



THE PENINSULA

How the U.S. and South Korea Can Power the Globe with Nuclear Energy

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On January 9, 2025, the United States and South Korea signed a [memorandum of understanding \(MOU\)](#) on principles of nuclear export and cooperation that could unlock new dimensions of the partnership and tens of billions of dollars in profit for construction and nuclear industries in both countries. In addition to its clear economic implications, the deal allows for a credible path toward delivering an alternative to Chinese and Russian nuclear offerings and, therefore, has significant geopolitical implications. The deal sets a precedent for an expanded bilateral partnership based on common understandings about nonproliferation, emerging technology, export controls, and the increased demand for nuclear power generation due to the burgeoning AI ecosystem.

In the next decade, nuclear power will play a significant role in satisfying the growing demand for electricity, which [will continue to increase](#) well beyond the capacity that fossil fuels can provide. Even if the [peak demand](#) for oil does not occur in 2030, and even if the move to decarbonize the global economy does not hit the climate targets outlined in the Paris Agreement, electricity production from nuclear energy will likely increase given the growing demand and the amount of ongoing investment and research. Electricity consumption is [expected to rise 4 percent annually](#) from energy-intensive sectors, including transportation and AI data centers. That translates to a doubling in demand over the next twenty years. As a “[plug and play](#)” technology, nuclear power from small modular or traditionally large nuclear plants can connect seamlessly to existing electrical

grids. Some experts suggest that companies could install small modular reactors (SMRs) on the sites of coal plants and connect them immediately to the existing coal-generation grid. Utilizing molten salt reactors could ease retrofits of coal plants to nuclear plants and provide more stability than light-water reactors.

Conservative estimates suggest that the amount of energy produced from nuclear plants could double in the next twenty-five years, and the high-case scenario from the International Atomic Energy Agency (IAEA) suggests a 250 percent increase in nuclear power by 2050 from 416 GWe to over 1000 GWe and provide 25 percent of global electricity production from its current 9 percent. The conservative market value for nuclear power contracts over the next twenty-five years is valued at USD 500–740 billion, representing a substantial economic opportunity for countries such as South Korea with advanced nuclear technology and strong production, research, and construction capacity. Not only does South Korea have capable government-backed research, construction, and operation organizations in Korea Hydro and Nuclear Power (KHNP) and Korea Electric Power Corporation (KEPCO), but it also has companies like Hyundai and Samsung that are capable of building and operating plants domestically and overseas.

South Korea is dependent on imported coal (33 percent of its energy mix in 2023) and LNG (26.8 percent of its energy mix in 2023) to fuel the manufacturing production of semiconductors, batteries, chips, and electric vehicles (EVs). While fossil fuels will continue to power much of South Korea in the near term, sustainable and alternative energy sources are needed to meet the country's carbon neutrality commitments by 2050. During his presidency, Yoon Suk Yeol renewed South Korea's commitment to nuclear power as a domestic energy source and outlined plans to build three new nuclear reactors, increasing nuclear-generated power to 35 percent of the country's energy supply by 2038. Lee Jae-myung, the leading presidential candidate for the Democratic Party ahead of the presidential election in June, has stated his support for nuclear power domestically and as an export. Meanwhile, any potential conservative candidate would likely continue Yoon's policy approach.

South Korea has invested heavily in developing advanced reactors, and its standardized designs reduce construction time by minimizing changes and ensuring smooth project execution. On average, South Korea is able to construct nuclear power plants in fifty-six months, more than three times faster than the global average. In addition to developing traditional and next-generation reactors, including SMRs and high-temperature gas-cooled reactors (HTGRs), South Korean companies are investing in U.S. companies like NuScale Power and TerraPower and will likely provide engineering know-how to U.S. SMR companies. The recent settlement agreement between Westinghouse, KEPCO, and KHNP positions South Korea to more effectively operate in the global market and fulfill contractual obligations for building plants in the Czech Republic and the United Arab Emirates and compete for contracts in Egypt, Finland, Ghana, the Netherlands, Poland, Sweden, and Turkey. In the best-case scenario, the United States would support South Korea's bids and even engage in commercial advocacy to boost its bid over China or Russia. This could look similar to U.S. efforts to support Nokia and other non-U.S. telecommunication organizations globally to counter China's Huawei due to the lack of a practical U.S. alternative. While this could sound counterintuitive in the current Donald Trump administration, the preferred path for the United States—due to the lack of

competitive U.S. alternatives and the economic benefits that would accrue from South Korea-led projects to Westinghouse and other U.S. companies—would be to support South Korea's bids on traditional reactor projects and invest heavily in SMR technology.

The United States is the world's largest producer of nuclear power, accounting for about 30 percent of global nuclear electricity generation. Nuclear power has contributed almost 20 percent of electrical generation in the United States and remains the single-largest contributor to non-greenhouse-gas-emitting electric power in the United States. Despite past success building in the United States and abroad, the export of nuclear reactors has declined in recent years, and U.S. companies now fail in speed and expense to match state-owned enterprises, especially those from China and Russia. Reports indicate that of the ninety reactors expected to be completed worldwide by 2030, only three will be supplied by U.S. companies and ten from South Korea—compared to forty-three from China and twenty-nine from Russia. China and Russia prioritize rapid deployment and cost-effectiveness over stringent safety and security measures. This contrasts with the United States' projects, which emphasize robust nuclear security protocols but also come with cost overruns and delays. Emerging markets that choose Chinese or Russian reactors due to the lack of alternative options may face a heightened risk of accidents or security breaches and, with the forty- to fifty-year production life of a typical reactor, become locked in a decades-long relationship of economic dependency on China and Russia.

South Korea's capabilities, coupled with U.S. research and capital, could answer many of the world's energy demand questions now that the path forward is clear for close cooperation and collaboration. In addition to offering clean energy and energy access to the billions who currently lack such resources, the United States and South Korea could do so while also providing a safer and more geopolitically aligned alternative to China and Russia's offerings.

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