

In Pursuit of Nuclear-Powered Submarines: Australia, South Korea, And Japan

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A naval nuclear sea change is underway in the Asia-Pacific. The number of states operating nuclear-powered submarines is set to expand in the coming decades.

North Korea is actively showcasing its ambition to develop nuclear-powered submarines armed with nuclear weapons (SSBNs).¹ This ambition is not altogether surprising given that sophisticated SSBNs are widely recognised as providing nuclear-armed states with a secure second-strike capability.

But states without nuclear weapons are also pursuing naval nuclear propulsion capabilities. Australia is partnering with the United States and United Kingdom as part of the AUKUS initiative to acquire conventionally armed, nuclear-powered attack submarines (SSNs).² South Korea recently announced that it will develop its own SSNs, with support from the United States to acquire fuel for the submarines' reactors.³ And calls in Japan for an SSN capability are growing.⁴

Understanding this expansion of naval nuclear propulsion in the Asia-Pacific requires unpacking a series of questions about why, how, and whether a state without nuclear weapons would seek nuclear-powered submarines. This paper considers each question in turn, examining the strategic, legal, technical, financial, and political factors shaping Australian, South Korean, and potential Japanese SSN ambitions and hurdles to making those ambitions reality. Assessing these issues not only provides deeper insight into these specific projects but can also help inform a deeper understanding of how any future non-nuclear state might think about acquiring this advanced nuclear capability.

Why would non-nuclear states seek SSNs?

Naval nuclear programmes are significant, costly, multigenerational endeavours that have only been developed and deployed by nuclear-armed states to date. And yet, two – and perhaps soon

¹ Dong-ha Kim, "North Korea's Nuclear Submarine Surges Ahead of South Korea's Fuel Delays," *The Chosun Daily*, December 26, 2025, <https://www.chosun.com/english/national-en/2025/12/26/EHBZGHXVTNF6JAWALXM2BMRNGA/>.

² Australia Submarine Agency, "Pathway to Australia's Nuclear-Powered Submarine Capability," accessed July 1, 2026, https://www.asa.gov.au/sites/default/files/documents/2024-10/Nuclear_Powered_Capability_Fact_Sheet_0.pdf.

³ Republic of Korea Ministry of National Defense, *The Republic of Korea's Nuclear Powered Submarine Initiative* (Republic of Korea Ministry of National Defence, 2026), <https://news.usni.org/2026/05/27/republic-of-koreas-nuclear-powered-submarine-initiative>.

⁴ Mizuki Sato and Ryo Kiyomiya, "Japan Eyes Nuclear Subs after U.S. Gives OK to S. Korea," *The Asahi Shimbun*, November 7, 2025, <https://www.asahi.com/ajw/articles/16143129>.

three – non-nuclear states in the Asia-Pacific are expected to operate nuclear-powered submarines by the 2040s.⁵

This shift is driven in large part by a perceived deteriorating regional security environment, with concomitant fears of aggression by adversary states. As China, Russia, and North Korea advance their own nuclear submarine programmes, advocates of SSNs argue that this capability can enhance a non-nuclear state's ability to deter threats to its national security. SSNs have some operational advantages over their diesel-powered counterparts – they can travel faster and farther, stay submerged longer, and can be stealthier. Both Australia and South Korea have highlighted these features in advancing deterrence rationales for their pursuit of SSNs.

Australia asserts that its future SSN fleet will enhance its ability to “deter aggression and contribute to stability in the Indo-Pacific.”⁶ Official documents describe SSNs as a “game-changing capability” that will allow Australia to maintain a critical advantage over potential adversaries.⁷ These documents highlight key features such as superior range, endurance, and stealth in pointing to the value of SSNs for defending Australian maritime interests and strengthening conventional deterrence.⁸ SSNs also constitute a blue-water capability that may be especially relevant for Australia given its geography.⁹

Similarly, in a paper announcing its Jangbogo-N project, the South Korean Ministry of National Defense (MND) identified three deterrence roles for its future SSN fleet: strengthen deterrence against North Korean nuclear submarine threats, implement an underwater kill-chain, and advance Seoul's deterrence by punishment capabilities.¹⁰ The paper references the “significantly enhanced operational capabilities” of SSNs in promoting their ability to deliver these objectives in light of North Korea's own nuclear submarine ambitions and advancements.¹¹ For instance, it argues that

⁵ Outside of the Asia-Pacific region, Brazil is also pursuing an SSN capability along similar timelines. For more information on this programme, see Layla Dawood, “The Brazilian Nuclear-Powered Submarine: Arguments for Deterrence and Development,” in *Navigating Responsible Stewardship of Nuclear-Powered Submarines*, ed. Jamie Kwong and Toby Dalton (Carnegie Endowment for International Peace, 2026), <https://carnegieendowment.org/research/2026/01/ssn-nuclear-powered-submarine-responsible-stewardship-australia-brazil>.

⁶ Australian Department of Defence, *2026 National Defence Strategy* (Australian Department of Defence, 2026), 53, <https://www.defence.gov.au/about/strategic-planning/2026-national-defence-strategy-2026-integrated-investment-program>.

⁷ Australian Department of Defence, *The AUKUS Nuclear-Powered Submarine Pathway: A Partnership for the Future* (Australian Department of Defence, 2023), 15, <https://www.asa.gov.au/sites/default/files/documents/2024-10/00.%20Public%20Report.pdf>.

⁸ Australian Department of Defence, *The AUKUS Nuclear-Powered Submarine Pathway*, 16.

⁹ Stephan Frühling, “Nuclear Order at Sea? Strategic Rationales and Unintended Implications of Australia's and Brazil's Nuclear Powered Submarine Programs,” in *Navigating Responsible Stewardship of Nuclear-Powered Submarines*, ed. Jamie Kwong and Toby Dalton (Carnegie Endowment for International Peace, 2026), <https://carnegieendowment.org/research/2026/01/ssn-nuclear-powered-submarine-responsible-stewardship-australia-brazil>.

¹⁰ Republic of Korea Ministry of National Defense, *The Republic of Korea's Nuclear Powered Submarine Initiative*, 7-10.

¹¹ Republic of Korea Ministry of National Defense, 8.

SSNs can operate underwater longer, stealthier, and with more manoeuvrability than diesel-powered submarines, allowing Seoul to better track and hold at risk Pyongyang's boats.¹²

Proponents of Japanese SSNs also cite their deterrence value in calling for a programme, particularly amid China's naval expansion in the region.¹³ Augmenting Japan's existing diesel submarine fleet with SSNs, they argue, could "maximize deterrence,"¹⁴ as the boats' endurance and speed would give Tokyo greater operational flexibility.¹⁵ Relatedly, many advocates cite the acquisition of nuclear-powered submarines by Japan's neighbours as further reason for Tokyo to acquire its own capability.¹⁶

In addition to strengthening their own deterrence, Australia and South Korea – and perhaps in the future, Japan – envision their SSN programmes contributing to joint regional defence efforts with the United States and other allies. Australia depicts its future SSNs as a significant contribution to joint operations and collective deterrence,¹⁷ while South Korean officials have indicated that Seoul's future SSNs could help shoulder some of the operational burden.¹⁸ Whether Washington would rely on those capabilities in a crisis or Australia, South Korea, and Japan would be willing to coordinate their SSN operations, however, are open questions.¹⁹

While most naval nuclear proponents tend to focus on these security drivers, there may be additional motivations for pursuing SSNs. Some proponents may, for example, view the submarines as an important status symbol.²⁰ The mastery of nuclear propulsion stands to signal a state's naval competence and prowess to adversaries and allies alike.

More concerningly, some SSN advocates may view them as useful ways to contribute to a state's nuclear weapons latency. Various technical choices – for example, indigenously enriching uranium for the boats' reactors – may subsequently advance a state's ability to develop nuclear weapons at some future date. And since non-nuclear states are legally permitted to remove nuclear material from international monitoring for use in an SSN, there is an even greater risk that a state could

¹² Republic of Korea Ministry of National Defense, 8-9.

¹³ Jiji, "JIP to Submit Proposals Seeking Swift Introduction of Nuclear Submarines," *The Japan Times*, June 18, 2026, <https://www.japantimes.co.jp/news/2026/06/18/japan/politics/japan-ruling-party-nuke-sub-proposal/>.

¹⁴ Kenji Yoshida, "JIP's Submarine Proposal Tests Japan's Nuclear Red Lines," *The Japan Times*, July 9, 2026, <https://www.japantimes.co.jp/news/2026/07/09/japan/politics/maehara-interview/>.

¹⁵ Kosuke Takahashi, "Japan's Nuclear Submarine Debate Gains Momentum Amid Rising Pacific Threats," *The Diplomat*, January 29, 2026, <https://thediplomat.com/2026/01/japans-nuclear-submarine-debate-gains-momentum-amid-rising-pacific-threats/>.

¹⁶ Sato and Kiyomiya, "Japan eyes nuclear subs after U.S. gives OK to S. Korea."

¹⁷ Australian Department of Defence, *The AUKUS Nuclear-Powered Submarine Pathway*.

¹⁸ Seung-yeon Kim, "S. Korea to Hold Talks with U.S. for Swift Progress in Nuclear-Powered Submarine Push: FM Cho," *Yonhap News Agency*, October 30, 2025, <https://en.yna.co.kr/view/AEN20251030014200315>.

¹⁹ Jamie Kwong, "Can South Korea Afford the Many Costs of Nuclear-Powered Submarines?" *Foreign Policy*, November 19, 2025, <https://foreignpolicy.com/2025/11/19/trump-nuclear-submarines-south-korea/>.

²⁰ Kwong, "Can South Korea Afford the Many Costs of Nuclear-Powered Submarines?"

pursue an SSN programme as cover for illicit nuclear weapons activities.²¹ These potential proliferation drivers are a fundamental issue presented by the pursuit of naval nuclear propulsion by non-nuclear states.

To be clear, both the Australian and South Korean governments have reiterated their commitments to non-proliferation as part of their policies and messaging around their SSN programmes, and presumably Japan would do the same.²² But intentions could change. The risk that South Korean intentions may change is of particular concern. The long-standing debate over whether Seoul should develop a nuclear arsenal has gained momentum in recent years amid North Korean nuclear weapons advancements and growing concerns about Washington's extended deterrence commitment. The Lee administration has clarified that it does not see a strategic case for South Korean armament, but advocates for maintaining the nuclear option, including those in the National Assembly, could one day enter the Blue House.²³

Are non-nuclear states legally and technically capable of developing SSNs?

While non-nuclear states may want to build SSNs, the question remains whether they have the legal and technical capacity to do so. Legally speaking, Australia and South Korea both have Comprehensive Safeguards Agreements (CSA) with the International Atomic Energy Agency (IAEA) that permit them to develop SSNs. Article 14 of their respective CSAs allows for the use of nuclear material in a “non-proscribed military activity.”²⁴ This provision permits them to remove nuclear material from traditional safeguards mechanisms to use as fuel for submarine reactors. They are required, though, to negotiate a special arrangement with the IAEA so it can continue to meet its technical safeguards objectives, including verifying the non-diversion of nuclear material. Australia has been working with the Agency on such an arrangement since 2023, and South Korea has recently initiated such discussions.²⁵

Japan's CSA would theoretically allow it to negotiate a similar arrangement. However, Article 14 of its agreement excludes the standard “non-proscribed military activity” phrase in favour of

²¹ James Acton, “Why the AUKUS Submarine Deal Is Bad for Nonproliferation—And What to Do About It,” Carnegie Endowment for International Peace, September 21, 2021, <https://carnegieendowment.org/russia- Eurasia/posts/2021/09/why-the-aukus-submarine-deal-is-bad-for-nonproliferationand-what-to-do-about-it>.

²² See, for example, 2026 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, “Australia's Naval Nuclear Propulsion Program,” NPT/CONF.2026/WP.5, March 2, 2026, <https://reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2026/documents/WP5.pdf>.

²³ Hyun Cho, “Non-Proliferation as a Strategic Imperative,” Asia-Pacific Leadership Network, April 1, 2026, <https://www.apln.network/analysis/commentaries/non-proliferation-as-a-strategic-imperative>.

²⁴ See, for example, International Atomic Energy Agency, “The Text of the Agreement Between Australia and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons,” IAEA, INFCIRC/217, December 13, 1974, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1974/infcirc217.pdf>.

²⁵ Min-kyung Jung, “Seoul moves closer to IAEA safeguards deal for nuclear-powered subs,” *The Korea Herald*, September 8, 2026, <https://www.koreaherald.com/article/10866759>.

vaguer language.²⁶ This exclusion likely reflects Japan's 1955 Atomic Energy Basic Act, a law that requires all nuclear material be used for peaceful purposes.²⁷ This provision may, in turn, complicate a Japanese decision to pursue SSNs – which clearly constitutes a military use of nuclear material. Notably, Brazil has wrestled with a similar issue in its pursuit of SSNs, as its constitution restricts nuclear activities to peaceful uses.²⁸ Some Brazilian interpretations therefore emphasise that SSNs constitute a peaceful use of nuclear energy, an approach Japan could seek to emulate.²⁹

Legalities aside, SSNs are a complex capability; designing and building them pose real challenges. To mitigate these challenges, non-nuclear states could pursue various development models. From a technical perspective, the simplest model would be to purchase the boats from a nuclear state that already builds and operates SSNs. The recipient state would still need to develop key competencies, such as a domestic regulatory framework and a social license, but it would encounter far fewer technical hurdles compared to building a boat from scratch. This type of off-the-shelf arrangement, however, would have its own challenges, not least that nuclear states may have little appetite to sell their submarines. The interim phase of the AUKUS Optimal Pathway that will see Australia purchase US *Virginia*-class SSNs appears an exception. But even this arrangement has been called into question, including over concerns that giving these boats to Canberra would weaken Washington's position in a future US–China contingency.³⁰

Alternatively, non-nuclear states could build new boats. In doing so, they would have to overcome numerous hurdles, from training a specialised workforce to outfitting shipyards with the special facilities and equipment needed to construct nuclear-powered submarines. They would also have to overcome key challenges related to the submarines' reactor design as well as the reactor fuel type and source of supply. They may choose to address these challenges in partnership or domestically.

²⁶ International Atomic Energy Agency, "The Text of the Agreement of 4 March 1977 Between Japan and the International Atomic Energy Agency in Implementation of Article III. 1 and 4 of the Treaty on the Non-Proliferation of Nuclear Weapons," IAEA, INFCIRC/255, March 1978, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1978/infcirc255.pdf>.

²⁷ Japanese Law Translation, "Atomic Energy Basic Act" [原子力基本法], Act no. 186, December 19, 1955, <https://www.japaneselawtranslation.go.jp/en/laws/view/4802>.

²⁸ Mariana Nascimento Plum, "Strategic Development, Environmental Responsibility, and Democratic Accountability: Brazil's Nuclear Balance," in *Navigating Responsible Stewardship of Nuclear-Powered Submarines*, ed. Jamie Kwong and Toby Dalton (Carnegie Endowment for International Peace, 2026), <https://carnegieendowment.org/research/2026/01/ssn-nuclear-powered-submarine-responsible-stewardship-australia-brazil>.

²⁹ 2026 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, "Brazil's naval nuclear propulsion program and the safeguards regime under the Treaty on the Non-Proliferation of Nuclear Weapons," NPT/CONF.2026/WP.13, March 3, 2026, <https://reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2026/documents/WP13.pdf>.

³⁰ Ronald O'Rourke, "Navy Virginia-Class Submarine Program and AUKUS Submarine (Pillar 1) Project: Background and Issues for Congress," Congressional Research Service, RL32418, January 26, 2026, https://www.congress.gov/crs_external_products/RL/PDF/RL32418/RL32418.295.pdf.

Australia is working with its AUKUS partners to develop the SSN-AUKUS boats, which will be based on a UK design and supplemented by US and Australian technologies.³¹ Because it does not have nor intends to develop its own enrichment capacity for this project, Australia will also receive highly enriched uranium (HEU) from its AUKUS partners to fuel the on-board reactors – the same material both the United Kingdom and United States use to fuel their own nuclear-powered submarines. To mitigate concerns associated with this proliferation-sensitive fuel source, London and Washington will provide this material in welded power units. Moreover, the use of HEU means the submarines will not require re-fuelling during their service lives. But while that removes the need for Australian operators to regularly access the power units, it may introduce additional safeguards complexities.

South Korea instead plans to design and construct its SSNs – including the submarines’ reactors – domestically, drawing on its distinguished (non-nuclear) shipbuilding capacity, civil nuclear expertise, and perhaps also its historical efforts to pursue SSNs.³² This domestic construction plan, however, stands in sharp contrast to US president Donald Trump’s 2025 announcement of the South Korean programme and subsequent declaration that the submarines would be built in the United States at the Hanwha Philly Shipyard.³³ Nevertheless, Seoul plans to coordinate closely with Washington on sourcing low enriched uranium (LEU) to fuel the submarines. LEU in and of itself poses less of a proliferation risk than HEU, but will require the boats to be periodically refuelled during their service lives. While U.S. officials have engaged in initial talks on the programme, many details, including around this supply of fuel, still need to be worked out.³⁴

It is too soon to tell what development model Japan might adopt if it pursues SSNs. Like South Korea, Japan has a robust and advanced civil nuclear programme that it may seek to draw on in a future SSN programme. Initial indications suggest proponents may push for such a domestic approach, but a full development plan would need to be devised before any SSN decision was finalised.³⁵

³¹ Australian Department of Defence, *The AUKUS Nuclear-Powered Submarine Pathway*.

³² Seoc Woo Kim et al., “South Korea’s Risky Quest to Build Nuclear-Powered Attack Submarines,” *The Bulletin of Atomic Scientists*, November 18, 2020, <https://thebulletin.org/2020/11/south-koreas-risky-quest-to-build-nuclear-powered-attack-submarines/>.

³³ Donald J. Trump (@realDonaldTrump), “South Korea Will Be Building Its Nuclear Powered Submarine in the Philadelphia Shipyards, Right Here in the Good Ol’ U.S.A. Shipbuilding in Our Country Will Soon Be Making a BIG COMEBACK. Stay Tuned!!! President DJT,” Truth Social, October 29, 2025, <https://truthsocial.com/@realDonaldTrump/posts/115459712836946359>.

³⁴ Joyce Lee, “US, South Korea Discuss Nuclear Cooperation in Security Talks,” *Reuters*, June 3, 2026, <https://www.reuters.com/world/asia-pacific/us-south-korea-discuss-nuclear-cooperation-security-talks-2026-06-03/>.

³⁵ Takahashi, “Japan’s Nuclear Submarine Debate Gains Momentum Amid Rising Pacific Threats.”

What are the costs of an SSN programme?

In general, non-nuclear states are thus legally and, through various development models, technically capable of developing SSNs. But whether an individual state should proceed requires weighing up the considerable financial, political, and strategic costs of an SSN programme.

SSNs are a significant financial undertaking. States not only need to consider the costs of submarine construction, but also other associated expenses, such as standing up the necessary infrastructure; skilled workforce; and relevant facilities for managing the entire life cycle of an SSN programme, including waste disposal and management sites. These cumulative costs will take up a large portion of a state's defence budget, inevitably forcing budgetary trade-offs.

Over the next three decades, Australia is expected to spend up to AUD 368 billion on its submarine programme – including significant injections into the UK and US shipbuilding industries – making it the country's largest ever defence initiative.³⁶ This figure may only increase throughout the actual delivery of the programme.³⁷ South Korea has yet to announce how much it expects to spend on the Jangbogo-N project, nor have any Japanese SSN proponents cited specific figures. But these expenditures are certain to be higher than their respective diesel-powered fleets – and any sticker shock risks seriously undermining support for these endeavours.

Beyond financial costs, states must also weigh up the potential political costs and risks of an SSN programme. Domestically, these multigenerational endeavours require durable political support over decades. Some politicians, however, may be reluctant to support such a significant investment, especially if faced with considerable public concern or pushback. The public, for example, may be concerned about how and where the submarines' spent nuclear fuel will be disposed, as is currently playing out in Australia.³⁸ If this concern or others are not resolved in ways perceived as safe and environmentally and socially sound, governments could fail to secure public buy-in, posing a significant risk to the long-term sustainability of the programme.

States may also encounter political challenges on the regional or global stage. Regional states may pushback over safety and security concerns, potentially damaging a state's standing or interaction with its neighbours. The broader international community may also have proliferation concerns. Some concerns may be geopolitically motivated, as appears to be the case with China's criticism

³⁶ Andrew Greene and Matthew Doran, "Australian Nuclear Submarine Program to Cost up to \$368b as AUKUS Details Unveiled in the US," *ABC News*, March 13, 2023, <https://www.abc.net.au/news/2023-03-14/aukus-nuclear-submarine-deal-announced/102087614>.

³⁷ Ben Doherty, "AUKUS Costs Balloon with More Cash and Staff for Submarine Agency amid Ongoing Search for Nuclear Waste Dump," *The Guardian*, May 12, 2026, <https://www.theguardian.com/australia-news/2026/may/12/australia-federal-budget-2026-aukus-submarines-nuclear-defence-spending>.

³⁸ Art Cotterell, "Whose Voices Matter? Power, Legitimacy, Nuclear Legacies, and the Social License for AUKUS," in *Navigating Responsible Stewardship of Nuclear-Powered Submarines*, ed. Jamie Kwong and Toby Dalton (Carnegie Endowment for International Peace, 2026), <https://carnegieendowment.org/research/2026/01/ssn-nuclear-powered-submarine-responsible-stewardship-australia-brazil>.

of the AUKUS SSN initiative.³⁹ Others may be more genuine, as with concerns about South Korean nuclear latency.⁴⁰ Regardless, these proliferation anxieties may invite greater scrutiny over an SSN programme that could make their delivery and operation more difficult.

Australia, South Korea, and Japan must also consider alliance politics. In partnering with the United States on various aspects of their programmes, Australia and South Korea are doubling down on the US alliance precisely at a time when the perceived reliability and sustainability of Washington's commitments are in serious doubt. While their SSNs may help address US calls for greater defence burden-sharing, their reliance on the United States could leave their programmes problematically exposed. Moreover, all three states must consider how their own SSN developments affect one another. For instance, it seems likely that South Korea's decision to pursue SSNs is a substantial factor informing Japan's SSN debate.⁴¹

Finally, states must assess the possible strategic implications of pursuing naval nuclear propulsion. In particular, a non-nuclear state's SSNs could potentially threaten a nuclear state's SSBNs. Whether that non-nuclear state actually intends to do so, its nuclear adversaries may nevertheless perceive its SSNs as a strategic threat – especially if they rely on their SSBNs as a secure second-strike capability.

Official Australian discourse has been reluctant to identify a specific adversary in discussing the deterrence role of its SSNs, but most analysts readily point to China. Australian SSNs operating in the South China Sea will likely be able to hold Chinese SSBNs at risk, a threat that Beijing is thus likely to factor into its own deterrence calculus.⁴² Meanwhile, South Korean officials have been much more direct. The MND paper identifies a key role for Seoul's SSNs as holding Pyongyang's SSBNs at risk.⁴³ Yet, it does little to acknowledge how this threat could significantly affect Pyongyang's strategic thinking.

That SSNs could affect a nuclear adversary's strategic behaviour means that a non-nuclear state's SSN programme may inadvertently exacerbate escalation risks. States must therefore seriously consider such strategic implications in determining whether SSNs are best suited to address their security needs.

³⁹ International Atomic Energy Agency, "Communication dated 12 September 2022 received from the Permanent Mission of the People's Republic of China to the Agency," IAEA, INFCIRC/1034, September 12, 2022, <https://www.iaea.org/sites/default/files/publications/documents/infircs/2022/infirc1034.pdf>.

⁴⁰ Toby Dalton, "Non-Proliferation as a Strategic Imperative: Experts Respond to ROK Foreign Minister," Asia-Pacific Leadership Network, April 2, 2026, <https://www.apln.network/analysis/the-pulse/non-proliferation-as-a-strategic-imperative-experts-respond-to-rok-foreign-minister>.

⁴¹ Takahashi, "Japan's Nuclear Submarine Debate Gains Momentum Amid Rising Pacific Threats."

⁴² Benjamin Zala, "AUKUS and the Importance of Reassurance," in *Navigating Responsible Stewardship of Nuclear-Powered Submarines*, ed. Jamie Kwong and Toby Dalton (Carnegie Endowment for International Peace, 2026), <https://carnegieendowment.org/research/2026/01/ssn-nuclear-powered-submarine-responsible-stewardship-australia-brazil>.

⁴³ Republic of Korea Ministry of National Defense, *The Republic of Korea's Nuclear Powered Submarine Initiative*, 8-9.

How to turn SSN ambitions into reality?

Japan has not yet decided that the perceived benefits of SSNs outweigh these costs. Australia and South Korea have, but it is still far from certain that their programmes will come to fruition as planned.

Both face significant hurdles in putting their boats to sea. They have a long way to go in building up their respective infrastructure, operational, and regulatory capacities, where a trained and experienced workforce will be critical. And both are operating on tight delivery timelines. Australia set a target to deliver its boats from the early 2040s, and South Korea is working toward an even more ambitious mid-2030s launch date.⁴⁴ Seoul's existing shipbuilding capacity will likely be an asset in meeting this deadline, but it still lacks critical nuclear competencies. No South Korean shipyards, for example, are currently equipped with the special facilities needed to construct nuclear-powered submarines.

Both countries may also face obstacles working with partners to deliver key aspects of their respective SSN programmes. Washington has shipbuilding capacity problems of its own – and, as relevant to Canberra, so does London – and thus may deprioritise partnered efforts. This capacity issue appears to be a factor in Washington's decision to sell Canberra second-hand *Virginia*-class boats, rather than a mix of old and new.⁴⁵ Moreover, while Australia and South Korea have presented their programme plans, many details still need to be worked out. There is greater clarity over Australian plans five years on from the initial AUKUS announcement, but delivery challenges abound.⁴⁶ As a much newer effort, numerous questions remain about how South Korea will deliver its Jangbogo-N project. Seoul's simultaneous – though seemingly separate – efforts to amend its civil nuclear agreement with Washington to expand its enrichment and reprocessing capability are only likely to complicate the project's delivery.⁴⁷

Beyond delivery challenges, it is critical that these non-nuclear states work to establish themselves as responsible stewards of naval nuclear propulsion. Not only will such efforts facilitate the successful delivery and implementation of their own programmes, but they can also help create expectations for how future non-nuclear operators, potentially including Japan, manage their programmes.

One way to do so could be by building up their credentials of responsible stewardship, measures for reassuring various audiences of their intention and capacity to safely and securely manage this

⁴⁴ Australia Submarine Agency, "Pathway to Australia's Nuclear-Powered Submarine Capability." See also, Republic of Korea Ministry of National Defense, *The Republic of Korea's Nuclear Powered Submarine Initiative*.

⁴⁵ Stephen Dziedzic, "Australia to Buy Three Second-Hand United States Submarines under AUKUS Shake-up," *ABC News*, May 31, 2026, <https://www.abc.net.au/news/2026-05-31/australia-to-buy-second-hand-united-states-submarines-aukus/106742496>.

⁴⁶ Sarah Tzinieris and Karl Dewey, "AUKUS Under Pressure: The Capacity Constraints that Put a Dampener on Delivery," *Security & Defence Plus*, March 2023, <https://securityanddefenceplus.plusalliance.org/essays/aukus-under-pressure-the-capacity-constraints-that-put-a-dampener-on-delivery/>.

⁴⁷ Lee, "US, South Korea discuss nuclear cooperation in security talks."

advanced nuclear capability over its entire life cycle.⁴⁸ These credentials could include measures for assuring domestic and regional audiences as well as for reassuring the international community of their non-proliferation bona fides, such as:

- robust regulatory frameworks, public consultations with local communities around submarine sites, and solutions for long-term waste storage, all of which can contribute to building social licenses for the SSN programmes;
- Canberra's membership in the South Pacific Nuclear-Free Zone Treaty, and any additional Australian efforts to further invest in the regime;⁴⁹
- efforts by both states to engage with their neighbours on confidence-building measures around the safe and secure operation of the submarines as well as the potential effect of the submarines on regional security dynamics; and
- good-faith, transparent engagement with the IAEA to negotiate their special safeguards arrangements

Given South Korea's ongoing nuclear weapons debate, Seoul will need to carefully consider what other non-proliferation credentials it can establish. The MND's proposed legal framework for the Jangbogo-N project, which includes a specific non-proliferation clause, is an important but not altogether sufficient step.⁵⁰

To build or not to build?

Numerous factors stand to shape a non-nuclear state's SSN ambitions. From the potential costs and benefits of an SSN programme to the legal, technical, and practical complexities of delivering a programme, pursuing naval nuclear propulsion is not a decision to be made lightly. Taken together, these factors have informed Canberra and Seoul's decisions to advance the AUKUS submarine initiative and Jangbogo-N project, respectively. Whether they can turn their ambitions into reality, however, will require overcoming significant challenges. It remains unclear whether these factors will lead Japan to proceed with an SSN programme of its own. More work must be done to determine if Tokyo can – and indeed, should – move forward.

What does remain clear: amid this expansion of naval nuclear ambitions in the Asia-Pacific and the prospect of future non-nuclear SSN endeavours, these issues merit closer attention and careful consideration by officials and experts alike before any new nuclear submarines are put to sea.

⁴⁸ Jamie Kwong and Toby Dalton, "From Australia to Brazil: Naval Nuclear Propulsion and Responsible Nuclear Stewardship," in *Navigating Responsible Stewardship of Nuclear-Powered Submarines*, ed. Jamie Kwong and Toby Dalton (Carnegie Endowment for International Peace, 2026), <https://carnegieendowment.org/russia-eurasia/research/2026/01/nuclear-powered-attack-submarine-nwzf>.

⁴⁹ Jamie Kwong et al., *A New Era of Nuclear-Powered Submarines Is Making Waves in Nuclear-Weapon-Free Zones*, (Carnegie Endowment for International Peace, 2026), <https://carnegieendowment.org/russia-eurasia/research/2026/01/nuclear-powered-attack-submarine-nwzf>.

⁵⁰ Eunhyuk Cha, "South Korea Issues Draft Law to Advance Jangbogo-N Nuclear Submarine Program," *Naval News*, August 11, 2026, <https://www.navalnews.com/naval-news/2026/08/south-korea-draft-law-jangbogo-n-nuclear-submarine-program>.