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THREE MAJOR CONTROVERSIES A OVER SOUTH KOREA'S NUCLEAR-POWERED SUBMARINE PLAN

BY BONG-GEUN JUN

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한국의 핵추진 잠수함 도입을 둘러싼 세 가지 쟁점

BONG-GEUN JUN

PRESIDENT, KOREA NUCLEAR POLICY SOCIETY

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Among the outcomes of the Gyeongju summit between the Republic of Korea (hereafter "South Korea") and the United States, held on October 29, 2025, the issue that attracted the greatest public and media attention was the Lee Jae-myung administration's plan to build nuclear-powered submarines (hereafter "SSNs") and President Donald Trump's approval of the plan. The Summit Joint Fact Sheet released on November 14 formalized the submarine plan by stating that "the United States will work closely with the Republic of Korea to advance requirements for this shipbuilding project, including avenues to source fuel." This plan to build SSNs was welcomed by most Koreans, as an opinion poll showed 87 percent of public support.

이재명 정부의 핵추진 잠수함 건조 계획과 이에 대한 도널드 트럼프 대통령의 승인 문제는 경주 정상회담의 성과 가운데 대중과 언론의 가장 큰 주목을 받은 사안이었다

미국의 동의를 확보함으로써, 한국의 핵추진 잠수함 도입 계획은 사상 처음으로 이를 실행할 수 있는 정치적·외교적 기반을 갖추게 되었다

By securing U.S. consent, South Korea's SSN acquisition plan now has the political and diplomatic foundation needed to implement it for the first time. Yet given the SSN's distinctive military-strategic implications—and the sensitivities associated with nuclear proliferation—the road ahead is unlikely to be smooth. This article therefore examines three major political and diplomatic controversies surrounding the SSN plan from a South Korean perspective. It concludes that acquiring SSNs could be a rational military and strategic option for South Korea to respond to the existential North Korean nuclear threat — provided that it does so as a responsible, non-nuclear member state in the NPT, within the bounds of the U.S.–ROK alliance and the international nuclear nonproliferation regime.

Needs and Uses of Nuclear-Powered Submarines

Since the Lee government publicly revealed its plan to build SSNs, the most frequently raised question and criticism has been: "Why does South Korea need nuclear-powered submarines, and for what purpose?" If Korea is to complete SSN development, which will require significant expenditures and a long period of time, there should be a wide consensus among Koreans on its necessity and purposes.

한국의 핵추진 잠수함은 고도화된 북한의 핵 위협에 대응하기 위한 효과적인 '비핵 억제 수단'이 될 수 있다

First, South Korea's nuclear-powered submarines could be an effective 'non-nuclear deterrent' against North Korea's heightened nuclear threats. In addition to a rapidly expanding nuclear arsenal, North Korea has been diversifying its delivery systems—inter-continental ballistic missiles, submarine-launched ballistic missiles, strategic cruise missiles, hypersonic missiles, nuclear torpedoes, and others, including a potential nuclear-powered ballistic-missile submarine (SSBN) that carries nuclear missiles. In addition, the North's 2022 Law on the State Policy on Nuclear Forces called for arbitrary, preemptive, offensive and arbitrary nuclear use against South Korea. Since 2024, Kim Jong Un has intensified nuclear threats against the South and redefined inter-Korean relations as those of "two hostile states."

In South Korea, there are claims that indigenous nuclear armament is essential to counter North Korea's nuclear weapons. However, the Lee government has excluded this option, claiming that South Korea, as a non-nuclear member state of the NPT and a "global responsible power" would faithfully comply with international norms. It also emphasized that nuclear armament would bring about economic sanctions against South Korea—a trading state with one of the highest levels of external economic dependence—and would severely damage the economy, and therefore is not a viable option. Accordingly, South Korea needs to maximize non-nuclear deterrent capabilities in order to respond to diversifying and growing North Korean nuclear threats.

South Korea's current diesel-electric submarines have limitations in deterring North Korean attacks and nuclear threats as well as in tracking and striking its strategic submarines due to their limited submerged endurance, operational radius, and weapon payload. By contrast, South Korean SSNs would be able to remain submerged for months and thus offer virtually the only non-nuclear military means capable of tracking and attacking the North Korean strategic submarines (SSBNs) currently under development. In addition, SSNs could provide a preemptive strike option in the event of an imminent North Korean nuclear attack. And after an attack, surviving SSNs and powerful conventional missiles, such as Hyunmoo-4,could also be used as a strategic retaliation strike means against critical North Korean targets. The South Korean government is developing the "three-axis system" (preemptive strike, missile defense, and massive punishment and retaliation) to deter North Korean nuclear attack. In this context, nuclear-powered submarines—especially as major means

한국의 핵추진 잠수함은 수개월간 잠항 상태를 유지할 수 있어, 북한의 전략잠수함을 추적하고 타격할 수 있는 사실상 유일한 비핵 군사 수단을 제공하게 될 것이다

of preemptive strike and punitive retaliation—would become the core force of South Korea's non-nuclear deterrent.

In addition, South Korean SSNs could contribute to maintaining the balance of power and strategic stability in the region. While North Korea, China, and Russia are expanding their nuclear and missile forces and naval power, U.S. forces in the region have been relatively constrained. South Korean SSNs could help fill capability gaps in the region, thereby contributing to maintaining peace and stability in the region.

Proliferation Implications of Nuclear-Powered Submarines

Criticism was raised by friends and foes that South Korea's acquisition of SSNs could undermine the global nuclear nonproliferation regime, and could also be perceived as an intermediate step toward nuclear armament. Some argue that, even if South Korea's SSNs do not formally violate international nuclear nonproliferation rules, they could establish another precedent of a non-nuclear-weapon state using nuclear energy for military purposes following Australia's planned purchase of SSNs under the AUKUS program.

한국의 핵추진 잠수함 도입은 핵무장으로 나아가는 중간 단계로 인식될 수 있다는 우려를 불러일으킬 수 있다

이재명 대통령은 한국이 핵무기를 개발하거나 보유하지 않는 NPT 체제의 모범적인 비핵 회원국으로 남을 것임을 강조했다

To dispel such concerns, President Lee Jae-myung has emphasized that South Korea will remain a model non-nuclear member state to the NPT by neither developing nor possessing nuclear weapons, and will use nuclear energy solely as a submarine propulsion source to respond to the existential nuclear threats posed by North Korea. Furthermore, the government will pursue two safeguard measures to mitigate proliferation risks.

First, South Korea's plan is not to produce nuclear fuel for its SSNs domestically, but to import it from the United States. At the U.S.–ROK summit in Gyeongju, President Lee specifically requested from President Trump "the provision of nuclear fuel" for SSNs built in South Korea. The summit fact sheet reaffirmed U.S. readiness to arrange such fuel provision.

Some in South Korea argue that the 2015 U.S.–ROK peaceful nuclear cooperation agreement (nicknamed the 123 Agreement) should be revised to restore South Korea's autonomy over enrichment and enable it to produce SSN nuclear fuel domestically. Yet unlike Brazil, South Korea has no indigenous enrichment facilities, making this option infeasible. Even if, under a future revision of the U.S.–ROK nuclear cooperation agreement, Washington were to permit enrichment in South Korea, it would be strictly limited to civilian purposes. Given that the agreement is limited to "peaceful uses," even a revised agreement allowing civilian enrichment would still prohibit producing SSN-related (military) fuel at those facilities. Ultimately, the only realistic approach is to assume U.S. provision of SSN fuel, while supplying it under a separate U.S.–ROK military arrangement distinct from the existing civil nuclear cooperation agreement.

Second, South Korea's planned SSNs would use low-enriched uranium (LEU) fuel rather than highly enriched uranium (HEU). This contrasts with the AUKUS submarines, which use weapons-grade HEU fuel. HEU-fueled submarines have a clear military-technical advantage in that they generally do not require refueling over the submarine's service life of 30–40 years, whereas LEU-fueled submarines typically require refueling about every 10 years—often necessitating cutting open the hull to replace the reactor core. However, it is highly unlikely that the United States would supply South Korea with HEU fuel, given the proliferation risks associated with it.

By the same token, because the AUKUS submarines that the United States and United Kingdom will provide to Australia may conflict with the nonproliferation values that both countries espouse, it is worth investigating the adoption of LEU-fueled reactors. In light of the United States' limited SSN construction capacity and the risk of significant delivery delays, this article proposes that the three countries – South Korea, the United States, and Australia - consider jointly developing and producing LEU-fueled SSNs, taking advantage of South Korea's shipbuilding and reactor-manufacturing capabilities.

Possible Negative Security Impacts on the Region and the Alliance

As expected North Korea criticizes that South Korean SSNs will stimulate an arms race and damage regional stability in Northeast Asia. In a North Korean KCNA commentary dated November 18, 2025, North Korea condemned the SSN plan as a "grave development that would destabilize the Asia-Pacific security environment beyond the Korean Peninsula and lead to an uncontrollable nuclear situation globally." It also criticized the SSN plan as a "stepping-stone toward indigenous nuclear armament," warning of a "nuclear domino effect."

This criticism is difficult to accept. South Korea's SSN initiative is a reactive and defensive measure to an existential threat created by North Korea's nuclear armament and nuclear coercion. Had Pyongyang neither gone nuclear nor threatened nuclear use, Seoul's SSN program would not have been necessary—or politically feasible. China was also critical of South Korea's SSN plan, though governmental responses were rather muted.

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In response to these criticisms, Seoul's position is clear: Its SSNs are primarily for defensive and retaliatory uses against North Korea's nuclear threats; dealing with regional disruptions and supporting regional stability are secondary.

Next, some warn that South Korean SSNs could weaken the U.S.–ROK alliance over time. The claim is that, as strategic priorities between Seoul and Washington diverge, Seoul—armed with greater "strategic autonomy" enabled by SSNs—may drift away from Washington. In fact, the Trump administration seeks greater strategic flexibility for U.S. Forces Korea and a larger China-contingency role for them, while the Lee Jae-myung administration aims to accelerate the transfer of wartime operational control (OPCON)—a goal that requires stronger South Korean capabilities, potentially including SSNs. Thus, they are not an exit ramp from the alliance; SSNs are part of greater burden- and role-sharing intended to free U.S. forces for a regional contingency, as Seoul assumes more security responsibility on the Korean Peninsula by itself.

Most importantly, South Korean SSNs can never substitute for the U.S. nuclear umbrella and extended deterrence toward South Korea. And if Washington's objective is to prevent South Korea from pursuing nuclear weapons, sustaining the nuclear umbrella and extended deterrence remain indispensable. As long as geopolitical competition persists and North Korea continues its nuclear buildup, Seoul and Washington shall maintain an "ironclad alliance" based on the common security interests of preventing war and nuclear use on the Korean Peninsula and in the region, while seeking a nuclear-free Korean Peninsula.

한국의 핵추진 잠수함은 미국의 핵우산과 확장억제를 결코 대체할 수 없다

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