# Novel organizational models for advanced reactors’ operations: the implementation of A/CPPNM obligations in the context of multiple jurisdictions

**MADALINA MAN**

**Primary Author**

Pacific Northwest National Laboratory

Seattle, Washington, USA

Email: madalina.man@pnnl.gov

P. Eftekhari

Contributor

Pacific Northwest National Laboratory

Washington D.C., USA

**Abstract**

International commerce of advanced and small modular reactors (A/SMR) supplied from one State to another is poised to expand considerably in the near term. “While most advanced reactors will likely be sited in conventional terrestrial locations, marine-based water-cooled A/SMRs have been designed for deployment as either a barge-mounted floating power unit or as an immersible underwater power unit. New organizational models have been recently developed in connection with advanced reactors. Under the build, own, and operate (BOO) model, the supplier remains the owner and operator for the life of the facility. Under the build, own, operate, and transfer (BOOT) model, the supplier is initially the owner and operator of the facility, but the contract includes arrangements for the transfer of ownership and operation to the host country at a specified point in the life of the facility.” (See Morris, Man, Marek, 2022) Under both models, an A/SMR might be transported across multiple jurisdictions. Such scenarios and operation models may pose challenges in the operationalization and application of Article 5 of the Convention on Physical Protection of Nuclear Material and its Amendment (A/CPPNM) that need to be resolved. This paper analyzes the legal implications of multiple jurisdictions in the application of A/CPPNM Article 5 in the context of an A/SMR built, owned, and operated by State A on the territory of State B.

## INTRODUCTION

Advanced and small modular reactors (A/SMR) figure prominently in international debates around nuclear energy and the role of new nuclear technologies in addressing energy needs. The Nuclear Energy Agency (NEA) predicts that several A/SMR designs will be commercially deployed within five to ten years, with an increasing rate of construction in net zero pathways, anticipating that A/SMRs will represent 21 gigawatts of the global market up to 2035 and between 50 and 150 gigawatts per year afterwards[[1]](#footnote-2). The International Atomic Energy Agency (IAEA) has catalogued over 80 A/SMR designs in its 2022 edition of the Advances in Small Modular Reactor Technology Developments publication. These designs present evolutionary and innovative features characterized by the choice of coolant, levels of fuel enrichment, energy output, envisioned applications, and dependence on automated systems[[2]](#footnote-3), amongst others. Some of these characteristics pose new challenges for the nuclear security domain, including the effective application of the Amendment to the Convention on Physical Protection of Nuclear Material (A/CPPNM) and its Article 5[[3]](#footnote-4).

The IAEA identifies several unique attributes of A/SMRs in its 2023 preprint version of the Milestones document [1], namely: greater simplicity of design; serial production, largely in factories; smaller power output; installed module by module with multiple units on the same site; shorter construction times; applicability to countries with smaller grids; easier financing due to reduced front-end capital required and construction efficiency; ability to remove reactor module *or in-situ* decommissioning at the end of lifecycle; smaller source term which allows for a less demanding infrastructure, in particular for emergency preparedness and response[[4]](#footnote-5). Some of these attributes, such as modularity and lower front-end capital costs make A/SMRs capable of lending themselves to alternative contracting and ownership approaches that may result in more flexibility for a deploying State. These alternative contracting and ownership approaches include the Build-Own-Operate (BOO) and Build-Own-Operate-Transfer (BOOT) models. BOO and BOOT models may have an impact on the implementation of specific obligations under the A/CPPNM, including obligations related to the establishment and implementation of a legislative and regulatory framework for physical protection, the ability of the A/CPPNM point of contact (POC) to implement their role in connection to matters under the Convention, and cooperation, assistance and information exchange in the case of theft of material or sabotage.

Meeting A/CPPNM obligations is also closely linked to the concept of State jurisdiction over nuclear material and facilities, as well as the State’s sovereignty and national responsibility for nuclear security. The principle of State responsibility, which is clearly established in the A/CPPNM, raises questions related to jurisdiction in the context of BOO and BOOT ownership models. The question as to what legal and regulatory arrangements may have to be made for the effective implementation of the A/CPPNM Articles 2 and 5 in relation to BOO and BOOT, hereinafter referred to collectively as BOO(T), models is at the core of this paper.

## Overview of alternative contracting and ownership approaches

IAEA TECDOC-1750 [2] examines alternative contracting and ownership approaches for the development, construction, commissioning, operation, and decommissioning of new nuclear power plants. While these approaches are not examined in the context of A/SMR deployments, the document offers a useful analysis of such contracting and ownership models that helped the authors identify the potential challenges they may pose to established assumptions in relation to legislative and regulatory frameworks for nuclear security.

TECDOC-1750 describes BOO(T) structures, multiple ownership structures and related variations, and provides a series of case studies[[5]](#footnote-6) such as the Akkuyu nuclear power plant (NPP) project that used a BOO approach, the of the Krško NPP between Croatia and Slovenia, the Visaginas NPP project in Lithuania, or the Olkiluoto-3 project in Finland.

In the BOO(T) concept, “a private or non-private entity is granted the right by the host country to develop finance, build, own, operate, and maintain a facility for a specified period, during which the entity retains the revenue and associated risks. Under the BOOT model, at the end of the designated period, ownership of the facility is transferred to the host country.”[[6]](#footnote-7) The same publication notes that in the BOO(T) arrangement the developer takes the responsibility for delivering the project. The developer would also be responsible for the fuel supply for the operating lifecycle of the project. Furthermore, the document recommends that the foreign ownership component is accounted for in the laws and regulations of the host State. In terms of operation, the developer[[7]](#footnote-8) will have the responsibility for all licensing aspects of the project. For the purposes of this paper, the authors assume that in the BOO(T) model the developer is the supplier State, and it is also the owner of the A/SMR. Hereinafter, the A/SMR owner (also the supplier State) will be referred to as ‘the developer’.

TECDOC-1750 offers some guidance in relation to safety, security, and safeguards considerations and emphasizes that nuclear security is the responsibility of the State. The host country is responsible for the “adoption, within its national legal system of such legislation, regulations and other standards and measures as may be necessary to fulfil its national responsibilities and international obligations effectively, and for the establishment of an independent regulatory body.”[[8]](#footnote-9) Despite this guidance, the document does not offer a detailed account of the potential legislative and regulatory challenges that may arise in relation to nuclear security considerations of BOO(T)[[9]](#footnote-10) arrangements. Some of the considerations that are worth exploring pertain, ultimately, to the implementation of the A/CPPNM are listed below.

* The developer (and owner) of an A/SMR in the BOO(T) model will have to become familiar early on with the host country’s legislative and regulatory framework for nuclear security and identify the relevant requirements related to physical protection, including security-by-design (SeBD) and the necessary licensing requirements.
* The developer (and owner) of an A/SMR in the BOO(T) model will have to establish adequate arrangements with the host country to discuss threat assessment and design basis threat (DBT) related information that would ultimately drive SeBD decisions.
* The developer (and owner) of an A/SMR in the BOO(T) model will have to establish adequate arrangements in relation to physical protection and response considerations at the site, as well as in the context of sabotage and threat of sabotage, or nuclear material that may be lost or stolen. Similarly, the host country’s legislative and regulatory framework will have to provide the regulatory body and other relevant competent authorities with the necessary legal authority to enforce nuclear security requirements, and thus warrant that that authority will remain intact and unimpaired in a BOO(T) model.

These considerations are examined further in the context of the concepts of the *jurisdiction to prescribe* and the *jurisdiction to enforce*.

## the concept of jurisdiction in The Amendment to the Convention on the physical protection of nuclear material (A/CPPNM)

### The Concept of Jurisdiction

The concept of jurisdiction has been discussed in public international law literature primarily in relation to sovereignty, human rights, as well as international criminal law. In a 1923 Issue of the Harvard Law Review, Joseph H. Beale defines jurisdiction as “the power of a sovereign to affect the rights of persons, whether by legislation, by executive decree, or by the judgment of a court”[[10]](#footnote-11). It thus refers to delimiting a State’s regulatory authority, the question of when a person or event may be subject to national regulation[[11]](#footnote-12). Alex Mills, in *Rethinking Jurisdiction in International Law*, emphasizes that “[j]urisdiction has traditionally been considered in international law as purely a question of the rights and powers of states” and argues that the concept is at the heart of the international legal order to provide for the lawful coexistence of sovereigns. He further highlights that “rules of jurisdiction reflect fundamental requirements in the international system which flow from the acceptance by States that there are limits on their own regulatory authority, and that exercises of regulatory authority by foreign sovereigns are themselves legitimate. These rules do not pretend to eliminate entirely the possibility of overlapping regulation”. This paper does not intend to discuss extensively the concept of jurisdiction, but rather to identify some of the issues that BOO(T) approaches pose to the application of a State’s national regulation regarding nuclear security in line with A/CPPNM principles and obligations in the context of A/SMR deployments.

In foreign relations, the term jurisdiction can be divided into three categories:

1. “*Jurisdiction to prescribe*, *i.e.,* a country’s ability to make its law applicable to persons, conduct, relations, or interests;
2. *Jurisdiction to adjudicate*, *i.e.,* a country’s ability to subject persons or things to the process of its courts or administrative tribunals; […]
3. *Jurisdiction to enforce*, *i.e.,* a country’s ability to induce or compel compliance or to punish noncompliance with its laws or regulations.”[[12]](#footnote-13)

The scope of this paper is limited to discussing the jurisdiction to prescribe and the jurisdiction to enforce in the context of a State acquiring an A/SMR, utilizing the BOO(T) model. The key questions that the paper examines and attempts to answer relate to the following:

* Which countries’ laws and regulations would apply in order to meet the obligations in A/CPPNM Article 2A paragraph 2?
* What legal and regulatory arrangements may have to be made for a country’s POC, designated as required by A/CPPNM Article 5 paragraph 1, to effectively discharge his/her responsibilities in relation to matters within the scope of this Convention?
* What legal and regulatory arrangements may have to be made for the effective implementation of A/CPPNM Article 5 paragraphs 2 and 3?

### Jurisdiction in Relation to Implementation of A/CPPNM Obligations

The A/CPPNM is the only legally binding international instrument that requires the protection of nuclear material in domestic use, storage, and transport and of nuclear facilities used for peaceful purposes. The CPPNM, which entered into force in 1987, established physical protection obligations for nuclear material used for peaceful purposes while in international transport or while in storage incidental to that transport. The Amendment to the CPPNM, which was adopted in 2005 and entered into force in 2016, significantly expanded the scope of the CPPNM beyond international transport, imposing additional obligations for the physical protection of nuclear material in domestic use, storage, and domestic transport, and of nuclear facilities used for peaceful purposes. The A/CPPNM is thus a cornerstone of the international nuclear security architecture and the non-proliferation regime writ large for the secure use of nuclear materials and facilities in civilian applications.

One of the core tenets of the A/CPPNM is that nuclear security is the responsibility of the State, a principle enshrined in several articles of the A/CPPNM and further emphasized in IAEA Nuclear Security Series (NSS) publications, in particular NSS No. 20 [3] and NSS No. 13 [4]. Article 2 paragraph 2 of the A/CPPNM provides that “the responsibility for the establishment, implementation and maintenance of a physical protection regime within a State Party rests entirely with that State”. Article 2A paragraph 1 establishes the objectives of a State’s physical protection regime, which are to protect against theft of nuclear material, endure the implementation of rapid and comprehensive measures to locate and recover missing or stolen nuclear material, protect nuclear material and nuclear facilities against sabotage, and mitigate or minimize the radiological consequences of sabotage. In implementing paragraph 1, each State Party shall “(a) establish and maintain a legislative and regulatory framework to govern physical protection; (b) establish or designate a competent authority or authorities responsible for the implementation of the legislative and regulatory framework; and (c) take other appropriate measures necessary for the physical protection of nuclear material and nuclear facilities”. In implementing these obligations, each State Party shall apply, insofar as is reasonable and practicable the Fundamental Principles of Physical Protection of Nuclear Material and Nuclear Facilities. Fundamental Principle A in the A/CPPNM, reasserts Art. 2, paragraph 2, regarding the State’s responsibility to establish, implement and maintain a physical protection regime within its jurisdictional boundaries. The State’s responsibility to establish a physical protection regime for nuclear material and nuclear facilities is bound by its territorial sovereignty and jurisdictional limitations.

Article 5 of the A/CPPNM encompasses several obligations centred around cooperation with other States Parties and with the IAEA, namely: designation of a point of contact (Article 5 para. 1); cooperation, assistance, and information exchange in case of theft of nuclear material or a credible threat thereof (Article 5 para. 2); cooperation, assistance, and information exchange in the case of sabotage of nuclear material or a nuclear facility or a credible threat thereof (Article 5 para. 3).

The State Parties’ obligations under the A/CPPNM including the obligations under Articles 2 and 2A are rooted in and intended to achieve the objectives of the A/CPPNM, set forth in Article 1A, namely “to achieve and maintain worldwide effective physical protection of nuclear material used for peaceful purposes and of nuclear facilities used for peaceful purposes; to prevent and combat offences relating to such material and facilities worldwide; as well as to facilitate cooperation among States Parties to those ends”. Therefore, although the concepts of a State’s sovereignty and responsibility is central to nuclear security and the implementation of A/CPPNM obligations, these obligations are ultimately designed to achieve the overall objective of the A/CPPNM to establish worldwide effective physical protection. When looking at the implementation of A/CPPNM obligations within the BOO(T) models several challenges and unknows arise pertaining to coordination of responsibilities between the supplier and recipient States in the application of security requirements in regulatory frameworks and in licensing conditions, as well as regulatory enforcement and response. These unknowns need to be clarified and satisfactorily resolved to ensure the continuous protection of nuclear material and facilities.

## An analysis of A/CPPNM obligations related to articles 2a and 5 and their implementation in the context of the boo(t) approach

This section examines legal and regulatory questions pertaining to the implementation of A/CPPNM Article 2A and Article 5 in the context of the BOO(T) model. First, the authors offer a broad analysis of the ‘jurisdiction to prescribe’ and the ‘jurisdiction to enforce’ in relation to Article 2A and investigate legal and regulatory considerations related to the BOO(T) approach. Second, the authors analyse obligations under A/CPPNM Article 5 and discuss the legal and regulatory arrangements that may have to be put in place for the BOO(T) model to ensure effective implementation of the amended Convention.

### The implementation of A/CPPNM, Article 2A

As discussed above, A/CPPNM Article 2A obligates States Parties to establish, implement, and maintain an appropriate physical protection regime applicable to nuclear material and nuclear facilities under their jurisdiction. To implement these obligations, each State Party shall apply, insofar as reasonable and practicable, the Fundamental Principles of Physical Protection[[13]](#footnote-14).

The Fundamental Principles of Physical Protection provide a framework for the implementation of Article 2A by outlining the key considerations for the establishment of a physical protection regime. Of significance is that regardless of the BOO(T) models’ specificities, the host State is responsible for establishing the legislative and regulatory framework for physical protection and also to designate a competent authority for its implementation. The jurisdiction to prescribe and the jurisdiction to enforce of a State should remain unimpaired in a BOO(T) model given this broad responsibility under the A/CPPNM of the State to establish a legislative and regulatory framework and designate a competent authority for all nuclear material and facilities. Assuming that there are no extraterritorial considerations pertaining to the location of the A/SMR[[14]](#footnote-15), *i.e.,* the A/SMR is inside the jurisdiction of the State and is not shared by another State, the legislative and regulatory framework would have to provide the competent authority with a clear mandate to issue licenses for the construction and operation of the facility[[15]](#footnote-16), conduct inspections at the site of the A/SMR to verify compliance with nuclear security regulations and license conditions, and perform enforcement activities as necessary. Per IAEA NSS No. 13 (INFCIRC/225/Revision 5), regulations should place the prime responsibility for the implementation of physical protection with the license holder. In the BOO(T) model, the developer[[16]](#footnote-17) would thus be obligated to establish and maintain physical protection systems and measures at the facility in line with the host State’s regulatory requirements. These systems and measures should be based on the DBT or Representative Threat Statements (RTS) and reflect the concepts of a graded approach and defense in depth. Host State’s legislation would obligate the developer to provide unimpaired access to inspectors of the competent authority(ies) at any time to the facility to perform their inspection activities, for both announced and unannounced inspections, as appropriate. Furthermore, in cases of non-compliance, legislation should clearly mandate the host State’s competent authority(ies) to pursue cases of non-compliance through the appropriate administrative, and as appropriate, criminal law structures and procedures. Arrangements between the host State and the developer should clearly confirm the host State’s authority to subject the developer to the enforcement measures established in legislation.

Certain attributes of A/SMRs, in particular their modularity, factory production, the ability to transport an entire reactor module and assemble it on site, and shorter construction times, may pose challenges to some of the principles described above. For instance, a nuclear newcomer State may have to rapidly develop a legal and regulatory framework for nuclear security, including licensing and other requirements, and communicate requirements to the developer sooner than may be required for larger conventional plants. The potentially compressed timeframe for new nuclear power projects will impact broader infrastructure and administrative measures for nuclear security from the perspective of the host State; the same time constraints may also apply to the developer to the extent they intend to or are being required to integrate security considerations at the design stage of the A/SMR (SeBD) and also for purposes of addressing the host State’s regulatory requirements as part of the A/SMRs’ design specifications. It is recognized that the integration of SeBD principles in the legislative and regulatory framework would offer great benefits by requiring developers/designers to integrate security early in their facility’s design.

Furthermore, sharing information regarding the threat assessment and the DBT/RTS with the developer may be essential, but presents confidentiality challenges within the host State’s domestic legislation. Thus, appropriate structures within the host country would either have to enter into an arrangement with the developer for the sharing of sensitive threat information or identify other solutions to communicate concerns pertaining to the threat assessment/DBT with the developer (owner). Examples may include “mock” DBTs, guidance, or simply communicating design considerations that would reflect the State’s DBT/RTS. While such arrangements may be a time intensive process, they allow the earlier integration of SeBD considerations. In a BOO(T) model, the integration of SeBD considerations early on into the A/SMR project would enable the application of relevant A/CPPNM Physical Protection Principles and contribute to the implementation of A/CPPNM obligations, by both the developer and the host State.

Based on this analysis, the authors conclude that a scenario where the A/SMR is deployed on the territory of the host State (i.e., excluding any questions of extraterritoriality) and operated based on the BOO(T) approach, does not pose challenges to the host State’s *jurisdiction to prescribe* and the *jurisdiction to enforce[[17]](#footnote-18)* in order to ensure the implementation of the host State’s obligations under Article 2A. However, this scenario does raise some practical challenges pertaining to the host State’s ability (and desire) to share confidential information with the developer. It is also imperative that the host State establishes a legislative and regulatory framework for security as early as possible. If States incorporate SeBD principles into their legislative and regulatory framework, then it would be easier to address these practical challenges posed by the BOO(T) modelrs to the effective implementation of A/CPPNM, Art. 2A.

### The implementation of A/CPPNM Article 5

As indicated above, Article 5 of the A/CPPNM establishes a number of obligations centred around international cooperation with other States and the IAEA, *inter alia*. Per Article 5 para. 1, States Parties are required to designate a POC for matters under the Convention. The A/CPPNM POCs are typically representatives appointed within the host State’s regulatory authority, but sometimes may be from the ministry of interior, the ministry of defense, or the ministry of foreign affairs.

To avoid duplication and for a detailed analysis of Article 5, consult M. Man, A. Cooper, P. Eftekhari, *A Fictional Case Study with a Corresponding Legal and Regulatory Framework: Challenges and Good Practices in the Implementation of CPPNM Amendment Article 5*, Vienna, 2024. The key conclusions and recommendations of the cited study focus on the necessary legislative and regulatory provisions that would empower the A/CPPNM POC to take certain actions, put in motion certain coordination mechanisms, and have the ability to implement a number of enforcement activities, including: legal provisions that would require the POC to inform other States that may be affected by theft of nuclear material or sabotage and identify the necessary coordination mechanisms in this regard; provisions establishing a legal mandate on the POC to cooperate with other competent authorities, and coordinate with intelligence and law enforcement entities, etc.

In the context of the BOO(T) approach for an A/SMR, the application of Article 5 may be triggered by a scenario of theft, sabotage, or threat thereof. The effective implementation of Article 5 would entail entry into a number of legal arrangements between the A/SMR developer and relevant competent authorities in the host State, in particular: a response plan between the A/SMR operator and response forces (offsite and onsite) to describe roles, responsibilities and coordination requirements, as appropriate; arrangements for periodic training and exercises to test the response plan; reporting requirements in the security plan, specifically requiring the developer to report nuclear security events to the host State’s regulatory body and other competent authorities; and concluding Memorandum of Understandings (MOUs) or similar arrangements establishing coordination and communication mechanisms between the developer and the host State’s A/CPPNM POC.

Several challenges may arise in the host State’s implementation of its Art. 5 obligations in the context of a BOO(T) approach. First, response measures and the facility’s nuclear security plan would have to be based on the DBT or RTS. If the developer of the A/SMR is a foreign entity employing foreign nationals to operate the facility, confidentiality concerns and difficulties related to sharing confidential information between the host State and the A/SMR licensee can arise. The same scenario may create difficulties for the host State to conduct appropriate trustworthiness assessments on the A/SMR’s foreign personnel.

 Similar to the implementation of Article 2A, the authors conclude that a scenario where the A/SMR is deployed on the territory of the host State (i.e., excluding any questions of extraterritoriality) and operated based on the BOO(T) approach, does not pose significant challenges to the host State’s *jurisdiction to prescribe* and the *jurisdiction to enforce* in the implementation of the obligations under A/CPPNM Article 5. Nevertheless, issues pertaining to confidentiality can become significant roadblocks in the implementation of effective arrangements between the developer and off-site response or other competent authorities that may have a role in the implementation of Article 5, including the A/CPPNM POC. These challenges may impact the host State’s ability to share information timely with other States Parties or the IAEA, in relation to theft or sabotage of nuclear material or the A/SMR or threats thereof, as required by A/CPPNM Article 5.

## Conclusions and recommendations

One of the core tenets of the A/CPPNM is that nuclear security is the responsibility of the State, a principle enshrined in several articles and further emphasized in IAEA NSS publications. Meeting A/CPPNM obligations is closely linked to the concept of State’s jurisdiction over nuclear material and facilities, as well as the State’s sovereignty and national responsibility for nuclear security. BOO(T) ownership models of A/SMRs raise a number of questions related to the jurisdiction to prescribe and the jurisdiction to enforce of a host State in order for that State to meet its A/CPPNM obligations. The question of what legal and regulatory arrangements may have to be made for the effective implementation of the A/CPPNM in relation to these models is at the core of this paper. While the authors concluded that BOO(T) approaches to A/SMR deployments do not pose significant challenges to the host State’s *jurisdiction to prescribe* and the *jurisdiction to enforce* in connection with A/CPPNM articles 2A and 5[[18]](#footnote-19), difficulties may arise in the practical application of associated laws, regulations, and licensing requirements. These are centred around confidentiality concerns pertaining to threat information that may have to be shared with the foreign developer of the A/SMR. As described in Section 4, the authors conclude that arrangements between the developer and the host State are necessary to clearly describe responsibilities in relation to physical protection, including the authority of the host State’s regulatory body, to subject the A/SMR developer to the host State’s licensing, inspection, and enforcement requirement. Nevertheless, the authors recommend further analysis of nuclear security legal and regulatory considerations in relation to BOO(T) approaches beyond the confines of a conference paper, including the effective integration of SeBD into regulatory frameworks and modalities to harmonize such frameworks.

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1. See the Nuclear Energy Agency (NEA) Small Modular Reactor (SMR) Strategy: https://www.oecdnea.

org/jcms/pl\_26297/the-nea-small-modular-reactor-smr-strategy [↑](#footnote-ref-2)
2. See M. A. Man, P. E. Eftekhari, F. Putzu, and J. Rivers, *A Nuclear Security Regulatory Model for Small Modular Reactors*, Vienna, 2024. [↑](#footnote-ref-3)
3. Some of these challenges were identified in previous studies, such as M. A. Man, P. E. Eftekhari, F. Putzu, and J. Rivers in supra, F.A. Morris, M. Man, and R, Marek, *Advanced Reactors and the International Legal Framework for Safety, Security, and Safeguards*, International Conference on Nuclear Law, Vienna (2022), P. EFTEKHARI, M. MAN, Regulatory Harmonization of Nuclear Security Requirements for Small Modular Reactors: Challenges and Opportunities, Institute of Nuclear Materials Management (INMM) Annual Meeting, Vienna (2023). [↑](#footnote-ref-4)
4. See Annex *Infrastructure Considerations for SMR*s, International Atomic Energy Agency, Milestones in the Development of a National Infrastructure for Nuclear Power, IAEA Nuclear Energy Series No. NG-G-3.1 (Rev. 2) [IAEA Preprint] (2023). [↑](#footnote-ref-5)
5. TECDOC-1750 describes a number of considerations that will affect the project development and execution strategy in a State that is launching a national nuclear power program. These considerations include a possible lack of technical capability and skilled personnel, possible lack of project management expertise, leveraging financial resources, or regional and strategic partnership and risk-sharing. The publication notes that “when considering the development of a national infrastructure for nuclear power, a Member State might see significant challenges when comparing its current financial, industrial and skills capacities against the desired implementation schedule. The Member State might find that traditional contraction and ownership approaches do not meet its needs […] and there may be a desire to explore alternative contracting and ownership approaches.” The case studies presented by the publication are meant to illustrate some of these alternative contracting approaches, such as the BOO, BOOT models, or the ‘regional ownership’ approach, which involved the participation of two or more countries that decide to cooperate towards a common goal making sovereign commitments that become the basis upon which the project will then proceed. [↑](#footnote-ref-6)
6. See page 14 in INTERNATIONAL ATOMIC ENERGY AGENCY, Alternative Contracting and Ownership Approaches for New Nuclear Power Plants, IAEA-TECDOC-1750, IAEA, Vienna (2014). [↑](#footnote-ref-7)
7. TECDOC-1750 defines the ‘developer’ as an “entity that takes responsibility for delivering the project, typically in return for being granted some kind of concession (such as the exclusive right to supply a particular customer base – often on terms set out in a PAA (power purchase agreement)), The developer with often be a project company with a single ‘parent’ company (to whose assets recourse is limited by virtue of the project company framework) or else be comprised of a Joint Venture (JV) set up by a number of partners.” The term ‘owner’ is defined in the document as the “entity that holds the equity interest in the nuclear power project. The Owner can also be the developer.” [↑](#footnote-ref-8)
8. Ibid. [↑](#footnote-ref-9)
9. In light of the space limitations of a conference paper, the authors decided to focus on the common characteristics of the BOO and BOOT models, excluding an analysis on the nuances between the two ownership approaches. [↑](#footnote-ref-10)
10. Joseph H. Beale, *Harvard Law Review*, Vol. 36, No. 3, 1923. [↑](#footnote-ref-11)
11. Alex Mills, in “Rethinking Jurisdiction in International Law”, emphasizes that “Jurisdiction has traditionally been considered in international law as purely a question of the rights and powers of states” and argues that the concept is at the heart of the international legal order to provide for the lawful coexistence of sovereigns and “rules of jurisdiction reflect fundamental requirements in the international system which flow from the acceptance by states that there are limits on their own regulatory authority, and that exercises of regulatory authority by foreign sovereigns are themselves legitimate. These rules do not pretend to eliminate entirely the possibility of overlapping regulation”. [↑](#footnote-ref-12)
12. Am. Soc’y Int’l L., “Jurisdictional, Preliminary, and Procedural Concerns,” in Benchbook on International Law § II.A (Diane Marie Amann ed., 2014), available at www.asil.org/benchbook/jurisdiction.pdf [↑](#footnote-ref-13)
13. The Fundamental Principles of Physical Protection are established in A/CPPNM Article 2A paragraph 3 and cover: A – Responsibility of the State, B- Responsibilities During International Transport, C – Legislative and Regulatory Framework, D – Competent Authority, E – Responsibility of the License Holders, F – Security Culture, G – Threat, H – Graded Approach, I – Defense in Depth, J – Quality Assurance, K – Contingency Plans, and L – Confidentiality. [↑](#footnote-ref-14)
14. Complications would arise if the facility is located on a barge in the territorial waters of the State, or in its exclusive economic zone. [↑](#footnote-ref-15)
15. Some States’ regulatory frameworks require a separate license for each stage of a nuclear facility’s lifecycle, including during planning, siting, design, construction, commissioning, operation and decommissioning, while other States may issue a license for the entire lifecycle of the facility, with certain conditions that apply during certain stages. [↑](#footnote-ref-16)
16. Per Section 2 above, the paper assumes that the developer is the supplier State and the owner of the A/SMR [↑](#footnote-ref-17)
17. The authors of this study recognize that further legal complexities pertaining to the jurisdiction to enforce would arise in a BOO(T) model. These matters warrant further examination and legal analysis in a separate study that would be beyond the space allocated to this conference paper. [↑](#footnote-ref-18)
18. This conclusion stands exclusively for scenarios where questions of extraterritoriality arising from the siting of the A/SMR are not a concern. [↑](#footnote-ref-19)