How Enhancing Civil Nuclear Energy Safety Can Benefit the Korean Peninsula

KEY TAKEAWAYS

- Cooperative energy policies could be vital for U.S.-South Korean confidence-building and risk-reduction efforts with North Korea.
- Attempts to reengage North Korea will require close U.S.-South Korea coordination.
- Current tensions create an urgency to explore engagement opportunities.

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BY: Kayla Orta

This essay is part of a series, Pursuing Peaceful Coexistence with North Korea, that explores how the United States and South Korea can peacefully coexist with a

nuclear North Korea.

At the 28th Conference of the Parties to the U.N. Framework Convention on Climate Change in 2023, the United States and South Korea, alongside 18 like-minded countries, endorsed the "Declaration to Triple Nuclear Energy." By joining the initiative, the countries agreed to augment domestic nuclear energy production to fight climate change and to promote the safe application of civil nuclear energy at home and abroad. As tensions on the Korean Peninsula rise and U.S.-North Korea and inter-Korean relations remain at a stalemate, however, this commitment could also inspire potential engagement with North Korea beyond traditional security dynamics.

Cooperation on civil nuclear energy safety, leveraging U.S. nuclear safety standards and South Korea's rising civil nuclear energy industry prowess, could support energy-focused, confidence-building measures with North Korea.

Past U.S.-North Korea Nuclear Energy Cooperation

The United States and its allies have engaged in energy and technical safety cooperation with North Korea in the past. During the 1993-94 nuclear crisis, Washington offered to construct two proliferation-resistant light water reactors in Kumho that would support future cooperation in producing a low-carbon, reliable energy source. This collaborative energy package formed a blueprint for reciprocal exchange, known as the 1994 Agreed Framework, that was designed to incentivize North Korea's denuclearization and foster positive regional transformation.

While some have criticized the agreement as an early policy failure toward North Korea, it facilitated political rapprochement and opened the North Korean economy to investment and infrastructure projects. This cooperation ultimately collapsed due to the pendulum swings of U.S. domestic partisanship and the discovery of North Korea's secret uranium enrichment plant. Nevertheless, a similar provision for civil

nuclear reactors reemerged as an incentive for North Korean denuclearization during the Six-Party Talks (2003-2008). Although North Korea eventually withdrew from the talks, energy cooperation helped advance broader diplomatic engagement for 15 years.

Rationale for Energy Cooperation Today

Despite three decades of U.S. policies focused largely on denuclearization, North Korea is now a de facto nuclear weapons country and continues to expand its nuclear weapons stockpile with minimal constraints. At the same time, North Korea faces chronic energy deficits, with less than 60% of the population having access to electricity. The current tensions on the Korean Peninsula, coupled with North Korea's severe energy needs and broader climate risks, present both urgency and opportunity for the United States, South Korea, North Korea and other relevant partners to begin a conversation on international energy cooperation in areas such as renewables, civil nuclear energy safety, electrical grid infrastructure and climate policy.

> "Cooperative energy policies could play a key role in U.S. and South Korean confidence-building and risk-reduction measures vis-à-vis North Korea."

While North Korean denuclearization remains unlikely in the near term, the United States and South Korea should not let it overshadow other avenues for risk reduction on the Korean Peninsula. In particular, cooperative energy policies — situated at the intersection of intergovernmental diplomacy and industrial know-how — could play a key role in U.S. and South Korean confidence-building and risk-reduction measures vis-à-vis North Korea. The suspected activation of North Korea's Experimental Light Water Reactor underscores the connection between security and energy dynamics, necessitating a more thoughtful analysis of how energy and climate collaboration might facilitate interaction — encompassing nonproliferation, safety and security considerations — among the three nations.

The current North Korea policies of the United States and South Korea ostensibly provide an opening for engagement in areas such as economic growth, food aid, industry cooperation and energy development, though much of this engagement is conditioned on denuclearization progress. After taking office, South Korean President Yoon Suk Yeol offered an "audacious initiative" to strengthen the North Korean economy and better the quality of life for North Korean citizens by enhancing power generation and providing electrical infrastructure assistance contingent upon North Korea embarking on "a genuine and substantive process for denuclearization." Similarly, during the U.S.-South Korea presidential summit in April 2023, President Joe Biden reaffirmed the U.S. commitment to pursuing diplomacy with North Korea and backed South Korea's initiatives, confirming that the United States remains ready to provide humanitarian aid to North Korea if an opportunity for peaceful engagement arises.

In August 2024, Yoon reiterated that South Korea would "keep the door to inter-Korean dialogue wide open" if North Korea were to engage in even low-bar denuclearization negotiations. He also called for the creation of an inter-Korean working group to explore "any issue ranging from relieving tensions to economic cooperation." Critics of the proposal, however, remain concerned that South Korea's new unification doctrine could undercut any potentially positive engagement. While North Korean leader Kim Jong Un continues to reject U.S. and South Korean offers for

diplomatic engagement — turning instead to Russia — if the window for engagement reopens, low-risk avenues of communication and cooperation, such as safety-centric knowledge-sharing, may be an achievable step forward for the three countries.

A Strategy Toward Nuclear Safety and Confidence Building

Any cooperation on civil nuclear energy safety between the United States, South Korea and North Korea should follow three principles: (1) close policy coordination between the United States and South Korea; (2) risk reduction of malpractice, sabotage and accidents; and (3) North Korea's long-term reintegration into global standards for nuclear safety and security.

First, attempts to reengage North Korea on nuclear energy safety require close policy coordination between the United States and South Korea. Both countries would need to start from the same premise: the potential for nuclear accidents in North Korea poses a hazard to the peninsula and Indo-Pacific region at large. The denuclearization impasse should not obstruct preemptive efforts to address the risks of poor safety systems, accidents and radioactive material leakage in North Korean civil nuclear power plant development.

Effective cooperation on North Korea's civil nuclear energy safety will require both U.S. and South Korean expertise. The United States' well-established safety regulations and standards should be utilized as the gold standard baseline for safety enhancements in nonproliferation, security and safety. Moreover, South Korea's localized experience and current industrial knowledge — the country ranked fifth globally in nuclear energy production in 2023 and has rapidly established its own international platform for the export of its APR-1000 nuclear reactor — should be leveraged. The commitment of both countries to the safe, secure and proliferation-resistant growth of nuclear energy worldwide should extend to North Korea.

Second, clear, well-established regulatory systems and training programs can mitigate the risk of malpractice, sabotage and accidents at North Korean nuclear facilities. According to the Nuclear Threat Initiative's 2023 Nuclear Security Index, North Korea ranked last among 46 countries with nuclear facilities in terms of protection against sabotage. In contrast, South Korea today leads globally in nuclear energy production as well as nuclear regulatory capacity building for nuclear development and "nuclear curious" countries. Both the Korea Institute for Nuclear Safety (KINS) and Korea Institute of Nuclear Nonproliferation and Control offer regular trainings, workshops and onsite support, emphasizing safety and security for latecomer nuclear countries. The International Nuclear Nonproliferation and Security Academy — established within KINS to fulfill South Korea's commitments made during the second Nuclear Security Summit in 2012 — has offered training programs to over 500 nuclear security and safety experts from 28 countries.

Historically, North Korea was an early benefactor of South Korea's KINS training programs. In July 2002, KINS hosted 25 North Korean regulators on the fundamentals of nuclear safety prior to the collapse of the Agreed Framework. In the future, South Korea will continue to establish its foothold in the global nuclear energy market for development and export, and ensuring the safety of civil nuclear power production across the Korean Peninsula serves to further promote its domestic expertise.

Third, similar to the Korean Peninsula Energy Development Organization agenda in the 1990s and early 2000s, the end goal of engaging North Korea in a civil nuclear energy safety and security agenda should be to reintegrate North Korea's safety practices into global standards for civil nuclear energy, including International Atomic Energy Agency safeguards. Nuclear safety is a global imperative and should be handled through globally monitored normative frameworks. Short-term gains would center on improving U.S.-North Korea and inter-Korean scientific relations through nuclear safety procedures and training to ensure risk reduction regarding malpractice, sabotage and accidents. The long-term aim, however, must be to bring the development of any potential North Korean civil nuclear energy programs into

alignment with international regulations and standards for safely operating reactors, handling radioactive materials and managing nuclear waste.

Through principled efforts in the three areas mentioned above, U.S. and South Korean engagement with North Korea on civil nuclear energy safety and security would not only aim to make North Korea's framework consistent with global regulatory procedures but also reinforce the United States and South Korea as responsible actors committed to promoting global nuclear safety and security standards.

Conclusion

International efforts to advance peaceful civil nuclear safety standards and technology for North Korea would not only contribute to global endeavors but also furnish a constructive platform for discourse. Within the context of the denuclearization stalemate, such joint efforts could enhance regional stability and showcase the potential of responsible nuclear energy safety on both halves of the Korean Peninsula.

Many difficulties in U.S.-North Korean relations persist. It is often the case that periods of high tension with North Korea provide opportunities for engagement. While denuclearization will likely remain a policy focus for Washington and Seoul, nontraditional confidence- and peace-building measures with North Korea may highlight shared interests and reduce risks on the Korean Peninsula.

Kayla Orta is a senior associate at the Hyundai Motor-Korea Foundation Center for Korean History and Public Policy at the Wilson Center. She is a former U.S. Department of Defense NSEP Boren Scholar to South Korea and the lead editor of Avoiding Meltdowns & Blackouts: Confidence-building in Inter-Korean Engagement on Nuclear Safety and Energy Development *(Wilson Center, 2023).*

PHOTO: South Korean soldiers stand facing North Korea at the Joint Security Area at Panmunjom, in the Demilitarized Zone between North and South Korea, Feb. 7, 2023. (Chang W. Lee/The New York Times)

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