convention.

a. Costs

Essentially, there are three principal costs of becoming a Contracting Party to the Joint Convention: (1) the cost of implementing substantive obligations, (2) the costs of implementing procedural provisions, and (3) the costs of accession.

i. Substantive obligations

By becoming party to a treaty, a state consents to be bound by it and undertakes to faithfully observe and implement its provisions.[84] In the case of the Joint Convention, this entails incorporating its substantive obligations domestically (i.e. formal compliance) and giving effect to them in practice (i.e. factual compliance).[85] However, the costs of implementation

80. The GRP set out the method for the establishment of Country Groups with Contracting Parties categorised as: 1) those with larger fleets of nuclear power reactors; 2) those with smaller fleets of nuclear power reactors; 3) those with research reactors but no nuclear power reactors; and 4) those with neither nuclear power reactors nor research reactors. *Ibid*., para. 36. Within each category, Contracting Parties are then assigned successively to Country Groups until all have been allocated. *Ibid*. This should result in each Country Group having roughly equal numbers of Contracting Parties from each category. *Ibid*. Paragraphs 14-15 of the GRP provide further illustrative examples of Country Group allocation.
81. *Ibid*., para. 36(c); Stoiber, C. (2018), "Inside Nuclear Baseball: Reflections on the Development of the Safety Conventions", *Nuclear Law Bulletin*, No. 100, OECD Publishing, Paris, p. 66.
82. GRP, *supra* note 15, para. 5.
83. *Ibid*., para. 56.
84. Vienna Convention on the Law of Treaties (1969), 1155 UNTS 331, entered into force 27 Jan. 1980, Article 26.
85. GNR, *supra* note 16, para 4(c).

are not easy to estimate based solely on the Convention's text, because most of its provisions are drafted as high-level objectives and principles rather than specific, self-executing requirements.[86] Translating broad principles into detailed requirements will therefore involve additional steps.

Four resources are relevant in this regard. The first resource is the IAEA safety standards.[87] These are standards of safety published by the Agency that reflect international consensus on what constitutes a high level of protection for people and the environment in the use of nuclear technology.[88] They also serve as a global reference to help parties meet their obligations under various international safety conventions,[89] including the Joint Convention.[90] When Contracting Parties adopt the principles, requirements, recommendations, and guidance given in the applicable safety standards, they effectively transpose conventional obligations into their national systems.

Due to their broad scope, it can be challenging to work out which safety standards correspond to which obligations under the Joint Convention. This, in turn, leads to the second resource in this regard, a document entitled "Synopsis of relevant IAEA safety standards that relate to the issues addressed by articles of the Joint Convention".[91] The synopsis functions like a concordance, cross-referencing Joint Convention obligations with their corresponding safety standards, making the wealth of material more navigable and usable for implementation.[92]

The third resource is the IAEA Nuclear Safety and Security Online User Interface, which is publicly available.[93] This is a knowledge management platform that, among other features, allows users to browse safety standards by topical areas and terms of interest,[94] and explore relationships between standards.[95] Though not specifically tailored to the Joint Convention, search terms and filters for radioactive waste and spent fuel can be applied to retrieve relevant content.

The fourth resource is the Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS).[96] ARTEMIS is the IAEA's expert peer review service in the field of radioactive waste and spent fuel management, decommissioning, predisposal, disposal and remediation of sites contaminated by radioactive materials.[97] Depending on the needs of the requesting Member State, ARTEMIS

86. Tonhauser, W., A. Wetherall and L. Thiele (2022), *supra* note 2, p. 124.
87. IAEA (n.d.), "Safety Standards", www.iaea.org/resources/safety-standards (accessed 9 Mar. 2026).
88. IAEA (2006), *supra* note 23, Foreword.
89. *Ibid*.
90. GNR, *supra* note 16, para 13; Tonhauser, W., A. Wetherall and L. Thiele (2022), *supra* note 2, p. 126.
91. IAEA (2014), "Summary Report of the 2nd Extraordinary Meeting of the Contracting Parties to the Joint Convention", available at: www.iaea.org/sites/default/files/summary-report-2nd-meet-2nd-rev-meeting-may13.pdf, para. 11.
92. As of this writing, the Synopsis is unavailable publicly and can only be accessed by Contracting Parties via the Joint Convention website. See IAEA (n.d.) "Synopsis of relevant IAEA safety standards that relate to the issues addressed by articles of the Joint Convention", https://nucleus.iaea.org/sites/jcweb/SitePages/Home.aspx (login required, access restricted to authorised users).
93. IAEA (n.d.), "Nuclear Safety and Security Online User Interface: Welcome", https://nucleus-apps.iaea.org/nss-oui/ (accessed 19 June 2026).
94. IAEA (n.d.), "Nuclear Safety and Security Online User Interface: Search", https://nucleus-apps.iaea.org/nss-oui/search/advancedsearch (accessed 19 June 2026).
95. IAEA (n.d.), "Nuclear Safety and Security Online User Interface: Relationship Search", https://nucleus-apps.iaea.org/nss-oui/collections/relationship (accessed 19 June 2026).
96. IAEA (n.d.), "GNSSN Global Nuclear Safety and Security Network: ARTEMIS", https://gnssn.iaea.org/main/ARTEMIS/Pages/default.aspx (accessed 19 June 2026).
97. IAEA (2026), Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) Guidelines, IAEA Services Series, No. 52, IAEA, Vienna, p. 6.

reviews may include assessments of national programmes and frameworks against IAEA safety standards, other IAEA publications and international legal instruments.[98] The resulting recommendations and suggestions are likely to indicate to the requesting Member State what is needed to fully comply with the Joint Convention.[99]

Cumulatively, these resources support the operationalisation of the Joint Convention's substantive obligations: the safety standards supply the technical requirements, the synopsis and online user interface map standards to obligations, while ARTEMIS tracks progress in national implementation.

Assuming a prospective Contracting Party is equipped to implement the substantive obligations of the Joint Convention, how should it assess the associated costs? Ultimately, the cost assessment turns on two considerations: one relating to magnitude and the other relating to significance.

The first consideration in this context is the size of the gap between the country's existing frameworks, rules and practices for spent fuel and radioactive waste management, and the requirements of the Joint Convention and related IAEA safety standards. This gap can be measured through a national gap analysis or compliance audit, supplemented by external input from ARTEMIS reviews. Given that many IAEA Member States have adopted IAEA safety standards for use in their national regulations,[100] most countries may already be at the level of substantial compliance, and any remaining gaps and associated costs may be modest in magnitude.

The second consideration is the extent to which a country aspires to meet the overall objectives of the Joint Convention. As mentioned in Subsection 2.a, the Joint Convention was not conceived as a radical departure from the status quo, but rather as a means of codifying prevailing soft law. Similarly, the IAEA safety standards operationalising the Joint Convention are produced through and reflective of international consensus.[101] Insofar as countries have already resolved to uphold the principles and norms underlying the Joint Convention, the act of legal adherence is largely a formal acceptance of commitments already found acceptable in substance. Once it has been determined that adherence is intrinsically right and worthwhile, the significance of the associated costs shifts, and their magnitude ceases to be decisive.

ii. Procedural obligations

Subsection 2.c has already described the responsibilities that prospective Contracting Parties should be ready to assume. From a cost perspective, the foremost concern is often the financial and human resources required to submit National Reports and attend Review Meetings. However, these resources and their associated costs are challenging to quantify because they hinge on a myriad of country-specific factors so varied that no one-size-fits-all formula exists.

There are, for example, differences in the architecture of spent fuel and radioactive waste frameworks and arrangements. These influence how regulatory oversight is exercised (e.g. federal versus local control), the number of stakeholders involved (e.g. single versus multiple regulatory authorities, few versus many regulated entities) and the nature of stakeholder interactions, all of which can significantly affect resource and cost calculations. A country with centralised operations and fewer stakeholders may find it relatively straightforward to compile and consolidate information, whereas a country with a more decentralised, diverse structure is likely to face a heavier administrative burden. Differences in the types of facilities and activities within a country (e.g. applications of radioactivity, research reactors, power reactors, a part versus the whole of the nuclear fuel

98. *Ibid.*, pp. 3-4.
99. Tonhauser, W., A. Wetherall and L. Thiele (2022), *supra* note 2, p. 135.
100. IAEA (2006), *supra* note 23, Foreword.
101. Madsen, M.A. (2021), "Know the IAEA Safety Standards", *IAEA Bulletin*, Vol. 62, No. 1, IAEA, Vienna, p. 12.

cycle and any takeback arrangements) can also be material. This in turn determines the scale of the radioactive waste and spent fuel inventories, and the measures to manage them. In general, more extensive programmes and larger inventories are more resource-intensive to report on.

In the absence of a precise quantification of the expected resource and cost outlay, governments are understandably concerned about their ability to meet the demands of the reporting regime and are hesitant to commit to the Joint Convention. These concerns are not unfounded,[102] but neither are they so insurmountable as to rule out adherence. Various forms of support are available to help prospective Contracting Parties obtain a realistic understanding of the resource and cost commitments involved before deciding, as well as to provide guidance and assistance to fulfil their procedural obligations once they have joined the Joint Convention.

The most immediate source of support obviously comes from the IAEA itself, which has been given the mandate to promote conventions concluded under its auspices and to assist Member States with adherence, participation and implementation.[103] In its capacity as the Secretariat of the Joint Convention, the IAEA organises a range of promotional and implementation assistance activities. For example, it conducts tailored workshops to help newly acceded Contracting Parties prepare their first National Report and to participate in their first Review Meeting.[104] These workshops invite other Contracting Parties with comparable programmes to share their knowledge and expertise, which is then adapted to the recipient state's domestic context.[105] In the most recent iteration of such workshops, four out of five new Contracting Parties went on to successfully submit their National Reports for the 8th Review Meeting of the Contracting Parties to the Joint Convention.[106] The IAEA also regularly conducts regional and interregional workshops for prospective Contracting Parties to gain exposure to the peer review system. These workshops incorporate practical components such as brainstorming exercises that replicate the process of developing National Reports and mock Country Group sessions that simulate the dynamics and expectations when National Reports are reviewed.[107]

New Contracting Parties may also draw on the experience of more established Contracting Parties, whether through formal or informal channels. The Joint Convention public website[108] hosts a large repository of National Reports spanning a wide spectrum of national circumstances and reporting scopes and complexities,[109] making it possible for a

102. A recurring trend observed is that a small number of new Contracting Parties default on their procedural obligations during their first review cycle. This can be discerned from the introductory sections of the Review Meeting Summary Reports, which record instances of non-submission and non-attendance, tallied against the dates on which the Joint Convention entered into force for the states concerned.
103. IAEA (2025), *supra* note 4, para. 22.
104. IAEA (2024), "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: News", Joint Convention Newsletter Issue No. 11, pp. 15-17.
105. *Ibid*.
106. *Ibid*.
107. *Ibid*., pp. 12-14.
108. IAEA (n.d.), *supra* note 57.
109. IAEA (2003), "Summary Report of the 1st Review Meeting of the Contracting Parties to the Joint Convention", available at: www.iaea.org/sites/default/files/summary-report-first-rev-meeting-e.pdf, para. 9, recounts that "[a]mong the Contracting Parties, there was a wide spectrum of size and scope of nuclear programme … The National Reports therefore varied widely in size, scope and complexity". These variations ranged from major nuclear power programmes to legacy wastes, uranium mining, hospital waste and disused sealed sources. IAEA (2009), "Summary Report of the 3rd Review Meeting of the Contracting Parties to the Joint Convention", available at: www.iaea.org/sites/default/files/final-report-english.pdf, para. 11, again notes two review cycles later the "large diversity of national situations". Whatever a state's national situation, it will almost certainly find its own cohort.

state to identify reports broadly aligned with its own situation and to use them as reference points. Having identified suitable National Reports, a state may go one step further by establishing closer bilateral co-operation with the Contracting Parties that produced them, availing itself of their mentorship through consultancies, personnel exchanges and other means of transferring experience.[110]

Türkiye provides a good illustration of a state effectively marshalling both sources of support.[111] Prior to becoming a Contracting Party, it sought assistance from the IAEA to draft national legislation incorporating the provisions of the Joint Convention. Following accession, it again received IAEA assistance in preparing its first National Report, including a workshop at which the GNR and GRP were explained in detail, and experts from Czechia and Argentina were invited to share their experiences. On its own initiative, Türkiye consulted publicly accessible National Reports as practical references, particularly those of countries with similar nuclear and radioactive waste programmes. It also adopted the common practice among Contracting Parties of establishing a dedicated inter-agency working group of relevant stakeholders to ensure co-ordinated input in preparing their National Report. Türkiye's example demonstrates that, while the resource demands of the reporting process are real, they can be mitigated and managed through strategic engagement with both vertical and horizontal support, and the judicious use of existing precedents.

iii. Accession

As with any treaty, before becoming party to the Joint Convention, a state must complete the requisite steps for accession,[112] both at the national level (e.g. parliamentary and/or executive approval) and at the international level (e.g. deposit of the appropriate instrument of accession).[113] The necessary domestic procedures are largely determined by constitutional and legal requirements, and will vary in difficulty, duration and cost from state to state. Relevant considerations include the degree of political support for accession, the level of involvement of different branches of government and other stakeholders, and any accompanying need to raise awareness among decision makers. A state's prior experience with ratifying or acceding to other nuclear safety conventions may be instructive in this regard.

b. Benefits

Essentially, there are three principal benefits of becoming a Contracting Party: national safety, regional safety and public perception.

i. National safety

The most direct effect of becoming a party is that a state assesses its status quo and its position against the Joint Convention's substantive obligations, ultimately prompting reforms and refinements in its management of spent fuel and radioactive waste, to bring it into conformity with its obligations under the Convention and enhancing its own safety regime. In parallel, the peer review mechanism established by the Joint Convention's

110. IAEA (2006), "Summary Report of the 2nd Review Meeting of the Contracting Parties to the Joint Convention", available at: www.iaea.org/sites/default/files/summary-report-of-the-second-review-meeting.pdf, para. 31, recommends bilateral efforts for mentoring and sharing expertise as one possibility to increase membership in the Joint Convention.
111. IAEA (2024), *supra* note 104, p. 9.
112. Since the Joint Convention has already entered into force, any state seeking to become a Contracting Party at this stage does so by accession rather than by ratification, acceptance or approval (Joint Convention, *supra* note 1, Article 39(3)). In all cases, however, these acts have the same legal effect of indicating the state's intention to be legally bound by the Joint Convention.
113. Joint Convention, *supra* note 1, Article 39(5).

procedural obligations invokes the complementary elements of national self-assessment and international peer assessment, both being instrumental to safety-related progress.[114]

National self-assessment is, in fact, embedded throughout the peer review process – in the preparation of the National Report, in the formulation of responses to written questions and comments, and in the presentation and discussion of the National Report within Country Groups. These actions compel a state to "take a critical look at its national program and report issues and potential issues, in a frank and candid manner",[115] thereby engendering the awareness and sensitivity necessary to detect where improvements are required.

Complementing the above, international peer assessment adds an additional aspect of external scrutiny. As discussed in Subsection 2.c(ii), the Joint Convention's Review Meetings incorporate multiple features to optimise the quality of peer review, relying in particular on peers to ask one another "difficult and sometimes challenging questions" to ensure review is "comprehensive", "thorough" and "robust".[116] In doing so, they inject rigour and objectivity that go beyond what self-assessment alone can achieve.

Yet it is not merely the intensity of external scrutiny that drives improvement, the other hallmark of the peer review system is the conducive environment it fosters for learning. It is the combination of candour and constructiveness that makes international peer assessment capable of delivering genuine and sustained improvements.[117] Moreover, arrangements are put in place to maintain continuity between Review Meetings,[118] allowing these salutary effects to compound over successive review cycles.

The peer-supported learning environment can indeed be advantageous for states in the early stages of developing and fine-tuning their radioactive waste or spent fuel programmes.[119] Remaining outside the Joint Convention would mean forgoing these unique and valuable opportunities to strengthen national programmes and promote the upward convergence of relevant safety standards.

ii. Regional safety

Nuclear safety is inherently a transboundary issue. Accidents involving spent fuel or radioactive waste facilities and activities may generate harm that transcends national borders. Consequently, the policies and practices adopted by neighbouring states are not purely domestic concerns but may directly and vitally affect others in the region. If most states in a region are Contracting Parties to the Joint Convention, accession places a state in a stronger position to monitor, engage with and positively influence the safety-critical decisions of its neighbours. Exclusive privileges enjoyed by Contracting Parties make such monitoring, engagement and influence possible, contributing to a safer region for all.

The first privilege, as set out in Subsection 2.b(ii), is the right to be consulted, as well as to request and receive information, before a spent fuel or radioactive waste management facility with potential transboundary impacts is sited in the Contracting Party's vicinity. Advance notification and provision of information do more than merely inform; they create the conditions for early engagement, empowering a state to take

114. Linsley, G. (2004), "Observations on the First Review Meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management", *Nuclear Law Bulletin*, No. 74, OECD Publishing, Paris, p. 83.
115. GRP, *supra* note 15, para. 2.
116. *Ibid*., paras. 2, 41 and 56.
117. Tonhauser, W., A. Wetherall and L. Thiele (2022), *supra* note 2, pp. 129-130.
118. GRP, *supra* note 15, para. 28, mention the example of the workshop of incoming and outgoing officers held prior to the Review Meeting to facilitate knowledge transfer and the turnover of duties. Tonhauser, W., A. Wetherall and L. Thiele (2022), *supra* note 2, p. 130, consider other initiatives to enhance the continuity of knowledge management and retention between review cycles.
119. IAEA (n.d.), *supra* note 6, p. 3.

appropriate steps to protect its interest at a formative stage of planning, before decisions are locked in or risks have materialised.

The second privilege is the right to ask questions and seek explanations regarding the continuing safety performance of other Contracting Parties, over the lifetime of their spent fuel and radioactive waste programmes, as they evolve. National Reports, while often informative and publicly accessible, [120] are self-reported snapshots that afford no opportunity for further interrogation. However, Contracting Party status unlocks additional avenues of accountability. Firstly, the option to submit written questions and comments on any National Report of concern with an expectation of a reply and, secondly, the option to examine National Reports in detail at Country Group sessions, largely irrespective of assigned groupings. These avenues elevate passive information into active and meaningful involvement and scrutiny.

The third privilege is the right of access to documents that are available only to Contracting Parties. One category of documents comprises the written questions, comments and answers exchanged in the lead-up to Review Meetings.[121] A Contracting Party receives not only answers to its own questions and comments but the full set of questions, comments and answers submitted by all Contracting Parties. [122] Another category of documents comprises the reports prepared by officers appointed to manage Country Group sessions. These reports provide insightful analysis and synthesis of pre-meeting and in-session material, as summarised in Figure 4 below. With these documents, a state can delve far deeper into the national safety situations of other states than is possible through National Reports alone, thereby enhancing the capacity to understand and monitor safety-related changes and developments over time.

120. The GNR encourage Contracting Parties to make their National Reports publicly available. GNR, *supra* note 16, Annex, para. 2(a). By default, the Joint Convention Secretariat will make all National Reports publicly available on the Joint Convention public website unless notified otherwise by the Contracting Party concerned. *Ibid*., para. 1. Most, if not all, Contracting Parties make their National Reports publicly available.
121. While the GNR similarly encourage Contracting Parties to make the questions, comments and responses publicly available, there is no default arrangement for the Joint Convention Secretariat to make them publicly available and far fewer states have done so in practice. See *Ibid.*, para. 2(b).
122. GRP, *supra* note 15, paras. 40, 67 and 68.

Figure 4: Selected Joint Convention documents accessible only to Contracting Parties

Document	Purpose	Availability
Co-ordinators' reports	Pre-meeting summary and analysis of National Reports and written questions, comments and answers of the Country Group, as well as identification of any trends[123]	Available to Contracting Parties in respect of both its own Country Group and other Country Groups[124] Not available to the public
Rapporteurs' session reports	In-session summary and synthesis of the Country Group's discussions, including good practices, areas of good performance, suggestions, challenges, overarching issues, and feedback on areas for improvement and follow-up[125]	Available to Contracting Parties in respect of its own Country Group,[126] but not to other Country Groups[127] Not available to the public
Rapporteurs' written and oral reports	More condensed version of the Rapporteurs' session reports[128]	Available to Contracting Parties in respect of both its own Country Group and other Country Groups[129] Not available to the public

iii. Public perception

Participation in the Joint Convention signals a state's commitment to maintaining legal frameworks, technical infrastructure and operational practices that meet internationally accepted safety benchmarks for the management of spent fuel and radioactive waste, thus enhancing domestic and international public perception of Contracting Parties. It also conveys that the state is willing to subject itself to regular reporting and peer review, underscoring its readiness to withstand the rigour of such external scrutiny.[130]

This signalling function can play a powerful legitimising role. Domestically, the public may be more assured of the safety and adequacy of national arrangements when these are situated within a reputable framework of standards and oversight, and are peer reviewed by other more experienced Contracting Parties. More broadly, uncertainties and concerns about transboundary effects may be reduced, helping to secure buy-in and support from regional and international communities.

Legitimacy does not derive solely from protecting people and the environment in the present. As radiation risks may persist over long periods, the consequences of current actions for subsequent generations must also be considered. It is a fundamental safety principle that radioactive waste should be managed so as to avoid imposing undue burdens on future generations.[131] The Joint Convention embeds this forward-looking perspective within its objectives[132] and requires Contracting Parties to take responsibility for the waste they generate, to develop and apply solutions for its long-term management, and to keep

123. *Ibid.*, para. 58.
124. *Ibid.*, para. 58(b).
125. *Ibid.*, Annex 1, paras. II.5(b)-(e).
126. *Ibid.*, paras. 46-47.
127. *Ibid.*, para. 51, highlights the confidentiality of Rapporteurs' Session Reports, which suggests they are not disseminated outside the Country Group.
128. *Ibid.*, Annex 1, para. II.5(h).
129. *Ibid.*, paras. 31(a), 31(c)(i), 31(c)(v), 50 and 63(e).
130. IAEA (n.d.), *supra* note 6, p. 4.
131. IAEA (2006), *supra* note 23, p. 12.
132. Joint Convention, *supra* note 1, Article 1(ii).

waste generation to the minimum practicable level.[133] Acceding to the Joint Convention affirms that a state embraces the intergenerational dimension of spent fuel and radioactive waste management, further bolstering public confidence.

These benefits, albeit perceptional in nature, should not be underestimated. Credibility and trust can be just as critical as technical competence for societal acceptance and the long-term success of a country's nuclear and radiological programmes.

c. Cost-benefit matrix

Thus far, the costs and benefits of adhering to the Joint Convention have been discussed separately. To recapitulate, these are:

- the cost of implementing substantive obligations (Cost 1);
- the cost of implementing procedural obligations (Cost 2);
- the cost of the accession process (Cost 3);
- the benefit of enhancing national safety (Benefit 1);
- the benefit of enhancing regional safety (Benefit 2); and
- the benefit of enhancing public perception (Benefit 3).

The following subsection weaves together these separate strands of costs and benefits to discern their trade-offs. States face diverse circumstances, with some actively considering nuclear power, and others not; some are developing countries with limited human and financial resources, while others are more advanced; and neighbouring countries may be charting their own courses altogether.

A matrix-based approach systematically captures this diversity. Accordingly, Figure 5 depicts two states: a state contemplating accession (Prospective Contracting Party or PCP) and a neighbouring state already party to the Joint Convention (Neighbouring Contracting Party or NCP),[134] whose respective choices to pursue nuclear power or not, give rise to four possible scenarios. Each scenario entails a distinct cost-benefit profile, assessed from the standpoint of the PCP. These profiles can then be compared to determine whether the circumstances of accession are likely to be favourable overall for the PCP concerned, leading to an informed policy decision.

133. *Ibid.*, Articles 4(ii), 4(vi, vii), 11(ii, vi and vii).
134. This assumption is made because if a state is surrounded by non-Contracting Parties, the core benefit of accession (i.e. establishing treaty relations with neighbours to enhance regional safety) would be negated.

Figure 5. Cost-benefit matrix

		Prospective Contracting Party	
		Nuclear	No nuclear
Neighbouring Contracting Party	Nuclear	**Scenario 1** Cost 1, in respect of SFM and RWM Cost 2, in respect of SFM and RWM Cost 3 Benefit 1, in respect of SFM and RWM Benefit 2, in respect of SFM and RWM Benefit 3	**Scenario 2** Cost 1, in respect of RWM only Cost 2, in respect of RWM only Cost 3 Benefit 1, in respect of RWM only Benefit 2, in respect of SFM and RWM Benefit 3
	No nuclear	**Scenario 3** Cost 1, in respect of SFM and RWM Cost 2, in respect of SFM and RWM Cost 3 Benefit 1, in respect of SFM and RWM Benefit 2, in respect of RWM only Benefit 3	**Scenario 4** Cost 1, in respect of RWM only Cost 2, in respect of RWM only Cost 3 Benefit 1, in respect of RWM only Benefit 2, in respect of RWM only Benefit 3

SFM = Spent fuel management.

RWM = Radioactive waste management.

A few explanatory remarks regarding Figure 5 here are apposite.

Firstly, the qualifier "in respect of" has been attached to Costs 1 and 2, and Benefits 1 and 2. Although the Joint Convention contains provisions covering both spent fuel and radioactive waste, in the non-nuclear scenarios, the relevant costs and benefits pertain solely to radioactive waste management. On the other hand, Cost 3 and Benefit 3 are unlikely to differ substantially between nuclear and non-nuclear scenarios, and hence no qualifier is attached to them.

Secondly, Costs 1 and 2 and Benefit 1 depend on the nuclear position of the Prospective Contracting Party. If the PCP chooses to pursue nuclear energy generation (i.e. SFM is relevant), these items apply in respect of both SFM and RWM. If the PCP remains a non-nuclear state (i.e. SFM is not relevant), they apply in respect of RWM only. This shift can be observed between Scenarios 1 and 2, and Scenarios 3 and 4 (i.e. when only the PCP's position changes), but not between Scenarios 1 and 3 or Scenarios 2 and 4 (i.e. when the PCP's position remains unchanged). The corollary is that Benefit 2 depends on the nuclear position of the NCP. If the NCP chooses to pursue nuclear energy generation (i.e. SFM is relevant), this item applies in respect of both SFM and RWM. If the NCP remains non-nuclear (i.e. SFM is not relevant), this applies in respect of RWM only. This shift can be observed between Scenarios 1 and 3, and Scenarios 2 and 4 (i.e. when only the NCP's position changes) but not between Scenarios 1 and 2 or Scenarios 3 and 4 (i.e. when the NCP's position remains unchanged).

Thirdly, although the costs and benefits for Scenarios 1 and 3 have been laid out, the cost-benefit outcome is relatively straightforward. If the PCP opts to pursue nuclear energy, accession to the Joint Convention is all but inevitable.[135] As mentioned before, to date, only three nuclear-powered countries have yet to become parties. Should the PCP follow suit, it would join this small minority and group of states. Put another way, Benefit 3 would be so compelling that the PCP would have little practical choice in the matter.

135. States intending to embark on a nuclear power programme should adhere to the Joint Convention by no later than the end of Phase 2, in line with the IAEA Milestones Approach. IAEA (2022), *Evaluation of the Status of National Nuclear Infrastructure Development*, IAEA Nuclear Energy Series, No. NG-T-3.2 (Rev. 2), IAEA, Vienna, pp. 13 and 38.

Fourthly, the cost-benefit outcome for Scenario 2 is likely the most favourable for the PCP. In this scenario, the PCP incurs some additional, though modest, costs, mainly arising from compliance with the procedural obligations of the Joint Convention, but limited to radioactive waste management only. In exchange, it stands to gain substantial benefits, including the right to be consulted by and receive information from its nuclear neighbour, and the ability to monitor and hold its neighbour accountable through the peer review process, with respect to both radioactive waste and spent fuel management. Put another way, the modest and limited-scope Costs 1 and 2 would be outweighed by the substantial and full-scope Benefit 2. This result is not surprising when one considers that non-nuclear states with nuclear facilities near their borders have long sought legal provisions enhancing their ability to participate in safety reviews.[136]

Finally, Scenario 4 has the most ambiguous cost-benefit outcome. In the previous three scenarios, the direction of the outcome could be deduced logically, without recourse to precise data or numbers. By contrast, Scenario 4 involves weighing costs against benefits solely in relation to radioactive waste management, where no clear offset exists. At its core, the question is whether submitting to the Joint Convention's regime with respect to radioactive waste management alone is worth gaining treaty relations with other Contracting Parties in respect of radioactive waste management alone. The considerations outlined in Subsections 3.a and 3.b provide a useful starting point, but obviously a state must apply them to its own circumstances and undertake a precise quantification of costs and benefits to reach its final decision. A further complication arises if the PCP and NCP have already made political commitments to the Code of Conduct's regime. The question then becomes what additional advantage is conferred by also participating in the Joint Convention, which, as mentioned in Section 1, warrants separate investigation and is beyond the scope of this article.

d. Summary

To summarise the key points of this article, the principal costs considered are:

- Cost 1: Implementing substantive obligations
- Cost 2: Implementing procedural obligations
- Cost 3: Completing the accession process

The principal benefits are:

- Benefit 1: Enhancing national safety
- Benefit 2: Enhancing regional safety
- Benefit 3: Improving public perception

The trade-offs between costs and benefits are contingent on whether the state and its neighbour intend to pursue nuclear power. Four possible scenarios emerge:

- Scenario 1: Both the state and its neighbour pursue nuclear power.
- Scenario 2: The state does not pursue nuclear power, but its neighbour does.
- Scenario 3: The state pursues nuclear power, but its neighbour does not.
- Scenario 4: Neither the state nor its neighbour pursue nuclear power.

The matrix in Figure 5 illustrates how to weigh costs against benefits in each scenario. Based on the analysis:

- For a state pursuing nuclear power, accession is almost non-negotiable, given the weight of expectations.
- For a non-nuclear state with nuclear neighbours, accession is highly favourable, as it grants the non-nuclear state valuable access to information, consultation and accountability mechanisms.

136. Stoiber, C. (2018), *supra* note 81, p. 63.

- For states without nuclear ambitions and with non-nuclear neighbours, the net effect is uncertain and must be assessed on a case-by-case basis. The central question is whether improved oversight of neighbours' radioactive waste programmes justifies taking on the Joint Convention's radioactive waste management obligations. The applicability of the Code of Conduct further complicates the assessment.

4. Conclusion

Treaty participation is often discussed in terms of advantages and disadvantages of joining a particular treaty or convention. However, the considerations underlying this decision are often shaped more by intuitive or politically driven judgement, or even by persuasion from third parties, than by structured analysis.

The principal contribution of this article lies in making explicit a strictly analytical framework for such a decision. It catalogues the principal costs and benefits of accession, identifies the factors that shape their assessment and demonstrates how they may be weighed against each other through a matrix in Figure 5 that captures four distinct configurations of domestic and regional nuclear policies.

This analysis suggests that there is a strong case for accession in two categories. Firstly, for a state pursuing nuclear power, adherence is, in practical terms, close to inevitable given prevailing normative expectations. Secondly, for a non-nuclear state with nuclear neighbours, accession offers significant regional accountability benefits at comparatively modest costs. In both scenarios, the cost-benefit proposition is compelling.

The situation is more nuanced where both the State and its neighbours are non-nuclear states. In this case, it depends on how the state assesses the benefits of increased oversight relative to the costs of assuming the obligations under the Convention within the realm of radioactive waste management only. The calculus becomes even more complex where the Code of Conduct already applies, raising questions about the marginal gains from participating in both regimes.

As a last point, it is worth noting that the framework described in this article is no less relevant for developing countries, which make up a substantial proportion of states not yet party to the Joint Convention. While acknowledging that their treaty participation decisions are profoundly shaped by resource constraints and competing policy priorities, intentionally incorporating cost-benefit thinking can nonetheless support more informed and confident decision making and priority setting. It is also hoped that the discussion of available avenues of assistance in this article has provided further practical value to these states.

Future application of the cost-benefit framework to specific national or regional contexts may test and refine the matrix further, particularly in entirely non-nuclear regions or where interactions with the Code of Conduct arise.

Ghana's nuclear journey: Building legal pathways and powering a sustainable future

*By Theodora Tawiah Amarh**

Ghana is currently embarking on a nuclear power programme as part of an energy transition strategy that includes diversification of its energy sources.[1] Significant and steady progress has been made by Ghana, with a key focus on emission reduction and long-term energy security.[2] This study considers Ghana's nuclear path, focussing on its legal frameworks and the steps taken towards the implementation of nuclear power.

I. History of nuclear technology in Ghana

Ghana's first president, Dr Kwame Nkrumah, strongly supported the adoption of nuclear technology due to its potential to contribute to national development.[3] His vision for the country emphasised the peaceful application of nuclear energy to advance industrialisation and economic growth.[4] In line with this vision, the Government of Ghana launched the Ghana Nuclear Reactor Project (GNRP) in 1961 and formed the Ghana Atomic Energy Committee to oversee its implementation.[5] The project aimed, in the short term, to facilitate research, training and the production of radioisotopes.[6] Its long-term objective was to build human capacity and promote plans for the introduction of nuclear energy for electricity generation in the country.[7] In 1963, the Ghana Atomic Energy Commission (GAEC) was established through an Act of Parliament, to expand the GAEC's responsibilities to include commercialisation of its nuclear research and development results.[8] The GAEC was tasked with advising the government on nuclear matters, promoting nuclear science and technology, and managing the reactor project, among other duties.[9] In 1964, Ghana entered into an agreement with the Union of Soviet Socialist Republics (Soviet Union) to support the construction of a research reactor.[10] Although the original plan was to build a 2 megawatt (MW) reactor, policy shifts and delays led Ghana to instead acquire a

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1. International Atomic Energy Agency (IAEA), Press Release, "IAEA Mission Finds Ghana Committed to Nuclear and Radiation Safety, Encourages Continued Improvements", IAEA Press Release No. 124/2024 (5 Dec. 2024).
2. *Ibid*.
3. Ghana Nuclear Regulatory Authority (NRA) (n.d.), "The Role of the NRA in Ghana's Nuclear Power Programme", https://nra.gov.gh/nuclear-power (accessed 5 May 2026).
4. *Ibid*.
5. Ghana Atomic Energy Commission (GAEC), (n.d.), "History of the Ghana Atomic Energy Commission", https://gaec.gov.gh/history/ (accessed 5 May 2026).
6. *Ibid*.
7. *Ibid*.
8. Note that there have been two GAECs. The Ghana Atomic Energy Committee was superseded by the Ghana Atomic Energy Commission, which was granted expanded powers. See Ghana Atomic Energy Commission Act 204 of 1963 (Act 204), superseded by Act 588 of 2000 (Act 588).
9. See Acts 204 and 588, *supra* note 8.
10. Ennison, I. and M. Dzobo (2011), "Nuclear Power and Ghana's Future Electricity Generation", IAEA-CN-164-1P01, IAEA, Vienna, p. 5.

34 kilowatt (kW) Miniature Neutron Source Reactor (MNSR) from China.[11] This reactor was officially commissioned in 1995 under a technical co-operation agreement with the International Atomic Energy Agency (IAEA).[12]

The GNRP has remained in operation since its commissioning and has both enabled local researchers to gain hands-on experience in nuclear reactor operations and helped train personnel for a future nuclear power programme. To further enhance nuclear education and capacity-building, the GAEC, in collaboration with the University of Ghana and with support from the IAEA, established the Graduate School of Nuclear and Allied Sciences (SNAS) in 2006.[13]

II. Implementation of Ghana's nuclear power programme

The Adzei Bekoe Presidential Committee was established by the Government of Ghana in 2008 to report on the feasibility of integrating nuclear power into Ghana's energy generation mix.[14] The report produced by the committee provided the groundwork for Ghana's current nuclear programme.[15] Since then, Ghana's path towards establishing a nuclear power programme has been shaped by key historical milestones, the development of relevant institutions and progress in legal and regulatory frameworks. This section highlights the main institutions engaged, significant achievements, infrastructure progress and the strategic plan guiding the implementation of Ghana's nuclear power programme.

The Ghana Nuclear Power Programme Organisation (GNPPO) was founded by the Government of Ghana to oversee the implementation of Ghana's Nuclear Power Programme. The GNPPO is responsible for the co-ordination of activities of the key stakeholders and seeks to ensure the seamless progress of the nuclear power programme, as planned.[16] Key stakeholders include the Nuclear Regulatory Authority (NRA), Nuclear Power Ghana (NPG) and Technical Services Organisations (TSOs), such as the Nuclear Power Institute of the Ghana Atomic Energy Commission. The NRA's role is to exercise regulatory oversight over nuclear and radiological activities to ensure security, safety, and adequate protection of public health and the environment.[17] The NPG is the government institution tasked with owning and operating the proposed nuclear power plant for electricity generation.[18] The NPG oversees project development, feasibility studies, site and plant licensing, adherence to regulatory standards, contract negotiations, construction and commissioning.[19] It also ensures the plant remains operational and properly maintained throughout its lifecycle, until it is officially decommissioned and released from regulatory oversight.[20] TSOs are tasked with offering specialised knowledge, skills, and assistance to ensure the effective and long-term operation of the nuclear power programme.[21] The type and extent of technical and scientific support functions would include, *inter alia*, safety reviews and assessments, drafting of safety and security documents, monitoring and inspections, environmental assessments and surveillance, and training and knowledge management, among others.

11. IAEA (2012), "Country Nuclear Power Profiles: Ghana", www-pub.iaea.org/mtcd/publications/pdf/cnpp2012_cd/countryprofiles/Ghana/Ghana.htm (accessed 5 May 2026).
12. *Ibid*.
13. GNA (2016), "School of Nuclear and Allied Sciences celebrates 10th anniversary", Modern Ghana, www.modernghana.com/news/681895/school-of-nuclear-and-allied-sciences-celebrates-10th-annive.html.
14. Ghana Nuclear Power Institute (NPI) (n.d.), "About the institute", https://npi.gaec.gov.gh/about-the-institute (accessed 11 June 2026).
15. *Ibid*.
16. *Ibid*.
17. NRA (n.d.), *supra* note 3.
18. Nuclear Power Ghana (n.d.), "Beyond Electricity: How Nuclear Energy Can Transform Ghana's Economy", https://nuclearpowergh.com (accessed 6 July 2026).
19. *Ibid*.
20. *Ibid*.
21. NRA (n.d.), "Regulations", https://nra.gov.gh/regulations (accessed 11 June 2026).

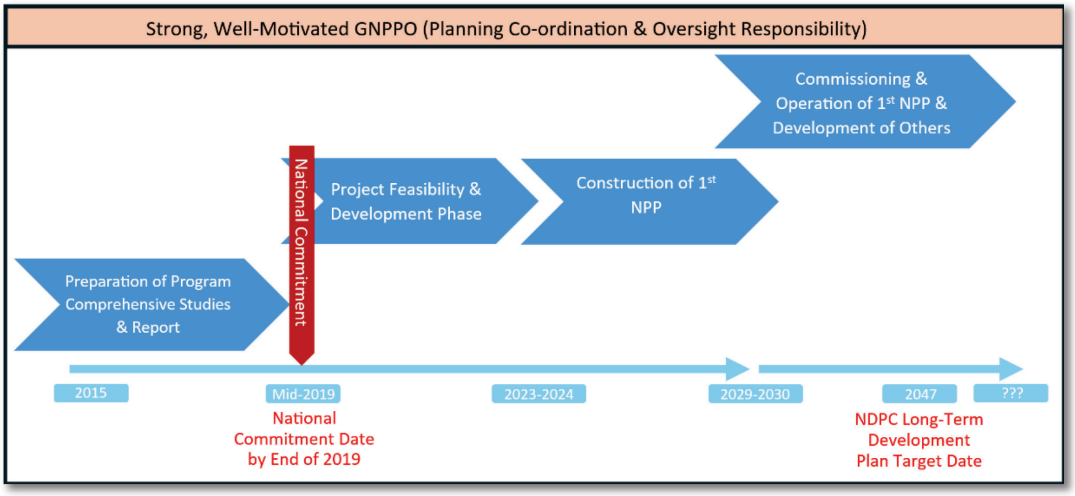
As a Member State of the IAEA, the Government of Ghana is expected to follow the milestone approach designed for newcomer countries developing a nuclear power programme.[22] This approach consists of three key phases:[23]

- Phase one addresses the necessary evaluations and considerations before deciding to pursue a nuclear power programme.
- Phase two involves preparatory actions related to contracting and constructing a nuclear power plant following a policy decision.
- Phase three focusses on the implementation of the initial nuclear power facility.

Ghana has successfully completed phase one and is making substantial progress toward finalising phase two.

In accordance with the IAEA milestone approach, Ghana has created a roadmap (detailed in Figure 1, below) towards implementation of its nuclear power programme. The roadmap is based on the framework provided by the IAEA Milestones for the Development of National Infrastructure for Nuclear Power[24] and spans across the three phases.

Fig 1: Overall roadmap of Ghana's nuclear power programme[25]



In January 2017, Ghana availed itself of an international peer review of Ghana's development of nuclear power infrastructure in phase one.[26] The Integrated Nuclear Infrastructure Review (INIR) was conducted by the IAEA after Ghana submitted a self-evaluation report (SER)[27] and supporting documents. The SER detailed the status of each of 19 infrastructure issues.[28] The INIR team determined that Ghana had made significant advancements in developing its phase one nuclear power infrastructure.[29] They also noted that Ghana had put in place effective systems to engage a broad and inclusive range of

22. IAEA (n.d.), "Milestones Approach", www.iaea.org/topics/infrastructure-development/milestones-approach (accessed 11 June 2026).
23. *Ibid.*
24. IAEA (2015), *Milestones in the Development of a National Infrastructure for Nuclear Power*, IAEA Nuclear Energy Series, No. NG-G-3.1 (Rev. 1), IAEA, Vienna.
25. GNPPO (2019), *Ghana Nuclear Power Programme: Comprehensive Report*, GNPPO, Accra, Ghana.
26. IAEA (2017), *Mission Report on the Integrated Nuclear Infrastructure Review (INIR) – Phase 1*, IAEA Accra, Ghana, available at: www.iaea.org/sites/default/files/2025-03/inir-mission-to-ghana-january-2017.pdf.
27. GNPPO (2016), *INIR Phase 1 Self Evaluation Report*, NPID-120000-PRG-001, GNNPO, Accra, Ghana.
28. *Ibid.*
29. IAEA (2017), *supra* note 26, p. 5.

national stakeholders in related activities.[30] In October 2019, a follow-up INIR mission was carried out by IAEA experts to assess progress since the initial review conducted in 2017.[31] The follow-up INIR mission concluded, *inter alia,* that Ghana has completed the studies needed for the Government to be able to make a knowledgeable commitment to a nuclear power programme, completed its assessment of the adequacy of its national legal framework and had begun preparing itself for phase two activities, including discussions with vendors and other potential partners.[32]

In November 2024, Ghana hosted an Integrated Regulatory Review Service (IRRS) mission aimed at enhancing the effectiveness and robustness of its national regulatory framework concerning nuclear, radiation, radioactive waste and transport safety.[33] The IRRS, established to support countries efforts to strengthen regulatory infrastructure, recognises the state's primary responsibility to ensure safety across these domains.[34] Ghana's request for this mission aligns with ongoing efforts to assess the NRA's effectiveness in overseeing regulatory functions in support of the country's nuclear power programme.

In parallel, Ghana is actively developing its educational infrastructure to sustain the nuclear power programme. The designation of the SNAS as a Regional Designated Centre for Radiation Protection and Safety Education underscores its pivotal role in training personnel both nationally and from across Africa.[35] Additionally, Ghanaian universities and technical institutions are expanding and enhancing nuclear-focussed academic courses. For example, the Kwame Nkrumah University of Science and Technology's Department of Physics runs a Master of Science in Physics programme with a specialisation in Nuclear Science and Technology. Recently, Academic City University, which is a private university, and the Ghana Atomic Energy Commission signed a memorandum of understanding to strengthen collaboration in research, innovation and training in nuclear science and technology. The agreement is aimed at creating a framework that will enable both institutions to build the capacity of students and faculty through internships, joint research and academic exchanges. These programmes are monitored by the National Accreditation Board (NAB) and the National Commission for Tertiary Education (NCTE), to ensure they are brought into line with requirements for national capability and skill development. Efforts also include the establishment of public nuclear information centres, strong community engagement initiatives at potential plant sites and active international collaboration. These ongoing preparatory actions place Ghana in a strong position to transition successfully into phase three of its nuclear power programme.

III. Ghana's international nuclear legal instruments

To facilitate its Nuclear Power Programme, Ghana has ratified and/or acceded to several international treaties, conventions and protocols on nuclear safety, nuclear security, nuclear safeguards and nuclear civil liability.

30. *Ibid.*
31. IAEA (2019), *Report of the Phase 1 Follow-Up INIR Mission to Ghana, 21–24 October 2019*, IAEA, Vienna, p. 7.
32. *Ibid.*
33. IAEA IRRS (2024), *Report of the Integrated Regulatory Review Service (IRRS) Mission to Ghana, 25 November to 4 December 2024*, IAEA-NS-IRRS-2024/7, IAEA, Vienna.
34. IAEA (n.d.), "Integrated Regulatory Review Service (IRRS)", IAEA RegNet, https://gnssn.iaea.org/regnet/peerreview/irrs (accessed 15 June 2026).
35. Ghana Association for Radiation Protection (GARP) (2022), "Ghana commits to ensuring radiation protection, safety", GARP, https://garpghana.org/ghana-commits-to-ensuring-radiation-protection-safety (accessed 15 June 2026).

1. *Nuclear safety*

Though accession to nuclear safety conventions, Ghana seeks to both demonstrate its adherence to nuclear safety principles based on common awareness of the international community and to attain advanced levels of safety. The legal instruments on nuclear safety to which Ghana is a party include:

- the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency;[36]
- the Convention on Early Notification of a Nuclear Accident;[37]
- the Convention on Nuclear Safety;[38] and
- the Joint Convention on Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.[39]

In addition to these legally binding instruments, Ghana has made commitments to adhere to the following non-binding instruments:

- the Code of Conduct on the Safety of Research Reactors;[40]
- the Code of Conduct on the Safety and Security of Radioactive Sources;[41] and
- Guidance on the Import and Export of Radioactive Sources.[42]

2. *Nuclear security*

International legal instruments on nuclear security aim to promote principles that are designed to prevent, detect and respond to criminal and other unauthorised acts, involving or directed to nuclear or other radioactive material and the associated facilities or activities. Towards this same end, Ghana has acceded the Convention on the Physical Protection of Nuclear Material and its Amendment.[43]

3. *Nuclear safeguards*

Nuclear safeguards are legal measures designed to ensure that states do not divert nuclear materials for weapons development and that they comply with their commitments under international non-proliferation agreements.[44] Ghana, in alignment with these objectives, is a signatory to the following key safeguards legal instruments:

36. Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (1986), IAEA Doc. INFCIRC/336, 1457 UNTS 134, entered into force 26 Feb. 1987 (Assistance Convention).
37. Convention on Early Notification of a Nuclear Accident (1986), IAEA Doc. INFCIRC/335, 1439 UNTS 276, entered into force 27 Oct. 1986 (Early Notification Convention).
38. Convention on Nuclear Safety (1994), IAEA Doc. INFCIRC/449, 1963 UNTS 293, entered into force 24 Oct. 1996 (CNS).
39. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (1997), IAEA Doc. INFCIRC/546, 2153 UNTS 357, entered into force 18 June 2001 (Joint Convention).
40. IAEA (2006), Code of Conduct on the Safety of Research Reactors, IAEA Doc. IAEA/CODEOC/RR/2006, IAEA, Vienna.
41. IAEA (2004), Code of Conduct on the Safety and Security of Radioactive Sources, IAEA Doc. IAEA/CODEOC/2004, IAEA, Vienna.
42. IAEA (2012), Guidance on the Import and Export of Radioactive Sources, IAEA Doc. IAEA/CODEOC/IMO-EXP/2012, IAEA, Vienna.
43. Convention on the Physical Protection of Nuclear Material (1980), IAEA Doc. INFCIRC/274 Rev. 1, 1456 UNTS 125, entered into force 8 Feb. 1987 (CPPNM) and the Amendment to the Convention on the Physical Protection of Nuclear Material (2005), IAEA Doc. INFCIRC/274/Rev.1/Mod.1, entered into force 8 May 2016 (ACPPNM).
44. IAEA (n.d.), "IAEA Safeguards Overview", IAEA, www.iaea.org/zh/node/10022 (accessed 15 June 2026).

- the Comprehensive Safeguards Agreement; and
- the Additional Protocol to the Safeguards Agreement. [45]

4. *Nuclear civil liability*

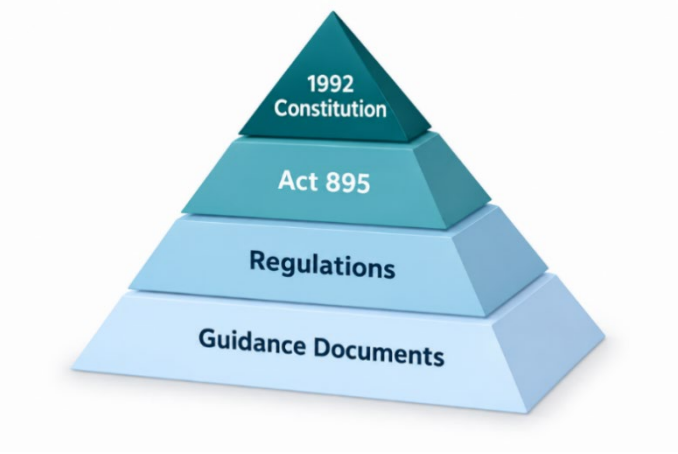
Nuclear civil liability conventions define the legal responsibility in the event of a nuclear accident, ensuring clarity regarding liability and the provision of appropriate compensation for those affected by nuclear damage. The principal conventions in the area of nuclear liability are the Vienna Conventions,[46] the Paris Convention,[47] the Brussels Supplementary Convention[48] and the Convention on Supplementary Compensation for Nuclear Damage (CSC).[49] Ghana is party to both the Revised Vienna Convention and the CSC.

IV. Ghana's national nuclear law

Ghana's national nuclear law follows a hierarchy (as illustrated in Figure 2, below). The 1992 Constitution is the supreme law, and every other law must be consistent with the Constitution. The drafting process of primary legislation begins with a request for policy approval from Cabinet for the proposed legislation by the Sector Ministry. Regulations are subsidiary legislation that implement the primary legislation. Regulations do not often require prior Cabinet approval before the policy proposals are submitted for drafting to the Attorney-General.

45. Ghana's safeguards agreements include the Application of Safeguards with the Treaty on the Non-Proliferation of Nuclear Weapons, IAEA Reg. No. 1134, entered into force 17 February 1975, available at: https://inis.iaea.org/records/knefp-25105, and the Protocol Additional to the Agreement Between the Government of the Republic of Ghana and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, IAEA Reg. No 1773, entered into force 11 June 2004, available at: https://www.iaea.org/sites/default/files/infcirc226a1.pdf.
46. The term "Vienna Conventions" includes the original 1963 Vienna Convention, Vienna Convention on Civil Liability for Nuclear Damage (1963), IAEA Doc. INFCIRC/500, 1063 UNTS 266, entered into force 12 Nov. 1977, as well as the Revised Vienna Convention, Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage (1997), IAEA Doc. INFCIRC/566, 2241 UNTS 302, entered into force 4 Oct. 2003.
47. Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982, and by the Protocol of 12 February 2004, entered into force 1 Jan. 2022, consolidated text available at: NEA (2024), "Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004", NEA Doc. NEA/NLC/DOC(2017)5/FINAL (Paris Convention or PC).
48. Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004, entered into force 1 Jan. 2022, consolidated text available at NEA (2024), "Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004", NEA Doc. NEA/NLC/DOC(2017)6/FINAL (Brussels Supplementary Convention or BSC).
49. Convention on Supplementary Compensation for Nuclear Damage (1997), IAEA Doc. INFCIRC/567, 36 ILM 1473, entered into force 15 Apr. 2015 (CSC).

Figure 2: National Legal Hierarchy on Nuclear Law in Ghana[50]



Enacted by parliament, the Nuclear Regulatory Authority Act, 2015 (Act 895) is the primary legislation on nuclear law in Ghana. Under Section 91(1) of Act 895, the Minister of Environment, Science and Technology (MEST), on the advice of the Board, may, by legislative instrument, make regulations for the efficient and effective implementation of the Act. The scope of Act 895 includes:

- regulation and oversight of activities, and practices related to the peaceful use of nuclear energy and radiation;
- management of radioactive waste from civilian applications in Ghana; and
- the establishment of liability for nuclear damage in Ghana.

Act 895 also established the NRA as an independent regulatory body under the MEST with the mission to regulate radiation and nuclear facilities to meet national and international standards and obligations in a professional, objective and transparent manner. The functions of the NRA can be found under section 5 of Act 895, which sets out that the NRA is responsible for:

- facilitating the development of national policies for nuclear safety, research, radiation and safeguarding nuclear materials;
- regulating radiation sources, nuclear materials and practices, that expose individuals and the environment to radiation;
- issuing and managing authorisations related to nuclear activities;
- overseeing research on radiation safety, nuclear security and radioactive waste;
- regulating the use of radioactive materials in industries such as oil, gas and mining;
- defining obligations, including financial, for individuals and organisations that handle radiation sources and nuclear materials;
- maintaining a national registry of radiation sources and authorised personnel;
- collaborating with private and public entities, collecting information for its regulatory activities.
- co-ordinating emergency plans for radiological incidents;
- ensuring operators provide safety training and education to the public on nuclear and radiation matters;
- establishing regional offices for effective operations; and
- facilitating IAEA inspections to verify compliance with safeguards and protocols.

50. Chart created with assistance from ChatGPT based on information from the GNPPO (2019), *supra* note 25.

As outlined in section 7 of Act 895, the NRA is overseen by a seven-member board appointed by the President in accordance with Article 70 of the Constitution. This governing body includes representatives from the National Security Council and the Environmental Protection Agency, along with a chairperson and three other members possessing significant scientific expertise, with a requirement that at least one of these three be female. The Director-General of the Authority handles the NRA's daily administrative operations. Section 12 of Act 895 also allows for the creation of committees to offer advisory and technical support to the Board and enables the appointment of additional personnel and specialists to ensure the NRA's effective functioning.

The core responsibilities of the NRA are comprehensively addressed under Act 895, including detailed provisions on radiological protection, and incorporating safety principles and regulatory oversight mechanisms. It assigns primary responsibility for safety to the operator, addresses both medical and public radiation exposure, and mandates the establishment of a National Register of Radiation Sources. Additionally, the Act governs the regulation of nuclear installations, the management of radioactive waste and the decommissioning of nuclear facilities. It includes provisions for the safe transport of radioactive materials, the enforcement of safeguards, prohibitions on unauthorised use, and outlines liability in cases of nuclear damage. Financial and transitional arrangements are also covered.

The Nuclear Regulatory Authority (NRA) is empowered by Act 895 to develop the necessary regulations and guidelines to implement the Act effectively. Currently, most of these regulations are in draft form and are under review by the Attorney General's Department before submission to Parliament for formal approval.

Draft regulations developed by the NRA include:[51]

- Draft Basic Ionising Radiation Control
- Draft Safeguards
- Draft Radioactive Waste Management
- Draft Site Evaluation
- Draft Requirements for Technical Services
- Draft Nuclear Security
- Draft Emergency Preparedness and Response
- Draft Licensing of Nuclear Installations
- Draft Integrated Management System
- Design of Nuclear Installations
- Construction of Nuclear Installations
- Commissioning of Nuclear Installations
- Operation of Nuclear Installations
- Draft Nuclear Civil Liability Regulations

The NRA has also produced recommendatory guidance on the implementation of Act 895.

V. Current plans – National legal framework

Nearly a decade after implementing Act 895, it has become clear that a comprehensive revision to the Act is essential. This need for amendment emerged due to several key factors:

- Findings from international collaborations: Ghana's engagement with global nuclear partners and regulatory institutions, such as with the European Instrument

51. NRA (n.d.), "Draft Regulations", NRA, https://nra.gov.gh/draft-regulations (accessed 15 June 2026).

for International Nuclear Safety Cooperation (INSC), revealed the need for modification of the Act.

- Implications of ratifying nuclear liability conventions: The ratification of nuclear liability conventions exposed additional legal and regulatory gaps. The existing law lacked sufficient provisions to fully meet the obligations imposed by these international agreements, making legislative updates necessary.
- Recommendations from the ISSAS mission: The International Safeguards Support and Advisory Service (ISSAS) mission offered an independent evaluation of Ghana's nuclear safeguards and regulatory practices. Their recommendations emphasised the need to enhance the existing framework, reinforcing the case for amending the Act.
- Recommendations from the IRRS mission: The International Regulatory Review Service (IRRS) mission also outlined key areas of Act 895 that need amendments to strengthen the independence of the Regulatory Body.

VI. Conclusion

Ghana has made significant progress in strengthening its nuclear legal framework and advancing its nuclear power programme. The country has consistently shown a strong commitment to align its efforts with international standards for safety, security and non-proliferation. A key breakthrough in this journey is the enactment of Act 895, Ghana's comprehensive nuclear legislation, which established the legal and regulatory foundation for all nuclear and radiation-related activities and facilities.

Further, the development of a roadmap for amending Act 895 underscores Ghana's proactive stance in aligning its regulatory framework with evolving global best practices. As a relative newcomer to nuclear energy development, Ghana's decision to embrace nuclear energy represents a major shift in its national energy strategy. This move offers a structured opportunity to expand the country's energy portfolio and contribute to climate change mitigation through reduced carbon emissions.

By maintaining adherence to international standards, allocating appropriate resources, and building public confidence, Ghana is well positioned to successfully integrate nuclear energy into its power sector. This initiative not only enhances Ghana's long-term energy security but also supports the nation's broader development objectives.

The Creation of Brazil's national nuclear regulatory authority: Origins, transition and challenges ahead

*By Alessandro Facure, Lorena Pozzo, Ailton Fernando Dias and Ricardo Fraga Gutterres**

1. Introduction

The regulation of nuclear activities in Brazil has a long trajectory that started in the mid-20th century with the founding of the Comissão Nacional de Energia Nuclear (CNEN). Created in the developmentalist administration of President Juscelino Kubitschek, and under the strong worldwide influence of the Atoms for Peace programme, the CNEN was imagined as a single institution responsible for practically everything in the nuclear field: to promote, to conduct research, to operate installations and, at the same time, to regulate them.[1] This integrated model, aligned with the logic of administrative centralisation that prevailed in many state-led development programmes in the post war period, particularly in countries launching nuclear activities under strong governmental control, quickly showed an important contradiction. Being both promoter and regulator implied a permanent tension, almost a built-in conflict of interest. Over time, however, this model increasingly placed Brazil outside of the norms of international nuclear governance.

During the decades that followed, the CNEN became the decisive national programme. It contributed to fuel cycle projects, participated in the deployment of the Angra Nuclear Power Plant, and trained several generations of engineers and physicists. Its institutes, Instituto de Pesquisas Energéticas e Nucleares (Institute for Energy and Nuclear Research – IPEN) in São Paulo, Instituto de Engenharia Nuclear (Institute of Nuclear Energy – IEN) in Rio de Janeiro and Centro de Desenvolvimento da Tecnologia Nuclear (Nuclear Technology Development Center – CDTN) in Minas Gerais, became important centres for research and production of radioisotopes. Yet as the nuclear field grew more complex, with electricity generation, medical uses, industrial uses and radioactive waste management all demanding strong oversight, the integrated model produced even more tension. Regulatory functions often appeared secondary to the Agency's promotional activities.[2] Even with the CNEN acting diligently, impartiality remained compromised.

Internationally, the idea of independent regulation consolidated in the 1980s and 1990s, especially under the International Atomic Energy Agency (IAEA). Its General Safety Requirements, Part 1 (GSR Part 1) state that the regulator must be institutionally separated from entities that promote or use nuclear technology.[1] The logic is clear: credibility of regulation depends not only on technical quality but also on independence, both real and perceived. The Organisation for Economic Co-operation and Development (OECD) Nuclear

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1. IAEA (2016), *Governmental, Legal and Regulatory Framework for Safety*, No. GSR Part 1 (Rev. 1), IAEA, Vienna (GSR Part 1).
2. See Tribunal de Contas da União (TCU) (2019), *Audit Report on Nuclear Oversight*.

Energy Agency (NEA) reinforced this point with its work, *The Characteristics of an Effective Nuclear Regulator*.[3]

Brazil, however, kept the integrated model. The effect was two-fold: externally, it weakened the country's position in peer reviews and conventions; internally, it fed criticism from parliament, academia and even operators, who wanted more transparency.[4] The Fukushima Daiichi Nuclear Power Plant accident of 2011 added urgency. Even without a domestic crisis, the sense that Brazil's model was outdated grew stronger.

Proposals for reform had circulated for years. Already, in the 1980s, parts of the scientific community voiced concerns about the fragility of regulatory structures.[5] Parliamentary commissions of inquiry into the nuclear programme also called for separation.[6] But it took until the 2020s for the reform efforts to be realised with the approval of Law 14,222 which established the Brazil's Autoridade Nacional de Segurança Nuclear (National Nuclear Regulatory Authority – ANSN).[7]

The creation of the ANSN is a historic landmark. For the first time, Brazil fully aligns itself with international best practice by creating a body exclusively responsible for nuclear and radiological safety, security, safeguards, licensing, inspection and enforcement. Still, the reform is not complete. The new authority begins with personnel, budgetary flows and infrastructure that remain linked to the CNEN in this transition step. In form, the ANSN is separate, but in substance it still depends on its predecessor.

In this sense, this study has four objectives:

- to show the historical reasons why Brazil kept the integrated model for so long;
- to examine international principles and comparative cases that motivated reform;
- to analyse the transition process and the institutional challenges in building the ANSN; and
- to reflect on what the Brazilian case might mean for other countries that could one day follow a similar path.

The Brazilian case belongs to a global movement of regulatory independence. The argument here is that the ANSN represents both a necessary correction and an incomplete solution; an important step, but not the end of the road. Brazil has formally adopted independence but the real substance will depend on resources, legal status and a career structure capable of sustaining it. This duality – symbolic achievement versus momentary fragility – is what makes the Brazilian experience particularly relevant for international discussion.

3. NEA (2014), *The Characteristics of an Effective Nuclear Regulator*, OECD Publications, Paris.
4. TCU (2024), Judgment *No. 240/2024 – Plenary, Follow-up Audit Report on the Structuring of Brazil's National Nuclear Safety Authority (ANSN)*, 21 Feb. 2024, Brasília, available at: www.tcu.gov.br/acordaos.
5. Joint Parliamentary Commission of Inquiry (1990), *Final Report of the Joint Parliamentary Commission of Inquiry into the Autonomous Nuclear Energy Programme*, Rapporteur: Senator Severo Gomes, Senate Press, Brasília, pp. 118, available at: www2.senado.leg.br/bdsf/handle/id/194598.
6. *Ibid*.
7. 2021 Law No. 14,222 of October 15, 2021, creating the National Nuclear Safety Authority (ANSN); amending Laws No. 4,118 of August 27, 1962, No. 6,189 of December 16, 1974, No. 6,453 of October 17, 1977, No. 9,765 of December 17, 1998, No. 8,691 of July 28, 1993 and No. 10,308 of November 20, 2001; and repealing Law No. 13,976 of January 7, 2020., *Official Gazette of the Union*, Brasília, (18 October 2021) (Law 14,222), available in the original Portuguese at: www.planalto.gov.br/ccivil_03/_ato2019-2022/2021/lei/l14222.htm.

2. International context and rationale for reform

2.1 International principles

The consolidation of international nuclear safety standards over the last decades left little room for ambiguity: a regulatory body must be independent from those institutions responsible for the promotion or direct use of nuclear technology. GSR Part 1 explicitly recommends such separation, arguing that the credibility of a regulator depends as much on its functional independence as on its technical competence.[8] In parallel, *The Characteristics of an Effective Nuclear Regulator*, stresses transparency, accountability and the absence of conflicts of interest as core elements of a strong regulatory authority.[9]

These principles converged after the major nuclear power plant accidents at Three Mile Island, Chernobyl and Fukushima. In each case, inquiries highlighted that deficiencies in regulatory independence aggravated the crisis.[10] From that point, a broad consensus emerged: safety cannot be credible if the same organisation both promotes and controls nuclear technology.[11]

2.2 Comparative experiences

Many countries reformed their nuclear governance to address precisely this dilemma. Spain, for instance, created the Consejo de Seguridad Nuclear (Nuclear Safety Council – CSN) in 1980, at a time when the country was undergoing a transition to democracy.[12] Beyond the technical rationale, the establishment of CSN also carried a symbolic weight, reinforcing public trust in state institutions after decades of authoritarian rule.[13]

Canada, in turn, reorganised its system in the 1990s by establishing the Canadian Nuclear Safety Commission (CNSC).[14] The reform aimed at providing a modern, flexible body capable of responding to an expanding nuclear sector, with growing demands from both energy generation and medical applications.[15] The CNSC was built with a strong emphasis on transparency and public participation, ensuring that its decisions were subject to scrutiny and public debate.[16]

In Argentina, the Autoridad Regulatoria Nuclear (National Regulatory Authority – ARN) was created in 1997.[17] The country had inherited a structure similar to Brazil's, in which the Comisión Nacional de Energía Atómica (National Atomic Energy Commission – CNEA)

8. See GSR Part 1, *supra* note 1, secs. 4.6-4.10.
9. NEA (2014), *supra* note 3, p. 14.
10. IAEA (2015), *The Fukushima Daiichi Accident*, Vol. 1, STI/PUB/1710, IAEA Vienna, pp. 45–78; see also IAEA (1992), *The Chernobyl Accident: Updating of INSAG-1*, Safety Series No. 75, INSAG-7, IAEA, Vienna.
11. GSR Part 1, *supra* note 1, Requirement 4; NEA (2014), *supra* note 3.
12. Law 15/1980, of April 22, establishing the Consejo de Seguridad Nuclear (Nuclear Safety Council – CSN), Official State Gazette (BOE), No. 100, 25 April 1980.
13. CSN (n.d.), "*Historia abreviada de 40 años* [Brief History of 40 Years]", www.csn.es/app-aplicaciones-moviles/noticias-csn/-/asset_publisher/vLxpS0fovO1R/content/historia-abreviada-de-40-anos (accessed 4 June 2026).
14. Nuclear Safety and Control Act, S.C. 1997 (c. 9).
15. See Canadian Nuclear Safety Commission (CNSC) (2026), "Public Commission hearings" www.cnsc-ccsn.gc.ca/eng/the-commission/hearings.
16. *Ibid.*
17. Law No. 24,804 of 1997, establishing Autoridad Regulatoria Nuclear (ARN), official English translation available at: https://oecd-nea.org/jcms/pl_23239/argentina-nuclear-activity-law-law-no-24-804.

accumulated promotional and regulatory functions.[18] The separation was motivated by both international obligations and domestic debates on credibility, and it gave rise to a regulator that rapidly achieved recognition as an independent authority, with clear legal status and its own budget.[19]

Each of these cases demonstrates that reforms were justified not only by technical arguments, but also by political considerations, including concerns about public perception and legitimacy. Independence was seen as a way to rebuild or reinforce trust in the state's capacity to oversee high-risk technologies.

2.3 Brazil's drivers

In Brazil, the debate followed a similar path but took longer to mature. Pressures came from two directions. Externally, peer reviews, international conventions ratified for the country (e.g. the Convention on Nuclear Safety) and recommendations from the IAEA repeatedly pointed out the limitations of the integrated model.[20] Brazil's standing in international fora was affected by the perception that its regulatory body lacked autonomy.[21] Internally, parliamentary debates, audits by the Federal Court of Accounts and recommendations from scientific associations all stressed the conflict of interest embedded in the CNEN's dual mandate.[22] The issue reappeared in multiple reports, from congressional inquiries to audit findings, underlining the need for a separate authority.

By the early 2020s, the case for reform was consolidated. Law No. 14,222/2021 which established the ANSN, was not born in a vacuum, but as the culmination of decades of debate, criticism and comparative learning. Brazil finally followed the international trend, recognising that the credibility of regulation depends not only on technical expertise but also on institutional independence – a condition that is indispensable for public trust and for the country's alignment with global best practices.

3. Institutional transition process

A reform in law does not instantly create a fully operational regulatory authority. The ANSN was born in 2021, but its effective consolidation depends on a complex transition away from the the CNEN. This process involves people, infrastructure, budgets, contracts and data systems. Without these practical steps, the ANSN's independence is at risk of remaining only symbolic.

One of the first concrete measures aimed at ensuring the operational independence of the newly created authority was the establishment of a Transition Working Group, composed of representatives from the CNEN, line ministries and staff linked to the ANSN. This group was charged with preparing the roadmap for the transfer of responsibilities in five areas:

1. personnel – ensuring that inspectors, licensing officers and administrative staff migrate without interruption of functions;
2. assets – identifying which assets are essential for regulatory activities;
3. contracts – separating research-related arrangements from those tied to regulation;

18. IAEA (2024), *Brazil 2024 National Report to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, IAEA, Vienna, (noting the effective separation of regulatory functions through the creation of the ANSN), available at: www.iaea.org/sites/default/files/2025-08/national_report_brazil_2024_br1.pdf.
19. Law No. 24,804 of 1997, *supra* note 17.
20. IAEA (2024), *supra* note 18.
21. *Acórdão* No. 240/2024 *Plenário*, accompanying the structuring of the Autoridade Nacional de Segurança Nuclear created by Law 14.222/2021, available in the original Portuguese at: https://pesquisa.apps.tcu.gov.br/doc/acordao-completo/240/2024/Plen%C3%A1rio.
22. IAEA (2024), *supra* note 18.

4. budget – defining flows of resources that, initially, remain executed by the CNEN but should progressively pass to the ANSN's direct control; and
5. information technology – guaranteeing secure migration of regulatory data.

The group's role was to translate the law into operational reality. In practice, it was the hinge between a formal decision and the creation of a body able to act effectively.

3.1 Human capital

One of the central challenges for ANSN is human resources. The new authority inherits inspectors and technical specialists from the CNEN, professionals with long experience and international recognition. Yet the reform also revealed a weakness: the absence of a dedicated regulatory career track. Moreover, most support staff remained tied to the CNEN, leaving the ANSN dependent on shared services during the first years.

To function as a modern regulator, the ANSN must gradually build its own structure, with specific positions for legal, financial, administrative and IT functions. In the future, public service entrance examinations will be indispensable to consolidate a career path, attract young professionals and ensure continuity. Independence requires not only technical capacity but also organisational autonomy.

3.2 Infrastructure

In its first stage, the ANSN will operate in the same building as the CNEN. This arrangement ensures continuity but also demonstrates the fragility of a body that was created without its own facilities. Co-location is a practical solution, but it must be temporary. As the authority gains budgetary and administrative autonomy, it will need its own headquarters and facilities dedicated exclusively to regulatory purposes. This does not diminish the technical quality of current staff, but it makes clear that a regulator requires its own space, free from ambiguities about identity and function. A distinct institutional image can also contribute to credibility in the eyes of both the Brazilian public and the international community.

3.3 Budget

The law that created the ANSN provided for an independent budget, but in practice the first two annual budgets will still be executed through the CNEN's structures. This hybrid model ensures that essential functions are not interrupted, but it underlines the importance of a progressive transfer of financial control.

Over time, the authority must have the ability to manage its own resources directly — approving expenditures, hiring staff and investing in IT systems — without relying on the CNEN's bureaucracy. Only then will independence be complete.

3.4 Building institutional identity

Finally, a regulator is not defined solely by law or administrative routines, but also by its identity. The ANSN has been designed with a collegiate board of directors, a model that strengthens transparency and avoids excessive concentration of power in the hands of one individual. This governance structure must be accompanied by communication policies that engage society, industry and academia.

Institutional identity also involves symbolic elements: a clear logo, a professional website and an accessible regulatory framework. These are not minor details. They shape the perception of legitimacy. A regulator that communicates poorly risks being perceived as opaque, even if technically competent. Conversely, a regulator that adopts best practices in communication and stakeholder engagement strengthens its authority.

The Brazilian transition thus involves not only transferring personnel and budgets but also constructing a new image. The ANSN must present itself as a professional,

independent and reliable institution, even if in its first years, it continues to coexist physically and administratively with the CNEN.

3.5 Information management

Another dimension of the transition is information management. The vast majority of regulatory documentation in Brazil is already digital, available through structured databases. Still, part of the archive remains in physical form and not yet digitalised. Credibility today is also measured by transparency: operators, professionals and citizens expect that norms, licences and inspection reports be accessible and reliable. The ANSN's task is to guarantee both security and openness in the management of regulatory information.

4. Institutional independence

The concept of independence is central to the legitimacy of any nuclear regulator. International standards, especially those of the IAEA and the NEA, highlight that independence is not a single element but a set of institutional guarantees: legal separation, decision making autonomy, stable funding and accountability mechanisms.[23] The ANSN's creation sought to embody these principles within the Brazilian context.

4.1 Legal framework

Law 14,222 gave the ANSN its legal personality, administrative autonomy and mandate to licence, inspect and enforce sanctions.[24] For the first time in Brazil, the regulator is endowed with explicit power to impose fines and other penalties, a competence that the CNEN exercised only in a limited way. This provides the ANSN with concrete instruments of enforcement and enhances its capacity to demand compliance. The law also established a collegiate board, whose members have fixed mandates and must be confirmed by the Senate. These mechanisms are not merely symbolic; they shield the regulator from sudden political interference and strengthen its credibility.[25]

4.2 Comparison with the CNEN

The contrast with the CNEN is clear. While the CNEN had a collegial structure, regulatory decisions were diluted among four directorates, of which only one focussed on safety, security and licensing. In practice, the regulatory voice represented just a quarter of the votes. By concentrating regulatory powers in the ANSN, the reform eliminates this imbalance and aligns Brazil with international best practices.

4.3 Organisational development

Still, independence is not guaranteed solely by law. It requires organisational robustness.[26] At present, the ANSN inherited experienced inspectors and licensing officers, but it must expand its internal structure to cover legal, administrative and technical functions that are still fragile today. Public service entrance examinations will be essential to establish a professional regulatory career, ensuring renewal and continuity.

This is not a criticism of the current staff, whose competence is widely recognised, but a recognition that a regulator needs its own backbone of support functions. Otherwise, technical excellence risks being undermined by administrative fragility.

23. GSR Part 1, *supra* note 1, Requirements 4-6.
24. Law 14,222, *supra* note 7, Articles 1 and 6.
25. NEA (2014), *supra* note 3.
26. IAEA (2013), *Managing Regulatory Body Competence*, Safety Reports Series, No. 79, IAEA, Vienna.

4.4 External perception

International conventions such as the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel and Radioactive Waste, emphasise that independence must also be perceived.[27] In other words, it is not enough for the ANSN to be formally distinct from the CNEN; society and operators must see it as a body capable of acting impartially. The establishment of its own budget, career structures and headquarters will all contribute to reinforcing this perception. The regulator's legitimacy lies not only in its technical decisions but also in the confidence, perceived and otherwise, that these decisions are free from conflicts of interest.

5. Regulatory framework

The consolidation of the ANSN requires not only institutional autonomy but also a coherent and modern regulatory framework. Under the CNEN, regulations were produced incrementally, often in response to specific projects or urgent demands, which over time resulted in a fragmented normative landscape. While many standards fulfilled their technical purpose, the absence of a systematic policy for consolidation led to overlaps, inconsistencies and, in some cases, obsolescence.

In exercising the regulatory competences conferred by Law No. 14,222/2021 including licensing, inspection, enforcement and normative authority, the ANSN is expected to progressively review, rationalise and update the body of existing regulations inherited from the CNEN. This process is not framed as a new statutory mandate, but as a functional requirement for the effective performance of its legal responsibilities, ensuring consistency with international safety standards, and improving accessibility and clarity for operators and the public.

5.1 Adaptation to international standards

The starting point is the alignment of Brazilian regulation with the IAEA Safety Standards. These documents emphasise the importance of clarity, independence and predictability in regulatory action. By adapting existing CNEN resolutions to these parameters, the ANSN not only addresses technical requirements but also sends a political and institutional message: Brazil recognises that effective regulation must follow the best global practices. This process is gradual and requires technical expertise, but it is essential to consolidate international credibility and prepare for peer review missions, such as the IRRS.

5.2 Consolidation and simplification

The ANSN's mission includes the permanent review and revision of Brazil's nuclear regulations, looking for a coherent, simplified framework. This is not only an exercise in legal technique, but also a matter of regulatory governance. For operators, clarity about applicable rules reduces uncertainty in licensing and inspection processes.[28] For professionals and researchers, simplification means easier access to technical standards. And for the wider public, a transparent system reinforces confidence in the independence and seriousness of the regulator.[29] The consolidation process, therefore, is central to strengthening compliance and building trust.

27. IAEA (2016), *Organization, Management and Staffing of the Regulatory Body for Safety*, GSG-12, IAEA, Vienna.
28. GSR Part 1, *supra* note 1.
29. NEA (2014), *supra* note 3.

5.3 Continuous updating

Regulation cannot be seen as static. The rapid evolution of nuclear technology, from new reactor designs to advanced applications of radioisotopes, requires a regulatory framework that is dynamic and adaptable.[30] The ANSN inherits a robust base of rules, but its responsibility is to maintain mechanisms for periodic review, to update requirements when necessary and to incorporate lessons learned from international experience.[31] The Fukushima Daiichi Nuclear Power Plant accident demonstrated how regulatory systems worldwide must be prepared to absorb new insights and adapt to emerging risks.[32] For the ANSN, this means creating internal processes for continuous learning and dialogue with stakeholders, so that regulation evolves alongside technology and society's expectations.

6. Institutional independence and governance

The effectiveness of any nuclear regulatory authority depends not only on technical competence but also on its institutional independence. In Brazil, this principle acquired concrete form with the creation of the ANSN. For decades, the dual mandate of the CNEN — at once promoter, operator and regulator — exposed the country to criticisms of conflicts of interest. The separation achieved with Law 14,222 corrected this structural problem, but the transition revealed how independence is not declared only in law: it must be built in governance practices, in public perception and in the day-to-day decisions of the regulator.

6.1 Collegiate structure and mandates

A key innovation is the creation of a collegiate board of directors, with fixed terms of office, appointed by the Executive and subject to Senate confirmation hearings.[33] This arrangement reflects international good practice: independence is reinforced when regulatory leaders are not directly removable at will, but rather enjoy institutional stability.[34] Compared to the CNEN, where the regulatory voice represented only a fraction of a broader collegiate, in which research and promotion predominated, the ANSN introduces a model where regulatory perspectives are central and non-negotiable. The Senate's role in hearings also enhances legitimacy, embedding democratic oversight into the authority's design.

6.2 Legal powers for enforcement

Independence without effective instruments of enforcement risks being merely symbolic. The CNEN often faced criticism for lacking clear sanctioning capacity or for applying penalties of limited deterrent effect.[35] The ANSN, in contrast, was created with explicit legal authority to impose fines, suspend licences or even revoke authorisations when safety is at stake. These powers, enshrined in law, place the Brazilian regulator in line with international expectations. They also send a clear signal to operators: regulatory requirements are not recommendations, but rather binding obligations backed by legal mandate.

6.3 Relation to ministries

The institutional positioning of the ANSN also marks a change. The CNEN remained under the Ministry of Science, Technology and Innovation (MCTI), a natural home for research but not always for independent regulation. The ANSN, on the other hand, is located within

30. IAEA (2010), *Establishing the Safety Infrastructure for a Nuclear Power Programme*. IAEA Safety Standards Series, No. SSG-16. Vienna: IAEA,
31. NEA (2016), *Five Years after the Fukushima Daiichi Accident: Nuclear Safety Improvements and Lessons Learnt*, OECD Publishing, Paris.
32. IAEA (2013), *supra* note 26.
33. Law No. 14,222, *supra* note 7.
34. GSR Part 1, *supra* note 1, Requirement 4.
35. TCU (2009), *Operational Audit on Nuclear Regulatory Oversight,* TCU Judgment No. 519/2009.

the Ministry of Mines and Energy (MME), which supervises the nuclear fuel cycle and electricity generation. While this arrangement could be seen as delicate, the crucial point is that the ANSN's autonomy is guaranteed by law: it does not take instructions on technical decisions from any ministry. Additionally, the mandates of the ANSN board are not coincident with the government administrations. Instead, its link to the MME is administrative, while the ANSN's regulatory decisions are strictly independent.

6.4 Accountability and transparency

Independence must always be balanced with accountability. A regulator that is isolated risks losing legitimacy.[36] The ANSN must therefore cultivate mechanisms of transparency, such as public consultations on new regulations, publication of inspection reports and regular communication with operators, the scientific community and civil society. International experience shows that transparency is not a threat to independence but its complement: it builds trust that regulatory decisions are impartial, technically grounded and aligned with the public interest.[37] The ANSN also has its accounts audited, and the exercise of its functions are also audited by the federal government and by a parliamentary audit body.

6.5 Resources and career structure

The creation of the ANSN was legislated as a "zero-cost" reform, which means it began without its own staff cadre or administrative apparatus. Initially, personnel and budgets were transferred from the CNEN – even the headquarters building had to be shared. While such arrangements are common in transition phases, they risk undermining the perception of full autonomy. Over time, the ANSN must establish its own civil service career, dedicated to regulatory functions, with recruitment by public examinations and clear progression paths. Administrative and technical staff are not secondary actors but the backbone of enforcement. Without them, independence would remain only a principle, without execution.

6.6 Long-term consolidation

The ANSN was born with the essential instruments of independence – legal powers, collegiate leadership with fixed mandates and Senate scrutiny. Yet independence is never a finished product; it must be defended and cultivated continuously. The consolidation of careers, budgetary autonomy and regulatory culture will determine whether the authority becomes a respected institution capable of standing on equal footing with its international counterparts. Independence, in this sense, is both a legal status and a daily practice, achieved through firmness in enforcement, transparency in decision making and the gradual construction of institutional credibility.

7. Conclusion

The creation of the ANSN represents a turning point in Brazil's institutional landscape. For the first time, the country separates regulatory functions from the promotion and use of nuclear technology, aligning itself with international safety standards and with the principles defended for decades by the IAEA and the NEA.

This reform closes a historical cycle. Since 1956, the CNEN combined the roles of research institution, operator and regulator – a model that was functional in the early days but increasingly untenable in a world that demands transparent, independent oversight. With Law 14,222 Brazil corrected this structural weakness and gave its regulator the legal mandate to licence, inspect and sanction with autonomy. Symbolically, this step places

36. NEA (2014), *supra* note 3.
37. GSR Part 1, *supra* note 1, Requirement 36.

Brazil within the global community of countries that make nuclear safety a sovereign priority.

At the same time, the transition highlights the paradox of independence. The ANSN was created with "zero-cost" provisions, sharing headquarters and resources with the CNEN and depending initially on the transfer of staff and budget. These arrangements ensured continuity but also underscored the fragility of the early stage. Independence, in this sense, is not achieved overnight: it is consolidated through career structures, stable funding and the gradual building of regulatory culture.

The lessons of international experience are clear. Effective regulators rely on three pillars: legal authority, institutional stability and credibility. Brazil has already secured the first, by granting the ANSN sanctioning powers and fixed-term leadership subject to Senate approval. The second and third will depend on political commitment and administrative investment. Building a dedicated regulatory career, strengthening information systems and ensuring transparency in communication with society, are steps still to come.

Ultimately, the ANSN embodies both a correction and a promise. It corrects the potential conflict of interest that persisted for decades and it promises a future in which Brazil can regulate its nuclear sector with independence, technical excellence and international legitimacy. The path ahead is not free of obstacles, but the foundation has been laid. The credibility of the reform will be measured less by the text of the law and more by the daily practice of an authority that must act firmly, transparently and in the public interest.

For Brazil, the creation of the ANSN is not only an institutional reform. It is also a reaffirmation of a principle: nuclear safety is not negotiable, and its guarantee must rest on an authority that is both independent and accountable. In the decades to come, this choice will shape how the country develops nuclear technology and co-operates internationally, and will ensure that the benefits of the atom are always accompanied by the highest standards of protection.

Determining the beneficiaries of the public funds provided in case a Contracting Party establishes lower amounts of liability for a low risk installation or transport*

Background

The Paris Convention on Third Party Liability in the Field of Nuclear Energy[1] applies to nuclear damage suffered in the territory of, or in any maritime zones established in accordance with international law of, or on board a ship or aircraft registered by: (i) a Contracting Party; and (ii) a non-Contracting State if: (a) it is a party to the Vienna Convention (either the original Vienna Convention or the revised Vienna Convention)[2] and the 1988 Joint Protocol,[3] provided that the Contracting Party to the Paris Convention in whose territory the installation of the operator liable is situated is also party to that Joint Protocol, or (b) it has no nuclear installations or (c) its nuclear liability legislation affords equivalent reciprocal benefits and is based on principles identical to those contained in the Paris Convention (Article 2 of the Paris Convention).

Article 7(b) of the Paris Convention allows a Contracting Party to provide for a lower liability amount: (i) having regard to the nature of the nuclear installation involved and to the likely consequences of a nuclear incident originating therefrom; or (ii) having regard to the nature of the nuclear substances involved and to the likely consequences of a nuclear incident originating therefrom.

It is interesting to note that Article V.2 of the revised Vienna Convention clearly states that:

> Notwithstanding paragraph 1 of this Article, the Installation State, having regard to the nature of the nuclear installation or the nuclear substances involved and to the likely consequences of an incident originating therefrom, may establish a lower

* A question was raised by the International Atomic Energy Agency (IAEA) International Expert Group on Nuclear Liability (INLEX) regarding whether the victims of non-Paris Convention states, who in principle would be covered by the scope of application of the Paris Convention, may benefit from the public funds that the Contracting Party will have to provide in accordance with its backstop obligation under Article 10(c) of the Paris Convention. More specifically, it was questioned whether the distribution of such public funds may be subject to reciprocity or other restrictions. To address this question, the Secretariat to the Contracting Parties to the Paris Convention prepared this note on determining the beneficiaries of the public funds provided in case a Contracting Party establishes lower amounts of liability for a low-risk installation or transport. This note was approved by the Contracting Parties to the Paris Convention on 5 April 2024. It has since been subject to minor updates and formatting adjustments for publication purposes.

1. Nuclear Energy Agency (NEA) (2024), "Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004", NEA Doc. NEA/NLC/DOC(2017)5/FINAL (Paris Convention or PC).
2. Vienna Convention on Civil Liability for Nuclear Damage (1963), IAEA Doc. INFCIRC/500, 1063 UNTS 266 (Vienna Convention or VC). Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage (1997), IAEA Doc. INFCIRC/566, 2241 UNTS 302 (revised Vienna Convention or RVC).
3. Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (1988), IAEA Doc. INFCIRC/402, 1672 UNTS 293 (Joint Protocol).

> amount of liability of the operator, provided that in no event shall any amount so established be less than 5 million SDRs, and *provided that the Installation State ensures that public funds shall be made available up to the amount established pursuant to paragraph* 1. (emphasis added by the Secretariat)

The Convention on Supplementary Compensation for Nuclear Damage[4] (CSC) has a similar provision (Article 4, paragraph 2), but that is not the case under Article 10(c) of the Paris Convention, which states that:

> The Contracting Party within whose territory the nuclear installation of the liable operator is situated shall ensure the payment of claims for compensation for nuclear damage *which have been established against the operator by providing the necessary funds to the extent that the insurance or other financial security is not available or sufficient* to satisfy such claims, up to an amount not less than the amount referred to in Article 7(a) or Article 21(c). (emphasis added by the Secretariat)

The *Exposé des Motifs* of the Paris Convention[5] under Article 10(c) (paragraph 69) explains that:

> If a Contracting Party establishes a lower amount of liability for a nuclear operator under Article 7(b), *that Contracting Party will be obliged to provide compensation for any nuclear damage incurred as a result of a nuclear incident that is in excess of that lower amount, but only up to a certain limit*. This limit is an amount not less than that set forth in Article 7(a) or Article 21(c) whichever is applicable. Thus, if a Contracting Party fixes an operator's liability amount at EUR 70 million for a small research reactor and the nuclear damage resulting from an incident at such an installation exceeds that amount, the Contracting Party is required to provide compensation for the nuclear damage actually incurred, but only up to an amount that is not less than EUR 700 million or EUR 350 million as the case may be. (emphasis added by the Secretariat)

The Brussels Convention Supplementary to the Paris Convention (the "Brussels Supplementary Convention")[6] also addresses this issue under Article 3(c)(ii):

> [For this purpose, each Contracting Party shall either] establish under its legislation the liability of the operator at an amount at least equal to that established pursuant to paragraph (b)(i) of this Article *or Article 7(b) of the Paris Convention, and provide that, in excess of such amount and up to the amount referred to in paragraph (a) of this Article, the public funds referred to in paragraphs (b)(i), (ii) and (iii) of this Article shall be made available by some means other than as cover for the liability of the operator*, provided that the rules of substance and procedure laid down in this Convention are not thereby affected. (emphasis added by the Secretariat)

4. Convention on Supplementary Compensation for Nuclear Damage (1997), IAEA Doc. INFCIRC/567, 36 ILM 1473 (CSC).
5. NEA (2024), "Exposé des Motifs of the Paris Convention as amended by the Protocols of 1964, 1982 and 2004", adopted by the Contracting Parties to the Paris Convention on 18 Nov. 2016, NEA Doc. NEA/NLC/DOC(2020)1/REV1/FINAL (*Exposé des Motifs* of the Paris Convention).
6. NEA (2024), "Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004", NEA Doc. NEA/NLC/DOC(2017)6/FINAL (Brussels Supplementary Convention).

The principles applying to the distribution of public funds

There is no indication of how the public funds should be used under the Paris Convention, whether in the text of the Convention itself, its *Exposé des Motifs* or the Explanatory Report of the Final Act.[7] This may raise uncertainty regarding the distribution of public funds to victims in non-Contracting States.

Consequently, the Contracting Parties to the Paris Convention consider that the decision of a Contracting Party to lower the liability limits for low-risk installations and transport should not impair the rights of the victims entitled to be compensated as per Article 2 of the Paris Convention. If a Contracting Party has decided to lower the liability limits for low-risk installations or transport, in case a nuclear incident causes damage above such limits, such Contracting Party shall cover the gap and public funds used to this effect should also be distributed to victims in non-Contracting States, within the scope of application of the Paris Convention, subject to the distribution rules that would have applied, had the amounts been provided by the operator (e.g. reciprocity principle, if applicable).

7. NEA (2004), "Explanatory Report by the Representatives of the Contracting Parties on the Revision of the Paris Convention and the Brussels Supplementary Convention", Annex IV of the Final Act of the Conference on the Revision of the Paris Convention and of the Brussels Supplementary Convention, 12 Feb. 2004 (Explanatory Report of the Final Act).

The compatibility of the Paris Convention and the Convention on Supplementary Compensation with regard to the definition of "nuclear damage"*

Background

The Convention on Supplementary Compensation (CSC) for Nuclear Damage[1] is open to ratification, acceptance, approval or accession, as applicable, by the Contracting Parties to the Paris Convention on Third Party Liability in the Field of Nuclear Energy. [2]

Article I(f) of the CSC contains a definition of "nuclear damage" which is binding on all parties to the convention, including those who are also party to the Paris Convention.

The definition of nuclear damage under the CSC

Article I(f) of the CSC provides for the same heads of damage as the Paris Convention along with an additional head of damage defined in paragraph (vii) as "any other economic loss, other than any caused by the impairment of the environment, if permitted by the general law on civil liability of the competent court." Although the definition of "nuclear damage" in the CSC is in principle a "closed" definition, in that it does not allow the law of a state party to cover heads of damage other than the ones listed therein, in practice, the inclusion of this residual head of damage allows for some flexibility.

According to the Explanatory Texts for the 1997 Vienna Convention and the CSC,[3] Section 3.5.4:

> It seems clear that this definition is not entirely self-executing and requires implementing legislation, in so far as the law of a Contracting Party does not already provide for compensation of the various categories of damage enumerated in Article I(f)(iii) to (vi). As is pointed out in Section 3.4 of these explanatory texts, all the Contracting Parties to the Convention on Supplementary Compensation have to implement the new definition, irrespective of whether or not they are also Party to

* A question was raised by the IAEA International Expert Group on Nuclear Liability (INLEX) regarding whether the definition of "nuclear damage" in the CSC may cause a conflict of treaty obligations for states parties to both the CSC and the Paris Convention. To address this question, the Secretariat to the Contracting Parties to the Paris Convention prepared this note on the compatibility of the Paris Convention and the CSC with regard to the definition of "nuclear damage". This note was approved by the Contracting Parties to the Paris Convention on 25 May 2020. It has since been subject to minor updates and formatting adjustments for publication purposes.

1. Convention on Supplementary Compensation for Nuclear Damage (1997), IAEA Doc. INFCIRC/567, 36 ILM 1473, entered into force 15 Apr. 2015 (CSC).
2. NEA (2024), "Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004", NEA Doc. NEA/NLC/DOC(2017)5/FINAL (Paris Convention or PC).
3. IAEA (2020), *The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage – Explanatory Texts*, IAEA International Law Series, No. 3 (Rev. 2), IAEA Doc. STI/PUB/1906, IAEA, Vienna (Explanatory Texts for the 1997 Vienna Convention and the CSC), Section 3.5.4.

the Vienna Convention or to the Paris Convention, and irrespective of whether or not any amendment thereto is in force for them. Moreover, the new definition has to be applied irrespective of whether damage is to be compensated on the basis of the national compensation amount to be provided by the Installation State or of the additional public funds to be made available by all the Contracting Parties.

Footnote 278:

The issue of discrepancies between new definitions of nuclear damage in the revised Paris and Vienna Conventions and the Convention on Supplementary Compensation was discussed by INLEX at its fourth meeting (7–11 February 2005). As is pointed out in Section 2.3.2 of these explanatory texts, there are in fact two such discrepancies. The first is the inclusion in the revised Paris Convention of the word "direct" to qualify the economic interest that may be adversely affected by an impairment of the environment. The second is the lack of reference to the residual category of economic loss which was referred to in the text above. On both issues, the Group concluded that the revised Paris Convention makes an attempt to narrow the discretion of the competent court (see footnotes 126 and 129, respectively). The Group further recognized that "the language of the revised Vienna Convention and the CSC, with the omission of 'direct' and the additional head of damage, is broader and allows more scope for the forms of 'economic loss' intended to be encompassed to be captured". Finally, the Group noted that, "if a revised Paris Convention country joined the global regime established by the CSC, it would be obliged to follow the definition of nuclear damage in the CSC".

The definition of nuclear damage under the original Paris Convention

The original Paris Convention[4] does not contain a specific definition of "nuclear damage" but states, in Article 3(a), that the operator of a nuclear installation shall be liable for "(i) damage to or loss of life of any person; and (ii) damage to or loss of any property" (other than the nuclear installation itself or other on-site property).

According to the *Exposé des Motifs* of the original Paris Convention,[5] paragraph 39:

The Convention contains no detailed provisions determining the kind of damage or injury which will be compensated, but it is provided merely that damage must be to persons or property and related causally to a nuclear incident. What should be considered as damage to persons or property and the extent to which compensation will be recoverable, is, in view of the very wide divergence of legal principles and jurisprudence in the law of torts in European countries, left to be decided by the competent court in accordance with the national law applicable [Article 3].

Therefore, the kind of damage that could be compensated under the original Paris Convention is left to the competent court that will decide the extent of the two heads of damage in accordance with the national law, which also means that the Contracting Party's national law could consider a wider definition of nuclear damage, which could, potentially, include additional heads of damage such as the one provided under Article I(f) of the CSC.

4. Convention on Third Party Liability in the Field of Nuclear Energy of 29th July 1960, as amended by the Additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982 (1960), 1519 UNTS 329 (original Paris Convention). On 12 February 2004, the Contracting Parties to the Paris Convention adopted a Protocol to amend this Convention (2004 Protocol), which entered into force on 1 January 2022. Secretariat note: The term "Paris Convention" in this note refers to the convention as applicable after the entry into force of the 2004 Protocol, unless it is otherwise understood by the context of the concerned paragraph. The term "revised Paris Convention" is used only in the context of reproducing in the present note extracts from source documents that employ this term.
5. NEA (1982), "Exposé des Motifs", revised text approved by the OECD Council on 16 Nov. 1982, OECD Doc. C/M(82)24(Final) (*Exposé des Motifs* of the original Paris Convention).

The definition of nuclear damage under the Paris Convention

The Paris Convention contains a definition of "nuclear damage" under Article 1(a)(vii) which is similar to the one provided in the CSC, except for the additional head defined as "any other economic loss, other than any caused by the impairment of the environment, if permitted by the general law on civil liability of the competent court" in Article I(f)(vii) of the CSC.

It is explained in the Explanatory Report of the Final Act,[6] paragraph 12:

> The definition of "nuclear damage" and its component elements, and the definition of "nuclear incident", are identical to those found in the Vienna Amending Protocol and the Supplementary Compensation Convention, with two exceptions: first, unlike the definition contained in the Vienna Amending Protocol, the definition of "nuclear damage" in the Paris Amending Protocol does not include "any other economic loss, other than any caused by the impairment of the environment, if permitted by the general law on civil liability of the competent court". The Paris Convention States were simply not convinced that this head of damage was not already covered by other heads of damage included in the definition.[11]

Footnote 11:

> It was deemed advisable to provide some assurance that this difference in definitions would not be problematical in terms of the application of the Joint Protocol[7] or for States wishing to adhere to the Supplementary Compensation Convention. Eventually, however, it was concluded that if this particular type of damage is not covered under the Paris Convention, then no operator would be held liable to compensate victims for it under the Convention whether those victims are in another Paris Convention State or in a Vienna Convention/Joint Protocol State and regardless of whether the victim's State has provided for compensation of such damage under its national law. Similarly, since the Supplementary Compensation Convention only applies to damage for which an operator is liable under the Paris Convention, the Vienna Convention or the national law of an "Annex State", no Paris Convention State operator will be liable to compensate victims for that particular head of damage. Nevertheless, the Contracting Parties recognise that if they join the Supplementary Compensation Convention, part of their contribution to the fund established by that Convention might be used to compensate this particular head of damage. They therefore agreed to add a note to the Exposé des Motifs of the Paris Convention indicating that the absence of coverage for this particular head of damage under the Paris Convention is not intended to prevent a Contracting State from contributing funds under the Supplementary Compensation Convention to be used to compensate that particular head of damage.

The *Exposé des Motifs* of the Paris Convention[8] reads as follows in paragraph 56(b):

> The definition of "nuclear damage" does not include a head of damage referred to in certain other international nuclear liability conventions as "any other economic loss, other than any caused by the impairment of the environment, if permitted by the general law on civil liability of the competent court". This head of damage is generally considered to be covered by other heads of damage already included in the definition. This difference of definitions does not touch upon possible

6. NEA (2004), "Explanatory Report by the Representatives of the Contracting Parties on the Revision of the Paris Convention and the Brussels Supplementary Convention", Annex IV to the Final Act of the Conference on the Revision of the Paris Convention and the Brussels Supplementary Convention, 12 Feb. 2004 (Explanatory Report of the Final Act).
7. Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (1988), IAEA Doc. INFCIRC/402, 1672 UNTS 293 (Joint Protocol).
8. NEA (2024), "Exposé des Motifs of the Paris Convention as amended by the Protocols of 1964, 1982 and 2004", adopted by the Contracting Parties to the Paris Convention on 18 Nov. 2016, NEA Doc. NEA/NLC/DOC(2020)1/REV1/FINAL (*Exposé des Motifs* of the Paris Convention).

obligations which a Contracting Party may have under other international liability conventions to which it may also be a Party, such as e.g. the Convention on Supplementary Compensation for Nuclear Damage.

Consequently, the competent court of a party to the Paris Convention may consider, under its national law, that the heads of damage provided under Article 1(a)(vii) include such damage as may be envisaged under Article I(f)(vii) of the CSC, in which case there would be no conflict of treaty obligations for a state party to both the Paris Convention and the CSC. Furthermore, the national law of the Contracting Party to the Paris Convention would also be entitled, under the Paris Convention, to provide the same head of damage as under Article I(f)(vii) of the CSC. This approach is in line with the *Exposé des Motifs* of the Paris Convention and the Explanatory Report of the Final Act, which clearly confirm that the intention of the Contracting Parties to the Paris Convention was not to prevent compensation of the head of damage under Article I(f)(vii) of the CSC, nor that a state that would be party to both the Paris Convention and the CSC would not comply with its obligations under the latter.

CASE LAW

Japan

High Court judgements in administrative litigation resulting from Tokyo Electric Power Company's (TEPCO's) Fukushima Daiichi Nuclear Power Plant accident

Following the 2011 accident at TEPCO'S Fukushima Daiichi Nuclear Power Plant (the Fukushima Accident), multiple lawsuits have been filed seeking injunctions to stop the operation of nuclear power plants in Japan. The High Court of Japan recently issued decisions on two cases pertaining the Fukushima Accident: (1) an administrative lawsuit concerning the cancellation of permission for an amendment to the reactor installation permit[1] for Kyushu Electric Power's Sendai Nuclear Power Plant (Sendai Nuclear Power Plant case); and (2) a lawsuit concerning the cancellation of permission for an amendment to the reactor installation permit for Units 3 and 4 of Kyushu Electric Power's Genkai Nuclear Power Plant (the Genkai Nuclear Power Plant case). The Sendai Nuclear Power Plant case is the first appellate judgement concerning administrative litigation under the New Regulatory Requirements, which has been set after the Fukushima Accident, and the Genkai Nuclear Power Plant case is the second appellate judgement after the Sendai Nuclear Power Plant case.

Principal Types of Lawsuits Related to Lawfulness of Nuclear Power Plant Operation

In Japan, lawsuits concerning the operation of nuclear power plants can be broadly categorised into following three types:

(1) Administrative lawsuits

Filed against the national government to seek cancellation of administrative dispositions such as granting permission for the amendment of Reactor Installation Permit.

(2) Civil lawsuits

Filed against nuclear plant operators to seek injunctions to stop plant operation or construction.

(3) Provisional injunctions

Filed to obtain emergency injunction by the court for temporary protection of residents' rights.

1. Japan's licensing process for nuclear reactors consists of roughly three steps: obtaining the Reactor Installation Permit, approval of the Design and Construction Plan, and approval of the Operational Safety Programs. The Reactor Installation Permit is basically the operating licence for which the Nuclear Regulation Authority (NRA) reviews the location, structure and equipment of the reactor and facilities, as well as the technical capability of the operator during the licensing process. In the Reactor Regulation Act, the Reactor Installation Permit is stipulated in Article 43(4 and 5). Most of the existing reactors in Japan had already obtained Reactor Installation Permits before the Fukushima Accident, but after the Fukushima Accident, operation of all reactors was suspended. Operators need to conform with the New Regulatory Requirements, which have proven effective, and obtain the NRA's permission on the amendment to the existing Reactor Installation Permit in order to restart.

Before the Fukushima Accident, residents primarily filed lawsuits of Types 1 and 2. A representative case of Type 1 is the 1992 Supreme Court judgement concerning Unit 1 of the Ikata Nuclear Power Plant. This judgement established criteria for determining illegality in administrative lawsuits regarding nuclear safety:

(a) when the safety examination criteria used by administrative authorities contain unreasonable aspects; and/or

(b) when the investigation, deliberation and judgement process used to determine that a nuclear power plant meets those criteria contains unreasonable aspects.

This "Ikata judgement framework" has been referenced widely in lower courts, regardless of the type of lawsuit. Some scholars point out that this framework imposes an effective explanatory responsibility on administrative authorities, thereby easing the evidentiary burden on residents and influencing recent judicial outcomes. The two lawsuits introduced in this document fall under Type 1: Administrative lawsuits.

Sendai Nuclear Power Plant Case

The Sendai Nuclear Power Plant lawsuit was filed by residents (the plaintiffs) seeking the cancellation of the NRA's administrative disposition dated 10 September 2014, granting permission for the amendment of Reactor Installation Permits for Units 1 and 2 of the Sendai Nuclear Power Plant. The dispute mainly concerned the volcanic impact assessment, one of the criteria for permission for the amendment of a Reactor Installation Permit. The plaintiffs challenged the reasonableness of the volcanic guideline used in the assessment and the reasonableness of the conformity review, based on that guideline.

- District court judgement

On 17 June 2019, the district court dismissed the plaintiffs' claims. However, the court judgement expressed partial doubts regarding the reasonableness of the volcanic guideline, noting that the conformity review based on the volcanic guideline is premised on the precise evaluation of volcanic mechanisms and the potential for changes in volcanic activity but that scientific understanding for that evaluation is not yet sufficiently established among experts. The plaintiffs appealed this judgement.

- High court judgement

On 27 August 2025, the high court issued the first appellate-level judgement nationwide regarding the legality of administrative dispositions based on the new regulatory standards established after the Fukushima Accident. The high court found both the volcanic guideline and the conformity review based on it to be reasonable, overturning the first-instance court's concerns and dismissing the plaintiffs' appeal. Key points of the high court judgement are as follows:

(a) Reasonableness of the volcanic guideline: The guideline is consistent with the IAEA safety standards (SSG-21) and was formulated based on expert knowledge, rendering it reasonable.

(b) Presence or absence of errors or gaps in the conformity review: Based on volcanic expertise, the NRA judgement that surrounding caldera volcanoes were not in imminent danger of major eruption and that the probability of eruption was sufficiently low, had grounds and was not unreasonable.

- Conclusion

In this appellate court, witness examinations of the NRA staff, which were not held during the first instance court, were conducted for the first time to establish the guideline's formulation process. The court's findings largely aligned with the witness testimony. The plaintiffs did not appeal to the Supreme Court, and the decision in favour of the government was finalised.

Genkai Nuclear Power Plant Case

Residents filed this administrative lawsuit seeking cancellation of the NRA's disposition dated 18 January 2017, granting permission for the amendment of a Reactor Installation Permit for Units 3 and 4 of the Genkai Nuclear Power Plant. The main disputes were concerning the reasonableness of the examination criteria for formulation of the standard seismic motion and assessment of volcanic impacts, and the reasonableness of the conformity review based on these criteria.

- District court judgement

On 12 March 2021, the district court found both the examination criteria and the conformity review to be reasonable and dismissed the plaintiffs' claims. The plaintiffs appealed.

- High court judgement

On 20 January 2026, the high court upheld the first-instance judgement and dismissed the plaintiffs' appeal. The court followed the logic of the preceding Sendai Nuclear Power Plant Case appellate decision and ruled that both the specific examination criteria concerning formulation of standard seismic motion and volcanic assessments, and the conformity review based on the criteria were reasonable. Key points of the high court judgement are as follows:

(a) Reasonableness of criteria and conformity review for formulation of standard seismic motion: The guideline on standard seismic motion does not impose the additional numerical requirements asserted by the plaintiffs when interpreted in light of related laws and regulations. Thus, the guideline is reasonable, as is the conformity review based on it.

(b) Reasonableness of criteria and conformity review for assessment of volcanic impact: Consistent with the preceding Sendai Nuclear Power Plant Case, both the volcanic guideline and the review based on it were found reasonable.

The appellate decision followed the first-instance judgement. As with the Sendai Nuclear Power Plant Case, the plaintiffs did not appeal to the Supreme Court and the decision in favour of the government was finalised.

Overall conclusion

These two high court judgements are highly significant as the first instances of appellate-level recognition of the reasonableness of conformity reviews conducted under the New Regulatory Requirements formulated after the Fukushima Accident.

United States

Spent fuel storage litigation

As previously reported in the *Nuclear Law Bulletin*[2] in September 2021, the United States (US) Nuclear Regulatory Commission (NRC) granted a licence to Interim Storage Partners (ISP) to build and operate a proposed spent fuel storage facility in the state of Texas. The State of Texas and Fasken Land and Minerals (Fasken), jointly with Permian Basin Land and Royalty Owners, petitioned for review of the NRC's order granting the licence in the US Court of Appeals for the Fifth Circuit. The cases were consolidated and, on 25 August 2023, the Fifth Circuit granted the petitions for review, vacating the ISP licence after concluding that federal law did not authorise the NRC to issue a licence to store spent nuclear fuel at a privately-

2. See NEA (2022), "Case Law", *Nuclear Law Bulletin*, No. 107, OECD Publishing, pp. 57-58.

owned facility located away from where the spent fuel was generated.[3] The NRC and ISP subsequently sought review in the US Supreme Court and, on 18 June 2025, the Supreme Court issued a decision reversing the Fifth Circuit on procedural grounds – the Court held that neither Texas nor Fasken was entitled to obtain judicial review of the NRC's final licensing decision – and remanded the case to the Fifth Circuit with instructions to deny or dismiss the petition for review, effectively restoring the ISP licence.[4]

On 30 June 2025, the Supreme Court also issued a summary disposition order concerning the Fifth Circuit's separate but related decision to vacate the NRC's issuance of a licence to Holtec International (Holtec) on 9 May 2023 to build and operate a spent nuclear storage facility in New Mexico.[5] The Court vacated the Fifth Circuit's decision and remanded the case for further consideration in light of the decision in NRC v. Texas. The Fifth Circuit had previously acknowledged that the case involving the New Mexico facility was "materially identical" to the Texas case, and the outcome of the Texas case would dictate the outcome of the challenge to the New Mexico facility.[6]

On 22 September 2025, the Fifth Circuit, as required by the Supreme Court, dismissed the petition for review of the ISP licence. Thereafter, on 20 October 2025, the Fifth Circuit, noting that it lacked jurisdiction to consider Fasken's challenge to the Holtec licence, dismissed that petition as well.

A separate petition related to the Holtec licence had been pending before the US Court of Appeals for the District of Columbia Circuit. Beyond Nuclear and Don't Waste Michigan (on behalf of several other co-petitioners) challenged the Commission's rejection of a claim that issuance of the licence, inasmuch as it would permit the storage of fuel to which the US Department of Energy holds title, would violate the Nuclear Waste Policy Act. On 27 August 2024, the DC Circuit denied the petitions for review, finding the Commission did not act unreasonably or contrary to law when it denied their requests for intervention. Beyond Nuclear sought *en banc* review before the DC Circuit,[7] which the DC Circuit held in abeyance and subsequently denied, following the Supreme Court's decision in NRC v. Texas. Beyond Nuclear filed a petition seeking Supreme Court review, which the Court denied on 12 January 2026, thereby leaving undisturbed both the DC Circuit's decision and the Holtec licence.

Generic Environmental Impact Statement for Operating Reactor License Renewal

On 7 October 2024, Beyond Nuclear, Inc. and the Sierra Club, Inc. petitioned the DC Circuit for judicial review of an NRC final rule codifying the agency's analysis of the environmental impacts of certain operating reactor licence renewals. The NRC's final rule took effect on 24 September 2024[8]. It codified, for purposes of the National Environmental Policy Act, the impacts identified in Revision 2 of NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants", as the environmental impacts resulting from the operation of a nuclear power plant during an initial or subsequent renewal term. Briefing in the case concluded on 27 May 2025 and on 30 October 2025 an oral argument was held before the DC Circuit.

3. Texas v. NRC, 78 F.4th 827 (5th Cir. 2023). Full summaries of this decision may be found in NEA (2023), "Case Law", *Nuclear Law Bulletin*, No. 111, OECD Publishing, Paris, pp. 76-77 and NEA (2026), "Case Law", *Nuclear Law Bulletin*, No. 114, OECD Publishing, Paris, pp. 84-85.
4. NRC v. Texas, 605 U.S. 665 (2025).
5. Holtec Int'l v. NRC, 145 S.Ct. 2838, 2025 WL 1787686 (30 June 2025)
6. Fasken Land and Minerals, Ltd. v. NRC, 2024 WL 3175460 (27 Mar. 2024).
7. An *en banc* review is one in which all of the judges in the Circuit hear the case, as opposed to the three-judge panel that made the initial decision on appeal.
8. 89 *Federal Register* (Fed. Reg.) 61466 (6 Aug. 2024).

Operating reactor restart litigation

On 24 July 2025, the NRC approved a series of licensing and regulatory actions that would allow the Palisades Nuclear Plant, located in the state of Michigan, to return to operational status. On 14 November 2025, Beyond Nuclear, Don't Waste Michigan and Michigan Safe Energy jointly filed a petition in district court challenging the NRC's granting of an exemption to Holtec Decommissioning International (90 Fed. Reg. 35737) in connection with authorising the restart. The same petitioners have also challenged the exemption as part of ongoing adjudicatory proceedings before the NRC. An Atomic Safety and Licensing Board denied the petitioners' hearing request and, as of this writing, the petitioners' appeal of the Board's decision remains pending before the Commission. The district court petition alleges that the exemption approved by the NRC violates the Atomic Energy Act. The NRC is being represented in the case by the US Department of Justice.

Applicable legal standards in tort law claims involving radiation hazards

On 30 October 2024, the US Court of Appeals for the Eighth Circuit issued a decision finding that federal standards of care (for example, NRC regulations that establish standards for protection against radiation hazards) do not, as a matter of law, pre-empt state tort standards of care in a "public liability" action brought under the Price-Anderson Act.[9] The Eighth Circuit expressly acknowledged that its decision created a split with other circuits holding to the contrary. The underlying dispute concerned a tort lawsuit by individual plaintiffs alleging they suffered personal injury due to exposure to radioactive materials. The defendant company filed a petition for a writ of certiorari with the Supreme Court, asserting that the decision creates the possibility within the Eighth Circuit that an NRC licensee may be found liable for tort damages by a jury applying the applicable state standards of care, even if the licensee was operating in full compliance with federal requirements. On 6 October 2025, the Supreme Court invited the Solicitor General to convey the US Government's views on the petition.

9. Mazzocchio v. Cotter Corp., 120 F.4th 565 (8th Cir. 2024).

NATIONAL LEGISLATIVE AND REGULATORY ACTIVITIES

Argentina

General legislation, regulations and instruments

Recent Decrees and Law on the privatisation of Nucleoeléctrica Argentina Sociedad Anónima (NASA)

By Decree 695 of 29 September 2025, the procedure for the partial privatisation of NASA was authorised in accordance with Article 4 of Annex I to Decree 695/2024,[1] under the modality of sale of shares and the granting of preference to an Employee Stock Ownership Program, as established by subsection 2 of Article 16 and Article 21 and related provisions of Law 23,696 and its amendments, and by subsection (i) of Article 8 of Law 27,742.

It is worth noting that although the specific regulation that originally declared NASA subject to privatisation (Article 34 of Law 24,804) had been repealed in 2013, the new Law 27,742 re-established the possibility of privatisation;[2] that is, it again declared NASA "subject to privatisation", referring to chapters of Law 23,696 on state reform from the 1990s:[3]

> Article 7 – The companies and corporations wholly or majority-owned by the National State, listed in Annex I of this Law, are hereby declared "subject to privatisation", under the terms and with the effects of Chapters II and III of Law 23,696.
>
> To proceed with the privatisation of such companies and corporations, the transfer of contracts currently in effect to the provinces may be considered.
>
> Article 8 – Nucleoeléctrica Argentina Sociedad Anónima (NASA) is hereby declared "subject to privatisation," in accordance with the terms and effects of Chapters II and III of Law 23,696.
>
> NASA may only: (i) organise an employee stock ownership programme and issue a class of shares for that purpose; and (ii) incorporate private capital participation, with the National State maintaining control or a majority stake in the share capital.
>
> Furthermore, the affirmative vote of the National State shall be required for any decisions that involve:
>
> a) The expansion of the capacity of an existing nuclear power plant and/or the construction of a new one;
>
> b) The temporary or permanent decommissioning of a nuclear power plant for non-technical reasons; and

1. Decree 695/2025, *Autorízase el procedimiento para la privatización parcial*, DECTO-2025-695-APN-PE, *Boletín Oficial de la República Argentina*, No. 72379 (30 Sept. 2025), available in the original Spanish here: www.boletinoficial.gob.ar/detalleAviso/primera/332079/20250930.
2. *Ley de Bases y Puntos de Partida Para la Libertad de los Argentinos* [The Bases and Starting Points for the Freedom of Argentinians Act], Ley 27742, *Boletín Oficial de la República Argentina*, No. 354656 (8 July 2024), available in original the Spanish here: www.boletinoficial.gob.ar /detalleAviso/primera/310189/20240708?busqueda=1.
3. Translated from original Spanish. *Ibid*, Articles 7 and 8.

c) The incorporation of shareholders into the Company that grant it control, as defined in Article 33 of Law 19,550, the General Corporations Law.

To this end, Decree 695 set out that the Ministry of Economy, with the intervention of the Temporary Special Executive Unit "Agency for the Transformation of Public Enterprises", shall adopt the necessary measures to comply with the aforementioned privatisation and must therefore carry out the following actions: the organisation of an Employee Stock Ownership Programme or 5% of the share capital of the aforementioned company; and the sale of 44% of the shares as a block of NASA through a public bidding process of national and international scope, based on the terms of Law 23,696 and its amendments, in accordance with the detailed report submitted.[4]

It was also established that 51% of the share package of NASA will remain in the hands of the National State – Secretariat of Energy – and the National Atomic Energy Commission, a decentralised agency operating within the scope of the Chief of the Cabinet of Ministers, with the National State maintaining the majority stake in the share capital.[5] Furthermore, the Ministry of Economy was authorised to issue the operational and complementary measures necessary for compliance with the provisions of the aforementioned decree, with the intervention of the Temporary Special Implementing Unit "Agency for the Transformation of Public Enterprises".[6]

Currently, the Ministry of Economy is implementing the measures to carry out the corresponding tender, that is, the partial sale of the share package of the only nuclear power operator in Argentina.

Decree 866/2025 of 9 December 2025

Another significant recent regulation related to the nuclear industry was passed by Decree 866/2025 of 9 December 2025.[7] Pursuant to the Decree, the National Executive Branch created the Secretariat of Nuclear Affairs with the following objectives and functions:[8]

1. To be responsible for defining nuclear policy in all matters related to the peaceful uses of nuclear energy or radioactive sources, the fuel cycle, radioactive waste management, and the development and research of nuclear activity, in coordination with the NATIONAL ATOMIC ENERGY COMMISSION (CNEA).

2. To be responsible for monitoring the operation of the nuclear industrial complex, promoting actions that tend to improve the efficiency of the system, including institutional reforms, process optimisation and private capital participation.

3. To evaluate the economic and financial feasibility and sustainability of strategic nuclear projects.

4. To evaluate and monitor the scientific and technological components of nuclear projects, ensuring compliance with the established goals.

5. To participate in co-ordinating the actions of the various political and business actors involved in strategic nuclear activity, at the national, local and civil society levels.

6. To identify and determine, within its area of competence, priority, strategic and relevant issues for national development in the nuclear field.

4. Decree 695/2025, *supra* note 1.
5. *Ibid.*
6. *Ibid.*
7. Decree 866/2025 of 9 December 2025, Amending Decree No. 50/2019, DECTO-2025-866-APN-PTE, *Boletín Oficial de la República Argentina*, No. 93010 (9 Dec. 2025), available in the original Spanish here: www.boletinoficial.gob.ar/detalleAviso/primera/335680/20251209.
8. Translated from the original Spanish (capitalisation as in the original). See *Ibid.*, Annex II.

7. To advise, within its area of competence, on matters related to the participation of the ARGENTINE REPUBLIC in international fora, organisations, or any other arena concerning nuclear matters and other related strategic issues.

8. To assist the Minister, within its area of competence, in actions that promote compliance with the ARGENTINE REPUBLIC's international commitments in the nuclear field and other related strategic issues.

9. To co-ordinate, within the scope of its competence, the actions aimed at fulfilling the functions and objectives established by Law No. 24,804, and its amending and regulatory norms, with the exception of those that establish regulatory functions.

10. To intervene in all matters related to nuclear power generation, as well as in the operation of nuclear power infrastructure.

11. To exercise oversight of the National Atomic Energy Commission (CNEA).

12. To participate in the development of policies regarding the research, design, and construction of nuclear reactors, in coordination with the National Atomic Energy Commission (CNEA).

13. To participate in the design and implementation of policies for the development, promotion, and co-operation of rare earth elements and nuclear minerals, in co-ordination with the relevant areas of the National Public Administration.

14. To participate, within the scope of its competence, in the interaction between the different actors of the mining sector and the provinces to sustainably increase the production of "rare earths" and nuclear minerals, as well as the investment of private capital for their exploitation, in co-ordination with the SECRETARIAT OF MINING.

15. To promote public policies and collaborative actions with public, private and civil society stakeholders involved in the field, enabling the viability of projects related to the mining, processing and application of nuclear technologies.

16. To participate, within its area of competence, in the design and establishment of technologies associated with the refining of rare earth elements, as well as their national development.

17. To issue, within the framework of the policies established by the Ministry and in co-ordination with the relevant areas of the National Public Administration, measures related to strategic nuclear projects and other related strategic matters.

18. To direct the planning, monitoring, and evaluation of matters related to nuclear projects and other related strategic issues, in co-ordination with companies and corporations with majority state ownership in the nuclear sector, and the National Atomic Energy Commission (CNEA).

19. To advise the Minister, in co-ordination with the relevant areas of the National Public Administration, on strategic nuclear projects, as well as on the identification of relevant strategic information in this area and on other matters within its purview.

20. To participate, in coordination with the National Atomic Energy Commission (CNEA), in the various stages of the nuclear fuel cycle.

21. To manage the representation in companies where the Secretariat holds shares and exercises shareholding rights.

22. To co-ordinate the management of the directors representing the National Government in companies where the Secretariat holds shares and exercises shareholding rights.

23. To assist the Minister in the application of Title VII – INCENTIVE REGIME FOR LARGE INVESTMENTS (RIGI) – of Law No. 27,742, within the scope of his competence, and in co-ordination with the SECRETARIAT OF CO-ORDINATION OF ENERGY AND MINING.

It is important to highlight the so-called tutelary control exercised by the new Secretariat of Nuclear Affairs, ultimately subsuming the National Atomic Energy Commission (CNEA) – up until now under the Chief of Cabinet of Ministers – into the Area of the Ministry of Economy.[9]

Slovak Republic

General legislation, regulations and instruments

The legislative process on a decree amending and supplementing the Decree of the Úrad jadrového dozoru Slovenskej republiky (Nuclear Regulatory Authority of the Slovak Republic – ÚJD SR) No. 431/2011 Coll. on the quality management system, as amended (hereinafter referred to as the "draft decree"), based on the enabling provision of Section 25(6) of Act No. 541/2004 Coll. on the peaceful use of nuclear energy (Atomic Act) and on amendments to certain acts, as amended (hereinafter referred to as the "Atomic Act") was adopted and published in the Collection of Laws under the No. 204/2025 Coll. on 2 July 2025. The amendment to the decree was adopted as a reflection on the changes resulting from current conditions in the world and regarding the principles of how commercial-grade products are introduced into practice, especially in the area of procurement of spare parts for the nuclear sector.

United States

International co-operation

On 15 September 2025, the US Nuclear Regulatory Commission (NRC) and the United Kingdom's (UK) Office for Nuclear Regulation (ONR) renewed their Memorandum of Understanding to co-operate and exchange technical information, reaffirming a shared commitment to regulatory excellence that will enable the safe, efficient and accelerated deployment of next generation nuclear technologies. The memorandum continues and expands upon a US-UK regulatory collaboration that has existed since 1975. The NRC-ONR agreement complements a Memorandum of Understanding between the NRC and the Environment Agency of England, signed in 2024.

Licensing and regulatory infrastructure

Since taking office on 20 January 2025, President Donald J. Trump issued a number of Presidential Memoranda and Executive Orders (EO), several of which have implications for the NRC. Of particular significance to the NRC is EO 14300, "Ordering the Reform of the Nuclear Regulatory Commission", issued by President Trump on 23 May 2025.[10] In section 2 of EO 14300, the NRC was ordered to reform its "structure", "personnel", "regulations" and "basic operations". The NRC was also mandated by section 5 of the EO to take a number of very specific reformatory regulatory actions, in addition to the broader mandate of a "wholesale" reform of its regulations. The specific section 5 mandates require the NRC to:

9. *Ibid.*
10. 90 *Federal Register* (Fed. Reg.) 22587 (29 May 2025). President Trump contemporaneously issued three other Executive Orders regarding nuclear energy and infrastructure: United States Executive Order (EO) No. 14299 of 23 May 2025, Deploying Advanced Reactor Technologies for National Security, 90 Fed. Reg. 22581 (29 May 2025); EO No. 14301 of 23 May 2025, Reforming Nuclear Reactor Testing at the Department of Energy, 90 Fed. Reg. 22591 (29 May 2025), and EO No. 14302 of 23 May 2025, Reinvigorating the Nuclear Industrial Base, 90 Fed. Reg. 22595 (29 May 2025).

- reorganise the NRC to promote the expeditious processing of licence applications and the adoption of innovative technology (EO 14300, section 4(a));
- reduce personnel and functions of the Advisory Committee on Reactor Safeguards (ACRS) to the minimum necessary to fulfil ACRS's statutory obligations (EO 14300, section 4(b));
- undertake a review and wholesale revision of regulations and guidance documents and issue notice(s) of proposed rulemaking effecting this revision by 25 February 2026 (EO 14300, section 5);
- establish fixed deadlines for the evaluation and approval of licences, licence amendments, licence renewals, certificates of compliance, power uprates, licence transfers and any other activity requested by a licensee or potential licensee (EO 14300, section 5(a));
- establish fixed caps on the NRC's recovery of hourly fees consistent with the deadlines set by EO 14300 (EO 14300, section 5(a));
- revise the NRC's National Environmental Policy Act (NEPA) implementing regulations "to reflect the Congress's 2023 amendments to [NEPA] and the policies articulated in sections 2 and 5 of EO 14154, 'Unleashing American Energy'" [11] (EO 14300, section 5(c));
- establish an expedited pathway to approve reactor designs that the US Department of Defense or the US Department of Energy have tested, and that have demonstrated the ability to function safely (EO 14300, section 5(d));
- establish a process for high-volume licensing of microreactors and modular reactors (EO 14300, section 5(e));
- establish stringent thresholds for circumstances in which the NRC may demand changes to reactor design once construction is underway (EO 14300, section 5(f));
- revise the Reactor Oversight Process and reactor security rules and requirements to reduce unnecessary burdens, and be responsive to credible risks (EO 14300, section 5(g));
- reconsider the regulations governing the time period for which a renewed licence remains effective and extend that period as appropriate, based on available technological and safety data (EO 14300, section 5(i)); and
- streamline the public hearings process (EO 14300, section 5(j)).

The NRC is taking numerous actions to meet the requirements and timelines of EO 14300. The agency is co-ordinating these efforts with the actions that were already underway to implement the provisions of the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act, which was signed into law on 9 July 2024.[12] In connection with the reform of NRC's regulations required by EO 14300, President Trump, in EO 14215, "Ensuring Accountability for All Agencies," issued on 18 February 2025,[13] required the NRC to comply with the provisions of EO 12866, "Regulatory Planning and Review," issued on 30 September 1993[14] and subjected the NRC's rulemaking processes to the US Office of Information and Regulatory Affairs review and prepublication processes.

11. 90 Fed. Reg. 8353 (29 Jan. 2025).
12. The NRC established a public website to inform and engage external stakeholders during implementation of EO No. 14300 of 23 May 2025, Ordering the Reform of the Nuclear Regulatory Commission, 90 Federal Register (Fed. Reg.) 22587 (29 May 2025), available at www.nrc.gov/about-nrc/governing-laws/advance-act.
13. 90 Fed. Reg. 10447 (24 Feb. 2025).
14. 958 Fed. Reg. 51735 (4 Oct. 1993).

NRC intends to publish the proposed rules in due course in the *Federal Register* for public comment, prior to issuance of the final rules.[15]

Nuclear installations

NRC policy determinations – microreactors

On 17 June 2025, the NRC approved three NRC staff policy recommendations regarding the licensing and deployment of microreactors:

- the Commission approved the position that a factory-fabricated microreactor with features to preclude criticality would not be "in operation" when loaded with fuel, that operation in these circumstances would begin with removal of those features, and that the removal of those features is the best analogue to "initial loading of fuel" for a reactor without such features;
- the Commission approved a recommendation that would allow fuel loading in the factory under a 10 CFR Part 70 licence provided the factory-fabricated module includes features to preclude criticality; and
- the Commission approved the NRC staff's use of the regulations for non-power reactors to authorise operational testing of commercial microreactors at a factory.

To support the regulatory framework for efficient microreactor licensing, in 2025 the NRC staff developed a draft Integrated Microreactor Activities Plan, to provide a comprehensive view of microreactor licensing and regulatory topics.[16] The plan includes actions the staff identified to enhance the flexibility of the regulatory framework to support the diverse technologies and deployment models being considered by microreactor developers and potential applicants. As directed by section (e) of EO 14300, the NRC staff is developing a proposed rule to address licensing requirements for microreactors and other low consequence reactors. The NRC staff is using the Integrated Microreactor Activities Plan to inform the rulemaking effort.

15. The agency's planned rulemaking activities may be viewed at: www.nrc.gov/reading-rm/doc-collections/rulemaking-ruleforum/active/ruleindex. The data has been updated to show which ongoing rulemakings are associated with EO 14300 and the parts and subparts of 10 CFR that are being considered for revision in each rulemaking package. Please note that this information is subject to change and may not include administrative or conforming changes to the NRC's regulations.
16. Microreactor Activities Integration Plan, July 2025, (Agencywide Documents Access and Management System [ADAMS] Accession No. ML25225A024), available at: www.nrc.gov/docs/ML2522/ML25225A024.pdf.

INTERGOVERNMENTAL ORGANISATION ACTIVITY

International Atomic Energy Agency

Nuclear safety

Convention on Nuclear Safety (CNS)

Regarding the nuclear safety conventions, the IAEA's current work is focussed on the successful implementation of activities related to the upcoming Tenth Review Meeting of the Convention on Nuclear Safety to be held on 13-26 April 2026.

To that end, an additional CNS Officers' Meeting was held on 10 September 2025 to advance preparations. The primary objective of the Officers' Meeting was to endorse the revised templates to be used during the current CNS review cycle, with the Secretariat facilitating and co-ordinating the revision process. The revisions were driven by the significant changes to the CNS processes agreed upon at the Third Extraordinary Meeting held on 3-4 September 2024, namely a reduction of the time allotted for Country Group sessions and an increase in the number of Contracting Parties (CPs) to the CNS. These adjustments were intended to streamline the schedule for the first week of the upcoming Review Meeting and to accommodate new CPs to their respective Country Groups. As a result, the templates presented at this meeting were updated accordingly. The roadmap outlining the timeline for the CPs and Officers' Actions in preparation for the Tenth Review Meeting was also finalised and approved.

Additionally, the Vice-Presidents of the Tenth CNS Review Meeting shared the basic concept for a topical session, "Strengthening national regulatory capabilities, taking into account new and innovative technologies and effective nuclear knowledge management" and presented a draft outline of the session along with the proposed way forward for its organisation.

The next Officers' Meeting is scheduled to be held on 25-26 February 2026 to review the status of preparations for the Tenth Review Meeting and to deliberate on all agenda items required for its successful conduct.

Outreach on the CNS

The Workshop for Permanent Mission Representatives on the Convention on Nuclear Safety was held on 10 October 2025. The objective of the event was to provide an introduction to, and overview of, the CNS, its obligations and the peer review process, as well as the adherence process to the CNS.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention)

At the Eighth Review Meeting of the Contracting Parties to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, CPs established a Working Group with the purpose of exploring further options to reduce the burden on officers and enhance the efficiency of the Joint Convention peer review process.

The Working Group held its first meeting online on 14–16 October 2025. Delegates from 33 CPs attended the meeting. Ten proposals were submitted by five CPs ahead of the meeting. The proposals were grouped under two relevant topics: "Burden Reduction" and "Efficiency". The topics were presented for detailed discussion and constructively debated. For some proposals, merging or revision was suggested based on participants' comments, whereas for others, further feasibility and cost-benefit analyses were advised with the support of the Secretariat, considering financial considerations and logistical constraints. All proposals will be further reviewed at the second (hybrid) meeting of the Working Group, scheduled for 6-10 July 2026. The final proposals resulting from the Working Group meetings, along with the outcomes of discussions among the CPs, will eventually be put forward for consideration and approval by CPs.

Outreach on the Joint Convention

The IAEA, in collaboration with the Government of Ghana, organised a Regional Workshop for Member States in Africa, which was held on 15-19 December 2025 in Accra, Ghana. The event brought together experts, regulators, lawyers and representatives from across Africa to enhance understanding of the Joint Convention, explore its benefits and discuss the challenges of becoming a CP to the Convention. A key component of the workshop was a simulated session on reviewing national reports, providing participants with practical experience in the peer review process.

Convention on Early Notification of a Nuclear Accident (Early Notification Convention) and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention)

In 2025, Kyrgyzstan and Uzbekistan became parties to both the Early Notification and Assistance Conventions, bringing the total number of CPs to 136 and 131, respectively.

Denials and Delays of Shipments of Radioactive Material

The Agency held the Fifth Meeting of the Denial of Shipment Working Group (DoS WG) in Vienna on 15-19 December 2025 to report on the progress of the DoS WG. A total of 34 participants from IAEA Member States, international organisations and non-governmental organisations were present at the meeting.

Reiterating that denial and delay of radioactive material shipments constitute a genuine and recurring issue, the Dos WG once again focussed on identifying the key root causes and the main consequences observed in this context. The development of a Joint Statement to promote political commitment at various levels, the establishment of a sustainable network of National Focal Points, enhanced co-operation with the International Civil Aviation Organization, the International Maritime Organization and other bodies of the United Nations, and other international organisations and the maintenance of a dedicated website on Facilitation of Transport of Radioactive Material have been proposed as potential solutions to address the issue. The Secretariat has been requested to actively support the DoS WG in advancing and implementing these activities.

Joint Statement

As part of the DoS Working Group activities, France and Italy drafted a Joint Statement on the Facilitation of Safe and Secure Transport of Radioactive Material, which is aimed at promoting effective and sustainable global facilitation of the safe and secure transport of radioactive material. The Joint Statement looks to elevate awareness of the denial of shipment issues at the international level and reinforce Member States' alignment of their national laws and regulations with international standards applicable to the safe and secure transport of radioactive material. The Joint Statement also seeks to enhance the efficiency of National Focal Points for denials of shipment and facilitate international co-operation to further strengthen the safety and security of international transport of radioactive material.

Code of Conduct on the Safety and Security of Radioactive Sources

The Agency organised a Regional Technical Meeting of the Points of Contact for the Purpose of Facilitating the Import and Export of Radioactive Sources in Accordance with the Guidance on the Import and Export of Radioactive Sources in Buenos Aires, Argentina, from 30 June to 4 July 2025. The event focussed on informing points of contact and strengthening their abilities to effectively fulfil their roles and responsibilities.

Moreover, based on the recommendations from the 2023 Open-ended Meeting of Technical and Legal Experts for Sharing Information on States' Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources and its Supplementary Guidance to encourage voluntary submission of national papers by Member States, the Consultancy Meeting for the development of the Code of Conduct Implementation Survey and review of the current National Paper Templates was organised by the Agency in September 2025. As a result, the survey was developed by experts using the national paper template and the Code of Conduct on a structural basis, ensuring consistency between reporting tools.

At the Second Consultancy Meeting, held from 29 September to 3 October 2025, the development of a tool for national self-assessment of the implementation of the Code of Conduct and its supplementary Guidance, was proposed. Further, the consultants reviewed the draft criteria and questions for a self-assessment tool developed during the first consultancy meeting, held in 2024, and developed functional requirements and specifications for the self-assessment tool in order to publish it under the Radiation Safety Information Management System (RASIMS), based on the analysis of RASIMS data alignment with the Code of Conduct provisions.

Nuclear security

The Agency continued to promote further adherence to, and full implementation of, the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment (A/CPPNM). On 18 November 2025, the IAEA convened the 11th Technical Meeting of CPPNM and A/CPPNM Points of Contact, giving participants the opportunity to discuss experiences, lessons learned and challenges in implementing the CPPNM and the A/CPPNM. This was followed by a technical meeting held on 20-21 November 2025 to promote the universalisation of the A/CPPNM. This event allowed parties to the A/CPPNM, parties to the original CPPNM only and non-parties to exchange views and experiences with a view to supporting universal adherence to the CPPNM and A/CPPNM.

In 2025, the Agency commenced preparations for the Second Conference of the Parties to the A/CPPNM, to be held in 2027. This included an informal briefing for members states on 4 November, as well as an informal meeting of the Parties to the A/CPPNM on 19 November, following the Points of Contact meeting, to allow for discussions on the preparatory arrangements. As with the first such Conference held in 2022, the 2027 Conference is meant to review the implementation of the Convention as amended and its adequacy as concerns the preamble, the whole of the operative part and the annexes in the light of the situation prevailing at that time, as foreseen in Article 16.

Nuclear liability

The process for amending the Convention on Supplementary Compensation for Nuclear Damage (CSC) continued during this period. The CPs had a round of informal virtual consultations on 7 August 2025 and a virtual preparatory meeting on 15-16 October 2025. Thereafter, in final preparation for the Amendment Conference to be held on 13-14 January 2026, the necessary documents (including the Draft Provisional Agenda, the Draft Provisional Rules of Procedure of the Amendment Conference and the Basic Proposal) were finalised and approved by the CPs through the silence procedure. Two sub-regional workshops on the CSC were held in October 2025 in Vilnius, Lithuania, and in December 2025 in Bangkok, Thailand, respectively. A national workshop on the CSC was held in December 2025 in Brasilia, Brazil.

Legislative assistance

The Agency provided legislative assistance to Member States, through national workshops and awareness-raising activities in Burkina Faso and Azerbaijan, to support the establishment of an adequate and comprehensive national nuclear legal framework and to promote adherence to the relevant international legal instruments. In addition, bilateral legislative assistance was provided to six Member States through written comments and advice on the preparation of national nuclear legislation. Under the framework of the IAEA Legislative Assistance Programme, the Agency trained five fellows in nuclear law, four through the Technical Cooperation Programme and one through the IAEA Marie-Sklodowska-Curie Fellowship Programme.

In September and October 2025, the 13th session of the Nuclear Law Institute, supported through the IAEA Technical Cooperation Programme, was held in Vienna, Austria, and attended by 64 participants from 54 Member States who acquired a solid understanding of all aspects of nuclear law, with a particular focus on legislative drafting. The Agency also supported 15 participants to attend the NEA International School of Nuclear Law.

In response to the growing demand for advanced training on nuclear law in the IAEA official languages, an Advanced Interregional Training Course on Nuclear Law in Spanish was held in July 2025 in Mexico, gathering 33 participants from 15 Member States. Also, the First Advanced Interregional Training Course on Nuclear Law in French was held in Algeria in August 2025, gathering 28 participants from 16 Member States. These courses followed the First Advanced Interregional Training on Nuclear Law, held in English in Serbia in 2024.

The IAEA University Partnership Programme on Nuclear Law came to fruition during the reporting period. Of the six partner academic institutions, the University of Buenos Aires (Argentina) was running the second session of its postgraduate course in nuclear law, which was first launched in May 2024. The other five institutions launched their courses in the latter half of 2025, including: the Institute of Nuclear Engineering (Brazil), Khalifa University (UAE), and the University of the West Indies (Jamaica) in September 2025; and Alexandria University (Egypt) and the University of the Witwatersrand (South Africa) in October 2025.

In December, the IAEA signed a Partnership Agreement with the George Washington University Law School in the United States to launch an IAEA Summer School on the International Legal Frameworks for the Safe, Secure and Peaceful Uses of Nuclear Energy. The course will bring together world-class expertise from around the globe in a two-week virtual programme scheduled for 16-25 June 2026.

IAEA events

69th Regular Session of the IAEA General Conference

The 69th Regular Session of the IAEA General Conference was held in person, at IAEA Headquarters in Vienna, Austria, on 15-19 September 2025.

This year, over 3 000 participants registered for the conference, including 2 757 Member State representatives. There was a higher number of representatives from international organisations and non-governmental organisations than at any IAEA General Conference to date. Delegates from over 150 of the 180 IAEA Member States attended the conference.

Resolutions of the Conference

A number of resolutions were adopted by the Conference, including resolution GC (69)/RES/7 on Nuclear and Radiation Safety and resolution GC (69)/RES/8 on Nuclear Security, including sections addressing the legal-related aspects of nuclear safety and security. All resolutions adopted during the 69th Regular Session are available on the IAEA website.[1]

1. IAEA (n.d.), "GC69", IAEA: GC documents archives, www.iaea.org/gc-archives/gc/gc69.

Nuclear and Radiation Safety (GC(69)/RES/7)[2]

Regarding the CNS, the General Conference urged "all Member States that have not yet done so, especially those planning, constructing, commissioning or operating nuclear power plants, or considering a nuclear power programme, to become Contracting Parties to the CNS".[3]

The Conference likewise urged "all Member States that have not yet done so, particularly those managing radioactive waste or spent fuel, to become Contracting Parties to the Joint Convention".[4]

The Conference stressed:

> the importance of CNS and Joint Convention Contracting Parties fulfilling their respective obligations stemming from these Conventions and reflecting these in their actions to strengthen nuclear safety and in particular when preparing National Reports, and actively participating in peer reviews for CNS and Joint Convention Review Meetings.[5]

In addition, the Conference requested "the Secretariat to provide full support for the CNS and Joint Convention Review Meetings, and to consider addressing their outcomes in the Agency's activities, as appropriate and in consultation with Member States".[6] The Conference further urged:

> all Member States that have not yet done so to become Contracting Parties to the Early Notification Convention and the Assistance Convention" and stressed "the importance of Contracting Parties fulfilling the obligations stemming from these Conventions and actively participating in regular meetings of the Representatives of Competent Authorities".[7]

In this context, the Conference requested that:

> the Secretariat, in collaboration with regional and international organizations and Member States, to continue its activities to promote the importance of conventions concluded under the auspices of the Agency and to assist Member States upon request with adherence, participation and implementation as well as strengthening of their related technical and administrative procedures.[8]

With respect to the Code of Conduct on the Safety and Security of Radioactive Sources, its supplementary Guidance on the Import and Export of Radioactive Sources, and its supplementary Guidance on the Management of Disused Radioactive Sources, the General Conference encouraged:

> all Member States to make political commitments to the voluntary and non-legally binding Code of Conduct on the Safety and Security of Radioactive Sources, its Guidance on the Import and Export of Radioactive Sources, and its Guidance on the Management of Disused Radioactive Sources, and to implement these, as appropriate, in order to maintain effective safety and security of radioactive sources throughout their life cycle.[9]

The Conference also requested "the Agency to continue supporting Member States in this regard and to promote these instruments".[10]

2. IAEA (2025), "Nuclear and radiation safety: Resolution adopted on 19 September 2025 during the eleventh plenary meeting", GC(69)/RES/7, IAEA, Vienna.
3. *Ibid.*, para. 17.
4. *Ibid.*, para. 18.
5. *Ibid.*, para. 19.
6. *Ibid.*, para. 20.
7. *Ibid.*, para. 21.
8. *Ibid.*, para. 22.
9. *Ibid.*, para. 23.
10. *Ibid.*

Similarly, the Conference encouraged Member States "to apply the guidance of the Code of Conduct on the Safety of Research Reactors at all stages in the lifetime of research reactors, including planning" and "to exchange their regulatory and operating information and experience with regard to research reactors".[11] In this context, the Conference requested the Secretariat "to continue to support Member States, upon request, in [the] application of the guidance of the Code of Conduct on the Safety of Research Reactors".[12]

Nuclear Security (GC(69)/RES/8)[13]

Regarding the CPPNM and A/CPPNM, the General Conference encouraged "all Parties to the CPPNM and its 2005 Amendment to fully implement their obligations thereunder" and encouraged "States that have not yet done so to become party to this Convention and its Amendment".[14] It further encouraged "the Agency to continue efforts to promote further adherence to the Amendment with the aim of its universalisation."[15] In this context, it reminded all Parties to inform the depositary of their laws and regulations which "give effect to the Convention without further delay", and requested "the Director General of the IAEA, as the depositary, to continue communicating such information to all Parties."[16]

The Conference also requested "the Secretariat to take the Outcome Document of the 2022 Conference of the Parties to the Amendment to the CPPNM into consideration in line with the States Parties' respective legal obligations, in convening a follow-on Conference, in line with Article 16.2 of the Convention" and welcomed "updates on the substantive and organisational preparations of the follow-on Conference to be held in 2027".[17]

IAEA Treaty Event

The 15th Treaty Event was held on the sidelines of the 69th Regular Session of the General Conference, providing Member States with a further opportunity to deposit their instruments of ratification, acceptance or approval of, or accession to, the treaties deposited with the Director General. These included those related to nuclear safety, security and civil liability for nuclear damage.

At the event, Kyrgyzstan deposited legal instruments expressing consent to be bound by both the Assistance Convention and the Early Notification Convention. Uzbekistan was also recognised for its treaty actions, following its accession to the Early Notification Convention and the CNS on 14 April 2025, and the Assistance Convention on 30 July 2025.

In addition, Chile, Colombia, Ecuador, Paraguay, Peru and Venezuela deposited instruments of acceptance to further extend the Co-operation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL Extension Agreement).

Side event on the 20th Anniversary of the Adoption of the Amendment to the Convention on the Physical Protection of Nuclear Material and the International Convention for the Suppression of Acts of Nuclear Terrorism

A side event held on the margins of the 69th Regular Session of the General Conference marked the 20th anniversary of the adoption of two landmark legal instruments – the A/CPPNM and the International Convention for the Suppression of Acts of Nuclear Terrorism. The event was jointly organised by the IAEA, the Kingdom of Morocco, the United Nations

11. *Ibid.*, para. 24.
12. *Ibid.*, para. 26.
13. IAEA (2025), "Nuclear security: Resolution adopted on 18 September 2025 during the seventh plenary meeting", GC(69)/RES/8, IAEA, Vienna.
14. *Ibid.*, para. 14.
15. *Ibid.*
16. *Ibid.*
17. *Ibid.*, para. 15.

Office of Counter-Terrorism and the United Nations Office on Drugs and Crime (UNODC). Speakers, including among others the IAEA Director General, the Executive Director of UNODC, Resident Representatives of six IAEA Member States and the Permanent Representative of the Delegation of the European Union, reflected on progress made over the past two decades and reaffirmed the international commitment to preventing nuclear terrorism, and other criminal acts involving nuclear and other radioactive material.

OECD Nuclear Energy Agency

Bridging Law and Technology: International Workshop for the Deployment of Small Modular Reactors

On 8-10 December 2025, the Nuclear Energy Agency (NEA) and the Government of Sweden co-hosted Bridging Law and Technology: International Workshop for the Deployment of Small Modular Reactors (SMRs), held in Stockholm, Sweden.

Structured into five thematic sessions, combining keynote addresses, panel discussions and interactive Q&A segments, the event brought together more than 200 legal, technical and policy experts to address the unique legal challenges posed by advancements in SMRs and advanced reactors. Focussing on SMR design authorisation, pre-licensing and licensing challenges, factory manufacturing, mobile reactors and transportation, maritime applications, the fuel cycle, waste management and decommissioning, the workshop employed a highly interactive format with participants encouraged to contribute their own expertise and experience to the sessions. Panels featuring experts from governments, regulatory bodies, industry and academia, discussed practical approaches to licensing SMRs, managing liability and fostering international co-operation.

Extensive preparatory efforts were undertaken in the months leading up to the workshop, with thematic working groups convening virtually in September, October and November of 2025 to identify key challenges, draft targeted questions, and develop discussion papers summarising legal and technical frameworks relevant to SMR deployment. These groups were led by co-chairs representing the NEA's standing technical committees and provided participants with early engagement opportunities, fostering collaboration across jurisdictions and disciplines.

Proceedings from the workshop are expected to be published in 2026.

Roadmaps to New Nuclear 2025

On 18-19 September 2025 in Paris, the NEA and the Government of Korea co-hosted Roadmaps to New Nuclear 2025, which built on the success of Roadmaps to New Nuclear 2024. Industry representatives, government ministers and senior officials convened to share recent experiences, deliberate on best practices and chart a collaborative path toward delivering new nuclear energy construction at the scale and pace required to meet the growing global expectations for nuclear energy.

NEA analysis highlights that meeting global net zero targets will require tripling the amount of installed nuclear capacity by 2050. Nuclear new build has become a top priority in several OECD and NEA member countries, which now face significant challenges, in part due to workforce issues, construction delays, cost overruns, and issues related to fuel supply security and regulatory impediments. The high-level conference addressed the challenges of preparing for nuclear new build, with participants sharing recent experiences to pinpoint solutions that deliver new nuclear construction at the scale and pace required to meet national targets.

The next edition of Roadmaps to New Nuclear will be held in 2026 and will be co-chaired by the US Department of Energy.

NEA Global Forum on Nuclear Education, Science, Technology and Policy (Global Forum on Nuclear Education)

Working Group on Re-Establishing Nuclear Law Education Programmes (GF-WG5)

On 14 July 2025, the GF-WG5 met online for the sixth time since the Working Group's founding in 2023. Participants, including senior academics from universities and law schools in Africa, Asia, Europe, North America, Oceania and South America, discussed the preliminary data analysis of the Survey on Nuclear Law Workforce Planning. The survey was developed in early 2025 and distributed to individuals in government and private sector positions related to nuclear law. Respondents were asked to answer questions regarding the state of, and need for, legal staff in their respective organisations. Planning for targeted follow-up interviews and reporting of the preliminary survey results was discussed, along with potential paths forward for the final report on the outcomes of the survey and targeted interviews.

Inaugural Symposium

The first Symposium of the NEA Global Forum on Nuclear Education, hosted by the University of Michigan, was held from 30 September to 3 October 2025 in Ann Arbor, Michigan, in the United States. Representing academia, government, industry and civil society, approximately 180 attendees engaged in an exchange of ideas, and explored solutions to some of the most pressing issues facing nuclear education and workforce development.

The Symposium began with the leaders of the Global Forum Working Groups, including significant representation from GF-WG5, presenting their activities, discussing achievements, challenges and opportunities to strengthen cross-disciplinary approaches in nuclear engineering education. The Symposium's plenary sessions included opening remarks from the Dean of the College of Engineering at the University of Michigan and NEA Director-General William D. Magwood, IV. The programme featured a series of panels and fireside chats that considered regional perspectives, discussed the changing nuclear energy policy landscape and presented strategies for building a skilled nuclear workforce. Breakout group discussions focussed on capacity-building solutions, with a judging panel that selected the most promising ideas. The Symposium also highlighted novel approaches to nuclear education outreach, including art, toys, card games and travelling exhibits.

NEA Global Forum Rising Stars Workshop

The NEA Global Forum's Rising Stars Workshop, held on 10-12 December 2025 at the KTH Royal Institute in Stockholm, Sweden, offered professional development and mentoring sessions for female rising stars in science, technology, education and policy. The 40 participants, representing 38 academic and research institutions across 18 countries, had the opportunity to present their research on a wide range of nuclear science and policy topics, including materials testing, advancements in nuclear medicine, considerations for nuclear site selection, investigation of fuel properties, digital twin development and assessments of regional nuclear energy policies. In addition, experts from the nuclear sector shared their knowledge and expertise with participants, and a panel discussion on empowering women in STEM careers provided participants with personal insights and guidance from a diverse group of panellists.

2025 International School of Nuclear Law

The 24th edition of the International School of Nuclear Law (ISNL) course was held in Montpellier, France, from 25 August to 5 September 2025, bringing together a diverse group of 61 participants representing 39 countries. The rigorous two-week programme provided participants with an in-depth look at the legal framework and major issues affecting the peaceful use of nuclear energy. Activities consisted of lectures, group assignments and panel discussions touching on all aspects of international nuclear law, including nuclear safety, management of spent fuel and radioactive waste, environmental protection, transport,

nuclear security, non-proliferation, safeguards, nuclear liability and international trade. The programme was delivered by nearly 30 renowned specialists in nuclear law from international organisations, governments, academia and private industry.

Since 2001, the ISNL has attracted over 1 400 participants from 120 countries, and, through a partnership with the University of Montpellier, has awarded over 600 University Diplomas in International Nuclear Law. Many participants have gone on to become experts in the field of nuclear law, with some returning to the programme as lecturers.

NEA publications of interest

In October 2025, the NEA published *Legal Frameworks for Long-Term Operation of Nuclear Power Reactors: Second Edition* (LTO Report). The first edition of the LTO Report, published in 2019, was created to provide insight into the various laws, regulations and policies that contribute to countries' different approaches to LTO, without any judgement as to the merits of these approaches. The second edition of the LTO report both updated and expanded upon the original report, adding information from four additional countries: Brazil, Bulgaria, China and the United Arab Emirates.

With a total of 29 countries now included in the second edition of the LTO Report, it covers 99.3% of nuclear reactors in NEA countries, 91% of the world's operating reactors and 78% of reactors under construction. The Report includes a foreword by NEA Director-General William D. Magwood, IV, an executive summary and three chapters. Chapter 1 provides an introduction, Chapter 2 provides a review of approaches to long-term operation and Chapter 3 includes individual reports for each participating country.

News Briefs

26th Nuclear Inter Jura Congress, 2026

The 26th Nuclear Inter Jura Congress will take place in Newport, Wales, on 18-22 October 2026 at the International Convention Centre (ICC) Wales. Hosted by the International Nuclear Law Association (INLA), the 26th Congress will bring together representatives of government, regulatory authorities, nuclear specialists, legal professionals, academics and others involved in nuclear law, to promote the study of, and exchange information on, legal issues associated with the peaceful uses of nuclear energy.

2026 International Nuclear Law Essentials (INLE)

The 13th edition of the INLE will take place in Paris, France, on 19-23 January 2026. The five-day INLE course is designed to provide participants with a practical and comprehensive understanding of the various interrelated legal issues relating to the safe and peaceful use of nuclear energy. This intensive course in international nuclear law addresses the needs and interests of lawyers working in either the public or the private sector, but will also be of interest to scientists, engineers, policymakers, managers and other professionals working in the nuclear field. Renowned specialists in nuclear law from international organisations, governments, academia and private industry will deliver the INLE's intensive programme, which consists of a series of lectures, case studies and panel discussions. More information on the course and how to apply is available at www.oecd-nea.org/law/inle.

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NEA PUBLICATIONS AND INFORMATION

The full catalogue of publications is available online at www.oecd-nea.org/pub.

In addition to basic information on the Agency and its work programme, the NEA website offers free downloads of hundreds of technical and policy-oriented reports. The professional journal of the Agency, *NEA News* – featuring articles on the latest nuclear energy issues – is available online at www.oecd-nea.org/nea-news.

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The following articles and studies are featured in this issue: "To join or not to join? A cost-benefit framework for non-nuclear states considering adherence to the Joint Convention" by Annabelle Teo and Wolfram Tonhauser; "Ghana's nuclear journey: Building legal pathways and powering a sustainable future" by Theodora Tawiah Amarh; "The Creation of Brazil's national nuclear regulatory authority: Origins, transition and challenges ahead" by Alessandro Facure, Lorena Pozzo, Ailton Fernando Dias and Ricardo Fraga Gutterres; "Determining the beneficiaries of the public funds provided in case a Contracting Party establishes lower amounts of liability for a low risk installation or transport"; and "The compatibility of the Paris Convention and the Convention on Supplementary Compensation with regard to the definition of 'nuclear damage'".

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