Nuclear Proliferation Risks in East Asia

Latent Pathways and Explicit Pressures

IMPACT ESSAY

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ABOUT THIS ESSAY

This essay examines nuclear proliferation risks across East Asia through both overt military programs and latent civilian capabilities. While North Korea's nuclear expansion and China's arsenal modernization dominate attention on the northern flank, the analysis reveals a more complex landscape. South Korea and Japan demonstrate how proliferation pathways emerge through nuclear hedging—Seoul's pursuit of nuclear-powered submarines and fuel-cycle capabilities, alongside Japan's substantial plutonium stockpile and advanced civilian infrastructure, create latent nuclear options amid declining confidence in U.S. extended deterrence.

The essay challenges conventional assumptions about Southeast Asia's nuclear immunity. Despite the 1995 Southeast Asia Nuclear-Weapon-Free Zone Treaty, the region faces growing nuclear exposure through great-power maritime competition, China's SSBN deployments, AUKUS developments, and increasing conventional missile proliferation. Simultaneously, several ASEAN states are advancing civilian nuclear energy programs driven by energy security and climate commitments, creating infrastructure with dual-use potential.

The central argument emphasizes that proliferation risk now extends beyond weapons programs to encompass the intersection of civilian nuclear technology, strategic dependencies on external suppliers, maritime nuclearization, and regional security deterioration. This creates pathways through which formally non-nuclear states become enmeshed in nuclear risk, threatening regional stability and non-proliferation norms.

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Summary

1 The erosion of extended deterrence credibility in Northeast Asia is driving sophisticated nuclear hedging behaviors in South Korea and Japan. Seoul's pursuit of nuclear-powered submarines, recently approved by Washington alongside permissions for uranium enrichment and spent fuel reprocessing, represents a significant policy shift that shortens pathways to weaponization while maintaining technical compliance with non-proliferation obligations. Japan's substantial plutonium stockpiles (44.4 tonnes) and complete nuclear fuel cycle, combined with recent political questioning of the "three non-nuclear principles," demonstrate how latent nuclear capability can coexist with formal non-nuclear status under deteriorating security conditions.

2 China's selective interpretation of the Southeast Asia Nuclear-Weapon-Free Zone Treaty creates asymmetric leverage in regional nuclear governance. As the first protocol signatory, Beijing reportedly seeks arrangements preserving its sovereignty claims, potentially legitimizing its own SSBN operations in the South China Sea while characterizing other nuclear powers' presence as violations. This dynamic, combined with the treaty's expansive geographical scope, which covers exclusive economic zones and unresolved maritime disputes, risks transforming SEANWFZ from a confidence-building mechanism into an instrument of strategic manipulation that undermines rather than strengthens regional non-proliferation norms.

3 The AUKUS agreement introduces naval nuclear propulsion to Southeast Asia's southern flank, exploiting safeguards loopholes that permit withdrawal of nuclear material from international inspections. While Canberra maintains no nuclear weapons intentions, the agreement sets precedents for other technically capable states and compounds regional anxieties. ISEAS surveys indicate mixed Southeast Asian perceptions: majorities view AUKUS as potentially balancing Chinese power, yet substantial minorities fear accelerated arms racing and erosion of non-proliferation norms. Combined with incidents like the 2021 USS Connecticut grounding, AUKUS highlights how nuclear-powered platforms operate in regional waters with limited transparency or accountability to Southeast Asian states.

Summary

4 Southeast Asia's renewed embrace of civilian nuclear energy—driven by energy security imperatives and climate commitments—introduces proliferation concerns despite constitutional prohibitions against weaponization in states like Indonesia. Five ASEAN members (Indonesia, Malaysia, the Philippines, Thailand, and Vietnam), representing nearly 90 percent of regional energy demand, have incorporated nuclear power into their long-term planning, with operational plants likely within the decade. However, the accumulation of nuclear-relevant infrastructure proceeds without commensurate regulatory capacity, trained personnel, waste management strategies, or robust safeguards adapted to emerging reactor technologies. Strategic dependencies on external suppliers for fuel and technology risk entangle energy policy with great-power competition, while emerging small modular reactor designs present novel verification challenges for IAEA safeguards.

5 Conventional missile proliferation across Southeast Asia—including Indonesia's Turkish Khan ballistic missiles and Atmaca cruise missiles, the Philippines' Indian BrahMos systems, and similar acquisitions by Singapore and Vietnam—reflects responses to China's South China Sea militarization following the INF Treaty's collapse. While these capabilities remain firmly conventional, their expansion alongside growing nuclear-weapon-state presence and emerging civilian nuclear infrastructure heightens risks that targeting errors, misperceptions, or conventional strikes on nuclear facilities could trigger catastrophic escalation. The convergence of long-range strike capabilities, nuclear-adjacent maritime competition, and inadequate crisis management mechanisms creates conditions where conventional conflicts could rapidly acquire nuclear dimensions.

6 Contemporary proliferation pathways in East Asia operate within, rather than against, existing non-proliferation frameworks, exposing fundamental limitations of treaty architectures designed to prevent violations rather than to manage compliance-based hedging. South Korea and Japan pursue nuclear-relevant capabilities through ostensibly civilian and defensive programs that maintain formal Nuclear Non-Proliferation Treaty (NPT) compliance while reducing technical

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barriers to weaponization. Southeast Asian states accumulate nuclear infrastructure under peaceful use provisions despite governance gaps. These dynamics collectively normalize nuclear latency as a strategic practice, creating proliferation tipping points where technical capability, security pressure, and deteriorating crisis management intersect, making restraint increasingly fragile in future regional contingencies.

7 The regional implications extend beyond East Asia and challenge the sustainability of the global nuclear order. If democracies like South Korea and Japan normalize hedging behavior amid eroding extended deterrence guarantees, the precedent could legitimize similar calculations in other regions facing comparable security pressures. Managed or tolerated proliferation arguments that prioritize alliance burden-sharing over non-proliferation norms risk triggering destabilizing countermeasures from adversaries—shortened decision timelines, lowered nuclear thresholds, accelerated arms racing—that undermine rather than strengthen deterrence stability. The East Asian proliferation landscape thus represents less a question of whether states will acquire nuclear weapons than whether nuclear restraint remains meaningful when norm-compliant states can systematically shorten weaponization timelines through civilian infrastructure and security hedging.

8 Preventing proliferation requires institutional adaptation beyond legal prohibitions: strengthening safeguards for emerging reactor technologies, enhancing crisis management mechanisms to address nuclear-adjacent contingencies, improving transparency around naval nuclear operations in contested waters, and developing governance frameworks that account for the accumulation of dual-use infrastructure. The global non-proliferation regime faces a critical inflection point—whether it can evolve to manage proliferation through compliance and strategic ambiguity, or whether it will erode incrementally as technical barriers decline while political constraints weaken across multiple vectors simultaneously. East Asia's nuclear dynamics demonstrate that proliferation risk intensifies even as formal commitments remain intact, requiring responses that address the structural conditions that enable hedging rather than focusing exclusively on treaty violations.

Introduction

Nuclear proliferation risks in East Asia have entered a qualitatively new phase. While earlier concerns comprised the danger of nuclear materials falling into the hands of non-state actors, the most consequential risks today increasingly stem from the diffusion of nuclear-adjacent capabilities across the region. Submarine propulsion arrangements, the prospective expansion of civilian nuclear energy in Southeast Asia, and an accelerating missile competition are embedding nuclear technologies and infrastructure within broader conventional security dynamics. As these developments unfold amid intensifying great-power rivalry, they create pathways through which conventional conflicts could acquire nuclear dimensions, reshaping regional proliferation risks without overt violations of non-proliferation norms.

Prevailing assessments of nuclear risk in East Asia have long focused on overt military flashpoints, particularly on the Korean Peninsula. North Korea's continued expansion of its "nuclear shield and sword,"[1] including advances in submarine-launched ballistic missiles (SLBMs), China's accelerating warhead modernization and miniaturization,[2] and the resulting deterrence dynamics shaping Japanese and South Korean security policies, have dominated prevailing assessments. Recent maritime developments on the Korean Peninsula, most notably Pyongyang's pursuit of a nuclear-powered, nuclear-armed submarine[3] and Washington's agreement[4] to assist Seoul with nuclear-powered submarine development, alongside new permissions for uranium enrichment and spent fuel reprocessing, have further drawn greater attention to proliferation concerns in the region.

By contrast, Southeast Asia, shielded by the 1995 Southeast Asia Nuclear-Weapon-Free Zone Treaty (SEANWFZ)[5] and ASEAN's longstanding normative rejection of nuclear weapons, is often portrayed as insulated from nuclear risk. This perception, however, risks obscuring a more complex and evolving landscape of proliferation. The region, sitting at the intersection of intensifying U.S.–China strategic rivalry, contested maritime spaces, i.e., the South China Sea, faces a growing exposure to nuclear-powered and potentially nuclear-armed naval assets transiting its waters. For example, China's reported deployment of SSBNs into the South China Sea,[6] alongside sustained U.S. naval presence,[7] freedom of navigation operations, anti-submarine warfare activities, and a brewing missile race, have gradually led to the transformation of Southeast Asia into a theater of nuclear-adjacent competition. While the region continues to assert normative agency through its support for disarmament initiatives, these volatile dynamics have heightened awareness towards possible indirect nuclear exposure. Conventional military incidents may increasingly risk drawing in strategic assets and potentially raising the prospects of escalation. This, in turn, complicates ASEAN's

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efforts to maintain strategic autonomy and cohesion amid intensifying great-power rivalry.

At the same time, Southeast Asia's energy landscape is also being reshaped by a slow yet consequential trend—a renewed interest and a growing acceptance of civilian nuclear technologies. Driven primarily by energy security concerns, decarbonization commitments, and developmental priorities, several ASEAN members—led by Indonesia, Vietnam, and the Philippines- have now been exploring nuclear power and related fuel-cycle capabilities.[8] These ambitions, though, remain firmly embedded in non-nuclear norms and framed as exercises of the right to peaceful nuclear use—a perspective that is widely shared across the Global South and shaped by long-standing critiques of Western-centric non-proliferation regimes. Nevertheless, the diffusion of dual-use technologies, growing reliance on external nuclear suppliers,[9] and intensifying tensions among regional stakeholders, i.e., China, Russia, and the United States, may introduce concerns that sit uncomfortably alongside Southeast Asia's strong anti-nuclear identity.

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The stakes extend far beyond East Asia. If democracies such as South Korea and Japan normalize hedging under pressures from North Korea, China, and a dwindling U.S. nuclear umbrella, the distinction between military and civilian nuclear domains risks becoming increasingly blurred, weakening long-standing norms around restraint and exceptionalism. Likewise, if Southeast Asian states pursue civilian nuclear energy amid intensifying great-power competition without adequate regulatory capacity, technical expertise, and safeguards for spent fuel, waste management, and supply chains, comparable governance and proliferation challenges could emerge in the Middle East or Latin America. How East Asia manages these pressures may determine whether the global non-proliferation regime adapts to new technological and strategic realities of the newer nuclear order or erodes incrementally under their cumulative strain.

This essay argues that contemporary proliferation risk in East Asia stems from three mutually reinforcing dynamics:

First, the erosion of extended deterrence credibility is driving allied hedging behavior in Northeast Asia, most notably in South Korea and Japan.

Second, the expansion of nuclear exposure through maritime nuclearization—particularly the deployment and transit of nuclear-powered and potentially nuclear-armed naval assets, alongside a conventional missile race—is transforming Southeast Asia into a theater of nuclear-adjacent competition.

Third, the convergence of civilian nuclear ambitions with intensifying great-power rivalry is generating proliferation pathways that operate largely within legal and normative boundaries, as nuclear infrastructure and capabilities become increasingly entangled with conventional military planning and conflict. Together, these dynamics fundamentally reshape regional nuclear risk while exposing the limits of non-proliferation frameworks designed to police violations rather than manage proliferation through compliance.

The Erosion of Credibility: Status on the Northern Flank

Northeast Asia already constitutes one of the most concentrated nuclear risk environments in the region, involving the overlapping presence of four nuclear-armed states. North Korea's routine testing of nuclear-capable missiles at ranges threatening both regional targets and the U.S. homeland,[10] and Chinese actions in Taiwan[11] have intensified concerns in South Korea that Pyongyang may employ nuclear threats for coercion or compellence. These risks are amplified by the deepening Russia–North Korea military partnership,[12] and further forged through Pyongyang's direct involvement in Russia's war in Ukraine.[13] Simultaneously, China's expanding nuclear arsenal and advanced conventional capabilities are reshaping regional power balances.

Compounding these pressures is the uncertainty surrounding U.S. alliance commitments, reinforced by policy trends under the second Trump administration that have weakened confidence in extended deterrence.[17] Within this context, the intensification of nuclear hedging behavior and the increasingly explicit pro-nuclear tone within official discourses in South Korea and, to a growing extent, in Japan amid domestic political instability reflects not a rejection of non-proliferation norms, but a heightened response to perceived deficiencies in deterrence credibility and crisis assurance.

South Korea: The Pragmatic Hedge and the Fuel Cycle Breakthrough

South Korea occupies a distinct position among technologically advanced non-nuclear-weapon states in East Asia. While formally committed to the NPT and reliant on the U.S. nuclear umbrella, Seoul has long signaled nuclear ambitions to hedge against a deteriorating security environment. More recently, in January 2023, the then-President Yoon Suk-yeol had openly suggested that South Korea might consider acquiring nuclear weapons should North Korean threats become more severe.[18] His remarks notably asserted that South Korea's advanced civilian nuclear infrastructure and delivery systems would allow it to acquire a nuclear arsenal relatively quickly.[19] Although the government subsequently walked back these comments,[20] they reflected a broader and growing domestic debate over nuclear autonomy.

South Korea's nuclear hedging has also taken material form. For more than three decades, Seoul had intermittently pursued the idea of nuclear-powered submarines, beginning with early research efforts in the 1990s following the first North Korean nuclear crisis.[21]These efforts included covert uranium enrichment experiments and designing reactors culminating in the controversial 2004 revelation that South Korean

scientists had enriched uranium without declaring it to the International Atomic Energy Agency (IAEA).[22] Although these activities were halted, interest never disappeared. Former President Moon Jae-in campaigned in 2017 on acquiring nuclear-powered submarines,[23] and since 2020, South Korean officials have increasingly suggested that future submarine classes could be nuclear-powered.[24]

The strategic rationale for these submarines is often framed as countering North Korea's missile and nuclear forces. Yet the operational logic is questionable. North Korea does not yet possess a nuclear-powered submarine, though it has publicized progress on one that is under construction.[25] Even without such a platform, North Korea already operates dozens of diesel-electric submarines that can function effectively in the shallow waters of the Yellow Sea and create severe anti-submarine warfare (ASW) challenges in the East Sea. Several analysts argue that South Korea would gain more from investing in ASW capabilities, particularly in coordination with the United States, than from pursuing a small and costly nuclear-powered submarine fleet.[26] From a cost-benefit perspective, nuclear-powered submarines are most efficient for nuclear-armed states seeking assured second-strike capabilities; for non-nuclear states, they impose disproportionate financial, infrastructural, and regulatory burdens.[27] In this sense, the pursuit of nuclear-powered submarines signals not merely a capability gap response but a subtle shift toward force postures typically associated with nuclear deterrence, thereby edging closer to the structural and normative thresholds of nuclear proliferation.

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Beyond submarines, South Korea has also long sought U.S. consent to enrich uranium and reprocess spent nuclear fuel,[28]capabilities that would potentially provide it with a latent nuclear status option. South Korean officials have often justified these demands, citing the need to reprocess spent fuel to manage crowded cooling pools and political opposition to new storage sites.[29] They have since also promoted pyroprocessing as a more proliferation-resistant alternative to conventional plutonium separation.[30]However, several U.S. Department of Energy studies have found it no less risky than traditional reprocessing.[31] Moreover, South Korea already possesses dry cask storage capable of safely holding spent fuel for decades, undercutting claims of technical necessity.[32]

Similarly, Seoul has justified uranium enrichment on commercial grounds, arguing that full fuel-cycle services would enhance the competitiveness of its nuclear exports.[33] The more plausible motivation, however, may remain strategic. Indigenous enrichment capabilities would be highly valuable for naval reactors and would shorten the timeline for a potential weapons program.[34]

The recent announcement of U.S. approval for Seoul to build nuclear-powered submarines,[35] alongside support for independent enrichment and reprocessing capabilities, represents a significant departure from decades of stringent policy.[36] Formerly, although international safeguards allowed naval nuclear fuel to be withdrawn from inspection under the INFCIRC/153,[37] U.S. nuclear cooperation agreements would prohibit any military use.[38] As a result, U.S. assistance for enrichment or reprocessing could not support a South Korean nuclear submarine program, even though military applications are often the main rationale for pursuing these otherwise uneconomical technologies. Now, while enrichment, reprocessing, and nuclear submarines are treated as legally separate under U.S.–South Korea agreements, taken together, these dynamics lower political and normative barriers around technologies closely associated with weapons capability, by creating a permissive environment, rather than potentially raising longer-term proliferation concerns. This is especially concerning because naval fuel exemptions can create clear oversight gaps, even in the absence of nuclear-armed submarines.

These developments must also be understood in a broader regional context. The United States has reaffirmed support for AUKUS and currently shows little emphasis on rolling back North Korea's nuclear arsenal in its latest National Security Strategy.[39] Some U.S. policymakers argue that allied nuclearization would allow Washington to focus more on China.[40] Under conditions of declining U.S. credibility and worsening regional threat environments, managed or tolerated proliferation could appear strategically attractive or even stabilizing, relative to the status quo, despite serious risks.

Yet this logic is inward-looking and incomplete, as such arguments rarely account for likely reactions by Beijing, Pyongyang, or Moscow.

In practice, once nuclear acquisition is normalized for some allies, the normative and strategic barriers to further spread weaken. Even if the initial expectation is that only a small number of "responsible" democracies would pursue nuclear weapons, there is little assurance that proliferation would stop there. States such as Indonesia or Vietnam could eventually reassess their own restraint in a region increasingly defined by nuclear asymmetries, while proliferation dynamics in East Asia could generate permissive precedents for other regions.[41] If a U.S. loss of credibility either opened the door for Japan and South Korea to seek nuclear weapons or a more isolationist U.S. actually encouraged them to do so, it would become further difficult to argue for continued non-proliferation measures against Iran or even other parties in the Middle East.

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These strategies also risk triggering destabilizing military adaptations. Forward deployment of U.S. nuclear weapons or expanded allied nuclear capabilities could prompt adversaries to lower nuclear thresholds, shorten decision timelines, or accelerate an arms race—outcomes that would undermine rather than strengthen deterrence.[42] South Korea's nuclear hedging thus reflects a deeper tension between assurance and proliferation. While Seoul's concerns are legitimate, the pursuit of latent nuclear capabilities risks eroding non-proliferation norms, destabilizing regional security, and triggering countervailing responses. In contemporary East Asia, adversaries actively influence outcomes, and the secondary effects of nuclear hedging—regional arms pressures, escalation risks, and shifts in alliances are increasingly difficult to anticipate or control. If South Korea were to move further down this path, it could also spill over to Japan to follow suit or even lead Japan and South Korea to jointly pursue nuclear submarines with U.S. support under regional security concerns.

Japan: Normalization and the Plutonium Overhang

Japan presents a distinctive and paradoxical case in Northeast Asia's nuclear landscape. Officially, with the induction of its three non-nuclear principles,[43] Tokyo has long positioned itself as a global advocate for nuclear disarmament and the total abolition of nuclear weapons, a stance deeply shaped by its historical experience as the only country to suffer atomic bombings. At the same time, Japan relies fundamentally on the United States' extended nuclear deterrence for its national security. This dual posture of normative opposition to nuclear weapons, coupled with strategic dependence on them, is reflective of the complex assurance challenges and Japan's status as a latent nuclear power.

Unlike South Korea, where public support for nuclear acquisition has now reached 76.2%,[44] Japan's nuclear debate, while demanding specific reassurance measures from Washington, is also about societal acceptance of deterrence itself.[45] Japanese public opinion and policy often embody two contradictory positions simultaneously: endorsing U.S. nuclear protection, at times, even encouraging stronger U.S. nuclear capabilities in the region, while simultaneously continuing to champion disarmament and non-proliferation. This tension has grown more pronounced as regional threats from North Korea and China intensify.

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From a technical perspective, however, Japan, the textbook example for nuclear latency, possesses one of the most advanced civilian nuclear infrastructures in the world.[46] It operates a complete nuclear fuel cycle without possessing nuclear weapons.[47] Japan also holds substantial stockpiles of separated plutonium, totaling approximately 44.4 tonnes, with 8.6 tonnes stored domestically and the remainder allegedly held in the United Kingdom and France.[48] Although this plutonium is not weapons-grade, Japan has sophisticated reprocessing and refining capabilities, and only a small fraction of these stockpiles would be required to produce nuclear weapons. Some Japanese officials are known to have long acknowledged that the country has had the technical ability to build nuclear weapons since at least the 1980s and could likely do so within a few years or even faster, once a political decision was made.[49]

This reality has periodically surfaced in political discourse. Recent remarks by senior figures close to Prime Minister Sanae Takaichi, including suggestions that Japan should possess nuclear weapons and ambiguity over whether the "three non-nuclear principles" would be upheld in future security strategy revisions, indicate that long-standing political red lines may be under strain.[50] The debate has only intensified as China further inflames the rhetoric with exaggerated claims of Japan reverting to its pre–World War II militarism.[51] This was in light of remarks from Takaishi's officials suggesting that a Chinese blockade of Beijing could justify a joint U.S. military response. As regional security deteriorates, Japan's enduring nuclear latency and non-signatory status to the Treaty on the Prohibition of Nuclear Weapons (TPNW), combined with growing political ambiguity, pose a significant question to both alliance management and non-proliferation efforts in East Asia.

Taken together, the cases of South Korea and Japan illustrate how an increasingly severe threat environment, combined with growing uncertainty over alliance assurance, is driving nuclear hedging behavior short of overt proliferation. In both countries, the challenge is not a rejection of non-proliferation norms, but a recalibration of risk under conditions where extended deterrence is perceived as less credible, less controllable, or politically unreliable.

As confidence in crisis assurance erodes, nuclear-related capabilities—fuel-cycle technologies, stockpiled fissile material, naval propulsion, and advanced delivery systems begin to function as strategic insurance. These latent capabilities preserve political deniability and legal compliance while simultaneously reducing the time, cost, and uncertainty associated with a potential future nuclear option. The result is not immediate nuclearization, but the normalization of practices within civilian and defensive frameworks that may be potentially weapons-relevant, creating proliferation pathways which, even though reversible in theory, are consequential in practice.

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The Expansion of Nuclear Exposure: Changing Trends on the Southern Flank

Southeast Asia has long been regarded as a relatively stable non-nuclear zone within East Asia, underpinned by the 1995 Bangkok Treaty establishing a Southeast Asian Nuclear-Weapon-Free Zone. By prohibiting the development, possession, and deployment of nuclear weapons within ASEAN member states, the treaty reflects Southeast Asia's collective desire to remain insulated from nuclear competition among major powers. Yet this perception of stability is increasingly outdated, as great-power rivalry intensifies and the SEANWFZ faces growing political, strategic, and interpretive challenges.

At the heart of these challenges lies the treaty's protocol, which requires nuclear-weapon states to commit not to use or threaten to use nuclear weapons within the zone. The zone's geographical scope is expansive, covering not only land territory and territorial waters but also exclusive economic zones. This creates a vast maritime area stretching from the eastern Indian Ocean to the western Pacific. Nuclear Weapon States (NWS) have often expressed reservations about constraints that could limit their broader deterrence operations.[52] Article 2[53] of the protocol, which commits signatories not to use or threaten to use nuclear weapons "within" the zone, may be seen by some as potentially constraining operational flexibility by effectively extending negative security assurances and limiting freedom of deployment.[54] SSBNs from major nuclear powers, however, periodically transit through or operate within ASEAN EEZs. While UNCLOS permits SSBN transit under innocent passage, it imposes restrictions within EEZs. Requirements related to notification, approval, and weapons declaration, though, are viewed by some NWS as politically and militarily invasive and burdensome, incentivizing opposition to protocol signature.

Geography further complicates the issue. Several ASEAN states—most notably the Philippines, Vietnam, Malaysia, and Brunei have unresolved maritime disputes with China and Taiwan in the South China Sea, while Indonesia's EEZ overlaps with

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The Strategic Context: Southeast Asia on the US–China Nuclear Periphery

In this context, China has long agreed to become the first signatory to the Protocol to the SEANWFZ Treaty, a move widely interpreted as both strategic and symbolic.[57] This is because Beijing has reportedly sought a Memorandum of Understanding to ensure that SEANWFZ does not interfere with its claimed sovereignty or maritime rights.[58] Such an arrangement effectively allows China to interpret the treaty's geographical scope flexibly and selectively. In practice, China could view the presence of other NWS assets in the region as a violation of the SEANWFZ, while legitimizing its own nuclear deployments, such as SSBN operations in the South China Sea, on the basis of its expansive sovereignty claims. This selective interpretation stands in tension with China's own rapidly expanding nuclear arsenal. According to SIPRI estimates, China's warhead stockpile grew from roughly 410 in 2023 to over 600 by 2025, alongside the construction of hundreds of new ICBM silos.[59] This expansion underscores the gap between the alleged diplomatic restraint of being a treaty signatory and its own strategic reality. It also shapes threat perceptions among regional actors, including India, Japan, and the United States, raising broader arms-racing concerns.

Analysts argue that Beijing's decision reflects a calculated effort to project itself as a responsible nuclear power and to deepen its influence within ASEAN, particularly at a time when U.S.–China strategic competition is intensifying. By projecting itself as ASEAN's leading patron, China can deepen political and economic ties that reinforce trade diplomacy, advance Belt and Road connectivity across mainland and maritime Southeast Asia, and strengthen its strategic position in the South China Sea.[60] In this context, China's participation in SEANWFZ may shape whether the treaty becomes a confidence-building mechanism or a tool for bargaining leverage, including through how Beijing might engage in this through its civil nuclear industry. In the long run, China also has a clear interest in ensuring that Southeast Asian states' emerging civilian nuclear programs do not evolve into military nuclear capabilities. Supporting SEANWFZ strengthens this objective by reinforcing regional norms against weaponization.

In addition, these contested waters have already increasingly become a frontline in the U.S.–China rivalry, as Washington challenges Beijing's expansive claims through freedom of navigation operations, while China asserts military control.[61] The strategic competition in the region is no longer confined to conventional domains. Escalating tensions over Taiwan, now widely assessed in U.S. strategic circles as a plausible trigger for major-power conflict, carry the risk of nuclear escalation.[62] For Southeast Asian states, this proximity to great-power confrontation heightens insecurity while simultaneously constraining strategic autonomy.

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AUKUS and the Southern Flank

Against this backdrop of heightened regional instability, the AUKUS agreement has added a new layer of concern on Southeast Asia's southern flank. While Canberra insists it has no intention of acquiring nuclear weapons,[63] the introduction of naval nuclear propulsion into the region[64] has led to initial mixed regional perceptions of AUKUS.[65] Even without weaponization, nuclear-powered submarines raise practical and symbolic concerns. As stated before, naval nuclear propulsion exploits a safeguards loophole that allows nuclear material for military use to be withdrawn from international inspections, setting a precedent that could be exploited by others.[66] Safety and transparency concerns are also salient, particularly given incidents such as the 2021 grounding of the USS Connecticut in the South China Sea, which underscored how little regional states are told about nuclear risks in their own waters.[67] Surveys conducted by Singapore's ISEAS–Yusof Ishak Institute indicate that while a majority of Southeast Asian respondents believe AUKUS will help balance China's growing military power, a substantial minority fear it will accelerate regional arms racing or undermine the nuclear non-proliferation regime.[68] Australia's non-ratification of the TPNW, for its own reasons, further fuels skepticism about the long-term trajectory of its nuclear ambitions.[69]

In this environment, SEANWFZ remains a vital normative anchor, but one that is under strain. Its effectiveness increasingly depends not only on formal adherence, but on how major powers interpret and implement its provisions amid shifting strategic realities. As Southeast Asia moves toward greater nuclear energy development while sitting astride an increasingly nuclearized maritime theater, the challenge will be to preserve the treaty's credibility without allowing it to become a tool of selective influence or a casualty of great-power competition.

The southern flank thus illustrates a distinct yet complementary pathway through which non-nuclear states become entangled in nuclear risk. Unlike Northeast Asia, where alliance uncertainty incentivizes hedging through latent capabilities, Southeast Asia's exposure arises from proximity and permeability. Nuclear-weapon-free status has not insulated the region from the operational realities of maritime nuclearization, great-power rivalry, or the growing presence of nuclear-powered platforms operating in and around ASEAN waters. As strategic competition intensifies, civilian maritime spaces and economic zones increasingly overlap with nuclear deterrence postures, blurring the line between conventional and nuclear domains.

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Therefore, Southeast Asian states, despite their strong normative commitments, are drawn into nuclear risk not essentially by choice, but by geography, infrastructure vulnerability, and dependence on external security and energy arrangements. This form of indirect exposure complicates crisis management, risks undermining strategic autonomy, and strains existing non-proliferation instruments.

The next section turns to a third and increasingly consequential dynamic: how Southeast Asia's emerging civilian nuclear ambitions, when combined with supplier competition and weak governance environments, may further entrench these risks by embedding nuclear technologies more deeply into the region's political and security landscape.

The Convergence Point: The Return of Civil Nuclear Energy

Several Southeast Asian states are rethinking their historical aversion to civilian nuclear power amid energy security concerns, climate commitments, and rising fossil fuel prices. This shift is driven by changing energy needs, climate commitments, and technological diffusion. Advances in nuclear technology—particularly small modular reactors (SMRs) have further lowered political barriers by promising enhanced safety, flexibility, and reduced upfront costs. While no Southeast Asian state currently operates a nuclear power plant or possesses nuclear weapons, five countries, i.e., Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, that account for nearly 90 percent of regional energy demand, have all incorporated nuclear power into long-term national planning.[70] Nuclear power is likely to become functional in Southeast Asia over the next decade.

Nuclear Capacity Plans and Deployment Timelines in Southeast Asia

Country	Capacity Plans	Timeline
Indonesia	Two SMRs (2 × 250 MW); targeting ~5% nuclear share; part of broader clean energy goal (up to 75% of electricity from clean sources)	Included in RUPTL 2025–2034; nuclear share targeted by 2040
Thailand	Initial 600 MW SMR project; expansion up to 3 GW (~5% of power mix)	Construction around 2037; potential operation from 2035; expansion by 2050
Philippines	1.2 GW initial nuclear capacity; expansion up to 4.8 GW	Initial deployment by 2032; expansion through 2050
Vietnam	1.2 GW initial nuclear capacity; expansion up to 4.8 GW	Initial deployment by 2032; expansion through 2050
Malaysia	4–6.4 GW initially; expansion to 8 GW	Nuclear reintroduced post-2016; earliest deployment around 2030; expansion into early 2050s
Singapore	SMR deployment targeting 1.2 GW	SMRs planned by 2035; capacity target by 2050 (delayed from original 2031 target due to *regulatory challenges*)
Singapore	Expected addition of 0.8 GW to reduce reliance on imported LNG and clean electricty imports	

Infrastructure, Governance, and Proliferation Risks

As Southeast Asian states increasingly explore civilian nuclear energy, robust safeguards will be essential to prevent the diversion of nuclear materials for non-peaceful purposes. While IAEA safeguards are designed to verify that nuclear material is not misused, particularly through oversight of enrichment and reprocessing activities, emerging reactor technologies introduce new verification challenges.[71] Several advanced reactor designs involve continuous or online fuel loading, complicating the accurate accounting of nuclear material inventories.[72] Accordingly, the development and adaptation of IAEA safeguard frameworks for these technologies will be necessary prior to their deployment in the region (and also at large). The added proliferation concern in Southeast Asia may not be weaponization but is the potential accumulation of nuclear-relevant infrastructure without commensurate regulatory, human, and institutional capacity. Nuclear energy programs require robust safeguards systems, independent regulators, trained personnel, waste management strategies, and long-term fuel supply arrangements. Most Southeast Asian states currently lack experience in these areas.[73]

This creates several risks. First, weak governance increases the likelihood of safety incidents, corruption, or regulatory capture, all of which can undermine public trust and international confidence. Second, reliance on foreign suppliers for fuel, technology, and waste management introduces new strategic dependencies, potentially entangling energy policy with bloc alignments. Third, over time, expanded nuclear infrastructure could reduce technical barriers to nuclear hedging, particularly if regional security conditions deteriorate further.

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Legal Constraints and Political "What Ifs?"

While Southeast Asia remains far from nuclear weapons acquisition, and as debates over nuclear deployment and latency intensify in Japan and South Korea, Southeast Asian states may increasingly question whether strict nuclear restraint leaves them strategically exposed.

Formally, Southeast Asian states remain bound by strong legal and normative constraints. As aforementioned, the Bangkok Treaty prohibits nuclear weapons across ASEAN, and some states have embedded such prohibitions in their constitutions. Yet political rhetoric suggests growing unease. In 2020, Indonesia's then–Maritime Affairs and Investment Minister Luhut Pandjaitan had insinuated that possessing nuclear power might be the only way to command strategic attention from major powers.[74] While rhetorical, such remarks reflect a broader sentiment that strategic relevance increasingly correlates with nuclear capability, whether civilian or military. Importantly, however, this shift does not manifest primarily in calls for nuclear weapons, but in a reassessment of civilian nuclear energy, also once politically taboo across much of Southeast Asia.

Missile Proliferation and Conventional Arms Racing in Southeast Asia

Alongside renewed interest in nuclear energy, Southeast Asia is also experiencing a notable expansion in long-range conventional strike capabilities, particularly missiles with ranges of several hundred kilometres.[75] While these developments remain firmly within the conventional domain, they carry important implications for regional stability and the potential for a conventional conflict to escalate to nuclear levels, given the great power involvement in the region.

In 2022, Jakarta signed an agreement with Türkiye to procure the Khan short-range ballistic missile, followed by the purchase of land-attack-capable Atmaca anti-ship cruise missiles in 2024. The arrival of the first Khan missile in August 2025 marked a qualitative shift in Indonesia's military posture, as the country previously lacked long-range strike (LRS) systems capable of reaching targets beyond 200 kilometres.[76] These systems significantly enhance Indonesia's counterstrike and deterrence capabilities, particularly across its vast archipelagic domain. Similar dynamics are evident elsewhere as well. The Philippines acquired three batteries of the coastal-defence variant of the BrahMos supersonic cruise missile from India, with deliveries completed by 2025, and has considered hosting the U.S. Typhon missile system.[77] Singapore is strengthening its LRS capacity through the acquisition of the Blue Spear missile and upgrades to its multiple-launch rocket systems, while Vietnam is reportedly finalising its own BrahMos procurement to complement existing Russian-made LRS assets.[78] Together, these moves signal the gradual proliferation of advanced conventional missiles across Southeast Asia. Two structural factors drive this trend. First, China's rapid build-up of long-range missile forces, coupled with the militarisation of the Paracel and Spratly Islands, has altered the regional offense–defence balance. Second, the collapse of the Intermediate-Range Nuclear Forces (INF) Treaty removed constraints on the deployment of ground-launched conventional and nuclear missiles in the region.[79]

For Southeast Asian states, acquiring LRS missiles is widely viewed as a balancing response rather than an arms-racing ambition. For the Philippines and Vietnam, such systems serve as deterrents against Chinese militarisation in contested waters while enhancing strategic autonomy. For Singapore and Indonesia, long-range missiles strengthen deterrence, protect critical sea lanes, and hedge against uncertainty in great-power rivalry. Nevertheless, as conventional missile capabilities expand alongside increasing stakes for NWS states in the region and a budding civilian nuclear infrastructure, the region also faces heightened risks of miscalculation that nuclear-related facilities could become easy military targets in a crisis, with potentially disastrous escalation and humanitarian consequences across East Asia.

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In an already complex and opaque regional security environment, an accelerating missile arms race increases the risk that conventional strikes, misperceptions, or targeting errors could spill over into nuclear-adjacent conflict with severe escalation consequences. As the nuclear balance in East Asia becomes more fluid, Southeast Asia, once peripheral to nuclear dynamics, has become an increasingly consequential part of the regional nuclear landscape.

Taken together, the introduction of civilian nuclear energy in the region, the diffusion of advanced missile capabilities, and the intensification of great-power rivalry potentially create a convergence point in Southeast Asia where technical capacity and security pressure increasingly intersect. None of these developments, individually, constitutes proliferation. Collectively, however, they erode the structural barriers that have long insulated the region from nuclear risk. As civilian nuclear infrastructure expands without commensurate governance depth, and as conventional military planning increasingly incorporates long-range strike options in a nuclear-adjacent maritime environment, the distinction between peaceful capability and strategic hedge becomes progressively thinner.

The danger, therefore, lies in the gradual emergence of proliferation tipping points, where compliance, exposure, and insecurity combine to make restraint harder to sustain in a future crisis.

Policy Implications

Across East Asia, nuclear proliferation risks are evolving in ways that transcend traditional threats. Maritime nuclearization, growing civilian nuclear capacity, and conventional strike capabilities may act as mutually reinforcing dynamics in the region, creating indirect pressures. This may further incentivize similar hedging behavior among technically capable states. Its implications for the global nuclear order are significant as well. This is because a system designed to prevent horizontal proliferation by policing violations may, in turn, risk becoming increasingly ill-suited to manage such pressures. Over time, this could risk normalizing nuclear latency as an acceptable feature of international order.

East Asia, therefore, represents more than a regional challenge; it marks a structural inflection point for the global nuclear order. The developments in the region demonstrate how proliferation risk can intensify even as formal commitments to non-proliferation remain intact, and how nuclear hierarchies can be reshaped through technology, infrastructure, and strategic ambiguity rather than explicit weaponization. Ultimately, the stakes for the global nuclear order extend beyond whether new states acquire nuclear weapons. They hinge on whether nuclear restraint remains meaningful in an environment where technically advanced, norm-compliant states accumulate capabilities that shorten pathways to weaponization under crisis pressure.

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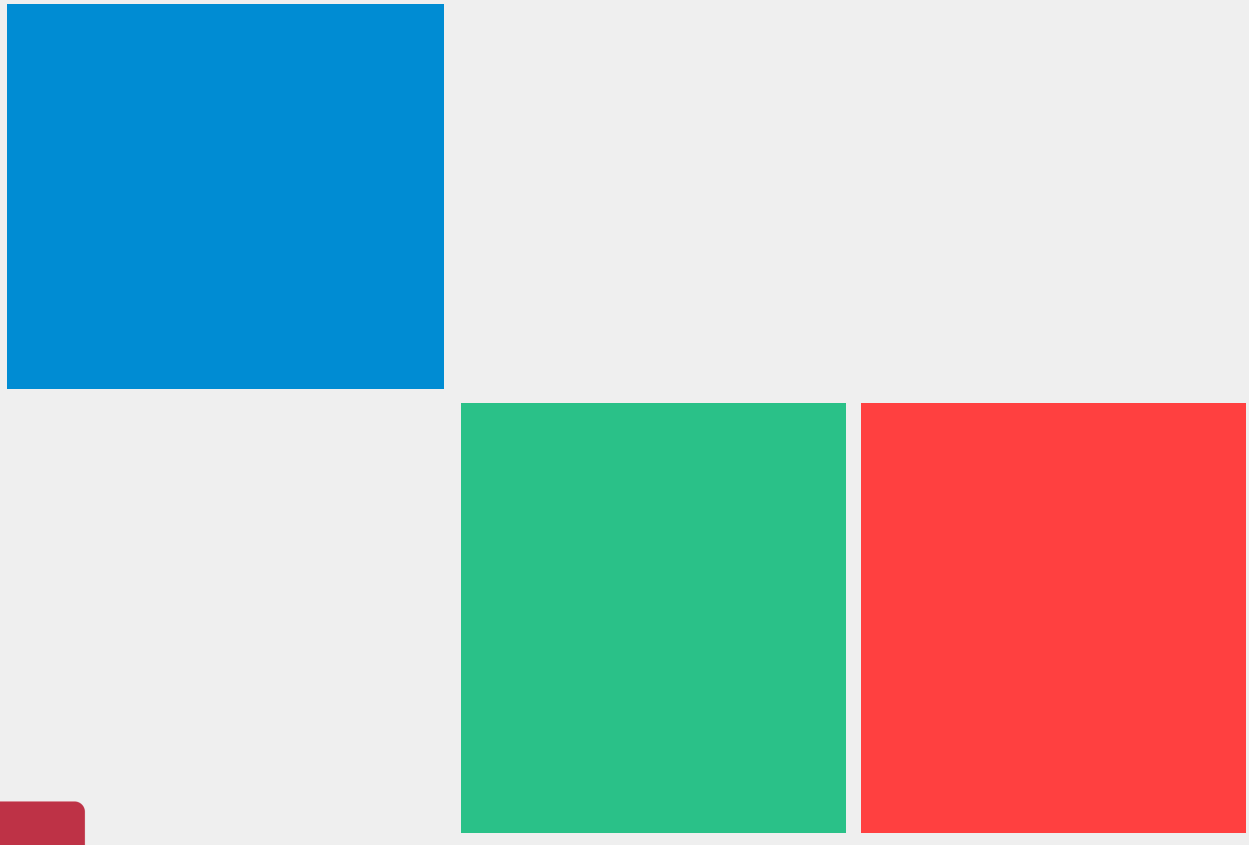

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