

A PROPOSAL FOR ARBITRATING DISPUTES ARISING FROM NUCLEAR DAMAGE*Xiaohan Cai****I. INTRODUCTION**

Many States are increasingly turning to nuclear energy as a power source. There are plenty of good reasons why: the promise of low greenhouse gas emissions; reliable energy supply; and long-term fuel availability. 2024 saw the world embrace nuclear energy on a larger scale. In June 2024, the Bill Gates-funded company TerraPower broke ground in Wyoming for a new next-generation nuclear power plant, in which Gates himself had invested US\$1 billion;¹ and in October 2024, both Google² and Amazon³ announced that they had signed the world's first corporate agreements to purchase small modular reactors to power their data centres. In Asia, China approved eleven new nuclear reactors across five sites in August 2024;⁴ South Korea approved two new nuclear reactors in September 2024;⁵ and various Southeast Asian States expressed renewed interest in nuclear energy despite the current absence of any large-scale nuclear power plants in that region.⁶

As use of nuclear energy gains new ground, it is important to develop and maintain legal frameworks to ensure prompt and adequate compensation for damage suffered by victims of nuclear damage. Several multilateral conventions have been adopted to harmonize substantive laws on civil liability for nuclear damage, but the procedural aspects of resolving a claim are largely left to States to address under national law, and through national court systems. This article proposes that both States and the nuclear industry should instead consider international arbitration as the primary mechanism for resolving claims arising from nuclear damage. In this

* Senior associate in the Litigation Department at Wilmer Cutler Pickering Hale and Dorr LLP, and a member of the firm's International Arbitration Practice Group in the London office.

¹ O. Manuel & S. Inskip, *Bill Gates Is Going Nuclear: How His Latest Project Could Power U.S. Homes and AI*, NPR (June 14, 2024), <https://www.npr.org/2024/06/14/nx-s1-5002007/bill-gates-nuclear-power-artificial-intelligence>.

² M. Terrell, *New Nuclear Clean Energy Agreement with Kairos Power*, Google Blog (Oct. 20, 2024), <https://blog.google/outreach-initiatives/sustainability/google-kairos-power-nuclear-energy-agreement/>.

³ Amazon, *Amazon Signs Agreements for Innovative Nuclear Energy Projects to Address Growing Energy Demands*, About Amazon (Oct. 20, 2024), <https://www.aboutamazon.com/news/sustainability/amazon-nuclear-small-modular-reactor-net-carbon-zero>.

⁴ World Nuclear News, *China Approves 11 New Reactors* (Aug. 21, 2024), <https://www.world-nuclear-news.org/articles/china-approves-11-new-reactors>.

⁵ Time, *In New Nuclear Push, South Korea Revives Plans to Build Two Reactors* (Sept. 12, 2024), <https://time.com/7020645/south-korea-nuclear-reactors/>.

⁶ See Necessary, *Small Modular Reactors Gain Traction in Southeast Asia to Cut Emissions* (May 21, 2024), <https://www.necessary.com/en/news/asean-market/small-modular-reactors-gain-traction-in-southeast-asia-cut-emissions>; Channel News Asia, *As Interest in Nuclear Energy Hots Up, Southeast Asia Countries Are Closely Watching Each Other's Moves* (Oct. 4, 2024), <https://www.channelnewsasia.com/today/big-read/nuclear-energy-interest-southeast-asia-4652231>.

regard, this article presents a relatively novel idea which rethinks current conventional thinking on how such disputes should be resolved. This article is a proposal meant to prompt a conversation on a fresh idea – whilst acknowledging that much more work will have to be done in ensuring better dispute resolution frameworks for all.

Section II sets out an overview of the existing nuclear liability conventions, such as the Paris Convention, the Vienna Convention, and the 1997 CSC. **Section III** argues that, despite these conventions entering into force decades ago, there is still no widespread acceptance of their terms. It describes the problems created by this, as well as the lack of harmonization of procedural laws even amongst State parties to the nuclear liability conventions. **Section IV** addresses why, in these circumstances, arbitration should be the preferred mode of dispute resolution for claims arising from nuclear damage. **Section V** addresses practical ways in which arbitration can be introduced in such disputes.

II. OVERVIEW OF THE NUCLEAR LIABILITY CONVENTIONS

The current international civil liability regime for nuclear damage is comprised of three conventions: (a) the 1960 Convention on Third Party Liability in the Field of Nuclear Energy (the “Paris Convention”);⁷ (b) the 1963 Vienna Convention on Civil Liability for Nuclear Damage (the “1963 Vienna Convention” or, following amendments, the “1997 Vienna Convention”);⁸ and (c) the 1997 Convention on Supplementary Compensation for Nuclear Damage (the “1997 CSC”).

This section sets out an overview of the Vienna Convention and the 1997 CSC, both of which were established by the International Atomic Energy Agency (“IAEA”) and intended to provide a global regime open to all States. The Paris Convention, in contrast, was adopted under the auspices of the OECD Nuclear Energy Agency; it is open to only OECD countries,

⁷ The Paris Convention was subsequently amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004. It was also followed by the 1963 Convention Supplementary to the Paris Convention (the “Brussels Convention”), which was adopted to provide additional funds to compensate damage as a result of a nuclear incident where Paris Convention funds proved to be insufficient, and which was itself amended by protocols adopted in 1964, 1982 and 2004.

⁸ The Vienna Convention was subsequently amended by the 1997 Protocol to Amend the Vienna Convention. This paper will refer to the “1963 Vienna Convention” as the original, unamended version; and the “1997 Vienna Convention” following the amendments made by the 1997 Protocol to Amend the Vienna Convention.

with non-OECD countries having to seek consent from other contracting parties before becoming a party.⁹

This article uses the following defined terms. The references to the “nuclear liability conventions” in this article refer generically to the Paris Convention, Vienna Convention, and the 1997 CSC; and their related instruments and amendments. The terms “Convention State” refers to a State that is a party to at least one of the nuclear liability conventions; the term “non-Convention State” refers to a State that is not party to any of the nuclear liability conventions.

A “nuclear installation,” which is a defined term under the nuclear liability conventions,¹⁰ generally refers to any nuclear reactor, or facility where nuclear material is produced or stored for peaceful purposes.¹¹ The “Installation State” refers to the State within which the installation is situated.¹² The “operator” refers to the party designated or recognized by the Installation State as the operator of that nuclear installation.¹³ “Nuclear incident” refers to an event or events that cause nuclear damage (“nuclear damage” is discussed below).¹⁴ This article uses the term “victim” to refer to a person who has suffered nuclear damage, and the term “foreign victim” to refer to persons resident or domiciled outside of the Installation State who have suffered nuclear damage.

Most of the above definitions are relatively uncontroversial; however, the specific contours of certain terms are the subject of debate. For example, “nuclear damage” is generally understood as damage arising out of or resulting from the radioactive or hazardous properties of nuclear material, but the specific categories of compensable damage have evolved over time. Under the 1963 Vienna Convention, “nuclear damage” originally only included loss of life, personal injury, and damage to property;¹⁵ the 1997 Vienna Convention expanded the definition of “nuclear damage” to include economic and environmental damage.¹⁶ Some national laws have

⁹ See Paris Convention, at Article 21. Currently, only Turkey may be deemed as a non-Western European State that is party to the Paris Convention. Because of the relatively limited geographical scope of the Paris Convention, it will not be focused on in this article.

¹⁰ See e.g. 1963 Vienna Convention at Article 1(j).

¹¹ The 1997 Vienna Convention made clear that military installations were outside the scope of the convention: 1997 Vienna Convention, at Article 1B.

¹² See e.g. 1963 Vienna Convention at Article 1(d). The nuclear liability conventions also address the rules that apply to the transport of nuclear materials, which is highly complex area of law and outside of the scope of this article.

¹³ *Id.*, at Art. 1(c).

¹⁴ *Id.* at Art. 1(l).

¹⁵ *Id.*, at Art. 1(k)(i).

¹⁶ 1997 Vienna Convention, at Article 1(k)(iii)-(vii).

an even more expansive definition; for example, Japanese law also considers emotional damage and reputational loss as compensable nuclear damage.¹⁷

A. The 1963 Vienna Convention

The 1963 Vienna Convention was “aim[ed] at harmonizing the national law of Contracting Parties by establishing some minimum standards to provide financial protection against damage resulting from certain peaceful uses of nuclear energy.”¹⁸ It was intended to represent a compromise between protection of the public and the interests of the nuclear industry.¹⁹

The 1963 Vienna Convention stipulated that States had to provide for the following minimum protections under national law.

- ***Exclusive Liability of the Operator.*** The 1963 Vienna Convention provided for the exclusive liability of the operator of the installation where the nuclear incident causing damage occurred.²⁰ This is also known as the “channelling” principle, where liability is legally “channelled” to the operator, to the exclusion of any other party potentially liable under general tort law. This principle simplified an otherwise complex and time-consuming process of establishing potential defendants.
- ***Strict Liability of the Operator.*** Under the 1963 Vienna Convention, the operator is liable regardless of who was at fault or whether fault can be established, *i.e.* the operator is subject to strict liability.²¹ Victims are only required to prove that the nuclear incident caused the damage for which compensation is sought. The strict liability principle is subject to certain exceptions that have evolved over time. For example, under the 1963 Vienna Convention, there was no strict liability for nuclear incidents which occurred due to a “grave natural disaster of an exceptional character”;²² this exception was subsequently removed in the 1997 Vienna Convention.

¹⁷ Nathan Swartz, *The Impact of the Convention on Supplementary Compensation for Nuclear Damage*, 12 U. Pa. Asian L. Rev. 342 (2016). Available at: <https://scholarship.law.upenn.edu/alr/vol12/iss2/6>.

¹⁸ International Atomic Energy Agency, *Vienna Convention on Civil Liability for Nuclear Damage*, <https://www.iaea.org/topics/nuclear-liability-conventions/vienna-convention-on-civil-liability-for-nuclear-damage> (last visited Oct. 20, 2024).

¹⁹ Mohit Abraham, *Nuclear Liability: A Key Component of the Public Policy Decision to Deploy Nuclear Energy in Southeast Asia* (Am. Acad. Arts & Sci. 2014), p. 17.

²⁰ 1963 Vienna Convention, at Article II.

²¹ *Id.*, at Art. IV.

²² *Id.*, at Art. IV(3)(b).

- **Limited Amount of Liability.** The 1963 Vienna Convention provided that the liability of the operator “may be limited by the Installation State to not less than US\$5 million for any one nuclear incident.”²³ This amount was subsequently increased in the 1997 Vienna Convention.²⁴ The general principle remained the same, *i.e.* that the nuclear liability conventions imposed a limit which the operator minimally needed to make available as compensation in the event of a nuclear incident. This ensured a fixed amount of compensation for victims, and also allowed the State to limit the financial exposure of the operator to ensure commercial viability.
- **Insurance or Security Obligation for the Operator.** The 1963 Vienna Convention also provided that an operator must maintain mandatory financial coverage (*e.g.* in the form of insurance or other financial security), for an amount determined by the Installation State.²⁵ This normally corresponded to the amount for which the operator could be liable for. Where the operator’s insurance or security was inadequate to satisfy the claims for compensation, the Installation State was required to ensure the payment of such claims up to the limit of the operator’s liability.²⁶
- **Limitation of Liability in Time.** Like most national tort laws, the 1963 Vienna Convention provided for a limitation period, *i.e.* a time period within which victims were required to submit their claims.²⁷
- **Equal Treatment of Victims.** The 1963 Vienna Convention provided for non-discrimination of victims on the grounds of nationality, domicile or residence.²⁸ This ensured that foreign victims would be given equal treatment before the Installation State’s courts if they sought compensation.
- **Exclusive Jurisdictional Competence of the Installation State’s Courts.** Under the 1963 Vienna Convention, there is a single competent forum to address all actions for compensation, which is the “courts of the Contracting Party within whose territory the nuclear incident occurred.”²⁹ In most cases, this would refer to the courts of the

²³ *Id.*, at Art. V.

²⁴ 1997 Vienna Convention, at Article V(1).

²⁵ 1963 Vienna Convention, at Article VII.

²⁶ *Id.*, at Art. VII(1).

²⁷ *Id.*, at Art. VI.

²⁸ *Id.*, at Art. XIII.

²⁹ *Id.*, at Art. XI(1).

Installation State.³⁰ This principle is also sometimes referred to as the procedural “channeling” of claims to one court, and prevents victims from forum shopping, offering operators a degree of certainty as to which forum such claims may potentially lie. National procedural law would govern matters such as which specific court is competent to adjudicate claims,³¹ as well as which court is competent to hear any appeals.

- ***Recognition and Enforcement of Final Judgments.*** The final judgments of the competent court shall be recognized by other signatories to the 1963 Vienna Convention, except in limited circumstances: such as where the judgment was obtained by fraud, or where the judgment is “not in accord with fundamental standards of justice.”³²

B. The 1997 Vienna Convention and the 1997 CSC

Following the 1986 accident at the Chernobyl nuclear reactor, States recognized the need to strengthen the 1963 Vienna Convention, leading to the negotiation and entrance into force of the 1997 Protocol to Amend the Vienna Convention.³³ Some of these amendments have already been discussed above. For example, the amended 1997 Vienna Convention provided for an increased minimum amount of liability of the operator of a nuclear installation.³⁴ It also provided for a broader scope and enhanced means for securing adequate and equitable compensation, such as by providing for a wider geographical scope,³⁵ a broader definition of “nuclear damage,”³⁶ and increased time limits for submission of loss of life or personal injury claims.³⁷

³⁰ A nuclear incident could occur outside of the territory of the Installation State in a situation involving transport of nuclear material, provided that the state in which the incident occurred in is also a contracting party to the relevant convention. However, if the incident occurs outside the territory of any contracting party, or if the location of the nuclear incident cannot be determined with certainty, jurisdiction over actions lie with the courts of the Installation State of the operator liable.

³¹ The 1997 Vienna Convention, at Article XI(4), expressly states that “[t]he Contracting Party whose courts have jurisdiction shall ensure that only one of its courts shall have jurisdiction in relation to any one nuclear incident.”

³² 1963 Vienna Convention, at Article XII.

³³ *See generally* International Atomic Energy Agency, Vienna Convention on Civil Liability for Nuclear Damage, <https://www.iaea.org/topics/nuclear-liability-conventions/vienna-convention-on-civil-liability-for-nuclear-damage> (last visited Oct. 20, 2024).

³⁴ 1997 Vienna Convention (as amended by the 1997 Protocol to Amend the Vienna Convention), at Article V.

³⁵ *Id.*, at Art. I A(1).

³⁶ *Id.*, at Art. 1(k).

³⁷ *Id.*, at Art. VI(1)(a).

States also agreed on the 1997 Convention on Supplementary Compensation, or 1997 CSC. The 1997 CSC established a minimum national compensation amount, and further increased the amount of compensation through public funds to be made available by the signatories to the 1997 CSC should the national amount be insufficient to compensate the damage caused by a nuclear incident.³⁸ The 1997 CSC is open to States that are party to either the Vienna Convention or the Paris Convention; it is also open to other States who are not parties to the Vienna or Paris Conventions, so long as their national legislation is consistent with the uniform rules on civil liability as set out in the Annex to the 1997 CSC.

III. CRITICISMS OF THE NUCLEAR LIABILITY CONVENTIONS

This section sets out common criticisms of the nuclear liability conventions. It focuses on the status of the nuclear liability conventions and addresses common criticisms, such as the difficulties for victims arising from the lack of global accession or ratification of the conventions.

A. Status of the Nuclear Liability Conventions

A key criticism of the nuclear liability conventions is the lack of global ratification or accession to their terms.

Globally, as of the date of writing, only 67 States are party to at least one nuclear liability convention (including the Paris Convention and related instruments). The 1963 Vienna Convention has 46 parties, the 1997 Vienna Convention has 17 parties, and the 1997 CSC has 11 parties.

Annex 1 to this article sets out a list of the nuclear power States today and the nuclear liability conventions to which they are a party. Of the 32 States with at least one operational nuclear power reactor, 26 States have ratified or acceded to at least one nuclear liability convention. The remaining six States that have not acceded or ratified any nuclear liability convention account for about 22% (92) of operational power reactors worldwide. More than half of these are in Asia, primarily in China and South Korea.

³⁸ International Atomic Energy Agency, Convention on Supplementary Compensation for Nuclear Damage (last visited Oct. 20, 2024), available at <https://www.iaea.org/topics/nuclear-liability-conventions/convention-supplementary-compensation-nuclear-damage>.

Unfortunately, most States are not party to any nuclear liability convention. Even amongst the 67 States that are party to at least one nuclear liability convention, not all States have uniformly ratified or acceded to the same conventions. And, even amongst those 67 States, there are differing levels of compliance with the terms of the nuclear liability conventions.³⁹ The result is a “patchwork of diverse legal regimes,”⁴⁰ with discrepancies across the Convention and non-Convention States alike on matters such as the maximum and minimum amount of liability that operators can be liable for, and the categories of compensable “nuclear damage.”

B. The Current Mode of Dispute Resolution for Claims

The lack of widespread ratification of or accession to the nuclear liability conventions compounds the difficulties of resolving claims arising from nuclear damage. To illustrate some of these difficulties, the following is considered below: (a) a scenario where a nuclear incident occurs in a non-Convention State, and the victims are domiciled or resident outside of that State; and (b) a scenario where a nuclear incident occurs in a Convention State, but the victims are domiciled or resident in a non-Convention State.

In the first scenario where a nuclear incident occurs in a non-Convention State, and the victims are domiciled or resident outside of that State, these foreign victims will face significant difficulties in seeking compensation for their claims. This in fact happened after the 1986 Chernobyl accident, where there were many foreign victims.⁴¹ However, the then-USSR was not a party to any of the nuclear liability conventions, and refused to pay compensation to any foreign victims. Commentators note that if the USSR had been a party to the 1963 Vienna Convention, foreign victims may have had at least a chance to receive some compensation.⁴²

³⁹ See Jonathan Bellamy, *Civil liability for nuclear damage in countries developing nuclear new build programmes*, *The Journal of World Energy Law & Business*, Volume 12, Issue 1, March 2019, Pages 108–120, <https://doi.org/10.1093/jwelb/jwy036>. In relation to China, see Philip Andrews-Speed, *The governance of nuclear power in China*, *The Journal of World Energy Law & Business*, Volume 13, Issue 1, March 2020, Pages 23–46, <https://doi.org/10.1093/jwelb/jwaa004> (“[w]hilst this legal regime for nuclear liability appears to be consistent with international practice in general terms, it remains a patchwork lacking an authoritative legal basis and the Nuclear Safety Law has done little to improve the situation”).

⁴⁰ Anthony Thomas and Raphael J. Heffron, *Third Party Nuclear Liability: The Case of a Supplier in the United Kingdom*, EPRG Working Paper 1205 and Cambridge Working Paper in Economics 1207 (2012), 2.

⁴¹ Nations directly affected by the radioactive waste released by the Chernobyl accident included Poland, Romania, Sweden, Great Britain, the Netherlands, Finland, Italy, Norway, Switzerland, and Hungary. See Victoria Riess Hartke, *The International Fallout from Chernobyl*, 5(2) *Penn St. Int'l L. Rev.* 8 (1987). Available at: <http://elibrary.law.psu.edu/psilr/vol5/iss2/8>; Steven G. Kaplan, *Compensating Damage Arising from Global Nuclear Accidents: The Chernobyl Situation*, 10 *Loy. L.A. Int'l & Comp. L. Rev.* 241 (1988). Available at: <https://digitalcommons.lmu.edu/ilr/vol10/iss1/7>.

⁴² See V. Lamm, *The Protocol amending the 1963 Vienna Convention*, OECD Nuclear Energy Agency, Nuclear Law Bulletin No. 61 (2000), available at <https://www.oecd-nea.org/law/nlb/nlb-61/vanda.pdf>.

The only recourse that the foreign victims had was to sue the operator in their respective own (foreign) courts, but victims “soon discovered that... recovery was uncertain and enforcement virtually impossible.”⁴³

In the second scenario where a nuclear incident occurs in a Convention State, but the victims are domiciled or resident in a non-Convention State, those victims should in principle be able to seek compensation from the operator in the national courts of the Convention State. However, foreign victims may decide not to do so if they consider national laws in their home State to be more beneficial to them. This was the case following the 2011 Fukushima disaster, where five Fukushima-related lawsuits were brought in U.S. federal courts. As one commentator notes, “[b]ecause there were no treaty relations in respect of nuclear liability between the United States of America and Japan at the time of the accident, US courts were under no obligation to defer to the jurisdiction of Japanese courts.”⁴⁴ The plaintiffs were able to sue a variety of defendants (not just the operator), seek higher compensation, and seek compensation for a wider category of damages – all of which would not have been the case had they filed suit in Japan. The last two of the five U.S. lawsuits were only dismissed in May 2021.⁴⁵

C. Other Criticisms of the Procedural Aspects of Nuclear Liability Conventions

There are other criticisms of the procedural aspects of the nuclear liability conventions.

First, the competent court adjudicating such claims may not be perceived to be neutral.⁴⁶ Operators are typically State-owned (or State-linked) and, under the nuclear liability conventions, claims against them would typically be adjudicated by national State courts. State courts may be reluctant to rule against an operator that is linked economically to the State, especially where the State may be required to pay compensation if the operator is unable to. Foreign victims have legitimate concerns that they may be discriminated against in these

⁴³ Linda A. Malone, *The Chernobyl Accident: A Case Study in International Law Regulating State Responsibility for Transboundary Nuclear Pollution*, Faculty Publications 590 (1987), available at <https://scholarship.law.wm.edu/facpubs/590>.

⁴⁴ Steven McIntosh, *Chapter 12: Nuclear Liability and Post-Fukushima Developments*, in *International Atomic Energy Agency, Nuclear Law: The Global Debate* (2022), 254.

⁴⁵ *Id.*

⁴⁶ Nathan Swartz, *The Impact of the Convention on Supplementary Compensation for Nuclear Damage*, 12 U. Pa. Asian L. Rev. 350 (2016). Available at: <https://scholarship.law.upenn.edu/alr/vol12/iss2/6>; see also Duncan E. J. Currie, *The Problems and Gaps in the Nuclear Liability Conventions and an Analysis of How an Actual Claim Would Be Brought under the Current Existing Treaty Regime in the Event of a Nuclear Accident*, 35 DENV. J. INT'L L. & POL'Y 85, 85 (2006).

circumstances. Moreover, the procedural “channelling” of claims to one court (typically in the Installation State) would create some inherent difficulties for foreign victims. Foreign victims may have to litigate in a foreign language; may find it difficult to seek legal aid or legal assistance in the Installation State; or may have to travel long distances to attend hearings.

Second, the nuclear liability conventions generally leave procedural questions to be determined by the national law of the competent court, which may not provide sufficient procedural protections for victims. For example, the nuclear liability conventions leave it to national law to determine the availability of mass claims, which would allow groups to represent certain interests (*e.g.* fishermen, farmers, communities) to bring claims. Mass claims are often critical for victims to litigate disputes arising from nuclear damage, as they allow large numbers of affected individuals or entities to pursue compensation efficiently and collectively. By consolidating claims, legal resources, and evidence, they reduce costs and streamline the process. Mass claims also strengthen the bargaining position of victims, and facilitate large-scale settlement or compensation efforts. If the national law of the competent court does not have a mass claims procedure readily available, victims may find it prohibitively costly and burdensome to bring individual claims. The nuclear liability conventions also leave it to national law to determine other issues, such as the costs of litigation, the availability of other funding mechanisms (such as third-party funding), and the speed of resolving disputes.⁴⁷

IV. WHY SHOULD PARTIES ARBITRATE CLAIMS ARISING FROM NUCLEAR DAMAGE?

This article proposes that a different mode of resolving claims arising from nuclear damage should be adopted: namely, international arbitration. **Section IV(A)** below describes the advantages of arbitration over litigation, and **Section IV(B)** addresses some of the disadvantages of arbitration over litigation and how they can be overcome.

A. Advantages of Arbitration over Litigation

The idea of arbitrating disputes arising from nuclear damage is not a new or original one. Previous commentators have mooted it decades ago, before the 1997 Vienna Convention and

⁴⁷ Duncan E. J. Currie, *The Problems and Gaps in the Nuclear Liability Conventions and an Analysis of How an Actual Claim Would Be Brought under the Current Existing Treaty Regime in the Event of a Nuclear Accident*, 35 DENV. J. INT'L L. & POL'Y 85, 99 (2006).

1997 CSC were signed.⁴⁸ There are also countless recent articles suggesting that parties should also arbitrate similar disputes arising from climate change, environmental damage, or natural disasters.⁴⁹

The present article aims to propose a new way of thinking about dispute resolution for nuclear liability disputes, given the criticisms of the current system highlighted above. There are several advantages of arbitration over litigation:

- ***Enforceability of Awards.*** Arbitration ensures the recognition and enforcement of any award, in virtually all jurisdictions. The 1958 Convention on the Recognition and Enforcement of Foreign Arbitral Awards (“New York Convention”) has 172 State parties, reflecting a near-universal acceptance of its terms. Thus, any arbitral award issued in a dispute arising from nuclear damage can and will likely be enforced in most jurisdictions. This is an advantage of arbitration over the litigation envisaged under the nuclear liability conventions: while the nuclear liability conventions require States to mutually recognize and enforce the judgments from other Convention States,⁵⁰ this will not be applicable if: (a) the judgment is issued by a non-Convention State; or (b) enforcement of the judgment is sought in a non-Convention State.
- ***Neutral Forum.*** Arbitration is perceived as a more neutral forum compared to national court litigation, as parties can nominate arbitrators of a different nationality from the Installation State. In addition, parties can choose their own desired hearing venue or location (instead of travelling to a national court), or agree on a common language for the proceedings (instead of using a national language). This is an advantage of arbitration over litigation envisaged under the nuclear liability conventions, which currently require victims to litigate in national State courts – which, as explained above, may be perceived as a non-neutral forum.

⁴⁸ See e.g. Ann Voorhees Bilingsley, *Private Party Protection against Transnational Radiation Pollution through Compulsory Arbitration: A Proposal*, 14 Case W. Res. J. Int’l L. 339 (1982), available at: <https://scholarlycommons.law.case.edu/jil/vol14/iss2/6>; see also Helmut J. Heiss, *Legal Protection Against Transboundary Radiation Pollution: A Treaty Proposal*, 4 Fordham Envtl. L. Rev. 167 (1993), available at: <https://ir.lawnet.fordham.edu/elr/vol4/iss2/5>.

⁴⁹ See e.g. Steve Finizio and Matteo Angelini, *Climate-Related Disputes and International Arbitration*, Global Arbitration Review, available at <https://globalarbitrationreview.com/guide/the-guide-climate-change-and-related-disputes/first-edition/article/climate-related-disputes-and-international-arbitration>.

⁵⁰ The Vienna Convention also provides for the recognition and enforcement of final judgments relating to claims for nuclear damage, in all Contracting Parties. See 1963 and 1997 Vienna Conventions, at Article XII.

- **Expertise.** Relatedly, because parties can nominate their own arbitrators, parties can also choose to have their disputes resolved by persons with specialized expertise. Nuclear damage-related disputes may encompass complex medical, scientific, financial, and accounting issues that may require specialist expertise and knowledge, particularly where issues of causation and calculation of damages are concerned. Arbitral institutions such as the PCA and the ICC maintain open databases of experts in different areas,⁵¹ who can be nominated by the parties to sit as arbitrator. In contrast, most national laws do not permit parties to choose their own judges in court litigation.

- **Procedural flexibility.** A related benefit of arbitration is its relative procedural flexibility compared to court litigation. Parties can adopt arbitral rules that have been specifically designed for use in arbitrating claims arising from environmental damage or natural disasters, such as the Hague Rules on Business and Human Rights Arbitration (the “Hague Rules”),⁵² or the PCA’s Optional Rules for Arbitration of Disputes Relating to Natural Resources and / or the Environment (the “PCA Rules”).⁵³ There are also the AAA’s Mass Arbitration Supplementary Rules⁵⁴ and the JAMS Class Action Procedures,⁵⁵ which have been used in disputes arising from natural disasters in the United States. These rules – while not necessarily designed with nuclear damage in mind – have innovative features that may be useful in resolving disputes arising from nuclear damage. For example, the Hague Rules: (a) contain specific provisions addressing mass claims;⁵⁶ (b) permit the tribunal to invite non-parties (such as non-governmental organisations) to participate in the dispute;⁵⁷ (c) require the tribunal to give due regard to the urgency of addressing human rights impacts;⁵⁸ (d) permit third-party funding, which can address imbalances of resources between the Parties;⁵⁹ and (e) encourage the settlement of disputes, such as through mediation, conciliation, or

⁵¹ Steve Finizio and Matteo Angelini, *Climate-Related Disputes and International Arbitration*, Global Arbitration Review, available at <https://globalarbitrationreview.com/guide/the-guide-climate-change-and-related-disputes/first-edition/article/climate-related-disputes-and-international-arbitration>.

⁵² Available at https://www.cilc.nl/cms/wp-content/uploads/2019/12/The-Hague-Rules-on-Business-and-Human-Rights-Arbitration_CILC-digital-version.pdf.

⁵³ Available at <https://docs.pca-cpa.org/2016/01/Optional-Rules-for-Arbitration-of-Disputes-Relating-to-the-Environment-and-or-Natural-Resources.pdf>.

⁵⁴ Available at <https://www.adr.org/sites/default/files/Mass-Arbitration-Supplementary-Rules.pdf>.

⁵⁵ Available at <https://www.jamsadr.com/rules-class-action-procedures/>.

⁵⁶ Hague Rules, at Article 19.

⁵⁷ *Id.*, at Art. 28.

⁵⁸ *Id.*, at Art. 18(1).

⁵⁹ *Id.*, at Art. 55.

negotiation.⁶⁰ Such rules may be preferable to litigation if national procedural laws do not have similar mechanisms. In the future, and assuming states and / or operators adopt arbitration as the primary mode of resolving such disputes, tailored “nuclear arbitration rules” can be proposed, incorporating elements such as mass claims and specialized tribunals.

- ***Speed and Timeliness.*** Given the irreversible and urgent nature of nuclear damage, speed and timeliness are critical to resolving such disputes. Arbitration – compared to litigation – can be a more predictable and structured process, provided certain measures are adopted. As one commentator noted, “[s]everal features that form part of institutional arbitral rules, such as expedited procedure, early dismissal, emergency arbitration, interim and conservatory measures, and escalating dispute resolution mechanisms, facilitate the timely resolution of such disputes.”⁶¹ Other mechanisms that can be deployed to increase the speed and timeliness of arbitral processes could be the establishment of a specialized arbitral institution or specialized panels for nuclear disputes, and integrating technological tools for managing evidence and facilitating remote proceedings. Compared to national court litigation, which may find it difficult to adapt these features in a short span of time, leading arbitral institutions such as the PCA and the ICC have indicated their willingness to administer large-scale mass claim disputes in a speedy and timely manner.⁶²

Moreover, arbitral awards are intended to be final and there are no appeals permitted from an award. This contrasts with most national court systems, which permit appeals. Some court systems may also not be able to issue a timely judgment, especially if the court system is overwhelmed by claims arising from the same nuclear incident.

B. Disadvantages of Arbitration over Litigation

⁶⁰ *Id.*, at Preamble paragraph 4, and Article 56.

⁶¹ Yue-Zhen Li, *What Role Does Dispute Resolution Have in Tackling Climate Change?*, *The American Review of International Arbitration* (September 28, 2023), available at https://aria.law.columbia.edu/dispute_resolution_tackling_climate_change/.

⁶² This was indicated by the PCA’s support for the Hague Rules (which expressly provides for many of these time-saving mechanisms), as well as the ICC’s acknowledgement that mass disaster disputes need to be appropriately managed with time and cost management techniques: *see* International Chamber of Commerce Commission on Arbitration and ADR, *Resolving Climate Change Related Disputes through Arbitration and ADR* (November 2019), para. 5.58, <https://iccwbo.org/wp-content/uploads/sites/3/2019/11/icc-arbitration-adr-commission-report-on-resolving-climate-change-related-disputes-english-version.pdf>.

The author nevertheless acknowledges that there are disadvantages over litigation, but that these can be overcome.

The first to consider is confidentiality. Arbitral proceedings are known to be private and confidential, which may be considered inappropriate for resolving disputes arising from nuclear damage. There is a clear public interest in maintaining transparency in such proceedings, and in establishing legal precedents in a relatively undeveloped area of law (e.g. in establishing standards for compensation). This, however, is not an insurmountable hurdle. Confidentiality can be waived in arbitration: for example, parties can choose to adopt the Hague Rules, which allows parties or the tribunal to adopt procedures that ensure transparency in proceedings, including the publication of certain documents⁶³ and public hearings.⁶⁴ And, even if parties choose not to waive confidentiality, that is not necessarily a disadvantage. Confidentiality ensures that the proceedings would not be exacerbated by negative media coverage, which in turn would increase the likelihood of reaching settlement. A notable precedent in this regard is the work of the “Dispute Resolution Centre for Nuclear Damage Compensation” (the “DRC”) established in the wake of the 2011 Fukushima accident, which – as explained in more detail below – was seen as a “mini-arbitration” process.⁶⁵ The DRC did not choose to make all its decisions public; instead, it published settlement agreements or recommended terms of settlement with the consent of the parties, and has published a small number of recommended terms online.⁶⁶

Another potential disadvantage is costs. Costs are “routinely identified as the worst feature of arbitration.”⁶⁷ However, the consensual nature of arbitration means that parties can agree on procedures that will alleviate some of the costs concerns. For example, where the rules permit mass claims to be brought,⁶⁸ this can allow the costs to be borne by a larger group of claimants.

⁶³ Hague Rules, at Article 40.

⁶⁴ *Id.*, at Art. 41.

⁶⁵ Eric A. Feldman, *No Alternative: Resolving Disputes Japanese Style*, in *Dispute Resolution--Alternatives to Formalization, Formalization of Alternatives* (Moritz Bälz & Joachim Zekoll eds., Brill 2014), U of Penn Law School, Public Law Research Paper No. 15-9, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2616031.

⁶⁶ Joel Rheuben and Luke Nottage, *Resolving Claims from the Fukushima Nuclear Disaster*, Japanese Law and the Asia-Pacific (Jan. 2015), <https://japaneselaw.sydney.edu.au/2015/01/resolving-claims-from-the-fukushima-nuclear-disaster/>.

⁶⁷ Iris Ng, *Beyond Litigation: Narrative, Place, and the Roles of ADR in Climate Change Disputes*, Hong Kong International Arbitration Centre (Sept. 22, 2021), <https://www.hkiac.org/content/beyond-litigation-narrative-place-and-roles-adr-climate-change-disputes>.

⁶⁸ See e.g. Hague Rules, at Article 19.

The applicable rules may also permit third-party funding,⁶⁹ which will allow claimants to have more funds for the proceedings. Finally, the applicable rules may expressly impose a broad mandate on the tribunal to ensure that there is a level playing ground between parties in an arbitration. For example, the Hague Rules provide that that, “[w]here a party faces barriers to access to remedy... the arbitral tribunal shall... ensure that such party is given an effective opportunity to present its case in fair and efficient proceedings.”⁷⁰

V. A PROPOSAL TO INTRODUCE ARBITRATION AS THE PRIMARY MODE OF DISPUTE RESOLUTION IN NUCLEAR DAMAGE DISPUTES

The most significant disadvantage of arbitration compared to litigation, however, is the fact that arbitration requires consent. This section addresses this issue and argues that there are two ways to introduce arbitration as the primary mode of dispute resolution in disputes arising from nuclear damage. The first is for *States* to recognize the advantages of arbitration over litigation in such cases, and to support the arbitration of disputes arising from nuclear damage by establishing an *ad hoc* dispute resolution body for that purpose. The second is for *operators* to recognize these advantages, and to agree with claimants to arbitrate such disputes. As noted in Section I above, the purpose of this article is to prompt a conversation as to the potential advantages of arbitration over litigation in such disputes; it is acknowledged, however, that incentivizing States and operators to arbitrate such disputes will require a far more in-depth and nuanced discussion.

A. Arbitration As the Primary Mode of Dispute Resolution Through National Law

The first proposal is for States to expressly provide, under national law, that disputes arising from nuclear damage should be arbitrated. States can support this by establishing an *ad hoc* dispute resolution body to resolve claims against an operator arising from a specific nuclear incident.

A similar approach was taken following the 2011 Fukushima accident in Japan. Where TEPCO (the Fukushima plant’s operator) could not reach agreement with claimants on compensation, claimants could refer the dispute to mediation via the specially established “Dispute Resolution Centre for Nuclear Damage Compensation” (or the “DRC”). The DRC appointed mediators to individual cases, and mediators could either guide parties to a settlement or issue

⁶⁹ See e.g. Hague Rules, at Article 55.

⁷⁰ Hague Rules, at Article 5(2).

recommended terms of settlement where no agreement was reached. TEPCO announced, in November 2011, that it would abide by settlement proposals made by the DRC's mediators.⁷¹ The Deputy Chief of the DRC's Secretariat described the DRC's mediation proceedings as a "mini-arbitration aiming at giving the mediator's non-binding ruling, rather than mediation seeking compromise and agreement among parties."⁷² The DRC was effective in addressing a large number of claims, and in correspondingly reducing the number of claimants seeking compensation in the courts. One commentator notes that "[a]s at 2 August 2013, the Dispute Resolution Centre had received 7313 applications for mediation, of which it had guided parties to reach settlement in 4239"; conversely, there were few claims brought by way of civil action against the operator, likely due to the "ease and low cost of [DRC] proceedings."⁷³

The DRC demonstrates how, following a nuclear incident, a State may establish an *ad hoc* dispute resolution body which can address and resolve claims against the operator. While the DRC did so through mediation, there are also other precedents where States have expressly established *ad hoc* bodies to arbitrate claims following an incident causing large-scale loss and damage. As the ICC observed in a recent report:

"[A]d hoc standing dispute resolution bodies are well known in international dispute resolution. Examples include: (i) the Iran-US Claims Tribunal; (ii) the Claims Resolution Tribunal for Holocaust Victim Asset Litigation, (iii) ad hoc standing dispute resolution bodies established to deal with environmental disasters, such as the Deepwater Horizon oil spill in the Gulf of Mexico; and (iv) the International Oil Pollution Compensation Funds maintained by an intergovernmental organisation that provides compensation for oil pollution damage resulting from spills from oil tankers."⁷⁴

B. Arbitration As the Primary Mode of Dispute Resolution Through Agreement

⁷¹ *Supra* note 66.

⁷² Eric A. Feldman, *No Alternative: Resolving Disputes Japanese Style*, in *Dispute Resolution--Alternatives to Formalization, Formalization of Alternatives* (Moritz Bälz & Joachim Zekoll eds., Brill 2014), U of Penn Law School, Public Law Research Paper No. 15-9, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2616031.

⁷³ *Supra* note 66.

⁷⁴ International Chamber of Commerce Commission on Arbitration and ADR, *Resolving Climate Change Related Disputes through Arbitration and ADR* (November 2019), para. 5.52, <https://iccwbo.org/wp-content/uploads/sites/3/2019/11/icc-arbitration-adr-commission-report-on-resolving-climate-change-related-disputes-english-version.pdf>.

The second proposal is for operators to submit to arbitration. The ICC's recent 2019 report on "Resolving Climate Change Related Disputes through Arbitration and ADR" (the "ICC Report") termed this as a "submission agreement": where parties enter into an arbitration agreement only after a dispute has arisen or crystallized. The ICC recognized that submission agreements are "rare, but not unprecedented."⁷⁵ The most notable example of a submission agreement is the Bangladesh Factory Accord, where about 200 apparel brands, retailers and importers agreed with trade unions to protect labour rights and to resolve disputes via arbitration.

As a commentator noted, there is some cause for optimism that operators will submit to arbitration in the event of a nuclear incident. There are several benefits to operators in doing so, including: "(1) prevention of multiple proceedings by agreeing to arbitrate with claimants collectively, (2) risk minimisation by opting for the 'known quantity' of international arbitration, and (3) reputational benefits from coming across as reasonable corporate citizens ready to shoulder responsibility if held liable."⁷⁶

There are also benefits for victims as well: enforceability of awards, neutrality, procedural flexibility, and speedier decisions, are all advantages of arbitration for victims. The class of victims who would benefit most from an agreement to arbitrate claims would be foreign victims who would otherwise face procedural hurdles in accessing national courts.

VI. CONCLUSION

As the world embraces nuclear power – and new nuclear installations – at a rate and volume greater than before, it is important to ensure a robust system in place for addressing civil liability arising from nuclear damage. Unfortunately, even decades after the 1997 Vienna Convention and 1997 CSC were first signed, there is still no widespread acceptance of the nuclear liability conventions. Nor are there any procedural safeguards to ensure that national law and national courts address disputes arising from nuclear damage in a neutral, effective, and timely manner.

In these circumstances, widespread acceptance of arbitration as an alternative mode of dispute resolution would provide a much-needed alternative recourse for potential victims in the wake

⁷⁵ *Id.*, at para. 2.6.

⁷⁶ Iris Ng, *Beyond Litigation: Narrative, Place, and the Roles of ADR in Climate Change Disputes*, Hong Kong International Arbitration Centre (Sept. 22, 2021), <https://www.hkiac.org/content/beyond-litigation-narrative-place-and-roles-adr-climate-change-disputes>.

of a nuclear incident. Arbitral rules, such as the Hague Rules and the PCA Rules, already provide a procedural framework that is particularly suited for arbitrating disputes arising from nuclear damage. The benefits of arbitration over litigation benefit both operators and victims, and both States and operators should strongly consider arbitration as a more appropriate mode of dispute resolution.

Annex 1: Nuclear power States and liability conventions to which they are party (as of 31 December 2023)⁷⁷

Country	Under construction	Operational	Suspended Operation	Shutdown	Planned	Conventions party to as of today ⁷⁸
Argentina	1	3				VC; RVC; CSC; (JP)
Armenia		1		1		VC
Bangladesh	2					N/A
Belarus		2				VC; RVC
Belgium		5		3		PC; BSC; (RPC); (RBSC); (JP)
Brazil	1	2				VC
Bulgaria		2		4		VC; JP
Canada		19		6		CSC
China	24	55			10	N/A
Taiwan, China ⁷⁹		2		4		N/A

⁷⁷ Data regarding number of nuclear reactors is from International Atomic Energy Agency, Nuclear Power Reactors in the World (Reference Data Series No. 2) (2024), available at <https://www.iaea.org/publications/15748/nuclear-power-reactors-in-the-world>.

⁷⁸ Data regarding subscription to the conventions is from IAEA Fact Sheets, Int'l Atomic Energy Agency (2024), <https://ola.iaea.org/Applications/FactSheets/>.

⁷⁹ The IAEA records the data for nuclear reactors in Taiwan separately from that in the People's Republic of China.

Country	Under construction	Operational	Suspended Operation	Shutdown	Planned	Conventions party to as of today⁷⁸
Czech Republic		6				VC; JP; (CSC); (RPC)
Egypt	3				1	VC; JP
Finland		5			1	PC; BSC; JP; (RPC); (RBSC)
France	1	56		14		PC; BSC; JP; (RPC); (RBSC)
Germany				33		PC; BSC; JP; (RPC); (RBSC)
Hungary		4			2	VC; JP
India	8	19	4		4	CSC
Iran, Islamic Republic Of	1	1			2	N/A

Country	Under construction	Operational	Suspended Operation	Shutdown	Planned	Conventions party to as of today ⁷⁸
Italy				4		PC; BSC; JP; (RPC); (RBSC)
Japan	2	12	21	27	9	CSC
Kazakhstan				1		VC, RVC
Korea, Republic Of	2	26		2		N/A
Lithuania				2		VC; RVC; JP; (CSC)
Mexico		2				VC
Netherlands, Kingdom Of The		1		1		PC; BSC; JP; (RPC); (RBSC)
Pakistan		6		1		N/A
Romania		2				VC; JP; RVC; CSC
Russia	3	37		10	18	VC
Slovakia	1	5		3		VC; JP

Country	Under construction	Operational	Suspended Operation	Shutdown	Planned	Conventions party to as of today⁷⁸
Slovenia		1				PC; BSC; JP; (RPC); (RBSC)
South Africa		2				N/A
Spain		7		3		PC; BSC; (RPC); RBSC; (VC); (JP)
Sweden		6		7		PC; BSC; JP; (RPC); (RBSC)
Switzerland		4		2		PC; RPC; BSC; RBSC; (JP)
Türkiye	4					PC; JP; (RPC)
Ukraine	2	15		4		VC; JP; (RVC); (CSC)
United Arab Emirates	1	3				RVC; JP; CSC

Country	Under construction	Operational	Suspended Operation	Shutdown	Planned	Conventions party to as of today ⁷⁸
United Kingdom	2	9		36		PC; BSC; (RPC); (RBSC); (VC); (JP)
United States Of America	1	93		41		CSC
Total	59	413	25	209	47	

Legend:

- PC = Paris Convention (PC).
- RPC = 2004 Revised Paris Convention, not yet in force.
- BSC = Brussels Supplementary Convention.
- RBSC = 2004 Revised Brussels Supplementary Convention, not yet in force.
- VC = Vienna Convention.
- RVC = 1997 Revised Vienna Convention (in force 2003).
- JP = 1988 Joint Protocol.
- CSC = Convention on Supplementary Compensation for Nuclear Damage, in force from 15 April 2015.
- () = signed but not yet ratified.
- N/A = not party to any of the nuclear liability conventions.