



U.S.-South Korea Nuclear Cooperation: A Pivotal Year

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By Ken Luongo

The United States and South Korea will hold a presidential summit meeting in Washington on April 26. This will be the second meeting between Presidents Joe Biden and Yoon Suk Yeol within a year. It comes at a critical time and is particularly important for righting a listing bilateral relationship on civil nuclear issues. In recent years, this essential area of joint cooperation has encountered major bilateral conflict and has been impacted by new global challenges that are fueling the expansion of the global nuclear reactor market.

Cooperation on Global Imperatives

The U.S.-Korea civil nuclear relationship is being reshaped by five key global imperatives:

- The need for reliable zero-carbon energy
- The growing importance of energy security
- The influence of nuclear geopolitics
- Advances in next-generation nuclear technologies, and
- The importance of maintaining high nuclear governance standards

In the wake of Russia's invasion of Ukraine, energy security has exploded back onto the global agenda as nations flee from dependency on Russian fossil fuels. It is now very clear that energy security is essential for national security. This connection had fallen out of favor as nations walled off energy from security and sought to use it as a commercial means of maintaining peace, particularly with Russia. That policy now has failed.

This development has increased interest in a number of countries in nuclear power, which can provide carbon free and baseload power while decreasing reliance on fossil fuels and supporting the globe's zero-carbon goals.

The increasing demand for nuclear power is occurring in an environment where Russia, despite the Ukraine war, remains the world's top exporter of large nuclear reactors and their fuel. And China has ambitions to rival that position. The nuclear industries in both of these nations are state-owned and financed, and support the geopolitical objectives of their political leadership.

The U.S. is attempting to recover from a period of significantly decreased nuclear export power and political influence in the international nuclear market. It has a strong and mutually dependent relationship with South Korea in this area that needs to remain robust if there is to be a serious response to the advantages offered by Russia and China. However, it is the very expansion of the global nuclear market that is stressing this essential relationship.

Next-generation small modular and advanced reactors are an emerging opportunity to contribute to emissions-free energy. They may have particular applicability in developing economy nations including in Africa, the Middle East, and South Asia. These new

operationally flexible and multipurpose technologies have the potential to meet the new market demands and break the fossil fuel dependencies of many of these emerging economy nations.

But there also is competition from Russia and China in this area. In 2020, Russia and China began operation of moderately-sized nuclear plants, and both see them as an important export technology.

Many of the advanced reactors will use novel or exotic fuel cycles for which the current international nuclear governance system is not prepared. The U.S. and South Korea have issued joint statements asserting that they will cooperate on exports to third countries and work together on next-generation, smaller nuclear technologies.

Much of the emerging nuclear market for smaller reactors includes nations with little preparation for nuclear operations and insufficient infrastructure to produce a qualified and stable work force. The IAEA provides considerable support in preparing nations for new nuclear programs, but deeper support is required for these nations in the development of the institutional, regulatory, non-proliferation, and security infrastructure that is specific to smaller reactors.

There are real dangers in allowing two authoritarian nations to control the nuclear market of the 21st century. The continued effectiveness of the nuclear governance system, especially during a period of nuclear expansion, requires that the U.S. and South Korea strengthen their cooperation as global nuclear suppliers.

Corporate Dispute

Unfortunately, a dispute between America and South Korea's top nuclear companies, Westinghouse and KEPCO, is impeding an effective bilateral nuclear relationship and it needs to be quickly resolved in order to meet the evolving global energy agenda.

This conflict was sparked by the potential sale of reactors to Saudi Arabia. In 2019, it looked like Saudi Arabia was the most viable next market for KEPCO after having successfully provided four of its reactors to the United Arab Emirates.

To pursue the Saudi opportunity, KEPCO informed the U.S. government that it had completely indigenized all components of the APR-1400 and that the reactor was no longer subject to American export controls. This created the current conflict as Westinghouse, backed by the U.S. government, did not agree that all U.S. controlled technology had been eliminated from the Korean reactor.

The problem for KEPCO was, and remains, that the U.S. does not have an agreement for nuclear cooperation with Saudi Arabia. This means that if U.S. controlled technology is in the Korean reactor, it will not be able to sell it to Saudi Arabia until a U.S.-Saudi nuclear cooperation agreement is in place.

A second brake on KEPCO's pursuit of the Saudi nuclear business is an agreement by President Yoon and his predecessor to require strong non-proliferation requirements for any deal. Saudi Arabia has rejected including requirements like adherence to the IAEA safeguards agreement's Additional Protocol as a condition of nuclear supply. Saudi Arabia also has indicated an interest in creating an indigenous uranium enrichment industry, which creates potential nuclear weapons worries. However, the most recent estimates of the Saudi uranium reserve indicate small deposits.

Further fueling the commercial conflict is the market opportunity for large reactor exports to Poland and the Czech Republic. Both nations are pursuing new and expanded nuclear energy as a result of their deteriorated relationship with Russia. Westinghouse and KEPCO have been competing for these new business opportunities and that has created additional irritants in the relationship.

However, the two countries and both companies are too dependent on one another in the civil nuclear field to allow the current cooperation freeze to continue much longer. Some accommodation is necessary because there are serious global issues on which their partnership depends.

Bilateral Cooperation Model

Assuming the Westinghouse-KEPCO issue can be settled, there are four areas where the U.S. and South Korea could collaborate and build partnerships to address growing global opportunities and challenges.

Balancing Market Competition

A fundamental reality is that South Korea is no longer a junior commercial nuclear partner to the U.S., and is a formidable reactor vendor. Both countries have strengths and weaknesses in their nuclear partnership. South Korea's technical prowess has been proven in the UAE, and it also is central to the effective building of American reactors overseas. But South Korea is hobbled to some degree in its unbridled pursuit of international nuclear business because of its dependence on American reactor technology.

There needs to be an incentive-focused approach to reducing the conflict between the major commercial vendors of each nation. They, or a third party, should discuss export opportunities, assess supply chain issues, and identify the strengths and weaknesses of each country and company. This should extend to the emergent field of small modular and advanced reactors. Over the course of the next twenty years, the global market for gigawatt-sized reactors may decrease while small reactor opportunities grow in emerging economy nations.

Non-Proliferation Cooperation

Both countries need to build a clear understanding of their joint commitment to require the nuclear safeguards Additional Protocol as a condition of supply in third countries. The agreement to do this has been codified in two bilateral summit statements, which are political commitments, but are not legally binding. The commitment has caused some distress on the Korean side because it can be viewed as providing an advantage to Russian and Chinese reactors exports, which don't carry that requirement. Defining the parameters and implementation mechanisms of this non-proliferation commitment can alleviate potential political and commercial conflicts.

Further, the two nations should join forces on the development of the nuclear security and safeguards guidelines that will be required for small and advanced reactors that use exotic fuel cycles and commit to building the capacity that is necessary in developing economy nations to operate these reactors.

Renewed Forum for Coordination

The High-Level Bilateral Commission, created by the 2015 U.S.-Korea nuclear cooperation agreement, should evolve to meet present day concerns. This forum was designed to address challenging issues at a high level. But the results to date have been disappointing and the agenda currently is dominated by technical issues resulting from the 2015 nuclear cooperation agreement extension.

One critical issue to address is the actions necessary to dethrone Russia as the dominant global nuclear reactor and fuel exporter while preventing China from replacing it. This may require a range of cooperation including technology partnerships, developing fuel products that can replace Russian offerings, and creating advanced reactor test facilities that now only exist in Russia. It also should include discussions on non-electricity applications of nuclear power including next-generation reactor use for industrial purposes, extension of the fuel processing pilot project created by the nuclear agreement's extension, and non-weapons military nuclear uses including small reactors for base power and naval propulsion.

Nuclear Climate Nexus

The two nations should take a page from the recent French initiative to build an alliance of EU states that advocate for nuclear energy as a climate change and energy security response. This idea should be expanded globally with the joint support of the U.S. and

South Korea. An expanded concept could link the EU nations and others including Canada, the U.K., Japan, and India in a global nuclear alliance supporting zero-carbon power, energy security, and strong nuclear governance.

Conclusion

The Biden-Yoon summit is an important pivot point for reversing the deterioration of what was once a sterling civil nuclear partnership. Reestablishing the strength of this nuclear alliance is essential for addressing climate change, building energy security, upholding high nuclear governance standards, and preventing authoritarian nations from dominating global nuclear trade in this century. The presidents need to take steps to rebalance the partnership when they meet later this month. Perpetuating the current dispute imperils these major global imperatives.

Mr. Ken Luongo is a recognized innovator, entrepreneur, and leader in global nuclear and transnational security policy. He is the founder and president of the Partnership for Global Security (PGS) and the creator of the Global Nexus Initiative. He served as the Senior Advisor to the Secretary of Energy for Nonproliferation Policy and simultaneously at the Department of Energy as the Director of the Office of Arms Control and Nonproliferation, Director of the Russia and Newly Independent States Nuclear Material Security Task Force and Director of the North Korea Task Force.
