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The legal challenges of global commercialisation of SMR new nuclear technologies: from an international investment law perspective

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Renewed interest in nuclear energy due to energy transition and net-zero goals is being fuelled by advances in nuclear energy technologies such as small modular reactors (SMR). With expected increased investment interests in SMR, this paper questions whether the features of SMR commercial transactions would comply with the various principles and standards of international investment law. It found that there are mixed areas of compliance and non-compliance, and certain limitations and ambiguities. These findings will be relevant to SMR manufacturers and regulatory authorities for SMR global commercialisation. The paper concludes with certain recommendations including amending the International Energy Charter.

Keywords: SMR; new nuclear technology; nuclear energy; international investment law; commercialisation of SMR; deployment of SMR; SMR investments; international energy charter

1. Introduction

As part of the ongoing global climate change mitigation efforts, there is strong push for energy transition from fossil fuels to low-carbon energy sources. Many countries have pledged to reduce their carbon emission by 2030 and to meet their net-zero targets from 2050. To meet up with 2015 Climate Change Paris Agreement commitments, countries are devising many innovative strategies to minimise their dependency on fossil fuels. A key strategy adopted by many countries is a policy shift towards the inclusion of low-carbon energy sources such as nuclear energy into their energy mix.[1] This policy shift is expected to boost increasing deployment of large-scale renewable energy in various countries, while minimising the use of fossil fuel energy sources for power generation. Due to the realisation of the limitations of renewable energy to fully sustain the energy requirements of most countries, there is a renewed interest in the deployment of nuclear energy as a supplement to renewable energy sources.[2]

However, the use of nuclear energy power is controversial and has generated widespread negative public perception in the past due to its associated risks. This perception

1 Chinenye Nriezedi-Anejionu, 'Carbon Reduction and Nuclear Energy Policy U-Turn: The Necessity for an International Treaty on Small Modular Reactors (SMR) New Nuclear Technology' (2024) 15(1) Carbon Management 1758 <www.tandfonline.com/doi/pdf/10.1080/17583004.2024.2396585> accessed 5 January 2025

2 Timur Tillyaev, 'EU Decision to Label Nuclear "Green" Is Key to Energy Transition and Autonomy – Euractiv' (2022) <www.euractiv.com/section/eet/opinion/eu-decision-to-label-nuclear-green-is-key-to-energy-transition-and-autonomy/> accessed 5 January 2025

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has been exacerbated by nuclear fallout from well-known incidents at nuclear power plants (NPPs) in Chernobyl (Ukraine) and Fukushima (Japan). As a result, most countries that previously relied on nuclear power for a long time, such as Germany, began to decommission their plants. Hence, this negative perception is challenging the reintroduction of large NPPs into the energy mix of many countries. The controversy and challenges surrounding the deployment of large NPPs such as huge cost and long duration for construction stimulated the development of small modular reactors (SMRs). SMRs promise a more portable, relatively cheaper and safer nuclear option that could assuage public perception about the reintroduction of nuclear energy into the energy mix of countries. Promoters believe that SMRs have the potential to persuade the public towards accepting increasing dependency on nuclear energy.

Increasing interest in the use of SMRs is backed by many countries through the implementation of new policies that are accommodating SMRs into the list of energy projects qualified to receive investment incentives. For instance, the European Commission included SMR-generated energy and other nuclear technologies (nuclear fission and fusion) in the list of accepted 'advanced technologies' in its Net-Zero Industry Act (Regulation (EU) 2024/1735) (NZIA).[3]

Similarly, the UK in 2023 included nuclear energy in its green taxonomy of environmentally sustainable energy sources. This was to support the UK's Ten Point Plan for a Green Industrial Revolution (2020), the Net Zero Strategy (2021) and the Mobilising Green Investment – Green Finance Strategy (2023) policies. The Ten Point Plan for a Green Industrial Revolution highlighted nuclear energy as one of the energy sources that will assist the country in meeting its net-zero carbon emission target by 2050.[4]

Despite the opposition of this classification from certain quarters,[5] it is widely believed that government will continue to encourage investments in this sector to meet its energy demands, through non-fossil means – hence the need to examine the relevant bilateral investment treaties (BITs), energy policies and contracts to ascertain whether provisions for SMR projects in these legal frameworks are compatible with international investment law standards. Thus, the overarching question which this research is hoping to address is whether the features of SMR technology commercial transactions would qualify as valid investments, and be in compliance with the various principles and standards of international investment law. To address this, certain sub-questions are asked. Firstly, will SMR transactions qualify as 'valid investments'? Secondly, will SMR manufacturers qualify as 'protected investors'? Thirdly, how will the various investment

3 European Union, 'Net Zero Industry Act' (2023) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023PC0161> accessed 3 January 2025; European Parliament, 'MEPs Back Plans to Boost Europe's Net-Zero Technology Production' (2023) <www.europarl.europa.eu/news/en/press-room/20231117IPR12205/meps-back-plans-to-boost-europe-s-net-zero-technology-production> accessed 3 January 2025

4 Gov.UK, 'UK's Path to Net-Zero Set Out in Landmark Strategy' (2021) <www.gov.uk/government/news/uks-path-to-net-zero-set-out-in-landmark-strategy> accessed 30 December 2024; HM Government, 'Mobilising Green Investment – 2023 Green Finance Strategy' <https://assets.publishing.service.gov.uk/media/643583fb877741001368d815/mobilising-green-investment-2023-green-finance-strategy.pdf> accessed 3 January 2025.

5 Elena Sánchez Nicolás, 'Green Groups Go to Court on EU Nuclear and Gas Rules (2022) accessed 30 December 2024; Kate Abnett, 'Campaigners sue EU for labelling gas and nuclear investments as green' (2023) <www.reuters.com/business/sustainable-business/campaigners-sue-eu-labelling-gas-nuclear-investments-green-2023-04-17/> accessed 30 December 2024

protections apply to SMR manufacturers? And, finally, how and to what extent will relevant energy investment treaties currently in force, such as the Energy Charter Treaty (ECT), apply to SMR manufacturers, and will the ongoing withdrawal from the ECT by some of its member states (who are actively developing SMRs) have any impact on the application of ECT to SMR projects?

For brevity, this paper focuses only on SMR nuclear energy technology, which has reached advanced stages of development and most likely will be soon commercialised. It is expected that most of the legal issues explored in this paper could also be considered applicable for other advanced nuclear reactors (eg advanced modular reactors (AMRs) and microreactors), currently at various stages of development. In addition, this paper focuses on SMR commercial and investment legal issues, although there are other vital legal issues concerning SMRs such as its double licensing feature[6] and its complicated, costly and time-intensive requirements, as has been legally challenged already in court;[7] these issues are considered out of the scope of the present research.

2. Overview of SMR technology and deployment

SMR is a portable (its components and systems can be shop fabricated and transported as modules to the sites for installation) reactor, smaller than the conventional large NPPs and designed to generate moderate electric power of up to 300 MW. The key driving forces of SMR development are to fulfil the need for flexible power generation for a wider range of users and applications, to enhance the safety performance of NPPs, to replace ageing fossil-fired units, and to offer better economic affordability.[8] Currently, there are various designs of SMRs at various stages of development. Differences in designs are largely based on fuel types used (eg low-enriched uranium (LEU) or mixed-oxide fuels (MOX), high-assay low-enriched uranium (HALEU) or thorium-based fuels), cooling mechanism, energy generation mechanism, and safety enhancements.[9] Generally, SMR designs are categorised into various types, namely pressurised water reactors (PWRs), light water-cooled reactors (LWRs), high temperature gas-cooled reactors (HTGRs), liquid metal-cooled reactors (LMRs), and molten salt reactors (MSRs).[10]

SMRs are becoming increasingly popular due to certain unique features which the conventional large NPPs do not have.[11] For instance, it takes less time to build, install and maintain an SMR (due to its smaller size); hence, it is not as capital intensive as the large NPPs. In addition, it has better emergency safety and response features built in. Also, SMRs can be transported to and installed in remote environments where it is impossible to install large NPPs.

6 Nriezedi-Anejionu Chinenye (n 1)
7 World Nuclear News, 'Lawsuit Challenges NRC on SMR Regulation' (2025) <www.world-nuclear-news.org/articles/lawsuit-challenges-nrc-on-smr-regulation> accessed 26 January 2025
8 IAEA, 'What Are Small Modular Reactors (SMRs)?' (2023) <www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs> accessed 1 November 2024
9 IEF, *Nuclear Small Modular Reactors: Key Considerations for Deployment* (2024)
10 Small Modular Reactors 'Types of Small Modular Reactors | List of 10 SMR Designs' (2025) <small-modular-reactors.org/types-of-small-modular-reactors/> accessed 26 June 2025
11 Nriezedi-Anejionu Chinenye (n 1)

3. What is a valid investment?

Under international investment law, the terms 'investments' and 'investors' are carefully defined, to minimise ambiguity and disputes. Certain elements such as the type of assets involved and the type of contributions made to the host state are used to determine what transactions (projects, contracts) qualify as valid investments. In determining the validity of investments, references are also made to relevant national investment laws and international investment treaties applicable to the parties involved. For an investment to be considered valid, both the investment and investor must be legally valid. Two main methods, the subjective (used by states in domestic investment laws and treaties) and the objective (mainly used by the International Centre for Settlement of Investment Disputes-ICSID arbitral tribunals for interpretation purposes) are usually used to define a valid investment.[12]

3.1. *The subjective method of defining 'investment'*

Many countries clearly specify what constitutes an investment in their relevant investment laws/treaties, while some do not explicitly define it but may simply have a list of assets recognised as valid investments. These provisions do vary from one to another. There are three main models of subjectively defining 'investment': the asset-based, enterprise-based and economic-based models.[13]

The asset-based model broadly defines investment to include property rights, shareholding, claims to payments or performance, intellectual property, intangible rights, and concession agreements for the exploitation of natural resources.[14] For example, the UK Model Bilateral Investment Treaty 2008 defines it in this light.[15] (See also the meaning of 'qualifying assets' in Section 7 (6) of the UK National Security and Investment Act 2021.)

The enterprise-based model defines investment as the acquisition of a business enterprise. This model is targeted at foreign direct investment (FDI) and therefore excludes standalone foreign portfolio investments (FPI: investment in shares mainly).[16] Its essence is to ensure that real management control of a company exists, rather than a mere transfer of shares.[17] For example, the Indian Model BIT 2015 defined investment as meaning

> an enterprise constituted, organised and operated in good faith by an investor in accordance with the law of the Party in whose territory the investment is made ….

12 B Stern, 'The Contours of the Notion of Protected Investment' (2009) 24 ICSID Review 535

13 Peter Muchlinski and others, *The Oxford Handbook of International Investment Law* (OUP 2008) ch 2, 52; UNCTAD (ed), Scope and Definition: [A Sequel] (United Nations 2011) 21

14 Christoph Schreuer, The ICSID Convention: A Commentary: A Commentary on the Convention on the Settlement of Investment Disputes between States and Nationals of Other States (CUP 2001) 129; US–Argentine BIT 1994, art 1

15 UNCTAD Investment Policy hub, 'UK Model Bilateral Investment Treaty (2008) accessed 6 January 2025

16 Michail Dekastros, 'Portfolio Investment: Reconceptualising the Notion of Investment Under the ICSID Convention' (2013) 14 JWIT 288

17 Ranjan Prabhash, 'Definition of Investment in Bilateral Investment Treaties of South Asian Countries and Regulatory Discretion' (2008) 26 Journal of International Arbitration 217; UNCTAD, Scope and Definition: [A Sequel] (United Nations 2011)

The economic-based model defines investment to mean that assets acquired should be used for the purpose of economic benefit of the host state. For example, Senegal's Model BIT defines investment to mean: ' … connected with business activities, acquired for the purpose of establishing lasting economic relations … '[18] Also, Article 1 of the Colombia–China BIT 2008 states that '[t]he term Investment means every kind of economic asset that has been invested by investors of a Contracting Party … .'[19]

Typical provisions relating to energy investment in BITs fall under the asset-based model of definition. The ECT, a key legally binding treaty on energy investments, defines investment in a more comprehensive manner that reflects both the asset model and the economic model of defining investment. It provides generally in Article 1(6) that 'Investment' means 'every kind of asset, owned or controlled directly or indirectly by an Investor, and then gives a list of categories of assets. And in Article 1(6) (f) it provides that:

> 'any right conferred by law or contract or by virtue of any licences and permits granted pursuant to law to undertake any Economic Activity in the Energy Sector'. 'Investment' refers to any investment *associated with an economic activity in the Energy Sector ...*

The meaning of 'Economic Activity in the Energy Sector' was expatiated in the provision to concern activities such as exploration, extraction, refining, production, storage, land transport, transmission, distribution, trade, marketing, or sale of energy materials and products except those concerning the distribution of heat to multiple premises.[20]

3.2. *The objective method of defining 'investment'*

In addition to the subjective models of investment definition, investment arbitral institutions also have objective methods/tests for practically interpreting the definition of investment in various treaties and laws.

The International Convention for Settlement of Investment Disputes (ICSID) 1965 provides in Article 25 that '[t]he jurisdiction of the Centre shall extend to any legal dispute arising *directly out of an investment*, between a Contracting State … and a national of another Contracting State … '. It fails, however, to define the exact meaning of 'investment'.[21] Due to this loophole, and the fact that most tribunals do not follow a binding precedent, there is no fixed definition of investment that they use.[22] Rather, they consider certain characteristics of an investment, while determining the definition of investment such as features 'involving a certain duration, a certain regularity of profit and return, assumption of risk, a substantial commitment and significance

18 UNCTAD Investment Policy hub, 'Senegal Model Bilateral Investment Treaty' <https://investmentpolicy.unctad.org/international-investment-agreements/treaty-files/3267/download> accessed 7 January 2025

19 'China – Colombia BIT (2008) | International Investment Agreements Navigator | UNCTAD Investment Policy Hub' <https://investmentpolicy.unctad.org/international-investment-agreements/treaties/bilateral-investment-treaties/880/china—colombia-bit-2008-> accessed 26 December 2024

20 Energy Charter Treaty 1994, art 1(5)

21 Laurence Burger, 'The Trouble with Salini (Criticism of and Alternatives to the Famous Test)' (2013) 31 ASA Bulletin 521; F Yala, '"The Notion of Investment" in ICSID Case Law: A Drifting Jurisdictional Requirement? Some "Un-Conventional" Thoughts on Salini, SGS & Mihaly' (2005) 22 J. Int'l Arb 105

22 Ozge Varis, 'International Energy Investments: Tracking the Legal Concept' (2014) 2 Groningen Journal of International Law 81; Tony Cole, *The Structure of Investment Arbitration* (Routledge 2013) 43

for the host State's development'.[23] The test was developed from *Fedax N.V v The Republic of Venezuela*[24] and confirmed in *Salini v Marocco*.[25] The ICSID does not recognise an investment that fails the objective test, even if it satisfies the subjective definition in the relevant laws and treaty.[26]

4. Who is a valid investor?

The definition of a valid 'investor' is also usually provided for in investment laws and treaties. This provision is critical for determining who a 'protected investor' is.[27] Usually, both natural persons and juridical persons/entities (incorporations) are recognised as investors if the conditions are satisfied. An example of such provision could be seen in Article 1(3) of the German Model BIT 2008.[28]

Article 25(2) (b) of the ICSID defines an investor as a 'national of another Contracting State' which includes 'any juridical person, which had the nationality of a Contracting State other than the State party to the dispute … '. However, this does not expressly define the method for determining the nationality of juridical entities. Hence, this is usually ascertained in investment laws and treaties by proof of nationality/citizenship.

Under international investment law, the recognised tests for ascertaining the nationality of legal persons/corporate bodies are the incorporation/constitution/registration test, the siège social (seat of business) test, or the control/ownership test (ie their nationalities is determined based on the place and centre of management).

5. Standards of investment protection/treatments

Despite the good intentions behind investment, there are occasions when certain actions of the parties could threaten or undermine the expected outcomes of the investment. For instance, there are various actions of a host state that could breach investors' rights and privileges. Some prominent actions include undue revocation of licences/permits, confiscation of an investor's investment properties, arbitrary or discriminatory imposition of taxation, withdrawal of incentives and subsidies, failure to protect investors and their investments from physical harm arising from

23 Christoph Schreuer, 'Commentary on the ICSID Convention' (1996) 11 ICSID Review-FILJ 372

24 Fedax N.V v The Republic of Venezuela ICSID ARB/96/3, Decision on Objection to Jurisdiction (11 July 1997)

25 Salini Costruttori S.p.A and Italstrade S.p.A v Kingdom of Morocco, ICSID No ARB/00/4, Decision on Jurisdiction, (31 July 2001)

26 Malaysian Historical Salvors SDN, BHD v The Government of Malaysia, ICSID Case No. ARB/05/10, Award on Jurisdiction (17 May 2007) para 55. It states that:

> under the objective test, a finding that the contract satisfied the subjective definition of 'investment' under the BIT would not be sufficient for this Tribunal to assume jurisdiction if the contract failed to satisfy the objective criteria of an 'investment'.

27 That is the natural person or corporate entity that will benefit from standard investment protections.

28 UNCTAD Investment Policy hub, 'German Model Bilateral Investment Treaty <https://investmentpolicy.unctad.org/international-investment-agreements/treaty-files/2865/download> accessed 28 December 2024

armed conflicts, and denial of justice, amongst others.[29] On the other hand, investors could breach their contractual terms and thus undermine the economic or developmental interests of a host state.

To ensure healthy, fair and equitable relations between a foreign investor and a host state, certain measures are put in place to protect both the interests of the host state and the investor. As foreign investors are usually perceived as the weaker party, certain rights and privileges are granted to them as promises of protection over their investment projects.[30] These measures are collectively known as standards of investment protections/guarantees.

Even though countries have the right to state sovereignty, by entering into international investment agreements, they promise to give up their absolute power of control and agree to certain rules of international investment law. Hence, through these protections, international investment risks such as economic, legal and political risks are minimised. There are different types of standards of treatment, such as fair and equitable treatment (FET), full protection and security (FPS), national treatment (NT), most-favoured nation (MFN) treatment, protection from expropriation, and right to transfer of funds.[31]

Generally, under international investment law, only investments made by qualified 'investors' are protected by these various investment standards of protection.[32] Conventional NPP projects are generally accepted as valid investments; however, due to the peculiarity of SMRs, disputes over their classification as valid investments could arise in the future. Hence, it becomes imperative to evaluate key elements of SMR transactions that could impact on their classification as valid investments and their qualification for these protections.

6. Evaluating the validity of SMR projects as investments

With growing interest and increasing incentivisation for SMR technology by many countries, it has become pertinent to understand whether SMR projects can qualify as valid investments or whether they would be regarded as mere contracts for sale of goods. The qualification of SMR projects as valid investments would guarantee that they receive relevant investment protections. This is imperative considering the prospects of the technology being exported to various countries for installation in the near future. This poses the question of whether the owners of the technology would benefit from investment protections from the host states. The inclusion of nuclear energy as green energy in many states is mainly to clearly signal to foreign investors that they can also invest in the new nuclear energy technologies and benefit from available green energy incentives.[33] However, as there are still on-going legal disputes against this latest

29 Mayer Brown, 'Investment Treaty Protection and Arbitration: Key Things to Know' <Microsoft PowerPoint – 939134083_1.PPTX (mayerbrown.com)> accessed 28 December 2024

30 Andrew Paul Newcombe and Lluís Paradell, *Law and Practice of Investment Treaties: Standards of Treatment* (Kluwer 2009)

31 August Reinisch, *Standards of Investment Protection* (OUP 2008); Jeswald W Salacuse, *The Law of Investment Treaties* (OUP 2010); Campbell McLachlan, Laurence Shore, and Matthew Weiniger, *International Investment Arbitration: Substantive Principles* (OUP 2008); Peter Muchlinski, *Multinational Enterprises and the Law* (OUP 2007) 682

32 ICSID Convention, art 25(1); Lu Wang, 'State-Owned Enterprises and The International Investment Law Regime' (PhD Thesis, University of Liverpool 2017) ch 2

33 Piyasi Mitra, 'Nuclear Is the New Green' (Fund Europe, 2023) <www.funds-europe.com/nuclear-is-the-new-green/>; WNN, 'A Guide to the EU's "Green" Taxonomy – And Nuclear's Place in It' (2022)

classification of nuclear energy, investors are wary of investing in this sector, because a legal decision disqualifying nuclear energy as green investment could negatively impact their energy investment projects if construction had already commenced. Such legal decisions could lead to further disputes between SMR manufacturers and the host states.

In addition, even if the legal disputes end up affirming nuclear energy as a qualifying green energy, there might still be other reasons that new nuclear energy projects such as SMR could be questioned. For instance, due to the nature of SMRs, the contracts between the manufacturers and host states could appear as mere transactions of goods and service, instead of being construed as purely investment projects. Hence it is necessary to examine this in detail to arrive at a definitive conclusion.

The key question here is whether new nuclear technology projects, in particular SMRs, could be regarded as valid investments. The challenge in addressing this stems from the peculiar nature of SMR nuclear technology. Hence, in this section, each relevant aspect of SMRs will be examined to evaluate their conformity to international investment law principles.

6.1. *Will SMR commercial transactions qualify as valid investments?*

The portability and modularity of SMR nuclear technology entails that they can be built in one country and shipped to another where they will be utilised. Under this guise, SMRs could appear as mere sale of goods and services. This contrasts with the manner in which a conventional large NPP is built, where the providers of the power will physically be on the ground to build the plant in the host country. This feature of SMR therefore begs certain questions, such as who is going to do the installation in the host state? Will it be the SMR manufacturers or the host state nuclear operators?

These questions are very significant as they will determine whether the SMR contract will be classified as a 'qualifying investment' or as a mere sale of goods. If SMR transactions are determined to be a mere sale of goods, there would not be any investment protection attached to them. Many BITs expressly exclude sale of goods from their definition of investment, using what is termed the 'exclusionary approach'. Under this approach, some assets and interests are excluded from the meaning of investment, for example portfolio investment and claims to money arising solely from commercial contracts. For instance, the definition in Article 1 of Azerbaijan Model BIT 2016 provides that a claim to payment that is immediately due and results from the sale of goods or services is expressly excluded as an investment. Also, under Article 1 of the UK–Mexico BIT 2006, 'commercial contracts designed exclusively for the sale of goods or services and credits to finance commercial transactions with a duration of less than three years … are not considered an investment'. Article 1 of the Japan–Peru BIT 2008 states that:

> The term 'investments' means every kind of asset owned or controlled, directly or indirectly, by an investor … *but investments do not mean*: (i) claims to money that arise solely from

<www.world-nuclear-news.org/Articles/A-guide-to-the-EUs-green-taxonomy-and-nuclears-pla>; EU, 'Taxonomy: MEPs Do Not Object to Inclusion of Gas and Nuclear Activities' (2022) <www.europarl.europa.eu/news/en/press-room/20220701IPR34365/taxonomy-meps-do-not-object-to-inclusion-of-gas-and-nuclear-activities> (accessed 20 December 2024). This date is applicable for all the references in this note)

> (i) commercial contracts for the sale of goods or services by a national … ; or
> (ii) the extension of credit in connection with a commercial transaction …

Furthermore, the Brazil Model BIT 2015, Article 3 used this approach by providing that

> for greater certainty 'Investment' does not include:
> claims to money that arise solely from commercial contracts for the sale of goods or services by an investor in the territory of a Party to a national or an enterprise in the territory of another Party, or the extension of credit in connection with a commercial transaction …

The German–Mexico BIT 1998 indicates in Article 1(c) that investment includes claims to money, or to any performance having an economic value. But it specifically states:

> However, commercial contracts designed exclusively for the sale of goods or services and credits to finance commercial transactions with a duration of less than three years, other credits with a duration of less than three years, as well as credits granted to the State or to a State enterprise are not considered an investment.

This could become problematic for either the host state or the SMR manufacturer. For instance, if a host state while installing an SMR delivered to them by the manufacturer, finds a fault in it or if general issues leading to legal dispute ensue, it becomes difficult for the host state to sue the manufacturers relying on the benefits of international investment arbitration.

A classic example of this scenario was seen in the case of *Petrobart v The Kyrgyz Republic*.[34] The case involved a Goods Supply Contract where the supplier (Petrobart) was to supply and transfer ownership of 200,000 tons of stable gas condensate to the purchaser (KGM, the state joint stock company) over the course of a year. After delivery, Petrobart sent invoices to KGM, but not all payments were made. After some time, the government decided to create a new state company. Petrobart instituted a first arbitration claim, and the issue of whether Petrobart is a valid investor that has made a valid investment came up. The claim was dismissed at this first stage for lack of jurisdiction on the ground that Petrobart had not made an 'investment' in line with the applicable domestic investment law.

This case is significant as it mirrors a possible way SMR supply contracts could operate in the future in various countries and the possible legal obstacles that could ensue from same.

6.2. *Will SMR manufacturers be valid investors?*

Like any other transaction, disputes could arise out of SMR transactions when one of the parties feels shortchanged. Hence, it becomes imperative to ascertain whether SMR manufacturers would be recognised as valid/protected investors. Depending on the type of financing and funding structure in place, varying investment legal issues may ensue. For example, if in a developing country, the build–own–operate (BOO) mechanism is

34 SCC Case No 126/2003, Award (29 March 2005) <www.italaw.com/sites/default/files/case-documents/ita0628.pdf>

agreed and the issue of indirect expropriation arises, or where denial of the investment guarantee of FPS from riot or war occurs, the SMR manufacturers will have a problem claiming legal remedies if they are not duly certified as valid investors in the installation country. To claim the status of a protected investor, the manufacturer must satisfy the provisions stipulated in the definition of a valid investor in the relevant laws and treaties.

BITs have been recognised as a vital instrument in attracting foreign investment.[35] A key element that will determine the validity of an SMR manufacturer as foreign investor is the existence of a ratified BIT in force between the home country of the manufacturers and the host country where the SMR is being installed. Relevant provisions for the recognition of a valid investor and investments are therefore stipulated in these BITs.

Another key element in the definition of a valid investor is the incorporation status of the manufacturer company. Most investment laws stipulate that for a corporate investor to be considered protected/valid they must be incorporated in the host state (see Section 4). Thus, there is a need for SMR manufacturers to ensure either that they are duly incorporated/registered in the installation country or that they have an operating seat of business or a centre of management there. This is so as to avoid the penalty of the Denial Clause being meted against them if they are considered merely 'mailbox companies' in the host state, as seen in Article 17 of the ECT which stipulates that:

> Each Contracting Party reserves the right to deny the advantages of this Part to:
>
> (1) a legal entity if citizens or nationals of a third state own or control such entity and if that entity has no substantial business activities in the Area of the Contracting Party in which it is organised …

Another important element in the definition of a valid investor is the duration and magnitude of work to be done in the host state for SMR installation. For investors in conventional large NPPs, there is hardly any question about their status as valid investors in the host states where such projects are carried out, due to the fact that these are usually long-term projects in the host state. But for SMR manufacturers ascertaining this could be problematic, because the bulk of the work on SMR will be carried out in the manufacturing country, and only the finished product shipped to the host state. SMR manufacturers are typically companies/legal entities in their own countries whose main aim is to build modularised parts for sale to another country. This poses a challenge to the determination of the validity of such investors. Hence, another important consideration in addressing this will be to determine who will install the SMR in the recipient country. This is very important as it would play a key role in determining whether the manufacturer can be regarded as a valid investor.

35 E Neumayer and L Spess, 'Do Bilateral Investment Treaties Increase Foreign Direct Investment to Developing Countries?' (2005) 33 World Development 1567; E Aisbett, 'Bilateral Investment Treaties and Foreign Direct Investment: Correlation Versus Causation' in K Sauvant and LE Sachs (eds), *The Effects of Treaties on Foreign Direct Investment: Bilateral Investment Treaties, Double Taxation Treaties and Investment Flows* (OUP 2009); T Büthe and HV Milner, 'Bilateral Investment Treaties and Foreign Direct Investment: A Political Analysis' (Annual Meeting of the American Political Science Association, 2004); P Egger and M Pfaffermayr, 'The Impact of Bilateral Investment Treaties on Foreign Direct Investment' (2004) 32 Journal of Comparative Economics 788; UNCTAD, *The Role of International Investment Agreements in Attracting Foreign Direct Investment to Developing Countries* (United Nations 2009)

There are potentially two main ways SMR could be installed: by the manufacturer or by the host state. If the manufacturer does the installation after shipping to the host country (especially in nuclear newcomer countries), this will entail a substantial work on the part of the manufacturer in the host country. However, for countries that already have the human resources and technical knowledge to handle the installation, they could just order the SMR and install it in their country themselves. Hence, the transaction might be regarded as a mere sale of goods. Based on the foregoing there is a strong indication that there are situations when an SMR manufacturer could be recognised as a valid investor and when it may not be. Hence, it is necessary to ascertain this in a timely fashion during the contract preparation stages to avoid undue disputes.

6.3. *Will SMR manufacturers that are state-owned enterprises (SOEs) qualify as valid investors?*

Investment protections are usually only accorded to entities (natural or corporate) regarded as nationals of a contracting party. For instance, the ICSID Convention refers to qualified 'investment' as only those made by a 'national' of a contracting state. This raises the question of whether state-owned enterprises (SOEs) manufacturing SMRs will be considered valid investors. Generally, SOEs, even though they are corporate entities, may not be considered nationals or 'private' contracting states but rather 'public' agencies or state-controlled organs.[36] Hence, they may not be considered valid investors. Even under public international law, contractual breach of SOEs is usually attributable to their states, not the entities. However, there are exceptional instances where it is recognised that the SOEs are not acting in a government capacity but in a purely economic/commercial capacity.[37]

Another concern with SOEs is whether or not they can pursue legal claims against host states using the investor–state dispute settlement mechanism. Normally, international investment agreements do provide for state–state dispute settlement procedures, but this only pertains to 'interpretation or application of such Agreement' and not for denial of investment protections.[38]

It should be noted that because nuclear energy is still regarded as a sensitive aspect of national security, most countries may not want to engage with SMRs built by SOEs.[39]

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36 Peter Bekker, 'Berne Union – State Responsibility for Acts of SOEs' (2023) <https://berneunion.org/Articles/Details/795/State-responsibility-for-acts-of-SOEs> accessed 27 June 2025

37 ILC Articles on Responsibility of States for Internationally Wrongful Acts, arts 5, 8; Michael Feit, 'Responsibility of the State under International Law for the Breach of Contract Committed by a State Owned Entity' (2010) 28 Berkeley Journal of International Law 142; Paul Blyschak, 'State-Owned Enterprises and International Investment Treaties: When Are State-Owned Entities and Their Investment Protected?' (2011) 6 Journal of International Law and International Relations 1; Mark Feldman, 'The Standing of State-Owned Entities under Investment Treaties' in Karl P Sauvant (ed), *Yearbook on International Investment Law & Policy 2010–2011* (OUP 2012) 615; Lu Wang, 'State Controlled Entities as Qualified "Investors": Implications for the Pacific Region Investment Treaty Making' (2015) 12 Transnational Dispute Management <https://www.transnational-dispute-management.com/article.asp?key=2188> accessed 10 September 2024; Mark Feldman, 'State-Owned Enterprises as Claimants in International Investment Arbitration' (2016) 31 ICSID Review 24 <https://academic.oup.com/icsidreview/issue/31/1> accessed 10 September 2024

38 UK Model BIT 2008, art 9

39 James E Mendenhall, 'Assessing Security Risks Posed by State-Owned Enterprises in the Context of International Investment Agreements' (Winter 2016) 31(1) ICSID Review – Foreign Investment Law Journal

Hence, it becomes imperative to question the status of SMRs built and marketed by government-controlled nuclear agencies or their subsidiaries as done by some countries such as Russia (Rosatom Nuclear Energy Corporation which is a Russian state corporation),[40] and China (China National Nuclear Corporation, also a state-owned enterprise) in other words, how will they be treated if investment dispute ensues from their sales? Will state/government agencies be regarded as the investors?

However, it need be noted that because some actively commercial state-controlled organs are aware of this legal problem, some (but not all) countries such as US, Canada, Japan, and UAE have expressly listed SOEs among the protected investors in the definition provision/section of their international investment agreements (IIAs).[41] In contrast, European countries' IIAs either do not expressly provide for same or exclude same.[42] Noting that some SMR manufacturers are European SOEs, for example the Nuward developed by France's EDF (a multinational electric utility company owned by the government of France). To boost SMR marketability, this paper proposes the need for EU manufacturers to reconsider this and begin to expressly provide for same in their IIAs as well.

The United States has provided some guidance through their Committee on Foreign Investment in the United States (CFIUS) on how to analyse whether a transaction really poses a national security risk based on its degree of independence from the state control, transparency and disclosure, etc.[43] This guidance could be mirrored by other countries to apply to SMR SOE manufacturers if SMR commercialisation and deployment globally is to be assured.

6.4. *SMR transportation and investment validity*

The mode through which SMRs are transported from the manufacturer to the target county will determine their classification as a 'valid investment'. There are three possible modes of SMR transportation.[44] The first mode is where the transportation involves only packaged fuel to be used by the reactors. The second is where an SMR is transported without the fuel (without any nuclear element in it). The third mode involves the

36 <https://doi.org/10.1093/icsidreview/siv056>; Marc Bungenberg and Angshuman Hazarika, 'Chinese Foreign Investments in the European Union Energy Sector: The Regulation of Security Concerns' (2019) 20(2–3) J World Invest Trade 375 <https://doi.org/10.1163/22119000-12340136> accessed 27 December 2024

40 Rosatom, 'Rosatom State Atomic Energy Corporation ROSATOM Global Leader in Nuclear Technologies Nuclear Energy' <https://rosatom.ru/en/about-us/> accessed 27 June 2025

41 India–Mexico BIT 2007, arts 1(3), (8); China–Mexico BIT 2009, art 1; Egypt–Indonesia BIT, art 1(2), (4); Malaysia-Saudi Arabia BIT 2000, art 1(3); Japan–Korea–China Trilateral Agreement on Investment 2012, art 1(2), (4); Mark Feldman, 'State-Owned Enterprises as Claimants in International Investment Arbitration' (Winter 2016) 31(1) ICSID Review – Foreign Investment Law Journal 24–35. <https://doi.org/10.1093/icsidreview/siv052> accessed 27 December 2024

42 Germany–Panama BIT (1983); Switzerland–Panama BIT (1983); UK–Panama BIT (1983)

43 Office of Investment Security, Guidance Concerning the National Security Review Conducted by the Committee on Foreign Investment in the United States <https://home.treasury.gov/policy-issues/international/the-committee-on-foreign-investment-in-the-united-states-cfius/cfius-laws-and-guidance>; CFIUS Guidance <https://home.treasury.gov/system/files/206/CFIUSGuidance.pdf> accessed 27 December 2024

44 Nuclear Engineering International, 'SMRs and the Transport Challenge' 11 January 2024 <www.neimagazine.com/features/featuresmrs-and-the-transport-challenge-11427709/> accessed 27 December 2024

transportation of fuel-loaded SMRs (eg with LEU, ie approximately five per cent U-235; or with HALEU).[45]

In the first mode where the transportation is only for packaged fuel to be used by the SMR reactors, this would most likely be considered a valid investment under most BITs, including the ECT, because it is the natural resource itself that is being transported. An example is the UK Model BIT 2008 which provides thus:

> (a) 'investment' means every kind of asset, owned or controlled directly or indirectly, and in particular, though not exclusively, includes:
>
> (v) business concessions conferred by law or under contract, including concessions to search for, cultivate, extract or exploit *natural resources*.[46]

Although some arguments could arise here in relation to the meaning of the clause ('including concessions to *search for, cultivate, extract or exploit* natural resources'). In this case, the shipping of packaged nuclear fuel may not fully satisfy the expectations of the clause because the natural resource is coming from the SMR manufacturer's country and not being extracted in the host/installation country.

The second mode is where the SMR will be transported without the nuclear fuel in it. This is largely dependent on the relevant BIT between the two countries involved. Many BITs define investment in relation to only 'natural resources', as seen in the UK Model BIT 2008 provision shown above. Thus, transporting SMR without the uranium-235 which is the nuclear natural resource may in the strict sense result in it being an invalid investment. However, the phrase 'every kind of asset' may be argued to apply to the empty SMR as well. But this will apply to BITs that used the asset model of defining investment only. On the other hand, the ECT, in its definition of investment as involving any economic activity in the energy sector, is broad enough to include transportation and marketing of energy materials and products, which should cover non-fuelled SMRs.[47]

The third mode, involving the transportation of fuel-loaded SMRs, appears to be a valid investment as both the reactor and the resource are in line with both BITs and the ECT as an asset capable of contributing to the economic development of the host state. However, the same argument regarding the source of the natural resource (the nuclear fuel) could still be a source of complaint.

7. SMR and standards of investment protection/treatments

From the foregoing, there are indications that some SMR transactions would qualify as valid investments depending on the applicable investment legal framework, such as the ECT which does not exclude sale of goods from being investments. This section will consider such a scenario and how SMR investors and investments will be treated. It will also consider to what extent they will be accorded relevant investment protection in the host state, considering the peculiarities of the technology. This section will therefore consider the applicability

45 WNA, 'High-Assay Low-Enriched Uranium (HALEU) – World Nuclear Association' <https://world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/high-assay-low-enriched-uranium-haleu> accessed 27 June 2025

46 UK Model BIT 2008, art 1(a)(v); see also Germany Model BIT 2008, art 1(f)

47 ECT 1994, art 1(5)

and scope/extent of relevant investments standards of protections/guarantees such as FET, FPS, NT, MFN, expropriation, and umbrella clause to nuclear SMR manufacturers.

7.1. *SMR and FET*

Generally, fair and equitable treatment (FET) is the fundamental protection granted to foreign investors. It is an absolute treatment that is unconditionally promised to any foreign investor.[48] It assures foreign investors that their investments will be fairly treated under the domestic laws in conformity with the level of treatment prescribed by international law. Hence, the host state assures foreign investors that fair treatment will be granted and applicable to all foreign investors within its territory.

Although there are diverse interpretations of the real meaning or scope of FET, some elements of FET are believed to include minimum standard (as defined by international customary law), basic/legitimate expectation, due diligence, due process (including non-denial of justice and lack of arbitrariness), transparency, lack of coercion and harassment of foreign investors and good faith.[49]

Due to the peculiarities of SMR, there is a necessity to examine whether there are obstacles that could prevent valid SMR investors from receiving fair and similar treatment like other investors such as foreign investors in renewable energy. This is a potential source of dispute between the host state and the SMR investors. This is because renewable energy and SMR nuclear energy are both low-carbon energy types being deployed by various countries to enhance their energy security and to enable them to meet their net-zero carbon emission targets. Also, both energy technologies are now included in taxonomies and energy policies as green investments meriting the award of green financing.[50] Hence, it is expected that whatever treatment that has been accorded to renewable energy investors to boost its integration into the energy mix, such as subsidies, tariffs and state aid, should be fairly granted to SMR investments too.

Article 10 of the ECT 1994 makes provision for Promotion, Protection and Treatment of Investments as follows:

> (1) Each Contracting Party shall, in accordance with the provisions of this Treaty, encourage and create stable, *equitable*, favourable and transparent *conditions* for Investors of other Contracting Parties to make Investments in its Area. Such conditions shall include a commitment *to accord at all times* to Investments of Investors of other Contracting Parties *fair and equitable treatment … In no case shall such Investments be accorded treatment less favourable than that required by international law*, including treaty obligations. Each Contracting Party shall observe any obligations it has entered into with an Investor or an Investment of an Investor of any other Contracting Party

48 C Schreuer, 'Fair and Equitable Treatment in Arbitral Practice' (2005) 6 JWIT 357; Rudolf Dolzer, 'Fair and Equitable Treatment: A Key Standard in Investment Treaties' (2005) 39 Int'l Law p. 367; Alexandra Diehl, *The Core Standard of International Investment Protection: Fair and Equitable Treatment* (Kluwer 2012)

49 OECD, 'Fair and Equitable Treatment Standard in International Investment Law' (2004) OECD Working Papers on International Investment, 2004/03, OECD Publishing <https://doi.org/10.1787/675702255435> accessed 28 December 2024

50 European Union, 'Net Zero Industry Act' (2023) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023PC0161> accessed 28 December 2024

> (3) For the purposes of this Article, 'Treatment' means treatment accorded by a Contracting Party which is *no less favourable* than that which it accords to its own Investors or to Investors of any other Contracting Party or any third state, whichever is the most favourable.

From the above, regarding the yardstick for comparisons, the provision went further to explain in its 'understanding' to Article 10 as follows:

> *A comparison between the treatment accorded to Investors of one Contracting Party, or the Investments of Investors of one Contracting Party, and the Investments or Investors of another Contracting Party, is only valid if it is made between Investors and Investments in similar circumstances … .*

From the above provisions, nuclear SMR manufacturers should be treated the same way as renewable energy foreign investors in 'similar circumstances' within a state. The 'similar circumstance' referred to here is the circumstance of the initial drive of integrating a new energy technology into the energy mix to boost energy supply.

The incentives initially granted to renewable energy investors were provided through legislative mechanisms known as support schemes or instruments that were used to attract investors to develop the renewable energy sector within a certain target date. The schemes are also used to guarantee payment and investment returns, thus making the sector less risky for investors. The schemes were either enacted as new laws, regulations and policy strategies or provided for in electricity laws.

There is a need to establish an attractive legal support framework for new SMR nuclear technologies in order to provide a level and fair playing field with renewable energy foreign investors. Thus, all the incentives afforded to various renewable energy technologies, such as for solar, wind, biomass, etc., should as well be granted to SMR new nuclear technology, especially in countries that are venturing into nuclear energy for the first time due to the promising positive features of SMR.

Just as renewable energy technologies initially had high capital cost, SMR NPPs will likely have a high initial cost (although not compared to that of large NPPs), which will obviously make long-term security and returns on investment unpredictable. Consequently, various similar support schemes/mechanisms as were used for renewable energy should be granted to SMR manufacturers to encourage them and reduce their investment risks. Such support schemes were both investment based (such as financial and fiscal incentives, eg tax incentives, soft loans, and subsidies) and generation based (such as feed-in tariffs, quota mechanisms, tender/bidding schemes, net metering, and tradable green certificate systems).[51] Support schemes tailored to the nature and features of SMR should therefore be provided to its manufacturers.

However, inasmuch as there were various alleged breaches of FET by some host states against renewable energy investors that led to various legal disputes, particularly allegations of breach of legitimate expectation for some solar energy investments that

51 David Jacobs, 'Framework Conditions and International Best Practices for Renewable Energy Support Mechanisms' (paper for the seminar on 'International Best Practices for the Legal and Regulatory Framework of Renewable Energy, Baku, Azerbaijan, 14 December 2009)

were initiated based on promised laws, policies and support schemes.[52] This paper advocates that nuclear SMR investments should therefore afford host states the opprtunity to correct some of those likely breaches in order to encourage/promote SMR manufacturers to invest in their territories.

7.2. *SMR NPP and FPS*

The overarching aim of the full protection and security (FPS) investment standard is to protect foreign investment infrastructures against any form of physical violence or interference in the host state, especially during emergency situations.[53]

This standard will become relevant to SMR manufacturers, where the nature of the funding and financing mechanism involves full infrastructural involvement of SMR manufacturers in the host state for installation – for example, where BOO is used or where government–government (export credit/loan) financing is done. For, in such circumstances, the home state of the SMR manufacturer will have a legitimate stake in the ownership of the SMR NPP.

For nuclear newcomer countries, especially developing countries, that are interested in deploying SMR NPP into their energy mix, they will have to develop a strong system for security risks including vandalism, attacks on energy infrastructures, accidents, natural disasters, cyberattacks and terrorism. Current global energy security threats include growing transnational conflicts and wars.

It should also be noted that although FSP is typically understood to protect foreign investments against physical violence, some tribunals have extended this to include protection of legal rights as well.[54] This is important because from the nature of SMR NPP, it is not only constant physical protection that SMR NPP will need but also legal security, for example to protect against undue revocation of licences and prompt changes in legislative support mechanism and incentives. Article 10(1) of the ECT provides that Investments ' … shall also enjoy the most *constant* protection and security … ' Even though SMR is believed to have inherent safety measures and the ability to shut itself down during emergencies without any human assistance, it is still expected that host states guarantee both physical and legal protection constantly to SMR NPPs. The need for FPS for SMR investment is underscored by the fact that SMR is capable of being installed in remote areas and is a sensitive part of national security.

7.3 *SMR and NT*

National treatment (NT) is a foundational non-discriminatory right that originated from the World Trade Organization (WTO)'s General Agreement on Tariffs and Trade (GATT), where all parties are mandated to apply the same internal taxes and regulations

52 *Charanne B.V. and Construction Investments S.a.r.l. v Spain*, Final Award dated 21 January 2016 (SCC Case No. 062/2012); *Isolux Infrastructure Netherlands B.V. v Kingdom of Spain* Final Award 21 January 2016 (SCC Case No. 2013/153). Various ICSID cases against Spain can be accessed at <https://icsid.worldbank.org/en/Pages/cases/AdvancedSearch.aspx> accessed 29 December 2024

53 Christoph Schreuer, 'Full Protection and Security' (2010) JIDS 16

54 Rudolf Dolzer and Christoph Schreuer, *Principles of International Investment Law* (OUP 2008) 149; *Azurix Corp v The Argentine Republic*, ICSID Case No ARB/01/12 Award (14 July 2006) para 406; *Saluka Investments B.V. v The Czech Republic*, UNCITRAL, Partial Award (17 March 2006) para 483

to all imported products as applied to 'like domestic products'.[55] However, this principle has been extended to international investment law to also mandate all contracting parties to treat all foreign investors the same way as their domestic investors in 'like circumstances'.[56]

NT tends to avoid national protectionism policies/laws as they result in discrimination against foreign investors.[57] Article 10 of ECT provides as follows:

> (3) For the purposes of this Article, 'Treatment' means treatment accorded by a Contracting Party *which is no less favourable* than that which it *accords to its own Investors* ….

The international minimum standard of treatment is used as a floor below which such treatments shall not fall.[58]

The issue here relates more to developed countries, especially those that already have their own national large NPPs. Because most of these large NPPs are now aging and are being shut down for either maintenance or decommissioning, there is a need to complement their nuclear energy with SMR NPPs. Hence, where SMR installation is done by foreign manufacturers as an investment project, the host state will have to extend the same treatment it gives to its NPP domestic investors to the SMR foreign investors as well. In other words, there should be no form of discrimination whatsoever.

This could play out mainly in the form of basic regulatory policies. However, because SMR due to its peculiar features may have slightly different/new laws, regulations and policies, some variations of treatment may be allowed.

NT is a strict principle; however, it still makes room for certain exceptions to be applied by the host state. Article XXI of GATT provides for security exception as follows:

> Nothing in this Agreement shall be construed (b) to prevent any contracting party from taking any action which it considers necessary for the protection of its essential security interests (i) relating to fissionable materials or the materials from which they are derived.

For example, while Article 3(2) of the China–Germany BIT states that '[e]ach Contracting Party shall accord to investments and activities associated with such investments by the investors of the other Contracting Party treatment not less favourable than that accorded to the investments and associated activities by its own investors', Article 3(a) of the Protocol to the BIT states that '[m]easures that have to be taken for reasons of public security and order, public health or morality shall not be deemed "treatment less favourable" within the meaning of Article 3'. (See also Article 24 of the ECT which provides for exception applicable to nuclear energy relating to the implementation of national policies to comply with the non-proliferation of nuclear weapons or devices).

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55 GATT, art III; Andrea K Bjorklund, 'National Treatment' in August Reinisch (ed), *Standards of Investment Protection* (OUP 2008)

56 *Feldman Karpa v United Mexican States*, ICSID Case No ARB(AF)/99/1, Award (16 December 2002) para 170; see also *Cargill, Incorporated v Mexico*, ICSID Case No ARB (AF)/05/2, Award (18 September 2009); *ADM v Mexico* ICSID Case No. ARB (AF)/04/5, Award (21 November 2007)

57 Jürgen Kurtz, *The WTO and International Investment Law: Converging Systems* (CUP 2016) 121

58 A Bjorklund, 'Reconciling State Sovereignty and Investor Protection in Denial of Justice Claims' (2005) 45 Virginia Journal of International Law 809, 836–837, cited in Andrea K Bjorklund, 'National Treatment' in August Reinisch (ed), *Standards of Investment Protection* (OUP 2008) 31

7.4. *SMR and MFN treatment*

Most-favoured nation (MFN) treatment is another investment protection akin to NT. However, instead of preventing discrimination of foreign investors from domestic investors, it protects a particular foreign investor from discrimination against other third-party foreign investors.[59]

MFN also originated from WTO GATT in its Article 1.[60] Thus, while the purpose of MFN under international trade law is to guarantee equal ground for all trading partners, under international investment law it guarantees equality of competitive conditions amongst foreign investors.

The same Article 10 of ECT also provides for MFN as follows:

> (3) For the purposes of this Article, 'Treatment' means treatment accorded by a Contracting Party *which is no less favourable* than that which it accords to its own Investors or *to Investors of any other Contracting Party or any third state*, *whichever is the most favourable*.

As there are about 80 different designs for SMR, this obviously may lead to competitive commercial deployments with the possibility of one country deploying more than one particular design in its territory. Thus, MFN will help to protect foreign investors of all these designs from any preferential treatment accorded to another by the host state.

7.5. *SMR and expropriation*

Expropriation is where a host state confiscates or takes over foreign investments within its territory, either directly through physical taking/nationalisation or indirectly through some government-imposed regulatory measures for economic or public reasons.[61]

Article 13 of the ECT provides that,

> (1) Investments of Investors of a Contracting Party in the Area of any other Contracting Party shall not be nationalised, expropriated or subjected to a measure or measures having effect equivalent to nationalisation or expropriation (hereinafter referred to as 'Expropriation') except where such Expropriation is: (a) for a purpose which is in the public interest; (b) not discriminatory; (c) carried out under due process of law; and (d) accompanied by the payment of prompt, adequate and effective compensation … .

Where a country experienced in building NPPs only imports/buys SMR for installation by itself, the issue of expropriation will not arise as it is already deemed to be a national

59 UNCTAD, 'Most-Favoured Nation Treatment | UN Trade and Development (UNCTAD)' (2011) <https://unctad.org/publication/most-favoured-nation-treatment> accessed 27 June 2025

60 Article 1 provides that that any advantage, favour, privilege or immunity with respect to customs duties and charges imposed on importation or exportation granted by any contracting party to any product originating in or destined for any other country shall be accorded immediately and unconditionally to like product originating in or destined for the territories of all other contracting parties.

61 Ursula Kriebaum, 'Regulatory Takings: Balancing the Interests of the Investor and the State' (2007) 8 JWIT 717; *Oschadbank v Russia Award* (26 November 2018); *Everest v Russia* PCA Case No. 2015–36 Award on the Merits (2 May 2018); *Olin v Libya* ICC Case No. 20355/MCP, Final Award (25 May 2018); *South American Silver v Bolivia* PCA Case No. 2013–15, Award (30 August 2018); for recent examples of indirect expropriation, see *Grot v Moldova* ICSID Case No ARB/16/8, Award (28 June 2018); *Beer Greek Mining v Peru* ICSID Case No ARB/14/21, Award (30 November 2017)

asset of the country once it has paid off the selling price. Where the problem lies is with regards to cases where the SMR manufacturer will also be the installer in the host state.

A possible reason for expropriation to happen will surely be the excuse of national security concerns, especially as the nuclear sector is sensitive. Another reason for expropriation could be for environmental concerns; for example, in the likelihood of radioactive accidents, the government of the host state may decide to disengage such nuclear activities and ask the operators to shut down operations and exit the country, as was done in the *Vattenfall v Germany case*.[62]

Again, this protection will mainly be relevant where the SMR manufacturers are also the operators or owners under the BOO mechanism, especially in nuclear newcomer states. And in such circumstances, SMR foreign operators will have to be guaranteed that their NPPs will not be unlawfully nationalised or that unlawful measures/policies that will indirectly affect the smooth operation of their NPP will not be instituted by the host government.

The issue of expropriation of energy related projects was addressed in the cases *Guaracachi v Bolivia*,[63] and *Ioannis Kardassopoulos v Georgia*.[64]

7.6. *SMR and umbrella clause*

Umbrella clause is a substantive obligation of investment protection that is found in a large number of investment treaties,[65] such as in various BITs and the ECT. It usually requires parties to observe any other obligation or undertakings it may have entered into with regard to investments such as other contractual agreements connected to their investment project. The most common formulation is as follows:

> Each Contracting Party shall observe any obligation it may have entered into with regard to investments of nationals of the other Contracting Party.[66]

Reneging on such contractual obligations/agreements could happen in various ways, such as revising or withdrawing related contractual commitments; for example, tax stabilisation clauses in investment contracts or tax rulings can be construed by arbitral tribunals as equating to breach of their applicable investment treaty. Thus, through the umbrella clause, contractual obligations or unilateral commitments could be elevated to treaty obligations which can result in investor–state dispute settlement (ISDS) proceedings too.[67]

There are several ways the umbrella clause could affect SMR transactions, such as when it is regarded as purely a sales contract, and for transactions involving other activities in addition.

62 *Vattenfall AB and others v Federal Republic of Germany (II)* (ICSID Case No. ARB/12/12)
63 *Guaracachi v Bolivia* PCA Case No 2011–17 Award (31 January 2014)
64 ICSID Case No ARB/07/15 Award (3 March 2010)
65 Zachary Douglas, 'The Umbrella Clause Revisited' (Spring 2023) 38(2) ICSID Review – Foreign Investment Law Journal 472 <https://doi.org/10.1093/icsidreview/siad013> accessed 31 December 2024
66 UNCTAD WIR 2019 <https://unctad.org/system/files/official-document/diaepcbinf2021d1_en.pdf> accessed 31 December 2024
67 UNCTAD, *World Investment Report* (2022), 90 <https://unctad.org/system/files/official-document/wir2022_en.pdf> accessed 31 December 2024

7.6.1. SMR transactions purely as sales contracts

Where an SMR transaction fails to qualify as a valid investment (especially where sales contracts are expressly excluded as investments) and thus falls under a sales contract, it becomes necessary to consider the interplay between such contracts and investment protection.

Thus, even where SMR transactions are not valid investments, they may still assume the status of a BIT protection. In this regard, the umbrella clause functions in three core ways: firstly, making a contract claim tantamount to a treaty claim; secondly, equating a violation of an investment contract to a violation of the BIT; and, thirdly, allowing foreign investors to jettison the dispute resolution clauses in a contract (which may, for example, give exclusive jurisdiction to local courts) and resort to preferably international investment arbitration.[68] However, the chances of this happening has become slim, as will be discussed in Section 8 below.

7.6.2. SMR transactions involving other activities in addition to sales contracts

Umbrella clauses may be relevant to or affect SMR-related transactions, especially with nuclear newcomer countries. Such countries without relevant NPP experience may require a substantial level of support from SMR manufacturers. In such circumstances, SMR manufacturers would likely be engaged not just to install and operate the NPP bought from them but also to handle the radioactive waste management from the SMR NPP. There is also a possibility that they could be granted uranium mining licences to mine for the nuclear fuel that will be used in the SMR NPP (particularly where it is transported over with an empty fuel load). Each of these engagements will require some form of contractual agreements between the manufacturer and the host state.

An example of this can be seen in the case of *Khan Resources v Mongolia*[69] and in *Michael Anthony Lee-Chin v Dominican Republic*.[70]

If SMR manufacturers are granted certain rights and privileges under any sort of agreement to do other things and they are thereafter revoked suddenly, this could become an issue falling under the umbrella clause of BITs.

8. Discussion

Many countries are keen to deploy SMR, and this is largely based on the assumption that SMR will broadly function like conventional NPPs. Hence, it will assume the same investment status as NPP. However, the nature of SMR presents some level of

68 Practical Law, 'Umbrella Clause' (2025) <https://uk.practicallaw.thomsonreuters.com/8-519-0939?transitionType=Default&contextData=(sc.Default)&firstPage=true#:~:text=Umbrella%20clauses%20are%20usually%20broadly,treaty%20protection%20under%20international%20law> accessed 30 December 2024

69 UNCITRAL (PCA Case No. 2011–09). Here, the failure to re-register the mining licence made the execution of other contractual obligations impossible. And the tribunal held that such a breach by Mongolia constitutes a breach of the ECT's so-called 'umbrella' clause in art 10(1). See para 295 <www.italaw.com/sites/default/files/case-documents/italaw4267.pdf> accessed 31 December 2024

70 ICSID Case No. UNCT/18/3 <www.italaw.com/sites/default/files/case-documents/180334.pdf> accessed 31 December 2024 – where the respondent's failure to abide by its obligations and commitments under the Concession Agreement (as amended) and various settlement agreements was held to violate the Claimant's rights under the Treaty, thereby constituting violation of the umbrella clause.

complexities that challenges the classification of its transactions/projects as valid investments (compared to large NPPs) in certain circumstances and jurisdictions. A valid investment is a protected investment. The protection accorded to any investment is a key incentive that attracts foreign investors in a sector into a country. It provides a level playing ground and ensures that the interests of the parties are not undermined. Hence, it is necessary to ascertain the validity of SMR projects or transactions under international investment law.

In this paper, these were all considered with respect to SMR projects. This paper found that there are situations and jurisdictions where SMR transactions could be considered valid investments, under certain circumstances, and there are also situations where their validity could be disputed.

For a project/transaction to be recognised as a valid investment, both the investor and the investment itself must meet the requirements laid down under international investment law. The parameters used in determining a valid 'investor' are usually provided for in investment laws and treaties. Key elements used in determining this are the incorporation/constitution/registration test, the siège social (seat of business) test, or the control/ownership test (ie their nationality is determined based on their place and centre of management). Thus, for SMR developers interested in conducting business in a certain jurisdiction, there is a need for them to have a legal presence/seat of business (incorporated as legal entity) in that jurisdiction and to meet the relevant control/ownership requirements over such businesses. This is particularly important as SMRs would be fabricated in the developer's base country (outside the host state's jurisdiction) and subsequently shipped to the host country, which may make the developers not recognise any value in incorporating their business in the host country. However, this may open doors to potential disputes that could argue the transaction is a mere sale of goods and services and not a protected investment.

With respect to valid investment, as explained in Section 3 above, the subjective and objective methods are used to determine what a valid investment is. Under the subjective method, countries clearly specify what constitutes an investment in their relevant laws or have a list of assets covered as valid investments. There are variants to these provisions, which could come under various models of definition: the asset-based, enterprise-based and economic-based models.[71] Thus, any transaction/project not included in the investment law or treaties of the host state may not be recognised as valid investment (see Section 3.1). In addition to these, investment arbitral institutions have also developed methods/tests used in interpreting the provisions in the various treaties and laws in a practical and objective manner. These are referred to as objective methods of defining valid investments. An investment must pass the subjective and objective test for it to be recognised as valid, under the ICSID provisions (see Section 3.2). Key elements considered in the objective test include the duration of the project, regularity of profit and return, assumption of risk, and substantial commitment and significance for the host state's development.

In its current state, SMR projects will likely pass the objective tests, as the nature of the project meets the various requirements considered in the tests. Regarding, 'a certain duration', SMR NPP meet this requirement because of the long time needed to

71 Muchlinski (n 31) 52; UNCTAD (ed), Scope and Definition: [A Sequel] (United Nations 2011) 21

manufacture, transport, and install in the host country; SMR projects will also meet the requirement for 'a certain regularity of profit and return', due to structuring of the SMR financing and funding to cover the cost of design, manufacturing and installation. Obviously, the financing of the whole cycle of SMR manufacturing and installation involves the expectation of huge profit and return to the manufacturers. With regards to the requirement for the 'assumption of risk', SMR design development, manufacturing, transportation, and installation in another environment come with enormous risk of project failure or termination as well as nuclear accidents that could occur during installation or operational phases of the project. Also, despite having built-in safety measures that better minimise safety risks associated with conventional NPPs, SMR NPPs may still have inherent risks, being first of a kind (FOAK) projects that have not been tested for a long time. Thus, it involves inherent risk. Lastly, SMR NPPs do fulfil the requirement for 'a substantial commitment and significance for the host state's development', being energy projects that will boost energy security in countries and lead to the development of various sectors as well as enabling countries to meet their commitment towards reduction of carbon emission. Thus, SMRs will enhance economic developments in host states.

Despite meeting the objective tests, SMR NPPs, in certain jurisdictions, may not be regarded as valid investments depending on the provisions of the relevant investment laws and treaties, from which flow the subjective tests. Thus, in answering the question whether SMR investments will be valid energy investments, the answer will be conditional based on the provisions of the relevant domestic laws and international investment treaties. Under the subjective method, the validity of SMR investments will depend on whether sale of goods and services is expressly excluded from the meaning of investment or not, in the applicable domestic investment laws and investment treaties, or whether energy-related assets are inclusive in the covered categories of assets. This is a critical aspect that the legal team of SMR manufacturers should pay particular attention to.

The ECT, which uses the economic model, has provisions that could largely apply to SMR transactions as it defines an investment in Article 1(6) in a broad sense to mean 'every kind of asset, owned or controlled directly or indirectly by an Investor', and then went further to give a list of such categories of assets. In particular, it recognises as investments, in Article 1(6)(c), claims to money and claims to performance pursuant to contract having an economic value and associated with an investment. And it goes further, in Article 1(6)(f), to also use the economic-based model to define investment as meaning any investment associated with an economic activity in the energy sector. 'Economic activity in the energy sector' was defined to include activities such as exploration, extraction, refining, production, storage, land transport, transmission, distribution, trade, marketing, or sale of energy materials and products except those concerning the distribution of heat, to multiple premises in its Article 1(5).

SMR NPPs will be modularised, with the factory built in the manufacturer's country and then transported to the host country. Hence, using the key elements of economic activity in the energy sector as stipulated in the ECT such as 'production', 'transportation', 'trade', 'marketing, or sale of energy materials and products', it could be argued that SMR qualifies as a valid investment under this treaty. The treaty does not specify the location where production will take place; hence, both external and internal factory productions/manufacturing of SMR will be covered. Concerning transportation, transportation of SMR will be covered; however, this is restricted to 'land transportation'. This means that SMR transportation via the sea will be excluded from the general

application of the ECT. With regards to trade, the ECT has numerous provisions that will include SMR trading from one country to another. But SMR trading must be done via Partnership and Cooperation Agreements, as was raised in the ECT between the EU and Russia.[72]

Also, as the ECT is reflective of the WTO's GATT 1947, its provision in Article XXI on 'Security Exceptions' should be noted. This provision states that

> Nothing in this Agreement shall be construed
> (b) to prevent any contracting party from taking any action which it considers necessary for the protection of its essential security interests
> (i) *relating to fissionable materials* or the materials from which they are derived.

This provision could affect free trading of SMR between countries as it involves nuclear fissionable materials. Regarding 'marketing, or sale of energy materials and products', SMR investment will have to comply with the Annex provisions on the acceptable nuclear energy materials and products. Furthermore, Annex EQ I: List of Energy-Related Equipment 84.01 of the ECT also clearly includes nuclear reactors as recognised assets. This implies that SMR investments which deploy nuclear reactors should be covered by this Annex provision, regardless of their modularised nature, for them to be protected by the ECT.

Despite the foregoing, the peculiarities of SMR such as the type of fuel used could undermine the recognition of SMR as a valid investment based on existing provisions in relevant domestic laws and treaties. For example, the provisions in Annex EM I: Energy Materials and Products of the ECT provides for *acceptable* nuclear materials and products that are covered under it. This is an exclusive list that does not include certain nuclear materials and products currently being used in various designs of SMRs. There are more than 80 SMR designs being developed, and while some of these use nuclear materials already covered in existing laws and treaties, others are using nuclear materials that have been enriched above acceptable limits, such as the HALEU fuel (5–20 w/o 235U) that is above the regulated limit of 5 wt% (w/o 235U).[73] Thus, these designs of SMR may not be recognised as valid investments in line with the provision in the ECT Annex.

In addition, most BITs, such as the UK Model BIT, have very limited provision to cover SMR investments as they broadly recognise 'development of natural resources' as valid investments. However, even though it could be argued that this provision covers SMR projects as the reactors will utilise nuclear material (a natural resource) to generate energy, their provisions do not cover for the situation where the natural resource is being obtained from outside the host state nor sale or trading of SMR. In most cases, the nuclear material that will be used for the SMR reactors will not be extracted from the

72 ECT Pg 138 – Final Act in respect of the Amendment to the Trade-Related Provisions of the Energy Charter Treaty, Joint Declaration by the Russian Federation and the European Union

73 L Carlson, J Miller and Z Wu, 'Implications of HALEU Fuel on the Design of SMRs and Micro-Reactors' (2022) 389 Nucl Eng Des 111648, doi:10.1016/j.nucengdes.2022.111648; S Prasad and others, 'Nonproliferation Improvements and Challenges Presented by Small Modular Reactors' (2015) 80 Prog Nucl Energy 102, doi:10.1016/j.pnucene.2014.11.023; Robert A Hall and others, 'Assessment of Critical Experiment Benchmark Applicability to a Large-Capacity HALEU Transportation Package Concept' (2021) 195 Nuclear Science and Engineering 310

host country; hence, it could be argued that there is no apparent development of natural resources in the host country in SMR transactions. Furthermore, provisions in some treaties do not cover all possible mode of the transportation of nuclear reactors and fuel from one country to the other. For instance, the ECT only applies to land transportation of nuclear materials and does not cover sea or air transport, which are possible modes by which the SMR reactors and fuel may be transported to the host state.

Another important aspect to consider is the interplay between umbrella clauses in some BITs and SMR projects. As was implied in Section 7.5, there are certain situations where SMR transactions may be regarded as a mere sale of goods. However, through the application of an umbrella clause, there is a chance that such transactions may be considered investments. However, the problem here is that many BITs are now omitting umbrella clauses.[74] Due to the disputes that have resulted from the interpretation of umbrella clauses, especially those pertaining to interpreting a contract qualifying for BIT protections,[75] many BITs are now excluding such clauses from their provisions. Many World Investment Reports, for example from 2017 to the present, have stated that various BITs have omitted umbrella clauses.[76] It is envisaged that this could impact on SMR manufacturers, as it would entirely preclude them, especially those considered mere sales of goods and service, from any chance of protection from any BIT.

Another critical issue that may affect SMR investment pertains to foreign investment screening policies and national security. The nuclear sector falls under national security. Conventional large NPPs are highly monitored and regulated by relevant law enforcement and security agencies of countries. While some countries such as India[77] have outright banned foreign investment in nuclear power,[78] the United States has a foreign ownership, control, or domination (FOCD) restriction in sections 103d and 104d of its Atomic Energy Act 1954, which has inhibited foreign investment in domestic reactors.[79] Others, through foreign investment legal screening frameworks, have also made stringent

74 Such as Canada–Hong Kong China BIT, Mexico–UAE BIT, Morocco–Nigeria BIT, Rwanda–Turkey BIT, and many more as found in various UNCTAD World Investment Reports since 2017

75 *SGS v Pakistan*, ICSID Case No ARB/01/13, Decision on Objection to Jurisdiction (6 August 2003) ; *SGS v Philippines*, ICSID Case No ARB/02/6, Decision on Objection to Jurisdiction (29 January 2004); *SGS v Paraguay*, ICSID Case No ARB/07/29, Decision on Jurisdiction (12 February 2010); UNCTAD (2020b), 'Investor–State Dispute Settlement Cases Pass the 1,000 Mark: Cases and Outcomes in 2019', IIA Issues Note, no. 2, July 2020

76 UNCTAD, *World Investment Report* (2017) 120 <https://unctad.org/system/files/official-document/wir2017_en.pdf>; UNCTAD, *World Investment Report* (2021) 131–32 <https://unctad.org/system/files/official-document/wir2021_en.pdf > accessed 4 January 2025

77 Though they are reconsidering this now due to their need for SMRs.

78 S C Singh, 'Exclusive: India considering allowing foreign investment in nuclear power' (2023) <www.reuters.com/world/india/india-considering-allowing-foreign-investment-nuclear-power-sources-2023-05-05/>; S C Singh, 'Exclusive: India seeks $26 billion of private nuclear power investments' (2024) <www.reuters.com/business/energy/india-seeks-26-bln-private-nuclear-power-investments-sources-say-2024-02-20/>; ABP News Bureau, 'Niti Ayog Panel Recommends Govt To Allowing Foreign Investment In Nuclear Power Industry: Report' (2023) <https://news.abplive.com/business/niti-ayog-panel-recommends-govt-to-allowing-foreign-investment-in-nuclear-power-industry-report-fdi-in-atomic-sector-1600146> accessed 4 January 2025. The 4 January 2025 accessed date applies to all the sources cited in this note.

79 https://energypost.eu/u-s-nuclear-change-the-laws-that-constrain-foreign-and-domestic-investment/ Sachin Desai and Kathleen Schroeder, 'U.s. Nuclear Foreign Ownership Policy Ready For A Refreshed Interpretation' (2016) <https://www.eba-net.org/wp-content/uploads/2023/02/10-21-85-134-Desai_FINAL.pdf> accessed 4 January 2025; Atomic Energy Act of 1954 <www.govinfo.gov/content/pkg/COMPS-1630/pdf/COMPS-1630.pdf> accessed 4 January 2025

rules for investing in the nuclear sector.[80] In the European Union, nuclear energy technologies is enlisted in its foreign direct investment screening regulations which specifies certain investment-related factors that EU Member States and the European Commission may consider when determining whether FDI is likely to affect national security or public order.[81] In the United Kingdom, the National Security and Investment Act 2021 imposes mandatory filing obligations for investments in companies that are active in 17 specified sensitive areas, such as civil nuclear.

This is the reason why the deployment of new nuclear technologies such as the SMR could be problematic, as some of them are being developed and manufactured by state-owned/national enterprises such as Rosatom (the Russian State Nuclear Energy Corporation) and the China National Nuclear Corporation.[82] This means that some countries may not be willing to allow state-controlled companies to build SMRs for them due to national security risks that may be involved in doing so.

Currently, there is push for global collaboration in relation to expansion of nuclear power at large scale to hit net zero.[83] As a result, countries are now being pressured to ameliorate their rigid policies towards foreign investment in the nuclear sector.[84] With the view that even though these stringent nuclear foreign investment policies were originally made during the world war era, continuing with it will affect the full development and deployment of needed nuclear energy technologies around the world, especially in areas affected by insufficient energy security.

In addition, there are other legal issues emanating from the nuclear energy international legal framework that could affect SMR commercialisation and investments. For instance, the Convention on Nuclear Safety (CNS), which aims to ensure safety in all nuclear installations, could be interpreted to currently apply to only land-based

80 https://globalcompetitionreview.com/guide/foreign-direct-investment-regulation-guide/second-edition/article/fdi-in-the-energy-sector GCR, 'How FDI is impacting the global energy sector' (2025) <https://globalcompetitionreview.com/hub/fdi-regulation-hub/fifth-edition/article/how-fdi-impacting-the-global-energy-sector> accessed 13 November 2025

81 Regulation (EU) 2019/452 of the European Parliament and of the Council of 19 March 2019 establishing a framework for the screening of foreign direct investments into the Union, art 4(1)(b)

82 Rosatom Newsletter, 'Small Modular Reactor – New Nuclear Trend' (2023) <https://rosatomnewsletter.com/2023/03/02/small-modular-reactor-new-nuclear-trend/>; Rosatom <https://rosatom.ru/en/about-us/>; Wikipaedia, <https://en.wikipedia.org/wiki/China_National_Nuclear_Corporation>; Wikipaedia, <https://en.wikipedia.org/wiki/Small_modular_reactor> accessed 8 January 2025. (This date is applicable to all the references in this note).

83 Nuclear Industry Association, 'Global Nuclear Industry Calls for Tripling Capacity Ahead of COP30' (2025) <https://www.niauk.org/global-nuclear-industry-calls-for-tripling-capacity-ahead-of-cop30/> www.niauk.org/triple-nuclear-energy-cop-declaration-marks-new-international-consensus/#:~:text=%E2%80%9CThis%20declaration%20marks%20a%20new,the%20potential%20of%20nuclear%20energy accessed 13 November 2025

84 Nuclear Innovation Alliance, 'U.S. Nuclear Innovation in a Global Economy' (2020) <https://nuclearinnovationalliance.org/sites/default/files/2020-07/NIA%20Updating%20an%20Outdated%20National%20Security%20Framework.pdf> accessed 4 January 2025; S.C Singh, 'Exclusive: India considering allowing foreign investment in nuclear power' (2023) <www.reuters.com/world/india/india-considering-allowing-foreign-investment-nuclear-power-sources-2023-05-05/> accessed 4 January 2025; ABP News Bureau, 'Niti Ayog Panel Recommends Govt To Allowing Foreign Investment In Nuclear Power Industry: Report' (2023) <https://news.abplive.com/business/niti-ayog-panel-recommends-govt-to-allowing-foreign-investment-in-nuclear-power-industry-report-fdi-in-atomic-sector-1600146> accessed 4 January 2025; GCR, 'How FDI is impacting the global energy sector' (2025) <https://globalcompetitionreview.com/hub/fdi-regulation-hub/fifth-edition/article/how-fdi-impacting-the-global-energy-sector> https://energypost.eu/u-s-nuclear-change-the-laws-that-constrain-foreign-and-domestic-investment/ accessed 13 November 2025

nuclear installations, based on provisions in its Article 2(i) 'nuclear installations'. This could lead to legal complexities in the deployment and commercialisation of SMR projects, especially with respect to marine-based SMRs.[85] Furthermore, with regards to nuclear liability, the current international legal regime is not harmonised globally, as different regions have conflicting minimum liability limits. This has been alluded to have the capacity to affect the marketability of SMR by operators in the long run.[86] Some of these legal issues were extensively explored in a previous work.[87]

The foregoing discussion has revealed certain limitations and ambiguities of domestic investment laws and investment treaties in fully catering for the peculiarities of SMR investments. It calls for careful consideration for any country wishing to deploy SMR in its locality. To minimise the ambiguity and overcome the limitations, and to avoid potential disputes, there is a need for changes to be made in the investment legal framework of countries/jurisdictions intending to deploy SMRs into their energy mix. The complexities of SMR may require some policy changes or adjustments in existing laws and international treaties, to accommodate their peculiarities. Even though the ECT, the only multilateral legally binding energy investment legal framework, seems to be better situated to apply to SMR, it still has some limitations that will make it not fully cater for the various variants of SMR NPPs. Moreover, the ECT is Eurocentric (its members are mostly European countries), and hence it may not generally be applicable to other countries that are not signatories to this treaty. The ECT is also on the verge of collapse, with recent withdrawals from some of its member states who believe that the treaty does not align with their climate change/net-zero target.[88] For example, the UK government confirmed its withdrawal from the ECT in February 2024. Other key states, such as Spain and France, have also withdrawn from the ECT because the members have been unable to reach agreement on modernising the ECT. Although the modernisation was adopted in December 2024, it is still believed that it will not be effective to address raised concerns.[89] Following these withdrawals from the ECT by member states who are also key players in SMR manufacturing, it becomes questionable what multilateral legal framework will regulate their SMR investments in various countries.

Hence, this paper recommends a special-purpose globally applicable international energy investment treaty, that is reflective of the provisions of the ECT and climate change/net-zero to be signed and enforced. The International Energy Charter (IEC) could be the best option for this, but its provisions are stated briefly and it does not cover in detail essential energy investment aspects as contained in the ECT. Moreover, the IEC is also not in force and thereby not legally binding. In addition to catering for all energy resources and investments, the IEC could be updated with provisions that

85 *ibid*
86 *ibid*
87 Nriezedi-Anejionu Chinenye (n 1)
88 Gov.UK, 'UK Departs Energy Charter Treaty' (2024) #x003C; https://www.gov.uk/government/news/uk-departs-energy-charter-treaty <www.gov.uk/government/news/uk-departs-energy-chartertreaty#:~:text=The%20UK%20government%20confirms%20its,to%20agree%20vital%20modernisation%20fail.&text=The%20UK%20will%20leave%20the,today%20(Thursday%2022%20February> accessed 4 January 2025
89 IISD, 'Why the Energy Charter Treaty Modernization Doesn't Deliver for Climate' (2024) <www.iisd.org/articles/explainer/modernized-ect-doesnt-deliver-for-climate> accessed 4 January 2025

will cater for the peculiarities and complexities of SMR transactions, and even renewable energy sources too.

In addition to recommending for the IEC to be updated, alternatively, and where it takes time to achieve, state parties involved (ie the host state and the home state of SMR manufacturers) should revise their BITs, if possible, to address the investment legal issues raised so far. This might be a faster and easier approach for both the host state and manufacturers to adopt to quicken the process of SMR deployment and commercialisation.

9. Conclusion and recommendations

In view of expected increased investments in SMR, this paper has examined the core characteristics of the SMR transactions/contracts and their applicability to the principles of international investment laws.

Firstly, regarding the question whether SMR transactions will qualify as 'valid investments', the paper found that this depends on how SMR is defined in the applicable investment legal framework.

Secondly, on whether SMR manufacturers will qualify as 'protected investors', the paper found that this depends mainly on who will do the installation of SMR in the host country. If the SMR manufacturers will do the installation especially in nuclear newcomer states, then depending on whether the SMR manufacturers fulfil the conditions for a valid investor as stated in the applicable investment treaty, they could be regarded as protected foreign investors.

Thirdly, regarding how the various investment protections will interplay with SMR, the paper found various possibilities and limitations and thus recommends as follows:

- Concerning fair and equitable treatment (FET), that SMR manufacturers should be treated fairly as renewable energy investors were treated at the initial stage of renewable energy deployment.
- Concerning national treatment (NT), that where for any reason, SMR manufacturers are invited to host states that are already experienced in nuclear NPPs, that SMR manufactures should be granted equal treatment as is given to their domestic large NPP constructors.
- Concerning most-favoured nation (MFN) treatment, that countries which may desire to buy different SMR designs from different manufacturers should endeavour to extend same and non-discriminatory treatments to all of them.
- Concerning expropriation, that non-confiscation of SMR NPP (especially if owned and operated by SMR manufacturers themselves) should be assured. And that if for any reason, such as public security or environmental concerns, such takeover still occurs, this paper recommends that the requirements of a legal expropriation should be adhered to by such host states.
- Concerning umbrella clauses, that because they are now being omitted from BITs, SMR manufacturers know that some of their projects may never be regarded as valid investments if they are deemed to be pure sales contracts and excluded from their applicable investment treaty. They need to carefully consider investment legal frameworks with their legal advisers up front.

Finally, the paper found that the ECT, which is the only multilateral legally binding energy investment legal framework, appears to have provisions that largely favour SMR

investments such as accepting sale of goods and services as valid investments and recognising various economic activities applicable to SMR deployment as valid investment activities; however, it has some limitations. These include the fact that it is only Europe-focused; and that transportation of SMR will be restricted to only 'land transportation'. This means that SMR transportations via the sea is be excluded. Another issue is the fact that the ECT is presently in distress as the majority of its members are beginning to withdraw from it due to the fact that it does not align with their climate change/net-zero targets.

This paper therefore recommends the establishment of a globally applicable international energy investment treaty (perhaps the International Energy Charter (IEC), although it is not as detailed as the ECT and it is not yet in force), that will cater for investments in all energy resources, irrespective of their inherent peculiarities and complexities. As the ECT is mainly Europe-focused and in current distress, the IEC will likely be applicable to all regions and globally.

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