THE NATIONAL INTEREST

Renewable Power for North Korea

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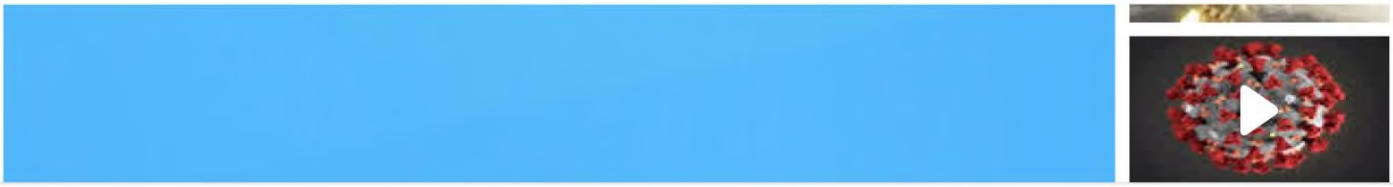

Experts forecast hundreds of tons of old wind turbines, batteries, and solar modules will need to be disposed of or recycled in this decade—and millions of tons by 2050. This could be a potential economic opportunity for North Korea.

by Troy Stangarone Sean Blanco

Earlier this year, controversy broke out in South Korea over reports that the government of Moon Jae-in had considered options for building a nuclear power plant in North Korea. Although the plans had been developed with an eye towards prospective inter-Korean economic cooperation, providing North Korea with nuclear power as an inducement for cooperation raises practical economic concerns in addition to any apprehension the United States and other countries might have in providing North Korea with a working nuclear reactor.

In its deliberations, South Korea considered three potential options for building a nuclear power plant in North Korea. One called for the construction of a South Korean designed light-water reactor in Kumho on the site where the Korean Peninsula Energy Development Organization was set to construct a light-water reactor under the 1994 Agreed Framework. The second option considered building a light-water reactor in the Demilitarized Zone (DMZ), while the final would have provided North Korea power from the South through the resumption of construction on the canceled Shin Hanul-3 and -4 reactors.

North Korea is unlikely to accept dependence on electricity produced through nuclear power in South Korea. Additionally, if North Korea is to be supplied power from South

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Korea there is no specific need for it to be nuclear power as the regime in Pyongyang gains no prestige from being dependent on nuclear power in South Korea.

Constructing a nuclear power plant in the DMZ would raise environmental issues even if it satisfied North Korea's political needs for the plant to be seen on North Korean soil.

Despite offering to build North Korea a light water reactor in the Agreed Framework, the United States and other countries would likely have reservations about providing North Korea with a nuclear power plant. However, if these could be overcome, the construction of a light-water reactor in North Korea would be the most viable option given the realities of the other options considered. Light-water [redacted] among the more proliferation-resistant types of reactors, as long as the facilities of the reactor are not paired with enrichment or reprocessing facilities. However, they may not be the most economically viable option for North Korea's economic development.

With the world increasingly focused on reducing carbon emissions, nuclear power has the potential to play a role in promoting carbon-neutral economic development in North Korea. However, it also comes with drawbacks. The reactor design that would be used in North Korea is estimated to cost $6 billion and likely take five years or longer for construction, delaying power generation necessary for economic development.

While there would be cost and time savings during construction from reusing the Kumho site, treating low and intermediate spent fuel is 2.7 times more expensive in South Korea than in the United States further raising the cost of nuclear power if the spent fuel is not to remain in North Korea.

These constraints on nuclear power in North Korea are significant considerations if one of the objectives is to help rebuild the economy in an efficient manner after the conclusion of any nuclear talks. North Korea will essentially need its entire energy

infrastructure rebuilt, so the question becomes how to quickly, cheaply, and cleanly get power flowing to jumpstart the economy.

In contrast to nuclear power, other renewable energy sources provide North Korea with potentially more affordable, easy-to-build power options. Even Kim Jong-un has stressed the importance of renewable energy for the long term as the country searches for an energy source that isn't vulnerable to sanctions.

Hydropower generation is already a large contributor to North Korea's power output, accounting for approximately 55 percent of its total electricity generation in 2017. The problem with hydropower generation is that the main river systems that drive hydropower generation in North Korea freeze during the winter, which drastically [redacted]mount of electricity available during the winter months. Also, large hydropower stations such as the Huichon Power Plant have struggled to meet output goals, and in any case, North Korea's poor electricity infrastructure makes it infeasible to rely on long-range transmission of electricity from large power plants. Instead, North Korea would do well to continue in its more successful policy of building smaller, hydroelectric power stations that are spread out to satisfy local and regional energy needs.

Following the trend of small, distributed power generation, as of 2019 around 55 percent of households in North Korea are equipped with solar panels, which are used to supplement an unstable power supply from the mostly hydro- and coal-fired national grid. Prices of solar panels have fallen in recent years thanks to an overabundant global supply and increasing North Korea production. North Korea already produces more solar power per year than South Korea, despite its slightly lower solar potential due to its higher latitude and cloudier conditions. Yet there is the potential for more solar generation as solar accounts for just an estimated 0.1 percent of North Korea's generation capacity.

Unlike solar power, North Korea produces more wind power and has significantly more wind power potential than South Korea. Strong winds on North Korea's west coast and its highly mountainous terrain give North Korea

relatively robust potential wind resources. Wind turbines take only two years to install and last for ten years making them fast and affordable. North Korea is already looking to develop large wind turbines, offshore wind power, and large-capacity wind farms with assistance from Russia.

Assisting North Korea in developing its renewable infrastructure could provide South Korea with diplomatic benefits, but could also complement Seoul's efforts to develop hydrogen as a renewable source. At the moment, South Korea's hydrogen ambitions are constrained by the usage of hydrogen produced with fossil fuels. In a joint development project, excess renewable energy could be repurposed to produce green hydrogen to support South Korea's hydrogen efforts.

[redacted]ding a light-water reactor were politically tenable, then North Korea would benefit more from improving its existing non-nuclear renewable infrastructure than building a nuclear power plant. Focusing on small power stations in hydro, solar, or wind would be cheaper and faster to build while being more reliable in satisfying local and regional energy needs due to North Korea's poor electricity infrastructure. On another note, if North Korea were to focus efforts on non-nuclear renewable energy, then this would provide Pyongyang with the potential to form a niche in recycling renewable sources and in disposing of renewable waste. Experts forecast hundreds of tons of old wind turbines, batteries, and solar modules will need to be disposed of or recycled in this decade—and millions of tons by 2050. This could be a potential economic opportunity for North Korea.

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