



## Consequences of Reining in Korea's Civil Nuclear Industry and Capabilities

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Inside the U.S. nuclear energy industry, there is a high level of respect and admiration--along with a barely suppressed tinge of jealousy--for the way that the Republic of Korea (aka South Korea) has steadily developed its world class nuclear power plant manufacturing and construction industry.

Starting from zero operating plants in the mid 1970s, [South Korea](#) now has 28 units that reliably supply one third of its electricity. Before the current presidential administration assumed power in May, the country's energy plans called for a continued building program to increase that number to 38 units by 2029.

South Korea's nuclear industry has gained international prominence. It has successfully competed for overseas contracts with the most visible one being a \$20 billion dollar construction contract for four APR-1400 reactors in the UAE. Successful progress on that construction project was a factor in winning a contract to operate the facilities, [valued at nearly \\$50 billion](#) over a 60 year period.

In May, the Emirates Nuclear Energy Corporation announced that it had completed construction on the first unit within the initially budgeted cost and schedule. In early July, there were [news reports](#), perhaps a bit premature, indicating that the U.K.'s NuGen project at the Moorside Nuclear Power Station might be shifting from Westinghouse AP1000 to Korea Hydro and Nuclear Power (KHNP) APR-1400 reactors.

### South Korea is a Unique Example of Positive Learning in Nuclear

With the consistent backing of the government and a highly organized network of suppliers providing materials and components to KHNP, the South Korean nuclear enterprise has achieved remarkable success. Unlike almost every other country, it has steadily increased its capability, trained new workers, refined manufacturing techniques, learned how to schedule complex projects--even in distant lands like the United Arab Emirates--and managed to deliver final products that work on a schedule and within a budget.

According to a [recent study](#) led by Jessica Lovering, the Director of Energy at the

Breakthrough Institute, the South Korean method of steady learning and improvement worked.

"Overall, from the first reactor in Korea in 1971, costs fell by 50%, or an annual rate of decline of 2% for the entire Korean nuclear construction history. This is in sharp contrast to every other country for which we present cost data."

And

"The latest experience in South Korea, with its standardized design and stable regulatory regime, suggests the possibility of learning-by-doing in nuclear power."

That success is not surprising to anyone who understands the importance of practice, steady effort, predictable investments and growing sophistication in an environment where the government and the public are generally supportive instead of antagonistic.

#### Worrying Increase in Antinuclear Activities

South Korea's nuclear energy successes are now at risk as actions are currently being taken to move from a reliance on nuclear and coal to reliance on natural gas and renewables.

Since the great Northeast Japan earthquake and tsunami on March 11, 2011, there has been an increasingly vocal movement that is resisting the continued development of nuclear power plants and is even agitating for efforts to close and destroy plants that are already completed and not even close to the natural end of their operating lives.

Growing antinuclear sentiment in Korea was embodied during the recent Korean special elections in an [agreement among seven leading presidential candidates](#) to oppose new nuclear construction should they be elected. The agreement included language on halting new construction, letting existing plant licenses expire without renewal, and stopping new nuclear plant construction, including work on units that were already partially completed.

Perhaps buttressed by such attitudes towards nuclear, the current government has announced plans to achieve "nuclear zero" by 2060, in addition to closing coal plants. Pledges have been made [to replace energy currently provided by coal and nuclear](#) by increasing both natural gas and renewable electricity generation.

#### Risk of Choking Off Domestic Nuclear Energy

Such developments may quickly reverse the progress that the Korea Electric Power Corporation (KEPCO) has achieved in learning how to build large nuclear plants. In June, KHNP was ordered to stop construction work on Shin-Kori units 5 and 6 for at least three months pending a review of public attitudes about the nuclear program.

Construction planning and licensing efforts for another four planned units have also been halted. Those moves have been [met with resistance](#), especially from the labor unions representing the construction workers whose jobs have been eliminated, from the companies whose contracts have been interrupted, and from the residents in the vicinity of the new plants who were promised a sustained stream of revenue in exchange for agreeing to host the new generating plants.

If the ROK stops building reactors at home, it will have substantially more difficulty maintaining its ability to successfully export the technology.

That prospect might bring cheer to competitive nuclear plant suppliers in China, Russia, France and the U.S., but it would remove an attractive supply option for a number of interested

customers. Current financial pressures and delivery difficulties for Toshiba, Westinghouse and Areva might winnow the global supply choice for large reactors to just two--Russia and China.

If South Korea exits the international market, it would lose part of its growing influence on international nuclear supplier norms and safety culture.

If a shift away from nuclear energy production is implemented as envisioned, it will result in a South Korea that is increasingly dependent on natural gas supply from Russia through North Korea and on imports of liquefied gas. That situation would have rippling effects through both the energy industry and world geopolitics.

Natural gas industry suppliers would love to profit from increased sales to South Korea. The increased demand will help keep world prices high and profitable while every commodity business enjoys situations that increase their sales volume.

There are interests in Russia, North Korea and China that would like to build more links binding South Korea to their fuel exports, making the government less willing and able to cooperate with the United States. There are also multinational energy interests headquartered in the United States that would benefit from increased sales of LNG and the increase in global demand for their product.

No matter how often or how loudly natural gas promoters claim that their product is "low carbon," chemistry dictates that burning it to generate electricity releases 40 times as much CO<sub>2</sub> per unit energy over its life cycle as using nuclear fission.

It is incumbent on the people that appreciate the benefits of South Korea's well-developed and well-positioned nuclear industry to make their voices heard during this present critical period of national discussion. The substantial long term risks of phasing out nuclear must be considered before fundamental and comprehensive changes are made to Korea's energy policy.

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**Mr. Rod Adams** is Publisher and Writer of [Atomic Insights](#), a blog that discusses atomic energy, the competitors to atomic energy, radiation, the risks and benefits of using nuclear technology, the hazards of avoiding the use of nuclear technology, and a variety of other topics associated with atomic technologies. Mr. Adams is an atomic energy expert with small nuclear plant operating and design experience, as well as experience as a financial, strategic, and political analyst. He is a former submarine Engineer Officer, and Founder of Adams Atomic Engines, Inc. Any views or opinions expressed above are his own.

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